



Awel y Môr Offshore Wind Farm

Category 6: Environmental Statement

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Volume 1, Annex 3.1	Cumulative Effects Assessment
Volume 1, Annex 3.2	Transboundary Screening

Glossary of terms

TERM	DEFINITION
Development Consent Order (DCO)	An order made under the Planning Act 2008 granting development consent for a Nationally Significant Infrastructure Project (NSIP) from the Secretary of State (SoS) for Business, Energy and Industrial Strategy (BEIS).
Design envelope/ Maximum Design Scenario (MDS)	The maximum design parameters of the combined project assets that result in the greatest potential for change in relation to the impacts assessed.

Acronyms and abbreviations

TERM	DEFINITION
AyM	Awel y Môr Offshore Wind Farm
AyMOWFL	Awel y Môr Offshore Wind Farm Limited (the Applicant)

TERM	DEFINITION
BEIS	Department for Business, Energy and Industrial Strategy
BSI	British Standards Institute
CEA	Cumulative Effects Assessment
Cefas	Centre for Environment, Fisheries and Aquaculture Science
CIEEM	Chartered Institute of Ecology and Environmental Management
COWRIE	Collaborative Offshore Wind Research into the Environment
DCO	Development Consent Order
DECC	Department of Energy and Climate Change
DMRB	Design Manual for Roads and Bridges
EEA	European Economic Area
EIA	Environmental Impact Assessment
EMF	Electromagnetic Field
ES	Environmental Statement
GyM	Gwynt y Môr Offshore Wind Farm
HSE	Health and Safety Executive
IEEM	Institute of Ecology and Environmental Management
IEMA	Institute of Environmental Management and Assessment
LSE	Likely Significant Effect
MDS	Maximum Design Scenario
NRA	Navigation Risk Assessment
NSIP	Nationally Significant Infrastructure Project
PEIR	Preliminary Environmental Information Report

TERM	DEFINITION
PINS	The Planning Inspectorate
SoS	Secretary of State (for BEIS)
UNECE	United Nations Economic Commission for Europe
WHO	World Health Organisation

3 Environmental Impact Assessment Methodology

3.1 Introduction

- 1 The Awel y Môr Offshore Wind Farm (hereafter referred to as AyM) is being developed by Awel y Môr Offshore Wind Farm Ltd. (AyMOWFL) (hereafter referred to as 'the Applicant'). This chapter describes the assessment methodology used throughout the Environmental Impact Assessment (EIA) to identify and evaluate the potential impacts associated with the development of AyM. It outlines the overall assessment approach for determining the Likely Significant Effects (LSEs) of AyM on the receiving environment. Information on topic-specific methodologies, including surveys, is presented within the methodological sections of the relevant chapters and/ or supporting documents of this Environmental Statement (ES).
- 2 The EIA assessment uses a systematic, evidence-based approach in order to evaluate and interpret the potential impacts and subsequent effects of the proposed development on sensitive physical, biological and human receptors. This document has been prepared in accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017ⁱ (EIA Regulations 2017), of relevance to Nationally Significant Infrastructure Projects (NSIPs), and the Marine Works (Environmental Impact Assessment) Regulations 2007ⁱⁱ, of specific relevance to marine licensing under the Marine and Coastal Access Act (MCAA) 2009 in Welsh waters. These regulations are collectively referred to as 'the EIA regulations', which require developers to provide a '*... description of the likely significant effects on the factors specified in regulation 5(2) [which] should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the developments*ⁱⁱⁱ.'

ⁱ <https://www.legislation.gov.uk/ukxi/2017/572/contents/made>

ⁱⁱ <https://www.legislation.gov.uk/ukxi/2007/1518/contents/made>

ⁱⁱⁱ Schedule 4, paragraph 5 of the EIA Regulations 2017.

3.2 Statutory and policy context

- 3 EIA is a widely-used tool for identifying the potential impacts of new developments and it is intended to provide decision-makers with an understanding of the probable environmental consequences of a proposed project and thereby facilitate the making of more environmentally-sound decisions. Further detail on the need for EIA is set out in Volume 1, Chapter 2: Policy and Legislation (application ref: 6.1.2).
- 4 The EIA has been carried out in accordance with the legislation mentioned above and also draws upon a number of additional policy, guidance and best practice documents, which are described below:

▲ Planning Inspectorate (PINS) Advice Notes

- Advice Note Three: EIA Consultation and Notification (PINS, 2017a);
- Advice Note Seven: Environmental Impact Assessment Process, Preliminary Environmental Information and Environmental Statements (PINS, 2020b);
- Advice Note Nine: Rochdale Envelope (PINS, 2018a);
- Advice Note Ten: Habitat Regulations Assessment relevant to Nationally Significant Infrastructure Projects (PINS, 2017b);
- Advice Note Eleven: Working with public bodies in the infrastructure planning process (PINS, 2017c);
- Advice Note Twelve: Transboundary Impacts and Process (PINS, 2020c);
- Advice Note Seventeen: Cumulative Effects assessment (PINS, 2017d); and
- Advice Note Eighteen: The Water Framework Directive (PINS, 2017d).

▲ National Policy Statements

- Overarching National Policy Statement for Energy (EN-1) (Department of Energy and Climate Change (DECC), 2011a);
- National Policy Statement for Renewable Energy Infrastructure (EN-3) (DECC, 2011b); and
- National Policy Statement for Electricity Networks Infrastructure (EN-5) (DECC, 2011c).

▲ Draft National Policy Statements

- Draft Overarching National Policy Statement for Energy (EN-1) (Department of Business, Energy & Industrial Strategy (BEIS), 2021);
- Draft National Policy Statement for Renewable Energy Infrastructure (EN-3) (BEIS, 2021); and
- Draft National Policy Statement for Electricity Networks Infrastructure (EN-5) (BEIS, 2021).

▲ Industry EIA Guidance Documents

- Assessment of the environmental impact of offshore wind farms (OSPAR, 2008);
- Offshore Wind Farms: Guidance Note for Environmental Impact Assessment in Respect of Food and Environment Protection Act 1985 and Coastal Protection Act 1949 requirements (Cefas, 2004);
- Cumulative Impact Assessment Guidelines – Guiding Principles for Cumulative Impact Assessment in Offshore Wind Farms (RenewableUK, 2013); and
- Guidelines for data acquisition to support marine environmental assessments of offshore renewable energy projects (Cefas, 2012).

▲ Professional EIA Guidance Documents

- Guidelines for Environmental Impact Assessment (IEMA, 2004);
- Guide to Shaping Quality Development (IEMA, 2016);
- Delivering Proportionate EIA, a Collaborative Strategy for Enhancing UK Environmental Impact Assessment Practice (IEMA, 2017);
- Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal (CIEEM, 2016);
- Guidelines for Ecological Impact Assessments in Britain and Ireland: Marine and Coastal (IEEM, 2010); and
- Guidelines for Landscape and Visual Impact Assessment 3 (Landscape Institute and IEMA, 2013).

5 Each technical assessment also refers to a range of specific guidance documents in order to frame and undertake their assessments, which is set out as appropriate within the topic-specific onshore and offshore ES chapters (Volumes 2 and 4 of the ES, respectively).

3.3 Consultation

- 6 A draft EIA methodology was provided within the AyM Scoping Report (Innogy, 2020). The feedback received within the Scoping Opinion (PINS, 2020) on the EIA methodology is provided in Table 1 together with how those comments have been addressed.
- 7 On receipt of the Scoping Opinion (PINS, 2020), agreement was sought with stakeholders on the scope of each of the technical topic assessments through consultation, including via the Evidence Plan process (see also Section 3.4.2).

Table 1: Summary of consultation relating to EIA methodology.

DATE AND CONSULTATION PHASE/ TYPE	CONSULTATION AND KEY ISSUES RAISED	SECTION WHERE COMMENT ADDRESSED
<p>Scoping Opinion (PINS, 2020)</p>	<p>The Environmental Statement (ES) should include an assessment of cumulative effects for all aspects and matters where significant effects are likely to occur. The assessment of cumulative effects should not be limited to one particular development type and should instead focus on the potential for overlapping impacts and LSEs.</p> <p>The Inspectorate encourages the use of the advice contained in its Advice Note 17 regarding the approach to the assessment of cumulative effects.</p>	<p>Each EIA topic includes a Cumulative Effects Assessment (CEA) in its respective ES chapter. The methodology for the CEA is described within this document in Section 3.7, and in detail within Volume 1, Annex 3.1: Cumulative Effects Assessment (application ref: 6.1.3.1).</p>

DATE AND CONSULTATION PHASE/ TYPE	CONSULTATION AND KEY ISSUES RAISED	SECTION WHERE COMMENT ADDRESSED
Scoping Opinion (PINS, 2020)	The Inspectorate expects the ES to include a chapter setting out the overarching methodology for the assessment, which clearly distinguishes effects that are 'significant' from 'non-significant' effects. Any departure from that methodology should be described in individual aspect assessment chapters.	The EIA methodology is described in detail in this chapter (Volume 1, Chapter 3). The precise methodology for determining the significance of effect is described within Section 3.6.
Scoping Opinion (PINS, 2020)	The Applicant should make use of appropriate guidance (e.g., that referenced in the Health and Safety Executives (HSE) Annex to Advice Note 11) to better understand the likelihood of an occurrence and the Proposed Development's susceptibility to potential major accidents and hazards.	The approach to the assessment of the development's susceptibility to major incidents and disasters is described in Section 3.10.2 of this document.

DATE AND CONSULTATION PHASE/ TYPE	CONSULTATION AND KEY ISSUES RAISED	SECTION WHERE COMMENT ADDRESSED
Scoping Opinion (PINS, 2020)	The Inspectorate recommends that the ES should identify whether the Proposed Development has the potential for significant transboundary effects and if so, what these are, and which European Economic Area (EEA) States would be affected.	The approach to transboundary effects is described in Section 3.9 of this document. A transboundary screening of the likely significant transboundary effects has been undertaken in Volume 1, Annex, 3.2: Transboundary Screening (application ref: 6.1.3.2). Each EIA topic chapter contains a consideration of potentially significant transboundary effects, where these have been screened in.
Scoping Opinion (PINS, 2020)	The Scoping Report seeks to scope out transboundary impacts for some aspects of the environment. The Inspectorate has not yet conducted its own transboundary assessment and accordingly does not agree to scope these aspects out at this stage.	

3.4 Key principles of the EIA

3.4.1 The Environmental Statement

- 8 The AyM development team responsible for the production of this ES is being led by RWE, with the assistance of lead EIA consultants GoBe Consultants Ltd. and their team of technical specialist sub-consultants. Additionally, Burges Salmon LLP is providing specialist legal advice throughout the process.
- 9 GoBe Consultants' EIA activities are accredited by the Institute of Environmental Management and Assessment under the EIA Quality Mark Scheme, which demonstrates GoBe's commitment to ensuring EIAs are undertaken at a high quality and in accordance with best practice.
- 10 The ES provides an assessment of the predicted environmental impacts arising from AyM, using the most contemporary data at the time of the assessment.
- 11 The potential environmental effects of AyM have been assessed for each relevant topic as agreed through scoping and subsequent consultation, by comparing the baseline environmental conditions with the expected conditions that will prevail if AyM is developed. The baseline environment has been determined through studies and surveys as agreed through consultation with the relevant stakeholders.
- 12 The assessments for each topic form separate chapters within the ES and for each chapter, the following are considered:
 - ▲ **Statutory and policy context:** Provides a summary of the relevant legislation and policy that has been taken into account in assessing each individual topic;
 - ▲ **Consultation:** Provides a summary of the consultation responses received to date from statutory and non-statutory consultees through scoping, the Evidence Plan process (described in detail in Section 1.3 of Volume 8, Chapter 2: Evidence Plan Report (application ref: 8.2)) and direct industry consultation;

- ▲ **Scope and methodology:** Provides detail confirming the extent of the study area, describing the baseline data sources and survey methodologies, and the topic-specific detail on the approach to assessment;
- ▲ **Baseline environment:** Provides a description of the existing environmental baseline condition, drawing on the relevant data sources, as well as a description of the anticipated evolution of the baseline over the lifetime of AyM;
- ▲ **Key parameters for assessment:** Provides a summary of the potential impacts and the maximum design scenarios assessed for each;
- ▲ **Embedded mitigation:** Provides detail on any mitigation measures or commitments that have been identified and adopted as part of the evolution of the project design of relevance to the topic;
- ▲ **Environmental assessment:** Presents an assessment of the significance of any identified effects (during construction, operation and decommissioning), taking account of the magnitude of impacts, sensitivity of receptors, any embedded mitigation, identification of any further mitigation measures required, and an assessment of the confidence in the conclusions of that assessment;
 - Identification of residual effects, taking into account further mitigation (where necessary) and/ or monitoring requirements;
- ▲ **Cumulative effects assessment:** Provides an assessment of any cumulative effects arising from interaction between AyM and other plans, projects or activities (discussed in Section 3.7);
- ▲ **Inter-related effects:** Provides an assessment of the potential for, and significance of, any project lifetime effects on the topic throughout multiple phases, and receptor-led effects resulting from several different effects upon the same receptor (discussed in Section 3.8); and
- ▲ **Transboundary effects:** Provides an assessment of any impacts arising from AyM on the environment of other countries (discussed in Section 3.9).

3.4.2 Evidence-based approach

- 13 The evidence-based approach to EIA involves not only utilising data collected specifically for the purposes of the development but also data and information from other relevant investigations to inform the understanding of the baseline and/ or impact assessments for the development that is the subject of the EIA.
- 14 AyM will be adjacent to the existing Gwynt y Môr offshore wind farm (GyM). Extensive data from the EIA process and baseline and post-construction monitoring for GyM are available which provide both raw data and also modelling that can be used to help inform the assessments for AyM. Where possible, appropriate, and agreed with the relevant stakeholders, the Applicant intends to use this existing data to:
 - ▲ Aid in the characterisation of the baseline environment, where data is sufficient and appropriate to do so;
 - ▲ Scope out impacts where there is a clear evidence base; and
 - ▲ Provide evidence for assessments where impacts are scoped in.
- 15 The use of this existing data is encouraged as part of the offshore wind industry's response to government drivers to reduce the cost of offshore wind energy, such as those outlined in the Offshore Wind Industrial Strategy: Business and Government Action (BEIS, 2013). Collaborative Offshore Wind Research into the Environment (COWRIE) has provided best practice principles for documentation and dissemination of data (COWRIE, 2008).
- 16 Each topic chapter will identify where the data used for the baseline and the assessments are sourced from to inform the EIA. A gap analysis has been undertaken to identify the requirement for additional data to be collected. Each topic chapter provides the methodology for any new data collections (if required) including surveys. Appropriate data collection methods have been undertaken for the purposes of the EIA, which has enabled the receiving environment to be robustly characterised. Further surveys post-consent will only be required to inform detailed design. The Evidence Plan provides details of datasets agreed with stakeholders for the purposes of characterisation and assessment for each of the technical expert panels.

3.4.3 Proportionate EIA

- 17 Over time, EIA practice has become more complex and has resulted in large volumes of information that consider every conceivable impact, rather than focusing on the impacts that are considered to result in LSEs, which is the ultimate requirement of the European Council Directive 2014/52/EU (the 'EIA Directive') and the EIA Regulations. As a result, many EIAs have become unfocused, with their key findings becoming diluted or unclear. As noted by the UK's professional body for EIA, the Institute of Environmental Management and Assessment (IEMA) in its 2017 report (IEMA, 2017), the need for delivering proportionate EIA is a key issue for the UK planning and consenting system for regulators and developers alike.
- 18 IEMA noted '... the drive for improved quality in EIA, combined with the UK's evidence-based and precautionary approach, has led to substantial challenges for the future of the practice. The increased complexity of multi-faceted decisions and wider range of stakeholders who seek transparency and clear audit trails, has further compounded the problems. The combined impact of the above good intentions has often led to individual EIAs being too broadly scoped and their related Environmental Statements to be overly long and cumbersome.'
- 19 An unwieldy or disproportionate EIA can make understanding the key environmental impacts of a proposed development difficult and can make the findings inaccessible to decision-makers and the public, creating confusion and potentially adding undue delay.
- 20 Additionally, PINS Advice Note Six: Preparation and Submission of Application Documents (PINS, 2020a) encourages applicants to think about the size of documents submitted with duplication and superfluous content discouraged. ESs are welcomed that are proportionate to the scale and complexity of the EIA undertaken, although it is appreciated that for Nationally Significant Infrastructure Projects (NSIPs), such documentation will comprise several volumes.

3.4.4 The design envelope approach

- 21 The EIA, in line with PINS Advice Note Nine: Rochdale Envelope (PINS, 2018a), is based on identifying the Maximum Design Scenario (MDS) for each impact assessed. This approach ensures that the scenario that would result in the greatest impact (e.g., largest footprint, longest exposure, or largest dimensions) is considered. Unless otherwise identified it can then be assumed that any other (lesser) scenario for that impact would result in no greater significance than that assessed in the EIA.
- 22 The design information is based on the best available information and the parameters outlined in the project description chapters are realistic and considered estimations of future design parameters. Therefore, each chapter will assess the 'realistic worst-case' scenario for each of the identified potential impacts, referred to as the MDS.
- 23 This approach is particularly relevant for large-scale developments involving complex engineering and multi-year development programmes (including offshore wind) where it is not possible to identify the exact components to be used within the final development, as it provides for flexibility in design and construction within maximum extents and ranges assessed within the EIA. Therefore, the consent permits the use of any components so long they are within the MDS assessed, rather than limiting the development to existing technology at the time of assessment, which may not be economically viable or feasible dependant on available components at the point of construction. This is of particular relevance to offshore wind development, where the technology is constantly improving, with larger and more efficient turbines being developed.

24 The MDS for each topic and the assessment of potential impacts are derived from the options for each parameter outlined in the Onshore and Offshore Project Description chapters (Volume 2, Chapter 1 (application ref: 6.2.1) and Volume 3, Chapter 1, (application ref: 6.3.1), respectively). Drawing on this information, each topic-specific chapter contains a tabulated description of the MDS for each of its impacts assessed. For example, the foundation type representing the MDS for loss of habitat in terms of benthic ecology would be the foundation type with the largest physical footprint, whereas for underwater noise effects on marine mammals, monopile foundations installed using pile driving would represent the MDS. As described in Section 3.4.2 above, the use of existing data and site-specific survey has enabled an adequate characterisation of the receiving environment to enable a robust assessment to be undertaken against a realistic worst-case 'Rochdale Envelope' approach to project design. Post-consent, further survey work including site investigation will be required to inform the final detailed design pre-construction.

3.4.5 Commitments and embedded mitigation

25 EIA is an iterative process and is used to inform the development of the final project design. Where the preliminary assessments identify unacceptable likely significant effects, changes to the design can be made and/ or embedded mitigation measures can be built-in to the proposed development to reduce these effects. The assessment is then repeated for the revised MDS until:

- ▲ The effect has been reduced to a level that is not significant in EIA terms; or
- ▲ No further changes may reasonably be made to the development parameters in order to reduce the magnitude of the impact, thereby permitting the presentation of an effect that is still significant in EIA terms.

26 The EIA Regulations 2017, Schedule 4, require that 'a description of the measures envisaged to avoid, prevent, reduce or if possible, offset any identified significant adverse effects on the environment' should be included within the ES.

- 27 Where changes are required to be made to the design of AyM during the iterative EIA process, these measures will be clearly identified within relevant ES chapters. The clear inclusion of these measures within the ES demonstrates the commitment of the Applicant to these measures. Where required, these measures will be secured by the Development Consent Order (DCO) and/ or the marine licence. This ensures that the significance of the effect presented for each identified impact may be presumed to be representative of the maximum residual effect that AyM will have, should it be approved and constructed.
- 28 Additionally, all mitigation measures are clearly identified within Volume 8: Document 11: Schedule of Mitigation (application ref: 8.11) which provides a summary of all the enhancement and mitigation commitments proposed and agreed pre-application (see also Section 3.6.4).

3.5 Characterisation of the existing environment

- 29 Characterisation of the existing environment has been undertaken to determine the baseline conditions in the area covered by AyM and relevant, surrounding, topic-specific study areas. This characterisation includes usage of readily-available information from desktop studies, consultation and, where it is required, site-specific surveys, including existing survey material and data from the adjacent GyM. The available data are reviewed to ensure they are robust and can underpin the required level of assessment in order to determine the significance of any potential effect with sufficient confidence.
- 30 The specific approach to establishing a robust baseline (upon which impacts can be assessed) is set out within each topic-specific assessment chapter of the ES. Where, through discussion with regulators and technical groups, further data is required, the scope and scale of surveys have been agreed prior to such survey work being carried out (where possible).

- 31 Schedule 4, paragraph 3, of the EIA Regulations 2017 requires that an outline of the likely evolution of the baseline, in the absence of the development (as far as this can be assessed 'with reasonable effort' based on available information and scientific knowledge) is provided. Each technical assessment sets out the anticipated evolution of the baseline that is predicted to occur over the time between the point of assessment and the time over which AyM will be built and operational. This reflects changes in the baseline that might be expected from natural variation (e.g., natural changes in habitat condition etc.) and other external factors in the absence of AyM.
- 32 Limitations with the data collected to inform the baseline are described in each technical assessment chapter, setting out clearly where either the data itself, or any subsequent subjective evaluation may introduce error. An explanation on how data limitations were managed or commentary on confidence levels is included. Key data limitations with the baseline data, and their ability to materially influence the outcome of the EIA, are noted and commented on in relevant chapters.

3.6 Assessment of effects

- 33 Throughout the AyM EIA, the term 'impact' is used to define a change to the receiving environment resulting from a project 'action', this can be direct, indirect, secondary, cumulative, inter-related or transboundary. They may also be adverse, beneficial or result in no change at all. Impacts are described in relation to the receiving environment, which is described as the receptor (or series of receptor groups). The result of an impact on a receptor is termed the 'effect'. For example, pile driving during construction (action) may result in a temporary increase in underwater noise levels during construction (impact) and cause fish and marine mammals (receptors) to experience temporary disturbance (effect).
- 34 Within the EIA, effects are described in terms of their 'significance', which takes into account the 'magnitude' of an impact, combined with the 'sensitivity' of the relevant receptors, in line with defined criteria. The following sections describe these steps in more detail, and it should be noted that each topic chapter describes the specific criteria for that topic, as well as where and why there are any deviations from industry assessment guidance.

- 35 As set out in various widely-used methodologies (e.g., Design Manual for Roads and Bridges (DMRB) (Highways England, 2020) and the British Standards Institute (BSI) PD 6900: 2015 Environmental Impact Assessment for Offshore Renewable Energy Projects – Guide (BSI, 2015), most technical topics will assess the likely significance of an effect using the methods described in the sections below and using the matrix illustrated in Table 2.
- 36 For some topics, the significance of an effect is established by comparing the magnitude of an impact with a quantified standard. In this instance, the quantified standard is in turn based on a level at which recognised effects are triggered (e.g., sleep disturbance for airborne noise). Such topic-specific methodologies followed are described in detail within the relevant assessment chapters as carried out by suitably qualified technical experts.
- 37 The methodology used broadly across the EIA is overarching guidance to technical authors to enable a consistent approach that outputs comparative results, whilst retaining topic-specific assessment guidelines and allowing a degree of expert judgement.

3.6.1 Assessing the magnitude of impact

- 38 The magnitude of an impact depends on a range of important factors:
- ▲ Spatial extent – the geographical extent over which the impact occurs. For example, is the impact spatially limited to the footprint of the project, or are there other factors that extend the impact beyond this?
 - ▲ Temporal extent – the duration over which the impact occurs. For example, is this limited to a brief construction period or will the impact occur over the lifetime of the project?
 - ▲ Frequency of occurrence – is the impact limited to one occurrence or will it occur repeatedly over the duration of the project?
 - ▲ Severity – what is the expected degree of change relative to the baseline?

39 Based on the criteria above, the magnitude of an impact is assessed as being within one of the groups below, and is also assigned a direction of 'adverse' or 'beneficial':

- ▲ Negligible;
- ▲ Low;
- ▲ Medium; or
- ▲ High.

40 Each topic area presents a 'magnitude of impact' table within the assessment chapter, which presents how the magnitude of impact is defined based on topic-specific criteria.

3.6.2 Assessing the sensitivity of receptors

41 The sensitivity of a receptor, or group of receptors, is dependent on its tolerance to change and its ability to recover from being impacted. The sensitivity of a receptor can therefore be determined by the following factors:

- ▲ Adaptability – the degree to which a receptor can avoid or adapt to an impact;
- ▲ Tolerance – the ability of a receptor to accommodate a temporary or permanent change;
- ▲ Reversibility and recoverability – the extent to which a receptor will recover following an impact;
- ▲ Value and importance – a measure of the importance of a receptor in terms of its relative ecological, social or economic value or status.

42 The sensitivity of a receptor is defined within each topic on the following scale:

- ▲ Negligible;
- ▲ Low;
- ▲ Medium; or
- ▲ High.

- ▲ Each topic area presents a 'sensitivity of receptors' table within its assessment chapter, which contains information on how the sensitivity is determined for its receptors based on topic-specific criteria.
- 43 In some assessments, for example the Navigation Risk Assessment (NRA) for shipping and navigation, the probability of an impact occurring is taken into account rather than the sensitivity of receptors. Where topic-specific methodology is used, following industry guidance, this is clearly explained within the methodology section of topic assessment chapters.

3.6.3 Determining the significance of effects

- 44 The significance of an effect, either adverse or beneficial, is determined using a combination of the impact magnitude and receptor sensitivity. A matrix approach is used throughout the EIA to ensure a consistent and comparable approach. The terms assigned to categorise the significance of effects are described in Table 2 below, which also illustrates the assessment matrix for determining effect significance. The impact magnitude is combined with the receptor sensitivity to determine the significance of effect.
- 45 Any effect that is concluded to be of moderate or major significance is deemed to be 'significant' in EIA terms. Effects concluded to be of negligible or minor significance are deemed to be 'not significant' in EIA terms.

Table 2: Deriving the level of significance of an effect.

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

3.6.4 Determining the requirement for additional mitigation and monitoring

- 46 Section 3.4.5 above describes the process and importance of embedding mitigation measures within the design of the project and how this has been incorporated into the assessment. Where the assessment determines significant effects accounting for embedded mitigation, further mitigation measures may be required. Through consultation and agreement with stakeholders, the need for monitoring may also be required to validate the conclusions of the assessment or the effectiveness of mitigation.
- 47 If required, additional mitigation measures will be outlined in the topic chapters. The extra mitigation measures may be deemed necessary where:
- ▲ An effect is significant in EIA terms, even with embedded mitigation, but additional mitigation measures are available to reduce the level of effect; or
 - ▲ Mitigation has been proposed but has not yet been agreed with regulators, stakeholders, etc. or it is unproven.
- 48 Where relevant, these additional mitigation measures are outlined in the topic chapters, after the assessment of significance section.

3.7 Cumulative effects assessment

- 49 The methodology for the CEA, including a longlist of projects that are considered within the CEAs for each topic, is described in detail within Volume 1, Annex 3.1: Cumulative Effects Assessment.
- 50 A CEA is required under the EIA Regulations 2017 (Schedule 4, Paragraph 5(e)). Cumulative effects are defined as those effects on a receptor that may arise when the development is considered together with other existing and/ or approved projects.
- 51 The need to consider cumulative effects is also outlined in NPS EN-1 (DECC, 2011a), which states in paragraph 4.2.5:

- 52 'When considering cumulative effects, the ES should provide information on how the effects of the Applicant's proposal would combine and interact with the effects of other development (including projects for which consent has been sought or granted, as well as those already in existence)'.
- 53 In line with the Energy White Paper, the NPSs are currently undergoing revision following consultation in late 2021. This document and the ES refer primarily to the extant NPSs, as these remain the primary policy tests of relevance. The draft NPSs are however referred to when relevant throughout the application. The draft NPS EN-1 (BEIS, 2021), states in paragraph 4.2.1: *'The Regulations require an assessment of the likely significant effects of the proposed project on the environment, covering the direct effects and any indirect, secondary, cumulative, transboundary, short, medium, and long-term, permanent and temporary, positive and negative effects at all stages of the project, and also of the measures envisaged for avoiding or mitigating significant adverse effects.'*

3.7.1 Approach to cumulative effects

- 54 PINS Advice Note 17 (PINS, 2019) identifies those other major developments which should be taken into consideration in a CEA, including those which are:
- ▲ Under construction;
 - ▲ Permitted applications, but not yet implemented;
 - ▲ Submitted applications, but not yet determined;
 - ▲ Identified in development plans (including emerging development plans) with appropriate weight given as those plans move closer to adoption; and
 - ▲ Identified in other plans and programmes which set the framework for future development consents and approvals, where such development is likely to come forward.

- 55 Projects that were built and operational at the time that survey data were collected are, for the most part, classified as part of the existing baseline environment. Operational projects that are built but have ongoing effects, or projects that are only partially completed at the time of data collection, are also included within the CEA.
- 56 The CEA consists of a screening exercise of projects, plans and activities followed by the assessment of the combined envelopes of the projects screened in, together with AyM. Screening is based upon the potential for cumulative effect, the spatial overlap of impact extents, the temporal overlap of impacts, and data confidence. Specific criteria for each type of project, plan or activity are used to develop a 'longlist' of projects to be considered.
- 57 Once a longlist is defined, this is further refined using specific criteria for each EIA topic to develop 'shortlists' of projects that are carried through to the CEA. Further detail is provided within Volume 1, Annex 3.1: Cumulative Effects Assessment.

3.7.2 Tiering of projects

- 58 In assessing the potential for cumulative effects, it is important to bear in mind that some projects, predominantly those proposed or not yet determined, may not actually be taken forward. The CEA can also only consider the publicly available project information, which may require certain assumptions, or qualitative assessments, to be made where information is not publicly available. Therefore, there is a need to build in a level of confidence with respect to the likely cumulative envelope that may result in cumulative effects.
- 59 For this reason, all projects, plans and activities are allocated into 'tiers', reflecting their current status in the planning and developments processes. This allows the CEA to present several future development scenarios, each associated with a different level of certainty and likelihood of eventually being built out. Appropriate weight may therefore be given to each tier when considering the potential for cumulative effects. This process is described in detail within Volume 1, Annex 3.1: Cumulative Effects Assessment.

3.8 Inter-related effects assessment

60 The methodology for the inter-related effects assessment is described in detail within Volume 2, Chapter 15: Inter-related Effects (application ref: 6.2.15). The inter-related effects assessment considers the potential for multiple impacts from the construction, operation or decommissioning of AyM on the same receptor to result in a greater effect than each impact when considered in isolation. Broadly, inter-related effects are divided into two categories:

- ▲ **Project lifetime effects:** Those arising throughout more than one phase of the project to interact to potentially create an effect of greater significance than for each project phase considered in isolation. For example, benthic habitat loss during both construction and operation; and
- ▲ **Receptor-led effects:** Potential for the scope of two or more effects to interact to create an effect of greater significance than each effect in isolation. For example, temporary disturbance to marine mammals from underwater noise together with temporary disturbance from increased vessel traffic.

61 The assessment incorporates the findings of the individual topic assessments to describe the potential additional effects that may be of greater significance than when each is considered in isolation. Where the potential for inter-related effects exists, a qualitative assessment is undertaken drawing on expert judgement, however the approach can be described by the following key steps:

- ▲ Identification of relevant receptors from the assessment of significance within each topic chapter;
- ▲ Identification of the source-impact-receptor pathways that can affect the receptor in question and identification of the topic chapter where those are described and assessed;
- ▲ Identification of potential effects on these receptor groups through a review of assessments; and
- ▲ Production of the inter-related effects assessment, using a tabulated approach listing all potential project lifetime and receptor-led effects as described in Volume 2, Chapter 15: Inter-related Effects (application ref: 6.2.15).

62 It is important to note that although it may not be explicit for some topics, consideration of inter-related effects is an inherent part of the assessment. For example, marine mammal and offshore ornithology assessments may consider the secondary impacts of reduced prey availability caused by primary impacts to fish and shellfish receptors. In these cases, the links with other assessment topics are clearly referenced and explained within the relevant assessment chapters.

3.9 Transboundary effects

63 Transboundary effects are those effects that may arise in the environment of other states outside of the UK. The need to consider these is enshrined within the United Nations Economic Commission for Europe (UNECE) Convention on EIA in a Transboundary Context, adopted in 1991 in the Finnish city of Espoo (the 'Espoo Convention'). The Espoo Convention has been transposed into UK legislation for the purposes of NSIPs by the EIA Regulations 2017. Regulation 32 of the EIA Regulations 2017 sets out a prescribed process of consultation and notification.

64 On behalf of the UK, the treaty is extended to the British Crown Dependencies of the Isle of Man and the Channel Islands. The Secretary of State (SoS) for BEIS is required to consider the potential for transboundary effects where it is deemed necessary, or where an EEA state submits a request for a transboundary assessment.

65 PINS Advice Note 12: Transboundary Impacts (PINS, 2020c), recommends that developers undertake independent consultation with other EEA states that may be affected. This is suggested to speed up the consultation process and to reduce the risk presented by a lack of time at examination stage for consideration of such effects. It is recommended that the relevant environmental bodies and interested parties within the identified states be consulted as appropriate.

66 Where consultation is required and undertaken by the developer, they are recommended to collate the names and contact details for the relevant states and share this information with PINS (and the SoS). All consultation will be recorded within the Consultation Report which is submitted as part of the DCO and Marine Licence applications (application ref: 5.1).

67 The Applicant has undertaken a transboundary screening exercise that sits within this ES (Volume 1, Annex 3.2: Transboundary Screening). Potential transboundary effects are then assessed as relevant within each topic chapter.

3.10 Other EIA matters

3.10.1 Human Health

68 Under the EIA Regulations 2017 (Regulation 5(2) and paragraph 4 of Schedule 4) the EIA must identify, describe and assess, the direct and indirect potentially significant effects of a proposed development on several factors including human health. This generally takes the World Health Organisation's (WHO) definition of human health, which is '*a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity*'.

69 AyM will include both onshore and offshore activities and infrastructure throughout the construction, operational and decommissioning phases. The main areas that will interact with human health determinants are in relation to noise, air quality and visual aspects, as well as traffic and transport. Exposure to electromagnetic fields (EMF) is also a consideration for human health, however all aspects of AyM will be designed in accordance with strict industry codes that ensure the protection of human health from EMF. AyM will also provide employment opportunities and economic benefits that may make positive contributions to human health.

70 The approach to the assessment of health impacts for AyM is to gather information that is presented in related assessments within Volume 3, Chapter 11: Air Quality, Health and Climate Change (application ref: 6.3.11), including:

- ▲ Volume 3, Chapter 3: Socioeconomics;
- ▲ Volume 3, Chapter 4: Tourism and Recreation;
- ▲ Volume 3, Chapter 6: Ground Conditions, Flood Risk and Land Use;
- ▲ Volume 3, Chapter 9: Traffic and Transport; and
- ▲ Volume 3, Chapter 10: Noise and Vibration.

71 The information as related to human health, including policy, legislation, the relevant embedded mitigation measures and an assessment of the likely significant effects on human health have been described within Volume 3, Chapter 11: Air Quality, Health and Climate Change (application ref: 6.3.11).

3.10.2 Major accidents, disasters and climate change

72 Regulation 5(4) of the EIA Regulations 2017 requires developers to consider 'expected significant effects arising from the vulnerability of the proposed development to major accidents or disasters that are relevant to that development.'

73 The EIA Regulations 2017 go on to say in Paragraph 8 of Schedule 4 that developers should include: 'a description of the expected significant adverse effects of the development on the environment deriving from the vulnerability of the development to risks of major accidents and/or disasters which are relevant to the project concerned. Relevant information available and obtained through risk assessments pursuant to EU legislation such as Directive 2012/18/EU of the European Parliament and of the Council or Council Directive 2009/71/Euratom or UK environmental assessments may be used for this purpose provided that the requirements of Directive 2012/18/EU are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies.'

74 AyM will not include any large inventories of hazardous material that could be released in the event of a natural disaster affecting the project. The main areas of vulnerability for the development stem from its marine operating conditions (but for which it will be designed in the first place), coastal erosion at the landfall and flood risk. However, the likelihood of a natural disaster for any of these components leading to consequential significant environmental effects is negligible.

75 However, relevant aspects of the EIA will examine risks to AyM and potential consequential risks to the environment and people. In this EIA, the two aspects relating to major accidents or disasters which could affect AyM, with knock on effects to environmental receptors that have been assessed are navigational risk (see Volume 4, Annex 10.1) and flood risk (see Volume 5, Annex 7.1). A standalone chapter on the topic of major accidents and/or disasters is not proposed to be included within the EIA, rather these matters are included within Volume 3, Chapter 11: Air Quality, Health and Climate Change (application ref: 6.3.11).

3.11 References

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- PINS (2017d) Advice Note Eighteen (version 1): The Water Framework Directive, Bristol.
- PINS (2018a) Advice Note Nine (version 3): Rochdale Envelope, Bristol
- PINS (2020c) Advice Note Twelve (version 6): Transboundary Impacts and Process, Bristol.
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