Arklow Bank Wind Park 2

Environmental Impact Assessment Scoping Report

sse Renewables

Revision	Date	Status	Author	Checked by	Approved by
1.0	07/03/23	First draft for review	GoBe Consultants Ltd.	LK	SSE
2.0	13/06/23	Second draft for review	GoBe Consultants Ltd.	LK	SSE
3.0	29/06/23	Final for issue	GoBe Consultants Ltd.	LK	SSE

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Glossary

Term	Meaning
Arklow Bank Wind Park 1	Arklow Bank Wind Park 1 consists of seven wind turbines, offshore export cable and inter-array cables. Arklow Bank Wind Park 1 has a capacity of 25.2 MW. Arklow Bank Wind Park 1 was constructed in 2003/04 and is operated by GE Energy. It remains the first and only operational offshore wind farm in Ireland.
Arklow Bank Wind Park 2 – Offshore Infrastructure	"The Proposed Development", Arklow Bank Wind Park 2 Offshore Infrastructure: This includes all elements under the existing Maritime Area Consent. This is the subject of this EIAR Scoping Report.
Arklow Bank Wind Park 2 (ABWP2) (The Project)	Arklow Bank Wind Park 2 (ABWP2) (The Project) is the onshore and offshore infrastructure. This EIAR is being prepared for the Offshore Infrastructure. Consent for the Onshore Grid Infrastructure and Operations Maintenance Facility has been granted in May and June 2022, respectively. • Arklow Bank Wind Park 2 Offshore Infrastructure: This includes all elements to be consented in accordance with the Maritime Area Consent. This is the subject of this EIAR and will be referred to as 'the Proposed Development' in the EIAR. • Arklow Bank Wind Park 2 Onshore Grid Infrastructure: This relates to the onshore grid infrastructure. • Arklow Bank Wind Park 2 Operations and Maintenance Facility (OMF): This includes the onshore and nearshore infrastructure at the OMF, for which planning approval has been granted. • Arklow Bank Wind Park 2 EirGrid Upgrade Works: any non-contestable grid upgrade works, consent to be sought and works to be completed by EirGrid.
Array Area	The area in which the wind turbine generators (WTGs) and inter-array cables will be installed, as defined in the MAC.
Bathymetry	The measurement of water depth in oceans, seas and lakes.
Benthic ecology	Benthic ecology encompasses the study of the organisms living in and on the sea floor, the interactions between them and impacts on the surrounding environment.
Biotope	The combination of physical environment (habitat) and its distinctive assemblage of conspicuous species.
Circalittoral	The subzone of the rocky sublittoral below that dominated by algae (i.e. the infralittoral) and dominated by animals.

Term	Meaning
Competent Authority (CA)	The authority designated as responsible for performing the duties arising from the EIA Directive as amended. For this application, the Competent Authorities is An Bord Pleanála.
Cumulative Impacts	'The addition of many minor or significant effects, including effects of other Projects, to create larger, more significant effects' (EPA, 2022).
Designated Landscape	Areas of landscape identified as being of importance at international, national or local levels, either defined by statute or identified in local development plans.
Do Nothing Scenario	The environment as it would be in the future should the Proposed Development not be developed.
Do Something Scenario	The environment should the Proposed Development be developed.
EIA	An Environmental Impact Assessment (EIA) is a statutory process by which certain planned Projects must be assessed before a formal decision to proceed can be made. It involves the collection and consideration of environmental information, which fulfils the assessment requirements of the Directive 2011/92/EU on the assessment of the effects of certain public and private Projects on the environment as amended by Directive 2014/52/EU of the European Parliament and of the Council (EIA Directive) and the regulations transposing the EIA Directive (EIA Regulations).
EirGrid	State-owned electric power transmission operator in Ireland.
Foreshore	The area of the land and seabed between the high-water mark of ordinary or medium tides and the 12 nautical mile limit.
Habitats Directive	Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (Habitats Directive).
Indirect Impact	'Impacts on the environment, which are not a direct result of the Project, often produced away from (the site) or as a result of a complex pathway' (EPA, 2022).
Infauna	The animals living in the sediments of the seabed.
Land Use	The use and management of the natural, semi-natural and built environment.
Landfall	The area in which the offshore export cables make landfall and is the transitional area between the offshore cabling and the onshore cabling.
MAC Area	The area in which the Proposed Development is seeking consent. The MAC Area includes the offshore export cable routes and Array Area, as referred to in the pre-application information.
Magnitude	Size, extent and duration of an impact.

Term	Meaning
Maritime Area Consent (MAC)	New lease consent for the occupation of the maritime area for offshore Projects. A MAC allows for the occupation of the seabed for the purposes of certain maritime usages.
Maximum Design Scenario	The Maximum Design Scenario approach ensures that the scenario that would have the greatest impact (i.e. largest footprint, longest exposure, or tallest dimensions, depending on the topic) is assessed; it can then be assumed that any other (lesser) scenarios will have an impact that is no greater than that assessed.
Mitigation Measure	Measure which would avoid, reduce, or remediate an impact.
Non-statutory stakeholder	Organisations with whom the regulatory authorities may choose to engage who are not designated in law but are likely to have an interest in a Proposed Development.
Polychaete	A class of segmented worms often known as bristleworms.
Profound Impact	An impact which obliterates sensitive characteristics.
Project Design Envelope (PDE)	The parameters relating to the Proposed Development for which consent is being sought. This allows for some flexibility in design options, particularly offshore, and more particularly for foundations and turbine types, where the full details of the Proposed Development are not known at application submission but where sufficient detail is available to enable all environmental impacts to be appropriately considered during the EIA.
Sensitive Receptor	Physical or natural resource, special interest or viewer group that may experience an impact.
Sensitivity	Vulnerability of a sensitive receptor to change.
Sound Exposure Level	Sound Exposure Level – a measure of the total sound energy of an event normalised to one second. This allows the total acoustic energy contained in events lasting a different amount of time to be compared on a like-for-like basis.
The Application	The full set of documents that will be submitted to An Bord Pleanála in support of the consent.
The Developer	Sure Partners Ltd.
The Project	All components of ABWP2 together. That is the Offshore Infrastructure, Onshore Grid Infrastructure and Operations Maintenance Facility.
The Proposed Development	Arklow Bank Wind Park 2 Offshore Infrastructure: This includes all elements to be consented in accordance with the Maritime Area Consent. This is the subject of this EIAR.
Water Body	A surface water body as defined under Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000

Term	Meaning
	establishing a framework for Community action in the field of water policy, as amended, the Water Framework Directive i.e. a river/stream, lake, transitional, coastal or groundwater body.
Zone of Influence	Areas within which environmental impact may occur – to be defined for each receptor by technical specialists

Acronyms

Term	Meaning
AA	Appropriate Assessment
ABP	An Bord Pleanála
ABWP1	Arklow Bank Wind Park 1
ABWP2	Arklow Bank Wind Park 2
ACL	Atlantic Container Liner
AEZ	Archaeological Exclusion Zone
AIS	Automatic Identification System
amsl	Above Mean Sea Level
AON	Apparently Occupied Nest
ATC	Air Traffic Control
ATS	Air Traffic Service
BIOMOR	Benthic Biodiversity in the Southern Irish Sea Project
BP	Before Present
CD	Chart Datum
CDP	County Development Plan
Cefas	Centre for Environment, Fisheries and Aquaculture Science
CEM	Community Engagement Manager
CIA	Cumulative Impact Assessment
CIEEM	Chartered Institute of Ecology and Environmental Management
COWRIE	Collaborative Offshore Wind Research into the Environment
CPS	Cable Protection System
CRM	Collision Risk Model
CSO	Central Statistics Office
CSTP	Celtic Sea Trout Project
CTSP	Celtic Sea Trout Project
DAA	Dublin Airport Authority
DAHGI	Department of Arts, Heritage, Gaeltacht and the Islands
DAS	Digital Air Survey

Term	Meaning
DCCAE	Department of Communications, Climate Action and Environment
DECC	Department of the Environment, Climate and Communications
DHLGH	Department of Housing, Local Government and Heritage
DMRB	Design Manual for Roads and Bridges
DoD	Department of Defence
EA	Environment Agency
EBA	European Boating Association
ECC	Export Cable Corridor
EEA	European Economic Area
EEZ	Exclusive Economic Zone
EIAR	Environmental Impact Assessment Report
EIS	Environmental Impact Statement
EMF	Electromagnetic Field
EMODnet	European Marine Observation and Data Network
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
ESAS	European Seabirds at Sea
EU	European Union
EUNIS	European Nature Information System
EUSeaMap	EMODnet broad-scale seabed habitat map for Europe
FLO	Fisheries Liaison Officer
FLOWW	Fishing Liaison with Offshore Wind and Wet Renewables Group
FMMS	Fisheries Management and Mitigation Strategy
FSA	Formal Safety Assessment
GHG	Greenhouse Gases
GPS	Global Positioning System
GSD	Ground Sample Distance
GVA	Gross Value Added
HABMAP	Habitat Mapping for Conservation and Management of the Southern Irish Sea

Term	Meaning
HDD	Horizontal Directional Drilling
HLV	Heavy Lift Vessels
HOOW	Harnessing Our Ocean Wealth
HWM	High Water Mark
IAA	Irish Aviation Authority
IAIP	Integrated Aeronautical Information Package
ICES	International Council for the Exploration of the Sea
ICOMOS	International Council on Monuments and Sites
ICPC	International Cable Protection Committee
IEF	Important Ecological Feature
IEMA	Institute of Environmental Management and Assessment
IFI	Inland Fisheries Ireland
IMC	Instrument Meteorological Conditions
IMO	International Maritime Organisation
INFOMAR	Integrated Mapping for the Sustainable Development of Ireland's Marine Resource
INIS	Invasive Non-Native Species
INSPIRE	Infrastructure for Spatial Information in Europe
IPCC	International Panel on Climate Change
iSPM	inorganic Suspended Particulate Material
IUCN	International Union for Conservation of Nature
IWDG	Irish Whale and Dolphin Group
IWEA	Irish Wind Energy Association
JNCC	Joint Nature Conservation Committee
LAT	Lowest Astronomical Tide
LCDC	Local Community Development Committee
LOBE	Level of Onset of Biological adverse Effect
LWM	Low Water Mark
MAC	Maritime Area Consent
MAPA	Maritime Area Planning Act 2021 as amended

Term	Meaning
MarLIN	Marine Life Information Network
MARPOL	International Convention for the Prevention of Pollution from Ships
MBA	Marine Biological Association
MCA	Maritime and Coastguard Agency
MCIB	Marine Casualty Investigation Board
MEC	Maximum Export Capacity
MSD	Maximum Design Scenario
MGN	Marine Guidance Notice
MIDA	Marine Irish Digital Atlas
MMMP	Marine Megafauna Mitigation Plan
MMO	Marine Management Organisation
MSA	Minimum Safe Altitude
MSO	Marine Survey Office
MWSQ	Marine Water and Sediment Quality
NE	Natural England
NECP	National Energy and Climate Plan
NIAH	National Inventory for Architectural Heritage
NIS	Natura Impact Statement
NMFS	National Marine Fisheries Service
NMPF	National Marine Planning Framework
nm	Nautical mile
NPWS	National Parks and Wildlife Service
NRA	Navigation Risk Assessment
NSR	Noise Sensitive Receptor
NtM	Notice to Mariners
NTS	Non-Technical Summary
NUC	Not Under Command
O&M	Operations and Maintenance
OFLO	Offshore Fisheries Liaison Officer

Term	Meaning
OGI	Onshore Grid Infrastructure
OMF	Operations and Maintenance Facility
OPW	Office Public Works
OREDP	Offshore Renewable Energy Development Plan
ORESS	Offshore Renewable Electricity Support Scheme
OSI	Ordnance Survey Ireland
OSP	Offshore Substation Platform
OSPAR	Oslo-Paris Conventions
PCB	Polychlorinated Biphenyls
PDA	Planning and Development Act 2000, as amended
PEXA	Practice and Exercise Area
PfG	Programme for Government
PINS	Planning Inspectorate
PPN	Public Participation Networks
PSR	Primary Surveillance Radar
PVA	Population Viability Analysis
Racon	Radar Beacon
RAM	Restricted in their Ability to Manoeuvre
RCP	Representative Concentration Pathway
RIFF	Regional Inshore Fisheries Forum
RNLI	Royal National Lifeboat Institution
RPO	Regional Policy Objective
SAC	Special Area of Conservation
SAR	Search and Rescue
SAS	Surfers Against Sewage
SEC	Sustainable Education Centre
SCANS	Small Cetacean Abundance in the North Sea
SCOS	Special Committee on Seals
SEA	Strategic Environmental Assessment

Term	Meaning
SEPA	Scottish Environmental Protection Agency
SFPA	Sea Fisheries Protection Authority
SNCB	Statutory Nature Conservation Body
SPA	Special Protection Area
SPL	Sound Pressure Level
SPM	Suspended Particulate Matter
SSC	Suspended Sediment Concentrations
SSW	South-South-West
SWISS	South West Irish Sea Survey
TSS	Traffic Separation Scheme
UHF	Ultra-High Frequency
UKFEN	UK Fisheries Economic Network
UKHO	United Kingdom Hydrographic Office
UKMMAS	United Kingdom Marine Monitoring Assessment Strategy
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
UNESCO	United National Educational, Scientific and Cultural Organisation
VFR	Visual Flight Rules
VHF	Very High Frequency
VMS	Vessel Monitoring System
VRP	Visual Reference Point
WCC	Wicklow County Council
WES	Wind Energy Strategy
WFD	Water Framework Directive
WHO	World Health Organisation
WiSe	Wildlife Safe
WTG	Wind Turbine Generator
XLPE	Cross-linked Polyethylene
ZoI	Zone of Influence

Term	Meaning
ZTV	Zone of Theoretical Visibility

Units

Unit	Description
%	Percentage
<	Less than
>	More than
CO_{2eq}	Carbon dioxide equivalent
dB	Decibel (unit used to measure the intensity of sound)
ft	Feet
km	Kilometres
kV	Kilovolt (electrical potential)
m	Metre
m/s	Metres per second (wind speed)
mg/l	Milligrams per litre
mt	Million tonnes
MW	Megawatt (power; equal to one million watts)
nm	Nautical Mile (distance; equal to 1.852 km)

1. Introduction

1.1. Overview

1.1.1. A Maritime Area Consent (MAC) (Ref:2022-MAC-002) was granted for the Arklow Bank Wind Park 2 Offshore Infrastructure (hereafter 'the Proposed Development) in December 2022 and Sure Partners Ltd. (hereafter 'the Developer') have commenced preparation of a planning application for the Proposed Development which will be submitted to An Bord Pleanála (ABP) following completion of an Environmental Impact Assessment (EIA).

1.1.2. Following the transfer of ABWP2 from the previous Foreshore to the Maritime Area Planning (MAP) process in March 2022, the offshore infrastructure has been revised to increase the power generation output from the site. This means ABWP2 will be able to make an even more significant contribution to Ireland's climate action target of at least 5GW by 2030, and to Ireland's national and local economy.

1.1.3. The area in which the export cable corridors, wind turbine generators (WTGs) and inter-array cables will be installed (the Array Area) covers an area of seabed approximately 27km long and 2.5km wide and is located 6 – 15km off the coast of Arklow, co. Wicklow, as shown in Figure 1.1

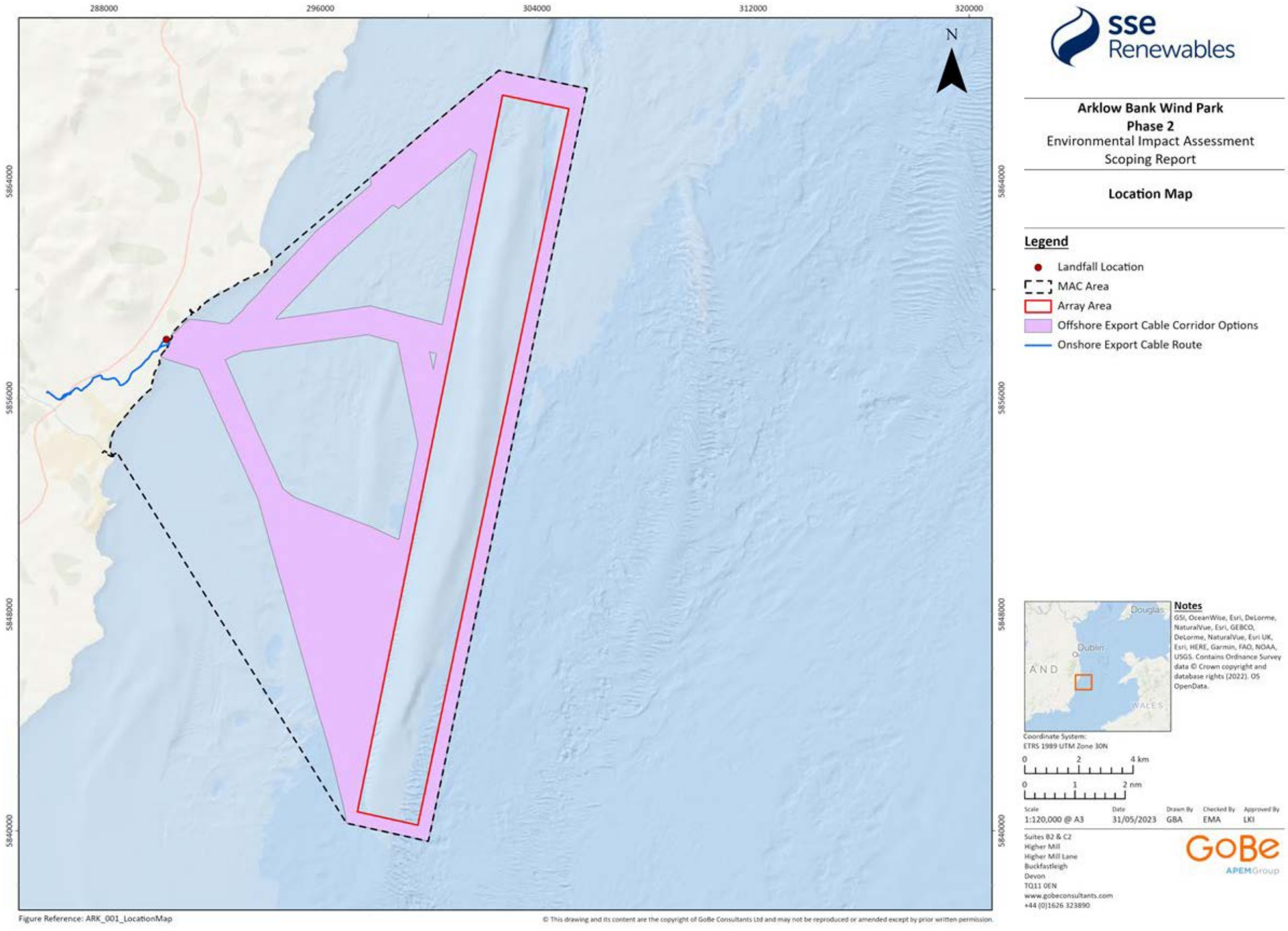


Figure 1.1 Arklow Bank Wind Park 2 Site Location

1.1.4. An Environmental Impact Assessment Report (EIAR), which will provide an assessment of the ABWP2 offshore infrastructure, will support the application for the Proposed Development to ABP.

1.1.5. This report forms the EIA Scoping Report, which will be used to inform the content of the EIAR for the Proposed Development.

1.2. Purpose of this Scoping Report

1.2.1. This Scoping Report has been prepared by GoBe Consultants Limited (GoBe), who have been appointed by the Developer to prepare the EIAR for the Proposed Development.

1.2.2. Within this Scoping Report, GoBe has set out the scope of the EIAR along with the proposed approaches that will be used to enable an assessment of the likely significant effects of the Proposed Development.

1.2.3. The purpose of this Scoping Report is to provide stakeholders with information on the Proposed Development and allow for engagement with stakeholders on the key topics to be addressed in the EIAR, the baseline data sources, and assessment methodologies to be used to inform the EIA.

1.2.4. The Developer welcomes the opportunity for engagement with stakeholders and feedback on the Proposed Development and the scope (proposed content) of the EIAR. Responses received during EIA Scoping will be used to inform the assessments to be undertaken for the EIAR (see section 3 on Consultation Process).

1.3. Onshore Project consents

1.3.1. ABWP2 is made up of both onshore and offshore components as shown in Figure 1.2. The Developer has already received consent for the onshore components of ABWP2 and now requires consent for the offshore elements (the Proposed Development). A description of the overall Project is provided below.

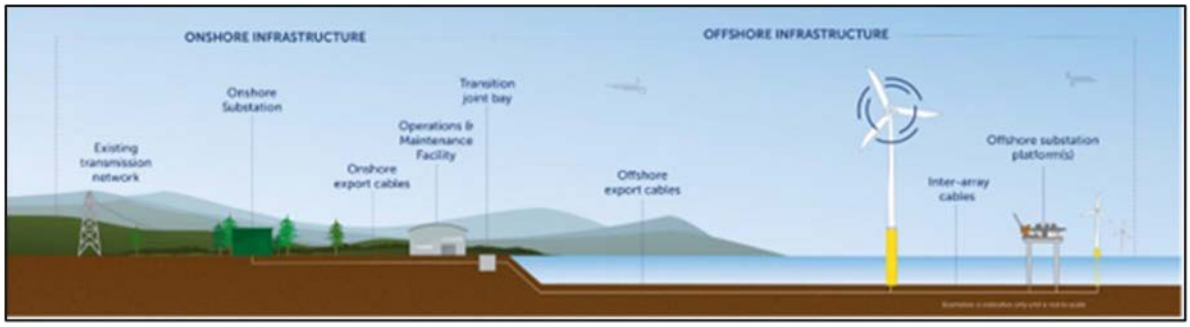


Figure 1.2 Key elements of ABWP2

1.3.2. In May 2022, ABP granted planning approval (Case Reference: 310090) to develop the onshore grid connection infrastructure (OGI). The OGI includes a 220kV substation at Shelton Abbey, with an associated connection from the new substation to the existing National Electricity Transmission Network. The consented development as outlined in Figure 1.3 also includes an underground cable route and associated infrastructure connecting the substation to the landfall point at Johnstown North (approximately 5km north of Arklow harbour), where it will meet the proposed offshore export cables connecting to the Proposed Development.

Figure 1.3 Consented Onshore Grid Infrastructure

1.3.3. In June 2022, the Developer received planning permission from Wicklow County Council (Planning Register Reference: 21/1316) to develop an Operations and Maintenance Facility (OMF) at South Dock, Arklow Harbour. The building and associated pontoon and ancillary infrastructure as shown in Figure 1.4 will serve as the support base for ABWP2 throughout its operational lifetime and will support around 80 long term local jobs. This facility will also incorporate a Sustainable Education Centre.

Figure 1.4 Consented Operations and Maintenance Facility

2. Policy and Legislative Context

2.1. Renewable energy targets

2.1.1. In June 2018, the recast Renewable Energy Directive ((EU) 2018/2001) was agreed which included a binding renewable energy target for the European Union of 32% by 2030.

2.1.2. In June 2020, the Programme for Government (PfG) included plans to achieve 5GW capacity in offshore wind by 2030 off Ireland's Eastern and Southern coasts. This is reflected in Ireland's Climate Action Plan 2023 which commits to increasing the proportion of electricity generated from renewable energy sources from 42% to 80% by 2030, including a target of at least 5GW of offshore wind by 2030.

2.1.3. The National Energy and Climate Plan (NECP) 2021 – 2030 highlights the importance of increasing and diversifying the indigenous production of clean energy sources, in particular the development of large offshore wind Projects. Ireland's NECP emphasises that Ireland has one of the best offshore renewable energy resources in the world with a sea area of 900,000 square kilometres which is approximately 10 times the size of our landmass. Because of Ireland's location at the Atlantic edge of the EU, we have more offshore energy potential than most other countries in Europe. In July 2021, the European Union (EU) introduced the European Climate Law which sets a legally binding target of net zero greenhouse gas emissions by 2050. It also sets a target of reducing net Green House Gas (GHG) emissions by at least 55% by 2030 compared to levels in 1990. The EU Institutions and the Member States are bound to take the necessary measures at EU and national level to meet the target. The "Fit for 55" package of EU reforms puts in place new initiatives with the aim of ensuring that EU policies are in line with these new climate goals.

2.1.4. In July 2021, Ireland enacted the Climate Action and Low Carbon Development (Amendment) Act. The Act binds Ireland to achieve net zero emissions by 2050 and commits to achieving 51% reduction in GHG emissions by 2030. It also provides for a governance framework including a new system of sectoral emissions ceilings and carbon budgets. The electricity sector needs to achieve a 75% reduction in emissions by 2030 in comparison to 2018 levels. The sectoral emissions ceiling is 3 $MtCO_2eq$. This is the most ambitious sectoral carbon budget. It is critical that large-scale offshore wind Projects are facilitated if Ireland is to meet this target.

2.1.5. In response to the global energy market disruption caused by the Russian invasion of Ukraine in 2022, the European Commission (EC) published the REPowerEU Plan (EC, 2022). The Plan is aimed at ending the EU's dependence on Russian fossil fuels, tackling the climate crisis and bringing about energy savings, diversifying energy supplies and accelerating the roll out of renewable energy. The Plan recognises the need to scale up and speed up the roll out of renewable energy Projects. The Plan increases the headline 2030 EU target from 40 – 45% renewables.

2.2. National Marine Planning Framework

2.2.1. The National Marine Planning Framework (NMPF) was published in July 2021. It contains overarching marine planning policies that are applicable to all proposals in Ireland's extensive maritime area. The NMPF serves as a parallel to the National Planning Framework (see below), as it sets out the Government's long-term planning objectives and priorities for the management of our seas over a 20-year time frame.

2.2.2. The main driver for the NMPF is the European Maritime Spatial Planning Directive and Harnessing our Ocean Wealth – An Integrated Marine Plan for Ireland. Public bodies are legally obliged to secure the objectives of the NMPF.

2.2.3. Section 13 of the NMPF relates to Offshore Renewable Energy and includes 11 planning policies, the following of which support ABWP2:

ORE Policy 1 - Proposals that assist the State in meeting the Government's offshore renewable energy targets, including the target of achieving 5GW of capacity in offshore wind by 2030 and proposals that maximise the long-term shift from use of fossil fuels to renewable electricity energy, in line with decarbonisation targets, should be supported.

ORE Policy 2 - Proposals must be consistent with national policy, including the Offshore Renewable Energy Development Plan (OREDP) and its successor. Relevant Projects designated pursuant to the Transition Protocol and those Projects that can objectively enable delivery on the Government's 2030 targets will be prioritised for assessment under the new consenting regime.

2.2.4. In addition, the NMPF highlights the importance of co-existence and societal benefits of the marine area.

2.3. National Planning Framework

2.3.1. The National Planning Framework 2040 (which is the Irish Government's high-level strategic plan for shaping the future growth and development of the country out to the year 2040) sets out National Policy Objective 44 which states:

"To support, within the context of the Offshore Renewable Energy Development Plan (OREDP) and its successors, the progressive development of Ireland's offshore renewable energy potential, including domestic and international grid connectivity enhancements".

2.4. Regional and local policy objectives

2.4.1. The Eastern and Midland Regional Assembly Regional Spatial and Economic Strategy (2019 - 2031) includes a regional policy objective (RPO 10.24) on renewable energy resources, which is to:

"support the sustainable development of Ireland's offshore renewable energy resources in accordance with the Department of Communications, Energy and Natural Resources 'Offshore Renewable Energy Development Plan' and any successor thereof including any associated domestic and international grid connection enhancements."

2.4.2. Local policy documents are also supportive of offshore wind developments, for instance the Wicklow County Development Plan 2016 to 2022 contains a Wind Energy Strategy (WES) which supports the development of offshore wind energy insofar as onshore facilities substations and connections to the grid that may be required (the WES has not been updated within the 2022 – 2028 County Development Plan). Furthermore, the Arklow and Environs Local Area Plan 2018 to 2024 acknowledges the benefits that the maritime sector, including offshore renewable energy, brings to the area and acknowledges that Wicklow County Council support the identification and realisation of economic opportunities within this sector.

2.5. Maritime Area Consent

2.5.1. Under Ireland's new maritime planning regime (the Maritime Area Planning Act, 2021), the Developer was awarded a MAC. The Proposed Development (subject to planning permission being obtained) will be built out under the awarded MAC.

2.6. Environmental Impact Assessment

2.6.1. EIA requirements derive Directive 2011/92/EU on the assessment of the effects of certain public and private Projects on the environment as amended by Directive 2014/52/EU of the European Parliament and of the Council (EIA Directive)). The primary objective of the EIA Directive is to ensure that Projects which are likely to have 'significant effects' on the environment are subject to an assessment of their likely impacts.

2.6.2. Article 4 of the EIA Directive makes provision for environmental impact assessments in respect of certain Projects listed in Annexes I and II of that Directive. Annex I of the EIA Directive lists

developments for which EIA is mandatory and Annex II lists Projects which require a determination as to whether an environment impact assessment is required. Member States shall make that determination through a case-by-case examination or thresholds or criteria set by the Member State. Where a case-by-case examination is carried out, or thresholds or criteria are set for the purpose of Article 4 paragraph 2 of the EIA Directive, the relevant selection criteria set out in Annex III shall be taken into account.

2.6.3. Paragraph 3(i), Annex II includes:

"Installations for the harnessing of wind power for energy production (wind farms)."

2.6.4. The Application for the Proposed Development relates to a Project for which a mandatory EIA is required. The Developer is therefore submitting an EIAR in order to comply with all relevant obligations.

2.6.5. The EIA Directive is given effect in Ireland through the Planning and Development Act 2000. A significant body of guidance on the EIA is available and further information is provided in Section 6.

2.7. Appropriate Assessment

2.7.1. The Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora ('the Habitats Directive') provides legal protection for habitats and species of European importance. Articles 3 to 9 provide the legislative means to protect habitats and species of Community interest through the establishment and conservation of an EU-wide network of sites known as Natura 2000. Natura 2000 is a European ecological network of Special Areas of Conservation (SAC), composed of sites hosting the natural habitat types listed in Annex I and habitats of the species listed in Annex II, to enable the natural habitat types and the species' habitats concerned to be maintained or, where appropriate, restored at a favourable conservation status in their natural range.

2.7.2. In Ireland, these Natura 2000 sites are designated as European Sites and include Special Protection Areas (SPAs), established under the EU Birds Directive (79/409/EEC, as codified by 2009/147/EC) for birds; and SACs, established under the Habitats Directive 92/43/EEC for habitats and species.

2.7.3. The Habitats Directive has been transposed into Irish law by Part XAB of the Planning and Development Act 2000 as amended and the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477/2011) as amended ('the Habitats Regulations').

2.7.4. An Appropriate Assessment (AA) is a separate but inter-related process to EIA, required under the Habitats Directive for any plan or Project likely to have a significant effect on a European Site. The AA will be undertaken by the 'competent authority' as defined by the Habitat Regulations, informed by a Natura Impact Statement (NIS) prepared by the Developer. While the NIS does not form part of the EIAR, the baseline presented within the EIAR will inform the NIS.

2.7.5. National Parks and Wildlife Service (NPWS) has published Appropriate Assessment Guidelines for Planning Authorities (NPWS, 2020). In addition to this advice, the European Commission has published a number of documents which provide a significant body of guidance on the requirements of AA, including 'Assessment of Plans and Projects Significantly Affecting Natura 2000 sites – Methodological Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC (EC, 2001) and 'Managing Natura 2000 sites: The Provisions of Article 6 of the 'Habitats' Directive 92/43/EEC' (EC, 2018), which set out the principles of how to approach decision making during the process. Other pertinent guidance documents will be identified and employed to inform the development of the NIS.

3. Consultation Process

3.1. Consultation – EIA scoping

3.1.1. Consultation is an essential part of the EIA process. Consultation with the public, key stakeholders and interest groups provides an opportunity to:

- Identify concerns about the Proposed Development and use these to inform the preparation of the EIAR;
- Incorporate mitigation measures where possible into the design of the Proposed Development in the early stages;
- Take into consideration the expertise and knowledge of local communities, experts and interest groups;
- Encourage participation in decisions yet to be made;
- Take into consideration concerns during the decision-making process and make the decision and conditions on the decision accordingly; and
- Ensure members of the community are fully informed with up to date information about all aspects of the development throughout the full duration of the Proposed Development.

3.1.2. This Scoping Report is intended to set out the proposed content (scope) of the EIAR which will be prepared to support the EIAR for the Proposed Development.

3.1.3. This Scoping Report will support consultation with a range of stakeholders to inform the scoping of the EIAR. The Scoping Report will be issued to stakeholders to firstly inform them of the Proposed Development and secondly to request their comments and feedback on the scope of the EIAR.

3.1.4. A full list of stakeholders consulted on this Scoping Report is provided in Appendix A.

3.2. Public consultation

3.2.1. The Developer has been actively engaging with stakeholders since 2018 when it was decided to progress the development of ABWP2. Since then, the Developer has been granted consent for the OGI under the Strategic Infrastructure Development process with ABP, and the OMF through a planning application to Wicklow County Council. The overall approach to stakeholder engagement on the Proposed Development is outlined below.

3.3. Stakeholder Engagement Lifecycle

3.3.1. Following the publication of the Climate Action Plan in 2019, and the Government's commitment to the offshore wind, the Developer embarked upon its Stakeholder Engagement Campaign for ABWP2. This was delivered in five phases. Once a stakeholder was engaged, the Developer sought to maintain an open and ongoing dialogue with them throughout the ABWP2 development process and to ensure an opportunity for continuous feedback is maintained. Each phase of the stakeholder engagement process is described below.

- **Phase 1 Strategic Engagement:** this included but is not limited to engaging relevant Government Departments, state and semi-state bodies, TDs, Senators and County Councillors for Co. Wicklow, and North Wexford, members of the Executive Team in Wicklow and Wexford County Councils.
- **Phase 2 National Engagement:** this phase included engagement with state and semi-state bodies, including many deemed as statutory stakeholders. In addition, non-statutory stakeholders with a keen interest in marine activities were engaged.

- **Phase 3 Regional Engagement:** at this point in the engagement process the Developer sought to brief regional stakeholders on ABWP2, and on the benefits of offshore wind and secure feedback. This engagement comprised outreach to Chambers of Commerce, Regional Assemblies, Municipal District Councils, Town Teams, Public Participation Networks (PPN), local offices for IDA and Enterprise Ireland, etc. At this stage the media were also briefed.
- **Phase 4 Public Information Campaign:** once the above stakeholders were informed, and feedback was secured, the Developer progressed to promote ABWP2 locally to the general public, through public meetings, specific fisheries engagement, schools' engagement and the development of Project materials. During this phase a Fisheries Liaison Officer (FLO) was appointed.
- **Phase 5 Consenting Process:** this represents the process of engagement that has been underway since 2020. During this phase a Community Engagement Manager (CEM) was appointed. The Developer sought to engage and hear from the widest range of stakeholders, including all those engaged during earlier phases. It should be noted that March 2020 was the point at which the county entered its first lockdown owing to COVID-19. The Developer's preference was to engage communities and stakeholders face to face, and in a location that is convenient to them, and local to ABWP2, where relevant. However, COVID-19 instead forced communication increasingly online using new methods, as well as traditional written forms. The Developer recommenced their preferred methods of engagement when COVID-19 restrictions were eventually lifted.

3.4. Methods of Stakeholder Engagement

Project Personnel

3.4.1. From the commencement of the development, the Developer has sought to provide information to stakeholders and members of the public. Dedicated resources and a suite of information channels have been put in place to ensure that stakeholders have access to information on ABWP2 on an ongoing basis. These are set out below.

Community Engagement Manager (CEM)

3.4.2. A dedicated CEM was appointed to facilitate engagement with the community in 2020. The CEM is available 9am to 5pm, Monday to Friday, or alternatively by appointment outside of these hours. The CEM can be reached via mobile phone or email and is the point of contact for the local community. The CEM was appointed to facilitate stakeholders obtaining information on ABWP2 and making a submission to the consultation process. The contact details for the CEM are promoted on the Project website, at Project exhibition stands, at online events, in Project newsletters, brochures and leaflets and in all correspondence issued. The locally based CEM is familiar with the community and the various stakeholder and community groups. Prior to formal non-statutory consultation commencing, the CEM carried out engagement with local councillors and organisations, as well as all residents living within 1km of the landfall point and proposed substation location. The CEM will continue their role in supporting ABWP2 during the application for the Proposed Development under the maritime area planning process.

Fisheries Liaison Officer

3.4.3. A Fisheries Liaison Officer (FLO) has been engaged on ABWP2 since January 2019. As a skipper for the RNLI and former fisherman from Arklow, the FLO is well placed to engage with and be the point of contact for the fishers, vessel users and, vessel owners around the area.

Information Service

3.4.4. Stakeholders are invited to contact the CEM via phone call or text message. The phone line is operated from 9am to 5pm, Monday to Friday. Outside of these times, a messaging service is available, and calls are returned at the earliest opportunity. A Project postal address is in place and stakeholders who wish to make submissions as part of the pre-application consultation, in hard copy can do so by sending correspondence to the following address:

- SSE Renewables, South County Business Park, Red Oak South, Leopardstown, Dublin 18, D18 W688.

3.4.5. The email address of the dedicated CEM has been in place since appointment in February 2020[1]. This email address is widely available via all of SSE's materials and on the Project website and will remain so throughout the Project lifecycle. Stakeholders are invited to submit correspondence, feedback or seek further information from the CEM or the wider team at this email address.

Project Website

3.4.6. A dedicated set of Project webpages[2] are hosted on the SSE Renewables website. The dedicated webpages are up to date with all the relevant Project information. The website was initially set up in 2019 and provides information on ABWP2; specific details on the offshore and onshore aspects of ABWP2; the Project timeline; a Project brochure; newsletters, locations where Project information can be read in person and contact details for the CEM.

3.4.7. The Project website was also recently updated to provide details of public consultation events relating to the Proposed Development which were held in March and April 2023.

3.4.8. It should be noted that as part of the planning application for the OGI to ABP, the Developer published a separate website containing all planning documentation relating to this application for consent for public access.

Project Newsletters

3.4.9. The Developer has been issuing Project newsletters on a frequent basis since 2021. These newsletters are circulated throughout the relevant catchment area for ABWP2 and include information about the Project, updates on Project activities, consultation events, Project timelines and details on how to engage with the Developer.

Project Leaflet/Brochures

3.4.10. Project leaflets and/or brochures have been used on the Project to support public consultation phases associated with certain elements of the Project e.g., OGI and OMF. Leaflets were delivered to 15,000 homes and businesses across Wicklow and Wexford. The Project leaflets/brochures included headings such as;

- About the Project;
- Public Consultation;
- Website;
- For a Better Future;
- Online Community Briefing;

[1] deirdre.keogh@sse.com
[2] https://www.sserenewables.com/arklowbankphase2

- Public Exhibition Spaces; and
- Our Team.

3.4.11. A new Project brochure has been compiled for the public consultation relating to the Proposed Development which launched in March 2023.

Adverts and Posters

3.4.12. Adverts for public consultation for ABWP2 feature on the local radio station (East Coast FM) and in local newspapers highlighting the consultation period and how stakeholders can get involved. The adverts run weekly across East Coast FM and four local papers: Wicklow People, Gorey Guardian, Wicklow Times and Wicklow Voice. Public consultation is also promoted on Wicklownews.net for the duration of this consultation phase. Posters were erected to draw attention to the consultation period and encourage stakeholders to get involved. This approach has been used for previous consultation phases and was also employed for the consultation phase relating to the Proposed Development which commenced in March 2023.

Public Affairs

3.4.13. The Developer seeks to maintain close relationships with all elected representatives, and stakeholders, in all of the constituencies within which we have a presence. In relation to ABWP2, the Developer has sought to maintain an open dialogue with all elected representatives in Wicklow, and North Wexford. The Developer also recognises that public representatives can act as important disseminators of information through their own social media channels and newsletter distribution lists. At key points throughout the lifecycle of the Project their views have been sought, and they have been continuously briefed in relation to all important announcements.

Social Media Platforms

3.4.14. The Developer uses the SSE Renewables LinkedIn page[3] to promote news, milestones achieved and advertise public consultation activity in relation to ABWP2. This page has over 130,000 subscribers. Native and sponsored content is posted via this channel to a targeted audience. Reporting is conducted after each sponsored campaign.

3.4.15. The Developer also uses the SSE Renewables Twitter account[4] in addition to LinkedIn to post shorter updates and to share information about consultation events, conferences, news articles in relation to ABWP2. The account has over 3,600 subscribers and there is capacity to run sponsored campaigns if and when required.

3.5. Relevant Stakeholders

3.5.1. As described above, a thorough process of stakeholder engagement has been carried out by the Developer to date. This has included correspondence featuring updates and invitations to engage with the Developer. Meetings with key stakeholders were facilitated to ensure that the Developer was cognisant of the views of the various organisations and that stakeholders were informed and up to date on the Project's development.

3.5.2. Prior to transferring to the Maritime Area Planning (MAP) process, The Developer sought to progress the development of the offshore infrastructure under their existing Foreshore Lease for the site which could have enabled an earlier delivery. Under this previous process EIA Scoping was conducted in 2020.

[3] https://www.linkedin.com/company/sse-renewables
[4] https://twitter.com/sserenewables

3.5.3. The list of organisations consulted during previous Foreshore Lease EIA scoping for the Offshore Infrastructure included:

- An Bord Pleanala (ABP) – SID Unit
- An Chomhairle Ealaíon (The Arts Council)
- An Taisce
- Arklow Port
- Birdwatch Ireland
- Bord Iascaigh Mhara
- Carlow County Council
- Casement Military Aerodrome
- CHC Helicopters
- Commission for Regulation of Utilities
- Commissioners of Irish Lights
- Comreg
- D2 Harbour Belfast
- Dublin Airport Authority (DAA)
- DAFM – Sea Fisheries Protection Agency
- Department of Agriculture, Food and the Marine
- Department of Communications, Climate Action and Environment
- Department of Culture, Heritage and the Gaeltacht
- Department of Housing Planning and Local Government
- Dept of Defence – Naval & Aer Corps
- Dept of Transport (Marine Survey Office)
- Dept of Transport (Maritime Services Division))
- Development Applications Unit – (NPWS and NMS)
- Dun Laoghaire Rathdown Co. Co. – Dun Laoghaire Port
- Dun Laoghaire Rathdown Co. Co • Dublin Port
- Eastern & Midland Regional Assembly
- EirGrid
- Enterprise Ireland
- Environmental Protection Agency
- Fáilte Ireland
- Gas Networks Ireland
- Geological Survey of Ireland
- GE
- Harland and Wolfe
- Health and Safety Authority
- Health and Safety Executive
- Heritage Council
- IDA
- Inland Fisheries Ireland
- Irish Aviation Authority
- Irish Coast Guard
- Irish Mussel Seed Company
- Irish Sailing Association
- Irish Water
- Irish Whale and Dolphin Group
- Irish Wildlife Trust
- Marine Institute
- Met Eireann
- Office of Public Works
- Port of Cork
- RNLI
- Rosslare Port
- Sustainable Energy Authority of Ireland
- South East Regional Inshore Fisheries Forum
- Transport Infrastructure Ireland (TII)
- Underwater Archaeology Unit
- Weston Aerodrome
- Wexford Co. Co.
- Wicklow Co. Co.

3.5.4. Since 2018, the Developer has also engaged via meetings, phone calls and emails with all of the organisations listed above and the following other organisations on the Project.

- Arklow Chamber
- Arklow Maritime Business Group
- Arklow Municipal District
- Arklow RNLI
- Arklow Rowing Club
- Arklow Sailing Club
- Arklow Sea Scouts
- Arklow Town Team
- Belview Port
- Cobra Gym Club
- Echelon
- Elected Representatives
- Gorey Kilmuckridge Municipal District
- HAS
- Kildare Wicklow Education and Training Board
- Irish Maritime Development Office
- Irish Rail
- Irish Water Safety
- Marine Renewables Industry Association
- Maritime Business Development Group (Wicklow County Council)
- Seal Rescue Ireland
- Shelton Abbey
- Smart Grid Ireland
- Southeast Regional Inshore Fisheries Forum (RIFF)
- Spectrum Licensing / Ofcom
- Department of International Trade (UK)
- Wicklow Bay Sea Angling Club
- Wicklow Chamber of Commerce
- Wicklow IFA
- Wicklow Local Community Development Committee (LCDC)
- Wicklow Municipal District
- Wicklow PPN
- Wicklow RNLI
- Wicklow Sailing Club
- Wicklow Superintendent (Gardaí)
- Wicklow Sub Aqua Club
- Wicklow Swimming Club
- Wicklow Town Team

3.5.5. Furthermore, engagement with fisheries through information events, meetings and circulation of questionnaires was undertaken in 2019 and 2020.

3.6. Public Consultation

Public Consultation 2020

3.6.1. Public consultation for ABWP2 was carried out in 2020 with a focus on the offshore and onshore elements. Consultation ran from 14th October to 11th November 2020. The terms of reference of the consultation sought to gather feedback and local knowledge to inform the Project. The terms of reference of the consultation were set out in the feedback form that the public were encouraged to complete and included topics such as:

- Climate Change;
- Offshore infrastructure;
- Onshore Grid Infrastructure;
- Further Feedback or Thoughts;
- Public Information; and
- ABWP2 Proposals.

3.6.2. A public consultation event was held on Wednesday 4th November 2020, at 7pm, live streamed via YouTube. As a result of the COVID-19 restrictions, the event was held online only. A recording of the online event was available on the website afterwards.

3.6.3. Public exhibitions were erected at four locations in County Wicklow and County Wexford. Due to COVID-19 restrictions at the time, these exhibitions were unmanned and self-guided. As no public gatherings were permitted, these exhibitions were of even greater importance. The exhibitions were located at:

- Bridgewater Shopping Centre North Quay, Arklow, County Wicklow;
- Arklow Library, Main Street, Arklow, County Wicklow;
- Town Hall, Market Square, Wicklow Town, County Wicklow; and
- Seamount/Main Street, Courtown, County Wexford.

3.6.4. During the weeks leading up to the launch of the public consultation, and during Level 3, per the COVID-19 restrictions, the CEM, conducted a door knock, on homes located within 1km of the proposed locations for the landfall, and the onshore substation. Feedback was gathered from householders available to engage. In all homes, including those where householders were unavailable, a letter was left for the occupants. This correspondence introduced ABWP2 at a high level, and encouraged contact with the CEM, whose details were also enclosed. The onset of Level 5 restrictions prevented similar outreach to residents living within 2km of both the landfall and substation location.

Public Consultation 2021

3.6.5. The Developer made considerable efforts to promote this public consultation, which focused on the OMF, to ensure stakeholders and the community were aware of ABWP2 at this stage. This included delivering over 22,000 leaflets and promoting the consultation in local media. In addition, a Notice to Mariners (NTM) was issued to publicise ABWP2.

3.6.6. The terms of reference of the consultation in 2021 sought to gather feedback and local knowledge to inform the Project. The public consultation ran from 7th to 25th June 2021.

3.6.7. A virtual exhibition was made available to access online throughout the second public consultation period. The online exhibition contained a welcome video, information displays, a video of the proposed OMF, and feedback form. The virtual consultation room was accessible on all browsers and devices.

3.6.8. A public consultation event was held on 16th June 2021, at 7pm, hosted via YouTube. As a result of the COVID-19 restrictions, the event was held online only. A recording of the online event was available on the website afterwards.

3.6.9. Public exhibitions and information points were erected at two locations, one in County Wicklow and one County Wexford. Due to COVID-19 restrictions, these exhibitions were unmanned and self-guided. The exhibitions were located at:

- Bridgewater Shopping Centre, North Quay, Arklow, County Wicklow; and
- Seamount/Main Street, Courtown, County Wexford.

3.6.10. The exhibition was accessible seven days a week and in accordance with the opening hours of the Bridgewater Shopping Centre. The information point in Courtown was accessible from the street, and thus available at all times.

3.6.11. A booklet was produced as part of the OMF consultation period. The leaflet was available at the Bridgewater Shopping Centre stand, by post and the content was replicated on the panel displays in the virtual consultation room for consistency. The booklet outlined ABWP2 as a whole but focused in on the aspects of the OMF including the Sustainable Education Centre (SEC) as well as how the Developer is providing voluntary funding to community groups. Information is provided under the follow headings:

- Our Vision;
- Operations and Maintenance Facility;
- Supporting the Community;
- Have Your Say;

- Find Out More; and
- About SSE Renewables.

3.6.12. The OMF announcement and consultation period received a high level of media coverage. A variety of local and national news outlets published the story. A variety of different sized adverts were prepared in order to be employed in different settings. A short video depicting the entire Project but focusing on the OMF was created and used throughout the consultation period. The video showed a computer-generated illustration of the proposed wind farm, crew transfer vessel bays, the SEC and buildings associated with the facility.

3.6.13. A LinkedIn social media campaign was previously run for the Project where native/organic and sponsored/paid content was prepared and issued on the SSE Renewables LinkedIn page. For the sponsored content, local businesses and individuals based in Arklow and Wexford were targeted. The campaign reached 108,624 people (impressions) in total. The engagement across native and sponsored content was consistent, with an engagement rate of 1.65% for sponsored and 2.29% for native. The sponsored content resulted in 420 clicks on the Project webpage. SSE Renewables continue to maintain their LinkedIn page with relevant and up to date material relating to ABWP2.

3.7. Public Consultation 2023

3.7.1. Public Consultation for the Proposed Development commenced on Monday 13th March 2023 with the launch of a Project virtual showroom which featured an overview of ABWP2 and offered the public an opportunity to share their views and feedback. The offshore infrastructure was the focus of this public consultation.

3.7.2. The virtual room replicated the updated Project brochure and included information boards under the following categories:

- About SSE Renewables;
- About the Project;
- Progress to Date;
- Local Partnerships;
- Project Benefits;
- Project Timeline;
- Public Consultation;
- Why Offshore Wind?;
- Consenting Process;
- Environmental Impact Assessment Report;
- Components of an Offshore Wind Farm;
- Community Engagement;
- Supporting the Community;
- Commercial Fisheries Engagement;
- Find Out More; and
- Meet the Team.

3.7.3. In-person events were scheduled where the Developer was present to meet members of the local community. Events were scheduled as follows:

- Thursday 16th March 2023: 5 - 8pm - Arklow Bay Conference and Leisure Hotel, Sea Road, Arklow, Co. Wicklow Y14DX02;
- Tuesday 21st March 2023: 5 - 8pm - Wicklow Sailing Club, South Quay, Wicklow, Co. Wicklow A67WV82; and
- Wednesday 29th March 2023: 5 - 8pm - Courtown Sailing Club, South Beach, Courtown, Co. Wexford Y25X9D0.

3.7.4. The in-person events featured an exhibition of the latest Project information and the most up to date printed assets such as brochure, newsletter and fisheries report were made available in hard copy to visitors. Feedback forms were also available and guests were invited to complete a form and share their views with SSE Renewables. They were also invited to sign up to the Project mailing list to receive relevant future updates.

3.7.5. In addition to in-person events, an online webinar took place on Wednesday 5th April 2023 at 7:30pm which has been posted to the Project website. This featured a presentation from members of the Developer's Project Team, a demonstration of a 3D simulation of the site and a question and answer session.

3.7.6. The consultation phase was promoted through various means as with previous consultation campaigns for the Project e.g., local radio and newspapers, local online news platform, adverts and posters, social media, public relations, direct stakeholder outreach etc.

4. Description of the Proposed Development

4.1. Location

4.1.1. The Proposed Development is a proposed offshore wind farm situated on and around Arklow Bank in the Irish Sea, approximately 6 to 15km to the east of Arklow in County Wicklow and measures approximately 27km by 2.5km. On the bank, water depths vary between 0.6m and 25m relative to LAT, with shallower areas particularly occurring in the vicinity of the existing seven wind turbines of ABWP1. The general morphology of this feature is oriented roughly in a north-south direction. There is a large variation in depth within the area, with water depths in excess of 50m Lowest Astronomical Tide (LAT) beyond the bank towards the east. The Arklow Bank is subject to very strong tidal currents with the general direction of flow in the offshore regions of the bank towards the north-north-east (NNE) during flood and towards south-south-west (SSW) during ebb. The Arklow Bank is sand and gravel dominated with mobile surface sediments. Medium sand is mainly located at upper levels. An existing windfarm of seven wind turbines with a capacity of 25.2MW which were constructed on Arklow Bank in 2003/04 is owned and operated by GE Energy (ABWP1). It remains the first and only operational offshore wind farm in Ireland.

4.1.2. The area in which the proposed wind turbines, inter-array cables and OSP(s) will be located on Arklow Bank covers an area of seabed approximately 64km^2. The proposed offshore export cable corridors will extend from this area to a landfall approximately 5km to the north of Arklow at Johnstown North.

4.1.3. Figures showing the site location (Figure 1.1) and proposed site layouts showing the extent of the range of turbines (Figure 4.1 and Figure 4.2) can be found below.

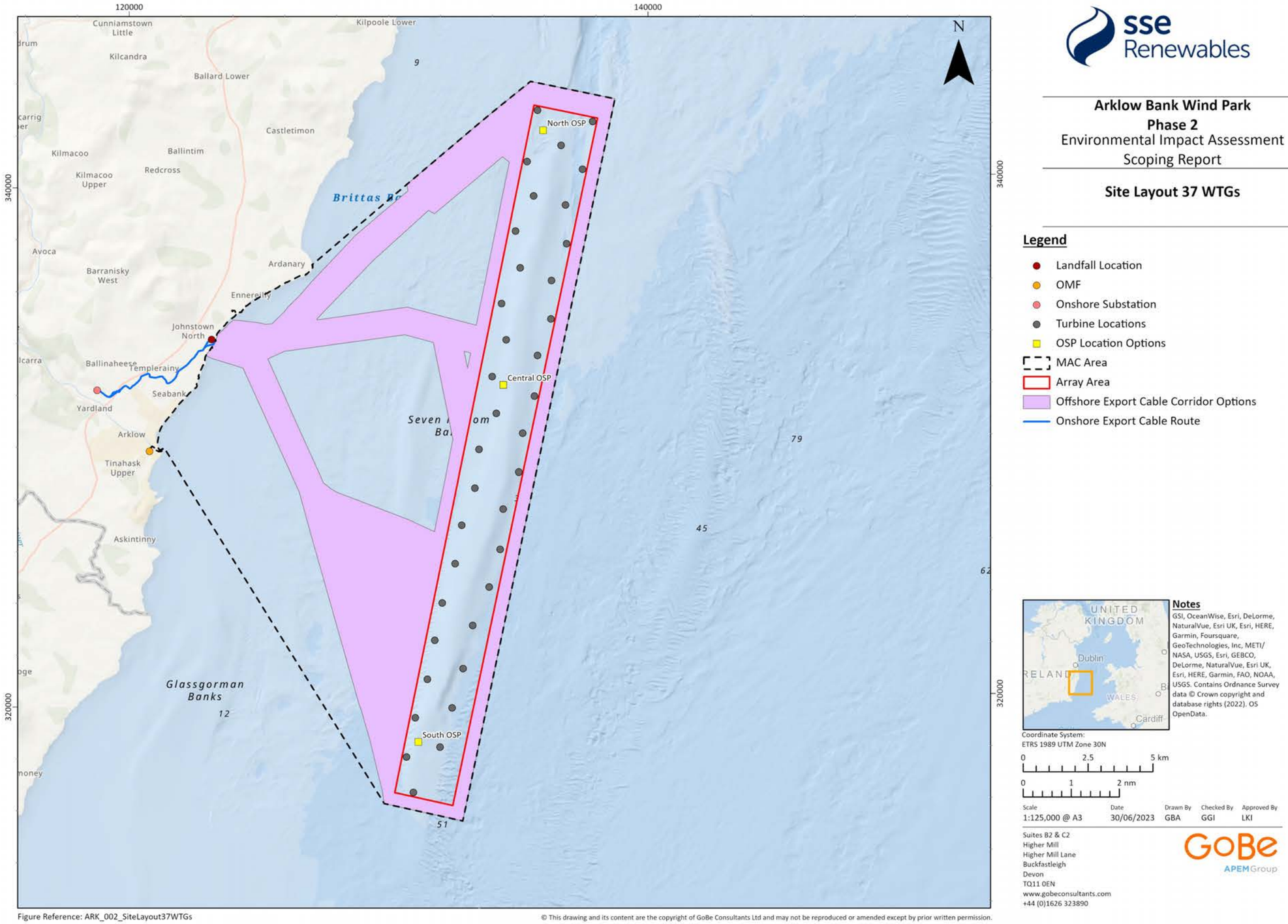


Figure 4.1 ABWP2 Site Layout 37 WTGs

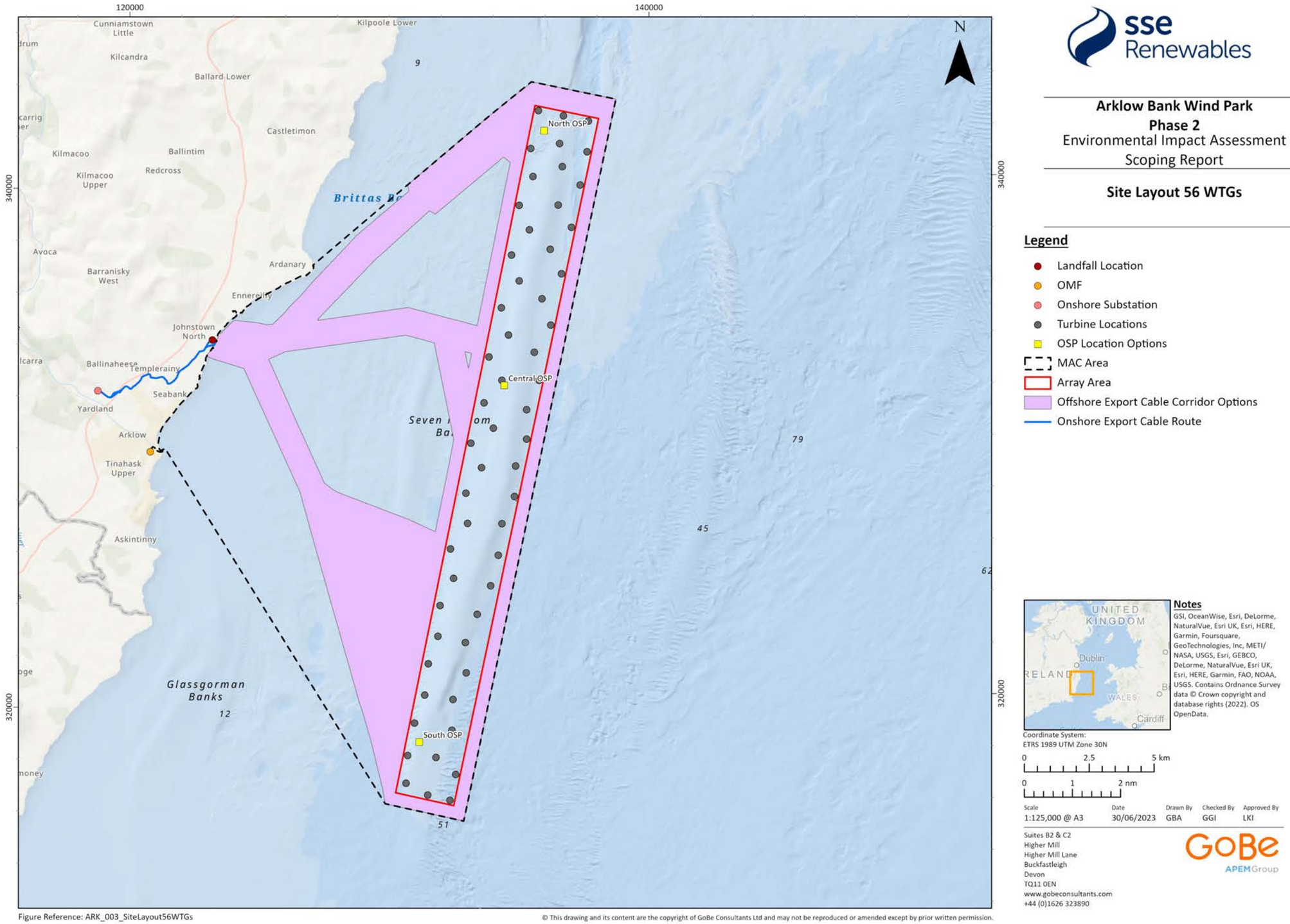


Figure Reference: ARK_003_SiteLayout56WTGs

Arklow Bank Wind Park
Phase 2
Environmental Impact Assessment
Scoping Report

Site Layout 56 WTGs

Legend

- Landfall Location
- OMF
- Onshore Substation
- Turbine Locations
- OSP Location Options
- MAC Area
- Array Area
- Offshore Export Cable Corridor Options
- Onshore Export Cable Route

Notes

GSI, OceanWise, Esri, DeLorme, NaturalVue, Esri UK, Esri, HERE, Garmin, Foursquare, GeoTechnologies, Inc, METI/ NASA, USGS, Esri, GEBCO, DeLorme, NaturalVue, Esri UK, Esri, HERE, Garmin, FAO, NOAA, USGS. Contains Ordnance Survey data © Crown copyright and database rights (2022). OS OpenData.

Coordinate System:
ETRS 1989 UTM Zone 30N

0 2.5 5 km

0 1 2 nm

Scale	Date	Drawn By	Checked By	Approved By
1:125,000 @ A3	30/06/2023	GBA	GGI	LKI

Suites B2 & C2
Higher Mill
Higher Mill Lane
Buckfastleigh
Devon
TQ11 0EN
www.gobeconsultants.com
+44 (0)1626 323890

Figure 4.2 ABWP2 Site Layout 56 WTGs

4.2. Overview of the Proposed Development

4.2.1. The proposed offshore infrastructure associated with ABWP2 will comprise all development that is seaward of the High Water Mark (HWM). Consent is sought by the Developer to construct the Proposed Development from a set of 4 discrete WTG options and 2 OSP options (Table 4.1 and Table 4.2).

Table 4.1 WTG Options

Component	WTG Option 1	WTG Option 2	WTG Option 3	WTG Option 4
Number of WTGs	56	47	42	37
Upper tip height above Lowest Astronomical Tide (LAT) (m)	278	292	318	332

Table 4.2 OSP Options

Component	2 OSP Option	1 OSP Option
Height of main structure above Lowest Astronomical Tide (LAT) (m)	39	48.5
Topside length (m)	46	50
Topside width (m)	33	52.5

4.2.2. Each WTG will comprise a tower section, nacelle and three rotor blades. The WTG foundations will consist of either monopiles or jackets and a network of inter-array cabling which shall be used to transmit power from the WTGs to the OSP(s). Two offshore export cables utilising the offshore export cable corridors which shall make a landfall at Johnstown North, north of Arklow town. The Proposed Development will also include scour protection and cable protection.

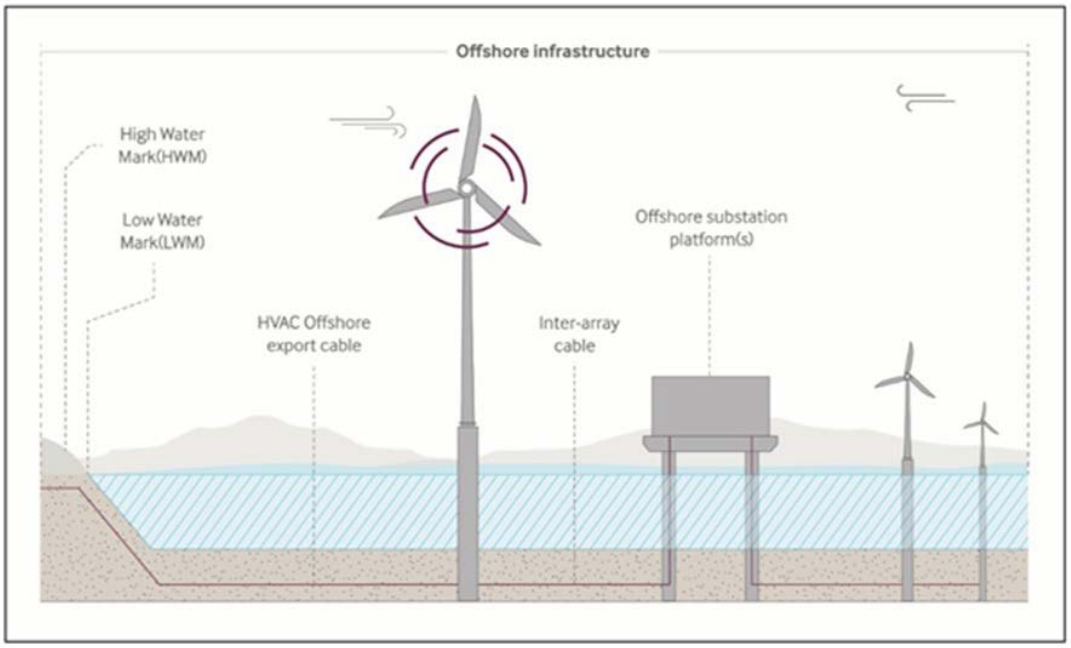


Figure 4.3 Key elements of proposed offshore infrastructure.

4.2.3. The following sections provide a description of each component of the Proposed Development.

4.3. Wind Turbine Generators (WTGs)

4.3.1. The Proposed Development will comprise either 56, 47, 42 or 37 WTGs. The final number and design of WTGs will depend on the rated capacity of the individual WTGs to be used.

4.4. Offshore Substations Platforms (OSPs)

4.4.1. The Proposed Development requires up to two OSPs. The purpose of the OSPs is to transform the electricity generated by the wind turbines (at 66kV) to a higher voltage (220kV), allowing the power to be efficiently transmitted to shore.

4.4.2. These platforms will be located within the Array Area and will contain switchgear, transformers, control equipment, auxiliary electrical equipment, and a meteorological mast.

4.4.3. The topside structure of the OSP(s) will also provide access and temporary or emergency accommodation for Proposed Development personnel, as well as areas for cable marshalling and other services.

4.5. Scour protection

4.5.1. Scour protection will be required at seabed level around the wind turbine and OSP foundations and cabling. This may include the use of:

- Concrete mattresses: typically, several metres wide and long, cast of articulated concrete blocks which are linked by a polypropylene rope lattice which are placed on and/or around structures to stabilise the seabed and inhibit erosion;
- Rock: methods such as placement of layers of graded stones on and/or around structures to inhibit erosion or rock filled mesh fibre bags which adopt the shape of the seabed/structure as they are lowered on to it; or
- Artificial fronds: mats typically several metres wide and long, composed of continuous lines of overlapping buoyant polypropylene fronds that create a drag barrier which prevents sediment in their vicinity being transported away. The frond lines are secured to a polyester webbing mesh base that is itself secured to the seabed by a weighted perimeter or anchors pre-attached to the mesh base.

4.6. Inter-array cabling

4.6.1. Inter-array cabling (66kV AC) will connect the wind turbines to each other and to the OSP. The cable is likely to consist of a cross-linked polyethylene (XLPE) insulated aluminium or copper conductor submarine cable.

4.6.2. It is anticipated that the inter-array cables will be buried wherever possible. Where burial is not possible, cables will be protected in order to prevent movement or exposure of the cables over the lifetime of the Proposed Development. Both these methods will protect cables from other activities such as fishing or anchor placement, protect against the risk of dropped objects, and limit the effects of heat and/or induced magnetic fields. The preferred solution for protection (comprised of either concrete mattressing, rock or artificial fronds) will depend on seabed conditions along the route.

4.6.3. The total length of inter-array cabling required will be between 115 and 200km in length. Each trench will be up to 15m in width with a burial depth of up to 1.5m

4.6.4. The total length of inter-array cabling between the two OSPs will be a maximum of 30km in length.

4.7. Offshore transmission infrastructure

4.7.1. The Proposed Development is considering three offshore export cable routes as displayed in Figure 1.1.

4.7.2. The offshore export cables will have a maximum length of 100km, consisting of two cables (double circuit) of up to 50km in length each. It is anticipated that up to two export cables will be installed in separate trenches, with each trench 20m wide with a burial depth of up to 2.5m It is expected that a multi-cored 220kV High Voltage Alternating Current (HVAC) cable will be used for the offshore export cables.

4.7.3. The requirements for any cable protection (comprised of a combination of rock installation, concrete mattress, rock bags, cast iron shells, sleeving, Cable Protection Systems (CPS)) will be confirmed during detailed design.

4.7.4. The method for installation through the intertidal zone at the landfall will depend on the ground conditions. Trenchless technology such as Horizontal Directional Drilling (HDD) is being considered. HDD involves drilling a channel underground, into which the offshore export cable is installed, without the need to excavate an open trench. To achieve this, a drill rig is located inland of the landfall location and will comprise a working area containing the drill rig, electrical generator, water tank, mud recycling unit and temporary site office.

4.8. Construction

4.8.1. Construction sequence

- Step 1 – Pre-construction confirmatory surveys (including geotechnical surveys);
- Step 2 – Seabed preparation;
- Step 3 – Foundation installation and scour protection installation;
- Step 4 – OSP topside installation/commissioning;
- Step 5 – Offshore export cable – landfall installation;
- Step 6 – Offshore export cable – offshore installation and cable protection installation;
- Step 7 – Inter-array cable installation and cable protection installation; and
- Step 8 – Wind turbine installation/commissioning.

4.8.2. WTG and OSP foundations will be transported to the Array Area (potentially from a pre-assembly harbour) and installed with any associated scour protection. Scour protection may comprise of a pre-installation (before foundation installation) filter layer and also a post installation armour layer.

4.8.3. The WTGs will be transported to the Array Area from the pre-assembly harbour where sub-assemblies (nacelle, rotor blades and towers) will be loaded onto an installation vessel or support vessel. Depending on the vessel selected, multiple wind turbine sub-assemblies may be transported to the Array Area at any one time.

4.8.4. At the installation location, the wind turbine tower will be erected first, followed by the nacelle and blades. The blades will either be installed one at a time or pre-assembled. Following installation of the wind turbine and connection to the necessary cabling, a process of testing and commissioning will be undertaken.

4.9. Indicative construction programme

4.9.1. The construction programme for the Proposed Development will depend on a number of factors, including:

- Receipt of development consent; and

- The availability and lead times associated with procuring and installing the Proposed Development components.

4.9.2. It is currently anticipated that construction of the Proposed Development will take place over a 3–4-year period.

4.10. Operation and maintenance

4.10.1. The Proposed Development will be designed to operate with minimum day-to-day intervention over its lifetime, with each WTG being monitored and controlled using onboard controls. Faults can typically be diagnosed by the WTG itself and shut down automatically if required. The in-turbine system will transmit faults to the onshore control room, where oversight and control will be provided as necessary. It is likely that each WTG and OSP control system will also be linked to the onshore monitoring facilities via the fibre optic cables contained within the inter-array and offshore export cables.

4.10.2. Typical operation and maintenance activities include:

- Inspection and maintenance of foundations and ancillary equipment;
- Inspection and maintenance of WTGs and OSPs, including:
- Local resets;
- Scheduled maintenance;
- Unscheduled maintenance; and
- Inspection and maintenance of the inter-array cables and offshore export cables.

4.11. Decommissioning

4.11.1. A decommissioning plan and rehabilitation schedule will be included within the consent application. At the end of the operational lifetime of the Proposed Development, it is anticipated that all structures above the seabed level will be completely removed. The decommissioning sequence will generally be the reverse of the construction sequence and involve similar types and numbers of vessels and equipment.

4.12. Assessment of alternatives

4.12.1. The EIA Directive requires an EIAR to contain:

"A description of the reasonable alternatives (for example in terms of Project design, technology, location, size and scale) studied by the Developer, which are relevant to the proposed Project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects."

4.12.2. As the boundary of the Proposed Development has already been secured through the MAC (see Figure 1.1), it is proposed that the EIAR will address alternatives in terms of the design of the offshore infrastructure, for example, any design parameters considered but discounted (which may include layout and number of WTGs, construction methodologies, construction phasing, and mitigation measures). The 'do nothing' scenario will also be assessed.

4.12.3. The consideration of alternatives will address the key issues associated with each option and record how environmental considerations were taken into account in deciding on the selected option.

5. EIA Scoping

5.1. Background

5.1.1. The objective of this EIA scoping process is to identify potential environmental impacts for assessment which may be relevant to the Proposed Development.

5.1.2. The scoping process involves an assessment of a Project's potential environmental impacts before deciding which should be brought forward for further consideration in the EIAR. Although scoping commences early in the process and informs the content and level of detail in the EIAR, it is noted that scoping is dynamic and only provides a starting point from which to launch an environmental assessment of the Proposed Development. It is regarded as an ongoing process throughout the evolution of the EIAR.

5.1.3. An initial scoping of potential impacts may identify those issues thought to be potentially significant in EIA terms, those where significance is unclear, and those thought to be not significant. The issues in the potentially significant category are brought forward, together with those in the uncertain category. Those considered to be not significant are not considered further in the EIAR. Figure 5.1 illustrates the environmental assessment process and the role of scoping in the overall EIA context.

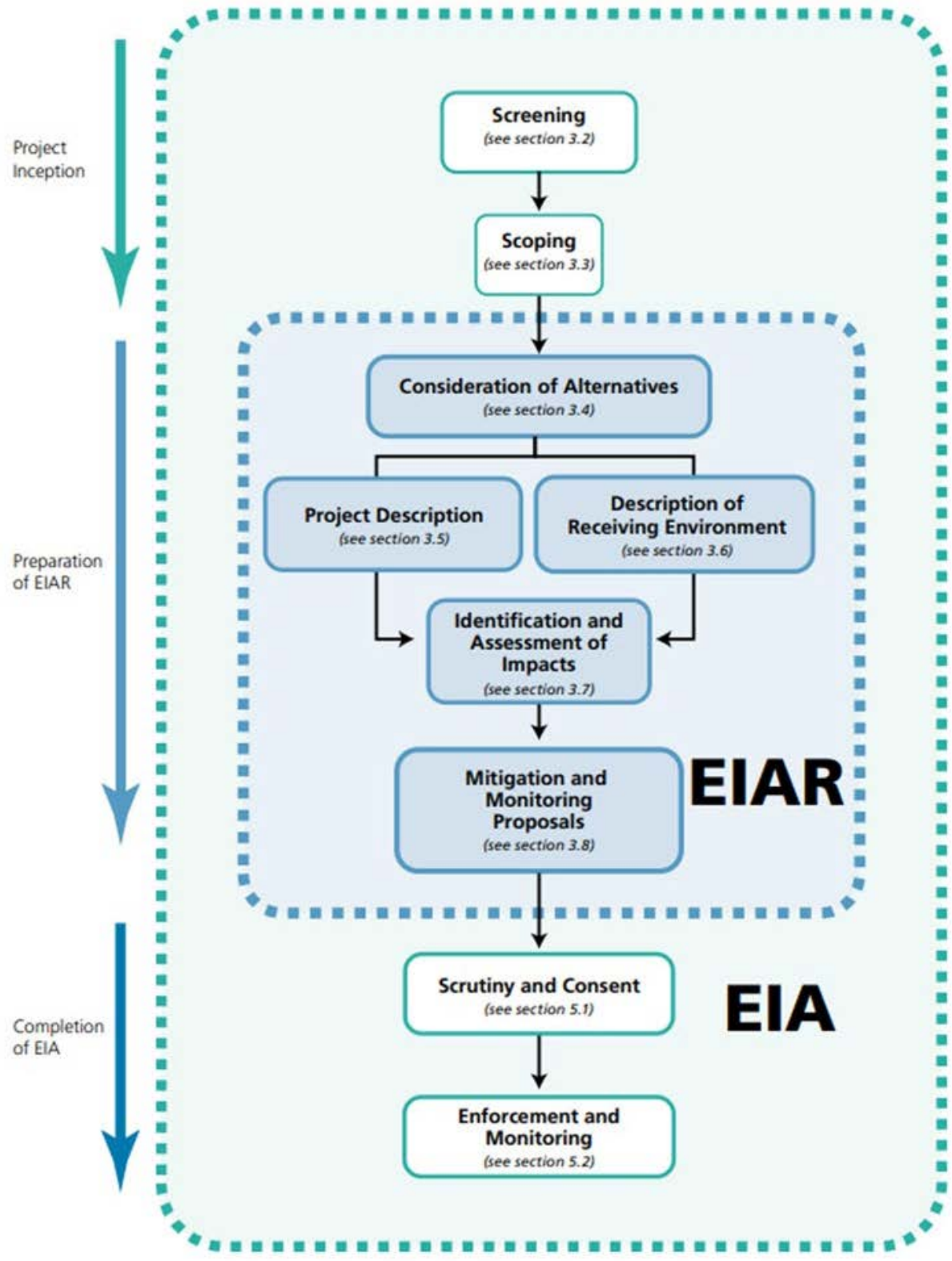


Figure 5.1 The position of scoping an EIAR within the EIA process[5]

[5] This section is referenced from 'Guidelines on the information to be contained in an EIAR' (Environmental Protection Agency (EPA), 2022

5.2. EIA Scoping guidance

5.2.1. The preparation of this Scoping Report has had regard to the following guidance documents:

- Guidance on EIA Scoping (European Commission, 2001);
- Guidelines on the Information to be Contained in Environmental Impact Statements (EPA, 2022);
- Guidance on EIA Scoping (European Commission, 2017a); and
- Guidance on EIA Report (European Commission, 2017b).

5.2.2. Having regard to the most recent guidance, based on the EIA Directive, scoping must be focused on issues and impacts which are:

- Environmentally based;
- Likely to occur; and
- Significant and adverse.

5.2.3. As noted above, scoping for an EIAR is ongoing and iterative throughout the evolution of the EIAR. This allows the flexibility to adapt to any new issues, for example the discovery of additional impacts arising from detailed baseline studies resulting in the investigation of new impacts, alternatives and mitigation measures as necessary.

5.3. Technical scope

5.3.1. The factors to be examined in an EIAR are set out in the EIA Directive as follows:

- Population and human health;
- Biodiversity;
- Land, soil, water, air and climate;
- Material assets, cultural heritage and the landscape;
- The interactions between these factors; and
- Risk of major accidents and disasters.

5.4. Consultation process feedback

5.4.1. This Scoping Report will be issued to a list of stakeholders (see Appendix A) and also made available to the public (see section 3). All feedback will be recorded and considered by the Developer in the preparation of the EIAR. Furthermore, the feedback will be documented in the EIAR with signposting to where issues have been addressed within the EIAR.

6. EIA Methodology

6.1. Introduction

6.1.1. This section presents an outline of the EIA methodology to be employed for the Proposed Development. It outlines the methodology for the identification and evaluation of potential likely significant environmental effects and also presents the methodology for the identification and evaluation of potential cumulative and interactive impacts and potential transboundary effects.

6.1.2. A systematic and auditable evidence-based approach is proposed to evaluate and interpret potential effects on physical, biological and human environment receptors.

6.2. Legislation and guidance

6.2.1. The impact assessment will draw upon a number of key guidance documents and legislation including:

- Council Directive 2011/92/EU of 13 December 2011 on the assessment of the effects of certain public and private Projects on the environment, as amended by Council Directive 2014/52/EU (the EIA Directive);
- Foreshore Act 1933 (as amended);
- European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. 296 of 2018);
- European Commission Legislation and Commission guidance documents on EIA (including screening, scoping EIA Report, etc) (https://ec.europa.eu/environment/eia/eia-support.htm);
- Environmental Protection Agency (EPA) Guidelines including: Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022);
- Guidelines on the Information to be Contained in Environmental Impact Statements (EPA, 2022);
- Guidance on Environmental Impact Statement (EIS) and Natura Impact Statement (NIS) Preparation for Offshore Renewable Energy Projects (Department of Communications, Climate Action and Environment (DCCAE), 2017);
- Guidance on Marine Baseline Ecological Assessments and Monitoring Activities for Offshore Renewable Energy Projects (Part 1 and 2, DCCAE, 2018);
- Best-Practice Guidelines for the Irish Wind Energy Industry (IWEA/SEAI, 2012);
- Government of Ireland (2018) Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (August 2018);
- Department of Housing, Planning and Local Government (2018) Circular PL 05/2018 - Transposition into Planning Law of Directive 2014/52/EU amending Directive 2011/92/EU on the effects of certain public and private Projects on the environment (the EIA Directive) And Revised Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment;
- Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater,
- Coastal and Marine (Chartered Institute of Ecology and Environmental Management (CIEEM), 2019);
- The Design Manual for Roads and Bridges (DMRB) Volume 11: Environmental Assessment (and updates) (Highways Agency et al., 2008);

- A Review of Assessment Methodologies for Offshore Wind Farms (COWRIE METH-08-08) (Maclean et al., 2009);
- 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).

6.2.2. A full account of applicable legislation and guidance taken into account within the EIA methodology will be documented within the EIAR.

6.3. Maximum design scenario

6.3.1. It is proposed to assess the Proposed Development under each EIA topic using a realistic worst-case scenario, hereafter referred to as the maximum design scenario (MDS).

6.3.2. This MDS will be selected from four discrete wind turbine generator (WTG) options and combined with one of two discrete Offshore Substation Platform (OSP) options and worst-case cabling parameters.

6.3.3. This approach ensures that the scenario that would have the greatest impact (i.e. largest footprint, longest exposure, or tallest dimensions, depending on the topic) is assessed; with robust justification to support the conclusion of further assessment that the other (lesser) WTG/OSP options would result in a potential impact that is no greater than the main impact assessment.

6.3.4. This approach is referred to in the DCCAE (2017) Guidance on EIS and NIS Preparation for Offshore Renewable Energy Projects and EPA (2022) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports.

6.3.5. Through adequate characterisation of the receiving environment, this will enable a robust assessment to be undertaken against an MDS approach to Project design, with further consideration of the other options undertaken to ensure a complete assessment of all options presented by the Developer.

6.4. Iterative approach

6.4.1. The approach to assessment will utilise an iterative approach, where impacts that are initially assessed as significant will be discussed with the Developer to ensure that changes to the design to reduce or offset the impact can be incorporated. The development of mitigation measures will also be considered as part of this iterative approach.

6.5. Identification of impacts and assessment of significant effects

6.5.1. The Proposed Development has the potential to create a range of impacts and effects with regard to the physical, biological and human environment. For the purposes of the EIAR, ‘impact’ will be used to define a change that is caused by an action. For example, the piling of turbine foundations (action) will result in increased levels of underwater noise (impact). Impacts can be defined as direct, indirect, secondary, cumulative and interactive. They can also be either positive or negative, although the relationship between them is not always straightforward. In addition, for certain impacts, the reversibility of an impact is relevant to its overall effect. An irreversible (permanent) impact may occur when recovery is not possible, or not possible within a reasonable timescale. In contrast, a reversible (temporary) impact is one where natural recovery is possible over a short time period, or where mitigation measures can be effective at reversing the impact.

6.5.2. The term ‘effect’ will be used in the EIAR to express the consequence of an impact. Using the foundation piling example again, the piling of turbine foundations (action) results in increased levels of subsea noise (impact), with the potential to disturb marine mammals (effect).

6.5.3. In general, the EIAR will determine the magnitude of the impact, the sensitivity of the receptor, and the significance of the effect, following the methodology outlined below. There may be some variations to the general EIA methodology where required by specific topic guidance, and where this is the case, this will be explained within each relevant topic chapter.

6.6. Defining magnitude of impact

6.6.1. The magnitude of an impact is the combination of extent, duration, frequency, probability and consequences of an impact. For each impact assessed within the EIAR, a magnitude will be assigned. For each topic, the magnitude of impact will be categorised into the below scale:

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

6.6.2. Scales of magnitude will be defined for each subject area within the EIAR that is relevant to the particular receptor being assessed. Design of such topic-specific scales will draw upon relevant external guidance and specialist knowledge relevant to each topic.

6.7. Defining sensitivity of receptor

6.7.1. Receptors will be defined as the physical or biological resource or user group that would be affected by the potential impacts. Potential receptors will be informed by baseline studies.

6.7.2. In defining the sensitivity for each receptor, the adaptability, tolerance, recoverability and value of that receptor will be taken into account.

6.7.3. The sensitivity of each receptor will then be defined for each topic according to the below scale:

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

6.8. Evaluation of significance of effect

6.8.1. Effect is the term used to express the consequence of an impact (expressed as the ‘significance of effect’). The significance of an effect will be determined by the consideration of the magnitude of impact alongside the sensitivity of receptor. To ensure consistency, a matrix approach will be adopted for the EIAR as presented below in Table 6.1.

Table 6.1 Matrix used for the assessment of the significance of the effect

			Existing Environment - Sensitivity			
			High	**Medium**	**Low**	**Negligible**
Description of Impact - Magnitude	**Adverse impact**	**High**	Profound or Very Significant (significant)	Significant	Moderate	Imperceptible
		Medium	Significant	Moderate	Slight	Imperceptible
		Low	Moderate	Slight	Slight	Imperceptible
	Neutral impact	**Negligible**	Not significant	Not significant	Not significant	Imperceptible
	Positive impact	**Low**	Moderate	Slight	Slight	Imperceptible
		Medium	Significant	Moderate	Slight	Imperceptible
		High	Profound or Very Significant (significant)	Significant	Moderate	Imperceptible

6.8.2. The significance of effect levels are adapted from the EPA (2022) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (Figure 5.1 Chart showing typical classification), described as follows:

- **Positive effects:** A change which improves the quality of the environment (for example, by increasing species diversity, or improving the reproductive capacity of an ecosystem, or by removing nuisances or improving amenities);
- **Neutral Effects:** No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error; and
- **Negative / Adverse Effects:** A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem, or damaging health or property or by causing nuisance).
- **Profound:** An effect which obliterates sensitive characteristics;
- **Very significant:** An effect which, by its character, magnitude, duration or intensity; significantly alters most of a sensitive aspect of the environment;
- **Significant:** An effect which, by its character, magnitude, duration or intensity, alters a sensitive aspect of the environment;
- **Moderate:** An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends;
- **Slight:** An effect which causes noticeable changes in the character of the environment without affecting its sensitivities;

- **Not Significant:** An effect which causes noticeable changes in the character of the environment but without significant consequences;
- **Imperceptible**: An effect capable of measurement but without significant consequences;

6.8.3. For the purposes of the EIAR, any effects with a significance level of moderate or less will be concluded to be not significant.

6.9. Competent experts

6.9.1. Article 5(3)(a) of the EIA Directive requires that *"the Developer shall ensure that the environmental impact assessment report is prepared by competent experts"* to ensure the completeness and quality of the EIAR. In this regard, the EIAR will be prepared by a team of competent, technical experts who have the knowledge and understanding of best science to assess the potential impacts associated with the Proposed Development and where required develop mitigation measures (including monitoring where required).

6.10. Cumulative Impact Assessment

6.10.1. The EPA (2022) defines cumulative effects as:

"the addition of many minor or significant effects, including effects of other Projects, to create larger, more significant effects".

6.10.2. This includes the impact of other relevant developments that were not present at the time of baseline data collection or survey.

6.10.3. The Cumulative Impact Assessment (CIA) will consider the likely cumulative impacts arising from the Proposed Development alongside the likely impacts of other development activities in the vicinity of the Proposed Development, based on publicly available information. The assessment will also specifically consider the likely cumulative impacts arising from the Proposed Development alongside the other ABWP2 Projects (including ABWP2 OGI, ABWP2 OMF and ABWP2 Eirgrid Grid Upgrade Works).

6.10.4. The following guidelines will be considered in undertaking the CIA:

- The EPA Guidelines on the Information to be contained in Environmental Impact Assessment Reports (EPA, 2022);
- Guidelines on the Assessment of Indirect and Cumulative Impacts as well as Impact interactions (European Commission, 1999);
- Guiding Principles for Cumulative Impact Assessment in Offshore Wind Farms (RenewableUK, 2013); and
- Advice Note Seventeen: Cumulative Effects Assessment. Approach to Cumulative Impact Assessment methodology UK Planning Inspectorate (PINS) (2015c).

6.10.5. A fundamental requirement of undertaking CIA is to identify those Projects, plans or activities with which the Proposed Development may interact to produce a cumulative impact. This process is referred to as 'screening'. A specialised process will be developed in order to methodically and transparently screen the large number of Projects, plans and activities that may be considered cumulatively alongside the Proposed Development. This three-staged approach is used to gather information on other Projects, plans and activities within the defined cumulative Zone of Influence (ZoI) for each topic considered in the EIAR. The initial long list of Projects outlined in Stage 1 is reduced in Stage 2 on an assessment of criteria/assumptions used to determine whether to include or exclude other existing/approved developments. Information is then gathered on the Projects, which is used to inform the topic-specific screening carried out by each topic specialist at Stage 3.

6.11. Transboundary assessment

6.11.1. The need to consider such transboundary impacts has been embodied by the United Nations Economic Commission for Europe (UNECE) Convention on EIA in a Transboundary Context (commonly referred to as the 'Espoo Convention'). The Convention requires that assessments are extended across borders between Parties of the Convention when a planned activity may cause significant adverse transboundary impacts. The Espoo Convention has been ratified by the European Union, Ireland and the United Kingdom. It is aimed at preventing, mitigating and monitoring environmental damage by ensuring that explicit consideration is given to transboundary environmental factors before a final decision is made as to whether to approve a Project. The Espoo Convention requires that the Party of origin notifies affected Parties about Projects listed in Appendix I and likely to cause a significant adverse transboundary impact.

6.11.2. Article 7 of the EIA Directive introduces similar requirements concerning Projects carried out in one Member State but likely to have significant effects on the environment of another. While the EIA Directive provides a definition of the term 'Project' the 1991 Espoo Convention uses the term 'proposed activity'. The principal obligation is in respect of information and consultation and is imposed by Article 7(4) of the amended EIA Directive:

"The Member States concerned shall enter into consultations regarding, inter alia, the potential transboundary effects of the Project and the measures envisaged to reduce or eliminate such effects and shall agree on a reasonable timeframe for the duration of the consultation period."

6.11.3. The EPA Guidelines (2022) outline that in the case of an EIAR, for any Project that is likely to cause significant transboundary effects, contact with the relevant authorities of other Member States should be made. This will establish a consultation framework to consider and address these effects.

6.11.4. A screening exercise has been undertaken to identify potential significant transboundary effects on another state arising from the Proposed Development (see Appendix B).

6.12. Interactions

6.12.1. Article 3(1) of the EIA Directive requires that the interaction between the environmental factors (population and human health, biodiversity, land, soil, water, air and climate, material assets, cultural heritage and the landscape) is identified, described and assessed in the EIAR.

6.12.2. The interactions assessment will be carried out with regard to the following guidelines:

- The Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions (EC, 1999);
- EPA Guidelines on the information to be contained in Environmental Impact Assessment Reports (2022); and
- PINS Rochdale Envelope Advice Note (Advice Note Nine) (PINS, 2012).

6.12.3. The assessment of potential interactions will be carried out considering two levels of potential effect:

- Project lifetime effects: effects that occur throughout more than one phase of the Proposed Development (construction, operational and maintenance and decommissioning) interacting to potentially create a more significant effect upon a receptor than if just assessed in isolation in a single phase; and
- Receptor-led effects: effects that interact spatially and/or temporally resulting in interactive effects upon a single receptor. Receptor-led effects might be short term, temporary or transient effects, or incorporate longer term effects.

6.12.4. The interactive effects chapter will provide a descriptive assessment outlining the potential for individual effects to combine, incorporating qualitative and, where reasonably possible, quantitative assessments, to potentially create additional effects that may be of greater significance than the individual effects acting in isolation.

6.13. Interface with onshore infrastructure

6.13.1. The EIAR for the Proposed Development will assess the potential environmental impacts associated with the offshore infrastructure up to the HWM.

6.13.2. The Developer will ensure that there is no gap in the assessment of the ABWP2 (offshore infrastructure and OGI) through regular discussion with the technical specialists on the assessments at the onshore/offshore interface together with the cumulative impact assessment described in section 6.10.

7. Scoping of EIAR

7.1. Introduction

7.1.1. The scoping of an EIAR is the process of deciding what information should be contained in an EIAR and what methods should be used to gather and assess that information. Scoping is concerned with identifying those aspects of the environment where there is an interaction with a Project, either direct or indirect, positive or negative, and as a consequence where there is potential for likely and significant effects, which need to be assessed.

7.1.2. The potential environmental impacts of the Proposed Development are set out in this Scoping Report, and it has been determined which impacts will be scoped into or scoped out of the EIAR process.

7.1.3. It is proposed that the following list of environmental topics will be examined in the EIAR for the Proposed Development. This list is presented with reference to the factors to be examined as set out in the EIA Directive:

- Land, Soil and Water:
  - Coastal processes.
  - Marine water and sediment quality
- Biodiversity:
  - Benthic subtidal and intertidal ecology;
  - Fish, shellfish and sea turtle ecology (including underwater noise);
  - Marine mammals (including underwater noise);
  - Offshore bats; and
  - Offshore ornithology.
- Population and human health:
  - Commercial fisheries;
  - Shipping and navigation;
  - Civil and military aviation;
  - Population and human health; and
  - Airborne noise.
- Landscape:
  - Seascape, landscape and visual amenity.
- Material assets:
  - Infrastructure and other users.
- Cultural heritage including archaeological heritage:
  - Marine archaeology.
- Air and Climate:
  - Air quality and climate.
- Major accidents and natural disasters

- Interactions.

7.1.4. The geographic scope of the EIA will vary for each environmental topic and will depend on the nature and sensitivity of the receiving environment and the pathway through which impacts may be received (e.g. via air, water etc.). The geographic scope of each EIA topic will be clearly defined in the EIAR. Further information on each topic study area is provided below.

7.1.5. The potential impacts of the Proposed Development during the construction, operational and maintenance and decommissioning phases will be assessed in the EIAR. The EIAR will include assessment of impacts over the short, medium and long term as appropriate.

7.1.6. An initial EIA scoping exercise has been carried out, the results of which are set out in the following sections. For each environmental topic proposed to be included in the EIAR, the following headings are discussed:

- Study area;
- Data sources;
- Baseline environment;
- Potential impacts;
- Impacts scoped out of further assessment;
- Proposed assessment methodology; and
- Designed-in measures and mitigation.

7.1.7. The most up to date available standards, guidelines and data have been referenced in this Scoping Report, however, it is recognised that amendments and updates will become available from time to time during the EIAR phase of the Proposed Development. The EIAR will reflect the most up to date information available at that time.

7.1.8. Section 25 provides a summary of the topics that will be further assessed in the EIAR.

8. Coastal processes

8.1. Introduction

8.1.1. This section of the Scoping Report identifies the Coastal Process receptors of relevance to the Proposed Development and considers the potential impacts from the construction, operation & maintenance and decommissioning of the Proposed Development, up to HWM.

8.1.2. For the purposes of both this Offshore Scoping Report and the subsequent EIAR, Coastal Processes includes the following topics:

- Morphology, including bathymetry, geology, surficial sediments and seabed form;
- Hydrodynamics, including tidal and non-tidal influences, and waves; and
- Sediment transport, including suspended sediment.

8.1.3. Coastal Processes pathways are closely linked to seabed, coastal and water quality receptors. This section covers the Marine and Coastal Processes pathways and receptors present within the study area.

8.2. Study area

8.2.1. The Coastal Processes Study Area, or Zone of Influence (ZoI) is defined as one tidal excursion from the Array Area and extends inshore to High Water Mark (encompassing the Export Cable Corridors), as shown in Figure 8.1. A tidal excursion is the distance which the tide (i.e., and therefore suspended material) travels during the course of a single tidal cycle. Here, the spring tidal cycle will be used to define the Study Area as it will represent the greatest tidal excursion. Any material which remains in suspension would be transported back towards the Array Area on the returning tide.

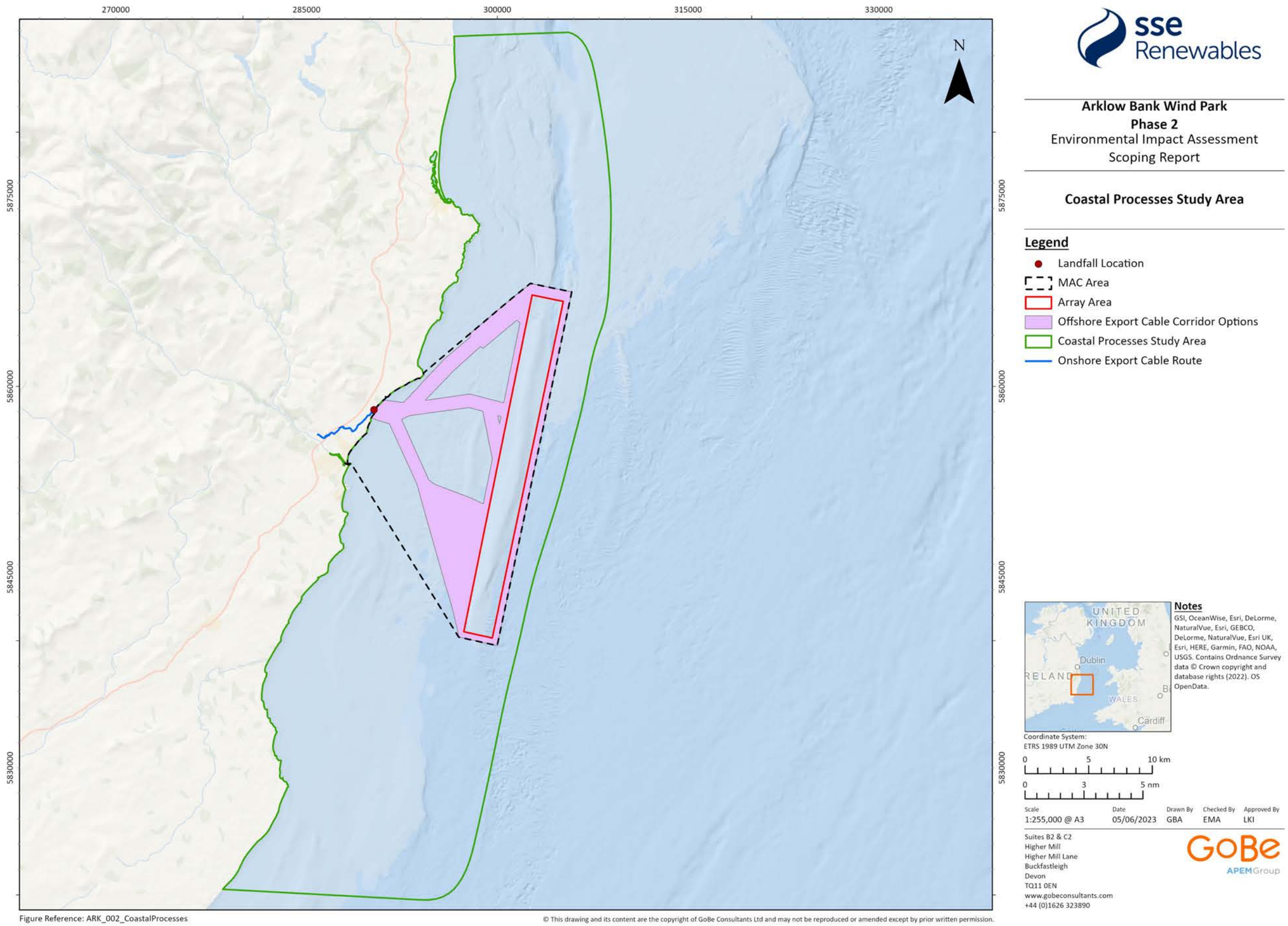


Figure 8.1 Coastal processes study area

8.3. Data sources

8.3.1. This initial characterisation of the baseline (pre-development) environment has been informed through a high-level, desk-based review of publicly-available literature and data sources, alongside a number of site-specific survey data. A further and more detailed consideration of the information sources presented in the following sections will be undertaken during the EIAR phase of works.

8.3.2. Pre-existing metocean, sedimentological and morphological data in addition to published literature is presented in Table 8.1.

8.3.3. Further, a suite of site specific measurements will be used to further support the baseline characterisation. These include both those collected for ABWP1 in addition to the Proposed Development:

- A series of geotechnical borehole surveys were conducted as part of the ABWP1 site investigations and the ABWP2 site investigations in 2020 and 2022. These surveys will inform on the underlying geology of the ABWP2 site;
- Geophysical surveys undertaken in 2019 (Ultrabeam Ltd, 2019) and 2022; and
- A suite of benthic surveys were undertaken within the ABWP1 site investigations (Section 11 of this Scoping Report provides a comprehensive list of these surveys).
- Additional benthic surveys have been undertaken as part of the ABWP1 post construction monitoring in 2021. Both sets of surveys provide sediment characterisation information, complementary to the more regional datasets.

Table 8.1 Summary of key publicly available data sources for Coastal Processes

Data source	Summary	Source
Irish Marine Weather Buoy network	M5 offshore wave buoy	http://www.marine.ie/
Marine Institute	Ireland's Marine Atlas	http://atlas.marine.ie
Commissioners of Irish Lights	Coningbeg and Splaugh buoys. These buoys are equipped with meteorological and oceanographic (MetOcean) sensors and transmit their data to Irish Lights Headquarters. Data collected includes average wind speed, wind gust speed, average wind direction, gust direction, wave height, wave period and water temperature	Commissioners of Irish Lights - Met Ocean Buoy Data Charts (cil.ie)
SEASTATES	Metocean Data and Statistics Interactive Map	www.seastates.net
Integrated Mapping for the Sustainable Development of Ireland's Marine Resource (INFOMAR).	Surveys covering the Array Area and offshore export cable corridor (ECC) completed in 2016, as part of the ongoing INFOMAR Project (formerly Irish National Seabed Survey or	https://www.infomar.ie/

Data source	Summary	Source
	INSS). The INFOMAR programme includes multibeam bathymetry, backscatter, single beam echosounder, sub-bottom profiling, magnetometer data and seabed sampling data.	
European Marine Observation and Data Network (EMODnet) bathymetry and geology	Bathymetry, seabed substrate and seafloor geology maps have been utilised in the development of the characterisation of the surface and underlying geology;	https://portal.emodnet-bathymetry.eu
Murphy Dollard (2001)	This study was examined the generalised baseline conditions, including the metocean regime, to determine the sediment transport characteristics. The study was undertaken by an assessment of the Arklow Bank cross-section	
Cefas Suspended Sediment Climatologies around the UK	Annual averages of non-algal Suspended Particulate Matter (SPM) data (Cefas, 2016)are based on the satellite derived Ifremer OC5 algorithm (Gohin et al, 2011).	https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/584621/CEFAS_2016_Suspended_Sediment_Climatologies_around_the_UK.pdf
Intergovernmental Panel on Climate Change (IPCC)	Sixth Assessment Report: Impacts, Adaption and Vulnerability	https://www.metoffice.gov.uk/pub/data/weather/uk/ukcp18/science-reports/UKCP18-Marine-report.pdf
NASA Sea Level Change Portal	Sea Level Projection Tool	https://sealevel.nasa.gov/ipcc-ar6-sea-level-Projection-tool
National flood information portal	Mapping tool indicating coastal flood erosion risks	https://www.floodinfo.ie/

8.4. Baseline environment

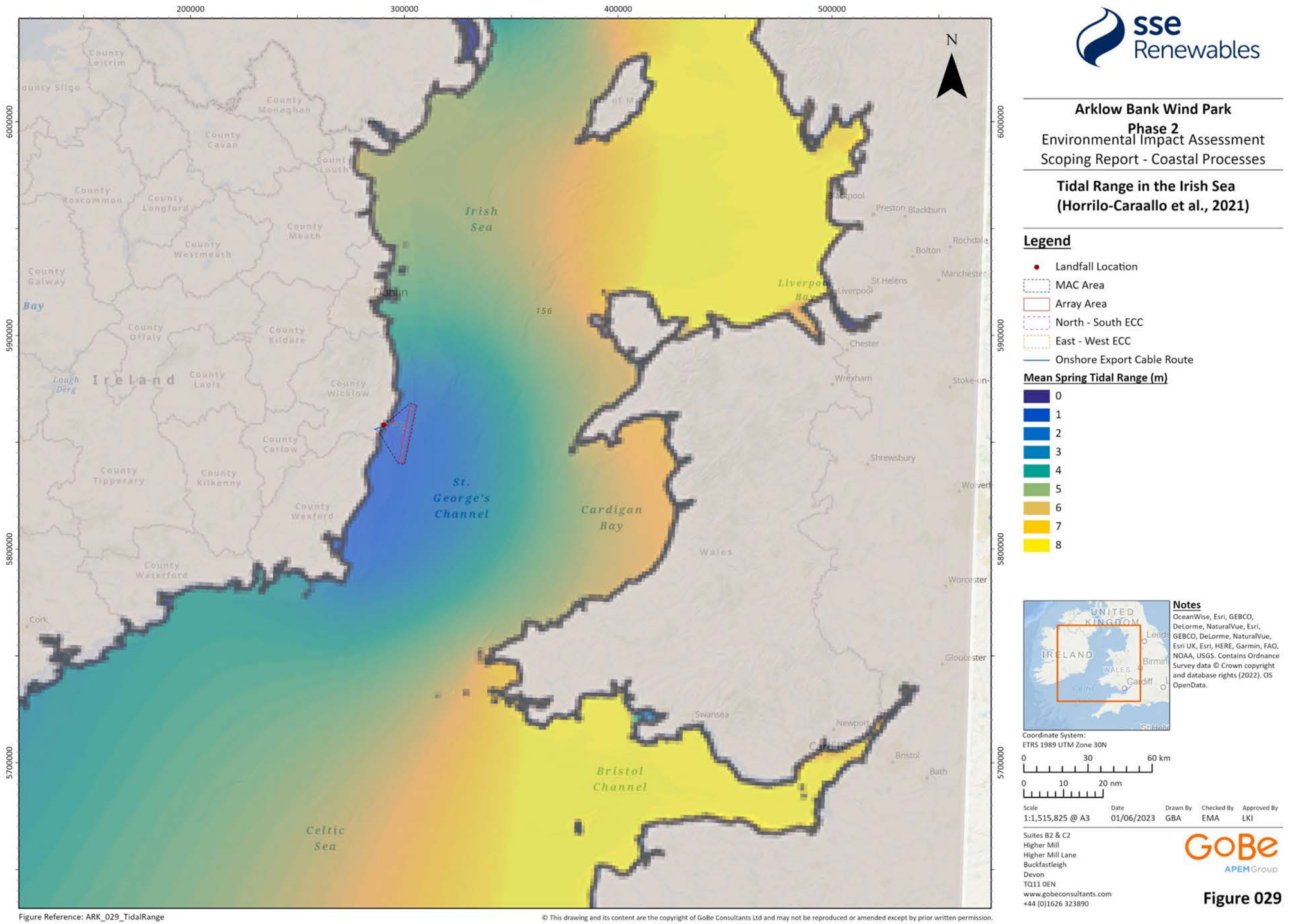
8.4.1. An understanding of the baseline coastal processes which control the features, pathways and receptors within the study area has been derived from the available data sources and literature (Table 8.1). Regional context is provided where appropriate and dependent upon the scale of the processes discussed. This baseline understanding, as presented below, will be further developed and updated in following phases of the EIAR process.

Hydrodynamics

8.4.2. This section provides an overview of the tidal, non-tidal, and wave processes on the Proposed Development.

Tides

8.4.3. The tidal range at the Proposed Development is influenced by the presence of a degenerate amphidromic point located in the eastern Irish coast at Courtown, resulting in a near-zero tidal range (Creane et al., 2022) which is classified as a micro-tidal setting (Figure 8.2).



sse Renewables

Arklow Bank Wind Park Phase 2
Environmental Impact Assessment
Scoping Report - Coastal Processes

Tidal Range in the Irish Sea (Horrilo-Caraallo et al., 2021)

Legend

- Landfall Location
- MAC Area
- Array Area
- North - South ECC
- East - West ECC
- Onshore Export Cable Route

Mean Spring Tidal Range (m)

- 0
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8

Notes
OceanWise, Esri, GEBCO, DeLorme, NaturalVue, Esri, GEBCO, DeLorme, NaturalVue, Esri UK, Esri, HERE, Garmin, FAO, NOAA, USGS. Contains Ordnance Survey data © Crown copyright and database rights (2022). OS OpenData.

Coordinate System:
ETRS 1989 UTM Zone 30N

0 30 60 km
0 10 20 nm

Scale	Date	Drawn By	Checked By	Approved By
1:1,515,825 @ A3	01/06/2023	GBA	EMA	LKI

Suites B2 & C2
Higher Mill
Higher Mill Lane
Buckfastleigh
Devon
TQ11 0EN
www.gobeconsultants.com
+44 (0)1626 323890

GoBe APEM Group

Figure 029

Figure Reference: ARK_029_TidalRange

Figure 8.2 Tidal range in the Irish Sea (Horrillo-Caraballo et al., 2021)

8.4.4. Strong tidal currents are experienced within the site and coincide with the presence of the Arklow Bank sandbank feature. The general flow direction is towards the NNE during the flood tide and towards the SSW during the ebb. Spring tidal current speeds are in excess of 2m/s towards the north end of the sandbank on both flood and ebb tides, whilst to the south the peak tidal currents are of the order of 1.7m/s. The residual tidal current on the Arklow Bank has a clockwise circulation, with a residual flow northward on the western flank and a southward direction of the residual flow on the eastern flank. As shown in Figure 8.3, high values of vorticity maxima in the tidal residual flow (an indicator of sediment transport and water movement) within the Array Area are predicted and align with the presence of the sandbank (Horrillo-Caraballo et al., 2021).

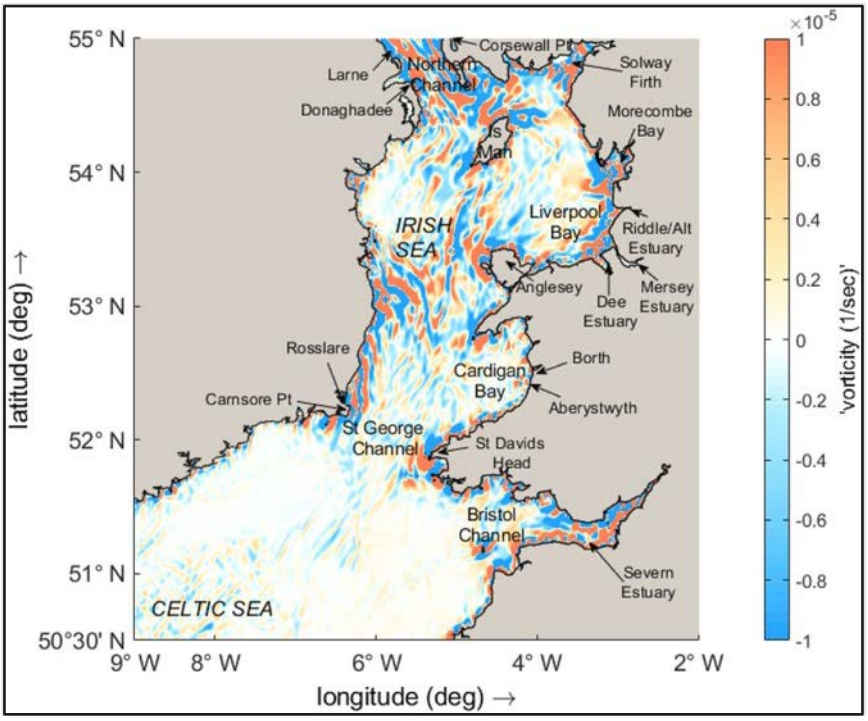


Figure 8.3 Vorticity field in the Irish Sea (Horrilloa-Caraballo et al., 2021)

Non-Tidal Influences

8.4.5. Superimposed upon regular tidal behaviours are various non-tidal influences, which mainly originate from meteorological effects. An example is surges, formed by rapid changes in atmospheric pressure causing the water levels to fluctuate considerably above or below the tidal level. This effect can be further impacted by the wind strength and direction. Moving low pressure systems and associated strong and persistent wind fields may generate strong positive surges, often referred to as a 'storm surge'. Storm surges may cause short-term modification of astronomically driven tidal currents. The 1 in 50-year return period storm surge at the site is of the order of 1.0m (Flather et al.,1998). Under an extreme (1 in 50-year return period) storm surge, current speeds may be more than twice that encountered under normal peak spring tide conditions.

Waves

8.4.6. The presence of the Irish and Welsh mainland provides relative shelter to the majority of the Irish Sea from waves generated within the North Atlantic and North Sea, such that the wave regime can be characterised as predominately locally-generated (Howarth, M.J., 1999). However, due to the relative proximity of the Proposed Development to the St.George's Channel, a proportion of the wave regime experienced at the site is under the influence of North Atlantic swell waves.

8.4.7. Whilst the mean annual significant wave height at the Proposed Development is of the order of 0.9m (ABPmer, 2023), maximum wave heights exceed this due to waves originating from a

southerly direction. The wave rose provided in Figure 8.4 clearly illustrates the dominance of southerly waves in the wave climate within the study area.

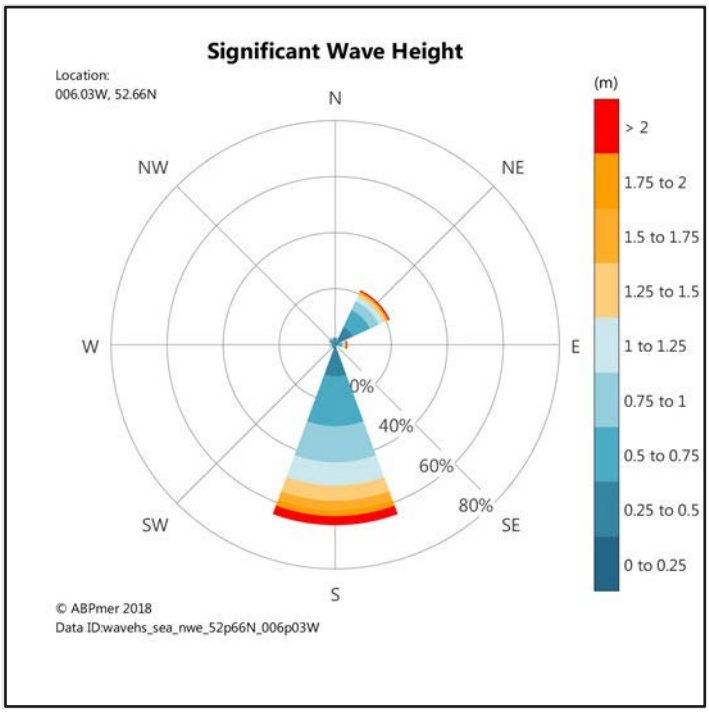


Figure 8.4 Significant wave height at the Proposed Development (ABPmer, 2023)

8.4.8. The water depths on Arklow Bank are within the range 0.6m and 25m (LAT). As such, breaking waves are often present on parts of the bank, even during low swell conditions. There is a dominance of southerly waves attributed to large Atlantic swells entering the Irish Sea and the dominance of westerly winds.

Morphology

8.4.9. This section provides an overview of the bathymetry, geology, surficial sediments and seabed features of relevance to the Proposed Development.

Bathymetry

8.4.10. Across the Array Area, water depths range between 0.6m and 50m (LAT), with the shallower depths corresponding to the prominent bathymetric feature, Arklow Bank. Along the ECC, depths typically shallow in a landward direction from 40m (CD). Bathymetric data for the site and wider area is shown in Figure 8.5.

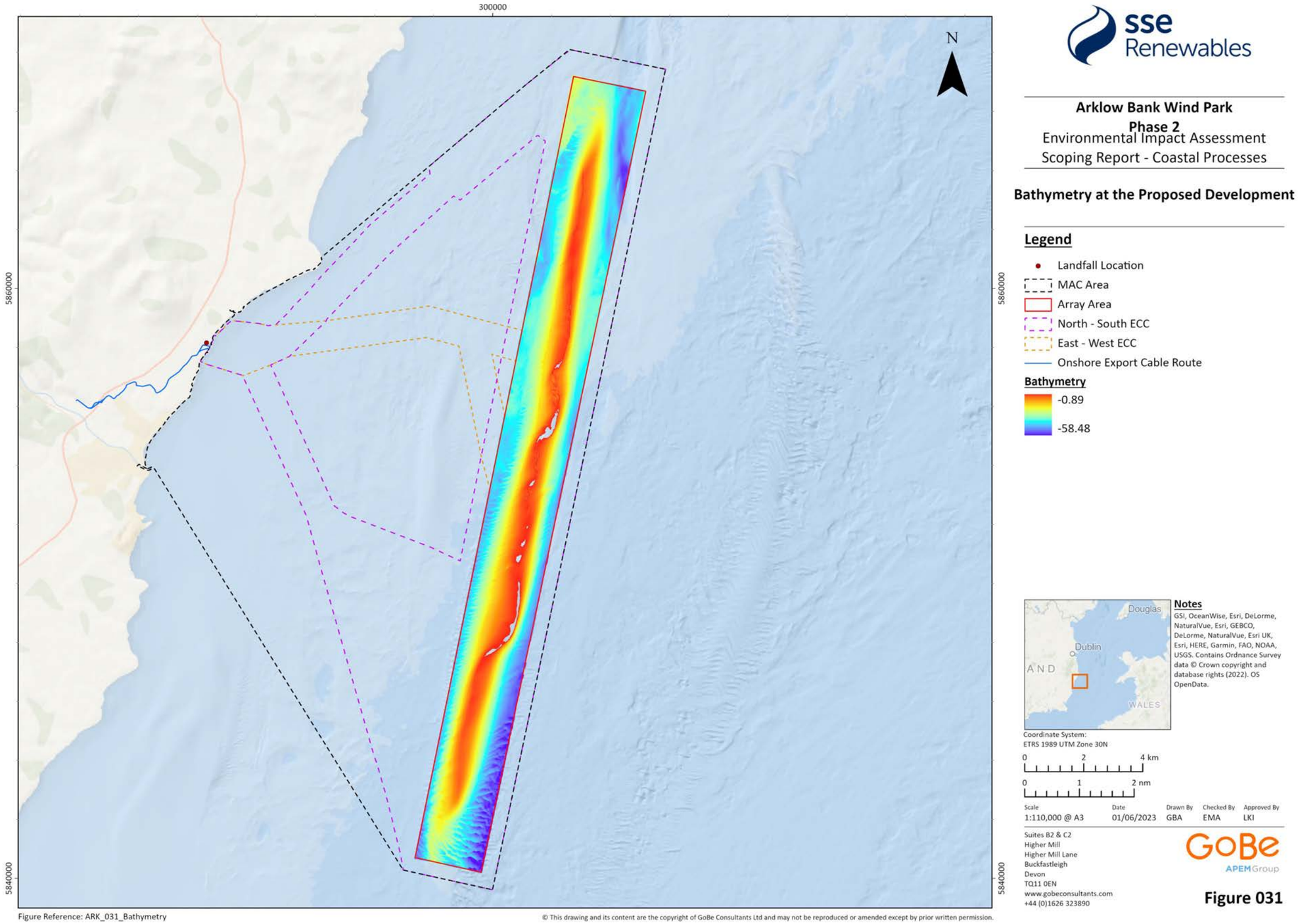


Figure 8.5 Bathymetry at the Proposed Development

Geology

8.4.11. The geology of the site can be generally characterised (Coughlan et al., 2020) by:

- Coarse-lag sediments, comprised of re-worked glacial sediments. The sediments are typically Holocene, with the underlying units classified as the Upper Till member and Chaotic Facies; and
- Mobile sediments, identified by mobile sandwaves and the presence of sandbanks, such as Arklow Bank.

8.4.12. Site-specific surveys and studies (Murphy Dollard, 2001; GEOQUIP, 2021; Waterman Infrastructure and Environmental Ltd, 2020; 2022) undertaken for the Proposed Development also indicate the following key geological characteristics:

- Below the bank core, quaternary soils predominantly consist of very dense sand, gravel and gravelly sand. A thin clay layer was encountered in one borehole at the north end of the bank;
- Marine deposits of silt, sand and gravel are located over Mudstone, Siltstone, Slate and Volcanoclastic igneous rock deposits in the nearshore zone, towards the proposed landfall locations.

Surficial Sediments

8.4.13. The surficial seabed sediments within the regional area are characterised by sand and gravel material, as illustrated in Figure 8.6. Project specific surveys indicate that sediments are heterogenous, composed of mobile sands, slightly gravelly sands and gravelly sands are present on Arklow Bank (Sure Partners Ltd., 2000; Aquatic Services Unit, 2012; 2021). Medium sand is mainly located at upper levels (<15m) with a gravel-sand with gravel fractions located at greater depths. The substratum ranges from sandy shell to gravel to the west, north and south of the bank to coarse shell and gravel and some rock to the east of the bank. The bank itself consists of mainly sand, cobbles with shells and pebbles at the northern end of the bank and fine sand at the southern end.

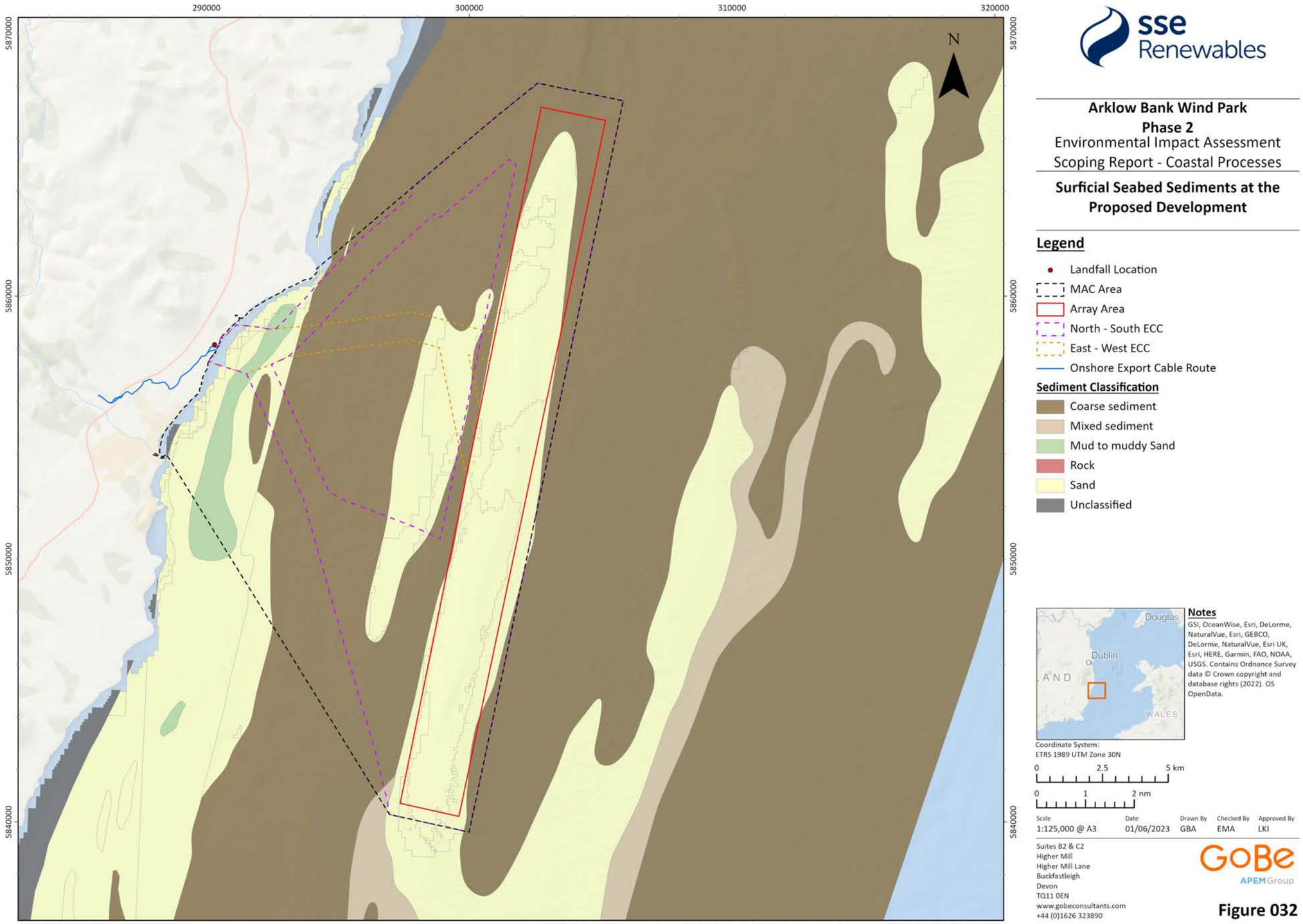


Figure 8.6 Surficial seabed sediments at the Proposed Development (INFOMAR, 2022)

Suspended sediments

8.4.14. Sediment in the Coastal Processes Study Area is dominated by sand or slightly gravelly sand. Recent sampling campaigns (Arklow Energy Ltd., 2016) in the area confirm that the bank is comprised of sandy sediments with around 90% of the sediment composition being between 2mm and 63µm. The significant proportion of relatively fine material coupled with the high energy environment in the region would indicate an area with potentially high background levels of suspended sediment.

8.4.15. The Centre for Environment, Fisheries and Aquaculture Sciences (Cefas) Climatology Report 2016 (Cefas, 2016) shows the spatial distribution of average non-algal Suspended Particulate Matter (SPM) for the majority of the UK continental shelf. Using this study, it is estimated that the average SPM associated with the Arklow Bank over this period is approximately less than 2.5mg/l, as shown in Figure 8.7. The higher levels are experienced more commonly in the winter months.

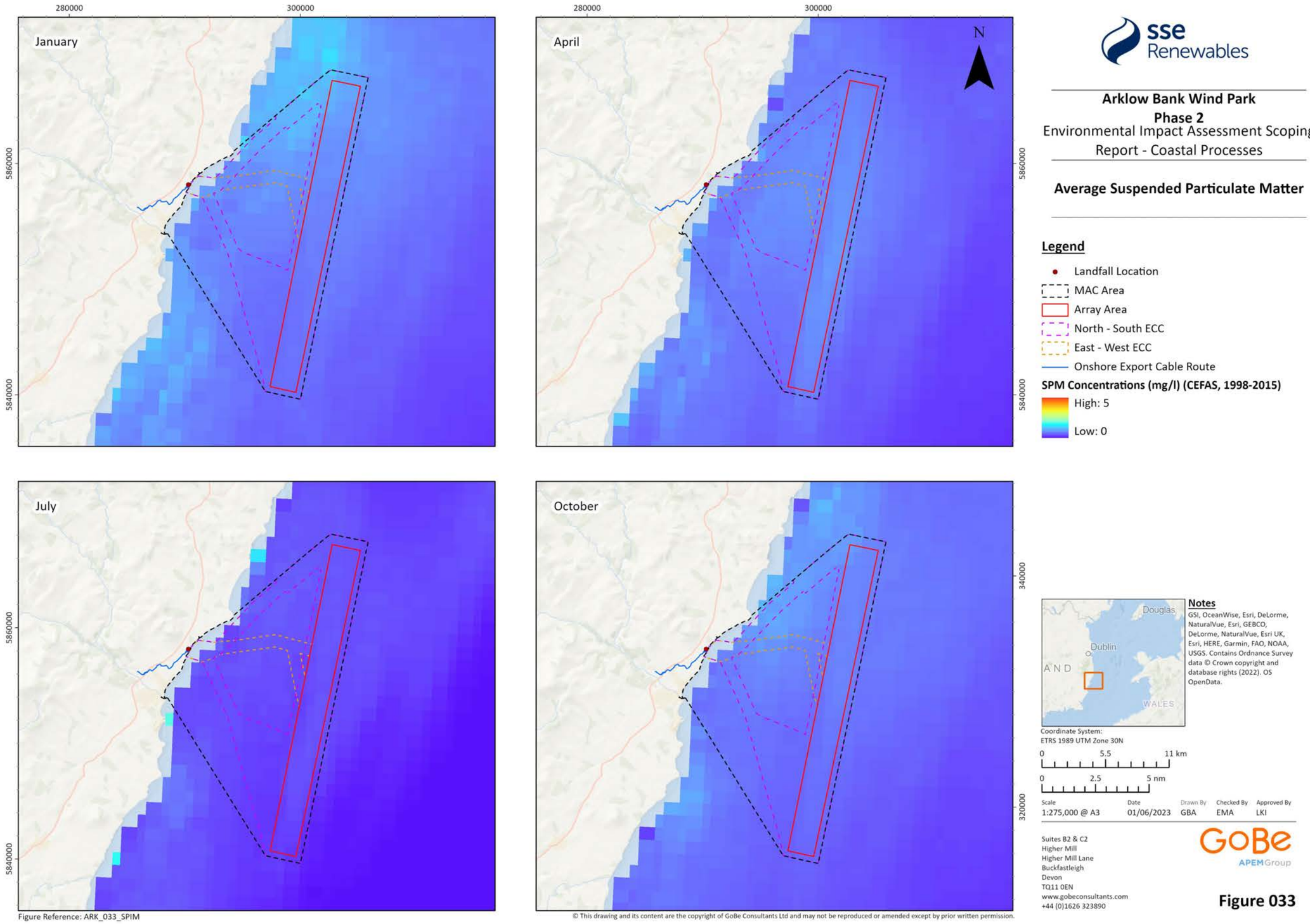


Figure 8.7 Average Suspended Particulate Concentrations at the Proposed Development

Seabed Features

8.4.16. The Proposed Development coincides with the location of a prominent seabed feature, Arklow Bank illustrated by sand habitat in Figure 8.6. This bathymetric feature is an open-shelf linear sandbank (Figure 8.8) situated, approximately, 6 to 15km off the Irish coast near Arklow. The sandbank is, approximately, 25km long and orientated roughly north-south and experiences strong tidal currents, breaking waves and active sediment transport.

8.4.17. The base of the sandbank exhibits long-term stability, with mobile bedforms present on the upper layers (Creane et al., 2023). The sandbank crest consists of a smooth seabed with areas of localised bedforms, attributed to the high current regime. Water depths vary along the bank crest with water depths along the north-south orientated bank crest varying between 0.6m and 4.0m (relative to lowest astronomical tide (LAT) which is Chart Datum (CD) Arklow). Beyond the bank crest water depths increase, with the angle of the crest slope being more pronounced on the eastern side.

8.4.18. Superimposed on both the sandbank flanks and crest are sandwaves, with wavelengths of up to 150m and amplitudes of 10m. Comparison of the 2019 Project specific bathymetric surveys against 2016 INFOMAR data indicates that whilst there is active bedform (sandwave) migration on the sandbank, both the banks' crest and alignment have remained stable.

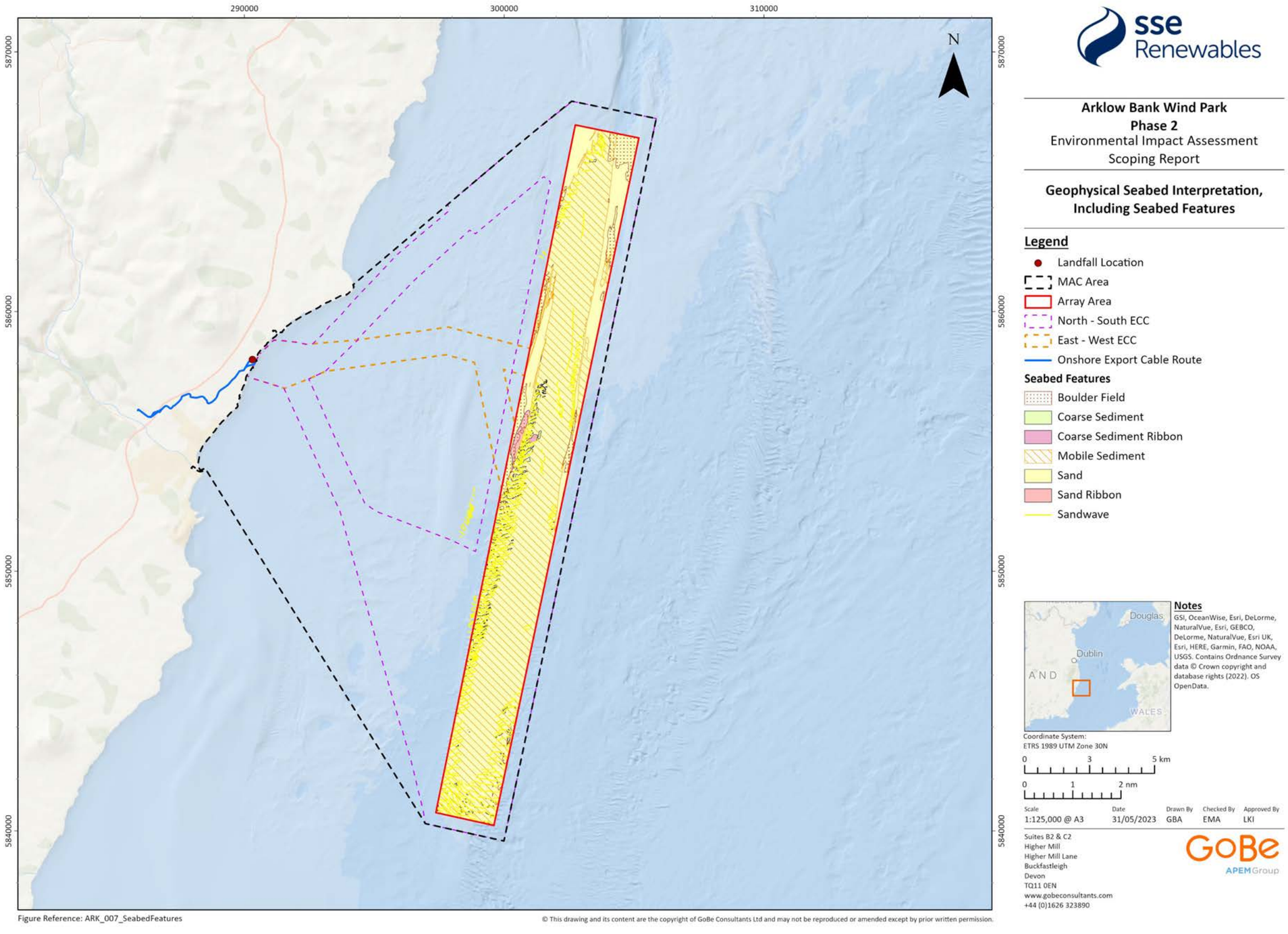


Figure 8.8 Geophysical Seabed Interpretation, Including Seabed Features

Coastal Form

8.4.19. The Arklow coastline shoreward of the Proposed Development is composed of rocky headlands and sandy beaches (Figure 8.9). A mix of foreshore cliffs, dunes and vegetated marshlands back the sandy beaches (Waterman Infrastructure and Environmental Ltd, 2020; 2022).

8.4.20. Between Arklow and Ardanary (Figure 8.9) the southern stretch of the coastline has been classified as being potentially vulnerable to wave overtopping (RPS, 2021b). Further, between Arklow and Seabank, to the south of the proposed landfall location, the coastline is shown to undergo erosion by 2050, based on existing management and climate conditions (Office of Public Works, 2023; Vousdoukas et al., 2020).

8.4.21. The presence of Arklow Bank affords some protection to the shoreline, acting as a natural breaker for incoming waves (RPS, 2010).

Figure 8.9 Coastal Form (Waterman Infrastructure and Environmental, 2020)

Sediment transport

8.4.22. Analysis of sandwaves alongside conceptual numerical modelling (hydrodynamic; sedimentological) confirms the presence of an active sediment transport system around Arklow Bank which is under the control of tidal currents (Creane et al., 2023; Creane et al., 2022).

8.4.23. The presence of off-bank anticlockwise residual tidal eddies have also been shown not only to control the long-term stability of Arklow Bank, but also sediment transport in and out of the local sediment transport system (Creane et al., 2023). Regional sediment transport directions and magnitude are shown in Figure 8.10.

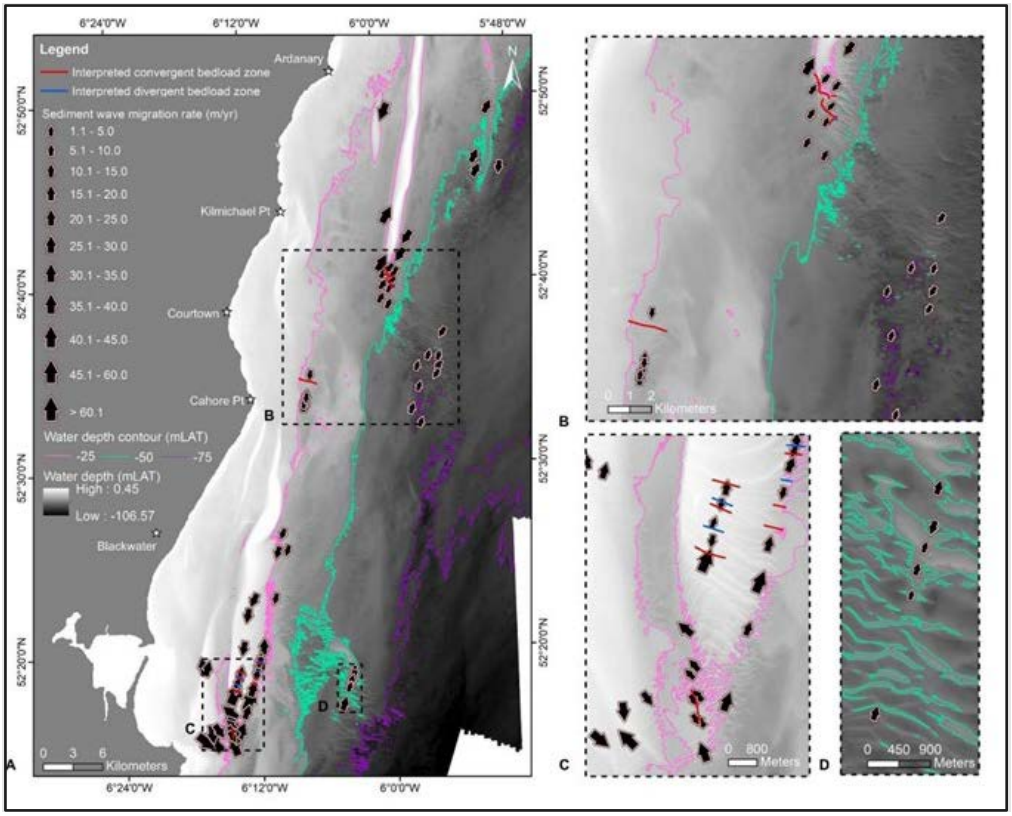


Figure 8.10 Regional sediment transport (Creane et al., 2022)

Future Changes

8.4.25. A consideration of the future baseline, including the associated variation, is provided in the context of the operating lifetime of the Proposed Development. For the current purposes of this Offshore Scoping Report, the Representative Concentration Pathway (RCP) 8.5 (high emissions) scenario (Palmer et al., 2018) has been presented.

8.4.26. UKCP18 suggests that an increase in mean sea level (MSL) of 0.6 to 0.8m at 2100 along the eastern coast of Ireland (Palmer et al., 2018). Extreme sea level (RCP 8.5; 100 year event) of 3.28m at 2100 at the nearest data point (approximately 25km north from Arklow) has been predicted (Vousdoukas et al., 2018).

8.4.27. Wave energy is predicted to increase, such that by 2100 an increase of up to 5% of the 100 year return period has been modelled in the Celtic Sea (RCP8.5 scenario; Meucci et al., 2020). Of note however, is that there is no significant increase in the frequency of occurrence of these events over the same period (Meucci et al., 2020).

Designated Sites and Protected Species

8.4.28. There are no sites of nature conservation importance for coastal processes that are located within the Proposed Development (Figure 8.11). The nearest Natura 2000 sites with relevant features are the:

- Wicklow Reef SAC designated for the Annex I habitat 'Reefs' (approximately 5km to the north of the Proposed Development); and
- Blackwater Bank SAC (approximately 15km to the south of the Proposed Development) designated for the presence of the Annex I habitat 'Sandbanks which are slightly covered by sea water all the time'.

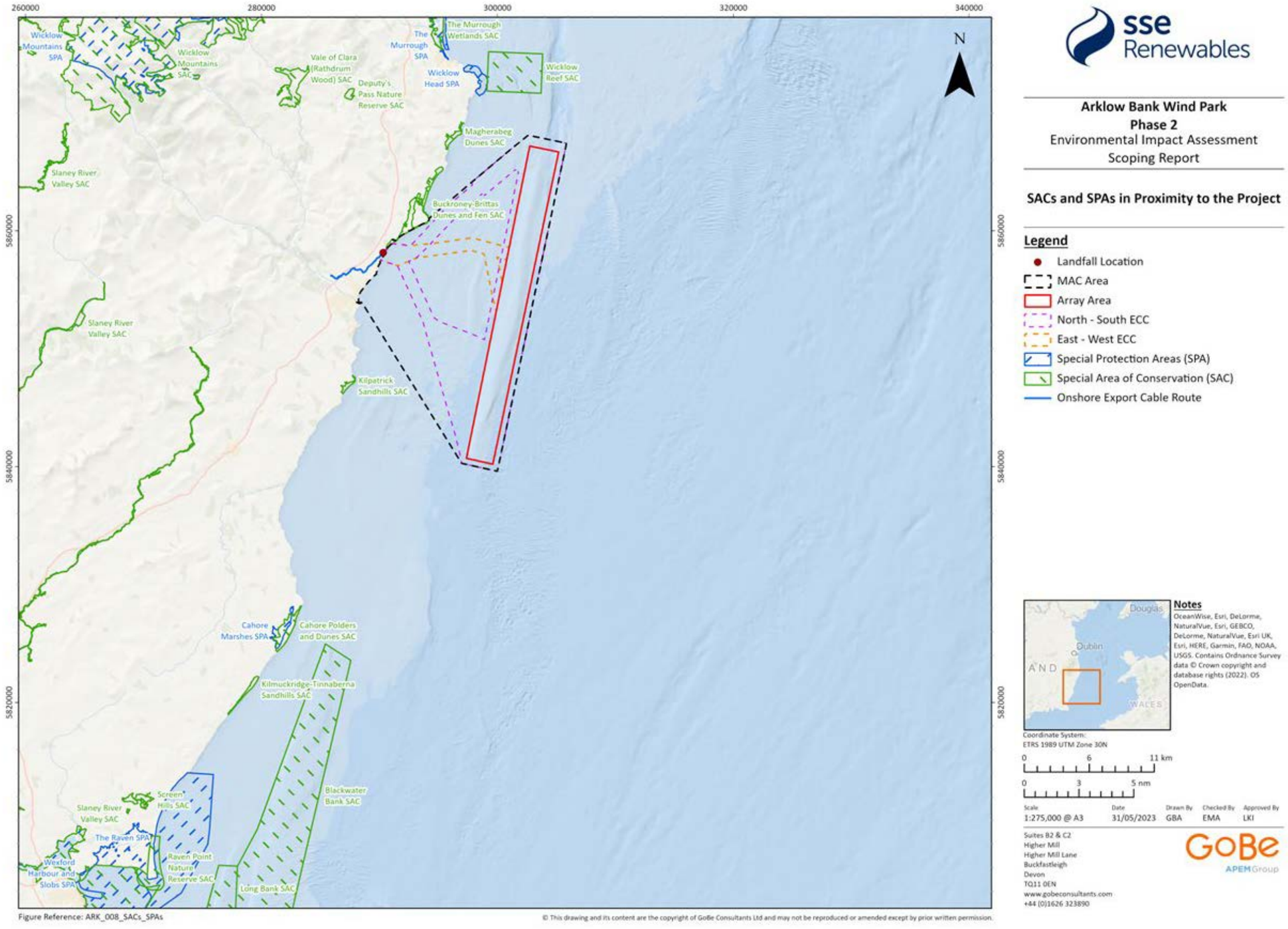


Figure 8.11 Designated site proximities to the Proposed Development

8.5. Potential impacts

8.5.1. Table 8.2 presents the potential impacts that could arise from the Proposed Development during the construction, operational and maintenance and decommissioning phases.

Table 8.2 Impacts to be scoped in for the Coastal Processes EIAR chapter

Potential impact	Phase			Justification
	C	O	D	
Increased suspended sediment concentrations and associated deposition	✓	✓	✓	Construction and decommissioning phase • There is potential for increased suspended sediment concentrations and associated deposition associated with seabed preparation activities in advance of the installation of offshore infrastructure, the installation of piled foundations via drilling, and cable installation activities (including trenchless techniques such as HDD). • The largest potential release would arise from augured (drilled) piles where the material would be jetted and released to the water column as a plume. The borehole logs indicated that relatively homogenous material exists to core depths with only the level of compaction increasing. Therefore, the material released would be native to the surroundings and given the mobile nature of the seabed it would be assimilated. This type of seabed material would indicate that piles may be driven (as undertaken for the installation of the ABWP1 foundations) however the augured method would present the largest potential influence on background conditions and would be used for the purposes of the assessment. • Inter-array and offshore export cables would likely be installed in trenches by ploughing or jetting within the seabed sand/gravel layer, or where the gravel layer is thin, in the underlying clays. Therefore, smaller sand particles within the sediment would have the potential to be raised into suspension during this phase of construction. • The potential for increased suspended sediment concentrations and associated deposition during the decommissioning phase will also be considered. Operational and maintenance phase

Potential impact	Phase C O D	Justification
		• There is potential for increased suspended sediment concentrations and associated deposition associated with any cable repair and/or reburial activities. Effects are likely to be similar to those described during the construction phase.
Presence of infrastructure may lead to changes to tidal currents, wave climate, sediment transport and seabed morphology	✗ ✓ ✗	Operational and maintenance phase • The presence of the wind turbines and OSP structures will cause some localised changes in tide and wave climate. The magnitude of these changes will be quantified in terms of the influence of individual structures and also the potential for interaction of effects. The impact of the Proposed Development on the tides would be assessed by comparing the wave climate and tidal currents distribution within the Array Area and surrounding area with and without the presence of the Proposed Development. • Changes in tidal flow and wave climate have the potential to alter sediment transport regimes both in the vicinity of the Proposed Development and closer inshore. The ABWP1 wind turbines on the bank have demonstrated the need for scour protection (Whitehouse et al., 2006) and the possible localised accretion where this is applied. This will be particularly important where larger gravity structures may be proposed for wind turbines located in deeper water.
C = Construction phase, O = Operational and maintenance phase, D = Decommissioning phase.		

8.6. Impacts scoped out of further assessment

8.6.1. Table 8.3 presents the potential impacts proposed to be scoped out of the Coastal Processes EIAR chapter.

Table 8.3 Impacts to be scoped out of the Coastal Processes EIAR chapter

Potential impact	Justification
Changes to seabed morphology due to depressions left by jack-up vessels	• Installation of offshore infrastructure may require the use of jack-up vessels. The potential for jack-up vessel spud-cans to affect the sediment regime has been scoped out of the assessment. Jack-up footprint depressions would likely persist after jack-up operations have been completed, although it is likely that these would infill over time through natural seabed mobility. Once depressions have been infilled, sediment transport will continue unimpeded. Vessel footprints will be of a much smaller scale than the processes governing the overall evolution of the sediment transport system (hydrodynamic regime, water depth and sediment availability) and they are therefore expected to recover through natural processes. It is not anticipated that jack-up vessel footprints will have implications for the sediment regime and therefore it is proposed that this impact is scoped out of the assessment.

8.7. Proposed assessment methodology

8.7.1. The EIA will follow the general approach outlined in Section 6 (EIA Methodology) of this Offshore Scoping Report.

8.7.2. The study area for Coastal Processes baseline within the EIA will be as currently outlined in section 8.2 above, with the scope of the Coastal Processes assessment being to characterise and understand the Coastal Processes present within the Proposed Development, particularly with respect to the metocean regime and associated sediment transport pathways. These will be used to inform other topic specific assessments, for example MWSQ and Benthic, Subtidal and Intertidal Ecology.

8.7.3. The Coastal Processes assessment will consider the magnitude and duration of the impact, the reversibility of the impact and the timing and frequency of the activity. An assessment of the potential impacts of the Proposed Development will be undertaken through application of the evidence base, alongside outputs from numerical modelling activities. Numerical modelling will be undertaken for those activities which have the potential to result in Coastal Process impacts. The significance of any changes will be evaluated against the likely naturally occurring variability in, or long-term changes to, the marine physical environment within the Project lifetime due to natural cycles, for example storm events, and/or climate change.

8.7.4. Consultation will be undertaken at pivotal points throughout the EIA process to ensure that the approach, including the application of the evidence base alongside numerical modelling, satisfies the requirements of both stakeholders and regulators.

8.8. Designed-in measures and mitigation

8.8.1. The following designed-in measures are proposed in relation to Coastal Processes:

- Scour protection: use of scour protection around offshore foundations;
- Development of and adherence to Cable Plan;
- Development of and adherence to a Development Specification and Layout Plan;
- Development of and adherence to a Construction Method Statement.

8.8.2. Any further mitigation requirements for coastal processes will be dependent on the significance of the effects. Based on the experience provided by ABWP1 construction and operation, it is anticipated at this time that no further mitigation measures will be necessary during the

construction, operational and maintenance or decommissioning phases of the Proposed Development.

9. Marine Water and Sediment Quality

9.1. Introduction

9.1.1. This EIAR chapter will consider the potential impacts the Proposed Development could have on Marine Water and Sediment Quality (MWSQ) during the construction, operation and maintenance and decommissioning phases.

9.2. Study area

9.2.1. The MWSQ study area is defined as the area encompassing the Array Area and Export Cable Corridors and extends to the, surrounding area (delineated as one tidal excursion from the Array Area) extending to HWM. A tidal excursion is the distance which the tide (and therefore suspended material) travels during the course of a single spring tide cycle (i.e. the largest tidal excursion).

9.3. Data sources

Desktop data

9.3.1. A desk-based review of literature and data sources will be undertaken to inform this Scoping report. Sources will include those presented in Table 9.1.

Table 9.1 Literature and data sources to inform scoping

Data source	Summary	Source
Marine Institute	M2 offshore wave buoy	http://www.marine.ie/
Marine Institute	Ireland's Marine Atlas	http://atlas.marine.ie
Marine Institute	Initial characterisation of the marine environment for the Marine Strategy Framework Directive (MSFD)	https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69632/pb13860-marine-strategy-part1-20121220.pdf
Cefas	Datawell Directional Waverider buoys	https://www.cefas.co.uk/data-and-publications/wavenet/
The Commissioners of Public Works	Flood Maps	https://www.floodinfo.ie/map/coastal_map/
INFOMAR	Bathymetric and sedimentology data	https://www.infomar.ie/
Environmental Protection Agency	Coastal bedrock and gravel aquifer locations	https://www.epa.ie/
Office of Public Works	Landfall coverage	Irish Coastal Protection Strategy Study Phase 3 – North East Coast

Data source	Summary	Source
Environmental Protection Agency	Water quality monitoring and assessment of Trophic Status carried out on Irish Coastal Waters for the Reporting period 2018-2020	https://gis.epa.ie/EPAMaps/
Environmental Protection Agency	Water monitoring stations used by the EPA and Local Authorities on the EDEN Monitoring Data System	https://gis.epa.ie/EPAMaps/
Environmental Protection Agency	Bathing water quality	https://gis.epa.ie/EPAMaps/
Environmental Protection Agency	WFD waterbodies risk (3rd river basin management plan cycle)	https://gis.epa.ie/EPAMaps/
Department of Housing, Local Government and Heritage	Shellfish water characterisation reports	https://www.gov.ie/en/collection/fb234-designated-shellfish-waters-wexford-waterford/

Site specific data

9.3.2. Site specific sampling was undertaken in 2016 in support of a permit application to undertake dredging and disposal works for ABWP1 (Ramboll, 2016).

9.4. Baseline environment

9.4.1. Circalittoral fine sand or circalittoral muddy sands are predicted in association with Arklow Bank itself and circalittoral/deep circalittoral coarse sediment in the areas to the east and inshore to the west. The most inshore waters near Arklow town are predicted to be a combination of circalittoral fine sand or circalittoral muddy sand and, to a lesser extent, circalittoral sandy mud (Ireland's Marine Atlas, 2016).

9.4.2. Within the Irish Sea concentrations of dissolved contaminants in seawater samples are often low or below detection limits (Cefas, 2005). However, a variety of contaminants may be present in seawater, including:

- Trace metals;
- Organic micro-pollutants (such as pesticides or Polychlorinated biphenyls);
- Hydrocarbons; and
- Radioactive isotopes.

9.4.3. In the Irish Sea, sediment contaminant concentrations are generally higher than those found in seawater (Cefas, 2005) due to the hydrophobic nature of many organic compounds and the partitioning of metals to suspended particles. Sediments with a finer particle size, such as clays and muds, can act as adsorption surfaces for contaminants that may be released into the water column if the sediment is disturbed (Cefas, 2001). Whereas sediments with larger particle sizes (e.g. sands) are not typically associated with elevated concentrations of natural and anthropogenic contaminants. According to the ABWP1 benthic ecology monitoring survey (2021), the dominant sediment type in the Array Area consists of sands and gravelly sands. The seabed on the Arklow Bank consists of slightly gravelly sands, with the deeper eastern part of the bank consisting

primarily of gravelly sands and sandy gravels. The extensive area to the west of the Arklow Bank contains sands and gravelly sands.

9.4.4. A 2016 site specific study (Ramboll, 2016) indicated in the vicinity of the landfall 1.5m layer of sand overlays a 2m till layer and no contamination is present; therefore, only native material is likely to be brought into suspension by the construction activities.

9.4.5. Suspended Sediment Concentrations (SSC) in the Irish Sea vary both spatially and temporally (annually and inter-annually). The annual average inorganic Suspended Particulate Material (iSPM) varies widely, generally decreasing with distance from the coastline. iSPM is generally derived from fluvial inputs (from both erosion in river catchments and from chemical reactions in the estuarine zone); fallout from the atmosphere; and coastal erosion combined with re-suspension of existing sediments and chemical reactions in the water column (UKMMAS, 2010).

9.4.6. Average measured iSPM for the period 1998-2015 in the vicinity of the Proposed Development is approximately 10mg/l, which is relatively turbid for open coast (Cefas, 2016).

9.4.7. Within the EIAR, classification of Irish waterbodies will be undertaken. Preliminary desktop research has determined that the waters west to the Array Area (Brittas Bay) are defined as 'high – good status' based on the 2016 – 2021 Coastal Waterbody Status results recorded in accordance with Water Framework Directive (WFD).

9.4.8. Bathing water quality at locations to the west of the Array Area (Brittas Bay (North & South), Clogga, Ballymoney and Courtown) have been classified as 'excellent' for the period 2018 – 2021 (EPA, 2022).

9.4.9. 'Other monitored waters' (beaches not formally managed under Bathing Water Regulations) have reported that the waters at 'The Cove, Arklow' meet the 'minimum standards' (EPA, 2022).

9.4.10. There are no designated shellfish waters in the vicinity of the export cable routes. The closest designated shellfish waters are Wexford Harbour and Malahide.

9.5. Potential impacts

9.5.1. Table 9.2 presents the potential impacts that could arise from the Proposed Development during the construction, operational and maintenance and decommissioning phases.

Table 9.2 Impacts to be scoped in for the Marine Water and Sediment Quality EIAR chapter

Potential impact	Phase			Justification
	C	O	D	
The potential release of contaminated sediments	✓	✓	✓	• This is as a result of sediment disturbance during construction, operation and maintenance and decommissioning (such as cable maintenance or repair) activities.
Accidental releases and spills	✓	✓	✓	• This is as a result of construction materials or chemicals. Accidental spills during all phases has the potential to reduce the Marine Water and Sediment Quality in the MWSQ study area.

Potential impact	Phase			Justification
	C	O	D	
Installation of infrastructure may affect water quality	✓	✗	✗	• Construction activities undertaken out to a distance of 1 nautical mile, such as trenching of the offshore export cable and activities at the exit point for trenchless techniques such as HDD, will be assessed in terms of the WFD. Any impact in terms of the biological elements from the aquatic and terrestrial ecology assessment will be considered in the context of the WFD ecological status and environmental objectives of water bodies. Any potential for hazardous or priority hazardous substances to affect surface and ground waters chemical status would be investigated.

C = Construction phase, O = Operational and maintenance phase, D = Decommissioning phase.

9.6. Impacts scoped out of further assessment

9.6.1. No potential impacts are proposed to be scoped out of the EIAR with regards MWSQ.

9.7. Proposed assessment methodology

9.7.1. The EIAR will consider the potential impacts of the Proposed Development within the MWSQ study area. The EIA methodology will consider the most recent Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines for Ecological Impact Assessment in the UK and Ireland (2019) and EPA (2022) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports.

9.7.2. A literature review of baseline information will be sourced from available site specific and regional data. Where data from previous site-specific surveys is relevant, they will be used to support the MWSQ EIAR assessment.

9.7.3. Numerical modelling will be developed to support the EIAR. This modelling will include:

- Hydrodynamic and Wave Models;
- Seabed Disturbance Plume Modelling; and
- Operational Impact Modelling.

9.7.4. An assessment of all coastal and transitional WFD water bodies and bathing waters within 5km of the offshore Array Area and export cables, will be undertaken to ensure there is no deterioration as a result of the Proposed Development's activities.

9.8. Designed-in measures and mitigation

9.8.1. An Environmental Management Plan (EMP) will be developed and implemented to cover the construction and operation and maintenance phases of the Proposed Development. The EMP will include planning for accidental spills, address all potential contaminant releases and include key emergency contact details.

10. Noise (airborne and underwater)

10.1. Introduction

10.1.1. The Airborne Noise EIAR chapter will consider the potential impacts of the Proposed Development arising from airborne noise generated during the construction, operational and maintenance and decommissioning phases, and will be supported by an Airborne Noise Technical Report.

10.1.2. A Subsea Noise Technical Report will also be prepared, which will inform the Fish, Shellfish and Sea Turtle EIAR chapter and Marine Mammals EIAR chapter.

10.1.3. Vibration is addressed within section 12 in relation to biological receptors.

10.2. Study area

10.2.1. The Airborne Noise Study Area is proposed to comprise noise sensitive receptors located within 500m of the shoreline between Magherabeg to the north and Kilgorman to the south. The Airborne Noise Study Area will be reviewed and updated if required, following review of the noise modelling results.

10.2.2. The study area for the underwater noise assessment is dependent on the marine ecology receptor, as defined in section 12 and section 13 of this Scoping Report.

10.3. Data sources

Airborne noise

10.3.1. A detailed technical baseline noise survey has been undertaken at six locations over 2020. The baseline noise survey was located between Magherabeg to the north and Kilgorman to the south. The locations are representative of the nearest noise sensitive receptors to the Proposed Development.

10.3.2. It is proposed to undertake predictive noise modelling using the baseline noise survey data and Light Detection and Ranging (LiDAR) data. The preferred noise prediction modelling method is BEK135.

Underwater noise

10.3.3. For the purposes of the assessment of underwater noise on the marine environment, there is no requirement to collect baseline data due to the criteria for assessing the impact of anthropogenic sound on the marine environment being absolute, and not relative to ambient noise as is typical for airborne noise.

10.3.4. In order to gain an understanding of the baseline underwater noise environment, it is proposed to use noise measurements from nearby and other acoustically similar sites as a proxy for the Arklow Bank area, where available. It is also proposed to investigate any noise data relating to other offshore sites and assess their suitability for application to Arklow Bank.

10.3.5. Underwater noise source data will be taken from a combination of publicly available noise data for other similar developments, relevant standards, empirical calculations and theoretical predictions. Specific underwater noise measurement data for the combinations of pile diameters and hammer energies is rarely available, for the intended Project specifications, which will be designed around equipment expected to be available in the future. Predictions will be based on analysis and extrapolations from a large database of existing underwater noise data primarily from Projects undertaken in the UK with which the Proposed Development will comply.

10.4. Baseline environment

Airborne noise

10.4.1. Baseline Noise Surveys were conducted in August – September of 2020. A summary of the Baseline noise Environment derived from the Baseline Survey Results are set out in Table 10.1.

Table 10.1: Baseline sound level summary

Location	Daytime 07:00 to 19:00		Evening 19:00 to 23:00		Night-time 23:00 to 07:00	
	Ambient noise, dB L_{Aeq}	**Background noise, dB L_{A90}**	**Ambient noise, dB L_{Aeq}**	**Background noise, dB L_{A90}**	**Ambient noise, dB L_{Aeq}**	**Background noise, dB L_{A90}**
LT1 – Silver Strand	52	33	42	30	38	29
LT2 - Brittas Bay	45	36	42	33	43	31
LT3 - Arklow	57	42	50	37	46	34
LT4 - Askintinny	55	33	43	31	39	29
LT5 – Clone Strand	48	34	46	34	42	33
LT6 - Johnstown	51	41	49	40	45	30

Underwater noise

10.4.2. Background or “ambient” underwater noise is generated by a number of natural sources, such as rain, breaking waves, wind at the surface, seismic noise, biological noise and thermal noise. Biological sources include marine mammals (which use sound to communicate, build up an image of their environment and detect prey and predators) as well as certain fish and shrimp. Anthropogenic sources also add to the background noise, such as fishing boats, cargo ships, industrial noise, seismic surveys and leisure activities.

10.4.3. The vast majority of research relating to both physiological effects and behavioural disturbance due to noise on marine species is based on determining the absolute noise level for the onset of that effect. As a result, criteria for assessing the effects of noise on marine mammals and fish tend to be based on the absolute noise criteria, as opposed to the difference between the baseline noise level and the specific noise being assessed. It is important to understand that baseline noise levels will vary significantly depending on, amongst other factors, seasonal variations and different sea states, meaning that the usefulness of establishing such a value would be very limited. Nevertheless, it can be useful (though not essential) when undertaking an appraisal of underwater noise to have an understanding of the range of noise levels likely to be prevailing in the area so that any noise predictions can be placed in the context of the baseline. It is important to note, however, that even if an accurate baseline noise level could be determined, there is a paucity of scientific understanding regarding how various species distinguish anthropogenic sound relative to masking noise. An animal’s perception of sound is likely to depend on numerous factors including the hearing integration time, the character of the sound and hearing sensitivity. Therefore, it is necessary to exercise considerable caution if attempting any comparison between noise from the Proposed Development and the baseline noise level.

10.5. Potential impacts

Airborne noise

10.5.1. Table 10.2 presents the potential impacts that could arise from the Proposed Development during the construction, operational and maintenance and decommissioning phases.

Table 10.2 Impacts to be scoped in for the Airborne Noise EIAR chapter

Potential impact	Phase			Justification
	C	O	D	
Increases in airborne noise due to impact piling, construction vessels, cable installation activities and decommissioning activities.	✓	✗	✓	Construction phase • There is potential for airborne noise impacts at onshore Noise Sensitive Receptors (NSR) in Arklow town and the surrounding areas due to impact piling of wind turbine and OSP foundations, construction vessels and cable installation activities. Decommissioning phase • Decommissioning effects associated with the removal of offshore infrastructure are envisaged to the same or similar to those described for the construction phase, but with the exception that piling operations will not be required.
The effects of airborne noise generated by the operational wind turbines	✗	✓	✗	• It is unlikely that there will be airborne noise effects from the operational wind turbines on onshore NSR due to distance between the receptors and the Array Area (i.e. 6 to 15km). However, noise modelling will be undertaken the EIAR to understand this impact further.

Underwater noise

10.5.2. During construction, there is potential for underwater noise impacts on sensitive ecological receptors due to impact piling, construction vessels and cable installation activities. During operation, there is potential for underwater noise impacts on sensitive ecological receptors due to operational wind turbines and maintenance activities. Decommissioning effects associated with the removal of offshore infrastructure are envisaged to the same or similar to those described for the construction phase, but with the exception that piling operations will not be required. The potential impacts on these receptors will be assessed within the relevant technical chapters of the EIAR.

10.6. Impacts scoped out of further assessment

10.6.1. No impacts are scoped out of the Airborne Noise EIAR chapter.

10.6.2. Any potential impacts from underwater noise to be scoped out will be outlined within the relevant technical chapters of the EIAR.

10.7. Proposed assessment methodology

Airborne noise

10.7.1. The assessment of airborne noise effects on onshore NSR from the construction phase will assume an MDS which leads to the greatest noise levels over the longest duration. Source noise data for offshore piling will be derived from a review of published measurements on pile driving hammers and, where necessary, scaled up for the appropriate pile size and hammer energy. Likewise, source noise levels for typical construction vessels, including the cable lay vessels, will be derived from published noise data. Sound propagation modelling will utilise a suitable peer reviewed methodology such as BEK135 which takes into account refraction under a number of commonly occurring meteorological conditions. The modelling will be carried out using typical meteorological conditions and assume downwind propagation (i.e. worst-case).

10.7.2. The approach to the construction phase airborne noise assessment will be carried out in accordance with BS 5228-1:2009+A1:2014 "*Code of practice for noise and vibration control on construction and open sites".* Mitigation measures will be formulated as part of the assessment.

10.7.3. The assessment of airborne noise effects on onshore NSR from the operation of the Proposed Development will assume the MDS of the wind speed resulting in the highest noise level, according to the manufacturer's data, for the loudest turbine option. The scenario will include all turbines operating simultaneously and be assessed at the closest residential receptor. Sound propagation modelling will utilise a suitable peer reviewed methodology such as BEK135 which takes into account refraction under a number of commonly occurring meteorological conditions.

10.7.4. There is no definitive guidance for the assessment of noise impacts from offshore wind farms. The assessment will therefore take account of World Health Organisation (WHO) guidance contained within the Night Noise Guidelines for Europe, The Assessment and Rating of Noise from Wind Farms: The Working Group on Noise from Wind Turbines (Report ETSU-R-97), 1996, the Institute of Acoustics Good Practice Guide to the assessment and rating of wind turbine noise (2013) and The Draft Revised Wind Energy Development Guidelines (2019).

Underwater noise

10.7.5. The impact criteria to be adopted for the Proposed Development will be based on the latest scientific research and guidance and will be based on a precautionary approach. Impacts on marine mammals and fish will be assessed with respect to the potential for injury and behavioural disturbance. Impact criteria will be based on those set out in National Marine Fisheries Service (NMFS) (2018) "Technical guidance for assessing the effects of anthropogenic sound on marine mammal hearing: Underwater acoustic thresholds for onset of permanent and temporary threshold shifts"; Southall et al. (2019) "Marine mammal noise exposure criteria: Updated scientific recommendations for residual hearing effects"; and Popper et al. (2014) "Sound exposure guidelines for Fishes and Sea Turtles". Mitigation measures will be formulated and assessed as part of the study.

10.7.6. Noise source data will be based on measured data from similar wind turbine devices wherever possible. If no data exists, source noise levels will be based on a combination of theoretical and empirical predictions and scaling of existing data where applicable. Source levels for other types of noise associated with the Proposed Development (e.g. piling, vessels, installation and decommissioning activities) will be based on published data and established prediction methodologies.

10.7.7. Underwater noise modelling will be undertaken to assess the impact of construction and operational noise using the, well known and widely used sound propagation model, INSPIRE, which is designed around and dedicated to piling for offshore installations such as ABWP2. This will take into account the bathymetry and other characteristics of the area intrinsically. The modelling will also take into

account the swim speeds of marine mammals and fish to calculate cumulative sound exposure levels.

10.7.8. The results of the study will be presented in the Subsea Noise Technical Report, which will be used to inform the Fish, Shellfish and Sea Turtle Ecology, and Marine Mammal EIAR chapters.

10.7.9. At the end of 2022, under the European Union (EU)'s Marine Strategy Framework Directive (MSFD) the Technical Group for Underwater Noise published guidance for Member States to assist in the achievement of Good Environmental Status. This was for both impulsive (TG-Noise DL2) and continuous (TG-Noise DL4) noise sources. Specifically, the guidance was developed to enable Stakeholders to set suitable noise thresholds for Member State's local habitat. Although guidance for the noise thresholds, or Level of Onset of Biological adverse Effect (LOBE), is offered, this has not been set in Irish legislation or national guidelines.

10.7.10. It is advised that for impulsive noise, these LOBEs, once determined, are not exceeded over 20% of an assessment or habitat area over the short-term (i.e. daily exposure) or 10% of the assessment or habitat area for long-term exposure (e.g. 1 year). For continuous noise, the advice is to set threshold values to 20% of the target species habitat on average over a month in any month of an assessment year. These recommendations will be monitored, and when adopted by Irish Stakeholders will be integrated into any assessment.

10.8. Designed-in measures and mitigation

10.8.1. Measures adopted as part of the Proposed Development in relation to subsea noise are discussed within section 12 and section 13 with respect to the environmental receptor.

10.8.2. Any further mitigation requirements to be adopted for airborne noise and subsea noise will be dependent on the significance of the effects.

11. Benthic subtidal and intertidal ecology

11.1. Introduction

11.1.1. This EIAR chapter will consider the potential impacts of the Proposed Development on benthic subtidal and intertidal ecology during the construction, operational and maintenance and decommissioning phases.

11.2. Study area

11.2.1. For the purposes of the benthic subtidal and intertidal ecology assessments, the Benthic Subtidal and Intertidal Ecology Study Area is defined as the area encompassing the Array Area, the offshore export cable routes and the Landfall location, and the surrounding area (delineated as one tidal excursion (see section 8) from the Proposed Development (i.e. the maximum extent to which impacts could occur). To provide a wider context, the desktop review will also consider the benthic subtidal and intertidal habitats, communities and species present within the wider southwest Irish Sea (i.e. Regional Benthic Ecology Study Area).

11.3. Data sources

Subtidal ecology

11.3.1. Desktop data sources include academic reports, consent applications, and surveys to support the designation of SACs for offshore sand banks located to the south of Arklow Bank. Specifically, these will include:

- EMODnet broad-scale seabed habitat map for Europe (EUSeaMap);
- Biological data collected through the Habitat Mapping for Conservation and Management of the Southern Irish Sea (HABMAP), Benthic Biodiversity in the Southern Irish Sea Project (BIOMOR) and South West Irish Sea Survey (SWISS) Projects (reported in Robinson et al., 2012);
- Diversity of demersal and megafaunal assemblages inhabiting sandbanks of the Irish Sea (Atalah et al., 2013);
- Littoral and Benthic Investigations on the South Coast of Ireland: II. The Macrobenthic Fauna of Carnsore Point (Keegan et al., 1987); and
- Aquafact International Services Ltd (2008) Proposed Dredge Disposal Sites for Arklow Harbour Commissioner.

11.3.2. A number of benthic subtidal ecology surveys have been conducted across the Array Area and export cable routes between 2000 and 2021. These include pre-construction baseline surveys undertaken in 2000 for ABWP1 and a series of post-construction monitoring surveys undertaken annually for ABWP1.

11.3.3. Site specific geophysical surveys were also undertaken across the Array Area and export cable routes in 2019 and 2022 and this data will be used to further inform the baseline characterisation, alongside the ecological datasets.

11.3.4. All site-specific data sources are summarised in Table 11.1 below and while the sampling methods were not identical across all surveys, these datasets provide a robust characterisation of the benthic subtidal ecology assemblages across the Benthic Subtidal and Intertidal Ecology Study Area for the purposes of the EIAR.

Table 11.1 Summary of site-specific benthic subtidal ecology surveys

Data source	Date(s) of survey	Survey methodology
EcoServe (2001b). Baseline/pre-construction survey.	June 2000	Anchor dredge with large net mesh (infauna) – 21 stations Intertidal (littoral) survey of landfalls.
	September 2000	Anchor dredge with large net mesh (infauna) – 19 stations Otter trawl (fish and epifauna) – 6 stations
	April 2001	Anchor dredge with large net mesh (infauna) – 15 stations Agassiz trawl (fish and epifauna) – 3 stations
HydroServ Projects Ltd. (2004). Post-construction survey.	June/July 2004	Day grabs (infauna) Beam trawls (epifauna)
HydroServ Projects Ltd (2005). Post-construction survey.	October 2004	Anchor dredge with closed metal base (infauna) Beam trawls (epifauna)
HydroServ Projects Ltd (2006a). Post-construction survey.	June 2005	
HydroServ Projects Ltd (2006b). Post-construction survey	November 2005	
HydroServ Projects Ltd (2007a). Post-construction survey.	June 2006	
HydroServ Projects Ltd (2007b). Post-construction survey.	May 2007	
HydroServ Projects Ltd (2009). Post-construction survey.	May 2008	
Arklow Energy Ltd (2010). Post-construction survey.	June 2009	
GE Wind Energy (2011). Post-construction survey.	June 2010	
GE Wind Energy (2012). Post-construction survey.	June 2011	
GE Wind Energy 2021. Post-construction survey.	September 2021	
Aqua-fact International Services Ltd (2008) Proposed Dredge Disposal Sites for Arklow Harbour Commissioner Post-construction survey.	June 2007	Divers using corers for benthic fauna, particle size analysis and organic carbon.

Data source	Date(s) of survey	Survey methodology
Atalah *et al*., 2013. Diversity of demersal and megafaunal assemblages inhabiting sandbanks of the Irish Sea	August 2007	Beam trawls (demersal fish and megafaunal invertebrates)
Aquatic Services Unit (2016). Sediment chemistry sampling to support dredge application.	May 2016	Van Veen grabs for sediment chemistry.
Site-specific geophysical surveys of the Array Area and offshore export cable routes.	July/August 2019 and August 2022	Multibeam echo sounder, side-scan sonar, sub-bottom profiler and magnetometer sampling.
Intertidal walkover survey.	June 2019	Phase 1 habitat intertidal walkover of the proposed landfall site including site dig-over sediment sampling.

11.3.5. Further benthic subtidal surveys are not proposed to characterise the benthic subtidal ecology baseline for the purposes of undertaking the EIA. This is on the basis that benthic subtidal ecology within the Benthic Subtidal and Intertidal Ecology Study Area has been very well characterised by numerous surveys between 2000 and 2021, all of which have demonstrated consistency in the infaunal and epifaunal communities present across the survey area. Furthermore, the results of these surveys are consistent with the findings of published desktop data sources for this part of the Irish Sea. In addition, site-specific geophysical data collected in 2019 have confirmed that the sediments characterising the Array Area and offshore export cable routes are comprised of sandy sediments, with coarser sediments to the west of Arklow Bank. These observations align with the patterns recorded in the site-specific benthic ecology surveys undertaken between 2000 and 2021, further demonstrating the consistency in the seabed sediment types/sediment and communities associated with them.

Intertidal ecology

11.3.6. The site-specific Phase 1 habitat intertidal walkover surveys of offshore export cable landfalls carried out in 2019 (Table 11.1) provide a robust characterisation of the intertidal communities present for the purposes of the EIAR. Some areas of the intertidal survey area were found to be inaccessible, with a small number of coves cut off by the sea and surrounding outcrops/cliffs and therefore not accessible on foot. However, sampling at adjacent areas of shore and observations of inaccessible areas from adjacent clifftops provided a robust characterisation of these areas as the inaccessible coves were observed to be comprised of identical sediments (i.e. coarse sands, gravels and shell hash) when compared to the areas where walkover survey and on site dig-over sampling was possible, and were subject to identical environmental conditions (i.e. wave exposed beaches with only a small tidal range).

11.4. Baseline environment

Subtidal ecology

11.4.1. The seabed of the western Irish Sea comprises current swept coarse sediments which consist of compact sand, with gravel, shell and/or cobbles in varying proportions. The European Marine Observation and Data Network (EMODnet) broad-scale seabed habitat map for Europe (EUSeaMap) presents the European Nature Information System (EUNIS) habitat classifications for

the southern Irish Sea. Seabed habitat information is also available through the habitats theme accessed through Ireland's Marine Atlas (Ireland's Marine Atlas, 2016). Circalittoral fine sand or circalittoral muddy sands are predicted in association with Arklow Bank itself and circalittoral/deep circalittoral coarse sediment is indicated to be present in the areas to the east and inshore to the west. The most inshore waters near Arklow town are a combination of circalittoral fine sand or circalittoral muddy sand and, to a lesser extent, circalittoral sandy mud.

11.4.2. The infaunal communities associated with the soft-sediment communities of the western Irish Sea are described in Keegan et al. (1987) as being typically impoverished, which is reflective of the mobile nature of the sediments in this area as a result of exposure to strong currents and weather-induced turbulence. The epifaunal communities are described in Keegan et al., (1987) as being characterised by hydroids (typically *Hydrallmania falcata*, *Sertularia argentea*, *Nemertesia spp*.) that attach to cobbles or shells, with the bryozoan *Flustra foliacea* abundant on bedrock exposed to strong currents and sand scour. Other habitats in this region include banks of cobbles and coarse sands characterised by the polychaetes *Nephtys cirrosa*, *Ophelia borealis* and *Lanice conchilega*, and the bivalves *Spisula elliptica* and *Abra alba* (Keegan et al., 1987).

11.4.3. More recently, Robinson et al., (2012), using a combination of Habitat Mapping for Conservation and Management of the Southern Irish Sea (HABMAP), Benthic Biodiversity in the Southern Irish Sea Project (BIOMOR) and South West Irish Sea Survey (SWISS) Project data, identified that the benthic infaunal communities associated with areas of sandy and gravelly waves off the coast at Arklow resemble the "*Moerella spp*. with venerid bivalves in infralittoral gravelly sand" biotope as described in Connor et al., (2004). Species-rich gravelly plains were recorded throughout St George's Channel and were generally classified as the '*Mediomastus fragilis, Lumbrineris spp*., and venerid bivalves in circalittoral coarse sand or gravel' biotope.

11.4.4. The results of the site-specific surveys indicated that the seabed was predominately sedimentary with little or no fixed hard substrata. The Arklow Bank itself was found to consist of sand and shell with pebbles at the northern end with fine clean sand at the southern end. To the west, north and south of the bank, the seabed ranged from sandy shell and gravel, and to the east, coarse shell and gravel characterised the seabed. Some large boulders and rocks were recorded in the area to the east of the bank. Inshore, the seabed was sandy with some mud content. These patterns in sediment composition have recently (2019) been validated via the site-specific geophysical survey (see Figure 11.1), which confirmed that the Arklow Bank was dominated by sandy sediments, with mobile seabed features including sand ribbons and sand waves also recorded (see Figure 11.1). Interpretation of the geophysical data also confirmed that the offshore export cable routes were characterised by a mix of mobile sandy sediments and areas of coarse sediment (i.e. sand and gravels; see Figure 11.1).

11.4.5. Site-specific survey data indicated that species diversity was highest with areas of sandy shell, gravel and cobbles in the northwest, southwest and southeast of the bank and inshore along the offshore export cable routes. The communities at locations with large amounts of gravel (i.e. to the east and northwest of the bank), were characterised by large numbers of epifaunal invertebrates such as the tubeworms *Pomatoceros triqueter*, *P. larmarckii* and *Hydroides norvegica*, the tunicate *Dendrodoa grossularia*, barnacles *Balanus crenatus* and *Verruca stroemia*, the chiton *Leptochiton asellus* and the colony forming tubeworms *Sabellaria spinulosa* and *S. alveolata*. The communities associated with sandy sediments were extremely species poor in comparison, as would be expected for mobile sandy sediments characterising a shallow sandbank.

11.4.6. During the site-specific surveys, a total of nine biotopes were identified across the survey area, all common to the east coast of Ireland. The Infralittoral mobile clean sand with sparse fauna (SS.SSa.IFiSa.IMoSa) biotope was recorded in association with the sandy/shell sediments of the Arklow Bank feature and also throughout the inshore area to the south of the offshore export cable routes. The inshore area through which the offshore export cable routes extend was characterised by the '*Flustra foliacea* on slightly scoured silty circalittoral rock' (CR.MCR.EcCr.FaAlCr.Flu)

biotope, with the muddy sands associated with the inshore area in the vicinity of the town of Arklow characterised by the 'Infralittoral muddy sand' (SS.SSa.IMuSa) biotope. The *Sertularia cupressina* and *Hydrallmania falcata* on tide-swept sublittoral sand with cobbles or pebbles' (SS.SSa.IFiSa.ScupHyd) biotope was recorded in the areas immediately to the east and west of the bank.

11.4.7. During the site-specific surveys no rare or uncommon species were recorded within the survey area although both S*. alveolata* and *S. spinulosa* were recorded subtidally to the northwest and the east of the bank (likely to be the *S. spinulosa* on stable circalittoral mixed sediment (SS.SBR.PoR.SspiMx) biotope, due to the prevalence of sand and gravelly sediments in the region). Species richness was found to be greatest at locations where *Sabellaria spp*. was recorded. There was some variability in the distribution and abundances of *Sabellaria spp*. across the survey area between the various pre-construction and post-construction surveys, with this taxon recorded at up to ten sites in 2005, but subsequent surveys showed a lower number of sites where *Sabellaria spp*. was recorded (three sites in 2004 and 2009, two sites in 2006 and one site in 2007). *Sabellaria* is a reef forming species, with reefs known to be naturally ephemeral habitats and the patchy and variable nature of its distribution and abundance within the site-specific surveys reflects this variability. While the locations where *Sabellaria spp*. was recorded were not assessed for their reef potential (e.g. using best practice guidelines set out in e.g. Limpenny et al., 2010; Gubbay, 2007), records of this species were most consistently made at the northern end of the survey area (to the northwest of Arklow Bank and to the north of the northernmost offshore export cable route) and to the east of Arklow Bank; no areas of *Sabellaria spp*. have been recorded on Arklow Bank itself.

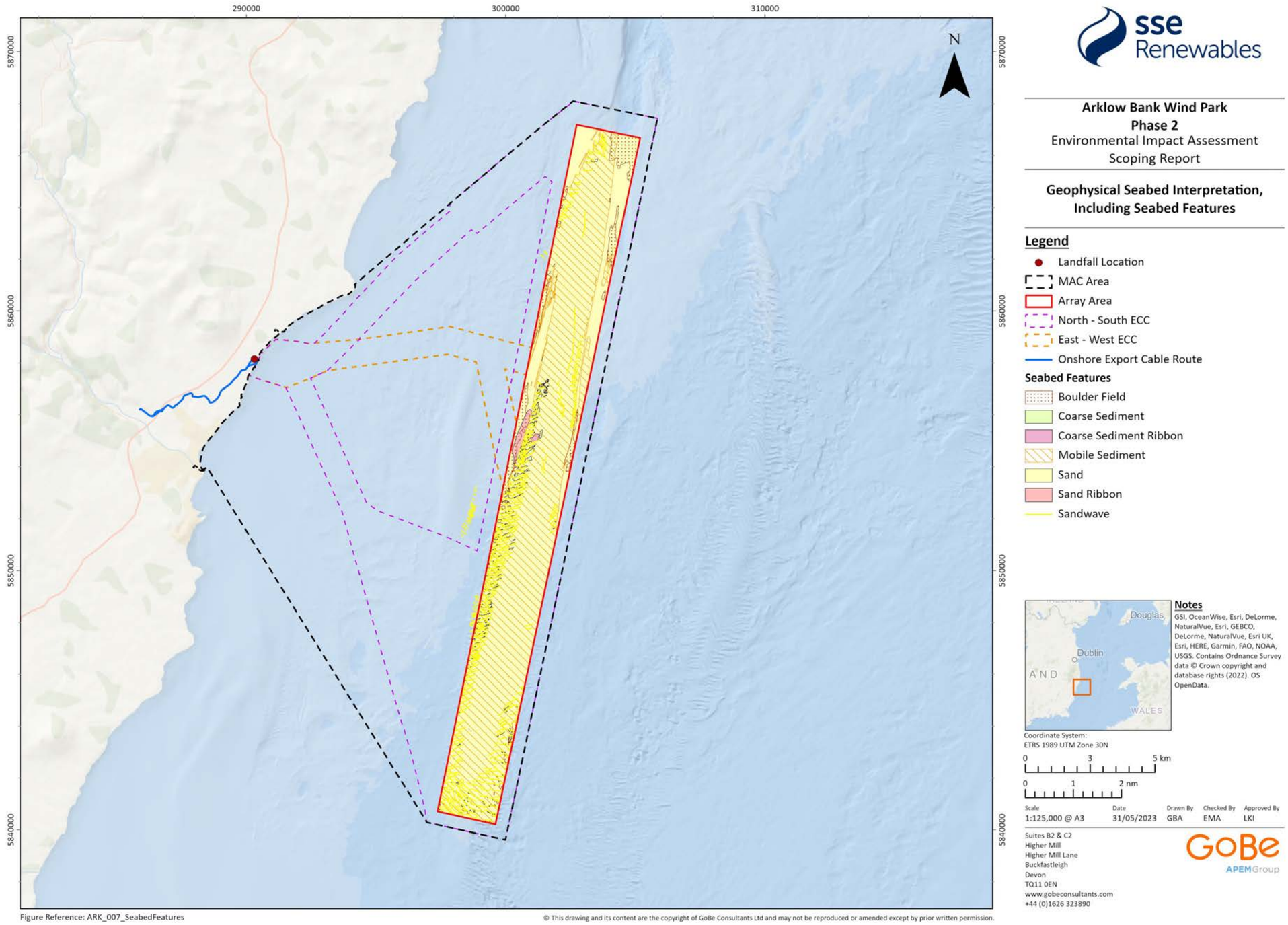


Figure 11.1 Geophysical Seabed Interpretation, including Seabed Features

Intertidal ecology

11.4.8. Site-specific intertidal data for the Landfall, south of Ennereilly Beach, were presented from an intertidal survey undertaken in 2001. The upper shore comprised very coarse sand with oyster shells, and no obvious fauna or flora. The mid-shore comprised fine and coarse mobile sand with gravel and cobbles, characterised by amphipods (*Talitridae*), mussels and oyster shells. Along the lower shore, the sediment consisted of coarse gravelly sand with amphipods (*Talitridae*). Patches of bedrock on the lower shore supported a faunal mosaic of mussel *Mytilus edulis*, limpet *Patella vulgata* and sparse barnacle species, with a floral community of green algae *Ulva sp.* and *kelp Laminaria sp*. No rare species or species of conservation importance were recorded.

11.4.9. In 2019, a Phase 1 habitat intertidal walkover survey was undertaken at the landfall location south of Ennereilly Beach to provide a robust and up-to-date baseline characterisation of the intertidal ecology for the purposes of the EIAR. Surveys were undertaken in June 2019, following best practice guidance outlined in Davies et al. (2001) and Wyn et al. (2006), while habitats/biotopes were classified in accordance with Connor et al. (2004).

11.4.10. The Landfall consists of a very narrow intertidal area with cliff outcrops of between 1m and 20m in height and vegetated slopes above the tide line. Periodically the cliff outcrops extend below the Low Water Mark (LWM) to create a series of small inlets. The shore in these inlets is gently sloping to steep soft sediment down to LWM. Some of these inlets were inaccessible. However, visual observations made during the survey suggest that these sediments were broadly similar. Generally, the intertidal habitats at the Landfall were consistent with those observed in 2001, being characterised by mobile pebbles, coarse to fine sands, with the upper shore comprised of coarse sand, cobble and relict native oyster *Ostrea edulis* shell hash. Replicate dig-over samples were carried out at a number of points in the intertidal and no organisms were recorded in all samples, confirming that the sediments are impoverished, with the most appropriate biotopes classifications being Barren littoral shingle (LS.LCS.Sh.BarSh) and Barren littoral coarse sand (LS.LSa.MoSa.BarSa).

11.4.11. The lower reaches of the cliff outcrops to the north and south of the beach supported low numbers of encrusting barnacles and limpets (*Patella vulgata*) and conform to the biotope classification LR.HLR.MusB.Sem.Sem (*Semibalanus balanoides, P. vulgata* and *Littorina spp*. on exposed to moderately exposed or vertical sheltered eulittoral rock).

11.4.12. No rare or uncommon species, or species or habitats of conservation importance were recorded at the landfall.

11.5. Designated sites

11.5.1. No sites of nature conservation importance for benthic subtidal or intertidal ecology overlap with the Array Area or export cable routes (see Figure 8.11). The nearest Natura 2000 sites with relevant benthic ecology features are the Wicklow Reef SAC designated for the Annex I habitat ‘Reefs’ (approximately 5km to the north of the Array Area) and the Blackwater Bank SAC (approximately 15km to the south of the Proposed Development) designated for the presence of the Annex I habitat ‘Sandbanks which are slightly covered by sea water all the time’.

11.6. Potential impacts

11.6.1. Table 11.2 presents the potential impacts on benthic subtidal and intertidal ecology that could arise from the Proposed Development during the construction, operational and maintenance and decommissioning phases of the Proposed Development.

Table 11.2 Impacts to be scoped in for the Benthic Subtidal and Intertidal Ecology EIAR chapter

Potential impact	Phase			Justification
	C	O	D	
Temporary subtidal habitat loss/disturbance	✓	✓	✓	Construction and decommissioning phases • There is potential for temporary, direct habitat loss and disturbance to benthic subtidal habitats as a result of site preparation activities in advance of installation of wind turbines and OSP foundations, cable installation activities (including pre-cabling seabed clearance, trenchless techniques such as HDD and anchor placements), and placement of spud-can legs from jack-up operations, and as a result of decommissioning activities. Operation and maintenance phase • Temporary habitat loss/disturbance may occur during the operational and maintenance phase of the Proposed Development as a result of maintenance operations (e.g. cable repair/reburial, use of jack-up vessels to facilitate WTG component repairs etc.). The impacts associated with these operations are likely to be similar in nature to those associated with the construction phase although of reduced magnitude.
Increased suspended sediment concentrations and associated deposition	✓	✓	✓	• Sediment disturbance arising from construction activities (e.g. foundation installation (WTG and OSP) and cable installation (including trenchless techniques such as HDD)) and decommissioning activities may result in indirect impacts on benthic subtidal and intertidal communities as a result of temporary increases in SSCs and associated sediment deposition (i.e. smothering effects). Sediment disturbance could also occur during operation and maintenance if cable repairs are required.
Long-term subtidal habitat loss	✓	✗	✓	• There is the potential for long-term habitat loss to occur directly under all foundation structures and associated scour protection, and under any cable protection required along the inter-array, interconnectors and offshore export cable routes.
Colonisation of hard structures	✗	✓	✗	• Artificial structures placed on the seabed (i.e. foundations and scour/cable protection) in the offshore environment are expected to be colonised by a range of marine organisms leading to localised increases in biodiversity. These structures may also facilitate the spread of marine invasive and non-native species.

Potential impact	Phase			Justification
	C	O	D	
Alteration of seabed habitats arising from effects on physical processes	✗	✓	✗	• The presence of foundation structures, associated scour protection and cable protection may introduce localised changes to the tidal flow and wave climate, resulting in potential changes to the sediment transport pathways and associated effects on benthic ecology. Some benthic species and communities may be more vulnerable to reductions in water flow if the decrease is sufficient to reduce the availability of suspended food particles, and consequently inhibit feeding and growth. Scour and increases in flow rates can change the characteristics of the sediment potentially making the habitat less suitable for certain species.
Removal of hard substrates resulting in loss of colonising communities	✗	✗	✓	• The removal of foundations and any scour/cable protection during decommissioning has the potential to lead to loss of species/habitats colonising these structures.
Increased risk of introduction and spread of invasive and non-native species	✓	✓	✓	Construction phase • There is potential for increased risk of introduction and spread of invasive and non-indigenous species (INIS) due to requirement for vessel round trips during the construction phase. • Operational and maintenance phase • There is potential for increased risk of introduction and spread of INIS due to the long-term creation of hard substrates due to foundations, associated scour protection and cable protection; and requirement for vessel round trips per year during the operational and maintenance phase. Decommissioning phase • There is potential for increased risk of introduction and spread of INIS due to requirement for vessel round trips during the decommissioning phase.
Accidental pollution	✓	✓	✓	• There is a risk of pollution being accidentally released during the construction, operational and maintenance and decommissioning phases from sources including vessels/vehicles and equipment/machinery.

11.7. Impacts scoped out of further assessment

11.7.1. Table 11.3 presents the potential impacts to be scoped out of the Benthic Subtidal and Intertidal Ecology EIAR chapter.

Table 11.3 Impacts to be scoped out of the Benthic Subtidal and Intertidal Ecology EIAR chapter

Potential impact	Justification
Temporary and long-term intertidal habitat loss/disturbance	• Offshore export cables will be installed via trenchless techniques such as HDD. This is a process whereby the offshore export cables are installed beneath the cliff, avoiding any direct impacts on intertidal habitats. It is proposed that a transition pit will be excavated on the landward side of the cliff, from which a borehole will be drilled underneath the cliff and the intertidal. Given the narrow intertidal zone, the drill exit point will be below the Low Water Mark. Once the bore is drilled, cable ducts and offshore export cables will be installed beneath the cliff. As such, there will be no direct impact on intertidal habitats, with any direct effects of trenchless operations limited to either the terrestrial or subtidal environments. As such it is proposed that temporary and long-term habitat loss effects on intertidal habitats are scoped out of the EIAR. • Other indirect effects on intertidal habitats, e.g. increases in suspended sediments, will remain scoped into the EIAR.
Remobilisation of contaminated sediments	• Seabed disturbance associated with construction, maintenance and decommissioning activities (e.g. foundation and cable installation) could lead to the remobilisation of sediment-bound contaminants that may result in harmful and adverse effects on benthic communities. Recent sampling undertaken in support of a permit application to undertake dredging and disposal works for ABWP1 (Ramboll, 2016) has demonstrated that contamination in the offshore sediments is low and at levels which are unlikely to result in adverse effects on benthic communities. Furthermore, the coarse nature of the sediments on site (i.e. sand and gravels with minimal proportion of fines) means that significant contamination is unlikely to be present in sediments (contaminants such as metals and hydrocarbons are typically bound to fine sediments such as mud). Therefore, it is considered unlikely that there would be any pathways for an impact on benthic communities. It is therefore proposed to scope this impact out of further consideration within the EIAR.

11.8. Proposed assessment methodology

11.8.1. The EIAR will consider the potential impacts of the construction, operational and maintenance and decommissioning phases of the Proposed Development within the Benthic Subtidal and Intertidal Ecology Study Area. The EIA methodology will consider the most recent Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines for Ecological Impact Assessment in the UK and Ireland (2018) and EPA (2022) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports.

11.8.2. For the purposes of undertaking the EIAR, marine habitats and species identified as having the potential to occur in the Benthic Subtidal and Intertidal Ecology Study Area will be grouped into broad habitat/community types. These broad habitat/community types will serve as the Important Ecological Features (IEFs) against which impacts associated with the construction, operational and

maintenance and decommissioning phases of the Proposed Development will be assessed. Habitats with similar physical and biological characteristics (including species composition and richness/diversity) as well as conservation status/interest will be grouped together for the purposes of the EIAR. Consideration will also be given to the inherent sensitivities of different habitats in assigning the groupings, such that habitats and species with similar vulnerability and recoverability, often as a result of similar broad sediment types and species complements, will be grouped together. Impacts on IEFs will be described in terms of the magnitude of that impact and correlated against the sensitivity of each IEF to each impact, to produce a statement of significance (see section 6.5).

11.8.3. Information on the sensitivities of benthic ecology receptors will largely be drawn from the Marine Evidence based Sensitivity Assessment (MarESA) (Tyler-Walters et al., 2018). The MarESA is a database which has been developed through the Marine Life Information Network (MarLIN) of Britain and Ireland and is maintained by several organisations, including the Marine Biological Association (MBA) and other statutory organisations in the UK. This database comprises a detailed review of available evidence on the effects of pressures on marine species or habitats, and a subsequent scoring of sensitivity against a standard list of pressures based on benchmarked levels of effect.

11.8.4. The evidence base presented in the MarESA is peer reviewed and represents the largest review undertaken to date on the effects of human activities and natural events on marine species and habitats. It is considered to be one of the best available sources of evidence relating to recovery of benthic species and habitats.

11.8.5. Further detail of how sensitivity is defined is outlined in Tyler-Walters et al. (2018). Sensitivities to the key activities across the Proposed Development lifetime (i.e. construction, operation and decommissioning phases) will be summarised according to the MarESA for each of the biotopes within the Benthic Subtidal and Intertidal Ecology Study Area. Where sensitivity information on specific biotopes are not available through the MarESA, suitable proxies will be used.

11.9. Designed-in measures and mitigation

11.9.1. The following designed-in measures are proposed in relation to benthic subtidal and intertidal ecology:

- Pre-construction Annex I reef survey may be required to determine the location, extent and composition of any *Sabellaria* spp. reefs present, which will inform cable routing to avoid direct impacts to these features if present. This would apply to the offshore export cable routes only, as *Sabellaria* spp. has not historically been recorded within the Array Area (i.e. *Sabellaria* spp. do not typically occur on sandbank features); and
- An EMP will be developed and implemented to cover the construction and operational and maintenance phases of the Proposed Development. The EMP will include planning for accidental spills, address all potential contaminant releases and include key emergency contact details.

11.9.2. Any further mitigation requirements for benthic subtidal and intertidal ecology will be dependent on the significance of the effects.

12. Fish, shellfish and sea turtle ecology

12.1. Introduction

12.1.1. This EIAR chapter will consider the potential impacts of the Proposed Development on fish, shellfish and sea turtle ecology during the construction, operational and maintenance and decommissioning phases.

12.2. Study area

12.2.1. For the purposes of the EIAR, the Fish, Shellfish and Sea Turtle Ecology Study Area is defined as the area encompassing the Array Area, export cable routes and the surrounding area (delineated as one tidal excursion from the Proposed Development). To provide a wider context, the desktop review will also consider the fish, shellfish and sea turtle habitats, communities and species present within the wider western Irish Sea (i.e. Western Irish Sea Fish, Shellfish and Sea Turtle Study Area). The study areas are illustrated in Figure 12.1.

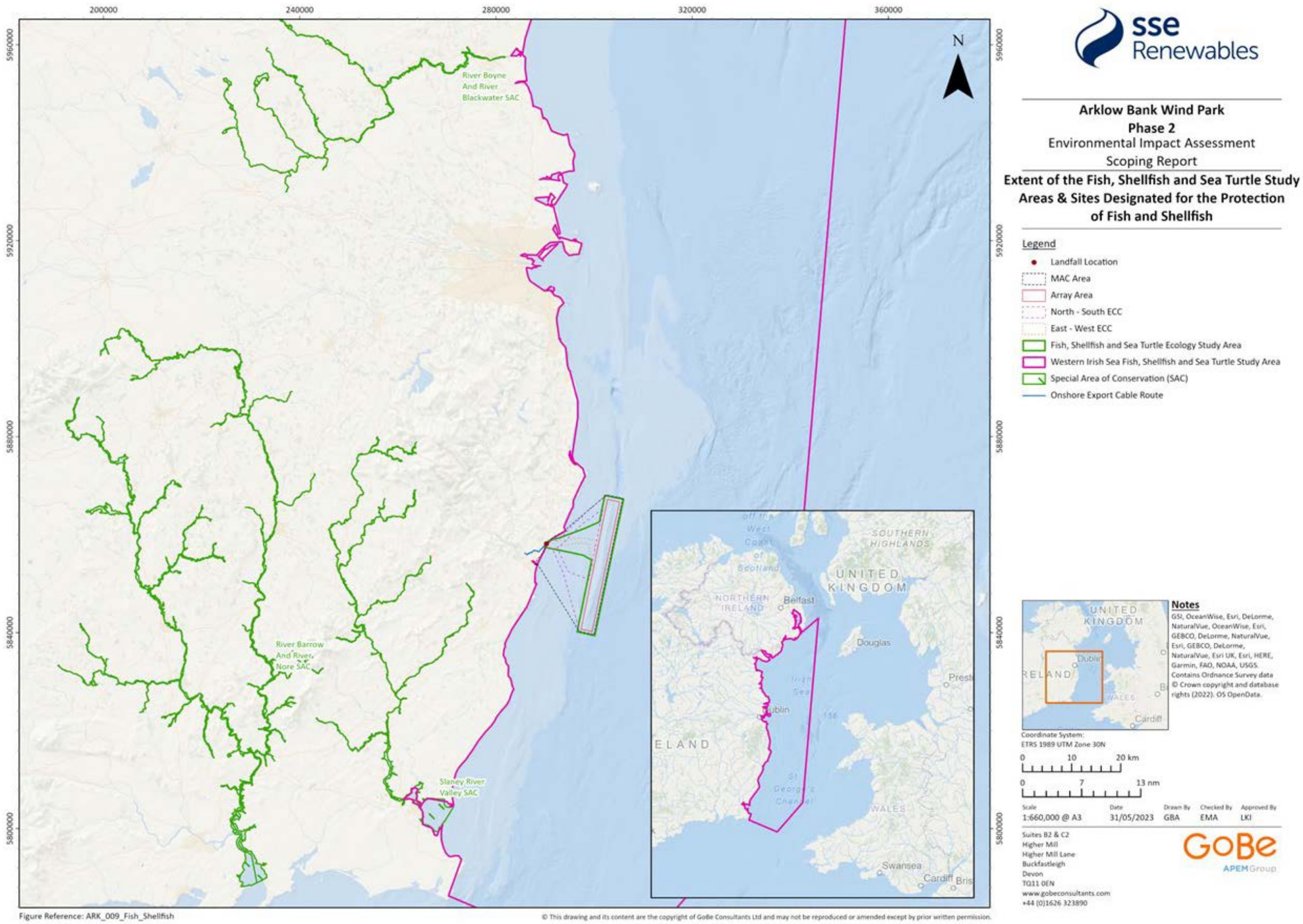


Figure 12.1 Fish and Shellfish Study Area

12.3. Data sources

Desktop data

12.3.1. Information on fish and shellfish ecology within the western Irish Sea and specifically across the Arklow Bank will be collated through a detailed desktop review of existing studies and datasets. Key organisations including National Parks and Wildlife Service (NPWS) and Inland Fisheries Ireland (IFI) will be contacted to obtain relevant data sources. Desktop data sources include academic reports, consent applications, and surveys to support the designation of SACs for Annex II fish species. Examples of key data sources are listed in Table 12.1, noting that this list is not exhaustive.

Table 12.1 Examples of key desktop sources to inform the fish, shellfish and sea turtle ecology baseline

Title	Description	Source
Celtic Sea Trout Project (CTSP)	Status, distribution, genetics and ecology of sea trout populations in the Irish Sea	CSTP (2016)
Celtic Seas ecoregion fisheries overview	Summary of commercial fisheries in the Celtic Sea	ICES (2022)
National Programme: Habitats Directive and Red Data Book Fish Species	Summary reports of monitoring undertaken by Inland Fisheries Ireland (IFI) in relation to threatened fish species (e.g. lamprey, shad)	Gallagher *et al*. (2021)
Ireland Red List (No. 11 and No. 5)	Red list of cartilaginous fish species for Ireland Red List of Amphibians, Reptiles and Freshwater Fish	Clarke *et al*. (2016) King *et al*. (2011)
National Parks and Wildlife Service protected sites	Online resources showing location and citation features of protected areas around the coast of Ireland	https://www.npws.ie/protected-sites
Biodiversity maps	National portal that compiles biodiversity data from multiple sources	https://maps.biodiversityireland.ie/#
ICES Division VIIa technical reports series	Various scientific reports on fish and shellfish ecology from surveys undertaken in the Irish Sea	Cefas (https://data.cefas.co.uk/)
Diversity of demersal and megafaunal assemblages inhabiting sandbanks of the Irish Sea	Analyses of demersal communities at three sandbanks in the Irish Sea, including the Arklow sandbank, Blackwater Bank (south of Arklow) and Kish Bank (north of Arklow)	Atalah *et al*. (2013)

Title	Description	Source
Fisheries Sensitivity Maps in British Waters	Spawning and nursery areas for key fish species including within the Irish Sea	Coull *et al*. (1998)
Spawning and nursery grounds of selected fish species in UK Waters	Spawning and nursery areas for key fish species including within the Irish Sea	Ellis *et al*. (2012)
An Inventory of Irish Herring Spawning Grounds	Herring spawning grounds around the coast of Ireland	O'Sullivan *et al*. (2013)
Slaney River Valley SAC. Site Synopsis (Site Code: 000781)	SAC site selection details	National Parks and Wildlife Service (NPWS)

Site-specific surveys

12.3.2. Site-specific surveys carried out to inform the pre-construction baseline and as part of post-construction monitoring for ABWP1 will also be drawn upon to characterise the fish and shellfish community. These data sources are summarised in Table 12.1.

12.3.3. Further published information, particularly in relation to inshore fish and shellfish resources, will be sought from appropriate sources such as the NPWS, Inland Fisheries Ireland (IFI) and the Marine Institute, to inform the EIAR.

12.4. Baseline environment

12.4.1. The surficial seabed sediments within the regional area are characterised by sand and gravel material, as illustrated in Figure 8.6. Project specific surveys indicate that sediments are heterogenous, composed of mobile sands, slightly gravelly sands and gravelly sands are present on Arklow Bank (Sure Partners Ltd., 2000; Aquatic Services Unit, 2012; 2021). Medium sand is mainly located at upper levels (<15m) with a gravel-sand with gravel fractions located at greater depths. The substratum ranges from sandy shell to gravel to the west, north and south of the bank to coarse shell and gravel and some rock to the east of the bank. The bank itself consists of mainly sand, cobbles with shells and pebbles at the northern end of the bank and fine sand at the southern end.

12.4.2. Inshore, along the offshore export cable routes, the substrate grades to finer sands and mud. The substrate is an important environmental variable in determining the composition and abundance of fish and shellfish communities in the region.

12.4.3. Fine substrates in inshore waters of the western Irish Sea are typically dominated by flatfish including plaice *Pleuronectes platessa*, dab *Limanda limanda* and common sole *Solea solea* (Ellis *et al*., 2000). In coarse substrates further offshore abundant species include common hermit crabs *Pagurus prideaux* and thickback sole *Microchirus variegatus* whilst muddy sediments are characterised by Norway lobster *Nephrops norvegicus* and witch *Glyptocephalus cynoglossus* (Ellis *et al*., 2000). Atlantic cod *Gadus morhua*, Atlantic herring *Clupea harengus*, European hake *Merluccius merluccius*, whiting *Merlangius merlangus*, blue whiting *Micromesistius poutassou* and horse mackerel *Scomber scombrus* are predominantly found in deeper waters in the benthopelagic or pelagic zone and have been observed throughout the Irish Sea. Their core range includes St Georges Channel (at the southern boundary of the Irish Sea, just south of Arklow Bank), however, they are present around the south and west coast of Ireland and north coast of Northern Ireland.

12.4.4. The fish and shellfish community in the Array Area are characteristic of demersal coastal communities of sandbank habitat. A published study on the demersal communities at three offshore sandbanks in the western Irish Sea included the Arklow Bank Wind Park site as one of the study areas (Atalah *et al*., 2013). Characterising species in the fish and shellfish communities within Arklow Bank included common hermit crab *Pagurus bernhardus*, spotted ray *Raja montagui*, lesser spotted dogfish *Scyliorhinus canicula* and flying crab *Liocarcinus holsatus*. High numbers of juvenile flatfish and elasmobranchs were reported on all the sandbanks, including juvenile spotted ray, plaice and dab, suggesting the use of these sandbanks as nursery areas. The waters off the coast of County Wicklow are reportedly an important pupping/nursery area for elasmobranch species and over the last 10 years the area has become favoured by recreational anglers, targeting mainly elasmobranch species (Roche, W (Inland Fisheries Ireland), pers. comm., 24 January 2019). Of the species that may occur within the Fish, Shellfish and Sea Turtle Study Area, spurdog *Squalus acanthias* is listed as Critically Endangered whilst cuckoo ray *Raja naevus* is listed as Vulnerable on the IUCN (International Union for Conservation of Nature) Red List for Ireland (Clarke *et a*l., 2016).

12.4.5. As part of ABWP1, Otter trawls were carried out in September 2000 to provide site-specific benthic data (Ecological Consultancy Services Ltd, 2001). Key fish species noted within the Proposed Development were typical of the wider region. Abundant species included poor cod *Trisopterus minutus*, pogge *Agonus cataphractus* and dragonet *Callionymus lyra*. Other commonly recorded species included monkfish *Lophius piscatorius*, thornback ray *Raja clavata*, cuckoo ray, dogfish *Scyliorhinus flesus*, flounder *Platichthys flesus*, and plaice. Additional site-specific data on fish communities were available from the post-construction benthic monitoring programme for ABWP1; sampling was undertaken around the ABWP1 site and inshore along the offshore export cable route, using both a beam trawl and an anchor dredge between 2004 and 2021. Plaice, turbot, whiting, dogfish, common sole *Solea solea*, dragonet, pogge, lesser weaver *Echiichthys vipera*, butterfish *Pholis gunnellus*, black scorpionfish *Scorpaena porcus*, sand goby *Pomatoschistus minutus* and black goby *Gobius niger* were included in the list of fish species noted from the trawls.

12.4.6. Arklow Bank and the surrounding waters also supports a diverse shellfish community, some of which are commercially exploited. Common whelk *Buccinum undatum* is the most commercially important shellfish, with Arklow Harbour forming part of the eastern Irish fisheries for this species, which also includes Codling Bank to the north. Common mussel *Mytilus edulis* is the second most commercially important shellfish after whelk. The area inshore from Arklow is considered to be particularly important as a mussel seed bed and for the settlement of larvae. Other shellfish noted in the region included *Nephrops*, great scallop *Pecten maximus*, brown crab *Cancer pagurus*, European lobster *Hommarus gammarus*, razor clam *Ensis siliqua* and cockle *Cerastoderma edule*. In terms of the general shellfish community at Arklow Bank, dredge samples taken as part of the benthic ecology baseline for ABWP1 identified that the dominant shellfish species included the barnacles *Balanus crenatus* and *Verruca stroemia*, common prawn *Palaemon serratus* and brown shrimp *Crangon crangon* (Ecological Consultancy Services Ltd., 2001). During the post-construction benthic sampling programme for ABWP1 (2004 to 2021) a total of 18 species of Crustacea were recorded, with large numbers of the blue mussel, pink shrimp *Pandalus montagui*, the barnacle *Balanus crenatus*, common hermit crab *Pagurus bernhardus*, shrimp *Crangon allmanni* and flying/swimming crabs *Liocarcinus spp*. (including many juveniles) present across many of the survey years. Additionally, queen scallops *Aequipecten opercularis* were particularly abundant in some years.

12.4.7. A large portion of the Irish Sea, including the waters off the coast of Wicklow, is considered important as a nursery and spawning area for several species of fish and shellfish (examples shown in Figure 12.2, Figure 12.3 and Figure 12.4). Data from Cefas (Ellis *et al*., 2010), the Irish Marine

Atlas[6]), and fisheries sensitivity maps (Coull *et al*., 1998) provides spatially explicit maps of the nursery/spawning areas for key species. For example whiting, haddock *Melanogrammus aeglefinus* and cod all spawn to the north of the Array Area with Wicklow at the southern limit of the spawning area (i.e. approximately 18km north). Key spawning periods are January to July for whiting, February to June for haddock, and February to April for cod. *Nephrops* spawns in summer/autumn to the north and south of Arklow. Nursery areas have been mapped overlapping the Array Area for Atlantic cod, whiting and several species of elasmobranch, as mentioned above. In the wider region, there were mapped nursery areas for herring, haddock and *Nephrops*. Juveniles of many species often favour sheltered inshore waters, and therefore the area within the vicinity of the offshore export cable routes is likely to be important for early life stages.

[6] https://atlas.marine.ie/#?c=53.9000:-15.9000:6

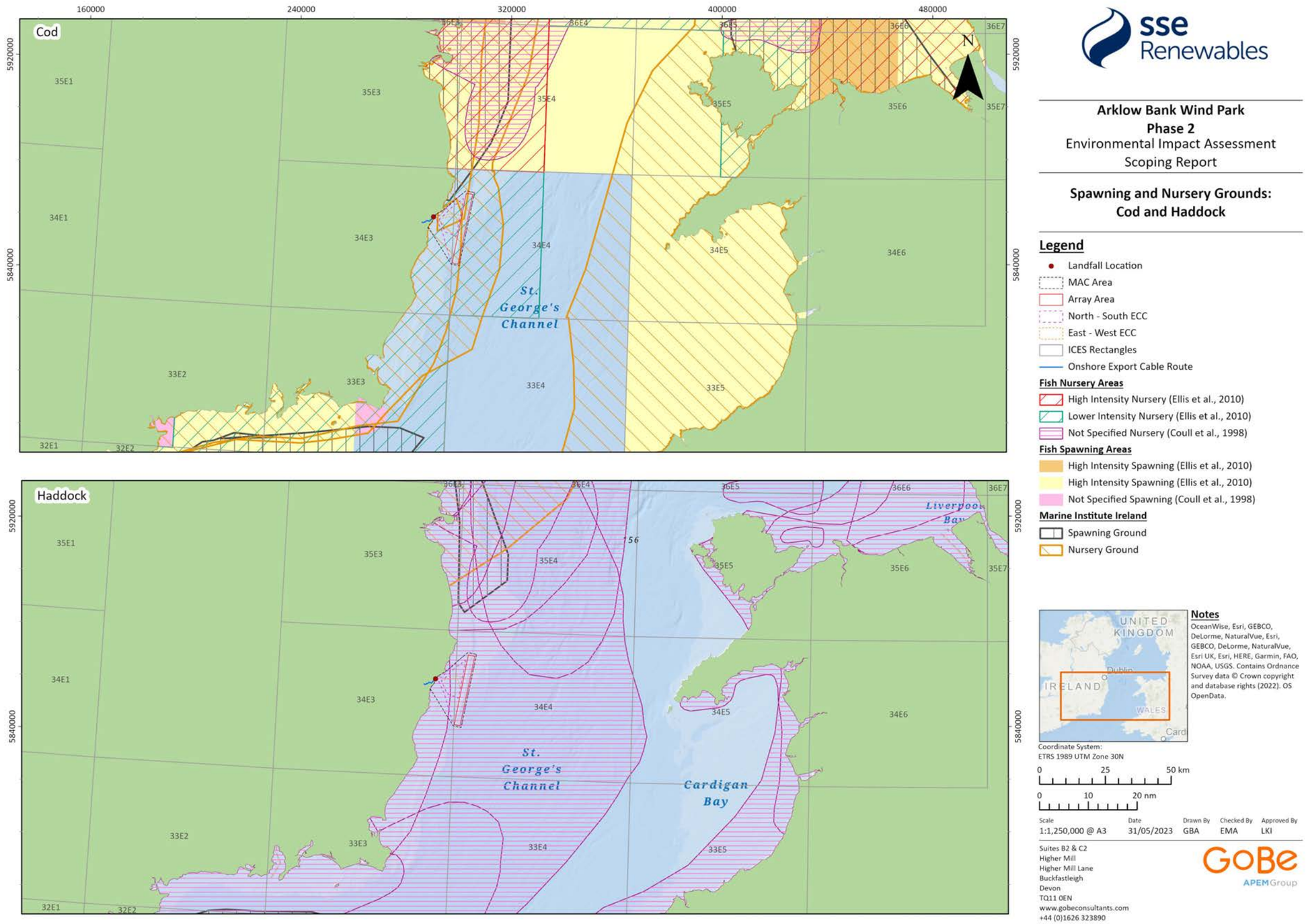


Figure 12.2 Spawning and nursery grounds for cod and haddock (Ellis et al., 2010)

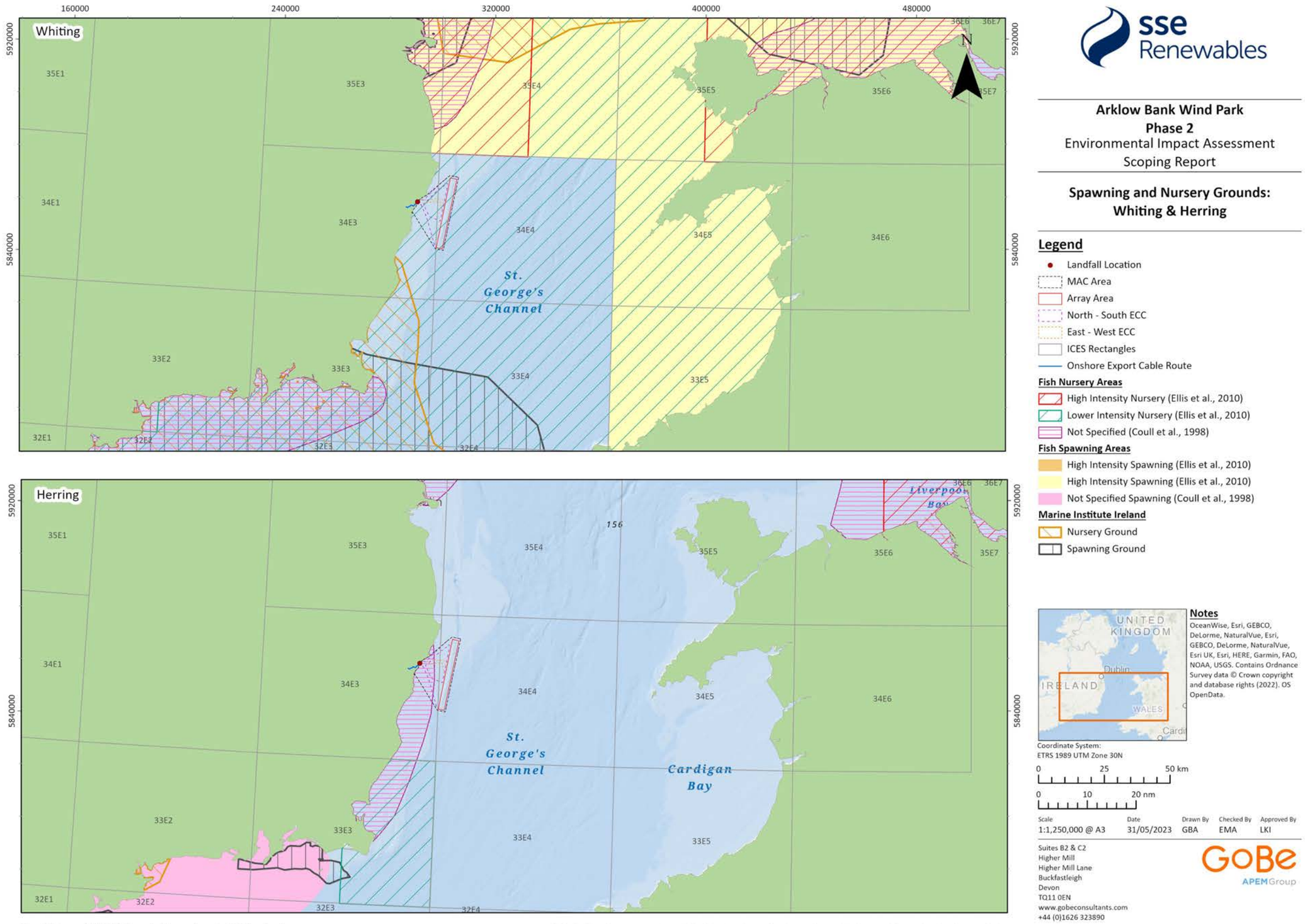


Figure 12.3 Spawning and nursery grounds for whiting and herring (Ellis et al., 2010)

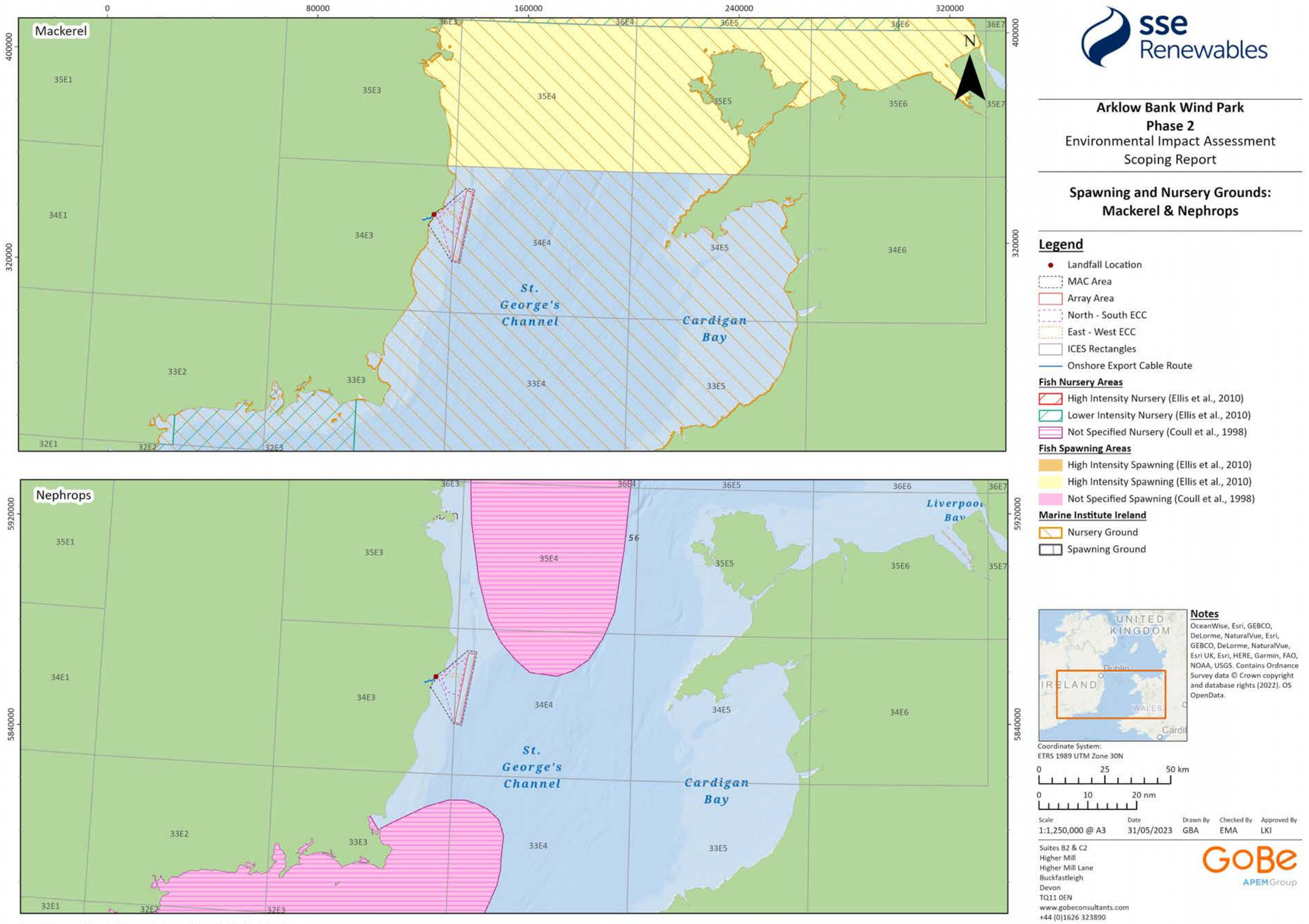


Figure Reference: ARK_012_SpawningNurseryGrounds_Mackerel_Nephrops

Figure 12.4 Spawning grounds for mackerel and *Nephrops* (Ellis et al., 2010)

12.4.8. The western Irish Sea is home to migratory fish species with Atlantic salmon *Salmo salar* and sea trout *Salmo trutta,* the two most commercially important species in the region. The rivers Slaney, Boyne, Dargle and Avoca on the east coast of Ireland are key rivers for migratory fish species with adults migrating upstream between spring and summer and smolts leaving the river in spring (Celtic Sea Trout Project, 2016). The Slaney River Valley is a SAC designated for the protection of Annex II migratory fish including salmon, sea lamprey Petromyzon marinus, river lamprey *Lampetra fluviatilis*, brook lamprey *L. planeri* and twaite shad *Allosa fallax* as citation features[7]. This SAC encompasses the freshwater stretches of the River Slaney from the coastal waters of Wexford harbour to the inland reaches of the river as far as the Wicklow mountains and is thought to provide a suitable habitat both for spawning migratory fish and for juveniles of these species. IFI monitor river lamprey in the Avoca as this species is known to migrate to this river and its tributaries to spawn (Inland Fisheries Ireland, 2021).

12.4.9. Basking shark *Cetorhinus maximus* migrate through the Irish Sea during spring and summer and migration routes cover large distances from the north of Scotland to North Africa. A tagging study of basking sharks found that half of the tagged sharks entered the Economic Exclusive Zone (EEZ) of Ireland, including the Irish Sea, indicating the importance of this area for overwintering and migration (Doherty et al., 2017).

12.4.10. Five species of marine turtles have been recorded in Irish waters including leatherback (or 'leathery') turtle *Dermochelys coriacea*, loggerhead turtle *Caretta caretta* and Kemp's Ridley *turtle Lepidochelys kempii*, Green turtle *Chelonia mydas* and Hawksbill turtle *Eretmochelys imbricata* (King and Berrow, 2009, Botterell et al., 2020). Of these, leatherback turtles are the most regularly reported around the coast of Ireland (King and Berrow, 2009, Botterell et al., 2020). Only a few records have been found of hawksbill turtle *Eretmochelys mbricate* and green turtle *Chelonia mydas*, both on the south coast of Ireland, and these are thought to be rare vagrants to Irish waters (King and Berrow, 2009). The majority of sightings captures or strandings have been recorded along the south and west coasts of Ireland, however, there are records of leatherback turtles along the east coast of Ireland suggesting that this species may occur within the Irish Sea.

12.5. Potential impacts

12.5.1. Table 12.2 presents the potential impacts on fish, shellfish and sea turtle ecology that could arise from the Proposed Development during the construction, operational and maintenance and decommissioning phases.

Table 12.2 Impacts to be scoped in for the Fish, Shellfish and Sea Turtle EIAR chapter

Potential impact	Phase			Justification
	C	O	D	
Temporary habitat loss/ disturbance	✓	✓	✓	Construction and decommissioning phases • There is potential for temporary, direct habitat loss and disturbance to fish and shellfish habitats as a result of site preparation activities, cable installation activities (including anchor placements), placement of spud-can legs from jack-up operations and decommissioning activities.

[7] http://www/npws.ie/protected-sites/sac/000781

Potential impact	Phase C	Phase O	Phase D	Justification
				Operational and maintenance phase • Temporary habitat loss/disturbance may occur during the operational and maintenance phase of the Proposed Development as a result of maintenance operations (e.g. cable repair/reburial, use of jack-up vessels to facilitate WTG component repairs etc.). The impacts associated with these operations are likely to be similar in nature to those associated with the construction phase (albeit to a lesser extent). Sessile or low mobility species may be particularly vulnerable and this impact may lead to temporary loss of spawning/nursery habitat for fish and shellfish.
Increased suspended sediment concentrations and associated deposition	✓	✓	✓	Construction and decommissioning phases • Sediment disturbance arising from construction activities (e.g. foundation and cable installation) and decommissioning activities may result in indirect impacts on fish and shellfish communities as a result of temporary increases in SSC and associated sediment deposition (i.e. smothering effects). Operational and maintenance phase • Sediment disturbance arising from maintenance activities (e.g. cable repair/reburial) may result in indirect impacts on fish and shellfish communities as a result of temporary increases in SSC and associated sediment deposition (i.e. smothering effects). The impacts associated with these operations are likely to be similar in nature to those associated with the construction phase although of reduced magnitude.
Injury and/or disturbance to fish and shellfish from underwater noise and vibration during pile-driving and cable installation activities	✓	✗	✗	• Sound may play an important role in fish and shellfish ecological functioning (e.g. communication or prey detection) and there are some species of fish which have highly developed hearing mechanisms (e.g. herring) and may therefore be particularly sensitive to subsea noise and vibration. The focus of the assessment will be on piling noise generated during foundation installation within the Array Area and noise arising from cable installation activities. The assessment methodology will follow the latest sound exposure guidelines for fish and invertebrates (Popper *et al*., 2014; Hawkins and Popper, 2016).

Potential impact	Phase			Justification
	C	O	D	
Injury and/or disturbance to basking shark and sea turtle from vessel activities	✓	✓	✓	• Increased vessel traffic has the potential to affect basking shark and sea turtles by vessel noise masking auditory signals or by increasing the risk of collision. Vessel type, speed and ambient noise levels will influence the magnitude of this impact and the assessment will therefore consider a range of potential vessels used and the spatial and temporal scale of the uplift in vessel activity. The potential for injury and disturbance from vessel activities to all other fish species has been scoped out.
Long-term habitat loss	✗	✓	✗	• There is the potential for long-term habitat loss to occur directly under all foundation structures and associated scour protection, and under any cable protection required along the inter-array and offshore export cable routes. Sessile or low mobility species may be particularly vulnerable and this impact may lead to long term loss of spawning/nursery habitat for fish and shellfish species.
Alteration of seabed habitats arising from changes in physical processes	✗	✓	✗	• The presence of foundation structures, associated scour protection and cable protection may introduce localised changes to the tidal flow and wave climate, resulting in changes to the sediment transport pathways and associated effects on fish and shellfish ecology. Some species and communities may be more vulnerable to reductions in water flow if the decrease is sufficient to reduce the availability of suspended food particles, and consequently inhibit feeding and growth. Scour and increases in flow rates can change the characteristics of the sediment potentially making the habitat less suitable for other species.

Potential impact	Phase			Justification
	C	O	D	
Changes in Electromagnetic Fields (EMF) from subsea electrical cabling	✗	✓	✗	• Transmission of electricity along subsea cables leads to the emission of low-frequency EMFs. The sensory mechanisms of fish and shellfish could be affected and may lead to avoidance behaviour, disruption in orientation and migratory behaviour, and effects on feeding. In order to reduce the risk of EMF effects on fish and shellfish receptors, a Cable Attenuation Plan will be prepared. The Cable Attenuation Plan will include an assessment of the EMF attenuation of the specified cables which will feed into recommendations on cable burial depth, micro-siting and cable protection to ensure that the magnetic field strength at the received distances falls within the limits of variation of the earth's magnetic field. Adoption of the measures recommended by the Cable Attenuation Plan will reduce the risk of EMF.
Accidental pollution	✓	✓	✓	• There is a risk of pollution being accidentally released during the construction, operational and maintenance and decommissioning phases from sources including vessels/vehicles and equipment/machinery. The release of such contaminants will be managed by the EMP (see section 12.8) and therefore the likelihood of an accidental spill occurring is very low.

12.6. Impacts scoped out of further assessment

12.6.1. Table 12.3 presents the impacts to be scoped out of the Fish, Shellfish and Sea Turtle Ecology EIAR chapter.

Table 12.3 Impacts to be scoped out of the Fish, Shellfish and Sea Turtle Ecology EIAR chapter

Potential impact	Justification
Temporary intertidal habitat loss/disturbance	• At the Landfall, offshore export cables are proposed to be installed via trenchless technologies (such as HDD), thereby avoiding any direct impacts on intertidal habitats, as described in 12.4. As such, there will be no direct impact on intertidal habitats, with any direct effects of trenchless operations limited to either the terrestrial or subtidal environments. As such it is proposed that temporary habitat loss effects on intertidal habitats are scoped out of the EIAR.

Potential impact	Justification
Remobilisation of contaminated sediments	• Seabed disturbance associated with construction, maintenance and decommissioning activities (e.g. foundation and cable installation) could lead to the remobilisation of sediment-bound contaminants that may result in harmful and adverse effects on fish and shellfish receptors. Sampling undertaken in support of a permit application to undertake dredging and disposal works for ABWP1 (Ramboll, 2016) has demonstrated that contamination in the offshore sediments is low and at levels which are unlikely to result in adverse effects on fish and shellfish receptors. Therefore, it is considered unlikely that there would be any pathways for an impact on fish and shellfish receptors, including consideration of indirect effect through changes to the benthic communities and as such this impact is proposed to be scoped out of the EIAR.
Injury and/or disturbance to fish from vessel activities	• Underwater noise generated from vessels is likely to be low and effects would only occur if fish species remained within immediate vicinity of the vessel (i.e. within metres) for a number of hours which is highly unlikely as fish will move away from any noise. Collision risk is only likely to be a risk to species which spend extended periods on the surface. This impact has therefore been scoped out of the assessment for all fish species, other than basking shark, and for sea turtles.
Disturbance to fish and shellfish from underwater noise and vibration generated by trenchless activities during construction	• There is potential for elevations in subsea noise during landfall operations at the seaward exit point(s) but this is considered to result in very localised, short-term effects on fish and shellfish and therefore it is proposed that this is scoped out of further assessment.
Disturbance to fish and shellfish from underwater noise and vibration generated by wind turbines during operation	• Noise and vibration generated by operational wind turbines is of a very low frequency and low sound pressure level (Andersson et al., 2011). Studies have found that sound levels are only high enough to possibly cause a behavioural reaction within metres from a wind turbine (Sigray and Andersson, 2011, Andersson et al., 2011) and that vibration generated by wind farms does not have any detrimental effect on invertebrates (Leonhard, 2000). Concerns, through consultation, have been raised specifically related to whelk species, however these are not considered to be different to other shellfish species. This impact has therefore been scoped out of the assessment.

Potential impact	Justification
Removal of hard substrates resulting in loss of colonising communities	• The removal of foundations and any scour/cable protection during decommissioning has the potential to lead to loss of shellfish species which colonise these structures as artificial reefs/refugia. This impact is likely to be very localised and only affect species that are of low mobility or sessile. In addition, whilst there is likely to be a shift in community structure (i.e. potentially a different suite of species colonising the area) the removal of such structures would allow for the habitat to revert to pre-construction conditions. Consequently, the fish and shellfish community would return to baseline conditions and therefore it is proposed that this impact is scoped out of the EIAR.

12.7. Proposed assessment methodology

12.7.1. The EIAR will consider the potential impacts of the construction, operational and maintenance and decommissioning phases of the Proposed Development on fish, shellfish and sea turtle receptors. The assessment methodology will consider the most recent Institute of Ecology and Environmental Management Guidelines for Ecological Impact Assessment in the UK and Ireland (CIEEM, 2019).

12.7.2. For the purposes of undertaking the EIAR, all fish, shellfish and sea turtle species that have the potential to occur in the vicinity of the Proposed Development will be identified as Important Ecological Features (IEFs). Where it is appropriate to do so, and particularly where there are large numbers of species characterising a community, the IEFs may be defined as a broad community ecotype with representative species highlighted. Each IEF will then be evaluated based on their legislative status together with the relative importance of the species/ecotypes present in the vicinity of the Proposed Development compared to the ecology of fish and shellfish in the wider region. Impacts on IEFs will be described in terms of their magnitude and correlated against the sensitivity of each IEF to each impact to define the significance (section 6.5).

12.8. Designed-in measures and mitigation

12.8.1. The following designed-in measures are proposed in relation to basking shark and sea turtle:

- Potential injury to basking shark and sea turtle arising from elevated levels of subsea noise during pile-driving will be mitigated via a Marine Megafauna Mitigation Plan (MMMP) following Ireland's published guidance (NPWS, 2014);
- The potential for collision risk and disturbance to basking shark and sea turtle from vessels during the construction, operational and maintenance and decommissioning phases will be minimised by following good practice, for example the Code of Conduct developed by Whale Watch West Cork, the Wildlife Safe (WiSe) Scheme as recommended by the Marine Management Organisation (MMO) in the UK, or the Scottish Marine Wildlife Watching Code.

12.8.2. Any further mitigation requirements for fish, shellfish and sea turtle ecology will be dependent on the significance of the effects.

13. Marine mammals

13.1. Introduction

13.1.1. This EIAR chapter will consider the potential impacts of the Proposed Development on marine mammals during the construction, operational and maintenance and decommissioning phases.

13.2. Study area

13.2.1. For the purposes of the EIAR, the marine mammal Study Area is defined as the area encompassing the Array Area, including the offshore export cable routes, plus an appropriate buffer within which to assess the effects on marine mammals arising from potential impacts. The buffer includes the recent digital aerial survey (Digital Aerial Survey (DAS)) campaign for ornithology and marine mammals, which encompasses a 4 km buffer which extends to the east of the Array Area and covers the area between the west of the Array Area and the coast (Figure 13.1). To provide a wider context, the desktop review will also consider the ecology, distribution, and abundance of marine mammals within the wider Irish Sea. This Irish Sea marine mammal Study Area will also inform the assessment where the ZoI for any of the identified impacts extends beyond the marine mammal Study Area (e.g. due to underwater noise from piling). The Study Area is illustrated in Figure 13.1.

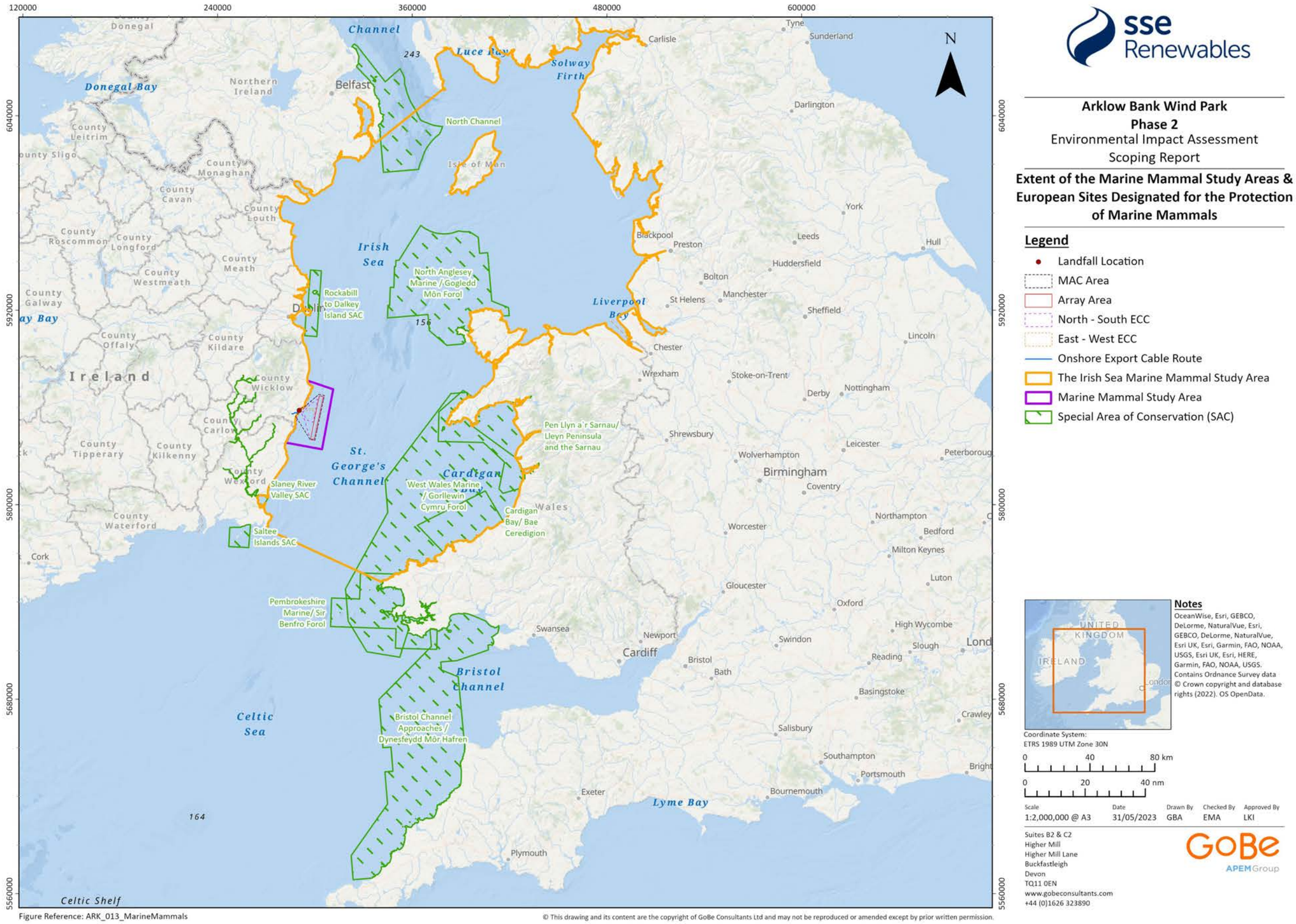


Figure Reference: ARK_013_MarineMammals

Arklow Bank Wind Park
Phase 2
Environmental Impact Assessment
Scoping Report

Extent of the Marine Mammal Study Areas & European Sites Designated for the Protection of Marine Mammals

Legend

- Landfall Location
- MAC Area
- Array Area
- North - South ECC
- East - West ECC
- Onshore Export Cable Route
- The Irish Sea Marine Mammal Study Area
- Marine Mammal Study Area
- Special Area of Conservation (SAC)

Notes

OceanWise, Esri, GEBCO, DeLorme, NaturalVue, Esri, GEBCO, DeLorme, NaturalVue, Esri UK, Esri, Garmin, FAO, NOAA, USGS, Esri UK, Esri, HERE, Garmin, FAO, NOAA, USGS. Contains Ordnance Survey data © Crown copyright and database rights (2022). OS OpenData.

Coordinate System:
ETRS 1989 UTM Zone 30N

0 40 80 km
0 20 40 nm

Scale	Date	Drawn By	Checked By	Approved By
1:2,000,000 @ A3	31/05/2023	GBA	EMA	LKI

Suites B2 & C2
Higher Mill
Higher Mill Lane
Buckfastleigh
Devon
TQ11 0EN
www.gobeconsultants.com
+44 (0)1626 323890

Figure 13.1 Marine mammal study area and sites designated for the protection of Annex II marine mammals

13.3. Data sources

Desktop data

13.3.1. Information on marine mammal receptors within the Irish Sea and specifically across the Arklow Bank will be collated through a detailed desktop review of existing studies and datasets. Key organisations including NPWS and Irish Whale and Dolphin Group (IWDG) will be contacted to obtain relevant data for the EIAR. Desktop data sources include academic reports, consent applications and surveys to support the designation of SACs for Annex II marine mammal species. Examples of key data sources are listed in Table 13.1, noting that this list is not exhaustive.

Table 13.1 Key sources of information for the marine mammal baseline

Title	Description	Source
Marine mammals in Irish waters atlas	Distribution and relative abundance of marine mammals in Irish offshore waters.	Wall *et al*. (2013)
Biodiversity maps for Ireland	Marine mammal sightings and stranding records from dedicated surveys and from incidental observations.	National Biodiversity Data Centre online mapping tool[8]
ObSERVE aerial data	Occurrence, distribution and abundance of cetaceans and seabirds in Irish waters based on aerial survey data (2015 – 2017).	Rogan *et al*. (2018)
Protected sites data	Internationally designated sites for the conservation of marine mammals in Irish waters.	NPWS (2011; 2013; 2014a; 2014b; 2014c; 2015)
Harbour porpoise surveys	Various surveys carried out by the IWDG using boat-based visual and aerial sampling techniques.	Berrow *et al*. (2008; 2013; 2018)
Harbour and grey seal maps	Updated at-sea distribution maps (mean and upper/lower confidence intervals) based on telemetry data from UK tagged seals and sightings data from the Irish Sea. These updated maps were compared to previous at-sea distribution maps for the Irish Sea which were based upon a 2003 aerial survey of the Irish Sea.	Marine Scotland online[9] (Russell *et al*., 2017) Jones *et al*. (2015) Carter et al. (2022)
Thermal imagery surveys	Pinniped population surveys across the Republic of Ireland via aerial survey during the harbour seal moulting period in 2003, 2011 – 2012 and 2017 – 2018.	Cronin *et al.* (2004) Duck (2006) Duck & Morris (2012; 2013) Morris & Duck (2019)

[8] https://maps.biodiversityireland.ie/Map
[9] https://data.marine.gov.scot/dataset/updated-seal-usage-maps-estimated-sea-distribution-grey-and-harbour-seals

Title	Description	Source
Inshore surveys for cetaceans	Visual and acoustic surveys for cetacean carried out in two survey blocks in the north and south Irish Sea; the northern half of block B was in proximity to the Arklow Bank Wind Park.	Berrow *et al*. (2010)
SCANS, SCANS-II and SCANS-III	Small cetacean abundance in the North Sea (SCANS) surveys which included the Irish Sea in survey years 2005 (SCANS-II) and in 2016 (SCANS-III).	Hammond *et al*. (2013) Hammond *et al*. (2017) Lacey et al. (2022)
Special Committee on Seals (SCOS) series	Scientific advice in relation to management of grey seal and harbour seal populations in the UK. Pup production and population trends are described which provide a picture of the health of seal populations around the UK and can be extrapolated to Ireland.	SCOS (2021)

Site specific surveys

13.3.2. Site-specific surveys include data collected in support of ABWP1 and recent surveys commissioned to inform the baseline for the Proposed Development.

13.3.3. The site-specific surveys for ABWP1 include historical boat-based visual surveys undertaken between June 2000 and June 2009 (Figure 13.2). A small amount of acoustic monitoring data was also obtained to the northwest of the ABWP1 wind turbines over a total of 25 days between 1 August and 1 September 2002.

13.3.4. Twenty-four months of DAS data (March 2018 to February 2020 and April 2020) are available to inform the baseline for the EIAR. The survey conducted in April 2020 were completed as data were not available for April 2019. Across these surveys, all calendar months were surveyed twice (Figure 13.2). This survey approach is designed to capture seasonal seabird and marine mammal species presence across the Array Area and export cable routes without the potential for under-recording due to human error (i.e. detection bias, which is not considered an issue for DAS). As marine mammals spend a large proportion of their time below the water surface, where possible, the data will be corrected for availability bias to allow for an estimate of the absolute numbers of each species of marine mammal during the surveys.

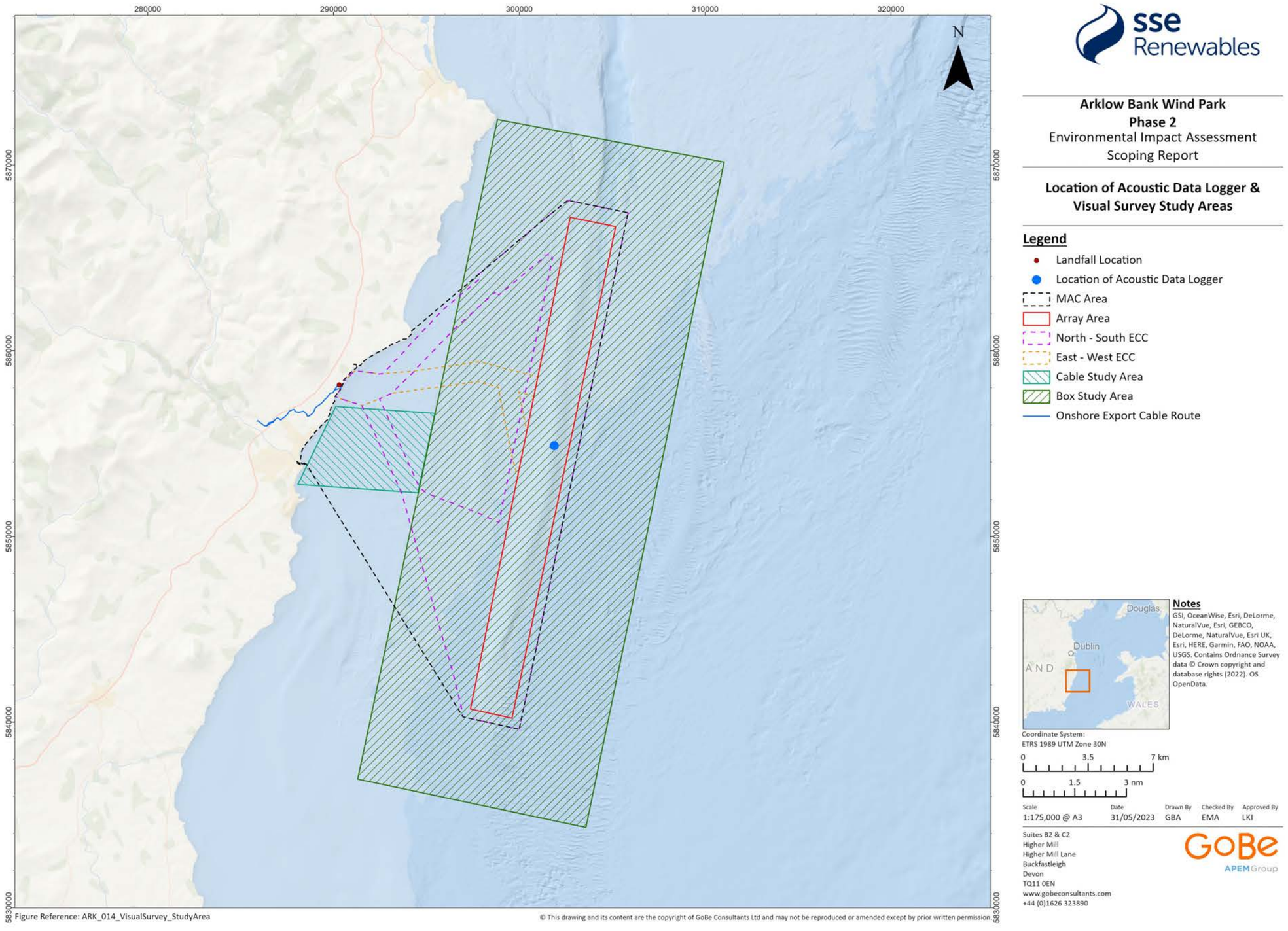


Figure 13.2 Location of Acoustic Data Logger & Visual Survey Study Areas

13.4. Baseline environment

13.4.1. The Proposed Development is located within Irish waters in the Irish Sea, on the east coast of the Republic of Ireland. Seventeen species of cetacean and two species of pinniped have been recorded in the Irish Sea, as evidenced from sightings or stranding records (Evans and Shepherd, 2006; Berrow et al., 2018; Rogan et al., 2018; IWDG, 2022). The high species richness is attributed to the suitability of the physical marine environment (bathymetry, seabed topography, salinity, temperature, etc.) and the availability and distribution of prey species in Irish waters. The west and southwest coasts of Ireland support the greatest diversity and abundance of marine mammals in Irish waters. On the east coast, in the Irish Sea, the more commonly recorded cetaceans include harbour porpoise *Phocoena phocoena*, bottlenose dolphin *Tursiops truncatus*, Risso's dolphin *Grampus griseus* and minke whale *Balaenoptera acutorostrata*. Both species of pinniped, harbour seal *Phoca vitulina* and grey seal *Halichoerus grypus*, occur commonly in the Irish Sea.

13.4.2. Marine mammals are protected under Irish and international legislation. National protection includes the Wildlife Act (1976) and Wildlife (Amendment) Act (2021) which protects marine mammals and their habitats from disturbance and wilful interference up to 12nm from the coast. The Conservation of Species and Habitats Directive (Council Directive 92/43/EEC) provides protection of marine mammals throughout EU member states through both the designation/classification of SACs as well as the protection of European Protected Species.

13.4.3. Site-specific baseline data collected from a boat-based survey which was conducted monthly between July 1996 and March 1997. Marine mammals were recorded as part of the seabird surveys following standard European Seabirds at Sea (ESAS) methodology (Webb and Durnick, 1992). These surveys provided a record of marine mammals over the offshore wind farm area (termed the 'Bank'), a 5 km wide buffer around the offshore wind farm (termed the 'Box') and the offshore export cable route from the western boundary of the Box to the landfall. Additional seabird and marine mammal surveys were undertaken monthly in the Bank, Box and offshore export cable route survey areas between 2001 and 2009 which provides further information on marine mammals. Whilst it is acknowledged that there were limitations to the marine mammal data gathered (as the surveys were designed for seabirds as the focal taxon), the data did, nonetheless, provide a relatively long-term record of the marine mammal species most commonly found within the survey area, their seasonality, and the distribution of sightings across the survey area.

13.4.4. In addition to these surveys, the ObSERVE programme conducted aerial surveys of cetaceans and seabirds across all Exclusive Economic Zone (EEZ) waters surrounding the Republic of Ireland across two summers and winters (2015-2017; Berrow et al., 2018; Rogan et al., 2018).

13.4.5. Surveys found that the highest densities of harbour porpoise were in the Irish Sea and to the southwest of Ireland (Rogan et al., 2018). Including regular occurrence within the Bank and Box survey areas. Occasional counts were made of larger harbour porpoise groups inshore along the offshore export cable route. The waters to the north of the Arklow Bank, off north County Dublin and to the east of Dublin Bay are thought to be most important for this species within the Irish Sea (Berrow et al., 2008). Consequently, harbour porpoise is a primary citation feature of the Rockabill to Dalkey Island SAC (see Figure 13.1), which is located approximately 37km to the north of the Proposed Development.

13.4.6. Risso's dolphin was recorded infrequently within the Bank area over the survey period, with sightings generally towards the end of the summer months. Sightings mainly occurred off the south Dublin/Wicklow coast (Coveney Wildlife Trust, 2002) or to the south of the Irish Sea (Rogan et al., 2018).

13.4.7. Bottlenose dolphin is the third most frequently recorded cetacean species in Irish waters. During the ObSERVE surveys, numbers were reported as very low in the west Irish Sea (Rogan et al., 2018) and are mainly noted across inshore coastal waters (Berrow et al., 2010). These sightings

may have a degree of connectivity to the resident population of bottlenose dolphin in Cardigan Bay SAC and Lleyn Peninsula and the Sarnau SAC, Wales, both situated approximately 77km to the east of the Proposed Development.

13.4.8. Minke whale is the smallest and most frequently recorded baleen whale in Irish waters. Incidental sightings and stranding records suggest that they occur seasonally in the Irish Sea between April and June (Berrow et al., 2010). Most minke whale records for the east coast of Ireland were from offshore waters around Dublin Bay and in the northern Irish Sea (Berrow et al., 2011) and this is corroborated by the recent ObSERVE aerial surveys, which reported all Irish Sea sightings of minke whale around the Dublin Bay area (Rogan et al., 2018).

13.4.9. Grey seals occur in the west Irish Sea and may use the habitat around the Arklow Bank (Berrow et al., 2011; Carter et al., 2022). Pinniped population assessments were conducted across the Republic of Ireland via aerial survey during the harbour seal moulting period between July and September 2003 (Cronin et al., 2004; Duck, 2006), 2011/2012 (Duck & Morris, 2012; 2013), and 2017/2018 (Morris & Duck, 2019). The east and southeast region contains the smallest proportion of grey seals in all three surveys (10% and 17% in 2017/2018; 5% and 5% in 2011/2012; 6% and 5% in 2003; Morris & Duck, 2019). They were recorded irregularly within the survey area with most sightings along the Bank, but individuals were also counted within the Box and along the offshore export cable route (Berrow et al., 2011). There was no seasonal pattern to the grey seal sightings as individuals were recorded in all seasons over the survey period, with variations in the month they were sighted from year to year.

13.4.10. Inshore boat-based surveys noted harbour seal in both the northern and southern parts of the Irish Sea, but sighting records suggest they may use the habitat around the Array Area infrequently (Berrow et al., 2011). Harbour seals have a higher distribution in Northern Ireland and along the west coast of the Republic of Ireland (Jones et al. 2015). The latest minimum population estimate for harbour seals in Ireland is 4,007 individuals counted in the 2017/2018 survey (Morris & Duck, 2019). The east and southeast region contains the smallest proportion of harbour seals in all three surveys (3% and 1% in 2017/2018; 3% and 2% in 2011/2012; 4% and 1% in 2003; Morris & Duck, 2019).

13.4.11. Key haul-out sites for both species are to the north of Dublin Bay and off the coast of County Wexford in the southeast of Ireland. Further information on seal counts will be sought as part of the baseline from the NPWS annual seal count database. Both grey seal and harbour seal are citation features for the Lambay Island SAC which lies approximately 63km to the north of the Proposed Development, off the coast of Portrane (north County Dublin) (Figure 13.1). The Slaney River Valley SAC, approximately 45km to the southwest of the Array Area lists harbour seal as one of the citation features (Figure 13.1). Just outside the Irish Sea geographic boundary (approximately 65km from the Array Area), the Saltee Islands SAC is designated for protection of grey seal (Figure 13.1).

Potential impacts

13.4.12. Table 13.2 presents the potential impacts on marine mammals that could arise from the Proposed Development during the construction, operational and maintenance and decommissioning phases.

Table 13.2 Impacts to be scoped in for the Marine Mammal EIAR chapter

Potential impact	Phase			Justification
	C	O	D	
Injury and/or disturbance to marine mammals from underwater noise during pile-driving	✓	✗	✗	• Marine mammals use sound for foraging, orientation, communication and predator avoidance and therefore may be sensitive to elevated levels of noise in the marine environment that may impair auditory function or disrupt normal behaviour. The assessment of effects will be based upon site-specific subsea noise modelling to determine the potential ranges over which injury or disturbance could occur in each of the key species within the marine mammal Study Area. The assessment methodology will follow the latest guidelines on subsea noise thresholds and species audiograms (National Marine Fisheries Service (NMFS), 2018; NMFS, 2005; Popper, 2014; Southall et al., 2019).
Injury and/or disturbance to marine mammals from vessel activities	✓	✓	✓	• Increased vessel traffic has the potential to affect marine mammals by vessel noise masking auditory signals or by increasing the risk of collision. Vessel type, speed and ambient noise levels will influence the magnitude of this impact. Therefore, the assessment will consider a range of potential vessels used and the spatial and temporal scale of the uplift in vessel activity.
Changes in the fish and shellfish community affecting prey resources	✓	✓	✓	• Changes to the prey species community as a result of construction, operational and maintenance and decommissioning activities may indirectly affect marine mammals due to potential changes in resource availability. This could lead to changes in the distribution of marine mammals if there are changes in the distribution and abundance of prey species or reduced foraging success if prey resources are depleted.
Accidental pollution	✓	✓	✓	• There is a risk of pollution being accidentally released during the construction, operational and maintenance and decommissioning phases from sources including vessels/vehicles and equipment/machinery. The release of such contaminants will however be managed by the EMP (see section 13.7) and therefore the likelihood of an accidental spill occurring is very low.

Potential impact	Phase			Justification
	C	O	D	
Changes in Electromagnetic Fields (EMF) from subsea electrical cabling	✗	✓	✗	• Transmission of electricity along subsea cables leads to the emission of low-frequency EMFs. As magneto-sensitive species, the sensory mechanisms of marine mammals could be affected which may lead to avoidance behaviour, disruption in orientation, and effects on feeding or social interaction. In order to reduce the risk of EMF effects on marine mammal receptors, a Cable Attenuation Plan will be prepared. The Cable Attenuation Plan will include an assessment of the EMF attenuation of the specified cables which will feed into recommendations on cable burial depth, micro-siting and cable protection to ensure that the magnetic field strength at the received distances falls within the limits of variation of the earth's magnetic field. Adoption of the measures recommended by the Cable Attenuation Plan will reduce the risk of EMF.

13.5. Impacts scoped out of further assessment

13.5.1. Table 13.3 presents the impacts to be scoped out of the Marine Mammals EIAR chapter.

Table 13.3 Impacts to be scoped out of the Marine Mammals EIAR chapter

Potential impact	Justification
Increased suspended sediment concentrations and associated deposition	• Marine mammal vision is adapted to deal with lower levels of light in the marine environment and vision can be an important cue in navigation, avoiding obstacles and detecting prey. Whilst elevated levels of SSC arising during construction and maintenance activities may decrease light availability in the water column and produce turbid conditions, the maximum impact range is expected to be localised with sediments rapidly dissipating over one tidal excursion. The ZoI for suspended sediment is not anticipated to overlap any key areas for marine mammals (i.e. SACs designated for marine mammals or in proximity to seal haul-outs) and the area affected is likely to be small in the context of the wider available habitat. Therefore, it is proposed that this impact is scoped out of the EIAR.

Potential impact	Justification
Remobilisation of contaminated sediments	• Seabed disturbance associated with construction, maintenance and decommissioning activities (e.g. foundation and cable installation) could lead to the remobilisation of sediment-bound contaminants that may result in harmful and adverse effects on marine mammals. Recent sampling undertaken for ABWP1 (Ramboll, 2016) has demonstrated that contamination in the offshore sediments is low and at levels which are unlikely to result in adverse effects on marine mammals. Therefore, it is considered unlikely that there would be any pathways for an impact on marine mammals, including consideration of indirect effect through changes to the benthic or fish and shellfish communities (see section 11).
Injury and/or disturbance to marine mammals from operational underwater noise	• The majority of studies investigating the impact of operational offshore wind farms on marine mammals and fish conclude that sound levels would likely be audible up to a few hundred metres from the turbine foundation, but not at a level sufficient to cause injury or behavioural changes. Norro et al. (2011) compared measurements of a range of different foundation methods and turbine ratings in the Belgian part of the North Sea, as well as comparing those to other European waters. The authors found a slight increase in Sound Pressure Level (SPL) compared to the ambient noise measured before the construction of the wind farms. They concluded that even the highest increases found within the dataset (20 to 25 dB re 1µ Pa) are likely to be within the natural range of variation in baseline noise and therefore, even with the long-term nature of this impact (lifespan of the wind farm), the operational noise would not cause a significant impact. It is predicted therefore that any impact would be highly localised and unlikely to affect marine mammals.

13.6. Proposed assessment methodology

13.6.1. The EIAR will consider the potential impacts of the construction, operational and maintenance and decommissioning phases of the Proposed Development on marine mammal receptors. The assessment methodology will consider the most recent Institute of Ecology and Environmental Management Guidelines for Ecological Impact Assessment in the UK and Ireland (CIEEM, 2019); Guidelines for data acquisition to support marine environmental assessments of offshore renewable energy Projects (Judd, 2012); and Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters (NPWS, 2014). The impacts of underwater noise on marine mammals will be supported by underwater noise modelling (see section 10).

13.6.2. During construction, there is potential for underwater noise impacts on sensitive ecological receptors due to impact piling, construction vessels and cable installation activities. During operation, there is potential for underwater noise impacts on sensitive ecological receptors due to operational wind turbines and maintenance activities. Decommissioning effects associated with the removal of offshore infrastructure are envisaged to the same or similar to those described for the

construction phase, but with the exception that piling operations will not be required. The potential impacts on these receptors will be assessed within the relevant technical chapters of the EIAR.

13.6.3. For the purposes of undertaking the EIAR, all marine mammal species that have the potential to occur in the vicinity of the Proposed Development will be identified as IEFs. The valuation of IEFs will be based on their legislative status together with the relative importance of the populations present within the marine mammal Study Area compared to the wider regional marine mammal populations in the Irish Sea. Impacts on IEFs will be described in terms of their magnitude and correlated against the sensitivity of each IEF to that impact to produce a statement of significance (see section 6.5).

13.7. Designed-in measures and mitigation

13.7.1. The following designed-in measures are proposed in relation to marine mammals:

- Preparation of an MMMP to reduce the potential for injury to marine mammals during pile-driving; and
- Adoption of good practice by following a pre-defined code of conduct for vessel operators during the construction, operational and maintenance and decommissioning phases to reduce the risk of disturbance/collision to marine mammals, for example: Code of Conduct developed by Whale Watch West Cork (2009), the Wildlife Safe (WiSe) Scheme as recommended by the MMO in the UK or the Scottish Marine Wildlife Watching Code (SNH, 2017).

13.7.2. Any further mitigation requirements for marine mammals will be dependent on the significance of the effects.

14. Offshore ornithology

14.1. Introduction

14.1.1. This EIAR chapter will consider the potential impacts of the Proposed Development on offshore ornithology during the construction, operational and maintenance and decommissioning phases.

14.2. Study area

14.2.1. The Offshore Ornithology Study Area has been defined through consideration of potential impacts on offshore ornithological receptors and the suitability of this area for the purposes of EIA, with the ZoI varying for the species and season being assessed. The Offshore Ornithology Study Area includes the Array Area and a 4km buffer (see Figure 14.1).

14.3. Data sources

Desktop data

14.3.1. Relevant literature and data sources will be reviewed and used to inform the EIAR including:

- Relevant literature on species baseline data, collision risk, flight heights and avoidance rates (Band, 2012, Wright et al., 2012; Johnston et al., 2014a,b; Cook et al., 2014; WWT Consulting, 2014; Statutory Nature Conservation Bodies (SNCB), 2014; McGregor et al., 2018; Bowgen and Cook, 2018; Cummins et al., 2019);
- Relevant literature on disturbance and displacement (SNCBs 2017; Natural England and Joint Nature Conservation Committee (JNCC), 2012; Garthe and Hüppop, 2004), and collision risks (Natural England 2022);
- ObSERVE aerial seabird survey data collected between 2015 and 2017 across all Exclusive Economic Zone (EEZ) waters surrounding the Republic of Ireland (Jessopp et al., 2018);
- Existing proposed offshore wind farm EISs (e.g. Codling Bank, Oriel) where available; and
- A review of assessment methodologies for offshore wind farms (e.g. Maclean et al., 2009, SNH).

14.3.2. Burke (2018) has identified current seabird data gaps relating to Irish waters. Species which have lower levels of confidence relating to numbers and distribution will be assessed with appropriate acknowledgement of these uncertainties in the EIAR (and NIS):Location and significance of seabird colonies: although a national census of seabird colonies took place in 2015 to 2018, some gaps remain, most notably for burrow-nesting species including puffin, Manx shearwater and storm-petrel, as well as some low-density cliff colonies, and urban gull populations;

- Key foraging areas: there is a lack of Global Positioning System (GPS) tracking data for some species including gulls, terns and cormorant. For other species such as auks, much current GPS tracking work in Ireland is biased to a few easily accessible colonies; and
- Non-breeding season distribution at sea: targeted surveys are required for storm petrel, and in inshore waters for divers, grebes and seaducks, to better understand non-breeding season distributions.

Site-specific studies

14.3.3. Seabird monitoring (boat-based surveys 2000 to 2009 and Wicklow Head colony counts 2001 to 2010) was undertaken between 2000 and 2010 to inform the ABWP EIS and provide construction and post-construction monitoring for ABWP1. These surveys provide a valuable span of continuous

seabird data which reveals both species-specific seasonal patterns and the degree of inter-annual variation present in the marine environment. These data have been reviewed to determine if changes in seabird densities before and after construction can be detected (MacArthur Green, 2018). This analysis did not find any significant changes in abundance or distribution which could be attributed to the ABWP1 (although given the small size of this wind farm and the inherent variability of the marine environment this result is not untypical of such analyses). Since these data were collected, changes in seabird distribution and abundance, both locally and as part of wider population trends, may have occurred. The DAS, conducted between 2018 and 2020, were therefore commissioned to provide an updated dataset which reflects any changes in conditions within the survey area or wider Irish Sea, compared to the original baseline data. All available survey data, as described below, will be used to inform the EIAR (and NIS).

Boat-based Surveys 2000 to 2009

14.3.4. Boat-based surveys of seabird activity on the Arklow Bank and surrounding area were undertaken between July 2000 and June 2009 in order to characterise the baseline environment for the 2001 EIS and for the purposes of post-construction monitoring at ABWP1. Data analysis revealed seasonal trends for the key species present and provided a time series of seabird activity and abundance in the area during this period. A summary of the results of the analyses will be presented in the EIAR.

Aerial Surveys 2018 to 2020

14.3.5. Seabird monitoring recommenced in advance of the 2018 breeding season (March 2018), with standard monthly aerial surveys undertaken by HiDef Aerial Surveying Limited ('HiDef') using an aircraft equipped with high-resolution HiDef Gen II digital video cameras with sensors set to obtain an image resolution of 2cm Ground Sample Distance (GSD). The intended survey campaign was completed after two years in February 2020, with an additional survey conducted in April 2020 to replace a missed survey due to poor weather conditions in April 2019, ensuring all calendar months were surveyed twice.

14.3.6. The aerial survey covered a larger area than the boat surveys; digital video images were collected over a series of strip transects spaced 2km apart across the Survey Area, which included a 4km buffer around the Array Area and also extended to the north of the Array Area to include Wicklow Head and to the west to cover the area inshore of Arklow Bank up to and including the coastline (Figure 14.1). Data were obtained from two cameras, each sampled a strip of 125m width, separated from the next camera by approximately 25m, thus providing a combined transect width of 250m. The target coverage for the survey was 10%, therefore data from a 100m strip width have been analysed from each camera (i.e. a total transect width of 200m, spaced at 2km (BSH, 2013)). The results from these surveys provide a comprehensive dataset covering two years and will be used to calculate average bird density and abundance estimates for the Array Area and appropriate buffers in each calendar month. These will be used as the basis for the EIAR. The mean density and abundance for each bird species each month will be calculated as the average of the individual monthly mean values (i.e. across two estimates, except for July, for which an additional survey was conducted and therefore three estimates are available). The results will also be compared with the baseline boat-based 2000 to 2009 dataset to determine if the previous temporal and spatial patterns have been maintained.

Wicklow Head Colony Counts 2001 to 2010

14.3.7. The seabird colony at Wicklow Head, approximately 7km from the Array Area, was surveyed in each summer from 2001 to 2010 to estimate the sizes of breeding seabird populations (see MacArthur Green, 2018). In addition, Birdwatch Ireland has supplied colony counts from surveys conducted in 2014 and 2015 and NPWS provided counts from 2018 and 2019. These data will be used to inform breeding season reference populations which will be assessed against potential

ornithological impacts of the Proposed Development during construction, operation and decommissioning.

Intertidal survey 2019 to 2020

14.3.8. Surveys of the landfall site were conducted during the 2019 to 2020 nonbreeding season and the 2022 breeding season. These were undertaken from land and/or from a survey vessel. These surveys have ensured coverage of the zone between that surveyed for terrestrial ornithology (which extends to the HWM) and the marine surveys (up to a minimum of the low water mark, but potentially higher depending on the tide state when surveys were conducted). Thus, the inclusion of these specific intertidal surveys, which include a degree of spatial overlap, has ensured there is no gap in survey coverage. Although there is a risk of double counting (i.e. including sensitive species in both the offshore and intertidal assessments) this will be avoided through consideration of sensitive species' habitat preferences (i.e. consideration of the risk of inclusion in both assessments) and also the timing of the surveys. All bird species recorded within the potential area of construction disturbance will be considered in the EIAR.

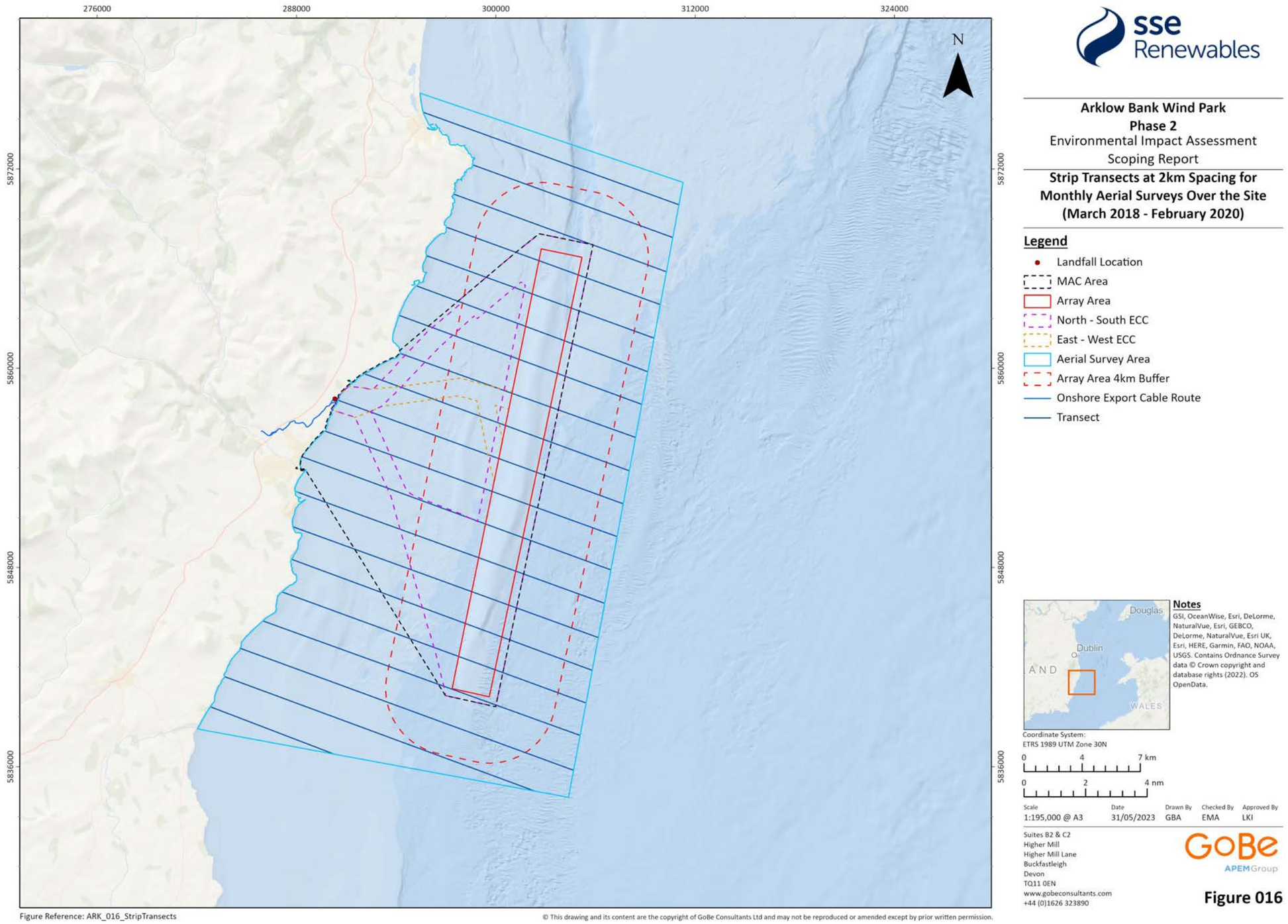


Figure 14.1 Aerial Survey Area

14.4. Baseline environment

Seabird species

14.4.1. Species that were recorded during the site-specific baseline surveys (2000 to 2009) and monthly aerial surveys (2018 to 2020) are presented in Table 14.1, together with an overview of relevant seasons for each species based on information from Furness (2015) and Snow and Perrins (1998).

14.4.2. Reference populations for each species and population sizes will be based on the best available information at the time of undertaking the assessment and will be consulted on and discussed with key stakeholders. The conservation status of each species will also be taken into consideration.

Table 14.1 Species recorded during the site-specific baseline surveys (2000 to 2009) and monthly aerial surveys (2018 to 2020), together with an overview of relevant seasons for each species based on information from Furness (2015) and Snow and Perrins (1998).

Species		Breeding	Migration-free breeding	Migration – autumn	Winter	Migration – spring	Non-breeding
Common name	Scientific name						
Common scoter	*Melanitta nigra*	-	-	-	-	-	Oct-Mar
Red-throated diver	*Gavia stellata*	Mar-Aug	May-Aug	Sep-Nov	Dec-Jan	Feb-Apr	-
Black-headed gull	*Chroicocephalus ridibundus*	-	Apr-Jul	-	-	-	Aug-Mar
Common gull	*Larus canus*	-	May-Jul	-	-	-	Aug-Apr
Great black-backed gull	*Larus marinus*	Mar-Aug	May-Jul	Aug-Nov	Dec	Jan-Apr	Sep-Mar
Herring gull	*Larus argentatus*	Mar-Aug	May-Jul	Aug-Nov	Dec	Jan-Apr	Sep-Feb
Lesser black-backed gull	*Larus fuscus*	Apr-Aug	May-Jul	Aug-Oct	Nov-Feb	Mar-Apr	-
Kittiwake	*Rissa tridactyla*	Mar-Aug	May-Jul	Aug-Dec	-	Jan-Apr	-
Little gull	*Larus minutus*	Apr-Jul	May-Jul	-	-	-	Aug-Apr
Guillemot	*Uria aalge*	Mar-Jul	Mar-Jun	Jul-Oct	Nov	Dec-Feb	Aug-Feb

Species		Breeding	Migration-free breeding	Migration – autumn	Winter	Migration – spring	Non-breeding
Common name	Scientific name						
Puffin	*Fratercula arctica*	Apr-Aug	May-Jun	Jul-Aug	Sep-Feb	Mar-Apr	Mid-Aug-Mar
Razorbill	*Alca torda*	Apr-Jul	Apr-Jul	Aug-Oct	Nov-Dec	Jan-Mar	-
Common tern	*Sterna hirundo*	May-Aug	Jun-Jul	Jul-Sep	-	Apr-May	-
Arctic tern	*Sterna paradisaea*	May-Aug	Jun	Jul-Sep	-	Apr-May	-
'Commic' tern	*Sterna sp.*	May-Aug	Jun	Jul-Sep	-	Apr-May	-
Sandwich tern	*Thalasseus sandvicensis*	Apr-Aug	Jun	Jul-Sep		Mar-May	-
Arctic skua	*Stercorarius parasiticus*	May-Jul	Jun-Jul	Aug-Oct	-	Apr-May	-
Fulmar	*Fulmarus glacialis*	Jan-Aug	Apr-Aug	Sep-Oct	Nov	Dec-Mar	-
Manx shearwater	*Puffinus*	Apr-Aug	Jun-Jul	Aug-Oct	-	Mar-May	-
Gannet	*Morus bassanus*	Mar-Sep	Apr-Aug	Sep-Nov	-	Dec-Mar	
Great skua	*Stercorarius skua*	May-Aug	May-Jul	Aug-Oct	Nov-Feb	Mar-Apr	-
Shag	*Phalacrocorax aristotelis*	Feb-Aug	Mar-Jul	Aug-Oct	Nov	Dec-Feb	Sep-Jan

Note that for many species there are months which overlap between seasons. To avoid double counting of impacts across adjacent seasons, such overlapping months have only been included in one season, and this will be defined in the relevant section of the EIAR.

14.4.3. Kittiwake was the most abundant species recorded at sea during boat-based surveys (2000 to 2009), especially on the Arklow Bank, with highest numbers in the early winter period (October and November). Low to moderate numbers were also recorded during the remainder of the year, with a pre-breeding peak. Higher densities were recorded following construction of ABWP1 both in the wider area and on the bank, which may indicate attraction to the shallower waters on the bank during the non-breeding periods. Kittiwakes were also one of the most abundant species recorded during the aerial surveys (2018 to 2020), with peak counts of 1,100 and 1,400 recorded across the survey area in January and February 2020 respectively. The majority of the individuals were recorded as adults, although small numbers of juveniles were also recorded in all calendar months. Guillemot and razorbill were recorded in moderate to high numbers in all months of boat-based surveys. Guillemot numbers peaked in May and July both in the wider area and also on the Arklow

Bank. There were higher peak densities prior to construction of ABWP1 both on the bank and in the wider area. While the pattern on the bank could indicate avoidance of ABWP1, the similar pattern in the wider area suggests this was part of a wider trend. Guillemot has been the most consistently abundant species recorded during aerial surveys, especially in May and August 2018, and July 2019 when over 1,000 individuals were recorded across the entire survey area in each survey. Razorbill numbers peaked in early mid-winter (September to November) during the boat-based survey period. In contrast to guillemot, peak densities were higher following construction of ABWP1, however there was no clear pattern across the year in either the wider area or the bank. During aerial surveys, razorbills were recorded in relatively low numbers apart from in September 2018 when over 870 observations were made across the survey area. During June when numbers were lowest, birds were seen in the northwest of the survey area close to the coast.

14.4.4. Fulmars were observed in most months during the boat-based survey period, albeit in low numbers, with moderate peaks in March and July. There were generally higher densities before construction of ABWP1, in both the wider area and on the bank, with a slightly clearer trend on the bank which may indicate avoidance of ABWP1. During aerial surveys, fulmars were recorded in low numbers; none were recorded in February, March, November or December and the highest number of birds recorded in any one survey was five in April 2020.

14.4.5. Gannets have been recorded in all months, but during boat-based surveys were present in generally low numbers between May and November with peaks in May and also between August and October. There was no clear trend in the before and after densities, but numbers may have decreased post-construction of ABWP1 in the Arklow Bank area. Gannet numbers peaked in August during aerial surveys with a count of 13 individuals across the survey area. During the breeding season between April to August, more gannets were recorded near the coast compared with the spring and autumn migration periods.

14.4.6. Manx shearwaters were recorded on boat-based survey between March and October in moderate numbers, peaking in May and September. There were no apparent trends in the presence before or after construction of the ABWP1. During aerial surveys, Manx shearwaters peaked in May with over 900 records across the survey area in 2018, and a second lower peak of around 400 occurred in August 2018.

14.4.7. Most gull species (black-headed gull, great black-backed gull, herring gull and lesser black-backed gull) were recorded in variable but low numbers in most months. In general, there were no clear trends in presence prior to and after construction of ABWP1. Common gulls peaked in winter and were almost entirely absent between April and September, with a peak count in January of 550 across the survey area. Presence before construction of ABWP1 was higher outside the bank, whereas presence post-construction was higher on the bank. This may indicate attraction of birds to the turbines (e.g. for roosting), but it may be a chance effect. Little gulls had a similar seasonal pattern with a winter peak count of 200 in December across the survey area. Great black-backed gull, lesser black-backed gull and herring gull were recorded in low numbers in most months, with peak counts across the survey area of 9 (September 2019), 8 (October 2019) and 28 (March 2018) respectively. .

14.4.8. Great skuas were only recorded between July and November, in very low numbers. This is consistent with post-breeding dispersal movements through the Irish Sea. Arctic skuas were recorded in low numbers between April and November only, with most observations made in September.

14.4.9. Red-throated divers were recorded in all months during boat-based surveys (2000 to 2009), albeit in very low numbers outside of a mid-winter peak period from December to February. With the exception of a mean January peak on the bank, densities in all months were higher before construction of ABWP1 than post-construction. This may indicate avoidance of the wind farm. During aerial surveys red-throated divers were recorded in low to moderate numbers in all calendar months except June to August when none were recorded. Numbers peaked during the winter

season and 74 birds were recorded in December 2019. The locations were all on the Arklow Bank, with a small number of observations close to the ABWP1 wind turbines.

14.4.10. Common and Arctic terns were recorded between April to September. Numbers of both species peaked in August 2018, with a combined peak count across the survey area of 630 individuals.

Designated sites

14.4.11. The closest designated site to the Array Area is the Wicklow Head Special Protection Area (SPA), approximately 7km to the northwest (at the closest point to the Array Area), for which kittiwake is a named qualifying feature, being present in nationally important numbers during the breeding season (NPWS, 2020) (note that the SPA also hosts regionally important numbers of fulmar, guillemot and razorbill). Given the proximity of this colony to the Survey Area it is highly likely that a large proportion of the individuals recorded during the breeding season originate from this SPA.

14.4.12. Colony monitoring was conducted as part of the ABWP1 monitoring requirements at this SPA between 2001 and 2010. All the species monitored (kittiwake, guillemot, razorbill, fulmar and shag) increased across this period, with mean annual rates of growth between 2.3% (razorbill) and 11.2% (fulmar). Kittiwake was the most numerous breeder and numbers increased from 783 adults on nest (Apparently Occupied Nest (AON)) in 2001 to 948 AON in 2010. Guillemot numbers increased from an estimated 507 to 773 individuals, with razorbills increasing from 179 to 220 individuals over the same period. The more recent counts of kittiwake for this colony recorded 674 AON in 2018 and 773 AON in 2019. The average annual growth rate (i.e., year to year change) over the period 2001 to 2019 was 3.5%. Over this same period the national trend has been a 32% reduction (Cummins et al., 2019).

14.4.13. In 2018 NPWS began monitoring the seabird populations at the SPA on an annual basis. The most recent survey, from the 2022 breeding season, reported an estimated 674 kittiwake AON (NPWS, 2022).

14.4.14. Kittiwake productivity varied between 2001 and 2010 with a mean of 0.74 chicks per pair (range 0.38 to 1.1). Across the period monitored, there is a suggestion of an overall increase in productivity, but this trend was not significant. The average productivity between 2018 and 2022 is estimated to have been 0.62 chicks per pair (NPWS, 2022).

14.4.15. There are several other seabird colonies designated as SPAs within species-specific foraging range of Arklow Bank and for which there is potential connectivity, including:

- Howth Head Coast (designated for breeding populations of kittiwake);
- Ireland's Eye (designated for breeding populations of cormorant, herring gull, kittiwake, guillemot and razorbill);
- Saltee Islands (designated for breeding populations of fulmar, gannet, cormorant, shag, lesser black-backed gull, herring gull, kittiwake, guillemot, razorbill and puffin);
- Grassholm (designated for breeding gannet); and
- Lambay Island (designated for breeding populations of fulmar, cormorant, shag, lesser black-backed gull, herring gull, kittiwake, guillemot, razorbill and puffin and wintering greylag goose).

14.4.16. Assessment of the potential impacts on the features of these designated sites will be provided in the NIS.

14.5. Potential impacts

14.5.1. Table 14.2 presents the potential impacts on offshore ornithology that could arise from the Proposed Development during the construction, operational and maintenance and

decommissioning phases. These impacts will be assessed for bird species that were recorded during boat-based and aerial surveys within the Offshore Ornithology Study Area, as well as those likely to be present in the vicinity of the Proposed Development including true pelagic birds (e.g. gannet and fulmar), other species that spend part of their annual life cycle at sea (e.g. divers and gulls) and non-seabird migrants (e.g. wildfowl, waders and passerines).

Table 14.2 Impacts to be scoped in for the Offshore ornithology EIAR chapter

Potential impact	Phase			Justification
	C	O	D	
Disturbance and displacement	✓	✓	✓	Construction and decommissioning phases • Construction activities (including installation of WTGs and associated vessel traffic) within the Array Area has the potential to directly affect bird populations through visual and noise disturbance, leading to displacement. This would effectively result in temporary habitat loss through a reduction in the area available for feeding, loafing and moulting. • Noise and vibration related to construction activities (particularly pile driving) and decommissioning activities, and associated vessel traffic (e.g. cable laying vessels), as well as direct disturbance by vessels, have the potential to disturb and displace bird species for the duration of installation activities. • The susceptibility of each species to construction disturbance will depend upon factors such as the feeding strategy of the species (i.e. aerial, swimming or surface) and timing of construction activities and behaviour (whether birds are breeding or migrating). The EIAR (and NIS) will be informed by reviews of species sensitivity (e.g. Garthe and Hüppop, 2004; Burke, 2018). Operational and maintenance phase • The presence of WTGs has the potential to directly disturb and displace birds from within and around the Array Area. This is assessed as an indirect habitat loss, as it has the potential to reduce the area available to birds for feeding, loafing and moulting. The lighting of wind turbines and associated ancillary structures could also attract (or repel) certain species of birds and affect migratory behaviour on a local scale.
Indirect effects upon prey species and habitats	✓	✓	✓	Construction and decommissioning phases

Potential impact	Phase C	Phase O	Phase D	Justification
				• Indirect impacts on birds may occur during the construction and decommissioning phases, due to impacts on prey species and the habitats of prey species. These indirect effects include those resulting from the production of underwater noise (e.g. during piling) and the generation of suspended sediments (e.g. during seabed preparation activities) that may alter the behaviour or availability of bird prey species. • Underwater noise may cause fish and mobile invertebrates to avoid the construction area and also affect their physiology and behaviour. Elevated suspended sediments may cause fish and mobile invertebrates to avoid the construction area and may smother and hide immobile benthic prey within the immediate area. These mechanisms could potentially result in less prey being available in the area adjacent to active construction works to foraging seabirds. Operational and maintenance phase • Indirect displacement of birds may occur during the operational and maintenance phase, due to impacts on prey species and the habitats of prey species. These indirect effects include those resulting from the temporary disturbance/loss of habitat, Electromagnetic Fields (EMFs) and the generation of suspended sediments (e.g. due to scour or maintenance activities) that may alter the behaviour or availability of bird prey species. • Maintenance operations resulting in the temporary loss or disturbance of habitat, EMF and elevated suspended sediment could potentially cause fish and mobile invertebrates to avoid the operational area and also affect their physiology and behaviour. Consideration of these potential impacts will be provided, however there is very little evidence to support this and in fact there is growing evidence gathered from existing offshore wind farms which suggests that the opposite may be true (Kerckhof *et al*., 2010; Emu, 2008; Krone *et al*., 2013; Linley *et al*., 2008 and Wilhelmsson, 2006).
Collision risk	✗	✓	✗	• There is a risk of birds colliding with turbine structures as they fly through the wind farm during operation. The susceptibility of species to collision risk depends upon physiological and behavioural characteristics of the species, in addition to the Proposed Development design specifications.

Potential impact	Phase C	Phase O	Phase D	Justification
Barrier effects	✗	✓	✗	• During operation, the presence of the wind turbines and OSPs may act as a barrier to free movement, causing birds to alter and lengthen their flight path to avoid the wind farm. This may increase energetic expenditure during foraging flights and migration (DECC, 2009). It has been shown that some species (e.g. divers and scoters) avoid wind farms by making detours around wind turbine arrays, which potentially increases their energetic costs (Petersen *et al*., 2006; Petersen and Fox, 2007), with an associated potential risk of decreased survival chances. Such effects may have a greater impact on birds that regularly commute around a wind farm (e.g. birds transiting between foraging grounds and roosting/nesting sites) than migrants that would only negotiate around a wind farm once per migratory period, or twice per annum, if flying the same return route (Speakman *et al*., 2009). • The proximity of the Proposed Development to the coast, particularly Wicklow Head (13km), means that the area is likely to be of importance to some species during the breeding season (e.g. kittiwake, auk species) and therefore the potential for increases in regular (commuting) flight distances will be considered in the EIAR (and NIS). The potential for impacts during the migration period will also be considered. However, due to typically very small increases in distance relative to total migration path and limited exposure, barrier effects are expected to be very small.

14.6. Impacts scoped out of further assessment

14.6.1. Table 14.3 presents the impacts to be scoped out of the Offshore Ornithology EIAR chapter.

Table 14.3 Impacts to be scoped out of the Offshore Ornithology EIAR chapter

Potential impact	Justification
Disturbance and displacement (maintenance vessels)	• During the operational and maintenance phase, the presence of vessels and personnel undertaking routine operations and maintenance activity at the wind farm and along the offshore export cable route may cause localised, temporary disturbance and displacement. However due to the nature of this impact (temporary/localised), any displaced birds may readily redistribute to areas of lower or no activity on site without impacting on fitness. It is therefore proposed that this impact is scoped out of the EIAR.

Potential impact	Justification
Species-specific effects	• Due to different ecological requirements and behaviour, different species have variable susceptibility to many of the impacts discussed above. For example, species such as guillemot and razorbill fly close to the sea surface and are therefore very unlikely to be at risk of collision with turbine rotors. Hence such species will be scoped out of the collision assessment. Similarly, species such as large gulls are not regarded as susceptible to displacement from operational wind farms and therefore these species will be scoped out of the operational displacement assessment. The basis for species-specific scoping out along these lines will be presented in the EIAR (and NIS).

14.7. Proposed assessment methodology

14.7.1. Full and detailed methodology for the EIAR (and NIS) will be consulted on and discussed with relevant stakeholders (e.g. NPWS). The Developer has met with representatives of NPWS in 2019, 2020 and 2023 and had also met with Birdwatch Ireland in 2018, at which the Proposed Development and potential ornithological impacts have been discussed. The following sections provide an overview of the assessment methodology.

Identification of species and sensitivity

14.7.2. The monthly aerial bird surveys of the Array Area, associated buffer and inshore areas will provide the key data source for the ornithology site characterisation and quantification of parameters for the assessment (e.g. displacement and collision risk modelling (CRM)). Additionally, information from the previous boat-based surveys (2000 to 2009) as well as recent wider studies in the Irish Sea (Jessop et al., 2018 and Rogan et al., 2018) will provide contextual information.

14.7.3. The aerial surveys will provide information on species (or species-groups if species identification is not possible) abundance, distribution, behaviour, location, numbers, sex and age (where possible), flight heights and direction. The EIAR (and NIS) will consider the nature of the use of the site by birds recorded, including seasonal differences and activities (i.e. foraging, overwintering, migrating or other) in order to determine the importance of the site relative to the wider area for seabirds throughout the year.

14.7.4. The intertidal surveys will be used to consider the potential construction impacts on species in the vicinity of the cable landfall. This will be based on appropriate disturbance buffers around activity (e.g. around construction vessels).

14.7.5. The potential impacts on other terrestrial species which may pass the Proposed Development on migration (e.g. wildfowl and waders) will be assessed using UK industry standard methods (e.g. Wright et al. 2012).

14.7.6. Data analysis for the EIAR (and NIS) will consider seasonal differences in site usage by each key species as well as the importance of the site for the life stages of each species. Analysis will include abundance and density estimates (with associated confidence intervals and levels of precision).

14.7.7. Reference populations for each species and population sizes will be based on the best available information at the time of undertaking the assessment and will be consulted on and discussed with key stakeholders.

14.7.8. The sensitivity of each species will be determined based on the size of its population, its conservation status and its known sensitivity to offshore wind farms, using industry standard data sources (e.g. Skov et al., 1995; Garthe and Hüppop, 2004; and Furness and Wade, 2012). Species identified as sensitive receptors will be subject to an assessment against the impacts listed above. The assessment will be undertaken in line with guidance by CIEEM (2019) and expert opinion.

Displacement

14.7.9. The UK Statutory Nature Conservation Bodies (SNCBs) issued a joint Interim Displacement Guidance Note (Natural England and JNCC, 2012 and SNCBs, 2017), which provides recommendations for presenting information to enable the appraisal of displacement effects in relation to offshore wind farm developments in English and Welsh waters. This guidance, together with species-specific reviews of the evidence for displacement at operational wind farms, will be used to inform the EIAR (and NIS).

14.7.10. There are a number of different measures used to determine bird displacement from areas of sea in response to activities associated with an offshore wind farm. Furness and Wade (2012), for example, use disturbance ratings for particular species, alongside scores for habitat flexibility and conservation importance to define an index value that highlights the sensitivity to disturbance and displacement. A similar approach is used by Ramiro and Cummins (2016) within an Irish context, as reported in Burke (2018).

14.7.11. A matrix approach (SNCBs, 2017; NE and JNCC, 2012) will be used as a framework for calculating a range of predicted impact magnitudes. These relate varying levels of displacement to varying levels of additional consequent mortality, with consideration then given to the population-level impacts of the potential additional mortality. For species at risk of displacement during the nonbreeding season, consideration will be given to a proposed approach for standardising assessments (i.e. to account for different numbers of nonbreeding seasons between species for which data is available). Evidence presented in recent wind farm assessments will be used to inform the species-specific rates of displacement and mortality used in the assessments (e.g. Vattenfall, 2019).

Collision risk modelling

14.7.12. Collision risk modelling (CRM) will be undertaken using industry-standard approaches (e.g. Band, 2012; McGregor et al., 2018) to predict potential mortality levels from this impact and the consequences of this for relevant populations. The parameter values used, such as for avoidance rates, flight heights and nocturnal activity levels, will be based upon the best available evidence and will be consulted on and discussed with relevant stakeholders (e.g. NPWS) with clearly defined methods presented in the EIAR (and NIS).

14.7.13. In addition to CRM to assess collision risk, where appropriate, population models (e.g. Population Viability Analysis (PVA)) will be undertaken to provide guidance on the potential population consequences of estimated impacts. These models will be constructed in accordance with best practice for such methods (e.g. WWT et al., 2012) with an emphasis on the relative outcomes for impacted versus un-impacted population Projections.

14.8. Designed-in measures and mitigation

14.8.1. The following designed-in measures are proposed in relation to offshore ornithology:

- Mitigation through Project design (e.g. in terms of the number of wind turbines and airgap) is a type of primary mitigation and is an inherent aspect of the EIA process.

14.8.2. The need for any further mitigation (and the feasibility of such measures in relation to ornithological receptors) will be dependent on the outcomes of the analysis and modelling of the potential impacts

on seabirds. Consultation with key ornithological stakeholders (e.g. NPWS) will be ongoing throughout the EIA process and will include discussion of the need for mitigation and monitoring.

15. Offshore Bat Activity

15.1. Baseline environment

15.1.1. A total of nine bat species are resident in Ireland, belonging to two families (Bat Conservation Ireland, 2020). Many of these species of bat are known to be migratory outside of Ireland, particularly in continental Europe where more northerly breeding species migrate southwards during the autumn and return north in the spring. While it is understood that bats undertake seasonal migrations within Ireland, due to a lack of scientific studies, bat migration to/from Ireland is less well understood. However, bat vagrancy/migration has been noted by Bat Conservation Ireland – in addition to the nine resident species, one individual each of Brandt's bat and greater horseshoe bat have been recorded, with both species likely to be vagrants (Bat Conservation Ireland, 2020).

15.1.2. There is currently no publicly available empirical evidence of offshore bat activity (e.g. migration, commuting, foraging) within Irish marine waters; however, this is due to an absence of survey rather than evidence that such activity does not occur. There is growing evidence of offshore bat activity within the European context, including long-distance migration by certain species, and offshore bat surveys in the North Sea (Lagerveld et al., (2014) and Lagerveld et al., (2021)).

15.1.3. There are no standard survey methods in Ireland or internationally for characterising offshore bat activity; however, existing United Nations Environment Program - Convention on Migratory Species (UNEP) and EUROBATS (The Agreement on the Conservation of Populations of European Bats) secretariat guidelines recommend surveying offshore wind development in the same manner as land-based (Rodrigues et al., (2015)).

15.1.4. An Offshore Bat Technical Report will be provided in the EIAR. The report will include a desk-based literature review addressing bat populations of Ireland, their migratory behaviours and likelihood to be observed offshore, potential impact pathways, and sensitivity to impacts.

15.1.5. Offshore bat monitoring surveys were conducted within the Array Area between 2021 - 2022. The findings of the survey confirm the presence of two bat species (Leisler's bats and common pipistrelle) in the offshore environment and within the vicinity of the Proposed Development.

15.1.6. It is proposed to conduct further bat monitoring surveys in 2023, with detectors placed at both onshore and offshore locations. Any results available at the time of application will inform the EIAR.

15.2. Potential impacts

15.2.1. Table 15.1 presents the potential impacts on bats that could arise from the Proposed Development during the construction, operational and maintenance and decommissioning phases.

Table 15.1 Impacts to be scoped in to the Offshore Bats EIAR chapter

Potential impact	Phase			Justification
	C	O	D	
Collision of migrating bats with offshore WTGs	✓	✓	✓	• There is a risk of bats colliding with turbine structures if they fly through the wind farm during operation. The susceptibility of species to collision risk depends upon physiological and behavioural characteristics of the species, in addition to the Proposed Development design specifications.

15.3. Impacts to be scoped out of further assessment

15.3.1. There are no impacts that have been scoped out of the assessment at this stage.

15.4. Proposed assessment methodology

15.4.1. There are no standard survey methods in Ireland or internationally for characterising offshore bat activity; however, existing UNEP - Convention on Migratory Species and EUROBATS (The Agreement on the Conservation of Populations of European Bats) secretariat guidelines recommend surveying offshore wind development in the same manner as land-based (Rodrigues et al., 2015).

15.4.2. Details of additional offshore bat monitoring will be included in the EIAR.

15.5. Designed-in measures and mitigation

15.5.1. The following designed-in measures are proposed in relation to offshore bats:

- Mitigation through Project design (e.g. in terms of the number of wind turbines) is a type of primary mitigation and is an inherent aspect of the EIA process.

15.5.2. The need for any further mitigation (and the feasibility of such measures in relation to bat receptors) will be dependent on the outcomes of the analysis and modelling of the potential impacts on bats. Consultation with key stakeholders (e.g. NPWS) will be ongoing throughout the EIA process and will include discussion of the need for mitigation and monitoring.

16. Commercial fisheries and aquaculture

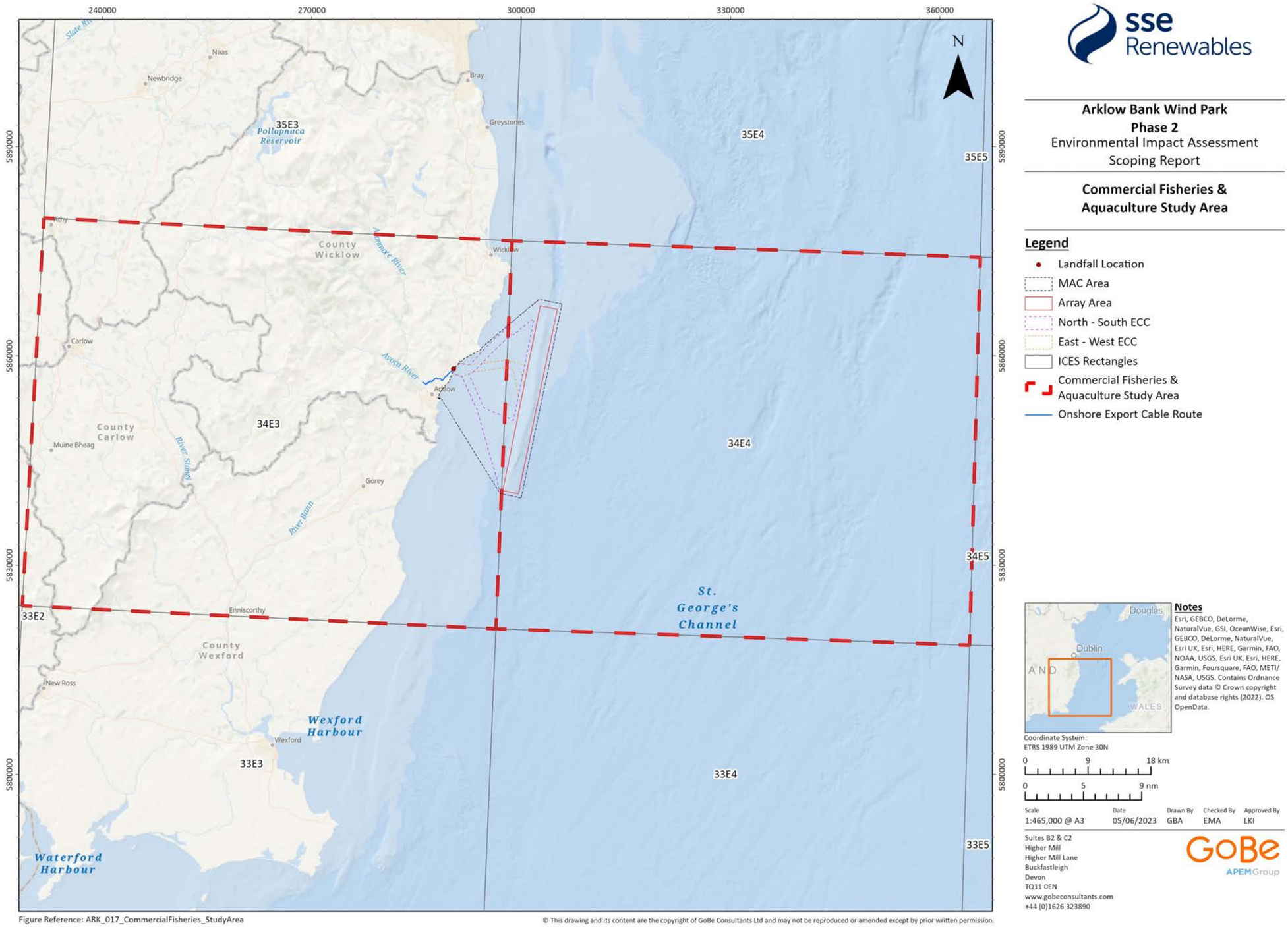
16.1. Introduction

16.1.1. This EIAR chapter will consider the potential impacts of the Proposed Development on commercial fisheries and aquaculture during the construction, operational and maintenance and decommissioning phases.

16.2. Study area

16.2.1. The Proposed Development is located in International Council for the Exploration of the Sea (ICES) Division VIIa (Irish Sea). Fisheries data are recorded and collated by statistical rectangles within each ICES Division. The Commercial Fisheries and Aquaculture Study Area has therefore been defined with reference to the ICES rectangles within which the Proposed Development is located. As shown in Figure 16.1 these are as follows:

- Rectangle 34E3: inshore rectangle within which the majority of the offshore export cable routes are located; and
- Rectangle 34E4: rectangle within which the Array Area and a small section of the offshore export cable routes are located.



Arklow Bank Wind Park
Phase 2
Environmental Impact Assessment
Scoping Report

Commercial Fisheries & Aquaculture Study Area

Legend

- Landfall Location
- MAC Area
- Array Area
- North - South ECC
- East - West ECC
- ICES Rectangles
- Commercial Fisheries & Aquaculture Study Area
- Onshore Export Cable Route

Notes

Esri, GEBCO, DeLorme, NaturalVue, GSI, OceanWise, Esri, GEBCO, DeLorme, NaturalVue, Esri UK, Esri, HERE, Garmin, FAO, NOAA, USGS, Esri UK, Esri, HERE, Garmin, Foursquare, FAO, METI/ NASA, USGS. Contains Ordnance Survey data © Crown copyright and database rights (2022). OS OpenData.

Coordinate System:
ETRS 1989 UTM Zone 30N

0 9 18 km

0 5 9 nm

Scale	Date	Drawn By	Checked By	Approved By
1:465,000 @ A3	05/06/2023	GBA	EMA	LKI

Suites B2 & C2
Higher Mill
Higher Mill Lane
Buckfastleigh
Devon
TQ11 0EN
www.gobeconsultants.com
+44 (0)1626 323890

Figure Reference: ARK_017_CommercialFisheries_StudyArea

Figure 16.1 Commercial Fisheries and Aquaculture Study Area

16.3. Data sources

16.3.1. The principal sources of data and information used to inform the baseline characterisation with regard to fishing activity are anticipated to include:

- Marine Institute's Inshore Fishing Activity Dataset (www.data.gov.ie);
- Atlas of Commercial Fisheries around Ireland (Gerritsen et al., 2014);
- Atlas of Commercial Fisheries for Shellfish around Ireland (Tully, 2017);
- Irish landings data by ICES rectangle (www.cso.ie);
- Vessel Monitoring System (VMS) data – effort data by method (Ireland's Marine Atlas);
- Baseline information gathered through consultation with fisheries stakeholders; and
- Information on the distribution of fishing vessels gathered as part of shipping and navigation assessment (see section 17).
- Marine activity surveys performed monthly since 2019;

16.3.2. In order to help inform the assessment, particularly in respect of activity by the under 10 m fleet which are not recorded in VMS data, consultation has been undertaken with local fisheries stakeholders. Consultation with the fishing industry is ongoing and will continue throughout the life cycle of the Proposed Development.

16.4. Baseline environment

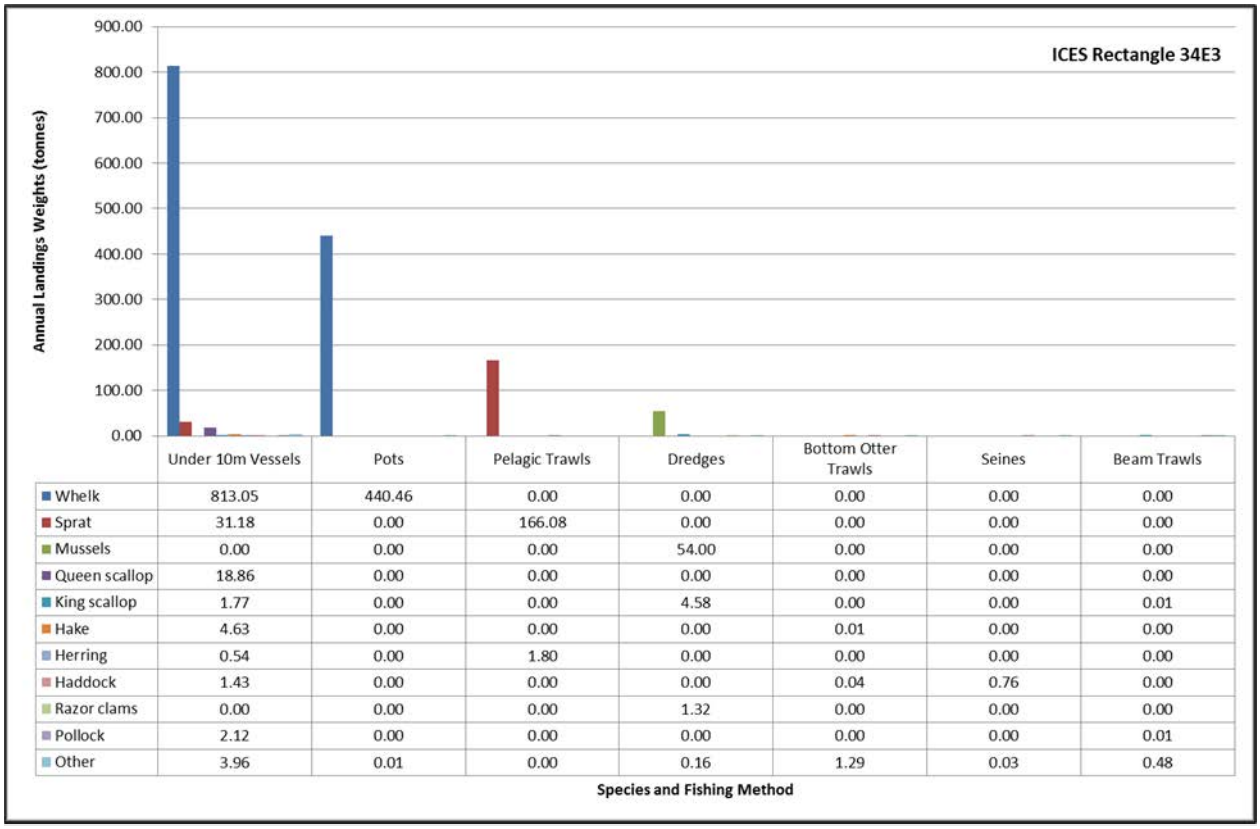
Existing fisheries

16.4.1. An indication of the principal species targeted in the Commercial Fisheries and Aquaculture Study Area and of the fishing methods used is given in Figure 16.2 and Figure 16.3 for ICES rectangles 34E3 and 34E4, respectively. This is based on landings data for the period 2015 to 2017 provided by the Marine Institute (2020). It should be noted that data for vessels below 10m in length does not specify the fishing method. It is understood, however, that in areas relevant to the Proposed Development, potting is the principal method used by vessels in the under 10m size category.

16.4.2. It is proposed to carry out a full analysis of the most up to date data held by the Sea Fisheries Protection Authority (SFPA) as part of the technical report for Commercial Fisheries and Aquaculture.

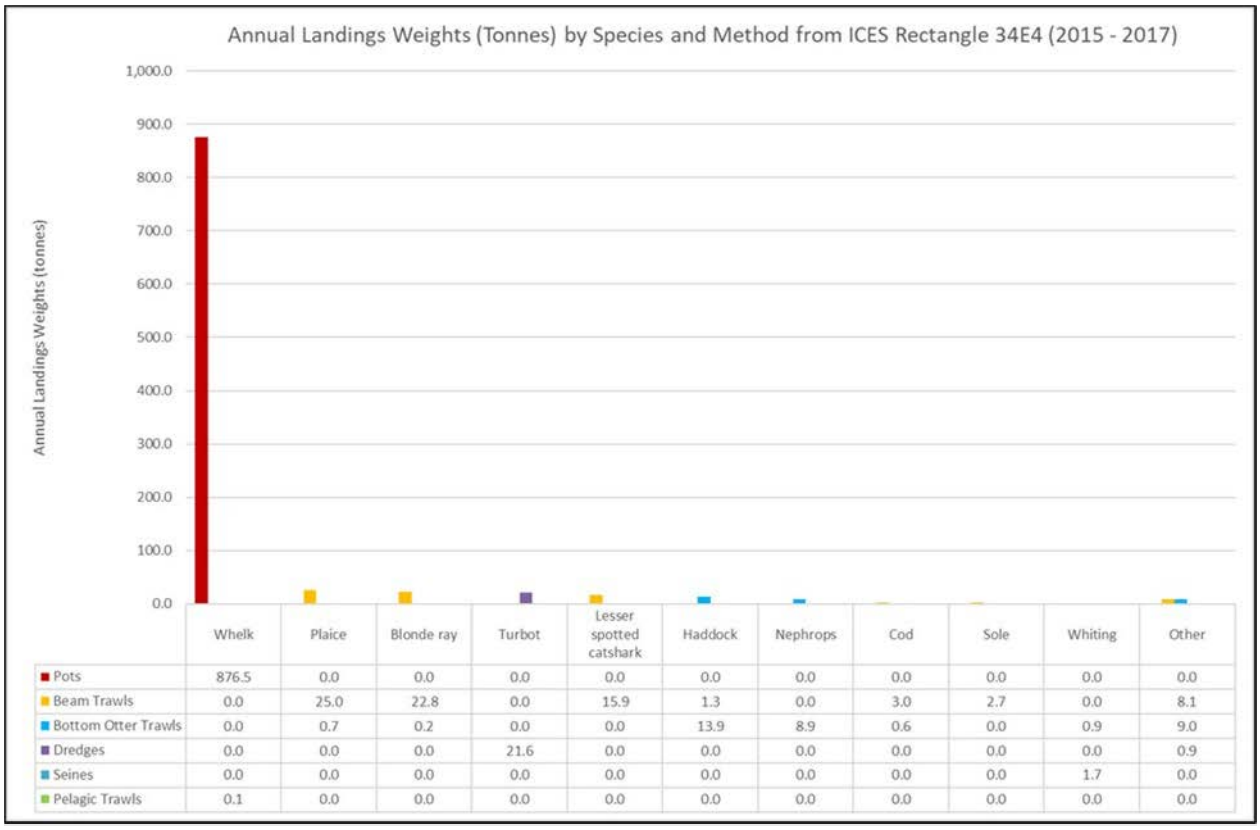
16.4.3. As shown in Figure 16.2, in inshore rectangle 34E3 the majority of landings are from small vessels (under 10 m vessels) that target whelks. Larger vessels (over 10m in length) also fish for whelks in this rectangle, as well as in rectangle 34E4, where potting for whelks also constitutes the main fishing activity (Figure 16.3).

16.4.4. A range of other fishing methods are recorded within the Commercial Fisheries and Aquaculture Study Area in the landings dataset, including pelagic trawling, dredging, bottom otter trawling, seine netting and beam trawling. However, these make a very small contribution to the overall landings from the Commercial Fisheries and Aquaculture Study Area and are for the most part associated with vessels over 10 m in length (Figure 16.2 and Figure 16.3).



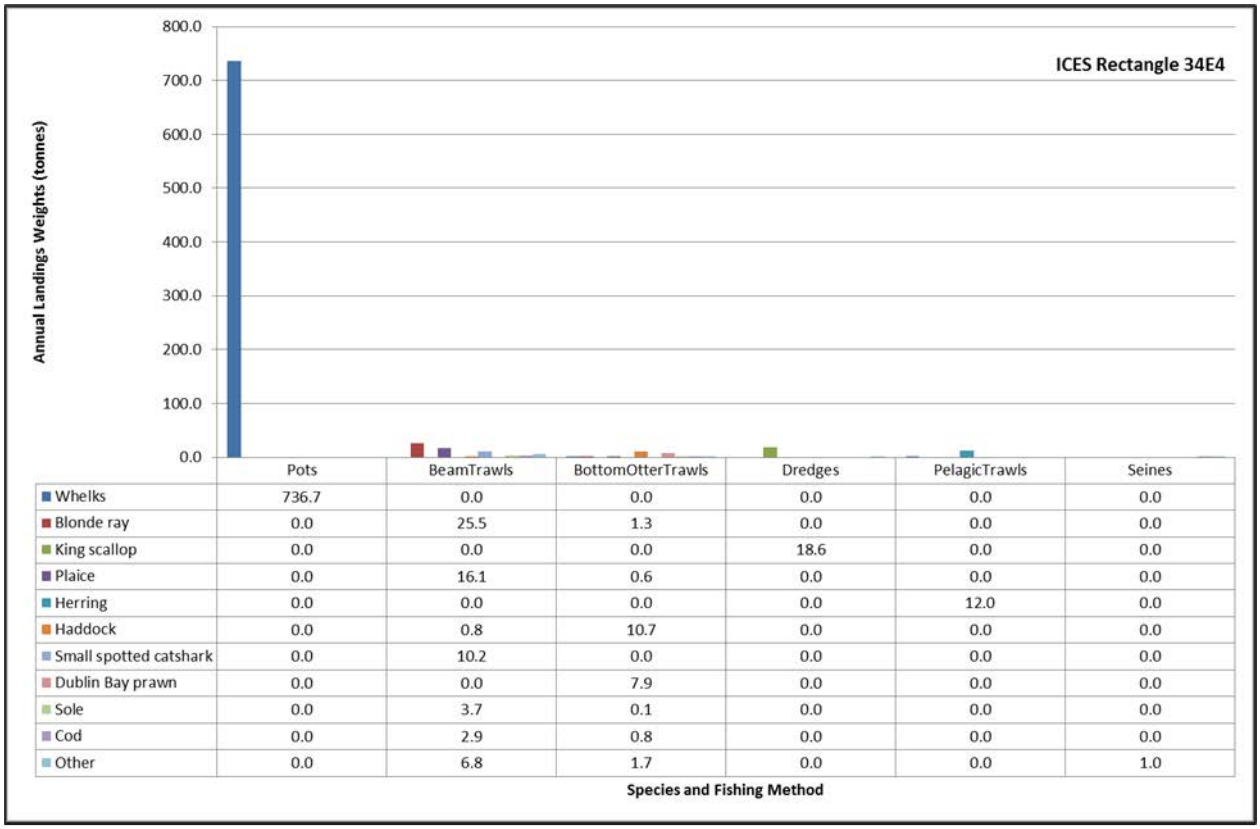
	Under 10m Vessels	Pots	Pelagic Trawls	Dredges	Bottom Otter Trawls	Seines	Beam Trawls
Whelk	813.05	440.46	0.00	0.00	0.00	0.00	0.00
Sprat	31.18	0.00	166.08	0.00	0.00	0.00	0.00
Mussels	0.00	0.00	0.00	54.00	0.00	0.00	0.00
Queen scallop	18.86	0.00	0.00	0.00	0.00	0.00	0.00
King scallop	1.77	0.00	0.00	4.58	0.00	0.00	0.01
Hake	4.63	0.00	0.00	0.00	0.01	0.00	0.00
Herring	0.54	0.00	1.80	0.00	0.00	0.00	0.00
Haddock	1.43	0.00	0.00	0.00	0.04	0.76	0.00
Razor clams	0.00	0.00	0.00	1.32	0.00	0.00	0.00
Pollock	2.12	0.00	0.00	0.00	0.00	0.00	0.01
Other	3.96	0.01	0.00	0.16	1.29	0.03	0.48

Figure 16.2 Annual landings weights (tonnes) from rectangle 34E3 (average 2013 to 2017)



	Whelk	Plaice	Blonde ray	Turbot	Lesser spotted catshark	Haddock	Nephrops	Cod	Sole	Whiting	Other
Pots	876.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Beam Trawls	0.0	25.0	22.8	0.0	15.9	1.3	0.0	3.0	2.7	0.0	8.1
Bottom Otter Trawls	0.0	0.7	0.2	0.0	0.0	13.9	8.9	0.6	0.0	0.9	9.0
Dredges	0.0	0.0	0.0	21.6	0.0	0.0	0.0	0.0	0.0	0.0	0.9
Seines	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.0
Pelagic Trawls	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Figure 16.3 Annual landings weights (tonnes) by species and method from ICES rectangle 34E4 (2015 - 2017)



	Pots	BeamTrawls	BottomOtterTrawls	Dredges	PelagicTrawls	Seines
Whelks	736.7	0.0	0.0	0.0	0.0	0.0
Blonde ray	0.0	25.5	1.3	0.0	0.0	0.0
King scallop	0.0	0.0	0.0	18.6	0.0	0.0
Plaice	0.0	16.1	0.6	0.0	0.0	0.0
Herring	0.0	0.0	0.0	0.0	12.0	0.0
Haddock	0.0	0.8	10.7	0.0	0.0	0.0
Small spotted catshark	0.0	10.2	0.0	0.0	0.0	0.0
Dublin Bay prawn	0.0	0.0	7.9	0.0	0.0	0.0
Sole	0.0	3.7	0.1	0.0	0.0	0.0
Cod	0.0	2.9	0.8	0.0	0.0	0.0
Other	0.0	6.8	1.7	0.0	0.0	1.0

Figure 16.4 Annual landings weights (tonnes) from ICES rectangle 34E4 (average 2013 to 2017)

16.4.5. As illustrated in Figure 16.3 and Figure 16.4, it is apparent that in the Commercial Fisheries and Aquaculture Study Area, fishing is primarily undertaken by potters targeting whelks. Analysis of landings data by port (between 2015 – 2017) suggests that the whelk fishery is primarily undertaken by local vessels, with the majority of the landings recorded from the Commercial Fisheries and Aquaculture Study Area being into Wicklow, Arklow and Courtown (Table 16.1 and Figure 16.2).

16.4.6. An analysis of the most up to date landings by port will be carried out as part of the technical report for Commercial Fisheries and Aquaculture.

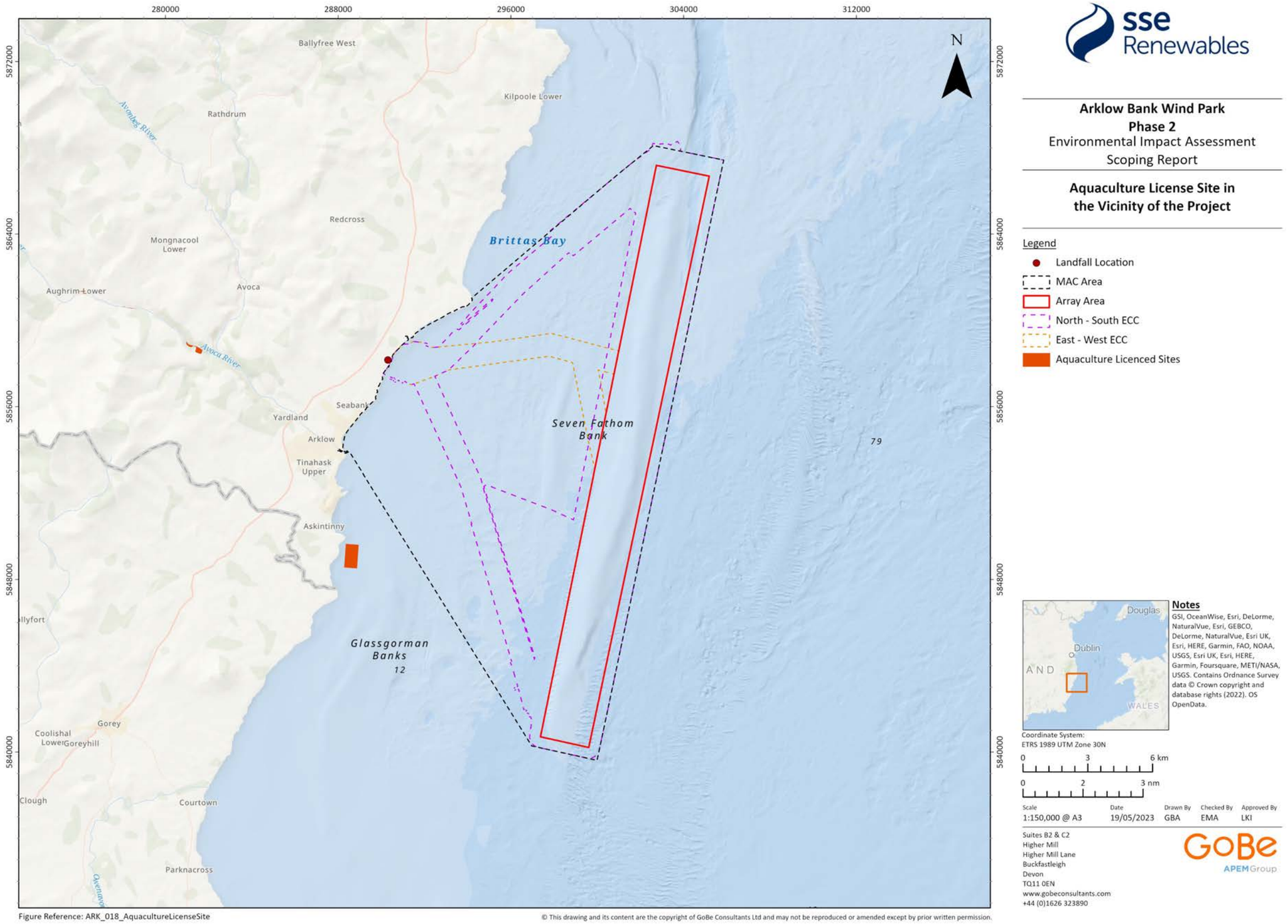
Table 16.1 Annual average landings from the Commercial Fisheries and Aquaculture Study Area (ICES rectangles 34E3 and 34E4) by port

Port	Over 10 m vessels operating pots (annual average 2015 to 2017)		Under 10 m vessels (all methods) (annual average 2015 to 2017)	
	Landings (tonnes)	% of total landings	Landings (tonnes)	% of total landings
Wicklow	844.7	49.5%	409.3	46.6%
Arklow	554.4	32.5%	226.5	25.8%
Courtown	33.3	2.0%	241.6	27.5%
Other	273.1	16.0%	0.0	0.0%

16.4.7. The baseline information outlined above indicates that potting for whelks is the main fishery in the area, with other fisheries active at low levels and primarily undertaken by visiting vessels.

Aquaculture

16.4.8. The Commercial Fisheries and Aquaculture Study Area is known to support a seed mussel fishery. Seed mussel beds local to Arklow Bank are primarily located in inshore areas off Wicklow (Marine Institute, 2018). A licence was granted in 2018 for the cultivation of mussel in proximity to the Proposed Development between Clogga Bay and Kilmichael Point (Figure 16.5). The licensed site is located to the south of the most southerly offshore export cable route at a distance of approximately 4.5km at its closest point.



sse Renewables

Arklow Bank Wind Park
Phase 2
Environmental Impact Assessment
Scoping Report

Aquaculture License Site in the Vicinity of the Project

Legend
- Landfall Location
- MAC Area
- Array Area
- North - South ECC
- East - West ECC
- Aquaculture Licenced Sites

Notes
GSI, OceanWise, Esri, DeLorme, NaturalVue, Esri, GEBCO, DeLorme, NaturalVue, Esri UK, Esri, HERE, Garmin, FAO, NOAA, USGS, Esri UK, Esri, HERE, Garmin, Foursquare, METI/NASA, USGS. Contains Ordnance Survey data © Crown copyright and database rights (2022). OS OpenData.

Coordinate System:
ETRS 1989 UTM Zone 30N

0 3 6 km
0 2 3 nm

Scale	Date	Drawn By	Checked By	Approved By
1:150,000 @ A3	19/05/2023	GBA	EMA	LKI

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Higher Mill
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Figure Reference: ARK_018_AquacultureLicenseSite

Figure 16.5 Aquaculture in the vicinity of the Proposed Development

16.5. Potential impacts

16.5.1. Table 16.2 presents the potential impacts on commercial fisheries and aquaculture that could arise from the Proposed Development during the construction, operational and maintenance and decommissioning phases.

Table 16.2 Potential impacts to be scoped in for the Commercial Fisheries and Aquaculture EIAR chapter

Potential impact	Phase			Justification
	C	O	D	
Loss of grounds or restricted access to fishing grounds	✓	✓	✓	Construction and decommissioning phases • Construction activities (e.g. presence of vessels, partially installed infrastructure, vulnerable sections of cable awaiting burial or protection) and decommissioning activities may result in a temporary loss of or restricted access to fishing grounds to fishing fleets that are normally active in the area. Operational and maintenance phase • Whilst fishing activity will be permitted within the Array Area, the physical presence of infrastructure may result in a loss of or restricted access to fishing grounds to fishing fleets that are normally active in the area. In addition, the undertaking of maintenance works during the operational phase may result in additional localised and short-term loss of grounds. • In the context of this assessment it is important to note that from the information available to date, it is understood that the Array Area sustains limited levels of fishing activity. In addition, fishing would be able to continue in the area of the offshore export cable routes (once cables have been buried/protected) and the operational wind farm. As such, any loss of fishing grounds during the operational phase would be expected to be very small.
Displacement of fishing activity into other areas	✓	✓	✓	Construction and decommissioning phases • Fishing activity which would normally take place in the area of the Proposed Development may be displaced to other areas as a result of loss of grounds or restricted access during construction and decommissioning. This could in turn result in increased competition for fishing on grounds in other areas. Operational and maintenance phase

Potential impact	Phase C	Phase O	Phase D	Justification
				• Whilst fishing activity will be permitted within the Array Area, any loss of or restricted access to fishing grounds during the operational and maintenance phase (see impact above) may lead to displacement of fishing activity into other areas. This could in turn result in increased competition for fishing on grounds in other areas. • Given the low levels of fishing activity within the Array Area(see above) and the expected small area potentially lost to fishing during the construction, operational and maintenance and decommissioning phases, any resulting displacement of fishing activity would also be very small.
Interference with fishing activities	✓	✓	✓	Construction and decommissioning phases • During the construction and decommissioning phases there may be potential for transiting vessels associated with the Proposed Development to cause interference with vessels engaged in fishing and/or with fishing gear. The assessment will evaluate the potential for conflicts to arise as a result of this and identify good practice approaches to minimise effects. Operational and maintenance phase • During the operational and maintenance phase there may be potential for transiting maintenance vessels to cause interference with vessels engaged in fishing and/or with fishing gear. The assessment will evaluate the potential for conflicts to arise as a result of this and identify good practice approaches to minimise effects.
Increased steaming times to fishing grounds	✓	✓	✓	Construction and decommissioning phases • The need for vessels to avoid areas in the proximity of construction and decommissioning works and partially installed infrastructure would result in short term increases in steaming distances and times. The potential for an effect to occur would largely depend on the location of construction works and infrastructure associated with the Proposed Development, relative to the location of fishing grounds and preferred steaming routes. Operational and maintenance phase

Potential impact	Phase C O D	Justification
		• The presence of infrastructure associated with the Proposed Development could result in increases in steaming distances and times for fishing vessels. The impact would largely depend on the location of infrastructure associated with the Proposed Development relative to the location of fishing grounds and preferred steaming routes, and on the layout of the infrastructure and minimum spacing between turbines.
Effects on commercially exploited species	✓ ✓ ✓	Construction and decommissioning phases • There are a number of activities associated with the construction and decommissioning phases which have the potential to affect fish and shellfish species, including those of commercial importance (whether fished or farmed). This may in turn result in effects on commercial fishing and/or aquaculture activities. The assessment will take account of the effects identified in the Fish, Shellfish and Sea Turtle Ecology EIAR chapter and evaluate whether these have potential implications for commercial fishing and aquaculture activities. Operational and maintenance phase • There are a number of activities associated with the operational and maintenance phase which have potential to affect fish and shellfish species, including those of commercial importance (whether fished or farmed). This may in turn result in effects on commercial fishing and/or aquaculture activities. The assessment will take account of the effects identified in the Fish, Shellfish and Sea Turtle Ecology EIAR chapter and evaluate whether these have potential implications for fishing and aquaculture activity.
Potential for snagging of gear	✓ ✓ ✓	• The potential for gear snagging and manoeuvrability issues will be identified and assessed. Other navigational safety issues associated with the construction of the Proposed Development (i.e. collision, allision) will be addressed in the Shipping and Navigation EIAR chapter.

16.6. Impacts scoped out of further assessment

16.6.1. No potential impacts are proposed to be scoped out of the EIAR with regards to commercial fisheries.

16.7. Proposed assessment methodology

16.7.1. The commercial fisheries assessment will be focused on key fishing fleets active in areas relevant to the Proposed Development. These will be identified through detailed analysis of available

fisheries data (i.e. landings and VMS data) and information collected through consultation with fisheries stakeholders.

16.7.2. For each potential impact the assessment will be undertaken on a fleet by fleet basis following the standard methodology approach outlined in section 6.5. An exception to this is the assessment of safety issues for fishing vessels (i.e. potential snagging of gear), which will consider potential risks and propose adequate measures to ensure that the safety of fishing vessels remains within acceptable limits. The assessment of safety issues will take account of the findings of the Shipping and Navigation EIAR chapter.

16.7.3. The commercial fisheries assessment will be undertaken with reference to relevant guidance, including but not limited to:

- Guidance on EIS and NIS Preparation for Offshore Renewable Energy Projects (DCCAE, 2017);
- FLOWW Best Practice Guidance for Offshore Renewables Developments: Recommendations for Fisheries Liaison. FLOWW (Fishing Liaison with Offshore Wind and Wet Renewables Group) (2014);
- FLOWW Best Practice Guidance for Offshore Renewables Developments: Recommendations for Fisheries Disruption Settlements and Community Funds. FLOWW (Fishing Liaison with Offshore Wind and Wet Renewables Group) (2015);
- International Cable Protection Committee (2009) Fishing and Submarine Cables - Working Together; and
- Economic Impact Assessments of Spatial Interventions on Commercial Fishing: Guidance for Practitioners. Second Edition (Seafish and UKFEN, 2013).

16.8. Designed-in measures and mitigation

16.8.1. The following designed-in measures are proposed in relation to commercial fisheries:

- Ongoing consultation with the fishing industry and continued engagement with the appointed Fisheries Liaison Officer (FLO);
- Development of a Fisheries Management and Mitigation Strategy (FMMS);
- Timely and efficient distribution of Notice to Mariners (NtM) and navigational warnings of the position and nature of works associated with the Proposed Development;
- The location of any areas of cable protection would be communicated to the fishing industry to prevent damage to and from fishing gear, ensuring the safety of vessels operating in the area;
- Use of guard vessels and Offshore Fisheries Liaison Officers (OFLOs), as required; and
- Undertaking of post-installation surveys and burial inspection surveys and, where appropriate and practicable, undertaking of rectification works.

16.8.2. Any further mitigation requirements for commercial fisheries will be dependent on the significance of the effects.

17. Shipping and navigation

17.1. Introduction

17.1.1. This chapter will consider the potential impacts of the Proposed Development on shipping and navigation during the construction, operational and maintenance and decommissioning phases.

17.2. Study area

17.2.1. The Shipping and Navigation Study Area (see Figure 17.1) has been defined as the Array Area plus a 10nm buffer, which also encompasses the offshore export cable routes.

17.3. Data sources

17.3.1. The following desktop and site-specific data sources have been used to inform the baseline conditions for the purposes of the Scoping Report, noting that approach to data collection for purposes of the Navigation Risk Assessment (NRA) has been provided in Section 17.9:

- Automatic Identification System (AIS) data between 4 March 2018 and 31 March 2018 (28 days);
- AIS data between 1 July 2018 and 28 July 2018 (28 days);
- Vessel traffic survey data collected during a geophysical survey:
  - AIS data between 13 July 2019 and 27 August 2019 (approximately 45 days); and
  - Manual (visual) observations of non-AIS targets during same period (effective survey period of approximately 21 days).
- 14 days of AIS, Radar and visual observation data (2022);
- Admiralty Sailing Directions Irish Coast Pilot NP40 (United Kingdom Hydrographic Office (UKHO), 2019);
- Marine Casualty Investigation Board (MCIB) incident reports (1992 to 2021);
- Royal National Lifeboat Institution (RNLI) incident data (RNLI, 2008 to 2017);
- Marine Irish Digital Atlas (MIDA, revised 2018);
- East and North Coasts of Ireland Sailing Directions (Irish Cruising Club, 13th Edition 2019);
- OSPAR Offshore Renewables and Dumping at Sea data layers (2016/2017); and
- UK Admiralty Charts 1410 and 1411 (UKHO, 2023).

17.3.2. It is noted that not all vessels are required to carry AIS mandatorily, including recreational vessels, smaller fishing vessels, and naval vessels. There may also be limited downtime in AIS coverage on occasion, although this is not expected to be significant or affect the completeness of the vessel traffic baseline.

17.3.3. The vessel traffic survey undertaken in summer 2019 includes visual observations, thus augmenting the AIS data, although it is noted that the non-AIS data was of limited range and duration (approximately 21 days) and therefore some activity will not have been identified. An additional 14 days of AIS, Radar and visual observation data was collected in 2022.Consultation has advised that there is no significant seasonal variation in fishing activity during the year and it is known that summer captures the peak period for recreational vessels.

17.4. Baseline environment

Navigational features

17.4.1. Figure 17.2 presents the charted navigational features in proximity to the Array Area. The Array Area is located approximately 3.2nm to 7nm from shore. Charted water depths (UKHO, 2023) within the Array Area range between 1 m and 34m at Lowest Astronomical Tide (LAT), with the presence of Arklow Bank resulting in the high variation. It is noted that water depths over this sandbank are subject to frequent change and in foggy weather; it is advised that vessels should not approach within a distance of 50 m. Data from a site-specific bathymetry survey carried out in 2019 recorded water depths within the Array Area between 0.9m and 51.3m LAT.

17.4.2. The ABWP1 wind turbines and associated meteorological mast are located within the ABWP1 Sublease Area, including a submarine cable approximately 8.3nm in length from one of the wind turbines to landfall at Arklow. A separate monopile with Lidar installed is also located within the northern part of the Array Area.

17.4.3. There are two International Maritime Organisation (IMO) Routeing Measures in the region which may be used by vessel traffic passing in proximity to Proposed Development. These are the Off Tuskar Rock Traffic Separation Scheme (TSS) and Off Skerries TSS, located approximately 26nm south and 46nm north east of the Array Area, respectively (not shown in Figure 17.2).

17.4.4. The North Arklow Light north cardinal buoy carries AIS and is located within the Array Area. This buoy advises shipping that safe water is found to the north and that vessels should be aware of a navigational hazard to the south, in this case the reduced depth of Arklow Bank. There are numerous other aids to navigation within proximity to the Proposed Development including the South Arklow Light south cardinal buoy, approximately 750m south of the Array Area, which has a Radar Beacon (Racon) in addition to AIS.

17.4.5. A pilot boarding place is located approximately 5.2nm west of the Array Area in the vicinity of Arklow (although based on the AIS data for the area there is limited pilotage activity). A charted anchorage is located approximately 9.7nm southwest of the Array Area near Polduff Harbour. This anchoring location is considered useful for southbound traffic in south westerly winds and awaiting a fair tide. It is noted that vessels may anchor outside of designated anchorage locations in the absence of restrictions.

17.4.6. A submarine cable runs north-south approximately 8.3nm east of the Array Area. There are no submarine pipelines charted in the area. There are a large number of charted wrecks in the area with up to six located within the Array Area; one of these has 33m depth and the other has unknown depth. The closest charted wreck outside of the Array Area is located approximately 580m from the south eastern corner and has 46m depth. It should be noted that there may be other wrecks not marked on charts as they are not considered to be of navigational significance (section 20).

17.4.7. A Military Practice and Exercise Area (PEXA) is located 14nm east of the Array Area. There are no restrictions in place with regard to the right for vessels to transit within such areas with firing only taking place when the areas are considered to be clear of all shipping.

Vessel traffic

17.4.8. Figure 17.2 presents the vessel traffic recorded on AIS within the Shipping and Navigation Study Area, based on 70 days of AIS data collected during 2018 to 2019, colour-coded by vessel type. The Shipping and Navigation Study Area has been designed to ensure that vessel movements in proximity to the Proposed Development are adequately considered whilst still ensuring the assessment is site specific

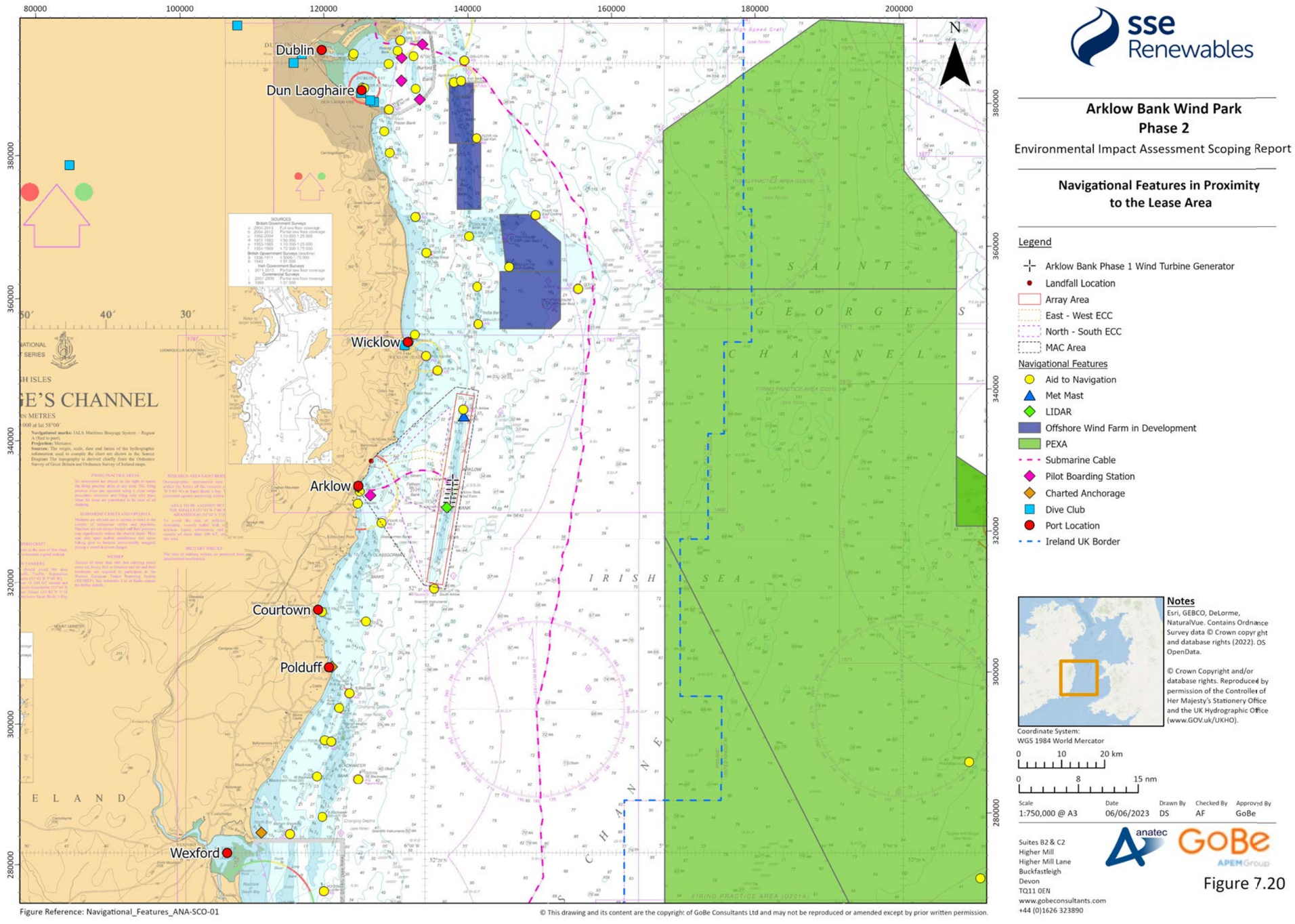


Figure 17.1 Navigational Features in Proximity to the Lease Area

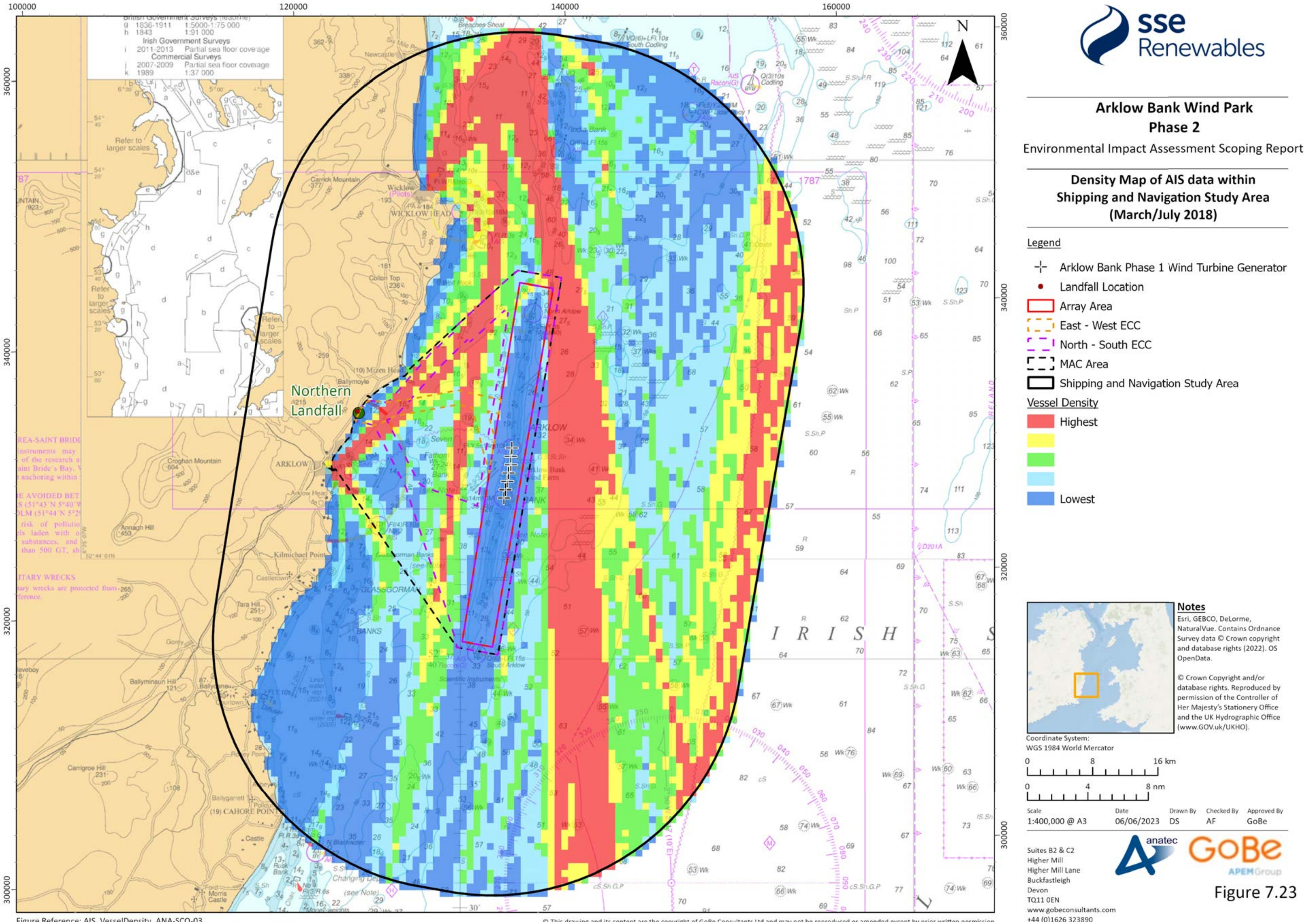


Figure 17.2 Density Map of AIS data within Shipping and Navigation Study Area

17.4.9. On average, 28 unique vessels per day were recorded within the Shipping and Navigation Study Area. Of these, 1 to 2 vessels per day on average crossed the Array Area boundary (the majority of these clipping the northern corner). Figure 17.4 presents the distribution by vessel type within the Shipping and Navigation Study Area in 2018/19. This shows that the main types of vessels within the Shipping and Navigation Study Area during the study period were cargo vessels (52%), recreational vessels (21%) (mostly during summer periods) and fishing vessels (12%). Dublin was the most frequently broadcast destination.

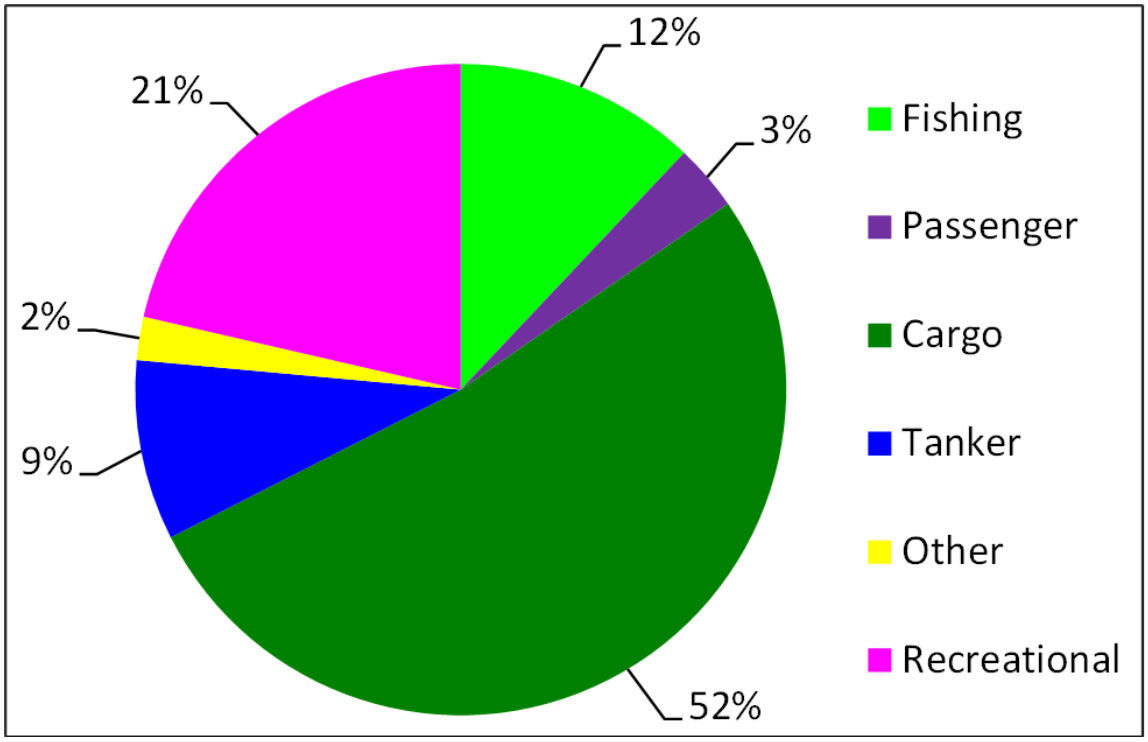
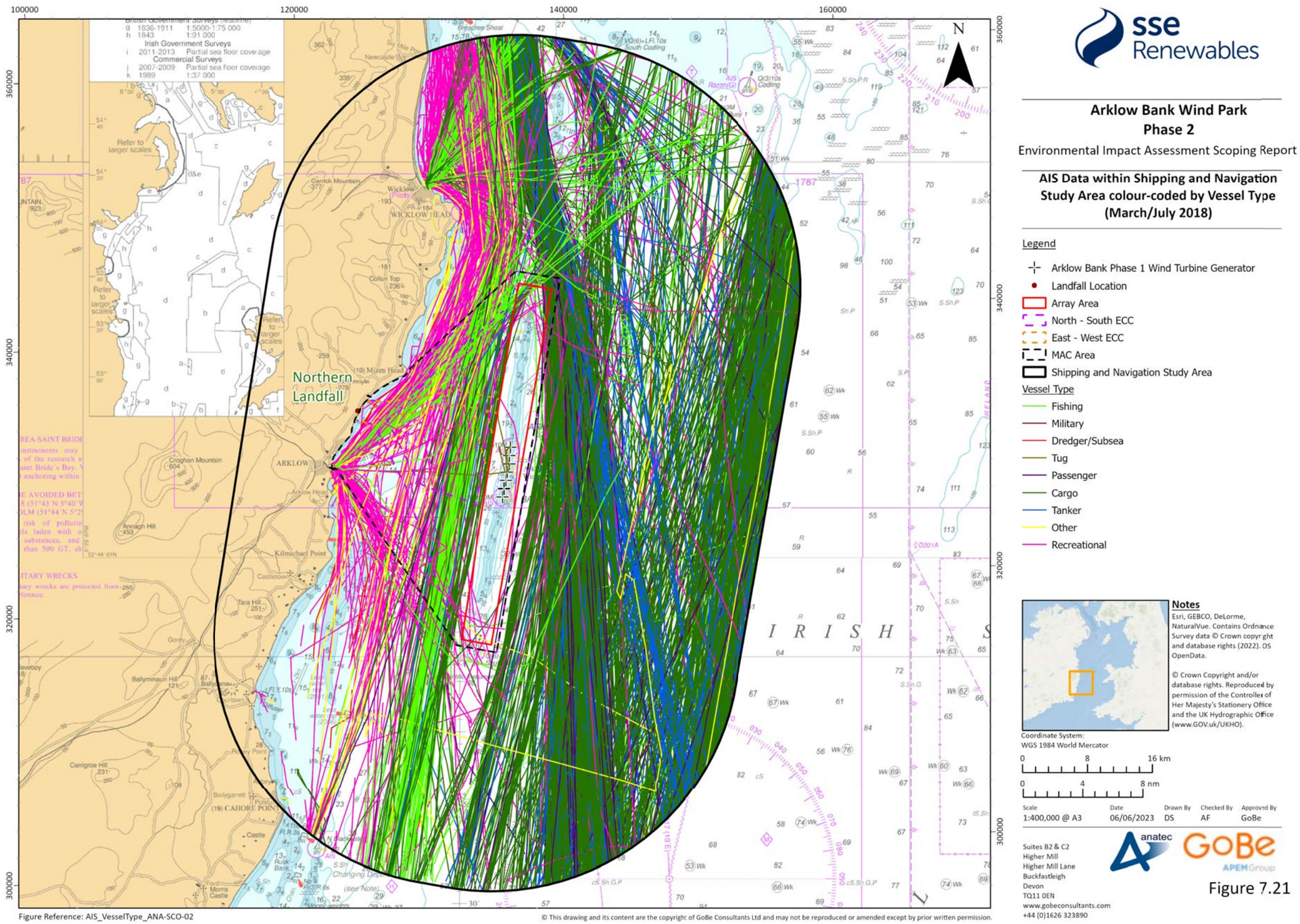


Figure 17.3 Vessel type distribution within the Shipping and Navigation study area (70 days AIS, 2018/2019)

17.4.10. Figure 17.2 presents a vessel density grid based on the 2018/19 AIS data mapped over the Shipping and Navigation Study Area. It can be seen that there are two busy north-south routes, mainly used by cargo vessels, passing east of Arklow Bank. The western fringe of one route intersects the north eastern corner of the Array Area, while the other has a mean position approximately 10nm east of the Array Area(note, only part of this route is within the Shipping and Navigation Study Area). Roll on Roll off (Ro-Ro) commercial ferries were prominent on these routes, with Cobelfret Ferries and Atlantic Container Line (ACL) being two key operators. Tankers (approximately 9% of all vessel traffic) were also recorded on these routes, particularly the route intersecting the Array Area. Other busy areas were associated with a north-south route passing inshore of Arklow Bank, and approaches to Arklow Harbour.



17.4.11.

Figure 17.4 AIS Data within Shipping and Navigation Study Area colour-coded by Vessel Type (March/ July 2018)

17.4.12. An average of three unique fishing vessels per day passed within the Shipping and Navigation Study Area, with relatively similar volumes of fishing vessel traffic recorded during summer and winter. This is in line with feedback during consultation which suggested that there is no significant seasonal variation in fishing activity levels during the year. The majority of fishing traffic was located inshore of the Array Area following the Irish coastline with a large volume of traffic in and out of Arklow and Wicklow harbours. From consultation there is estimated to be around 10 to 11 fishing vessels operating out of Arklow Harbour, with no more than half the vessels using AIS. Therefore, Figure 17.3 under-represents fishing activity. However, it was stated in consultation that non-AIS fishing vessels will follow similar tracks to those shown on AIS. Some non-AIS fishing activity was observed during the vessel traffic survey but this was limited in range.

17.4.13. An average of seven unique recreational vessels per day passed within the Shipping and Navigation Study Area over the entire study period, with the majority recorded during the summer survey periods, averaging 11 per day in both July 2018 and 2019, compared to less than one per day in winter. This pattern agrees with the consultation feedback from Arklow Marina, with their season running from May to the end of August and visitor numbers varying from about three to four per day in May to six to eight per day in other summer months. Additional non-AIS recreational vessels were sighted during the vessel traffic survey but this was limited in range. As with fishing vessels, the majority of recreational traffic was located inshore of the Array Area, following the Irish coastline. Again, this corresponds well with the Arklow Marina feedback, with most visitors being to/from other Irish east coast calling points to the north and south, such as Dublin and Kilmore Quay.

17.4.14. A small number of maintenance vessels were recorded in the survey, associated with the ABWP1 wind turbines.

17.4.15. Vessels which travelled at a speed of less than one knot for more than 30 minutes are assumed to potentially be at anchor. After applying these criteria, a total of nine vessels were identified. These were all cargo vessels recorded during the summer survey periods, with the majority located in the approaches to Wicklow Harbour. No anchoring was identified within the Array Area itself.

Historical incidents

17.4.16. From a review of RNLI incident data there were 390 lifeboat launches to 299 unique incidents within the Shipping and Navigation Study Area during the 10-year period between 2008 and 2017, corresponding to an average of 30 unique incidents per year. Incidents were concentrated in and around the ports of Wicklow, Arklow and Courtown with relatively few incidents occurring in open waters. Four incidents occurred within the Array Area with three of these involving a ‘person in danger’. All RNLI lifeboat launches were from four stations: Wicklow (45%), Arklow (35%), Courtown (18%) and Rosslare Harbour (1%).

17.4.17. A review of MCIB (1992 to 2018) data indicated a grounding incident on Arklow Bank on 14 January 2014. The general cargo vessel MV Arslan II was en-route between Nemrut (Turkey) and Belfast (Northern Ireland) when the Master decided to alter course and seek shelter from forecast winds of Beaufort Force 6. The vessel then ran aground on the Arklow Bank and was refloated several hours later having suffered damage to the rudder and bottom of the hull. The vessel could not proceed to port under its own power and was therefore anchored close to the incident location awaiting the arrival of a tug. The vessel was then taken under tow to Dublin. There was no pollution caused by the incident and no injuries sustained.

17.5. Potential impacts

17.5.1. Table 17.1 presents the potential impacts on shipping and navigation that could arise from the Array Area during the construction, operational and maintenance and decommissioning phases.

Table 17.1 Impacts to be scoped in for the Shipping and Navigation EIAR chapter

Potential impact	Phase C	Phase O	Phase D	Justification
Displacement of vessel traffic	✓	✓	✓	• From the AIS data reviewed, there is a busy north-south route, the edge of which intersects the north eastern corner of the Array Area Array Area. During construction this route may be displaced due to the presence of a buoyed construction area including 500m advisory safety zones around structures undergoing construction and advisory clearance distances around vessels. During the operational and maintenance phase this route may be displaced due to the presence of wind farm structures and any temporary advisory safety zones around structures or advisory clearance distances around vessels during periods of major maintenance. Other routes pass close to the eastern and western extremities of the Array Area boundary and could potentially be displaced by wind turbines located along the perimeter. The number of structures installed and final positions will affect the magnitude of the impact. • The north-south route includes a large number of RoRo commercial ferries which operate timetabled services transiting between Dublin and Zeebrugge/Rotterdam. However, any displacement is likely to have a minor impact on transit times. The impact is likely to be similarly low to other traffic in the area, which already avoids Arklow Bank due to the shallow water depths. • Decommissioning phase effects associated with the removal of offshore infrastructure are envisaged to be the same or similar to those described for the construction phase.
Port access restrictions	✓	✓	✓	Construction and decommissioning phases • Port access may be affected, in particular Arklow, given the proximity of the Array Area. However, from the AIS data it can be seen that the majority of existing port users are small craft which head north or south rather than crossing Arklow Bank. The presence of construction and decommissioning vessels at port may also restrict access for other vessels although the effect will depend upon the intensity of activity at the ports(s) selected for the construction works. Operational and maintenance phase

Potential impact	Phase C O D	Justification
		• Port/harbour access may be affected given the proximity of the Array Area to Arklow Harbour. From the baseline AIS data it can be seen that the majority of port users are small craft which head north or south rather than crossing Arklow Bank. This includes a small amount of activity from service vessels supporting the ABWP1 wind turbines. The location of the operational and maintenance base for the Proposed Development is Arklow Harbour. The Proposed Development will increase the frequency of service vessel traffic, and there may be additional activity during major maintenance. Consultation will be carried out with Arklow Harbour.
Increased collision risk	✓ ✓ ✓	Construction and decommissioning phases • The displacement of passing vessels may lead to an increase in the risk of a vessel-to-vessel collision with other third party vessels. It is anticipated that commercial traffic would generally choose to avoid areas where construction works are ongoing and therefore would pass around the Array Area. This would reduce the available sea room in the vicinity of the Array Area and may lead to an increase in the number of vessel-to-vessel encounters and consequently increased collision risk. However, as vessels are already avoiding the Arklow Bank due to its shallow water depth, the displacement effect (and hence change in collision risk) is anticipated to be limited. • Additionally, the presence of construction and decommissioning vessels may lead to an increase in the risk of a vessel-to-vessel collision between a vessel associated with the Proposed Development and a third party vessel. Vessels associated with the Proposed Development would include larger vessels such as heavy lift vessels (HLV) and jack-up vessels which when undertaking construction work would be restricted in their ability to manoeuvre (RAM). This would be a temporary effect and depend upon the base port(s) being used. Procedures and consultation may be used to mitigate any impact. Operational and maintenance phase • Displacement associated with vessels avoiding the operational structures within the Array Area may lead to an increase in the number of vessel-to-vessel encounters and consequently increased collision risk. However, as vessels are already avoiding the Arklow Bank due to its shallow water depth, the displacement effect (and hence change in collision risk) is anticipated to be limited.

Potential impact	Phase C O D	Justification
		• The presence of vessels during periods of maintenance may lead to an increase in the risk of a vessel-to-vessel collision between a vessel associated with the Proposed Development and a third-party vessel. Maintenance vessels would include larger vessels such as heavy lift vessels (HLV) and jack-up vessels which when undertaking major maintenance work would be restricted in their ability to manoeuvre, as well as smaller support vessels during routine maintenance. Again, the impact would depend upon the base port(s) being used. Procedures and consultation may be used to mitigate any impact.
Increased allision risk	✓ ✓ ✓	Construction and decommissioning phases • The physical presence of partially completed structures, or completed structures which have not yet been commissioned, would create an additional powered allision (i.e. contact) risk to passing vessel traffic (noting the pre-existing allision risk due to the ABWP1 wind turbines). Similarly, there is an additional drifting allision risk to vessel traffic which is not under command (NUC). • It is noted for both forms of allision that the shallow water at Arklow Bank may prevent some vessels experiencing an allision since a vessel may be more likely to ground on the bank prior to alliding with a wind farm structure, depending on its draft and the prevailing conditions. However, the AIS survey analysis showed vessels crossing the Array Area boundary, especially at the northern edge. Therefore, there is potential for allision, especially at the extremities of the Array Area. • Decommissioning phase effects associated with the removal of offshore infrastructure are envisaged to be the same or similar to those described for the construction phase. Operational and maintenance phase • The physical presence of the wind farm structures would create an additional powered allision risk to passing vessel traffic (noting the pre-existing allision risk due to the ABWP1 wind turbines). Similarly, there is an additional drifting allision risk to vessel traffic which is not under command (NUC). • It is noted for both forms of allision that the low water depth at Arklow Bank may prevent some vessels experiencing an allision since a vessel may be more likely to ground on the bank prior to colliding with a wind farm structure, depending on its draft and the prevailing conditions. However, the vessel traffic survey analysis showed vessels crossing the Array Area boundary, especially at the northern edge. Therefore, there is potential for allision, especially at the extremities of the Array Area.

Potential impact	Phase C	Phase O	Phase D	Justification
Cable interaction risk	✓	✓	✓	Construction and decommissioning phases • There is a risk of interaction with the offshore export cables routeing back to shore if they are exposed following laying prior to protection being applied. Both vessel anchors and fishing gear have potential to snag the offshore export cables. Any temporary risk can be mitigated via the circulation of information and use of a guard vessel to protect exposed cabling. • Decommissioning phase effects associated with the removal of offshore infrastructure are envisaged to be the same or similar to those described for the construction phase. Operational and maintenance phase • There is a risk of interaction with the offshore export cables routeing back to shore. Both vessel anchors and fishing gear have potential to snag the offshore export cables. This can be mitigated through suitable cable protection, e.g. burial. • Where a cable cannot be sufficiently buried there may be cable protection put in place which would reduce the navigable water depth for passing vessels. This may lead to a grounding risk, although it is noted that those vessels which pass west of the Array Area (where the offshore export cables would be located) are generally shallower draught (fishing vessels and recreational craft) and therefore a reduction in navigable water depth is less likely to impact such vessels.
Diminished emergency response capability	✓	✓	✓	Construction and decommissioning phases • The construction and decommissioning of the Proposed Development may result in an increase in the number of incidents in the area which require an emergency response. Consequently, the emergency response capability for the area (including Search and Rescue and pollution response) may be diminished. This effect will be mitigated through the implementation of an Emergency Response Plan. Operational and maintenance phase • The presence of the Proposed Development may result in an increase in the number of incidents in the area which require an emergency response, in particular during periods of major maintenance. Consequently, the emergency response capability for the area (including SAR and pollution response) may be diminished. This effect will be mitigated through the implementation of an emergency response plan. The final layout chosen for the Proposed Development may also require consideration in relation to ensuring safe access in the area for SAR providers.

17.6. Impacts scoped out of further assessment

17.6.1. There are no impacts that have been scoped out of the assessment at this stage.

17.7. Proposed assessment methodology

17.7.1. General industry understanding and consultation has indicated that there will specific shipping and navigation guidance for offshore wind farms released in the near future, however there is uncertainty over precise timelines. On this basis, guidance approach has been based on consultation with the Irish Coast Guard, Commissioners of Irish Lights and the Marine Survey Office (MSO), with indication that UK equivalent guidance should currently be followed. The following guidance is considered to be relevant on this basis:

- Marine Guidance Notice (MGN) 654 (M+F) Safety of Navigation: OREIs - UK Navigational Practice, Safety and Emergency Response (Maritime and Coastguard Agency (MCA), 2021) and annexes where appropriate;
- Revised Guidelines for Formal Safety Assessment (FSA) in the IMO (International Maritime Organization) Rule-Making Process (IMO, 2018); and
- Recommendation O-139 On the Marking of Man-Made Offshore Structures and Guidance G1162 On the Marking of Man-Made Offshore Structures (IALA, 2021).

17.7.2. As required under MGN 654 and the Guidance on EIS and NIS Preparation for Offshore Renewable Energy Projects (DCCAE, 2017) an NRA will be completed and summarised in the EIA. Noting uncertainty over guidance, appropriate data collection methodology to inform the NRA will be consulted upon with the MSO and the Commissioners of Irish Lights. This will include appropriate vessel traffic survey data collection, noting that in addition to the datasets presented in Section 17.9, the Project has collected further vessel traffic data during 2022. The NRA will also include consideration of the latest available desk based navigational feature and incident datasets.

17.7.3. In terms of consultation, the NRA process will include a hazard workshop with shipping and navigation stakeholders to identify and discuss hazards of relevance to shipping and navigation that will be assessed in the NRA and EIAR.

17.7.4. A cumulative assessment on shipping and navigation impacts will be included, noting that this will be based on a tiered approach based on multiple relevant factors, notably data confidence, proximity to the Proposed Development and status. The NRA will include a screening exercise on cumulative developments within 50nm of the Proposed Development on this basis.

17.8. Designed-in measures and mitigation

17.8.1. The following designed-in measures are proposed in relation to shipping and navigation:

- Marking and lighting;
- Liaison with ports and their users;
- Fisheries liaison;
- Notices to Mariners;
- Advisory safety zones and advisory clearance distances;
- Details included on Charts and in Sailing Directions;
- Appropriate procedures for vessel operations during construction and maintenance;
- Emergency response plan;
- Cable protection measures informed by cable risk assessment;

- Collision risk management during construction;
- Appropriate certification for Project vessels;
- Provision of self-help capability;
- Implementation of buoyed areas during appropriate phases;
- Compliance from all vessels associated with the Proposed Development and third-party vessels with COLREGs (IMO, 1972/77) and SOLAS (IMO, 1974);
- Use of a temporary guard vessel (where justified by risk assessment); and
- Vessel Traffic Monitoring by AIS during the construction phase.

17.8.2. Any further mitigation requirements for shipping and navigation will be dependent on the significance of the effects as determined by the NRA process.

18. Civil and military aviation

18.1. Introduction

18.1.1. This chapter will consider the potential impacts of the Proposed Development on civil and military aviation during the construction, operational and maintenance and decommissioning phases.

18.2. Study area

18.2.1. The Civil and Military Aviation Study Area is determined by the range of the aviation receptors that could potentially be affected, in particular, Air Traffic Control (ATC) radar systems. The Civil and Military Aviation Study Area covers radars on the east coast of Ireland that could potentially detect the wind turbines within the Array Area; with the extent of the Civil and Military Aviation Study Area defined by the furthest potential aviation receptor, Dublin Airport's Primary Surveillance Radar (PSR). The Civil and Military Aviation Study Area also covers airspace designations and military practice areas that intersect or are adjacent to the Array Area and offshore export cable routes; airspace used by helicopters on routes which may cross the Array Area; and within 9nm of the Array Area (based on potential for helicopter access to oil and gas platforms) (see Figure 18.1) which displays all aeronautical information within the bounds of the figure, however only airspace designations relevant to the Proposed Development are labelled).

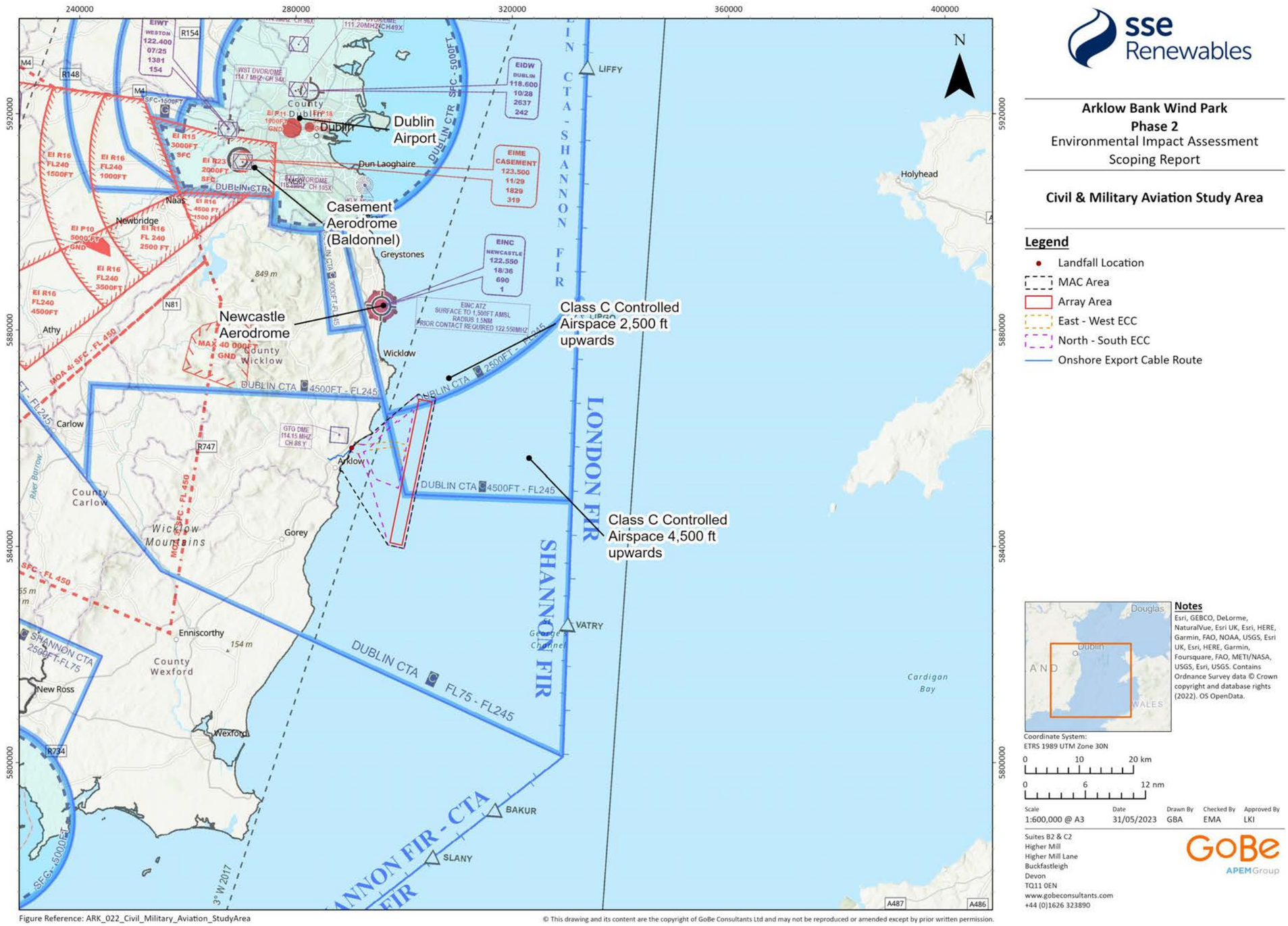


Figure 18.1 Civil and Military Aviation Study Area

Data sources

18.2.2. The following data sources will be used to inform the baseline conditions:

- Integrated Aeronautical Information Package (IAIP) (Irish Aviation Authority, 2023); and
- United Kingdom Civil Aviation Authority Visual Flight Rules Aviation Chart 1:500,000.

18.2.3. Information to inform the baseline has been drawn from a review of the data sources outlined above; in particular, the Irish IAIP.

18.3. Baseline environment

18.3.1. The baseline conditions are broadly similar to those considered in the 2001 EIS, although there have been changes to aviation regulations and guidelines and aviation organisations which will be taken into account. A desktop study has been undertaken to characterise existing baseline conditions in the vicinity of the Proposed Development.

18.3.2. A summary of the baseline environment for civil and military aviation is follows:

- Airspace Structure (Figure 18.1): the Proposed Development is situated in an area of Class G uncontrolled airspace which is established from the surface up to 2,500 feet (ft) above mean sea level (amsl) in the northern portion of the Array Area; and up to 4,500ft in the remaining portion of the Array Area. Above these altitudes, Class C controlled airspace is established up to Flight Level 245 (24,500ft). Within these classifications of airspace, the following applies:
  - Class G Airspace: aircraft can operate in this area of uncontrolled airspace without any mandatory requirement to be in communication with or receive a radar service from an ATC unit. Pilots of aircraft operate under Visual Flight Rules (VFR) in Class G airspace and are ultimately responsible for seeing and avoiding other aircraft and obstacles; and
  - Class C Airspace: aircraft operating within Class C controlled airspace must be in receipt of an Air Traffic Service (ATS) from an appropriate ATC unit;
- Military Aviation: the Department of Defence (DoD) has its primary airbase at Casement Aerodrome which is located at Baldonnel, County Dublin (Figure 18.1); this is home to the DoD's Air Corps. The Air Corps operates a fleet of fixed and rotary wing aircraft providing military support to the Army and Naval services, together with non-military tasks such as Garda air support, air ambulance, fisheries protection and the Ministerial Air Transport Service;
- Civil Aviation: the Irish Aviation Authority (IAA) operates a PSR at Dublin Airport (Figure 18.1). Although the Proposed Development is outside the airport's statutory safeguarding area, it is technically within the operating range of the PSR;
- Aerodromes: Newcastle Aerodrome, located near Greystones, 5nm north of Wicklow (Figure 18.1), is the nearest non-radar equipped licensed aerodrome to the Proposed Development;
- Search and Rescue (SAR): consultation has taken place with IAA and Canadian Holding Company Helicopters (CHC) (the provider of SAR operations in Ireland) regarding any potential impact on SAR operations. Further consultation is planned as part of the EIA Scoping process. However, it is not expected that the Proposed Development will have any significant impacts on SAR operations; and
- Helicopter routes: there are no oil and gas platforms requiring helicopter access within 9nm of the Array Area.

18.4. Potential impacts

18.4.1. Table 18.1 presents the potential impacts on civil and military aviation receptors that could arise from the Proposed Development during the construction, operational and maintenance and decommissioning phases.

Table 18.1 Impacts to be scoped in for the Civil and Military Aviation EIAR chapter

Potential impact	Phase			Justification
	C	O	D	
Creation of physical obstacles affecting air traffic	✓	✓	✗	• Aircraft operating at low levels are required to set a Minimum Safe Altitude (MSA); this is the lowest altitude set in areas to ensure safe separation between aircraft and known obstacles. The MSA for aircraft operating in Instrument Meteorological Conditions (IMC), essentially poor weather, enables aircraft to maintain a minimum of 1,000ft (305m) clearance between aircraft and known obstacles. The PDE will include wind turbines with a tip height of between 278 – 332m above LAT (912 – 1,089 ft). Therefore, the MSA in the area of Arklow Bank will need to be 2,000 – 2,100ft (912 / 1,089ft + 1,000ft rounded to the next 100 ft) in order to maintain at least 1,000ft vertical separation between the wind turbines and aircraft. The potential impact on air traffic and associated mitigation measures will be assessed in the EIAR.
Interference with civil PSR systems	✗	✓	✗	• Wind turbines have been shown to have detrimental effects on the performance of PSRs. These effects include the desensitisation of radar in the vicinity of the turbines, shadowing and the creation of unwanted returns which air traffic controllers must treat as aircraft returns. The desensitisation of radar could result in aircraft not being detected by the radar and therefore not presented to air traffic controllers. Controllers use the radar to separate and sequence aircraft; therefore, maintaining situational awareness of all aircraft movements within the airspace is crucial to achieving a safe and efficient ATS, and the integrity of radar data is central to this process. The creation of unwanted returns displayed on the radar leads to increased workload for both controllers and aircrews. Furthermore, real aircraft returns can be obscured by a turbine's radar return, making the tracking of both conflicting unknown aircraft and the controllers' own traffic much more difficult.

Potential impact	Phase C O D	Justification
		• Given the distance of the Proposed Development from both Dublin Airport, the impact on PSR systems is not expected to be significant. Initial consultation with the IAA has indicated this to be the case, and further consultation is planned as part of the EIA Scoping process. The potential impact on radar systems will be assessed in the EIAR.

18.5. Impacts scoped out of further assessment

18.5.1. Table 18.2 presents the potential impacts proposed to be scoped out of the Civil and Military Aviation EIAR chapter.

Table 18.2 Impacts to be scoped out of the Civil and Military Aviation EIAR chapter

Potential impact	Justification
Effects on aerodromes	• It is proposed that potential impacts on the Newcastle aerodrome during the construction, operational and maintenance and decommissioning phases are scoped out of the EIAR. Although technically outside the consultation zone, initial consultation with the owner of the aerodrome has indicated that the Proposed Development will not impact on Newcastle Aerodrome's operations. • The Brittas Bay Aerodrome, 5nm north of Arklow Town, is now disused and there are no plans for it to be re-established.

18.6. Proposed assessment methodology

18.6.1. The assessment will be carried out with reference to the following published guidance:

- How to Assess the Potential Impact of Wind Turbines on Surveillance Sensors (Eurocontrol, 2014);
- Irish Aviation Authority (Aerodrome Standards) Order 2008 (SI No 356 of 2008);
- Irish Aviation Authority (Air Traffic Control Standards) Order 2004 (SI No 856 of 2004);
- Irish Aviation Authority (En-Route Obstacles to Air Navigation) Order 1999 (SI No 423 of 1999);
- Guidance Material on Off-Shore Wind Farms (Irish Aviation Authority, 2015);
- European Guidance Material on Managing Building Restricted Areas (Irish Aviation Authority, 2015);
- Land Use Planning and Offshore Development (Irish Aviation Authority, 2014);

- Irish Aviation Authority (Obstacles to Aircraft in Flight) Order 2005 (SI No 215 of 2005); and
- Irish Aviation Authority (Rules of the Air) Order 2004 (SI No 72 of 2004).

18.6.2. There is no published legislation or guidance to define how the significance of impacts on aviation receptors should be determined. These criteria will be derived using professional judgement and developed in consultation with the relevant aviation stakeholders.

18.7. Designed-in measures and mitigation

18.7.1. The following designed-in measures are proposed in relation to civil and military aviation:

- The Developer will provide details of the Proposed Development to the IAA to enable the notification of the presence of the Proposed Development in appropriate aviation documentation and aviation charts; this will enable aviation operators to set an appropriate MSA over the Array Area; and
- As required by the IAA, the wind turbines will be fitted with appropriate aviation lighting in accordance with Aeronautical Services Advisory Memorandum (2015): Guidance Material on Off-shore Wind Farms.

18.7.2. Any further mitigation requirements for civil and military aviation will be dependent on the significance of the effects.

19. Seascape landscape and visual amenity

19.1. Introduction

19.1.1. This chapter will consider the potential impacts of the Array Area on seascape, landscape and visual amenity during the construction, operational and maintenance and decommissioning phases.

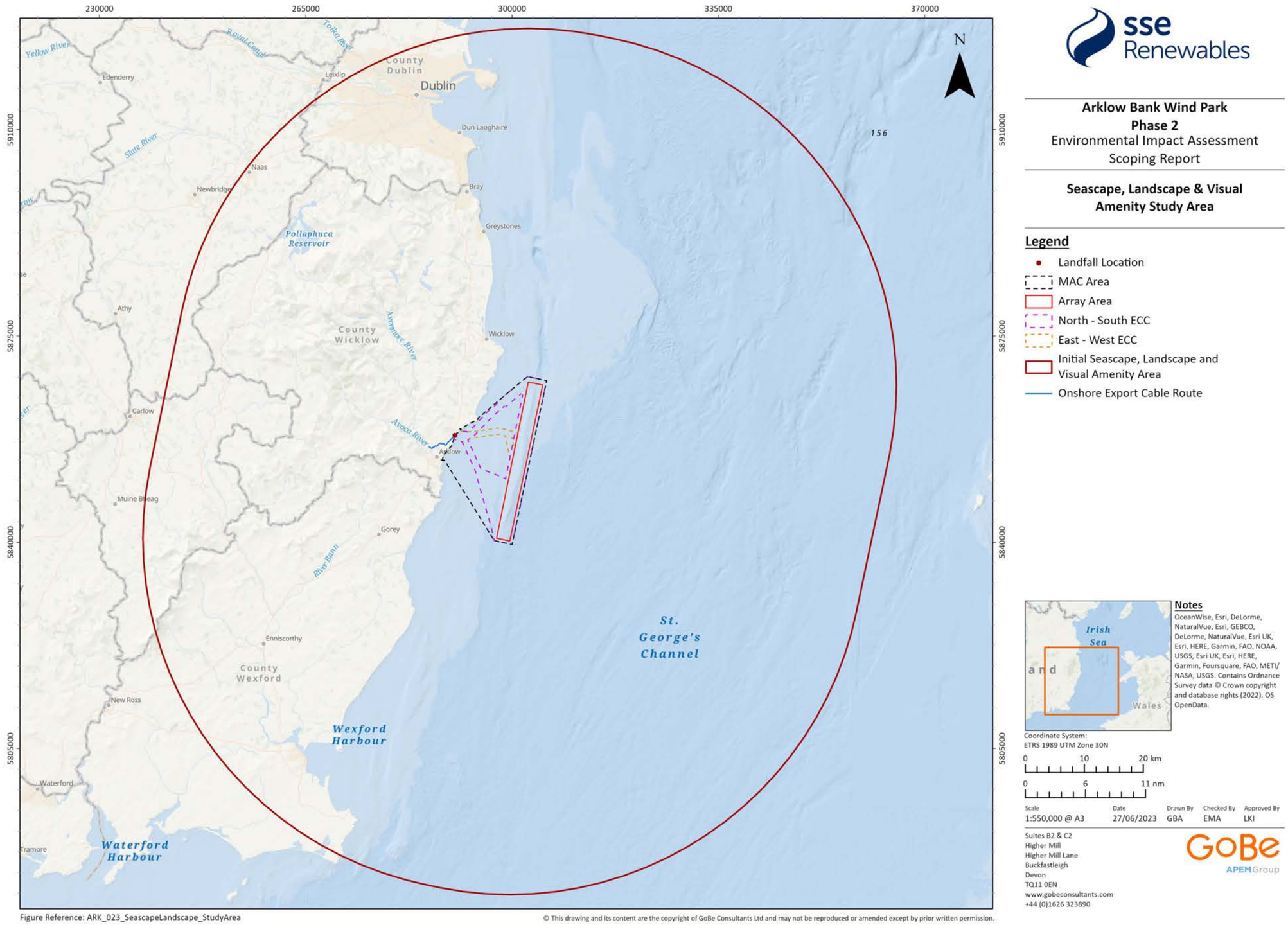
19.2. Study area

19.2.1. The Seascape, Landscape and Visual Amenity (SLVIA) Study Area (Figure 19.1) is initially defined as a 60km radius around the Array Area in line with referenced guidance. The SLVIA Study Area and extent of baseline receptors to be considered in the assessment will be refined based on the findings of the Zone of Theoretical Visibility (ZTV).

19.3. Data sources

19.3.1. The baseline data sources in respect of seascape and landscape are as follows:

- Landscape Character Assessment for County Wicklow, Wicklow County Development Plan (CDP) 2022 – 2028 (as per adopted CDP 2016 – 2022);
- Landscape designations, Wicklow County Development Plan 2022 - 2028;
- Seascape Character Assessment, Appendix A of the Strategic Environmental Assessment of the ODREP, Republic of Ireland;
- Landscape Character Assessment for County Wexford, Wexford County Development Plan 2022 - 2028;
- Landscape Designations, Wexford County Development Plan 2022 -2028;
- Wexford County Development Plan 2022-2028;
- National Inventory for Architectural Heritage (NIAH) of designed landscapes, Department of Culture, Heritage and the Gaeltacht website;
- Recorded visibility data, Met Eireann; and
- Baseline landscape character and landscape designations for Counties Kildare and Carlow where applicable.



sse Renewables

Arklow Bank Wind Park
Phase 2
Environmental Impact Assessment
Scoping Report

Seascape, Landscape & Visual Amenity Study Area

Legend

- Landfall Location
- MAC Area
- Array Area
- North - South ECC
- East - West ECC
- Initial Seascape, Landscape and Visual Amenity Area
- Onshore Export Cable Route

Notes

OceanWise, Esri, DeLorme, NaturalVue, Esri, GEBCO, DeLorme, NaturalVue, Esri UK, Esri, HERE, Garmin, FAO, NOAA, USGS, Esri UK, Esri, HERE, Garmin, Foursquare, FAO, METI/ NASA, USGS. Contains Ordnance Survey data © Crown copyright and database rights (2022). OS OpenData.

Coordinate System:
ETRS 1989 UTM Zone 30N

0 10 20 km
0 6 11 nm

Scale	Date	Drawn By	Checked By	Approved By
1:550,000 @ A3	27/06/2023	GBA	EMA	LKI

Suites B2 & C2
Higher Mill
Higher Mill Lane
Buckfastleigh
Devon
TQ11 0EN
www.gobeconsultants.com
+44 (0)1626 323890

GoBe APEM Group

Figure Reference: ARK_023_SeascapeLandscape_StudyArea

Figure 19.1 Seascape, landscape and visual amenity study area

19.4. Baseline environment

19.4.1. The SLVIA Study Area comprises the coastline and landscapes of Wicklow, Wexford and Dublin and the Irish Sea together with inland landscapes further west. The coastal landscapes are overlooked inland by the Wicklow Mountains and isolated peaks in Wexford and Carlow including Mount Leinster and part of the Bluestack Range. The SLVIA Study Area features large bays associated with Dublin and Wexford. The ABWP1 wind turbines are located approximately 11.5km off the coast of Arklow Town. The baseline includes the AWBP 1 wind turbines.

19.4.2. The SLVIA will consider the likely effects of the Proposed Development on seascape character, landscape character and designated landscapes throughout the 60 km SLVIA study area.

19.4.3. The Marine Institute (2020) has published a characterisation of seascape throughout the whole of Ireland. This document identifies 15 Regional Seascape Character Areas and two border local scale SCAs, informed by an identification of 13 generic Regional Seascape Character Types. The SLVIA study area contains four RSCAs, comprising RSCA 13: South East Irish Sea; RSCA14: Irish Sea Sandbanks & Broad Bays; RSCA 15: Dublin Bay; and RSCA 16: Northeastern Irish Sea Islands & Beaches. These RSCAs comprise characterisation of the both the seascape and the coastal landscape, and the Proposed Development is located within RSCA13: South East Irish Sea.

19.4.4. Landscape character across the study area has been identified within a series of published landscape character assessments covering the Wicklow, Wexford, Fingal, South Dublin, Dun Laoghaire-Rathdown, Kildare and Carlow County Council areas.

19.4.5. Designated landscapes within the SLVIA study area comprise Mountain and Lakeshore AONB, Coastal Areas AONB (Wicklow), Areas of High Amenity (Wicklow), Sensitive Hills and Ridges (Wicklow), and Landscapes of Greater Sensitivity – Coastal Promontories (Wexford).

19.4.6. The baseline visual amenity will focus on views from a range of viewpoint locations representing a range of viewer types. The main viewer types likely to be affected by the Proposed Development include:

- Residents of settlements and individual dwellings;
- Visitors staying or travelling through the area;
- Recreational visitors whose attention is focussed on the landscape;
- Recreational users of the marine environment; and
- People travelling along road and rail routes.

19.4.7. The baseline visual amenity proposes to consider the following viewpoints (VPs):

- VP 1: Wicklow Head
- VP2: Blainroe Golf Club
- VP3: Ballyncarrig (3rd Class Road)
- VP4: Ballynacarrig Public House
- VP5: Brittas Bay
- VP6: Tonglee (3rd Class Road)
- VP7: Ballinvally (3rd class road)
- VP8: Ballinaskea (3rd class road)

- VP9: Johnstown N11/M11
- VP10: Ferry Bank, Arklow
- VP11: Arklow Town
- VP12: Moneyribbin (3rd Class Road)
- VP13: Clogga Amenity Area
- VP14: Kilmichael Point
- VP15: Clones Coast Road
- VP16: Tara Hill Minor Road
- VP17: Ballymoney Beach
- VP18: Courtown Harbour Beach
- VP19: Cahore Point
- VP20: Curracloe Beach
- VP21: Barnacleagh (Minor Road)
- VP22: Johnstown Coast Road
- VP23: Kileagh (Minor Road)
- VP24: Mizen Head
- VP25: Newcastle Beach
- VP26: Scarr Mountain Summit
- VP27: Tara Hill (Track)
- VP28: Greystones Cliff Walk
- VP29: Sorrento Park

19.5. Potential impacts

19.5.1. Table 19.1 presents the potential impacts on seascape, landscape and visual amenity that could arise from the Proposed Development during the construction, operational and maintenance and decommissioning phases.

Table 19.1 Impacts to be scoped in for the Seascape, Landscape and Visual Amenity EIAR chapter

Potential impact	Phase			Justification
	C	O	D	
Temporary change to seascape, landscape and visual amenity	✓	✗	✓	• The installation and decommissioning of infrastructure will involve a range of activities which will result in effects on seascape, landscape and visual amenity, including presence of vessels and equipment within the Array Area and along the offshore export cable routes, presence of vessels travelling to and from the Array Area and the offshore export cable routes, and installation of foundations, wind turbines and OSPs within the Array Area.

Potential impact	Phase C	Phase O	Phase D	Justification
				• The activities and elements listed above are the main features of the construction and decommissioning phases which will be apparent from the surrounding area of sea, the coastline and the landscapes of Wicklow and Wexford primarily. • The activities and elements will be seen by viewers as a series of intermittent activities in accordance with the required construction and decommissioning sequences. These activities will be temporarily visible in views to be considered in the visual impact assessment.
Change to seascape, landscape and visual amenity	✗	✓	✗	• The presence of offshore wind turbines, OSPs and related navigational lighting, and the presence of intermittent sea traffic to facilitate maintenance operations, will result in effects on seascape, landscape and visual amenity. • The assessment will consider effects upon: • Seascape character and resources, including effects on the physical and aesthetic value of the coastal and marine seascape caused by changes in elements and qualities as a result of the offshore wind turbines and OSPs; • Landscape character and resources, including effects on the aesthetic value of the landscape character areas caused by changes in elements and qualities as a result of the offshore wind turbines and OSPs; • Designated landscapes, including effects on the particular characteristics of designated areas, as a result of the offshore wind turbines and OSPs; and • Visual amenity, including effects upon visual receptors (e.g. residents, visitors, tourists), caused by changes in the appearance of the landscape and/or seascape as a result of the offshore wind turbines and OSPs. • Effects resulting from aviation and marine navigation lighting on visual amenity at night

19.6. Impacts scoped out of further assessment

19.6.1. The following potential impacts are proposed to be scoped out of the EIAR with regards to SLVIA:

Table 19.2 Impacts to be scoped out of Seascape, Landscape and Visual

Potential impact	Justification
SLV effects outside 60km radius study area and outside ZTV	The 60km radius SLVIA study area is defined to an outer limit within which significant effects could occur. Significant effects will not occur beyond 60km due to the limited changes to views arising from the Proposed Development at distances of over 60 km. Additionally, where landscape and visual receptors fall outside the ZTV, there is no opportunity for significant effects.
Impacts on physical aspects/elements of landscape	No potential for significant effects on landscape receptors due to the Proposed Development's offshore location. Due to the offshore location of the WTGs and the offshore ECC, the Proposed Development will only affect the perceived character and qualities of the landscape, which is considered as an indirect effect. No physical attributes that define landscape character or special qualities of designated landscapes will be changed.
Impacts of offshore export cable route construction and operation	During construction, effects on SLVR are unlikely to be significant, due to the nature of the offshore export cable route; and the distant visibility of related activity offshore within an expansive seascape context. The sporadic nature of related above-sea construction activity means its effects will be short-term and temporary. Related above-sea construction activity is mainly related to the movement of sea vessels, which are an established component of the baseline seascape and views of it. Long-range visibility of this activity further reduces its impact. During operation, no potential for significant effects on SLVR arising from the offshore ECC, due to its location below the sea surface and its lack of visibility.

19.7. Proposed assessment methodology

19.7.1. The assessment approach and methodology will be informed by published guidance as follows:

- Landscape Institute and Institute of Environmental management and Assessment, Guidelines for Landscape and Visual Impact Assessment, 3rd Edition, (2013);
- NatureScot, Offshore Renewables – Guidance on assessing the impact on coastal landscape and seascape, Guidance for Scoping an Environmental Statement (2012);
- NatureScot, Visual Representation of Wind Farms Guidance (2017);
- NatureScot, Guidance - Assessing the cumulative landscape and visual impact of onshore wind energy developments (2021);
- DCCAE, Guidance on EIS and NIS Preparation for Offshore Renewable Energy Projects (2017); and
- Department of Housing Local Government and Heritage, Wind Energy Development Guidelines, (2006).

19.7.2. The assessment of effects on seascape and landscape resources and assessment of effects on visual amenity are separate but interconnected. Established guidance, referenced above, makes a distinction between landscape effects and visual effects.

19.7.3. Seascape and landscape receptors include physical elements, features and characteristics that may be affected by the Proposed Development. Visual receptors include the public or community at large and residents and visitors to the area.

19.7.4. It is proposed that assessment will involve the following key steps:

- The maximum design scenario will be identified, and the SLVIA Study Area will be confirmed;
- A ZTV of the proposed offshore wind turbines will be generated covering the SLVIA Study Area defined for the assessment;
- The seascape and landscape baseline within the ZTV will be identified and documented with reference to published landscape character assessments and seascape character assessments;
- Designated landscapes (historic gardens and designed landscapes) near the coast will be identified and described;
- The visual baseline will be recorded with reference to the viewpoints, as listed above. Detail on these viewpoints will be presented including a description of existing views and the different groups of people who experience these views;
- Use of photography to be captured in 2023;
- Visualisations (wirelines and photomontages) will be generated based on 3D modelling of the offshore wind turbines and OSPs; and
- An assessment of the effects on the following receptors will be undertaken:
  - seascape and landscape character;
  - designated landscapes;
  - viewers at selected viewpoint locations and principal visual receptors; and
  - cumulative effects

19.7.5. The assessment will be supported by figures illustrating the baseline seascape, landscape and viewpoint locations and ZTV together with photomontages prepared to technical standards detailed in the guidance.

19.8. Designed-in measures and mitigation

19.8.1. Any mitigation requirements to be adopted for seascape, landscape and visual amenity will be dependent on the significance of the effects.

20. Marine archaeology

20.1. Introduction

20.1.1. This chapter will consider the potential impacts of the Proposed Development on marine archaeology during the construction, operational and maintenance and decommissioning phases.

20.2. Study area

20.2.1. The Marine Archaeology Study Area is focused on the footprint of the Array Area and the offshore export cable routes, including the intertidal zone at the landfall location, extending to the area within one tidal excursion of the Array Area, which extends approximately 20km north and 20km south of the bank.

20.3. Data sources

20.3.1. Baseline conditions will be informed by the following:

- Inspection of National Sites and Monument Records;
- Inspection of the relevant files of the National Museum of Ireland;
- Inspection of the National Historic Shipwreck Inventory;
- Available online databases;
- Review of historic mapping resources;
- Review of desktop studies conducted for the Proposed Development;
- Inspection of relevant geophysical survey reports;
- Inspection of relevant site inspection reports; and
- Review of site-specific marine geophysical survey data collected in 2019 and subsequently, and associated reports.

20.4. Baseline environment

20.4.1. Arklow Bank is one of a series of sandbanks that run along the east coast from Dublin to Wexford and is situated geographically in an area known as the Irish Platform, which occupies a 20km to 30km wide corridor off Ireland's east coast. The surface sediment on Arklow Bank is mobile, formed due to reworking following relative sea level rise post-10,000 BP (Before Present, i.e. 1950). Areas around the bank are also characterised by mobile sand overlaying glacial clay. There is no indication in the data gathered to date for significant potential associated with palaeo-landscapes being exposed on Arklow Bank.

20.4.2. Arklow Bank has been hazardous to shipping, with 165 historic wrecking events associated with the bank and in the waters close to it. This includes 116 recorded wreckings of unknown specific location, as well as 49 known wreck site and potential wreck site locations, which have been identified through previous marine geophysical and related site surveys. In contrast, within the wider Marine Archaeology Study Area that extends approximately 20km north and 20km south of the bank, there are only 11 known wreck sites in the sea area to the north of the bank, and 7 wreck sites in the sea area to the south (Figure 20.1).

20.4.3. The wreckings have been recorded systematically since c. 1750 AD, and generally occurred during the winter and early spring, with the majority between November and March/April. This is in keeping with expectations for such events to occur during the seasonally foul weather. In nine cases, wind

direction was recorded. It appears that storm conditions during prevailing south westerly winds accounted for six wreckings; north-easterlies for two wreckings; while an east south easterly summertime storm resulted in the wrecking of one vessel. The Irish Sea is particularly treacherous during a north easterly/easterly and the low numbers of wreckings recorded in such conditions suggests that most captains knew when to seek shelter and had sufficient advance warning to do so. The wreckings that occurred during south westerlies suggests that despite efforts to hug the coastline inshore, there were many occasions when vessels trying to navigate harsh conditions were blown onto the bank.

20.4.4. Site-specific marine geophysical surveys were completed in 2019 and 2021. These surveys recorded 24 wreck sites and potential wreck sites within the Array Area, some of which had been identified previously and some of which were newly identified. In addition, three possible unexploded ordnance targets were identified, four possible fishing gear targets, over 1,200 debris targets and more than 5,000 boulder targets.

20.4.5. Archaeological review of the 2019 dataset concurred with the principal observations outlined above and identified seven additional potential wreck sites. There is close correlation between four historic wreck site locations and four of the sites recorded in the 2019 dataset. There is also a correlation in nine other instances between historic wreck site locations and targets recorded in 2019. The total number of wreck sites and potential wreck sites associated with the Arklow Bank to 2019 was 74.

20.4.6. Wreck sites and potential wreck sites identified in previous surveys were not all observed in the 2019 survey, while the 2019 survey identified new sites in areas surveyed previously. This speaks to the dynamic environment of Arklow Bank, where shifting sands will routinely expose and alternatively bury sites of archaeological interest. The record as reported in the 2019 survey will be used for the purposes of the EIAR, with this record considered to be very robust and comprehensive.

20.4.7. An update in the INFOMAR data set added an additional site in 2021. During the Geotechnical Investigations in 2020 and 2022 no additional archaeological discoveries were found. The results of the marine geophysical survey in 2022 are still being processed, however notice has been made of one new potential wreck site.

20.4.8. The distribution of historic wrecks on Arklow Bank and that of the sites recorded in 2019 and more recently, suggest that wreckings are focused in particular locations on the bank (Figure 20.1). There are more wreck sites recorded on the west side of the bank than on its eastern side. This accords with the pattern of historic wreckings as recorded in contemporary sources, where more vessels appear to have been lost during prevailing south westerly storms than on other occasions.

20.4.9. Desktop review indicates the presence of no known cultural heritage features on the foreshore at the landfall location.

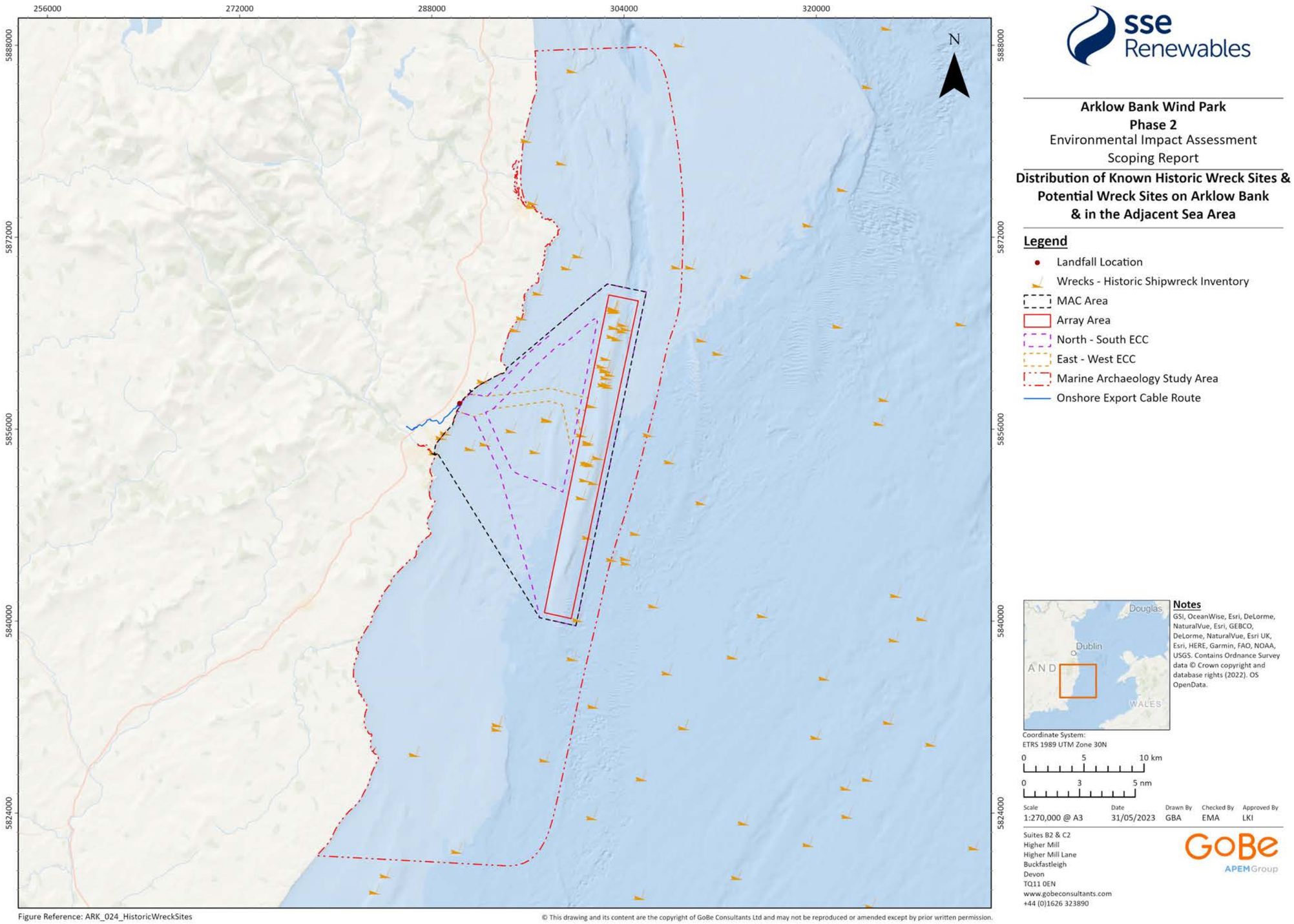


Figure 20.1 Distribution of known historic wreck sites and potential wreck sites on Arklow Bank and in the adjacent sea area

20.5. Potential impacts

20.5.1. Table 20.1 presents the potential impacts on marine archaeology that could arise from the Proposed Development during the construction, operational and maintenance and decommissioning phases.

Table 20.1 Impacts to be scoped in for the Marine Archaeology EIAR chapter

Potential impact	Phase			Justification
	C	O	D	
Sediment disturbance and deposition leading to effects on known heritage assets	✓	✓	✓	Construction and decommissioning phases • Construction works, including seabed preparation, installation of foundations, and cable installation, may cause seabed disturbance and associated deposition, which could lead to effects on known heritage assets. The extent of these effects will be considered in the Coastal Processes Chapter of the EIAR, subsequently informing any potential construction effects on heritage assets. Effects from decommissioning are likely to be similar to effects from construction. Operational and maintenance phase • Maintenance operations, including cable repair activities, may cause seabed disturbance and associated deposition, which could lead to effects on known heritage assets. The extent of these effects will be considered in the Coastal Processes Chapter of the EIAR, subsequently informing any potential operational effects on heritage assets.
Direct damage to known heritage assets	✓	✓	✓	Construction and decommissioning phases • Construction works could directly affect any shipwrecks present within the Array Area and along the offshore export cable routes. These effects will likely be localised, but should they occur, they could lead to adverse and irreversible damage to known heritage assets. Where asset locations are already known, measures adopted as part of the Proposed Development for their avoidance and protection include the siting of infrastructure to avoid any known archaeological constraints identified in pre-construction surveys. Effects from decommissioning are likely to be similar to effects from construction. Operational and maintenance phase

Potential impact	Phase			Justification
	C	O	D	
				• Maintenance operations could directly affect any shipwrecks present within the Array Area and along the offshore export cable routes. These effects will likely be localised, but should they occur, they could lead to adverse and irreversible damage to known heritage assets. Where asset locations are already known, measures adopted as part of the Proposed Development include avoidance of any known archaeological constraints identified in pre-construction surveys.
Alteration of sediment transport regimes	✗	✓	✗	• The physical presence of wind turbine and OSP foundations and any scour/cable protection may lead to localised changes in tide and wave climate, affecting the distribution of sediment, which could be directed towards or away from known heritage assets, causing damage. The extent of these effects will be considered in the Coastal Processes Chapter of the EIAR, subsequently informing any potential operational effects on heritage assets.
Change to settings and views from cultural heritage sites	✓	✓	✓	• The degree to which settings and views from recorded cultural heritage sites may be affected by the Proposed Development. The extent of these effects will be assessed in the Cultural Heritage Visual Impact Assessment Report.

20.6. Impacts scoped out of further assessment

20.6.1. No potential impacts are proposed to be scoped out of the EIAR with regards to marine archaeology.

20.7. Proposed assessment methodology

20.7.1. The EIAR will consider the potential impacts of the construction, operational and maintenance and decommissioning phases of the Proposed Development within the Marine Archaeology Study Area. The assessment will follow the methodology identified in section 6, and will be conducted in line with the following legislative procedures and guidelines:

- The National Monuments Act (1930-2004);
- The Foreshore Act (1933);
- Merchant Shipping Act (1995);
- European Convention on the Protection of the Archaeological Heritage (Valetta Convention);
- Department of Arts, Heritage, Gaeltacht and the Islands (DAHGI) Framework and Principles for the Protection of the Archaeological Heritage (1999);
- DAHGI Policy and Guidelines on Archaeological Excavation (1999);

- Spell out Guidance for Assessment of Cumulative Impacts on the Historic Environment from Offshore Renewable Energy (2007) quoted in Department of Communications, Climate Action & Environment Guidance on EIS and NIS Preparation for Offshore Renewable Energy Projects (2017);
- International Council on Monuments and Sites (ICOMOS) guidance, non-governmental international organisation dedicated to the conservation of the world's monuments and sites; and
- United Nations Educational, Scientific and Cultural Organization (UNESCO) guidance, who seeks to encourage the identification, protection and preservation of cultural and natural heritage around the world considered to be of outstanding value to humanity.

20.7.2. The assessment will be informed by the Coastal Processes chapter of the EIAR, which will rely on numerical modelling to represent the potential impacts of the Proposed Development (see section 8).

20.8. Designed-in measures and mitigation

20.8.1. The following designed-in measures are proposed in relation to marine archaeology:

- Implementation of Archaeological Exclusion Zones (AEZs) around known heritage assets. The extent of these will vary depending upon the size of the wreck identified and will be the subject of consultation with the Department of Culture, Heritage and the Gaeltacht; and
- Implementation of a Protocol for Archaeological Discoveries or similar, setting out the principles and management actions for unexpected archaeological discoveries made during the course of development.

20.8.2. Any further mitigation requirements for marine archaeology will be dependent on the significance of the effects.

21. Infrastructure and other users (material assets)

21.1. Introduction

21.1.1. This chapter will consider the potential impacts of the Proposed Development on infrastructure and other users during the construction, operational and maintenance and decommissioning phases.

21.2. Study area

21.2.1. The Infrastructure and Other Users Study Area is shown in Figure 21.1. This includes the Array Area and offshore export cable routes as well as all infrastructure and other users receptors within an area which has the potential to be affected by the Proposed Development up to the HWM.

21.2.2. The Infrastructure and Other Users Study Area varies in scale depending on the particular receptor and has been divided into different areas according to each receptor, as listed below:

- Infrastructure and Other Users Study Area – Inner Area (within 1km of the Array Area and the northern and southern offshore export cable routes): This area includes the extent of potential direct physical overlap between the Proposed Development activities and the following receptors (if identified):
  - Recreational receptors (including receptors carrying out fishing, sailing and motor cruising; kite surfing; surfing; windsurfing; kayaking and canoeing; and beach users);
  - Offshore energy Projects (e.g. offshore wind farms, oil and gas Projects, carbon capture and storage, natural gas storage and underground coal gasification);
  - Cable and pipeline operators;
  - Port activities and dredging areas;
  - Aggregate resource areas and coal deposits; and
  - Communications infrastructure (microwave, Very High Frequency (VHF) and Ultra-High Frequency (UHF) links).
- Infrastructure and Other Users Study Area - Outer Area: This area is based on one tidal excursion from the boundary of the Array Area (see section 7.1.4) to consider impacts on the following receptors:
  - Aggregate extraction and marine disposal sites; and
  - Recreational receptors (diving sites).
- Infrastructure and Other Users Study Area - Other Communications Infrastructure: This area will be confirmed following identification of other communications infrastructure receptors which could potentially be affected by the Proposed Development, such as television transmitters.

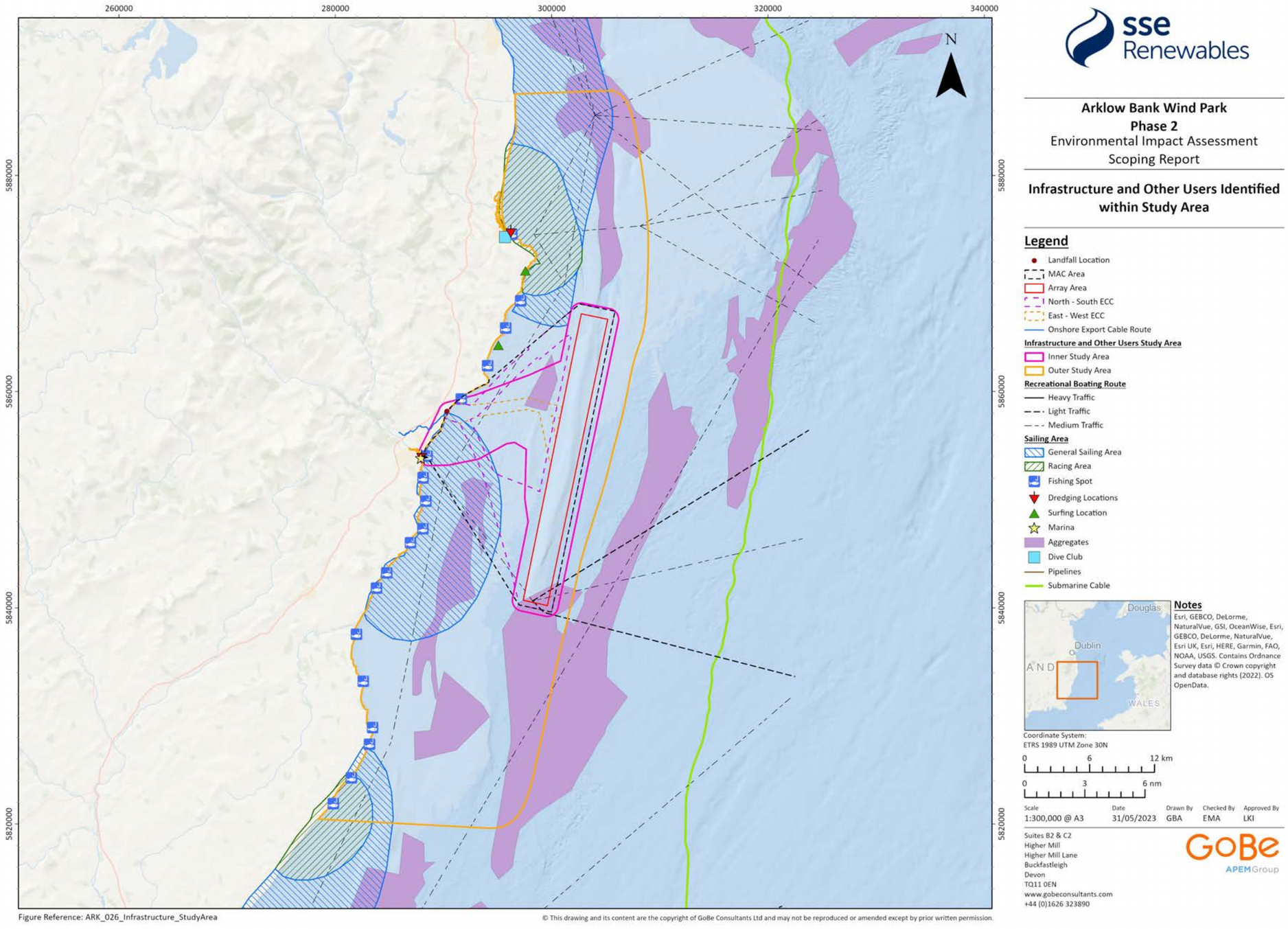


Figure 21.1 Infrastructure & Other Users Identified within Study Area

Data sources

21.2.3. The baseline environment for the Infrastructure and Other Users Study Area (Inner Area and Outer Area) will be identified through a detailed desktop review. Table 21.1 provides a summary of the data sources that will be used to inform baseline. Other data and information sources may be identified during the review as part of the EIA.

Table 21.1 Summary of infrastructure and other users data sources

Title	Description	Source
Human Activities – Webmap Service	Webmap service comprising of Dredge Spoil Dumping	EMODnet
Ireland's Marine Atlas – Webmap Service	Webmap service comprising of Offshore Wind Farms, Cables, Pipelines, Oil and Gas Infrastructure and Wrecks.	Marine Institute
Marine Irish Digital Atlas – Webmap Service •	Webmap service comprising of Diving and Sub-aqua Clubs, Fishing Spots, Surf Spots, Marines and Pontoons and ISA Sailing Clubs	International Coastal Atlas Network
Northern Ireland Marine Mapviewer – Webmap Service	Webmap service comprising of Dredging, Cable and pipelines and Oil and Gas infrastructure	Department of Agriculture, Environment and Rural Affairs
Webmap service: • Offshore Wind Farms.	Offshore Wind Farm webmap service	4COffshore
Possibilities for commercial mineral deposits in the Irish Offshore Area	Summary of possibilities for commercial mineral deposits in the Irish Sea	Marine Mining, 1989
Feasibility study on the establishment of a large-scale inshore resource mapping Project	The Marine Institute commissioned this feasibility study to cost and prioritise a comprehensive mapping programme for Zone 1 as the final phase in the Government's commitment to map Ireland's entire offshore resource.	Marine Institute, 2004
A Guide to Sea Angling in the Eastern Fisheries Region by Norman Dunlop	A variety of species, locations, and methods is synonymous with sea angling in the eastern region, backed up by a quality infrastructure to include approved accommodation, licenced charter boats, tackle shops, bait, and guiding services. This booklet is a reference point for angling in the area.	Eastern Regional Fisheries Board, 2009

Title	Description	Source
A Coastal Atlas of Recreational Boating in Ireland	Irish Cruising Club publication describing recreational boating areas in Ireland	Irish Cruising Club, 2018
Oil and Gas - Concession Map	Concession map of oil and gas infrastructure	DECC, 2019
Oil and Gas (Exploration & Production)	Overview of oil and gas exploration and production in Ireland	DECC, 2019
Material Assets	• Carbon Capture and Storage; • Marine Aggregates; and • Energy.	National Marine Planning Framework SEA Environmental Report, 2019
	• Petroleum Activity and Authorisations; • Marine Renewable Energy and Infrastructure; • High Potential Marine Aggregate Resource; and • Sport and Recreation Trends and Features.	National Marine Planning Framework Consultation, 2019

21.2.4. Consultation will be carried out to inform the communications infrastructure baseline (satellite communication, VHF radio, UHF communication, offshore microwave fixed links and television).

21.3. Baseline environment

Sailing, boating and motor cruising

21.3.1. The Infrastructure and Other Users Study Area – Inner Area overlaps with a general sailing area associated with Arklow Sailing Club. A sailing area to the northwest of the Array Area was also identified (Figure 21.1). General sailing areas are used for general day-to-day use by all recreational boating users, including dinghies, sailboards, watercraft and small cruisers.

21.3.2. There are no racing areas in the Infrastructure and Other Users Study Area – Inner Area, however a racing area is located to the north of the Array Area associated with the Arklow Sailing Club.

21.3.3. Medium use recreational boating routes run perpendicular to the coastline and cross the offshore export cable routes close to the coast. A medium use boating route also crosses the southern end of the Array Area, which leads to other light and medium traffic routes.

Recreational fishing

21.3.4. Recreational shore angling marks have been identified within the Infrastructure and Other User Study Area – Inner Area at the Landfall (Figure 21.1). There are a number of wrecks within the Infrastructure and Other User Study Area – Inner Area (Figure 21.1), which may offer suitable offshore recreational fishing marks, although this will be confirmed through the detailed baseline characterisation presented in the EIAR.

Recreational diving

21.3.5. No diving locations have been identified. However, there are a number of wrecks within the Infrastructure and Other User Study Area – Outer Area (Figure 21.1), which may offer diving locations, although this will be confirmed through the detailed baseline characterisation presented in the EIAR.

Surfing

21.3.6. No surfing locations were identified within the Infrastructure and Other Users Study Area – Inner Area, however there are two surfing locations to the north of the Northern Landfall (Figure 21.1).

Harbours, marinas and dredging areas

21.3.7. Arklow Harbour is located within the Infrastructure and Other Users Study Area – Outer Area (Figure 21.1). Ongoing maintenance dredging would be required within the port berth areas and vessel approaches to maintain sufficient draught for vessel access. No offshore dredge disposal grounds associated with dredging of the port were identified within the Infrastructure and Other Users Study Area – Outer Area, and this will be confirmed through the detailed baseline characterisation presented in the EIAR.

21.3.8. A Dumping at Sea Permit is currently valid for a period of eight years from 20/01/2017 for bed levelling activities associated with ABWP1. The permit allows for levelling of 99,999 wet tonnes of material using a sea plough to remove areas of sand accretion restricting access for maintenance vessels around ABWP1. The area permitted for bed levelling is provided in Figure 21.1.

Aggregate resource areas and coal deposits

21.3.9. Potential aggregate resource areas have been identified within the Infrastructure and Other User Study Area – Outer Area, however no licences have yet been granted for aggregate extraction (Figure 21.1).

21.3.10. There are no known coal deposits located within the Infrastructure and Other Users Study Area – Inner Area.

Offshore energy Projects

21.3.11. ABWP1 is located within the Infrastructure and Other Users Study Area – Inner Area. It comprises 3.6MW turbines with capacity of 27.2MW within an area occupying approximately 1.35 km^2. A single export cable route extends from the existing wind turbines to shore via landfall at Arklow Harbour. The length of the cable is approximately 15.5km from the Array Area to landfall (Figure 21.1). The existing ABWP1 export cable will be crossed by cables associated with the Proposed Development, specifically offshore export cable route 2 and inter-array cables to the west of Arklow Bank.

21.3.12. There are no other consented or operational offshore wind farms or wave and tidal energy developments within the Infrastructure and Other Users Study Area – Inner Area.

21.3.13. There are no active or proposed Carbon Capture and Storage, natural gas storage or Underground Coal Gasification sites within the Infrastructure and Other Users Study Area – Inner Area.

Offshore interconnector, telecommunication cables and pipelines

21.3.14. There are no active interconnector or telecommunication cables or pipelines within the Infrastructure and Other Users Study Area – Inner Area. There is one operational subsea telecommunication cable located offshore of Arklow Bank beyond the 12nm limit (Figure 21.1). There are two offshore gas pipelines that connect Ireland with Scotland located to the north of Dublin Bay (Figure 21.1).

Communications infrastructure

21.3.15. Communications infrastructure to be considered within this chapter will include satellite communication, VHF radio, UHF communication, offshore microwave fixed links and television. Communications receptors in the vicinity of the Proposed Development will be identified through consultation.

21.4. Potential impacts

21.4.1. Table 21.2 presents the potential impacts on infrastructure and other users that could arise from the Array Area during the construction, operational and maintenance and decommissioning phases.

Table 21.2 Impacts to be scoped in for the Infrastructure and Other Users EIAR chapter

Potential impact	Phase			Justification
	C	O	D	
Potential for damage to ABWP1 export cables	✓	✓	✓	• The installation, presence and decommissioning of infrastructure within the Array Area and offshore export cable routes, including cable crossings, may damage the ABWP1 export cable.
Restriction of access to ABWP1 for maintenance activities	✓	✓	✓	• The installation, presence and decommissioning of infrastructure within the Array Area and offshore export cable routes, including cable crossings, may restrict access to ABWP1 wind turbines and export cable for maintenance.
Impact on cables from scour and sediment mobilisation	✗	✓	✗	• Indirect impacts on the ABWP1 export cable may arise as a result of the physical impacts upon marine processes arising from the Array Area resulting in scour and sediment mobilisation.
Displacement of recreational activities	✓	✓	✓	• The installation, presence and decommissioning of infrastructure within the Array Area and offshore export cable routes may displace recreational activities from any areas subject to activities associated with the Proposed Development, resulting in a loss of recreational resource.
Increased suspended sediment concentrations and associated deposition	✓	✓	✓	• There is potential for increased suspended sediment concentrations and associated deposition arising from installation, maintenance and decommissioning activities affecting recreational diving sites (if identified) within the Infrastructure and Other Users Study Area – Outer Area.
Increased airborne noise	✓	✗	✓	• Potential for airborne noise during construction and decommissioning phases to interfere with recreational sailing and motor cruising, recreational fishing and other recreational activities.

Potential impact	Phase			Justification
	C	O	D	
Restrictions to port activities and users	✓	✓	✓	• The installation, presence and decommissioning of the export cable routes may impact on Arklow Harbour activities, including vessel movements and dredging activities.
Restrictions to potential aggregate resource availability	✗	✓	✗	• Potential impact on high potential aggregate resource area from presence of infrastructure, restricting future access.
Impact on communications infrastructure	✗	✓	✗	• The presence and operation of the offshore wind turbines may affect communications infrastructure (such as satellite communication, VHF radio, UHF communication, offshore microwave fixed links and television signals).

21.5. Impacts scoped out of further assessment

21.5.1. Table 21.3 presents the impacts to be scoped out of the Infrastructure and Other Users EIAR chapter.

Table 21.3 Impacts to be scoped out of the Infrastructure and Other Users EIAR chapter

Potential impact	Justification
Changes to wave climate	Potential for changes to wave climate affecting the surfing waves and surf breaks recreational resource has been scoped out from further assessment due to the distance of the Array Area from the shoreline (6km) and as effects are unlikely to be measurable at the shoreline.

21.6. Proposed assessment methodology

21.6.1. The following guidance documents will be considered to inform the impact assessment on infrastructure and other users:

- European Boating Association (EBA) Position Statement, Offshore Wind Farms (EBA, 2019);
- Assessment of Impact of Offshore Wind Energy Structures on the Marine Environment (Marine Institute, 2000);
- International Cable Protection Committee (ICPC) Recommendations (ICPC, 2021);
- Guidance on Environmental Impact Assessment of Offshore Renewable Energy Development on Surfing Resources and Recreation (Surfers Against Sewage, 2009); and
- Guidelines on the Treatment of Tourism in an Environmental Impact Statement (Fáilte Ireland, 2011).

21.6.2. The assessment methodology will follow that identified in section 6.

21.7. Designed-in measures and mitigation

21.7.1. The following designed-in measures are proposed in relation to infrastructure and other users:

- Advisory safety zones of up to 500m in radius around individual structures undergoing installation, maintenance or decommissioning; Advisory safety zones of 50m for incomplete structures at which construction activity may be temporarily paused;
- Advisory clearance distances of up to 500m in radius around cable installation vessels and cable repair vessels;
- Promulgation of information advising on the nature, timing and location of activities, including through Notices to Mariners. Information and notices will also be posted at the landfall location;
- The creation of a database of known users (including ABWP1 operator (GE Wind Energy), yacht clubs and local recreational activity centres) to act as a mailing list for direct issue of Notices to Mariners;
- Navigational aids and marine charting; and
- The use of guard vessels during installation and major maintenance activities.

21.7.2. Any further mitigation requirements for infrastructure and other users will be dependent on the significance of the effects.

22. Air quality and climate

22.1. Introduction

22.1.1. This EIAR chapter will consider the potential impacts of the Proposed Development on climate during the construction, operational and maintenance and decommissioning phases. It is proposed that impacts on air quality are scoped out of the EIAR, as discussed below. However, an assessment of indirect positive impacts in the reduction of emissions of Greenhouse Gases (GHG) will be provided.

22.2. Study area

22.2.1. The study area for the assessment of the Proposed Development on climate is the Republic of Ireland.

22.3. Data sources

22.3.1. The baseline conditions will be identified through a detailed desktop review of EPA data on total national emissions of GHG in Ireland including the EPA (2022) Ireland's Final Greenhouse Gas emissions 1990-2021. Other data and information sources may be identified during the review as part of the EIAR.

22.3.2. Details on materials for the assessment of GHG emissions from construction of the Proposed Development will be sought from the design team during the assessment.

22.4. Baseline environment

22.4.1. For 2021, the EPA reported that total national emissions of GHG (excluding Land Use Land Use Change and Forestry) in Ireland are estimated to be 61.53 million tonnes carbon dioxide equivalent (Mt CO_2eq), 4.7% higher (2.76 Mt CO_2eq) than emissions in 2020 (58.77 Mt CO_2eq) and follows a 3.4% decrease in emissions reported for 2020. Emissions are over 1% higher than pre-pandemic 2019 figures.

22.4.2. In 2021, the Energy Industries sector was the third largest individual contributor of GHG emissions at 16.7%, which is a decrease on emissions from the sector in 1990, when this sector represented 20.4% of total GHG emissions.

22.4.3. Public electricity and heat production accounts for 9.823 Mt CO_2eq of the total 10.364 Mt CO_2eq for this sector in 2018. The sector has experienced a 11.7% (1.38 Mt CO_2eq) decrease from 2017, when total emissions for this sector was 11.744 Mt CO_2eq. This change can be attributed to a 44% decrease in coal used in electricity generation (at Moneypoint) and an increase of 13.6% for electricity generated from wind.

22.4.4. The EPA estimate emissions to 2040 using two scenarios as follows:

- 'With Existing Measures' – scenario assumes that no additional policies and measures, beyond those already in place by the end of 2020 (latest EPA GHG Emissions Projections Report), are implemented; and
- 'With Additional Measures' – scenario assumes implementation of the 'With Existing Measures' scenario in addition to progressing of renewable and energy efficient targets for 2030.

22.4.5. GHG Projections published by the EPA for 2021 to 2040 Project that 'With Existing Measures', emissions in the Energy Industries sector are Projected to decrease by 37.8% from 8.7 to 5.4 Mt CO_2eq over the period 2020 to 2030. The 'With Existing Measures' scenario Projects that by 2030,

renewable energy generation will represent 70% of electricity consumption, with renewable energy generation capacity dominated by wind.

22.4.6. 'With Additional Measures', emissions from the Energy Industries sector are Projected to decrease by 48.9% from 8.7 to 4.5 Mt CO_2 eq over the period 2020 to 2030. This is 1.0 Mt CO_2eq more than the original 'With Existing Measures' scenario. The 'With Additional Measures' scenario assumes that by 2030 renewable energy generation will represent approximately 80% of electricity consumption. This is mainly due to an expansion in wind energy.

22.4.7. Overall, total national GHG emissions are Projected to increase from current 2020 levels by 10.5% under the 'With Existing Measures' scenario. Total national GHG emissions under the 'With Additional Measures' scenario is estimated to decrease from current 2020 levels by 28% by 2030.

22.5. Potential impacts

22.5.1. Table 22.1 presents the potential impacts on climate that could arise from the Proposed Development during the construction, operational and maintenance and decommissioning phases.

Table 22.1 Impacts to be scoped in for the Climate EIAR chapter

Potential impact	Phase			Justification
	C	O	D	
Direct and indirect emissions of greenhouse gases (GHG)	✓	✓	✓	• There is potential for both direct and indirect emissions of greenhouse gases (GHG) from the construction, operation and decommissioning of the Proposed Development.
Indirect positive impacts in the reduction of emissions of GHG from the national grid	✗	✓	✗	• There is potential for indirect positive impacts in the reduction of emissions of GHG from the national grid from the operation of the Proposed Development.

22.6. Impacts to be scoped out of further assessment

22.6.1. Table 22.2 presents the impacts to be scoped out of the Climate EIAR chapter.

Table 22.2 Impacts to be scoped out of the Climate EIAR chapter

Potential impact	Justification
Potential effects on air quality from dust and emissions	• The assessment of potential impacts on air quality typically addresses the potential for impacts from dust and traffic/plant emissions on nearby sensitive receptors. As the Proposed Development relates to the construction of offshore infrastructure only there is no potential for dust impacts. Furthermore, due to the distance between the Array Area and the shore (6 km), any potential impacts that might arise from emissions associated with plant or marine vessels are unlikely to give rise to likely significant effects due to the dispersal

Potential impact	Justification
	of emissions. There is unlikely to be potential for significant air quality impacts during the operational and maintenance or decommissioning phases of the Proposed Development. Therefore, the assessment of potential effects on air quality are not included in the scope of the EIAR.

22.7. Proposed assessment methodology

22.7.1. Consideration will be given to specific measures associated with the Proposed Development and the greenhouse gas emissions that may arise during the construction phase. Emissions of GHG may arise from the following sources:

- Embodied emissions in site materials relative to other materials;
- Direct emissions from plant machinery/equipment; and
- Transport emissions from vehicles and vessels importing/exporting material to and from the Proposed Development.

22.7.2. Embodied emissions are the carbon footprint of a material (i.e. the total emissions released throughout the supply chain of the material). This includes the energy required for extraction, processing, operation and disposal or recycling of a material. For some materials, such as steel, the use of recycled materials has a lower embodied GHG emission than the use of virgin material. These emissions will be estimated using the UK Environment Agency (EA) Carbon Calculator for Construction Sites.

22.7.3. The reduction in greenhouse gas emissions from the national grid associated with the operational phase of the Proposed Development will be calculated using the following formula:

- Tonnes CO_2eq = (A x B x C x D) / 1000

22.7.4. Where: A = The rated capacity of the wind energy development in MW; B = The capacity factor, which takes into account the intermittent nature of the wind, the availability of wind turbines and array losses etc. A capacity factor of 40% will be assumed for the Proposed Development. C = The number of hours in a year, 8,760 hours. D = Carbon load in grams per kWh (kilowatt hour) of electricity generated and distributed via the national grid. The latest data reported by the EPA states that the emissions intensity of power generation in 2021 was 331g CO_2/kWh (Ireland's Final Greenhouse Gas Emissions 1990-2021, July 2022).

22.8. Designed-in measures and mitigation

22.8.1. The following designed-in measures are proposed in relation to climate:

- The potential for use of materials with a reduced environmental impact may be incorporated into the construction design through re-use of materials or incorporation of recycled materials in place of conventional building materials.

23. Population and human health

23.1. Introduction

23.1.1. This EIAR chapter will consider the potential impacts of the Proposed Development on Population (employment) during the construction, operational and maintenance and decommissioning phases. Impacts on amenity will be addressed in the Seascape, Landscape and Visual Impact EIAR chapter (see section 19). Impacts on recreational activities carried out below the HWM will be addressed in the Infrastructure and Other Users chapter (see section 21). Impacts on commercial fisheries and aquaculture will be addressed in Commercial Fisheries and Aquaculture chapter (see section 16).

23.1.2. The EIAR will also consider the potential impacts of the Proposed Development on Human Health.

23.2. Study area

23.2.1. The Proposed Development relates to offshore infrastructure only but the employment impacts will affect onshore receptors. The Population and Human Health Study Area will generally cover County Wicklow, but national level impacts will also be considered where relevant. It will be linked to the selection of construction and operational and maintenance ports and the supply of a range of inputs and services for the Proposed Development.

23.2.2. A larger Regional Population and Human Health Study Area will also be defined to reflect the wider reach of Irish Gross Value Added (GVA) and employment impacts that are likely to materialise through the supply chain and provision of labour.

23.3. Data sources

23.3.1. Information on population within the Population and Human Health Study Area and the Regional Population and Human Health Study Area will be collected through a detailed desktop review of existing studies and datasets. These are summarised at Table 23.1 below.

Table 23.1 Summary of key desktop reports

Title	Description	Source
Census Results	The previous four years of census data for Ireland	Census of Population, 2006, 2011, 2016 and 2022
Demography	Small Area Population Statistics for the previous four census years in Ireland	SAPMAP, 2006, 2011, 2016 and 2022
Wicklow County Development Plan 2022-2028	Local Wicklow County Council development plan for the current time period	Wicklow County Council, 2016
Project Ireland 2040 - National Planning Framework and National Development Plan 2018-2027	Ireland's national planning and development plan	DHPLG, 2018
Regional Spatial and Economic Strategy for the	An outline of Ireland's spatial and economic strategy for the Eastern and Midlands Regional Assembly	Eastern and Midlands Regional Assembly, 2019

Title	Description	Source
Eastern and Midlands Regional Assembly		
ESRI Quarterly Economic Commentary	The Economic and Social Research Institute is an independent research institute working towards a vision of 'Informed policy for a better Ireland'. The ESRI seeks to support sustainable economic growth and social progress in Ireland by providing a robust knowledge base capable of providing effective solutions to public policy challenges.	ESRI, Quarterly

23.3.2. In addition to the sources listed above, Ordnance Survey Ireland (OSI) Maps, Google Earth/Maps, Myplan.ie and Fáilte Ireland will be consulted.

23.4. Baseline environment

23.4.1. The baseline that will be established will provide data on the following topic areas:

- Population;
- Demographics;
- Employment and economic deprivation; and
- Tourism and recreation.
- Potential impacts

23.5. Potential impacts

23.5.1. Table 23.2 presents the potential impacts on population and human health that could arise from the Proposed Development during the construction, operational and maintenance and decommissioning phases.

Table 23.2 Impacts to be scoped in for the Population and Human Health EIAR chapter

Potential impact	Phase			Justification
	C	O	D	
Increase in employment and demand for services	✓	✓	✓	Construction and decommissioning phases • The design and planning stage would provide employment for a number of technical consultants. There is likely to be direct employment for tradesmen, labourers and specialised contractors.

Potential impact	Phase C	Phase O	Phase D	Justification
				• There is likely to be significant need for local support services during the construction period. Any of the specialist contractors may be required to stay in the area over the construction period and may require the support of local hotel, accommodation and other service industries. Marine operations are less likely to require local service providers. • It is likely that suppliers and contractors will be required to fabricate and/or deliver turbines, sub-structures, cables, electrical systems, substations and control systems. Operational and maintenance phase • During the operational life of the Proposed Development there will be an ongoing programme of maintenance that will require the provision of permanent locally based work force and facilities. • The maintenance of the Proposed Development will require the provision and support of dedicated vessels and the creation of a dedicated work force which will be augmented by specialist contractors on a regular basis. • The regular servicing and upgrades are likely to require external specialist contractors input, some will be required to stay in the area and may require the support of local hotel, accommodation and other service industries. • The operational and maintenance phase of the Proposed Development provides a significant opportunity for new, highly skilled jobs in the County Wicklow area and beyond.
Impacts on human health	✓	✓	✓	Construction and decommissioning phases • During the construction and decommissioning phases, there is the potential for impacts on human health arising from activities such as the movement of materials and workforce associated with the Proposed Development. • Potential impacts on coastal water quality will be examined to understand if there is a pathway for impact on human health e.g. impacts on bathing water quality. Operational and maintenance phase • During the operational and maintenance phase there is potential for positive impacts on human health associated with increased employment opportunities locally.

23.6. Impacts scoped out of further assessment

23.6.1. Table 23.3 presents impacts to be scoped out of the Population and Human Health EIAR chapter.

Table 23.3 Impacts to be scoped out of the Population and Human Health EIAR chapter

Potential impact	Justification
Potential effects on human health arising from changes in air or soil quality	• The risks to human health from a Project are typically considered in the context of the environmental pathways such as air, water or soil through which health could be impacted. As outlined in section 7.14, likely significant effects on air quality are not expected and therefore further assessment on air quality has been scoped out of the EIAR. Soil is not a factor for consideration due to the offshore nature of the Proposed Development. On this basis, it is proposed that potential impacts on human health during the operation of the Proposed Development are scoped out of the EIAR.

23.7. Proposed assessment methodology

23.7.1. This assessment will be undertaken using the guidelines set out in section 6.5 of this Scoping Report.

23.7.2. The population and human health impacts of the construction and operation of the Proposed Development have the potential to be significant and will impact at a regional and local level.

23.7.3. Impacts will vary considerably depending on the technology deployed, type of structures, contracting strategy and other factors such as the availability and capacity of the supply chain. A range of scenarios will be considered.

23.7.4. It is proposed that population and human health impacts at the national level will be quantified as part of the EIA exercise where relevant (e.g. GVA); furthermore known or envisaged manufacturing, procurement and logistical matters may have impacts beyond local and regional.

23.7.5. It is proposed to carry out an economic impact assessment of the Proposed Development. This assessment will be included within the EIAR.

23.7.6. The assessment will be based on a desktop review of existing relevant studies and national datasets and indicators. The economic impacts and benefits of the Proposed Development will be quantified in terms of Irish GVA and expected jobs in Ireland.

23.7.7. Social impacts will also be considered on a qualitative basis and will complement the economic impact assessment. In the context of an offshore wind farm, the definition of “community” needs to be examined at a local, regional and national level. Qualitative factors will be examined to see how the Proposed Development is likely to impact on people, considering: Community Structure and Infrastructure, Community Behaviour and Perceptions, Social Equity and Individuals.

23.7.8. Human health impacts will be considered by drawing on the results of the other impact assessments in the EIAR.

23.8. Designed-in measures and mitigation

23.8.1. It is anticipated that the overriding Population and Human Health impacts of the Proposed Development will be positive in nature. Consultation will be carried out with local stakeholders to maximise the positive impacts. The wider consultation strategy is discussed further in section 3 of this Report. A community fund will also be available for local community and voluntary organisations.

24. Major accidents and natural disasters

24.1.1. This EIAR chapter will consider the vulnerability of the Proposed Development to risks of major accidents and/or disasters.

24.1.2. Annex IV (information for the EIAR) of the EIA Directive requires:

"A description of the expected significant adverse effects of the Project on the environment deriving from the vulnerability of the Project to risks of major accidents and/or disasters which are relevant to the Project concerned."

24.1.3. The EIA Directive also states:

"In order to ensure a high level of protection of the environment, precautionary actions need to be taken for certain Projects which, because of their vulnerability to major accidents, and/or natural disasters (such as flooding, sea level rise, or earthquakes) are likely to have significant adverse effects on the environment. For such Projects, it is important to consider their vulnerability (exposure and resilience) to major accidents and/or disasters, the risk of those accidents and/or disasters occurring and the implications for the likelihood of significant adverse effects on the environment."

24.1.4. The Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022) elaborate on risk assessment further:

"To address unforeseen or unplanned effects the Directive further requires that the EIAR takes account of the vulnerability of the Project to risk of major accidents and /or disasters relevant to the Project concerned and that the EIAR therefore explicitly addresses this issue. The extent to which the effects of major accidents and / or disasters are examined in the EIAR should be guided by an assessment of the likelihood of their occurrence (risk) (section 3.7.3 of EPA, 2017)."

24.1.5. The EIAR will address the vulnerability of the Proposed Development to risks of major accidents and/or disasters and the subsequent potential for the Proposed Development to cause risks to the environment. The chapter will draw on the relevant EIA topic chapters. For example, the potential for vessel-to-vessel collisions would be assessed in the Shipping and Navigation EIAR chapter (see section 17). Details of site security, Project resilience and emergency response protocols would also be set out as part of the Description of Development chapter.

25. Summary of EIA scoping

Summary

25.1.1. This Scoping Report has set out the scope of the EIAR along with the proposed approaches that will be used to enable an assessment of the likely significant effects of the Proposed Development. Table 25.1 provides a summary of the impacts that are proposed to be scoped in and out of the EIAR. The impacts scoped in will be further assessed and reported on in the EIAR.

Table 25.1 Summary of EIAR scoping topics to be assessed and in relation to phase

Environmental Topic	Phase		
	Construction	Operation	Decommissioning
Coastal Processes	✓	✓	✓
Marine Water and Sediment Quality	✓	✓	✓
Airborne Noise	✓	✗	✓
Benthic Subtidal and Intertidal Ecology	✓	✓	✓
Fish, Shellfish and Sea Turtle Ecology	✓	✓	✓
Marine Mammals	✓	✓	✓
Offshore Ornithology	✓	✓	✓
Offshore Bats	✓	✓	✓
Commercial Fisheries and Aquaculture	✓	✓	✓
Shipping and Navigation	✓	✓	✓
Civil and Military Aviation	✓	✓	✓
Seascape, Landscape and Visual Amenity	✓	✓	✓
Marine Archaeology	✓	✓	✓
Infrastructure and Other Users	✓	✓	✓
Air Quality and Climate	✗	✓	✓
Population and Human Health	✓	✓	✓
Major Accidents and Natural Disasters	✓	✓	✓

26. EIAR structure and content

26.1.1. An indicative structure of the EIAR for the Proposed Development is set out in Table 26.1.

Table 26.1 Indicative structure of the Arklow Bank Wind Park Phase 2 EIAR

Volume	Chapter/Report
Volume 1	Non-Technical Summary (NTS)
Volume 2 – Preface, Chapters 1 to 5 (Introductory, background and need for the Proposed Development)	Preface
	Introduction
	Policy and Legislation
	Consideration of Alternatives
	Description of Development
	EIA Methodology
Volume 2 – Chapters 6 to 23 (Specialist Assessments)	Coastal Processes
	Marine Water and Sediment Quality
	Airborne Noise
	Benthic Subtidal and Intertidal Ecology
	Fish, Shellfish and Sea Turtle Ecology
	Marine Mammals
	Offshore Ornithology
	Offshore Bat Activity
	Commercial Fisheries
	Shipping and Navigation
	Civil and Military Aviation
	Seascape, Landscape and Visual Amenity
	Marine Archaeology
	Infrastructure and Other Users
	Air Quality and Climate
	Population and Human Health
	Major Accidents and Natural Disasters

Volume	Chapter/Report
	Interactions
	Summary of Cumulative Effects
	Summary of Mitigation, Monitoring and Residual Effects
Volume 3 (Technical Appendices)	Consultation Report
	CIA Screening Annex
	Environmental Management Plan
	Transboundary Annex
	Coastal Processes Technical Report
	Airborne Noise Technical Report
	Subsea Noise Technical Report
	Benthic Subtidal and Intertidal Ecology Technical Report
	Fish, Shellfish and Sea Turtle Ecology Technical Report
	Marine Mammals Technical Report
	Offshore Ornithology Technical Report
	Offshore Bat Activity Technical Report
	Commercial Fisheries Technical Report
	Shipping and Navigation Technical Report
	Seascape and Landscape Visual Impact Technical Report
	Marine Archaeology Technical Report
	Cultural Heritage Visual Impact Assessment Report

26.1.2. The Natura Impact Statement (NIS) will be submitted following screening for Appropriate Assessment. The NIS will provide a clear statement of whether, or not, in view of best scientific knowledge and the conservation objectives of the European site(s), the Proposed Development, individually or in combination with other plans or Projects, may adversely affect the integrity of any European site(s).

27. Next steps

27.1.1. Using this EIA Scoping Report as the basis, the Developer is seeking feedback from the stakeholders outlined in Appendix A on the following:

- The key issues to be addressed in the EIAR;
- The proposed content of the EIAR and the potential impacts that have been scoped in/out;
- The proposed assessment methodologies to assess the potential impacts; and
- Any other data that the environmental assessments should consider and address in the EIAR.

27.1.2. All feedback can be submitted to the following: ArklowBank2@gobeconsultants.com

27.1.3. GoBe will continue to scope the EIAR as further assessment is undertaken on the Proposed Development and in consultation with the design team. Scoping will be ongoing through the preparation of the EIAR.

27.1.4. All feedback received during the scoping process will be considered by the Developer and the EIAR scope updated as required. The EIAR will record all issues raised during the scoping process and how they have been addressed in the EIAR.

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29. Appendix A - List of Scoping Consultees

Table 29.1 List of scoping consultees

Scoping consultees
An Bord Pleanála – SID Unit
An Chomhairle Ealaíon (The Arts Council)
An Taisce
Arklow Port
Birdwatch Ireland
Bord Iascaigh Mhara
Carlow County Council
Casement Military Aerodrome
CHC Helicopters
Commission for Regulation of Utilities
Commissioners of Irish Lights
Comreg
Dublin Airport Authority (DAA)
Sea Fisheries Protection Agency (SFPA)
Department of Agriculture, Food and the Marine
Department of the Environment, Climate and Communications
Department of Culture, Heritage and the Gaeltacht
Department of Housing, Local Government and Heritage
Department of Defence - Naval and Aer Corps
Department of Transport (Marine Survey Office)
Development Applications Unit - NPWS
DLR Co Co - Dun Laoghaire Port
Dun Laoghaire Rathdown Council
Eastern and Midland Regional Assembly
Eirgrid
Enterprise Ireland

Scoping consultees
Environmental Protection Agency
Fáilte Ireland
Fair Seas Ireland
Gas Networks Ireland
Geological Survey of Ireland
Harland and Wolfe
Health and Safety Authority
Health and Safety Executive
Heritage Council
IDA
Inland Fisheries Ireland
Irish Aviation Authority
Irish Coast Guard
Irish Mussel Seed Company
Irish Sailing Association
Irish Water
Irish Whale and Dolphin Group
Irish Wildlife Trust
Marine Institute
Met Eireann
Office of Public Works
Port of Cork
RNLI
Rosslare Port
SEAI
South East Regional Inshore Fisheries Forum
Transport Infrastructure Ireland (TII)
Underwater Archaeology Unit
Weston Aerodrome

Scoping consultees
Wexford County Council
Wicklow County Council

Transboundary
Northern Ireland
Department of Agriculture, Environment and Rural Affairs
Northern Ireland Environment Agency (NIEA)
Department for Infrastructure
Maritime and Coastguard Agency
England, Wales and Scotland
Department for Business, Energy and Industrial Strategy
Marine Management Organisation (MMO)
Marine Scotland
Natural Resources Wales (NRW)
The Environment Agency (EA)
Scottish Environmental Protection Agency (SEPA)
Cefas
Maritime and Coastguard Agency
Joint Nature Conservation Committee (JNCC)
Natural England
Scottish Natural Heritage
Isle of Man
Department of Environment, Food and Agriculture
Department of Infrastructure
Cefas
France
Ministère des Affaires étrangères
Armateurs de France
Préfecture Maritime de la Manche et de la Mer du Nord
Secrétariat Général de la Mer

Transboundary
CRPMEM Nord
Fédération Nationale de la Pêche
FROM Nord
CME Organisation de Producteur

30. Appendix B - Potential Transboundary Impacts

Legislative context

30.1.1. The need to consider transboundary impacts has been embodied by The United Nations Economic Commission for Europe (UNECE) Convention on Environmental Impact Assessment in a Transboundary Context, adopted in 1991 in the Finnish city of Espoo and commonly referred to as the ‘Espoo Convention’. The Convention requires that assessments are extended across borders between Parties of the Convention when a planned activity may cause significant adverse transboundary impacts. The Espoo Convention has been ratified by the European Union, Ireland and the United Kingdom. It is aimed at preventing, mitigating and monitoring environmental damage by ensuring that explicit consideration is given to transboundary environmental factors before a final decision is made as to whether to approve a Project. The Espoo Convention requires that the Party of origin notifies affected Parties about Projects listed in Appendix I and likely to cause a significant adverse transboundary impact.

30.1.2. Article 7 of Directive 2011/92/EU on the assessment of the effects of certain public and private Projects on the environment (‘the EIA Directive’) as amended by Directive 2014/52/EU introduces similar requirements concerning Projects carried out in one Member State but likely to have significant effects on the environment of another. While the EIA Directive provides a definition of the term 'Project' the 1991 Espoo Convention uses the term 'proposed activity'.

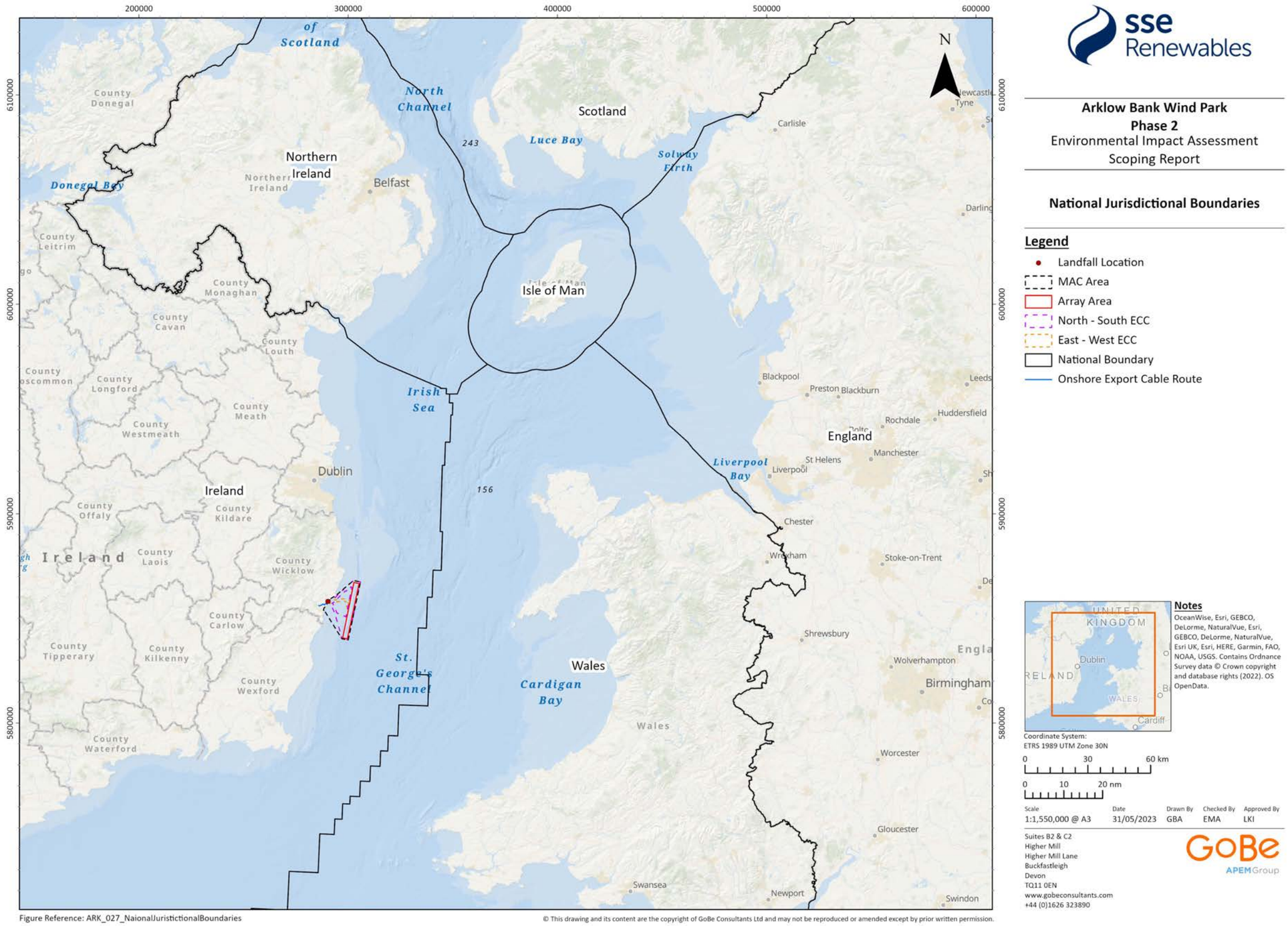

Figure 30.1 Location of the Proposed Development and relevant jurisdictional boundaries

30.1.3. Article 7(4) of the amended EIA Directive states:

"The Member States concerned shall enter into consultations regarding, inter alia, the potential transboundary effects of the Project and the measures envisaged to reduce or eliminate such effects and shall agree on a reasonable time-frame for the duration of the consultation period".

30.1.4. The EPA Guidelines (2022) also outline that, in the case of an EIAR, for any Project that is likely to cause significant transboundary effects, contact with the relevant authorities in other Member States should be made. This will establish a consultation framework to consider and address these effects.

30.1.5. The UK Planning Inspectorate (PINS) Advice Note 12: Transboundary Impacts (PINS, 2015) sets out procedures for consultation where a development may have significant transboundary impacts. Whilst the Advice Note has been prepared by PINS, it has been used to inform this transboundary appendix. The Advice Note sets out the role of EEA states and Developers. Based on Advice Note 12, Developers are advised to:

- Consider, when preparing documents for consultation and application, that the Minister may notify the relevant EEA State of their particular Project;
- Carry out preparatory work to complete a transboundary screening matrix to assist the Minister in determining the potential for likely significant effects on the environment in other EEA States; and
- Submit the transboundary screening matrix at the EIA scoping stage.

30.1.6. This transboundary appendix provides an assessment of the potential for significant transboundary effects considering the criteria and relevant considerations set out in Annex 1 of PINS Advice Note 12. It provides information about the Proposed Development and sets out information relating to the potential effects of the Proposed Development and the interests of the other States in the vicinity, in order to assist the Minister in forming a view on the likelihood of significant transboundary effects arising from the Proposed Development.

Consultation

30.1.7. The Developer is conducting informal scoping consultation for the Proposed Development through the issue of this Scoping Report. As part of this consultation, the ministries and industries in the United Kingdom of Great Britain and Northern Ireland, the Isle of Man and France will be consulted, as set out in Appendix A.

Potential impacts

30.1.8. The assessment of potential transboundary impacts associated with the Proposed Development is presented in two main sections below, 'Physical and biological environment' and 'Human environment'.

30.1.9. A series of matrices for potential transboundary impacts associated with the Proposed Development are presented in Table 30.2 for physical and biological receptors and Table 30.3 for human activities respectively. The information presented in these matrices is based on the impacts identified to be scoped into the EIAR based on the Description of the Development presented in section 4 of this Scoping Report, and follow the suggested format set out in Annex 1 to PINS Advice Note 12.

30.1.10. The matrices consider all potential transboundary impacts that may occur from all phases of the Proposed Development (i.e. construction, operational and maintenance, and decommissioning). The matrices also address the predicted spatial and temporal scale of potential transboundary impacts for those interests that are proposed to be screened into the assessment within the EIAR.

30.1.11. Potential effects upon European designated sites within other states (as well as those in Ireland) are considered separately within the appropriate assessment screening and screening process for the Natura Impact Statement (NIS).

30.1.12. The distance of the Proposed Development from the boundary of the EEZ or 'median line' of other states considered is presented in Table 30.1 and shown on Figure 30.1.

Table 30.1 Summary of approximate distances to nearest Exclusive Economic Zone (EEZ) (median line) of countries in the United Kingdom, Isle of Man and France

EEZ	Distance from the Proposed Development to nearest border (km)
Wales	31
Northern Ireland	100
Isle of Man	122
England	161
Scotland	180
France	373

Physical and biological environment

30.1.13. The Developer has completed a matrix to consider the potential for significant transboundary effects for the physical and biological environment. This matrix is set out in Table 30.2 below.

30.1.14. The conclusions for each physical and biological environment topic are presented, together with additional justification, in the following sections.

Table 30.2 Matrix for the identification of potential significant transboundary effects for the Proposed Development - physical and biological environment

Criteria	Coastal processes	Airborne noise	Benthic subtidal and intertidal ecology	Fish, shellfish and sea turtle ecology	Marine mammals	Offshore ornithology
Characteristics of the Proposed Development	For a detailed description of the characteristics of the Proposed Development, see Section 4 of this Scoping Report. Proposed Development					
Geographical area	The Array Area is located 6 to 15 km off the east coast of Ireland, near the town of Arklow (see section 4 this Scoping Report). The closest EEZ (median line) border is 31 km east of the Array Area (Wales).					
Location of the Proposed Development (including existing use)	The Proposed Development is located in the MAC Area and covers an area of approximately 63.4 km^2.					
Potential impacts and pathways	No significant transboundary impacts are predicted.	No significant transboundary impacts are predicted.	No significant transboundary impacts are predicted.	See paragraph 30.1.26	See paragraph 30.1.32	See paragraph 30.1.37
Environmental importance				See paragraph 30.1.27	See paragraph 30.1.33	See paragraph 30.1.38
Extent	See paragraph 30.1.16	See paragraph 30.1.19	See paragraph 30.1.22	See paragraph 30.1.28	See paragraph 30.1.34	See paragraph 30.1.38
Magnitude	The magnitude of the impacts will be subject to the assessment to be undertaken for the EIA and have, therefore, not been determined at this stage.					
Probability	No significant transboundary impacts are predicted.	No significant transboundary impacts are predicted.	No significant transboundary impacts are predicted.	See paragraph 30.1.28	See paragraph 30.1.33	See paragraph 30.1.38
Duration						
Frequency						

Criteria	Coastal processes	Airborne noise	Benthic subtidal and intertidal ecology	Fish, shellfish and sea turtle ecology	Marine mammals	Offshore ornithology
Reversibility						
Cumulative impacts	The potential cumulative impacts with other Projects and plans will be assessed in the EIAR, as stated in section 6.10 of this Scoping Report.					

Coastal processes

30.1.15. The coastal processes baseline for the Proposed Development is set out in Section 8.4 of this Scoping Report.

30.1.16. The Array Area and offshore export cable routes are located wholly within Irish territorial waters. It is anticipated, based on an understanding of the baseline environment (e.g. tidal regime and sediment types), that impacts from sediment disturbance as a result of the installation and maintenance of foundations and cables are likely to be localised and temporary in nature. Any impacts on coastal processes from the presence of the foundation structures will be confined to the localised area of the footprint of the Array Area. Transboundary impacts are therefore not expected.

30.1.17. It is therefore proposed that transboundary impacts upon coastal processes are screened out of the EIAR.

Airborne noise

30.1.18. The airborne noise baseline for the Proposed Development is set out in section 10.4 of this Scoping Report.

30.1.19. Any airborne noise impacts arising from the construction and decommissioning phases of the Proposed Development will be localised to the vicinity of the Array Area, offshore export cable routes and immediate surrounding area. It is considered that there is no pathway (direct or indirect) by which airborne noise effects arising from the Proposed Development could significantly affect receptors of another state.

30.1.20. It is therefore proposed that transboundary impacts upon receptors due to airborne noise arising from the Proposed Development are screened out of the EIAR.

Benthic subtidal and intertidal ecology

30.1.21. The benthic subtidal and intertidal ecology baseline for the Proposed Development is set out in section 11.4 of this Scoping Report.

30.1.22. It is considered that there is no pathway (direct or indirect) by which effects arising from the Proposed Development could significantly affect benthic subtidal and intertidal ecology receptors of another state. The extent of any predicted impacts on benthic subtidal and intertidal ecology receptors are expected to be limited in extent to:

- The footprint of the Array Area and offshore export cable routes for any subtidal habitat loss or disturbance; colonisation of hard structures or removal of hard substrates; increased risk of introduction and spread of invasive and non-native species; and alteration of seabed habitats arising from changes in physical processes; and
- One tidal excursion for increased suspended sediment concentrations and associated deposition and accidental pollution.

30.1.23. It is therefore proposed that transboundary impacts upon benthic subtidal and intertidal ecology are screened out of the EIAR.

Fish, shellfish and sea turtles

30.1.24. The fish, shellfish and sea turtle ecology baseline for the Proposed Development is set out in section 12.4 of this Scoping Report.

30.1.25. There is potential for transboundary impacts on fish, shellfish and sea turtle ecology due to potential impacts arising from the construction, operational and maintenance and decommissioning phases of the Proposed Development.

30.1.26. These impacts include underwater noise from piling activities during the construction phase; injury/disturbance to basking shark and sea turtle from vessel activities; changes in EMF from subsea electrical cabling during the operational and maintenance phase; habitat loss/disturbance (temporary and long term); increased suspended sediment concentrations and associated deposition; accidental pollution during all phases, and alteration of seabed habitats arising from changes in physical processes during the operational and maintenance phase.

30.1.27. These activities have the potential to affect Annex II migratory fish species that are listed as features of European Sites in other states, species that are of commercial importance for fishing fleets of other states or species that are of international conservation importance (basking shark and sea turtles). Potential effects may include direct effects on individuals (e.g. mortality, injury or disturbance) or indirect effects due to loss/disturbance of important habitats (e.g. fish spawning and nursery habitats – see section 12.5 and Figure 12.1 to Figure 12.4 of section 12 of this Scoping Report for spawning and nursery grounds located within the vicinity of the Proposed Development).

30.1.28. The probability of impacts during the construction phase is high, although the extent cannot be determined at this stage and will be subject to assessment in the EIAR. The majority of impacts during construction however are considered to be short term and temporary. The operational and maintenance phase is considered less likely to result in significant impacts, although the effects associated with EMF and long term habitat loss would be, inherently, longer term effects. These effects however may be reversible, depending on the decommissioning strategy. The decommissioning phase is considered low risk for significant impacts, and any effects will be short term.

30.1.29. Therefore, it is proposed that transboundary impacts on fish, shellfish and sea turtle receptors and their nature conservation interests are screened into the EIAR. Potential impacts upon European sites with Annex II fish species as a qualifying feature will be assessed within the NIS.

Marine mammals

30.1.30. The marine mammal baseline for the Proposed Development is set out in section 13.4 of this Scoping Report.

30.1.31. There is the potential for transboundary impacts upon marine mammals due to the mobile nature of marine mammal species and the proximity of the Proposed Development to the border of other states. Marine mammal species likely to be present in the vicinity of the Proposed Development include harbour porpoise, common dolphin, bottlenose dolphin, Risso's dolphin, minke whale, harbour seal and grey seal.

30.1.32. Direct impacts include injury/disturbance to marine mammals arising from elevations in underwater noise from piling activities during the construction phase. Increased disturbance and collision risk to marine mammals could arise as a result of vessel activities during all phases of the Proposed Development whilst changes in EMF from subsea cabling may directly impact marine mammals during the operational and maintenance phase. Effects of accidental pollution could impact marine mammals directly during all phases of the Proposed Development. Indirect impacts to marine mammals include changes in prey availability (fish and shellfish community) during all phases of the Proposed Development.

30.1.33. The probability of impacts to marine mammals occurring during construction, particularly as a result of underwater noise from piling, is high. As stated above, the extent cannot be determined at this stage and will be subject to assessment in the EIAR. The majority of impacts during construction are however considered likely to be short term and temporary. The operational and maintenance phase is considered less likely to result in significant impacts, although any effects (e.g. injury and/or disturbance to marine mammals from vessel activities, changes in fish and shellfish community affecting prey resources and changes in EMF) are, inherently, longer term effects. These effects however may be reversible, depending on the decommissioning strategy. The

decommissioning phase is considered low risk for significant impacts, and any effects will be short term.

30.1.34. Therefore, it is proposed that transboundary impacts on marine mammal receptors and their nature conservation interests are screened into the EIAR. Potential impacts upon European sites with Annex II marine mammal species as a qualifying feature will be assessed within the NIS.

Offshore ornithology

30.1.35. The offshore ornithology baseline for the Proposed Development is set out in section 14.4 of this Scoping Report.

30.1.36. There is potential for transboundary impacts upon offshore ornithological receptors due to the wide foraging and migratory ranges of typical bird species in the Irish Sea. A number of bird species known to occur in the vicinity of the Proposed Development include those which are listed as qualifying features of European sites in other states. The bird species likely to be present in the vicinity of the Proposed Development include a range of seabirds which may be present in one or more seasons and could be included as features of designated sites in other countries (e.g. at breeding colonies in the UK and elsewhere) which pass through the Irish Sea on migration. This may also include terrestrial migrants (e.g. wildfowl and waders) which winter in Ireland and breed in other countries.

30.1.37. The key direct impacts for ornithological receptors are likely to arise during the operational and maintenance phase. These impacts include direct mortality of individuals arising from potential collisions with rotating turbine blades and barrier effects caused by the physical presence of structures, which may inhibit clear transit of birds between breeding and foraging grounds, or on migration. Direct impacts may also arise as a result of temporary and/or long term habitat loss/disturbance during the construction, operational and maintenance and decommissioning phases. Indirect impacts may include changes in prey availability (fish and shellfish communities) due to changes to physical processes and habitat as a result of the presence of operational infrastructure.

30.1.38. The probability of impacts during the construction and decommissioning phases are high (although species-specific) and are likely to be short term and temporary. The probability of impacts during the operational and maintenance phase is high, and impacts are likely to be long term, continuous and of varying spatial extent, depending on the species. The magnitude of these impacts is not known at this time and will be subject to assessment in the EIAR. These effects however may be reversible, depending on the decommissioning strategy.

30.1.39. Therefore, it is proposed that transboundary impacts on offshore ornithology receptors and their nature conservation interests are screened into the EIAR. Potential impacts upon European sites with birds as a qualifying feature will be assessed within the NIS.

Human environment

30.1.40. The Developer has completed a matrix to consider the potential for significant transboundary effects on the human environment. This matrix is set out in Table 30.3 below.

30.1.41. The conclusions for each human environment topic are presented, together with additional justification, in the following sections.

Table 30.3 Matrix for the identification of potential significant transboundary effects for the Proposed Development - human environment

Screening criteria	Commercial fisheries and aquaculture	Shipping and navigation	Civil and military aviation	Seascape, landscape and visual amenity	Marine archaeology	Infrastructure and other users	Population and human health
Characteristics of the Proposed Development	For a detailed description of the characteristics of the Proposed Development, see section 4 of this Scoping Report.						
Geographical area	The Array Area is located 6 to 15 km off the east coast of Ireland, near the town of Arklow (see section 4 of this Scoping Report). The closest EEZ (median line) border is 31 km east of the Array Area (Wales).						
Location of the Proposed Development (including existing use)	The Proposed Development is located in the MAC Area and covers an area of approximately 63.4 km^2.						
Potential impacts and pathways	Commercial fisheries: see paragraph 30.1.45 Aquaculture: No significant transboundary impacts are predicted	See paragraph 30.1.49	No significant transboundary impacts are predicted	No significant transboundary impacts are predicted	No significant transboundary impacts are predicted	See paragraph 30.1.63	See paragraph 30.1.66
Environmental importance	See paragraph 30.1.46	See paragraph 30.1.51				See paragraph 30.1.63	
Extent	See paragraph 30.1.42	See paragraph 30.1.51	See paragraph 30.1.54	See paragraph 30.1.57 and 30.1.58	See paragraph 30.1.60	See paragraph 30.1.63	See paragraph 30.1.66

Screening criteria	Commercial fisheries and aquaculture	Shipping and navigation	Civil and military aviation	Seascape, landscape and visual amenity	Marine archaeology	Infrastructure and other users	Population and human health
Magnitude	The magnitude of the impacts will be subject to the assessment to be undertaken for the EIA and have, therefore, not been determined at this stage.						
Probability	See paragraph 30.1.46	See paragraph 30.1.51	No significant transboundary impacts are predicted	No significant transboundary impacts are predicted	No significant transboundary impacts are predicted	See paragraph 30.1.63	See paragraph 30.1.66
Duration							
Frequency							
Reversibility							
Cumulative impacts	The potential cumulative impacts with other Projects and plans will be assessed in the EIAR, as stated in section 6.10 of this Scoping Report.						

Commercial fisheries and aquaculture

30.1.42. The commercial fisheries likely to be operating in the vicinity of the Proposed Development are outlined in section 16 of this Scoping Report.

30.1.43. Due to the highly mobile nature of both commercial fish species and fishing fleets, there is the potential for transboundary impacts upon commercial fisheries receptors of other states. In addition to Irish vessels, vessels from France and the UK currently have access to fishing between the 6 and 12 nm limit as a result of historic fishing rights. In addition, in the case of UK vessels owned and operated from Northern Ireland, under the Sea-Fisheries (Amendment) Act 2019, access to fishing is also permitted to the area within the Irish 6 nm limit. Fishing vessels from these nations could therefore potentially target areas in the immediate area of the Proposed Development.

30.1.44. Due to the static nature of aquaculture, it is not anticipated that there will be any potential for transboundary impacts upon aquaculture receptors of other states.

30.1.45. The potential for transboundary impacts upon commercial fisheries may arise from two sources:

- Effects on commercial fishing fleets from other states as a result of impacts from the Proposed Development on fish and shellfish stocks targeted by these fleets; and
- Effects on commercial fishing fleets from other states as a result of effects on commercial fishing activities operating in the vicinity of the Proposed Development. These effects may include loss of or restricted access to fishing grounds and potential displacement of fishing activity into other areas, interference with fishing activities, increased steaming times and safety issues for fishing vessels.

30.1.46. The probability of impacts occurring during the operational and maintenance phase, particularly as a result of the presence of the offshore infrastructure associated with the Proposed Development, is likely to be high. However, this would depend on the level of fishing activity by other states that the area of the Proposed Development may sustain. The extent of the potential impact will be subject to assessment in the EIAR. Although impacts during the operational and maintenance phase are likely to be long term, it is likely that following cessation of construction that some fishing activity may be able to resume, depending on the final layout of the infrastructure. In addition, it is likely that any impacts from the Proposed Development would be reversible following decommissioning, as it is anticipated that all structures above the seabed will be completely removed and fishing activity would be able to resume once decommissioning is completed. The construction phase is considered less likely to result in significant impacts although the effects associated with the interference caused by the presence of infrastructure will progressively increase as the development is progressed.

30.1.47. Therefore, it is proposed that transboundary impacts upon commercial fisheries are screened into the EIAR. It is proposed that transboundary impacts upon aquaculture are screened out of the EIAR.

Shipping and navigation

30.1.48. The shipping and navigation baseline, including navigational features and vessel traffic, is outlined in section 17 of this Scoping Report.

30.1.49. The Array Area is located approximately 3 nm to 7 nm from shore. Charted water depths within the Array Area range between 1 m and 34 m at Lowest Astronomical Tide (LAT), with the presence of Arklow Bank resulting in the high variation. The main types of vessels recorded in the vicinity of the Proposed Development are cargo vessels, recreational vessels and fishing vessels.

30.1.50. There is the potential for transboundary impacts upon shipping routes which transit to/from other countries including the potential effects on shipping routes to/from Northern Ireland, Wales,

England, Isle of Man and Scotland. There are two busy north-south routes passing east of Arklow Bank, mainly used by cargo vessels, which include traffic associated with ports in continental Europe such as The Netherlands, however any effects on ship routing to continental Europe is not expected to be significant considering the overall voyage distance. Other busy areas are associated with a north-south route passing inshore of Arklow Bank, and approaches to Arklow Harbour.

30.1.51. The probability of impacts occurring during the operational and maintenance phase, particularly as a result of the presence of the offshore infrastructure associated with the Proposed Development, is likely to be high. The extent of the impact will be subject to assessment in the EIAR. Although impacts during the operational and maintenance phase are likely to be long term, it is likely that any impacts from the Proposed Development would be reversible following decommissioning, as it is anticipated that all structures above the seabed will be completely removed. The construction phase is considered less likely to result in significant impacts although the effects associated with the interference caused by the presence of infrastructure on shipping and navigation will progressively increase as the development is progressed.

30.1.52. Therefore, it is proposed that transboundary impacts upon shipping and navigation (considering shipping routes to/from Northern Ireland, Wales, England, Isle of Man and Scotland) are screened into the EIAR.

Civil and military aviation

30.1.53. The civil and military aviation baseline for the Proposed Development is outlined in section 18 of this Scoping Report.

30.1.54. The Proposed Development is located entirely within Irish airspace and therefore no transboundary effects are predicted in relation to aviation airspace. The potential for transboundary impacts may arise from the presence of wind turbines during the operational and maintenance phase disrupting civil and military radar coverage from the UK however this is considered to be very unlikely. The probability of impacts occurring during the operational and maintenance phase as a result of the offshore infrastructure associated with the Proposed Development is likely to be very low, although the extent of the impact will be determined in the EIAR. Although such impacts would be long term, it is likely that they would be reversible after decommissioning, as it is anticipated that all structures above the seabed will be completely removed.

30.1.55. It is therefore considered that there is no pathway (direct or indirect) by which effects arising from the Proposed Development could significantly affect civil and military aviation receptors of another Member State. As such, it is proposed to screen out transboundary impacts upon civil and military aviation are screened out of the EIAR.

Seascape, landscape and visual amenity

30.1.56. The baseline conditions for seascape, landscape and visual amenity are set out in section 19.4 of this Scoping Report. This includes landscape, seascape and land based visual receptors within the Seascape, Landscape and Visual Impact Assessment Study Area, initially defined as a 60 km radius from the Array Area, which extends into Welsh waters.

30.1.57. It is considered that there is no pathway (direct or indirect) by which effects arising from the Proposed Development could significantly affect seascape, landscape and visual amenity receptors of another state. Temporary change to seascape, landscape and visual amenity during the construction and decommissioning phases, and changes to seascape and landscape character and visual amenity for the duration of the operational and maintenance phase, are expected to arise mainly within the landscape and seascape of the east coast of Ireland.

30.1.58. In terms of sea-based receptors, the shipping and navigation baseline (outlined in section 17.4 of this Scoping Report) indicates that cargo vessels and ferries transiting to/from the UK and Europe pass within 10 nm of the Array Area. These are not expected to experience significant visual

impacts. Potential significant impacts would therefore be limited to landscape, seascape and visual receptors within the Republic of Ireland. Therefore, it is proposed that transboundary impacts upon seascape, landscape and visual amenity are screened out of the EIAR.

Marine archaeology

30.1.59. The marine archaeology baseline for the Proposed Development is set out in section 20.4 of this Scoping Report.

30.1.60. It is considered that there is no pathway (direct or indirect) by which effects arising from the Proposed Development could significantly affect marine archaeology receptors of another state. The extent of any predicted impacts on marine archaeology receptors are expected to be limited to:

- The footprint of the Array Area and offshore export cable routes for impacts associated with direct physical seabed disturbance; and
- One tidal excursion for impacts associated with sediment deposition on the seabed.

30.1.61. Therefore, it is proposed that transboundary impacts upon marine archaeology are screened out of the EIAR.

Infrastructure and other users (material assets)

30.1.62. The infrastructure and other users' baseline for the Proposed Development is set out in section 21.3 of this Scoping Report.

30.1.63. Potential impacts upon infrastructure and other users of other states are limited to potential effects on communications infrastructure such as satellite communication and VHF radio, during the operational and maintenance phase of the Proposed Development. The extent of the potential impact will be assessed within the EIAR following consultation with relevant communications receptors. Although such impacts would be long term, they would be reversible following decommissioning, as it is anticipated that all structures above the seabed will be removed.

30.1.64. Therefore, it is proposed that transboundary impacts upon infrastructure and other users are screened into the EIAR.

Population and human health

30.1.65. The population and human health baseline for the Proposed Development is set out in section 23.4 of this Scoping Report.

30.1.66. Potential impacts identified in section 23.5 of this Scoping Report include increase in employment and demand for services during all phases of the Proposed Development. The extent of this impact will be assessed in the EIAR. There is potential for transboundary impacts on other states relating to increase in employment and demand for services, through the purchase of Project components, equipment and the sourcing of labour from companies based outside Ireland. The probability of impacts occurring at all phases of the Proposed Development is high. Impacts related to the construction and decommissioning phases would be temporary and short term. Impacts related to the operational and maintenance phase would be long term.

30.1.67. Therefore, it is proposed that transboundary impacts upon Population and Human Health are screened into the EIAR.

Conclusions

30.1.68. This Appendix has been prepared to provide an assessment of the potential for transboundary impacts on other states arising from the Proposed Development.

30.1.69. On the basis of the information available, as detailed within this Scoping Report, there is the potential for the Proposed Development to have significant transboundary effects in other states. Transboundary impacts have been screened into the EIAR for the following topics:

- Fish, shellfish and sea turtle ecology;
- Marine mammals;
- Offshore ornithology;
- Commercial fisheries;
- Shipping and navigation;
- Infrastructure and other users; and
- Population and human health.