Environmental Impact Assessment Report

NISA

North Irish Sea Array

Volume 8: Appendices (Introductory)

Appendix 2.1
EIAR Scoping Report

Statkraft

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Acronyms

Term	Definition
AA	Appropriate Assessment
AC	Alternating Current
AEZ	Archaeological Exclusion Zones
BIM	Bord Iascaigh Mhara
CEA	Cumulative Effects Assessment
DECC	Department of the Environment, Climate and Communications, formerly Department of Communications, Climate Action and Environment (DCCAE)
DHLGH	Department of Housing, Local Government and Heritage
ECC	Export cable corridor
ECR	Export cable route
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EIS	Environmental Impact Statement
EPA	Environment Protection Agency
EU	European Union
EU DCF	EU Data Collection Framework
FLO	Fisheries Liaison Officer
FLOWW	Fisheries Liaison with Offshore Wind and Wet Renewables group
GIS	Geographical Information Systems
GW	Gigawatt
HDD	Horizontal Directional Drilling
HWM	High Water Mean Tide
ICES	International Council for the Exploration of the Sea
INFOMAR	Integrated Mapping for the Sustainable Development of Ireland's Marine Resource
km	Kilometres
LAT/ mLAT	Lowest Astronomical Tide/ meters relative to Lowest Astronomical Tide
MAP	Maritime Area Planning
MSL	Mean Sea Level

Term	Definition
NIS	Natura Impact Statement
NI	Northern Ireland
NISA	North Irish Sea Array Wind Farm
NM	Nautical Mile
NPWS	National Parks Wildlife Service
NtM	Notice to Mariners
O&M	Operations and maintenance
ORE	Offshore Renewable Energy
OREDP	Offshore Renewable Energy Development Plan
OSP	Offshore Substation Platform
OWF	Offshore Wind Farm
RESS	Renewable Energy Support Scheme
RSL	Relative Sea Level
SAC	Special Area of Conservation
SEA	Strategic Environmental Assessment
SFPA	Sea Fisheries Protection Agency
SPA	Special Protection Area
UK	United Kingdom
UK FEN	UK Fisheries Economics Network
VMS	Vessel Monitoring System
WFD	Water Framework Directive
WTG	Wind turbine generator
WSI	Written Scheme of Investigations
ZoI	Zone of Influence

1 Introduction

1.1 Project Background

The North Irish Sea Array Wind Farm (hereinafter referred to as NISA) is an offshore wind energy project being proposed off the coast of counties Dublin, Meath and Louth, bringing with it an opportunity to significantly contribute to the development of a clean, renewable energy future for the region. The proposed wind farm once operational, would have the capacity to provide renewable energy for up to 500,000 homes. The overall project and location context can be seen in **Figure 1.1.**

The proposed NISA offshore development area covers an area of over 226.9km^2. The development area spans 31km north-south and 14km east-west at its widest point. At its closest location, near Rush in Co. Dublin, the extent of the site boundary is 7.3km from land. The north-east corner of the development site lies directly on the 12nm foreshore area limit. The development area has a water depth, relative to the lowest astronomical tide level (LAT), ranging from 30m to 63m.

The NISA project will consist of a combination of offshore infrastructure and onshore infrastructure, and other supporting infrastructure and ancillary works.

1.1.1 Offshore Infrastructure

The principal offshore components of the proposed project are likely to comprise of the following:

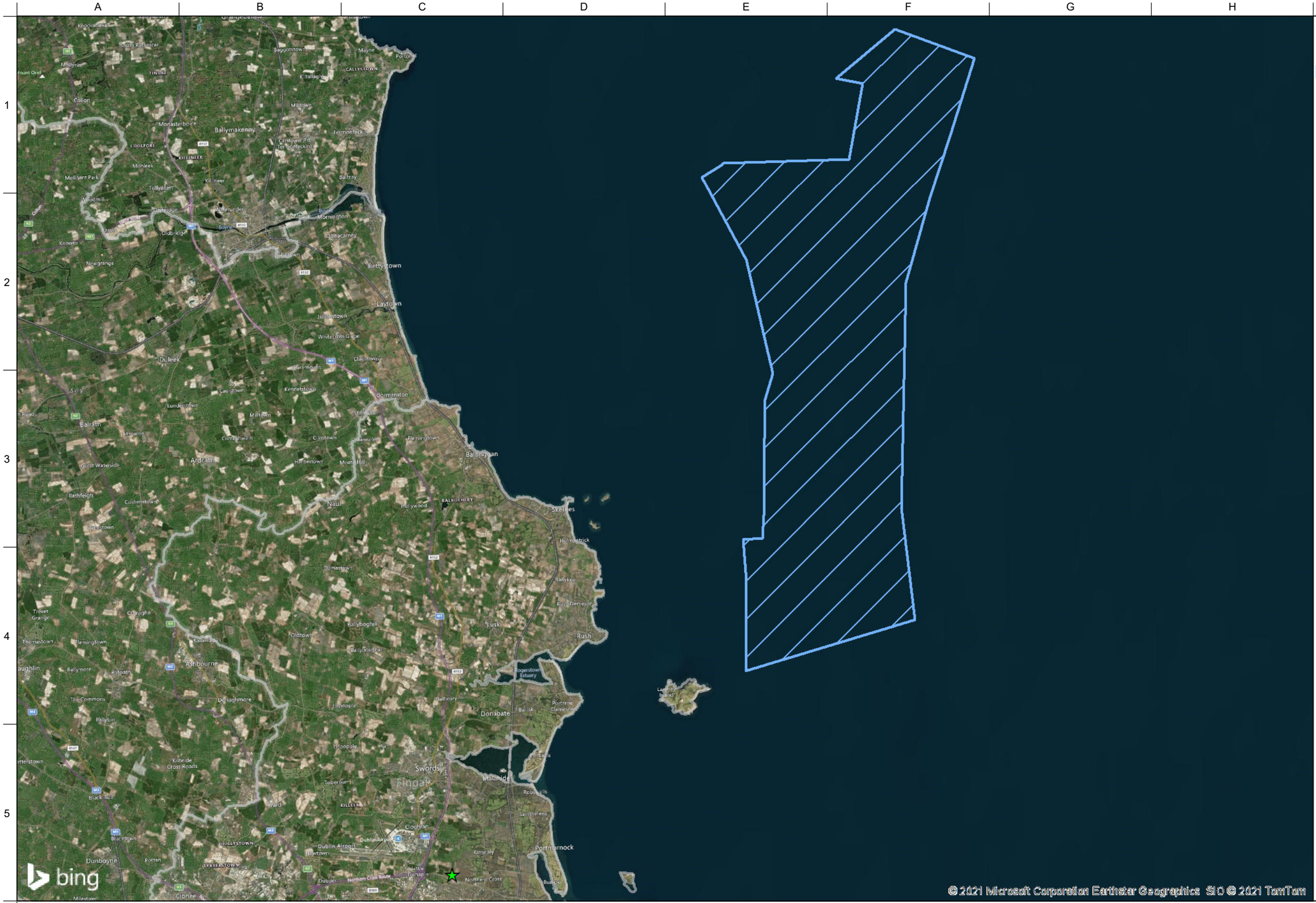
- Wind Turbine Generators
- Wind Turbine Foundations
- Offshore Substation and associated foundations (if required)
- Subsea Inter-Array Cables
- Subsea Export Cables

1.1.2 Onshore Infrastructure

The onshore infrastructure comprises connection of the generated energy from the offshore wind farm, to the national electricity transmission network. The onshore components of the project are likely to comprise of the following:

- Export cable landfall site
- Cable Transition Joint Pit
- Onshore substation (if required)
- Approximately 30-40km of onshore underground electrical cables
- Onshore 220kV GIS substation located adjacent to the Belcamp Substation at Swords, Co. Dublin
- Connection to the Belcamp substation from the proposed 220kV GIS Substation

- Supporting infrastructure and ancillary works



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Issue	Date	By	Chkd	Appd
P1	11/05/2021	RC	MW	COD

Project Title
North Irish Sea Array Offshore Wind Farm

Scale
1:200,000

Date
11/05/2021

Drawing Title
Overall Project and Location Context

Drawing Status
Preliminary

Figure No.
Figure 1.1

Issue
P1

In terms of the onshore electrical infrastructure, these are all located within the Fingal County Council jurisdiction, with the possible exception of minor works which may be required within Dublin City Council to provide access to the proposed Belcamp Substation.

1.1.3 Current Project Status and Consent Process

North Irish Sea Array Windfarm Ltd (hereinafter referred to as the Developer) is currently advancing the project which has progressed from advanced concept design. Surveys, consultations and assessments are underway, to inform the necessary detailed environmental assessments and statutory consent applications.

In May 2020, the Department of Housing Planning and Local Government (now Department of Housing, Local Government and Heritage) announced that seven offshore wind projects (with a combined capacity in excess of 3.5 GW in total) had been designated as 'Relevant Projects'. This designation secures special status for these projects, under the proposed Maritime Area Planning (MAP) legislation, due to be enacted later this year.

NISA has been designated as one of the Relevant Projects and as such, aims to apply for a Marine Area Consent (MAC) before the end of 2021 once the process opens for relevant projects following enactment of MAP. Subsequent to this, the intent (as detailed in the draft legislation) is to make an application for relevant statutory consent, to An Bord Pleanála (similar to the strategic infrastructure development process).

To inform the MAC process and the subsequent consent application which NISA intends to submit in 2022, NISA has applied for a Foreshore Licence to undertake the necessary offshore site investigations for the offshore wind farm array. These site investigations will commence as soon as possible following execution of the licence, with procurement well underway and contractors soon to be appointed. A separate Foreshore Licence application has also been submitted for any necessary investigative works associated with the offshore export cable from the wind farm to the proposed landfall(s).

1.1.4 Other Associated Developments

In parallel with the NISA project, there are related developments which will be required, but which will be submitted at a later date, separately, for the appropriate statutory consents. This includes in particular:

- possible upgrade works to the high voltage transmission network required to accommodate the power generated by the overall project;
- Operation and Maintenance Base (OMB) to allow for the ongoing maintenance and operation of the project, once commissioned.

These developments, as well as other relevant developments identified in the vicinity of the proposed development, will be described in the EIAR and the likely cumulative effects on the environment of these developments and the proposed development will be assessed.

1.2 The Developer

As detailed in Section 1.1, North Irish Sea Array Windfarm Ltd is the Developer of the proposed NISA project. North Irish Sea Array Windfarm Ltd. is a wholly owned subsidiary of Statkraft Ireland Ltd.

Statkraft is Europe's largest generator of renewable energy. The Group produces hydropower, wind power, solar power and supplies district heating. Statkraft has 4,000 employees in 17 countries (including approximately 70 employees in Ireland). A commitment to decarbonisation lies at the heart of every business decision Statkraft make.

Statkraft Ireland is endeavouring to develop suitable and appropriate renewable energy projects that will bring long-lasting benefits, not only to our country and our future generations, but also the local communities in which they are located. Statkraft believe that through positive engagement with local communities and the public, renewable energy projects that are socially and environmentally appropriate can be developed for the benefit of all.

1.3 Benefits of the Proposed Development

1.3.1 Need for the Proposed Development

As outlined, the NISA project provides an opportunity to significantly contribute to the development of a clean, renewable energy future for the region. The proposed wind farm once operational, would have the capacity to provide renewable energy for up to 500,000 homes.

The NISA project will further the Irish Government's objectives with regard to increasing the generation and supply of renewable electricity and reducing the emissions of greenhouse gases.

This will be an important contribution to reducing the effects of climate change on biodiversity and the environment, facilitating economic development and providing renewable power for a growing population.

1.3.2 Planning and Policy

The proposed development will contribute towards fulfilling the objectives of a wide range of European, national, regional and local energy, planning and development policies as outlined below.

1.3.2.1 European Policy

The European Green Deal, published by the European Commission in December 2019, provides an action plan to boost the efficient use of resources by moving to a clean, circular economy while cutting pollution and restoring biodiversity. The EU aims to be climate neutral by 2050. The EU Green Deal highlights that further decarbonisation of the energy sector is critical to reach climate objectives in 2030 and 2050.

The European Green Deal will increase the greenhouse gas emissions reduction 2030 target to at least 55% in comparison to 1990 levels. Targets for renewable energy and energy efficiency are also likely to be increased.

The NISA project would help meet the 2030 targets and objectives set out in the Climate and Energy Framework by providing a new renewable source of energy that will reduce reliance on fossil fuels and dependency on energy imports. It will also create opportunity for jobs and will bring environmental and health benefits.

The EU Strategy for Offshore Renewable Energy was adopted in November 2020. The strategy will integrate the environmental impacts of offshore renewable energy deployment in line with the commitments in the EU Biodiversity Strategy and European environmental legislation. The roadmap also highlights the EU response to the COVID-19 pandemic with regards to offshore renewable energy. The recovery from the COVID-19 crisis, will be based on investments in line with the European Green Deal priorities, including the EU Climate Adaptation Strategy.

1.3.2.2 National and Regional Plans and Strategies

In the Irish context, Ireland has introduced significant climate and energy policy and guidance in recent years, with increasingly ambitious targets being set to address climate change.

In 2014, the Government published the Offshore Renewable Energy Development Plan setting out key principles, policy actions and enablers for delivery of Ireland's significant potential for offshore renewable energy.

The Energy White Paper: Ireland’s Transition to a Low Carbon Energy Future 2015-2030 was launched in 2015. This policy set out a framework to guide policy and actions that the government needed to take in the energy sector up to 2030.

The Government published its Climate Action Plan (to tackle Climate Breakdown) in 2019. The Plan sets out the actions the Government intends to take to address climate breakdown across sectors such as electricity, transport, the built environment, industry and agriculture.

The National Energy and Climate Plan 2021 – 2030, which is required under the EU Clean Energy Package, will require the production of a climate strategy, with a statutory basis in EU law. This Plan incorporates all planned energy and climate policy measures (up to the end of 2019) and the objectives therein, to deliver a 30% reduction by 2030 in non-emissions trading scheme (non-ETS) greenhouse gas emissions (from 2005 levels). This plan also included a target of 3.5 gigawatts (GW) of offshore wind to be delivered by 2030. The NISA project, having been identified as a Relevant Project, is a key enabler in terms of this target.

The new Programme for Government *Our Shared Future*, agreed in June 2020, has accelerated the decarbonisation agenda even further, committing to a 7% average yearly reduction in overall greenhouse gases over the next decade, and to achieving net zero emissions by 2050, as well as setting a 5 GW offshore wind target by 2030.

The Climate Action and Low Carbon Development (Amendment) Bill introduced in October 2020, will, if enacted, commit Ireland, in law, to move to a climate resilient and climate neutral economy by 2050. This Bill is currently out for public consultation until May 2021.

In terms of the planning policy context, Project Ireland 2040: National Planning Framework and the National Development Plan 2018 – 2027 were published in 2018 and set out a number of National Strategic Outcomes, including *Transition to a Low-Carbon and Climate-Resilient Society.*

Further, the Government has in the past week, published Ireland's first national framework for managing marine activities, the National Marine Planning Framework (NMPF). The NMPF is Ireland's first plan for more sustainable, effective management of marine activities and will inform the Government's objectives and priorities. The NMPF supports the establishment of Ireland as a world leader in offshore renewable energy deployment, highlighting the importance of offshore renewable energy in Ireland's decarbonisation journey.

At a regional level, the Regional Planning Guidelines for the Greater Dublin Area 2010 - 2022 (Regional Planning Guidelines) set out the strategic policy for Dublin and the mid-east region over the twelve-year period to 2022. The Regional Planning Guidelines highlight the need to fully exploit renewable energy potential such as wind and wave energy and reduce national dependency on imported fuels for energy provision, to the benefit of the economy as well as the environment.

In turn, the Regional Spatial and Economic Strategy for the Eastern and Midlands Region 2019-2031 is a strategic plan which identifies regional assets, opportunities and pressures and provides appropriate policy responses in the form of Regional Policy Objectives. The RSES supports the provision of infrastructure to facilitate a more distributed, renewables-focused energy generation system, harnessing off-shore energy potential and connecting sites of optimal energy production to the major sources of demand.

1.3.2.3 Local Planning & Policy Context

Almost all of the onshore grid infrastructure is within the administrative area of Fingal County Council. The Fingal County Development Plan 2017 – 2023 includes some relevant policy and objectives, including the following objectives in under its Strategic Policy:

18. Secure the timely provision of infrastructure essential to the sustainable development of the County, in particular in areas of resource and waste management, energy supply, renewable energy generation and Information and Communications Technology (ICT).

21. Promote, drive and facilitate the transition in the future to an entirely renewable energy supply.

25. Prepare a Sustainable Energy Strategy for the County in consultation with relevant stakeholders and interest groups setting out strategies, policies and actions to facilitate a reduction in greenhouse gas emissions and the harvesting of renewable energy resources most appropriate to the County.

In addition to the above, the following objectives are also relevant:

Objective PM30

Encourage the production of energy from renewable sources, such as from Bio-Energy, SolarEnergy, Hydro Energy, Wave/Tidal Energy, Geothermal, Wind Energy, Combined Heat andPower (CHP), Heat Energy Distribution such as District Heating/Cooling Systems, and anyother renewable energy sources, subject to normal planning considerations and in line withany necessary environmental assessments.

Objective EN07

Support the implementation of the 'Strategy for Renewable Energy 2012-2020' Department of Communications, Energy and Natural Resources (now Department of Communications, Climate Action and Environment) and the related National Renewable Energy Action Plan (NREAP) and National Energy Efficiency Action Plan (NEEAP).

Objective EN10

Support Ireland's renewable energy commitments outlined in national policy by facilitating the exploitation of wind power where such development does not have a negative impact on the surrounding environment, landscape or local amenities including offshore sites that may be designated under the Birds and Habitats Directive in the lifetime of this Plan.

The offshore infrastructure is located off the coast of County Louth, Dublin and Meath.

The Louth County Development Plan 2015 – 2021 has a number of relevant policy objectives. This includes the following in terms of Louth's key economic strengths:

- *Strong reputation as a centre for the development of renewable energy technologies*

The County Development Plan, under Chapter 9, Energy and Communications, states that:

Louth County Council supports EU and national incentives for reducing emissions of greenhouse gases, the movement to a low carbon economy and encouraging the development of renewable energy sources in an environmentally acceptable manner, which is evident inter alia in the planning and land use policies contained within the ***Louth County Development Plan 2015-2021***

and:

The Government is now examining opportunities to develop Ireland's abundant offshore renewable energy resources, including offshore wind, wave and tidal energy, recognising that these offer rich potential over the coming decades. County Louth has a clear part to play in the development of renewable energy given its coastal location and therefore, the provision of such alternative energy resources will be considered on suitable sites throughout the County.

As a planning authority, it is important that Louth County Council recognises the range of new and developing technologies that can contribute to minimising greenhouse gas emissions, providing for a secure and stable energy supply and securing a greater proportion of our energy from renewable sources.

The following objectives of the Plan are also relevant*:*

EnCo12 - To support international, national and county initiatives for limiting emissions of greenhouse gases through energy efficiency and the development of renewable energy sources, which makes use of natural resources of the County in an environmentally acceptable manner and where it is consistent with the proper planning and sustainable development of the area.

EnCo 17 - To support the development of offshore windfarm developments subject to normal proper planning considerations, including in particular the impact on areas of environmental or landscape sensitivity.

1.3.3 Economic Benefits

As well as the need for renewable energy to reduce carbon emissions and combat climate change, renewable energy brings significant macroeconomic benefits. The Sustainable Energy Authority of Ireland has estimated that onshore and offshore wind generation could create over 20,000 direct installation and operation and maintenance jobs by 2040. Offshore wind creates employment opportunities in manufacturing, construction, scientific research and electricity generation.

The NISA project has the capacity to generate enough energy to power 500,000 homes. This means that a significant portion of the electricity used in the local area can be green, and it can be produced locally. Instead of relying on more expensive, imported energy, Ireland will be able to produce electricity using Irish resources – namely, the wind off the coast in the Irish Sea.

At a local level, the Developer will be developing a Community Benefit scheme over the coming years in collaboration with local communities, relevant authorities and local groups. Through this annual funding, the NISA project will support a range of local communities, including both the local coastal communities and the fishing communities. The Developer will seek input on how these funds could deliver a meaningful difference in the local area and we will work with local communities and local representatives to shape the scheme.

Funding opportunities for community projects associated with offshore wind farms will be aligned with the Government's new Renewable Energy Support Scheme (RESS). A new RESS scheme is currently being developed for the offshore sector and it is expected that this will require renewable developers to set aside €2 per MWh of electricity produced, for community benefit funds associated with local renewable energy projects. This being the case, once NISA becomes operational, an annual, multi-million Euro fund will be available for the local area.

Rates will also be payable to local authorities. which will make a meaningful contribution to the annual accounts of each local authorities. berates can be considered dependable sources of income given their reduced exposure to economic cycles.

Finally, in terms of business opportunities in the region, the Developer will be actively encouraging a local supply chain and is working with industry bodies, state agencies and Government to ensure as much of the investment and job creation as possible is made into the local, regional and national economy.

2 EIA Process and Approach to Scoping

2.1 Introduction

This section provides an overview of the statutory basis for EIA, including the relevant EU and Irish legislation and the need for EIA, as well as the likely statutory consent and associated consultation process to be followed.

A brief summary of the EIA process and the role of the EIAR is also provided, together with the proposed approach to the EIA scoping process, the rating and significance of effects. Section 8 details the EIAR structure to be adopted.

2.2 Statutory Basis

2.2.1 Relevant EU and Irish Legislation

A European Directive for EIA has been in force since 1985 since the adoption of Council Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment.

The EIA Directive of 1985 has been amended a number of times by Council Directives between 1997 and 2014. The amended directive sets out the requirements for member states on the assessment of the effects of certain public and private projects on the environment.

The EIA Directive, as amended, requires the competent authority to undertake an EIA of certain public and private projects that are likely to have significant effects on the environment as part of the consent decision making process. In Ireland, the requirements of the EIA Directive, as amended, in relation to planning consents are specified in the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (hereafter referred to as ‘the EIA Regulations’), as well as Part X of the Planning and Development Act, 2000, as amended, and in Part 10 of the Planning and Development Regulations, 2001, as amended.

This EIA Scoping Report has therefore been prepared to comply with the requirements of the EIA Directive, the EIA Regulations, the Planning and Development Act 2000, as amended, and the Planning and Development Regulations 2001, as amended.

2.2.2 The Need for EIA

The prescribed classes of development and thresholds that trigger a mandatory Environmental Impact Assessment (EIA) and the provision of an Environmental Impact Assessment Report (EIAR) are set out in Schedule 5 of the Planning and Development Regulations, 2001, as amended.

The classes under Schedule 5 that are relevant to the overall project are listed below:

Part 2 Class 3 Energy Projects

(i) Installations for the harnessing of wind power for energy production (wind/07 farms) with more than 5 turbines or having a total output greater than 5 megawatts.

The proposed development, being a c. 500 MW wind farm, exceeds the threshold and therefore an EIA will be required.

2.3 EIA Process

2.3.1 Introduction

Article 1(2)(g) of the EIA Directive provides the following definition:

"environmental impact assessment" means a process consisting of:

(i) the preparation of an environmental impact assessment report by the developer, as referred to in Article 5(1) and (2);

(ii) the carrying out of consultations as referred to in Article 6 and, where relevant, Article 7;

(iii) the examination by the competent authority of the information presented in the environmental impact assessment report and any supplementary information provided, where necessary, by the developer in accordance with Article 5(3), and any relevant information received through the consultations under Articles 6 and 7;

(iv) the reasoned conclusion by the competent authority on the significant effects of the project on the environment, taking into account the results of the examination referred to in point (iii) and, where appropriate, its own supplementary examination; and

(v) the integration of the competent authority's reasoned conclusion into any of the decisions referred to in Article 8a."

For the purpose of the EIA, North Irish Sea Array Windfarm Ltd is the 'developer' proposing the North Irish Sea Array Offshore Wind Farm development and An Bord Pleanála is likely to be the 'competent authority' that will undertake the EIA examination and decide whether to grant consent for the proposed development. This is subject to the enactment of the marine area planning (MAP - formerly known as the MPDM) legislation.

2.3.2 EIA Process and Role of the EIAR

The EIA is part of the consenting process for certain specified development projects. It ensures that consent decisions for those projects are made in the knowledge of the environmental consequences of the project. **Figure 2.2** from the EPA Draft Guidelines[1] (reproduced below) shows the principal elements of the EIA process and the role of the EIAR within that process.

[1] Guidelines on the Information to be contained in Environmental Impact Assessment Reports (EPA), DRAFT, August 2017

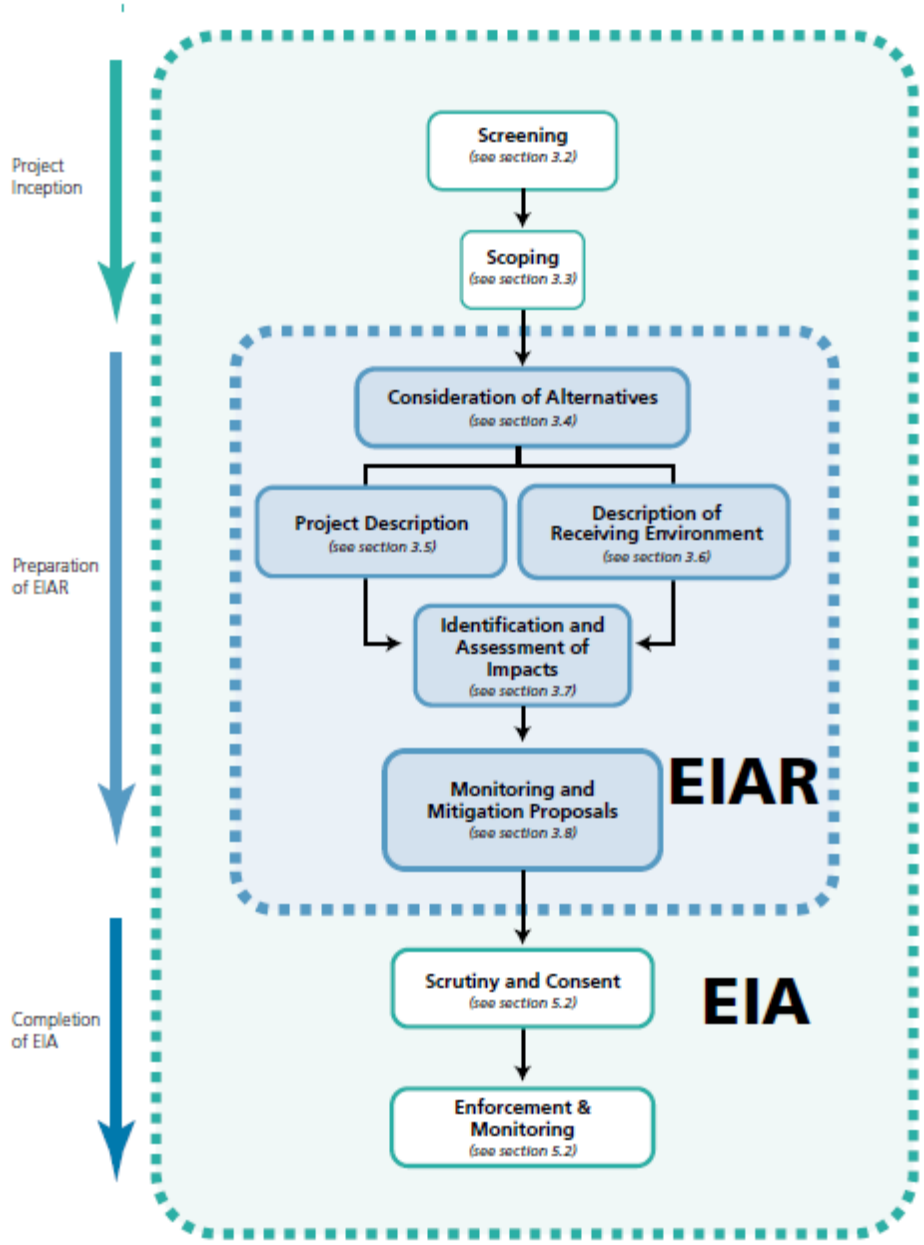

Figure 2.1: The position of the EIAR within the EIA Process (reproduced from Figure 2.2 of the EPA Guidelines)

2.4 Appropriate Assessment Process

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').

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). While the NIS does not form part of the EIAR, the baseline presented within the EIAR will inform the NIS.

The NIS will be submitted following screening for AA. The NIS will provide a clear statement of whether, or not, taking into account best scientific knowledge and the conservation objectives of the Natura 2000 and other designated site(s), the proposed development, individually or in combination with other plans or projects, may adversely affect the integrity of any Natura 2000 and other designated site(s).

2.5 Design Envelope Approach

The offshore wind industry continues to develop at a rapid pace in all aspects: turbine and foundation technology, construction and installation methods, and wind farm design. There is often considerable length of time between the completion of the preliminary design (on which the development consent application and its environmental assessments were completed) and their respective procurement and construction stages of a project.

It is intended to take a design envelope approach to the NISA project. This allows flexibility in the design as the project evolves, within a set of clearly defined parameters. For example, as turbine technology advances, it allows for flexibility in the final turbine selection, within the ‘envelope’ of parameters considered. In defining the parameters, the level of detail must be such that a robust assessment of the likely effects can be undertaken, which may require a range of options to be considered.

This approach, which is referenced in Section 3.5.8 of the Guidelines on the Information to be contained in Environmental Impact Assessment Reports (EPA, 2017, Draft) ensures that a ‘reasonable worst case scenario’ assessment is undertaken, with the ‘worst case’ effects being examined and enables the consent authority to condition how the final design conforms to the permitted parameters.

2.6 EIA Scoping Process

2.6.1 Purpose of the EIA Scoping Report

This EIA Scoping Report describes the key elements of the proposed development, the baseline conditions and sensitivities of the receiving environment likely to be affected by the proposed development and the studies and assessments proposed. It identifies likely significant effects and provides an outline of the proposed EIAR. The report also facilitates stakeholder engagement, with feedback sought from consultees to further inform the content and scope of the EIAR.

2.6.2 EIA Scoping Responses

Responses to this Environmental Impact Assessment (EIA) Scoping Report should be forwarded by email to fiona.patterson@arup.com by close of business on 30 June 2021. Alternatively, you can respond by letter to:

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One Albert Quay
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2.6.3 EIA Legislation and Guidance

The EIAR will be prepared in accordance with the EIA Directive and the relevant Irish legislation and guidelines issued by Department of the Housing, Planning, Community and Local Government, EPA and European Commission.

The scoping exercise has had regard to the following EIA guidance as appropriate:

- Department of the Housing, Planning, Community and Local Government (2018) *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment*;
- Department of Housing, Planning, Community and Local Government (2017) *Transposition of 2014 EIA Directive (2014/52/EU) in the Land Use Planning and EPA Licencing Systems*; and
- Department of Housing, Planning, Community and Local Government (2017) *Circular PL 1/2017 – Implementation of Directive 2014/52/EU on the effects of certain public and private projects on the environment (EIA Directive): Advice on the Administrative Provisions in Advance of Transposition*; and
- Environmental Protection Agency (2017) *Draft Guidelines on the Information to be contained in Environmental Impact Assessment Reports (Draft August 2017)*.
- European Commission (2017) *Environmental Impact Assessment of Projects: Guidance on Scoping*;
- European Commission (2017) *Environmental Impact Assessment of Projects: Guidance on the Environmental Impact Assessment Report.*
- Chartered Institute of Ecology and Environmental Management, CIEEM (2018). *Guidelines for Ecological Impact Assessment in Britain and Ireland, Marine and Coastal*.
- Department of Housing, Local Government and Heritage (2018). *National Marine Planning Framework Baseline Report;*
- Department of Housing, Local Government and Heritage (2021). *Draft National Marine Planning Framework.*
- Department of Communications, Climate Action and Environment (now DECC) (2017). *Guidance on EIS and NIS Preparation for Offshore Renewable Energy Projects;* and
- Department of Communications, Climate Action and Environment (now DECC) (2018). *Guidance on Marine Baseline Ecological Assessments & Monitoring Activities for Offshore Renewable Energy Projects Parts 1 and 2*.

In August 2017, the Environmental Protection Agency (EPA) published the latest edition of the draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2017). The Guidelines have been drafted with a view to facilitating compliance with the EIA Directive as amended by Directive 2014/52/EU. The draft Guidelines state that the scoping process should focus effort and resources on key significant issues that are guided by the following criteria:

- Use of likelihood and significance as the principal criteria for determining what environmental aspects need to be considered and addressed in the EIAR;
- Consider precedence to ensure any EIARs for similar projects on similar sites are used to develop an appropriate technical scope and robust assessment; and
- Recognise potential direct and indirect interactions that may magnify effects and/or give rise to cumulative significant effects (from multiple non-significant effects).

2.7 Rating and Significance of Effects

Section 3.7 of the draft EPA Guidelines (EPA, 2017) advises that the EIAR should focus on likely, significant effects and descriptions of effects that are accurate and credible.

Likely effects are considered to be those which are planned to take place and those which can be reasonably foreseen to be inevitable consequences of normal construction and/or operation of the proposed development, including the vulnerability of the proposed development to risks from major accidents. Significance of effects is understood to mean the importance of the outcome of the effect (i.e. consequence of change) and is determined by a combination of objective (scientific, often quantitative) and subjective (social, often qualitative) concerns.

2.8 Approach to Assessment of Inter-related Effects and Cumulative Effects

The summary chapter on inter-related effects will describe the approach adopted in the EIAR to the assessment of direct or indirect effects which are caused by the interaction of environmental aspects.

The summary chapter on cumulative effects will address the approach to the assessment of the potential for other projects or proposals, including other elements related to the overall NISA project (such as the OMB and any required upgrade to the Eirgrid network), as well as other relevant existing and permitted projects (as required by the EIA Directive) to exacerbate or create larger, more significant effects, when combined with the effects of the proposed development. This will include consideration of other offshore and onshore projects, such as offshore wind projects in Ireland designated as “Relevant Projects”, port and harbour developments, grid upgrades, among others.

Indirect effects and cumulative and interactive effects will be considered in detail in the assessment chapter for each environmental aspect, as appropriate, and they will be summarised in this chapter. Further detail is provided in Section 5.1.2.

2.9 Approach to Assessment of Transboundary Effects

The duty to carry out the transboundary assessment is outlined in the EIA Regulations. The NISA EIAR will include consideration of impacts that may occur in the environment of another State, and those impacts which may occur to interests of other States (such as commercial fishing occurring in the Irish EEZ).

A separate assessment of potential impacts on mobile species, for example, migratory birds or marine mammals, where their ranges overlap with international and European designations for which they are qualifying features, will be set out in the Natura Impact Statement (NIS).

3 Consultation

The Developer understands the importance of early, open and transparent consultation. The applicant is committed to providing information throughout the development phase of the project and believe that it is important that all stakeholders are involved from the earliest stages of the development process.

To that end, early stage engagement was carried out with the fishing industry during the concept design stage. A Fisheries Liaison Officer (FLO) was appointed to the project in late 2019 to provide information and gather feedback. This feedback was relayed to the project team and has informed the layout design as it has developed. A project website has been established: www.northirishseaarray.ie, which provides up to date and relevant information on North Irish Sea Array Windfarm Ltd (the Developer), the Project, the development path, benefits and contact details for further information. The FLO is continuing the ongoing consultation with relevant fisheries organisations and individuals involved in the fishing industry.

Stakeholder consultation is also ongoing. In addition to the aforementioned appointment of an FLO, the Developer has also appointed a Community Liaison Officer (CLO). The CLO is actively engaging with community groups and individuals in the area. This engagement is primarily focused on groups who are not involved in fishing industry.

Consultation with local authorities has also commenced and will continue throughout the project.

The Developer is in the process of preparing documentation and relevant information for the next steps in the public consultation campaign, which will commence in the coming weeks. This consultation process will utilise virtual consultation tools including the development of a virtual consultation room (VCR). This VCR will provide an interactive platform which will provide information relevant to the current stage of the project. In addition to this VCR, consultation will continue by way of CLO engagement directly with individuals and groups in the area. This engagement will be by phone and email until such time as Covid restrictions allow for face to face meetings. A variety of third parties will be consulted throughout the preparation of the EIAR and the scheme design for the proposed development.

Stakeholder consultation has commenced and will include ongoing consultation throughout the project development and will include Fingal, Dublin City, Meath and Louth County Councils, relevant statutory bodies, fisheries organisations and other interested coastal and marine bodies, utility/service providers, landowners, as well as residents and businesses in proximity to the proposed development. The bodies listed in Appendix A will be sent a copy of this EIA Scoping Report.

Public consultation will be undertaken as part of the design development and preparation of the EIAR.

4 The Proposed Development

4.1 Overview

As outlined in **Section 1.3**, the NISA project will consist of a combination of offshore infrastructure and onshore infrastructure, and other supporting infrastructure, ancillary works and activities both onshore and offshore. For clarity, the boundary between onshore and offshore is the high water point of mean or ordinary tides, which is shown as 'HWM' on Ordnance Survey Maps.

Section 1.3.2 outlines the main components of the project, both offshore and onshore. These are described in more detail below.

4.2 Development Boundary

As previously outlined, the proposed NISA development area is located off the coast of counties Dublin, Meath and Louth and covers an area of over 226.9km^2.

The offshore export cable corridor (ECC) and potential cable landfall location have not yet been confirmed. A survey area has been identified to allow for further investigations to take place to help determine the preferred ECC. The ECC assessment area is an irregular polygon shape with three potential cable routes approaching a northern, central and southern landfall option. All three options will be considered at this stage. These options are outlined in **Figure 4.1**.

As there are three potential landfall locations, several onshore cable corridor routes have been identified for each landfall location. The multiple cable route options will require further consideration before a final route can be selected. However, each landfall location has an identified indicative cable corridor zone. The onshore cable corridor will connect to the Belcamp Substation at Swords, Co. Dublin. Potential landfall and cable corridor zones are outlined in **Figure 4.2**.

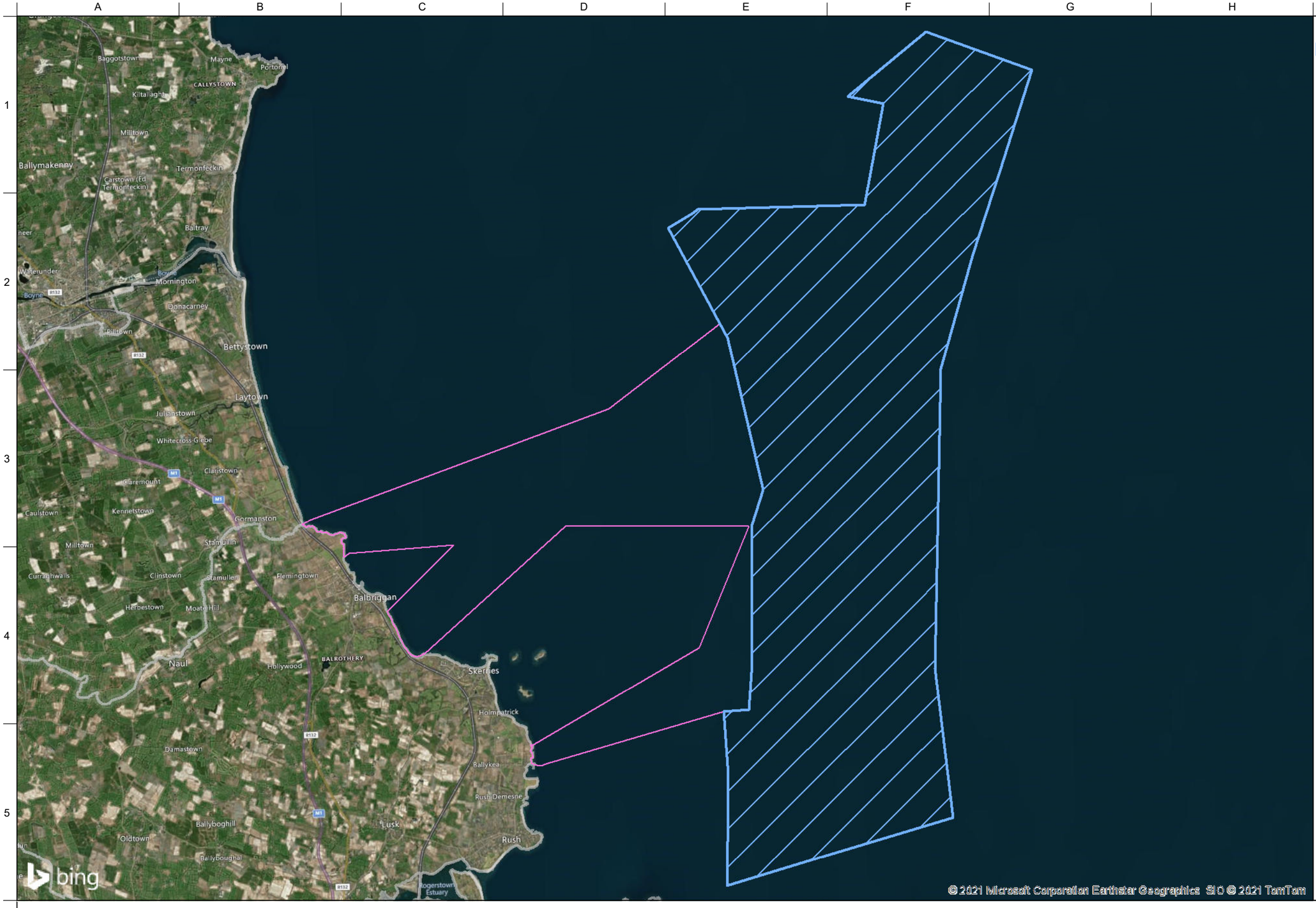
4.3 Offshore Wind Farm Infrastructure

As outlined in Section 1.1, the key offshore components of the proposed project are likely to comprise of the following:

- Wind Turbine Generators
- Wind Turbine Foundations
- Offshore Substation and associated foundations (if required)
- Subsea Inter-Array Cables
- Subsea Export Cables

4.3.1 Offshore Wind Turbine Generators (WTGs)

It is proposed to install up to 36 WTGs within the established project site boundary. The exact number and configuration of turbines cannot be confirmed at present, but the maximum parameters are outlined in **Table 4.4.**



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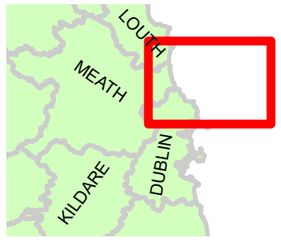
Statkraft

Irish Transverse Mercator
EPSG: 2157



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Issue	Date	By	Chkd	Appd
P1	14/05/2021	RC	MW	COD

Project Title
North Irish Sea Array Offshore Wind Farm

Scale
1:150,000

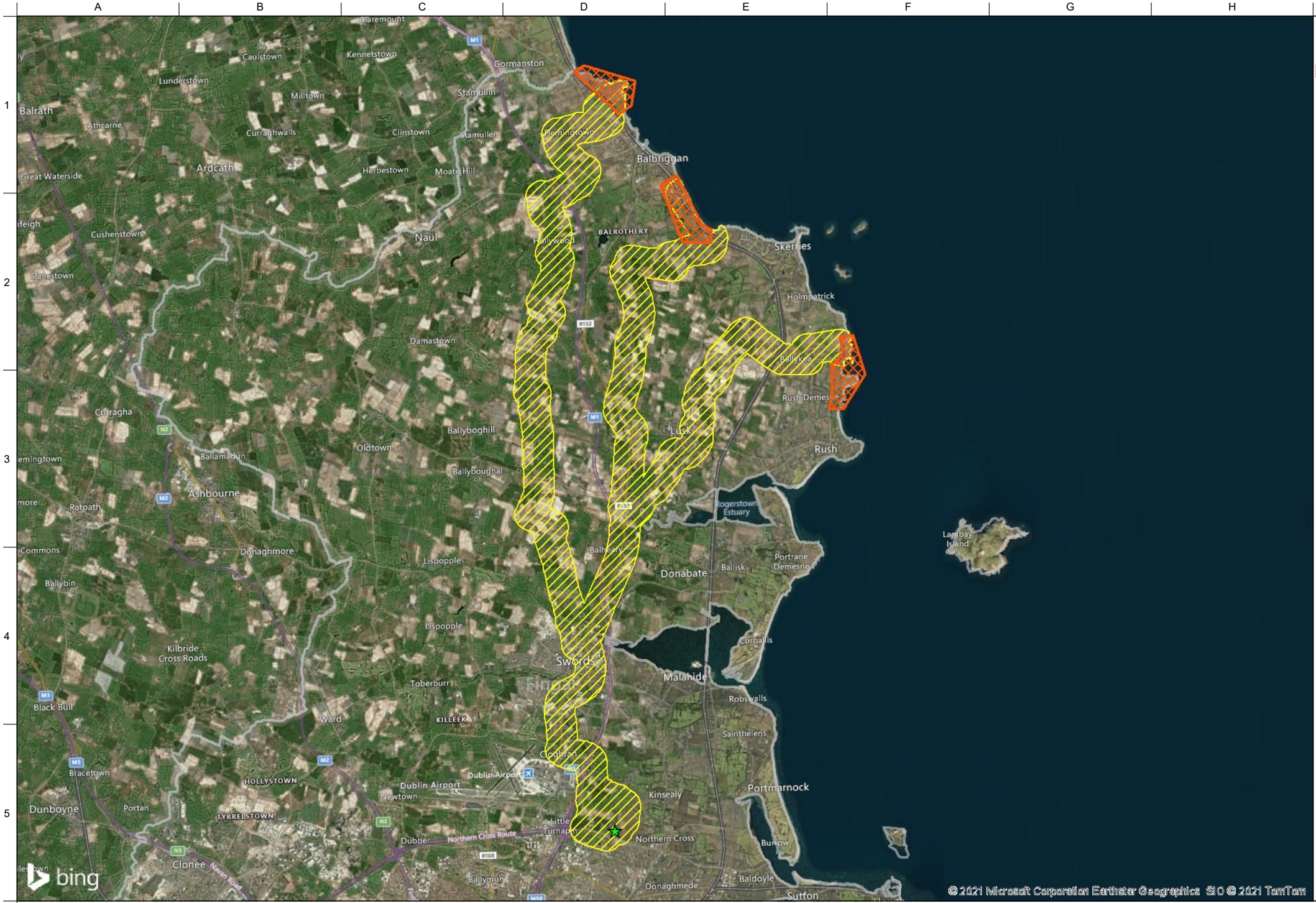
Date
14/05/2021

Drawing Title
Offshore Export Cable Corridor Options

Drawing Status
Preliminary

Figure No.
Figure 4.1

Issue
P1



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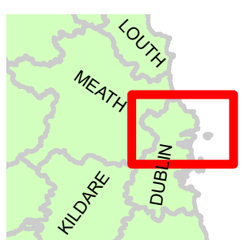
Statkraft

Irish Transverse Mercator
EPSG: 2157



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Issue	Date	By	Chkd	Appd
P1	14/05/2021	RC	MW	RC

Project Title
North Irish Sea Array Offshore Wind Farm

Scale
1:125,000

Date
14/05/2021

Drawing Title
Landfall and Onshore Cable Corridor Options

Drawing Status
Preliminary

Figure No.
Figure 4.2

Issue
P1

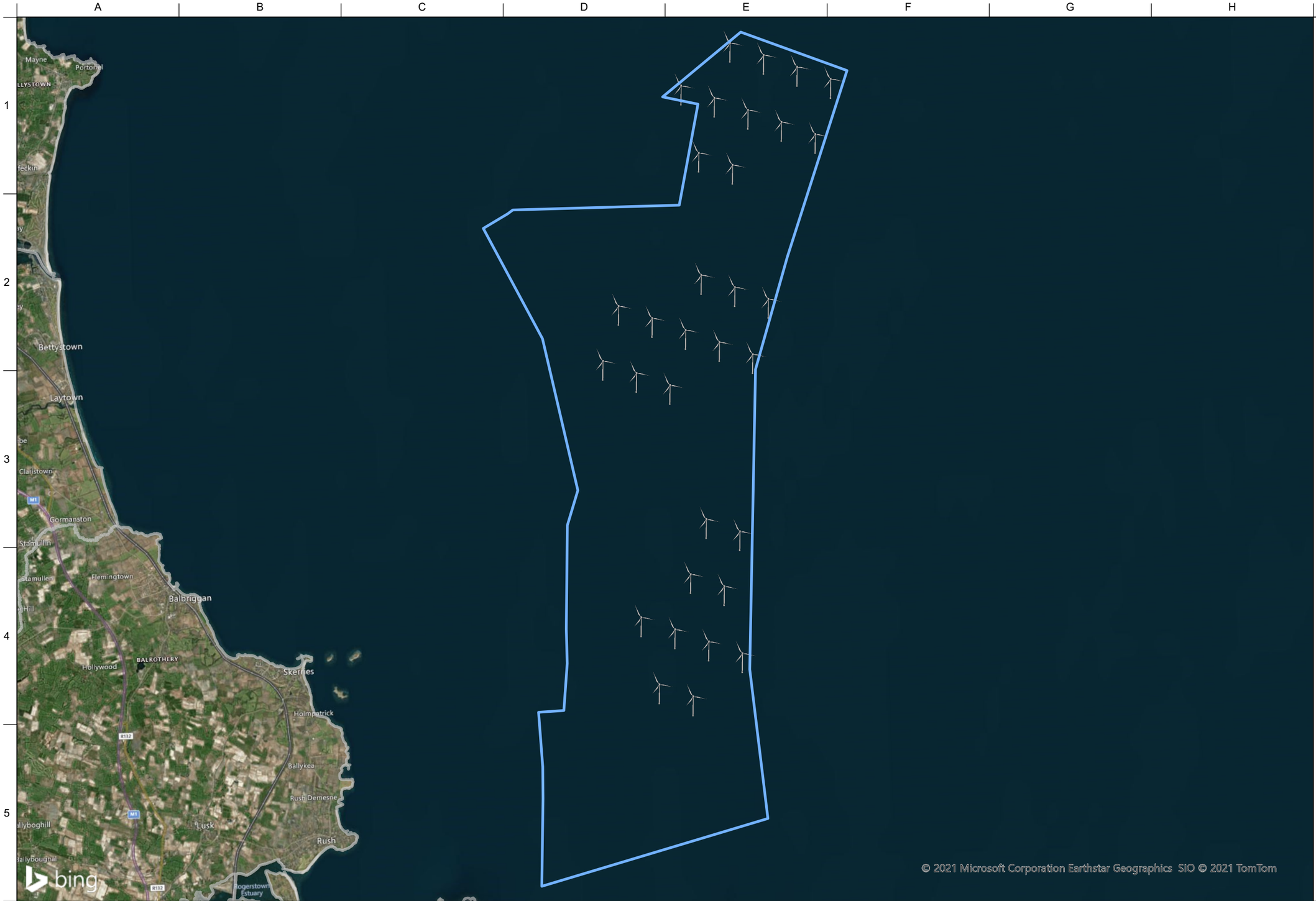
The current indicative layout for the offshore wind farm is based on the concept of installing 30-36 turbines (and associated infrastructure) in groups or 'pods' consisting of 10 to 12 turbines in each pod. This concept was adopted as a result of endeavours to move away from initial design iterations which consisted of significantly more turbines (in excess of 50), arranged in a typical wind farm configuration of a block type layout. The Developer's aspiration has been to move away from this type of arrangement which is a straight, 'picket fence' type view of turbines.

Each pod of turbines would be spaced in the region of 5km away from each other and following advice and input from technical specialists and the FLO, the Developer believes that arranging the turbines in this manner will have a dramatic impact on lowering any visual intrusion on the seascape and will enhance co-existence with fishing practices in the area

4.3.1.1 WTG Installation

WTGs will be installed within the array area as shown in **Figure 4.3**. Wind turbines comprise a tower, nacelle and rotor, supported and fixed to the seabed by means of a foundation. A transition piece may be used, which acts as the interface between the turbine and the foundation. **Figure 4.4** illustrates the main components of a WTG.

The turbine structures would typically be installed in sequence, commencing with the foundation. The transition piece (where required) is then installed, followed by tower, nacelle and rotor as shown in **Figure 4.5.**



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Irish Transverse Mercator
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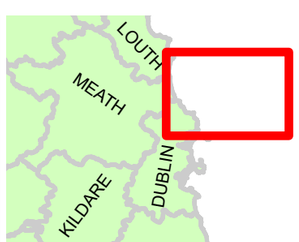

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Issue	Date	By	Chkd	Appd
P1	14/05/2021	RC	MW	COD

Project Title
North Irish Sea Array Offshore Wind Farm

Scale
1:150,000

Date
14/05/2021

Drawing Title
Offshore Wind Farm Array Area and Indicative WTG Layout

Drawing Status
Preliminary

Figure No.
Figure 4.3

Issue
P1

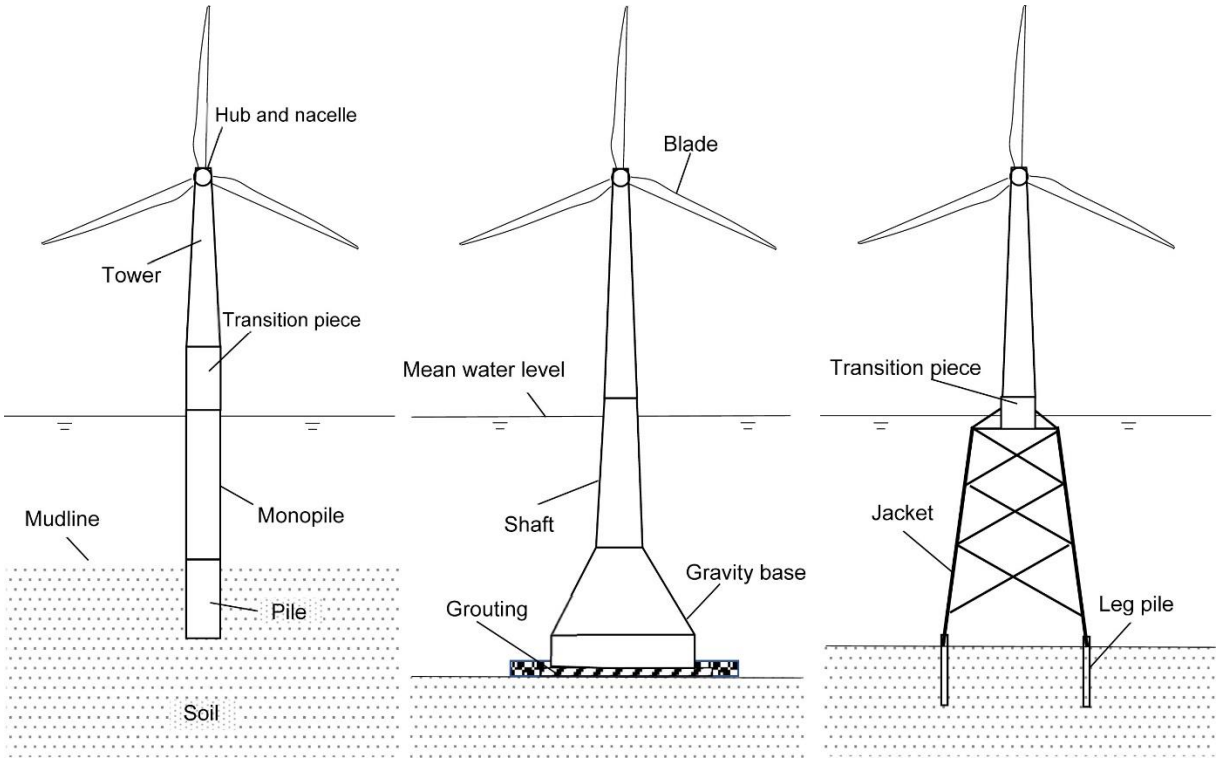


Figure 4.4: Typical main components of a WTG. Source: sciencedirect.com

4.3.2 Foundation Structures

Foundations are designed to support WTGs and offshore substation platform (OSP), should this be required. These structures are typically fixed to the seabed and are required to withstand wind forces and a wide range of meteorological conditions in the offshore environment.

A range of foundation types are being considered as shown in **Figure 4.5** including monopile, suction monopod, multi-leg and gravity based structures. Prior to installation of foundation structures, seabed preparation activities will be necessary and post-installation scour protection may be required irrespective of foundation type.

Figure 4.5: Indicative Foundation Options (Multileg, Monopile and Gravity Based Structure) Source: offshorewind.biz

Monopile Foundation

A monopile foundation comprises a single pile which is typically driven into the seabed. Other piling installation methods include drilling, vibration piling and innovative techniques such as Hi-Lo piling or BLUE piling, which uses a column of water under pressure instead of a steel ram.

Multileg Foundation

Multileg foundations include tripod and jacket options. These typically consist of three or four main legs which are linked by a lattice of cross-braces. Each leg is secured to the sea floor using a driven or drilled pin-pile or may be held in place by a suction caisson (similar to an inverted bucket, the hydrostatic pressure and the seabed properties provide the force required to hold the structure in place).

Gravity Base Foundation

Gravity base foundations means structures principally of concrete, steel or steel and concrete which rests on the seabed due to its own weight with or without added ballast or skirts.

4.3.2.1 Foundation Dimensions

The dimensions of the pile or suction bucket depend on the size of the turbine, the hydrodynamic forces, and the ground conditions at the turbine location. The maximum dimensions of each foundation type are presented in **Table 4.1, Table 4.2, Table 4.3** below.

Table 4.1: Maximum Dimensions of Piled Foundation

Piled foundation	Maximum pile diameter (m)	Maximum pile penetration (m)	Maximum width of foundation at seabed (m)
Wind turbine monopile	15	55	n/a
Wind turbine multileg	4,5	75	50
Offshore substation monopile	9	40	n/a
Offshore substation multileg	3	50	50

Table 4.2: Maximum Dimensions of Suction Bucket Foundation

Suction Bucket Foundation	Maximum Bucket Diameter (m	Maximum Bucket penetration depth (m)	Maximum width of foundation at seabed
Wind turbine	24	22	50
Offshore substation	15	8	55

Table 4.3: Maximum Dimensions of Gravity Base Foundation

Gravity Base Foundation	Maximum width of foundation at seabed
Wind turbine	60
Offshore substation	60

4.3.3 Offshore Substation Platform and associated foundations

An Offshore Substation Platform (OSP) may be required to support the proposed development. The need for either an OSP or an onshore substation (close to the landfall location) will be determined following further studies.

If deemed necessary, the inter array cables will be connected to the OSP and on the OSP the voltage will be transformed up.

The OSP topside will have a footprint of approximately 34m x 34 m and the foundation will be one of the methods as described above.

Figure 4.6 shows a typical OSP topside structure.

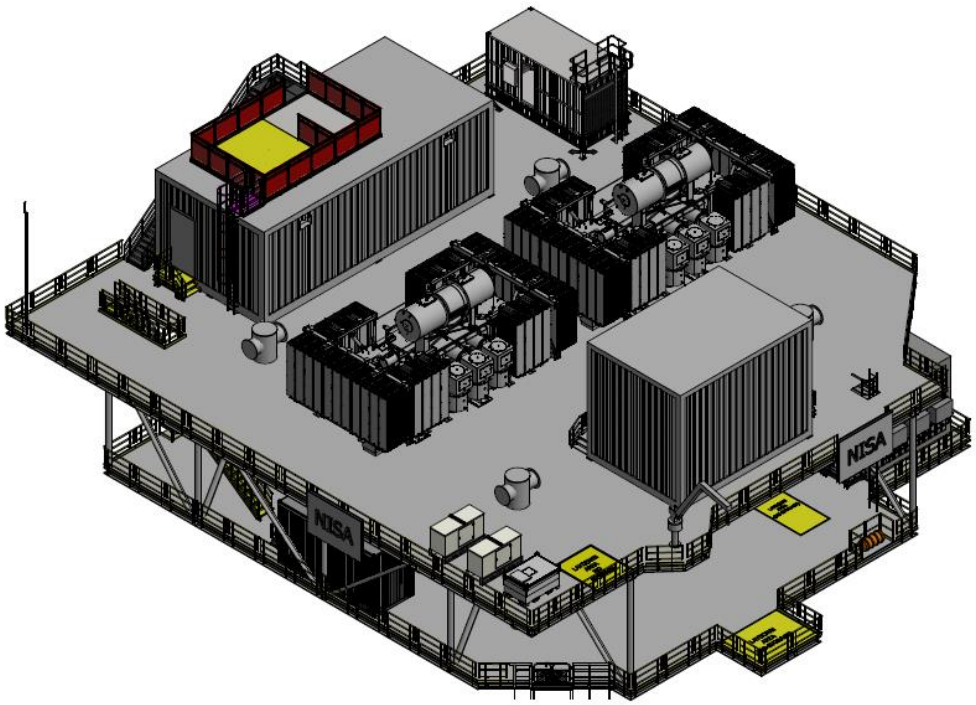


Figure 4.6: Typical topside of an OSP

4.3.4 Offshore Electrical Infrastructure

4.3.4.1 Subsea Inter-Array and Export Cables

The export cable will be up to 230kV AC and the inter array cable will be 66kV AC or higher. The inter array cables will connect the turbines together into groups/strings within the array. The strings will be connected to the offshore substation platform or to the onshore substation. In total the offshore cables are anticipated to have length of up to 175 km.

Export and array cables are likely to be installed using a combination of techniques including jetting, ploughing, trenching and cable injector.

Standard trenching tools will be used where possible to bury/protect the cables. However, in areas of more challenging strata there is potential of employing alternative cable protection measures such as rock placement, bags, mattresses to achieve adequate cable protection.

4.3.5 Design Parameters

Design parameters (design envelope) for the offshore wind farm infrastructure are provided below in **Table 4.4**.

Table 4.4: Design Parameters for Offshore Wind Farm Infrastructure

Design Parameter	Indicative Parameters
Capacity	~500MW
Estimated initial operational life	At least 35 years

Design Parameter	Indicative Parameters
Number of WTGs	Up to 36
Approximate NISA array site area	226.9km^2
Distance of array from shore (closest distance)	12.5km
Water depths for turbines	30-63m
Subsea export cable corridor length from site boundary	Approximately 15km
Export Cable voltage	Up to 230kV (operating voltage)
Maximum number of export cables	6
WTG capacity	Up to 25MW
WTG rotor diameter range	220m – 290m
WTG tip height range	245m – 320m
Minimum rotor clearance above Highest Astronomical Tide (HAT)	22m
Indicate separation distances between WTGs	1.1km
Number of OSPs	1(if required)

4.4 Onshore Electrical Infrastructure

As outlined in **Section 1.1.2**, the onshore electrical infrastructure will comprise:

- Export cable landfall site
- Cable Transition Joint Pit
- Onshore substation (if required)
- Approximately 30-40km of onshore underground electrical cables
- Onshore 220kV GIS substation located adjacent to the Belcamp Substation at Swords, Co. Dublin
- Connection to the Belcamp substation from the proposed 220kV GIS Substation
- Supporting infrastructure and ancillary works

These components are described in more detail below.

4.4.1 Landfall

Cable landfall is where offshore export cables are brought onshore to connect to the onshore electrical infrastructure. The exact landfall location(s) has not been confirmed however, there are currently three locations under consideration as detailed in **Figure 4.2**.

Subject to further feasibility work, that the location of the landfall of subsea export cable will be confirmed at one or multiple locations.

Landfall construction methods are anticipated to include options of Horizontal Directional Drilling (HDD)or Open Cut Trenching (OCT).

4.4.2 Cable Transition Joint Pit

A cable transition joint pit will be required at the transition between the offshore export cable and the onshore export cable near the cable landfall site.
The joint pit is typically an underground concrete chamber, which, after cable installation, will be covered by soil/sand or similar and the original surface will be reinstated, with marker posts being the only permanent above ground infrastructure.

4.4.3 Onshore Substation

An onshore substation may be required close to the landfall location. The inter array cables from the turbines are connected to the onshore substation and the voltage is transformed up to 230kV. The substation will comprise a Gas Insulated Switchgear (GIS) substation building and outdoor transformers.

The onshore substation will have a footprint of approximately 75m x 50 m. The GIS/control building will have a height of approximately 11 m.

A typical onshore substation is shown in **Figure 4.7** below.

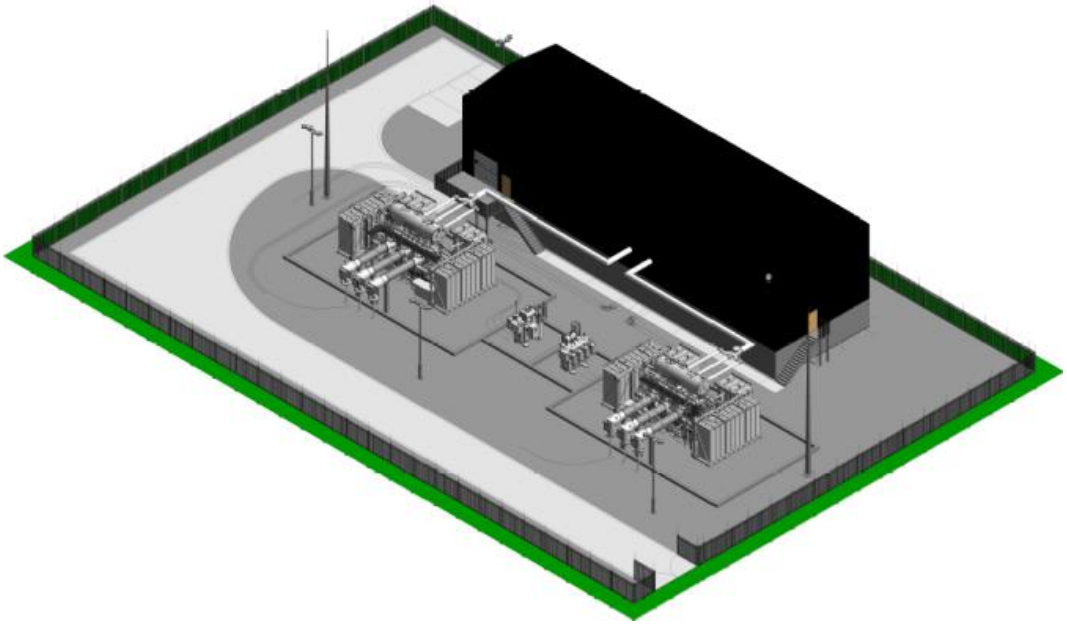


Figure 4.7: Typical onshore substation close to the landfall location

4.4.4 Onshore Cable Circuits

A Cable Route Corridor of approximately 30-40km in length is required to connect the substation site to the landfall site(s). The onshore cable circuits are anticipated to comprise of buried High Voltage Alternating Current (HVAC) power cables.

The onshore cable corridor route has not yet been confirmed. As there are three potential landfall locations, an indicative cable corridor zone for the onshore cable corridor routes has been identified for each landfall location. The onshore cable corridor will connect to the Belcamp Substation at Swords, Co. Dublin.

Potential landfalls and associated onshore cable corridor zones to the Belcamp substation are shown in **Figure 4.2**.

4.4.5 220kV Substation

The proposed substation, adjacent Belcamp substation, will comprise various electrical installations, structures and buildings. Reactive power compensation equipment and harmonic filter will be included in the 220kV GIS substation.

The 220kV GIS substation will have footprint of approximately 170m x 75 m. The GIS/control building will have a height of approximately 13m. **Figure 4.8** shows a typical 220kV GIS substation.

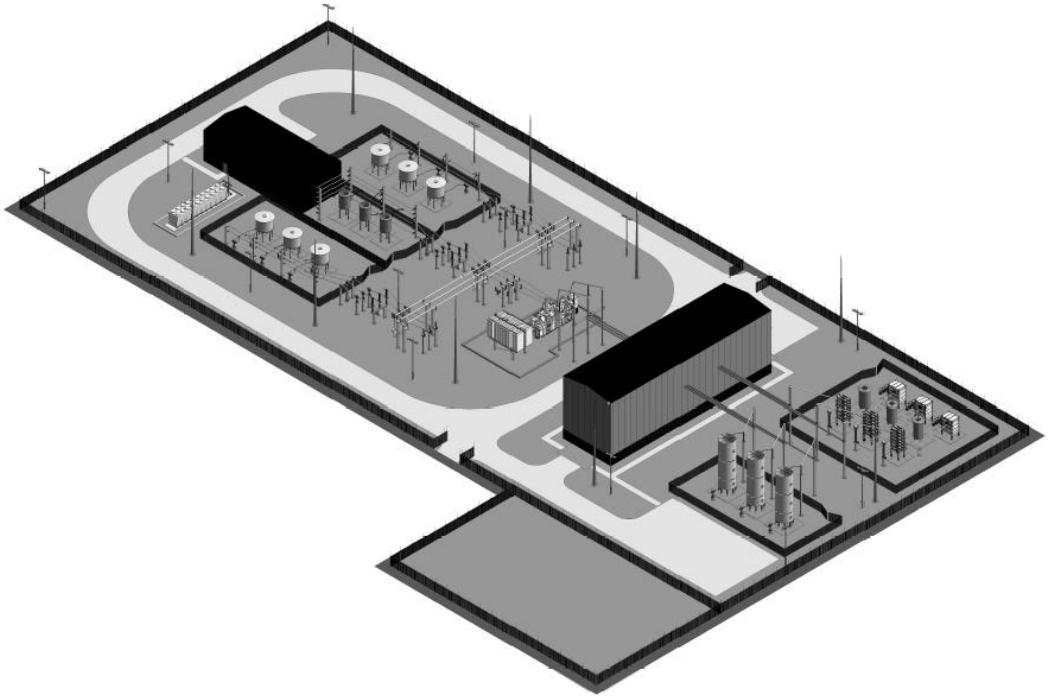


Figure 4.8: Typical 220kV GIS substation

4.4.6 Connection to the National Electricity Transmission Network

The method of connection to EirGrid's Belcamp substation will be via a new 220 kV Gas Insulated Switchgear ("GIS") single bay station tailed into EirGrid's Belcamp Phase 2 220/110 kV Station via underground cable ("UGC") and will require the provision and installation of the following:

- New 220 kV GIS single bay station
- 220 kV Underground Cable Section
- Cable Termination End.

4.5 Other Associated Developments

4.5.1 Operation and Maintenance Base

An operation and maintenance base (OMB) will be required to service the NISA offshore wind farm throughout the operational phase of the project. This facility will be located at a suitable location in the vicinity of the project (generally at a port facility) and will comprise an operation and maintenance building and associated storage facilities as well as a number of berths, for the vessels needed required to access the wind farm. A number of locations are currently being assessed in terms of their suitability for this facility.

4.5.2 EirGrid Grid Upgrade Works

It is proposed to connect the energy generated by the offshore wind farm, to the National Electricity Transmission Network (NETN), at Belcamp Substation. To accommodate this connection, EirGrid may require downstream upgrades to the NETN. Discussions are ongoing with EirGrid to determine what, if any, such upgrades are required.

4.6 Description of Construction Works

4.6.1 Overview

The following section describes the current assumptions on construction aspects of relevance for scoping the EIAR. Construction phasing and methodologies are currently being developed and these will be described in the EIAR. Current anticipated construction methodologies are included in the description of the development above.

A Construction Environmental Management Plan (CEMP) will be prepared and will accompany the consent application. The CEMP will set out the principles and control procedures to manage any likely significant effects on the environment from the construction phase.

4.6.2 Indicative Construction Programme

The construction period for the project is anticipated to last approximately 2 years. It is expected that construction would begin in late 2024, however the final start date will be dependent on securing all necessary consents, licences and approvals for the project and achieving a successful outcome in the forthcoming Renewable Energy Support Scheme (RESS) auction.

4.6.3 Indicative Construction Sequencing

Onshore and offshore infrastructure may be constructed in parallel, or construction activities may be undertaken in a phased, sequential approach. Onshore construction activities will include the connection of the offshore export cable to the onshore electrical cable infrastructure at landfall and construction of supporting infrastructure and ancillary works including the 220kV GIS substation located adjacent to the Belcamp Substation.

Offshore construction is anticipated to be undertaken following the indicative sequence below, although it should be noted that some activities may be undertaken simultaneously and this sequencing may be subject to change as the project design is refined.

- Pre-construction surveys;
- Seabed preparation;
- Foundation installation and scour protection installation;
- Offshore substation installation (if required);
- Offshore export cable installation and cable protection installation;
- Inter-array cable installation and cable protection installation; and
- Wind turbine installation.

4.7 Operation and Maintenance

The operation lifespan of the project is anticipated to be up to 35 years. During this period numerous operational and maintenance activities will be required including:

- Repair and/or replacement of WTG components
- Foundation inspections
- Inter-array and export cable inspection
- Inter-array and export cable repair, replacement or reburial
- Additional scheduled and unscheduled maintenance activities.

4.8 Decommissioning

Once the project has reached the end of its operational life it is anticipated that NISA will be decommissioned or repowered. At present decommissioning measures cannot be confirmed however these will reflect the relevant legislation and guidance available at the time of decommissioning and will be appropriately assessed as part of the EIAR.

5 Offshore EIA Topics - Scoping

5.1 Introduction

5.1.1 Overview

The offshore environmental impact assessment will be presented within Volume 3 of the EIAR and will be technically presented in line with industry standards, EIA guidance and best practice. The offshore environment comprises the intertidal and marine area extending from High Water Mean tide (HWM) outwards to the territorial limits. It encompasses all marine regions including benthic, demersal, mid-water and pelagic zones as well as the connecting and inter-related marine processes (biological, physical and human).

To inform this scoping exercise, a desk-based review of the existing conditions for each offshore environmental technical area has been undertaken, along with a literature search and appraisal of any existing datasets of relevance where these are publicly available. A description of the current understanding of the baseline conditions ('receiving environment') is presented, which is then used to identify the potential effects arising as result of the proposed development. Following this, the proposed approach to the EIA is presented, including any further site-specific studies or surveys that are planned as part of the EIA process. This includes reference to the potential cumulative and transboundary effects that may also occur when the proposed development is considered in combination with other Irish Sea projects.

5.1.2 Cumulative Effects Assessment

The approach to assessment of potential cumulative effects for the project has been outlined in **Section 2.8** of this Scoping Report. The cumulative effects assessment (CEA) will adhere to existing regulations and guidance, which requires significant environmental effects of a development to be considered cumulatively and in-combination with resultant effects of other existing or consented projects.

For offshore CEA specifically, a variety of projects may have the potential to result in cumulative effects on relevant receptors and these are outlined in subsequent sections of this chapter.

5.1.2.1 Offshore wind farms

There are currently several proposed wind farm projects being pursued within the Irish Sea, including projects in Ireland designated as "Relevant Projects" and potential developments in UK territorial waters. While the EIA Regulations state that only projects that are existing or have already received consent need to be considered in the CEA, projects not consented but acknowledged within the planning system at this time may potentially be constructed along similar timelines and in parallel with one another and/or subsequently become fully operational in a similar timeframe.

Taking into consideration other offshore wind projects that are currently being pursued in the region, there is potential for both construction and operational cumulative effects to occur in relation to this proposed development.

5.1.2.2 Marine activities and developments

There is the potential for other activities occurring in the region surrounding the NISA project to create cumulative impacts; these include existing cables and pipelines, Dumping at Sea licences, commercial fisheries, defence activities and wastewater disposal (as described in Infrastructure and Other Users Section 5.13). Whilst it is not considered likely that there would be significant cumulative impacts, all potential impacts (i.e. those listed for NISA in isolation) will be assessed within the EIAR.

Particularly relevant to marine mammals, fish and bird species sensitive to disturbance, potential sources of underwater noise in addition to noise arising from offshore wind farm construction, may include commercial and construction vessels, seismic surveys, other offshore construction developments, military sonar exercises.

5.1.2.3 Coastal developments and projects

Coastal projects that could overlap with works associated with the NISA ECC and landfall will be identified and included in the CEA. Such projects may include coastal protection works and ports developments. Whilst the programme details are currently unknown at this stage, the list of projects to be considered in the EIAR will be refined during the EIA process. The relevant authorities will be consulted to ensure this list is comprehensive and all associated programme and methodology information current at the time of assessment.

In addition to the cumulative impacts, the EIAR will also consider the possibility of transboundary impacts affecting receptors of another State, as described in **Section 2.9**.

5.2 Marine Geology, Oceanography and Physical Processes

5.2.1 Introduction

This section of the Scoping Report provides an explanation of current understanding on the existing marine geology, oceanography and physical processes conditions (hereafter referred to as Physical Processes) and the approach to be adopted for the EIAR.

5.2.2 Policy and Guidance

The approach to undertaking a Physical Processes assessment of the proposed development will be informed by a number of guidance documents listed in **Section 2.6.3** of this Scoping Report, as well as the following guidance of specific relevance to physical processes:

- Assessment of impact of Offshore Wind Energy structures on the marine environment (Marine Institute, 2000);
- Guidance on best practice for marine and coastal physical processes baseline survey and monitoring requirements to inform EIA of major development projects (Brooks et al., 2018).
- Potential effects of offshore wind developments on coastal processes. (ABPmer and METOC, 2002).
- Environmental impact assessment for offshore renewable energy projects. (BSI, 2015).
- Guidelines for data acquisition to support marine environmental assessment of offshore renewable energy projects (Cefas, 2011).
- Coastal process modelling for Offshore Wind Farm Environmental Impact Assessment: Best practice guide (COWRIE, 2009).
- Further review of sediment monitoring data. (COWRIE ScourSed-09).' (ABPmer, HR Wallingford and Cefas, 2010).
- Review of cabling techniques and environmental effects applicable to the Offshore Wind Farm industry technical report (BERR, 2008).
- International Cable Protection Committee Ltd Recommendations, (https://www.iscpc.org/publications/recommendations).

5.2.3 Data Sources and Baseline Methodology

The study area has been defined as regional (far-field) and project specific (near-field). This will be further refined during EIA with consideration to the tidal excursions and specifically sediment plume pathways to allow a definition of the Zone of Influence (ZoI).The understanding of the receiving environment (pre-development) baseline for this study area has been developed using a wide range of publicly available data sources. The project intends to supplement this through a series of project specific survey campaigns. Information pertaining to both these are presented in **Table 5.1**.

Table 5.1: Data sources used to inform the receiving environment baseline.

Source	Summary	Location
Metocean Data (waves and tides)		
Marine Institute	M2 offshore wave buoy. Observations of wave height, period and direction (May 2001 to present). Also available: sea & air temperature, wind direction & speed (available online http://www.marine.ie/).	Located 27 km to the east of the array's SE corner (Lat:53.4836 Long:-5.4302)
Marine Institute	Skerries Harbour tide gauge. Observations of water levels (October 2006 to present) (available online https://www.digitalocean.ie/).	Located 2.6 km to the east of landfall option 2. (Lat:53.585 Long:-6.1081)
	Howth Harbour tide gauge. Observations of water levels (November 2020 to present) (available online https://www.digitalocean.ie/).	Located 17.3 km to the south of landfall option 3. (Lat:53.39134 Long:-6.06809)

Source	Summary	Location
Cefas	AFBI 038A Waverider. Observations of wave height, period and direction (May 2020 to present). Also available: sea temperature (available online http://www.wavenet.cefas.co.uk//).	Located 8.7 km to the east of the array's NE corner (53°47'.03N, 005°38'.20W)
Marine Institute	Ireland's Marine Atlas (available online http://atlas.marine.ie)	Regional and project coverage.
Office of Public Works	Coastal flooding, erosion lines and extreme water levels. (available online https://www.floodinfo.ie/map/coastal_map/).	Regional and landfall coverage.
Geology, Morphology and Sedimentology Data		
INFOMAR	Bathymetric (water depths) (available online https://www.infomar.ie/).	Regional and project coverage.
	Sedimentology (FOLK and EMODnet sediment classification; vibrocore and sediment samples (available online https://www.infomar.ie/).	
Environmental Protection Agency (EPA)	Coastal bedrock and gravel aquifer location (available online https://www.epa.ie/).	Landfall coverage.
Office of Public Works	Irish Coastal Protection Strategy Study Phase 3 – North East Coast	Landfall coverage.
Geophysical survey of NISA (*)	Project specific surveys; ECC survey planned for 2021	Coverage of the array and ECC

(*) data sources specifically undertaken for the proposed development.

Through collation of available data sources and literature (Table 5.1), it has been possible to gain a high level understanding, for the purposes of this scoping study, of the baseline physical processes which control the features, pathways and receptors within the study area. Regional context is provided where appropriate and dependent upon the scale of the processes discussed.

This understanding will be further developed and study areas defined following completion of project specific surveys, which will inform the detailed receiving environment baseline for the EIAR. Relevant geophysical and geotechnical surveys that are currently proposed (Foreshore License FS007031) include:

Geophysical

- Multibeam echo sounder – to collect topographical data of the seabed;
- Side scan sonar – to develop seafloor imaging;
- Magnetometer – to identify any magnetic anomalies and map hazards (such as metal obstructions, ship wrecks, unexploded ordnance) on seabed surface and below;
- Sub-bottom profiling – to develop an image of the subsurface and profile different substrata;

- Ultra-high resolution seismic survey – to identify and characterise deeper sediment and bedrock layers.

Geotechnical

- Boreholes – to sample and test soil and rock material up to 70m depth below the seafloor (BSF);
- Cone Penetration Tests (CTPs) – allows testing the strength parameters of soils normally down to 25-40m BSF;
- Vibrocore and grab samples – for shallow depth sediment sampling.

Metocean

- Floating LiDAR – to obtain site-specific wind resource measurements;
- Acoustic Doppler Current Profiler (ADCP) – to collect wave and current data.

5.2.4 Receiving Environment

The following sections provides a high-level summary of the baseline physical processes in accordance with the guidance provided within DCAEE (2017) guidance. A detailed description will be presented within subsequent EIAR chapters, supported by a baseline technical report.

5.2.4.1 Marine Geology

The information presented in this section provides an overview of the marine geology characteristics within the development area and the wider regional area. Inherent in this section are the topics of geomorphology and superficial sedimentology. Consideration is afforded to the offshore and coastal regions.

The current seabed landscape is dominated by glacial advance and retreat resulting in the deposition of glacial and post-glacial sediments on top of largely Palaeozoic sedimentary bedrock. As shown in

Figure 5.1, the superficial seabed sediments within the array are classified as mud to sandy mud, with the seaward extent of the development area coinciding with a deep-water mud basin (Golding et al., 2004). Areas of sand, coarse sediments and rock patches present with increasing distance to shore[2].

Water depths within the array are of the order of 30 to 63 mLAT, with depths reducing towards shore (**Figure 5.2**). Available bathymetric information from INFORMAR[3] suggests a relatively uniform seabed, absent of larger scale features and with gentle gradients (<0.5 deg). Isolated seabed areas of higher gradients (circa 1 to 5 deg) are associated with the headlands and rock outcrops at Skerries and Braymore Point.

The eastern coast of Ireland (including Co. Dublin, Meath and Louth) is susceptible to coastal erosion, owing to the presence of unconsolidated sediments along the coastline. There is a high presence of coastal protection works along the coastline, predominately coincidental with higher urbanised areas.

[2] INFOMAR, 2021. https://www.infomar.ie/maps/interactive-maps/seabed-and-sediment
[3] INFOMAR, 2021. https://www.infomar.ie/maps/interactive-maps/dynamic-web-mapping

Available literature suggests that, in those locations where an erosion hazard exists, the mean annualised rate is less than 0.1 m (RPS, 2010).

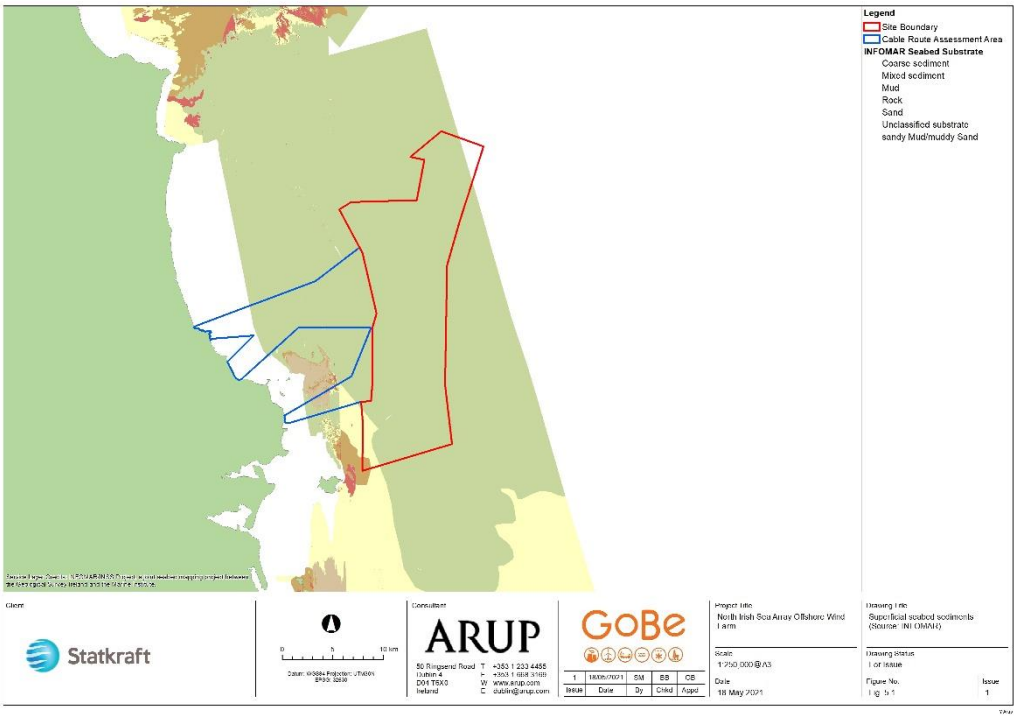


Figure 5.1: Superficial seabed sediments (Source: INFORMAR).

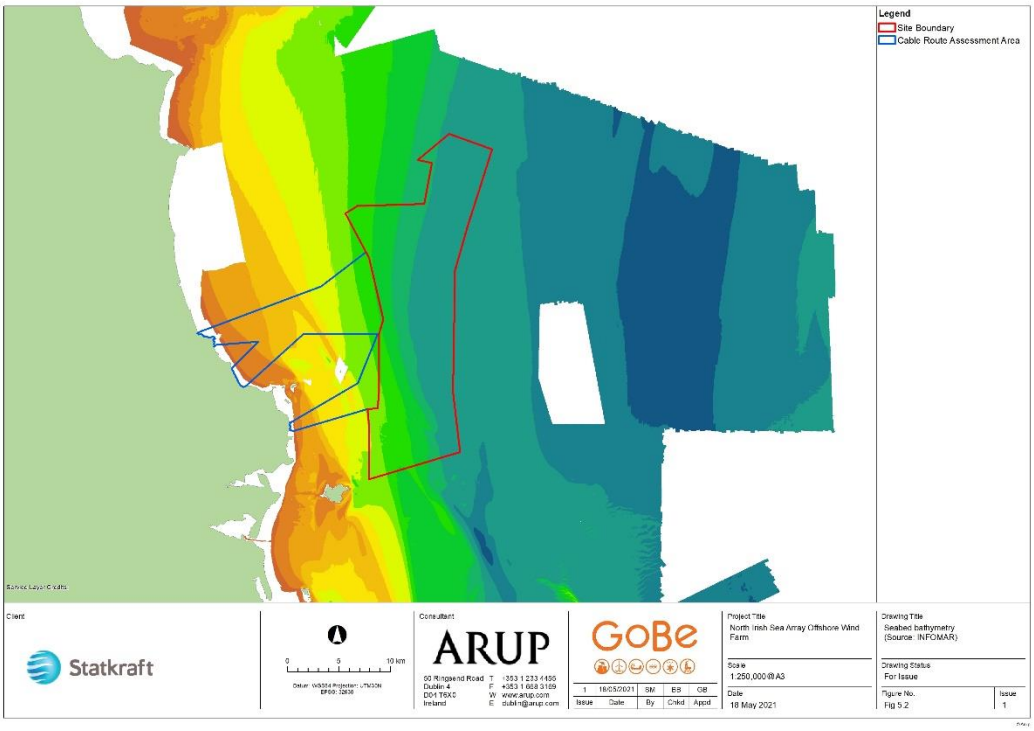


Figure 5.2: Seabed bathymetry (Source: INFORMAR).

5.2.4.2 Oceanography

The information presented in this section provides an overview of the oceanographic, or metocean, characteristics within the development area and the wider regional area. Inherent in this section are the topics of tides, waves and winds. Consideration is afforded to the offshore and coastal regions.

Tidal Regime

The tidal regime within the Irish Sea is determined by the propagation of the tidal wave from the Atlantic Ocean via the North Channel and St. George's Channel. Characterised as a standing wave, the tidal signature is also a function of the degenerate amphidromic point located at Courtown.

The tides in the Irish Sea are semi-diurnal. The tidal range varies in the Irish Sea with areas of very large tidal ranges (such as in Liverpool Bay, UK) and areas of very small tidal range near the amphidromic point) (Howarth, 2005). The mean spring tidal range is typically between 4 and 5 m near the Irish:UK median line, decreasing towards the shoreline to, approximately, 2 m. The proposed development is located in an area of relatively benign tidal currents, circa.0.25 m/s; spring tides (Howarth, 2005[5]). This is supported by the reported presence of fine sediments, including the deep-water mud basin (**Section 5.2.4.1**.

Wave Regime

Waves within the Irish Sea are typically fetch-limited and as such typically wind-generated – winds are considered to be responsible for over 60% of the wave climate within the Irish Sea (Gallagher et al, 2014). The influence of swell waves is greater during the winter months in the southern Irish Sea (RPS, 2013). Further, the North Atlantic Oscillation (NAO) has been shown to exhibit a strong influence on the Irish Sea wave climate during winter (Gallagher et al., 2014).

As shown in **Figure 5.3**, significant wave heights within the NISA development area and the wider region are typically between 0.25 and 1m (summer and winter average values, respectively) (Met Éireann, 2021[4]). The waves experienced within the array area and along the Irish Sea coastline predominately originate from the south, as presented in **Figure 5.4** (Gallagher et al, 2014).

Analysis of data from the M2 wave buoy (**Table5.1**) has shown that maximum wave heights (greater than 10 m) occur in response to a steady wind from the south (and with an associated speed in excess of 30 m/s). Lower wave heights occur as a result of winds originating from the west and in response to the sheltering effects enforced by the Irish landmass (Elliott and Neill, 2007).

[4] Met Éireann, 2021. https://www.met.ie

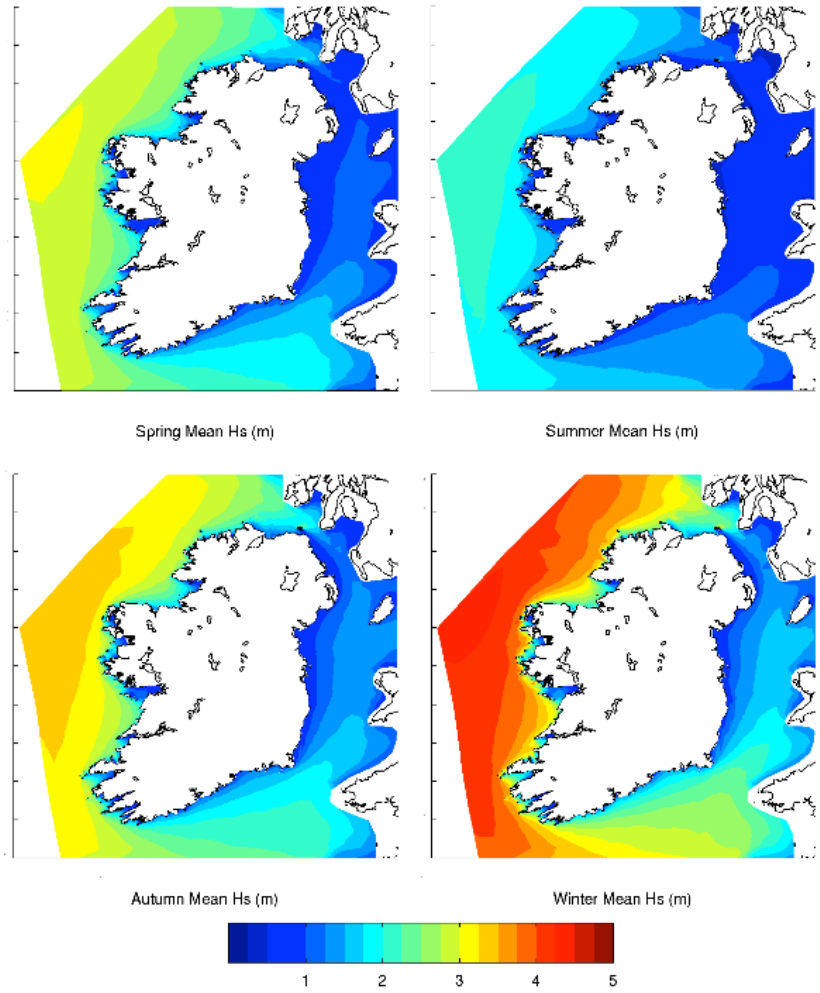


Figure 5.3: Average significant wave height (Hs) around the coast of Ireland (Source: Met Éireann).

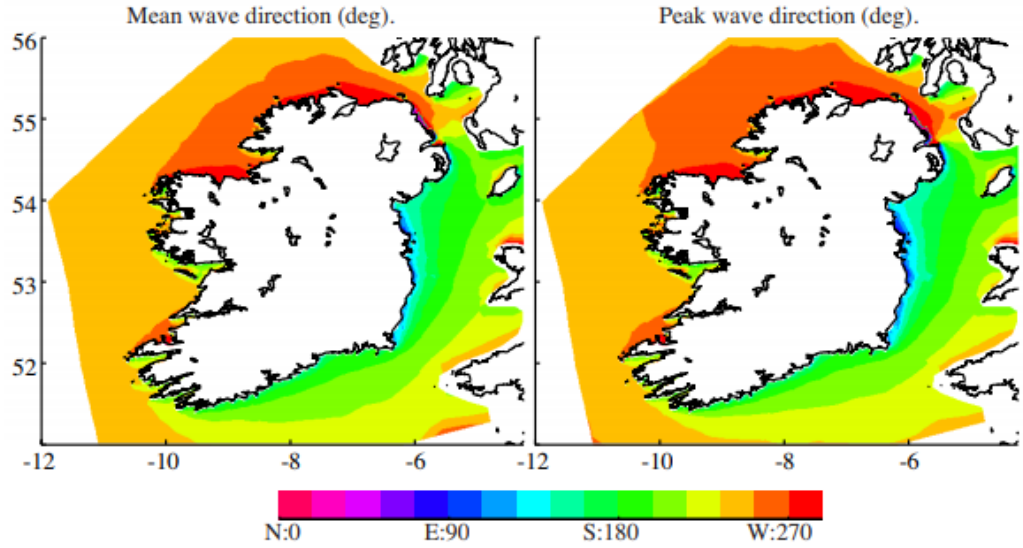


Figure 5.4: Wave direction around the coast of Ireland (Source: Gallagher et al., 2014).

5.2.4.3 Physical Processes

The interaction of the aspects presented in **Sections 5.2.4.1 and 5.2.4.2** result in the physical processes within the development area, along the coast and wider regional area.

The marine geology and oceanography regimes are intrinsically linked, through physical processes, to produce a morphodynamic response. In the offshore region of the proposed development, the array area, water depths are such the wave regime will have a limited influence on the seabed. Combined with the relatively benign tidal regime, finer sediments will characterise the superficial seabed sediments. The limited hydrodynamic controls can also be observed through suspended material levels, which are relatively low in the offshore extents of the proposed development. As shown in **Figure 5.5**, the annual average surface Suspended Particulate Matter (SPM) across the array area is of the order of approximately 5 mg/l, increasing to 18 mg/l at discrete locations along the coast (Cefas, 2016).

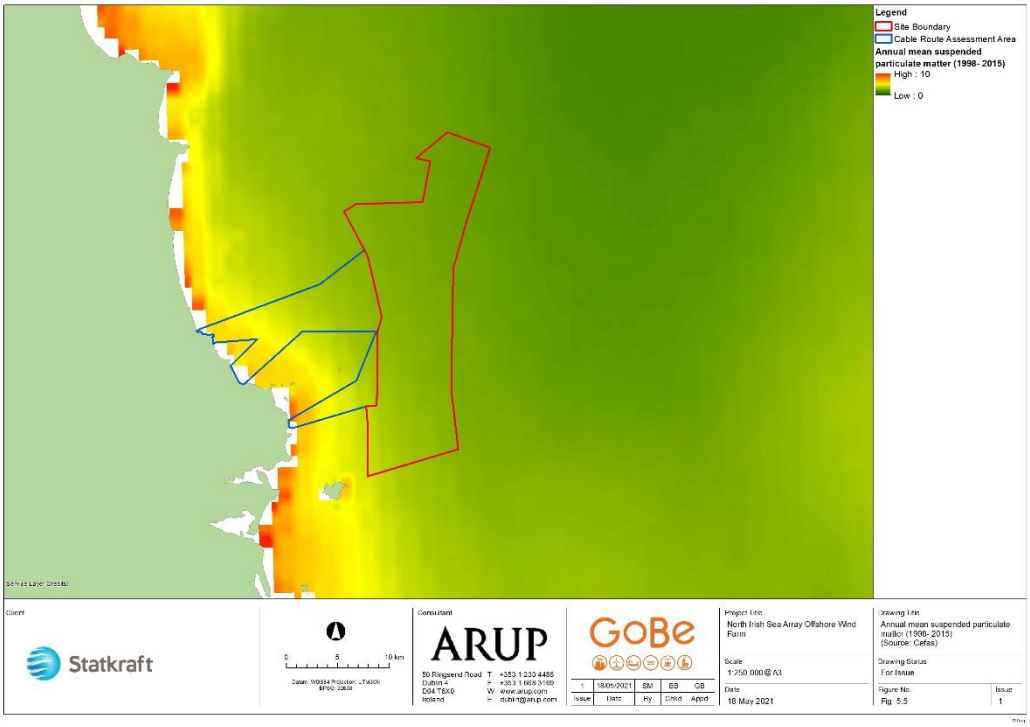


Figure 5.5: Annual mean suspended particulate matter (1998- 2015) (Source: Cefas).

Within the shallower water depths, along the export cable corridor (ECC) assessment area and at landfall, the wave regime will have a stronger influence upon the seabed and coastal behaviour. The coastal region, characterised by erosion-resistant headlands and rocky outcrops alongside sandy beaches, is managed by a coastal protection strategy.

5.2.5 Potential Impacts

Impacts which are to be considered throughout the project development are presented in **Table 5.2**. The cells shaded in grey indicate that there is no source-receptor-pathway for that phase of the development.

Whilst marine physical processes can largely be considered as 'pathways' for indirect effects on other receptors, a small number of features have been identified as potentially sensitive physical processes *receptors*.

Table 5.2: Potential impacts proposed to be scoped into the Physical Processes assessment arising from the proposed development.

Potential Impact	Project Phase		
	Construction	O&M	Decommissioning
Increases in suspended sediment concentrations and underlying seabed levels. Temporary increases may occur as a result of construction (i.e seabed levelling) and operation and maintenance (i.e. cable maintenance) activities. This in turn may result in variations in the underlying bed levels and changes to the seabed sediment type.	✓	✓	✓
Modifications to the wave and tidal regime. The interaction between the naturally present metocean regime (waves and currents) and the presence of the wind farm infrastructure may result in patterns of localised change in current speed, wave energy and turbulence.		✓	
Seabed scouring. The wind farm infrastructure has the potential to cause localised seabed scouring, resulting in bathymetric changes and localised alterations to sediment transport patterns. The extent and depth of scour may vary over time and will be assessed within the context of the characterised receiving environment.		✓	
Modifications to shoreline sediment transport coastal features, coastal erosion, landfall. The export cable installation at landfall may, for the duration of the activity, result in temporary changes to suspended sediments and coastal morphology, for example works associated with Horizontal Directional Drilling (HDD) or Open Cut Trenching (OCT).. Changes to coastal behaviour (erosion/ accretion, including sediment transport) may occur due to changes in the metocean regime, due to the presence of wind farm infrastructure.	✓	✓	✓
Modifications to the sediment transport regime. The wind farm infrastructure may result in changes to the metocean regime, which in turn may cause modifications to the rates and patterns of sediment transport both within offshore and along the shoreline.		✓	

5.2.6 Potential Mitigation Measures

Mitigation measures will be considered throughout the design process of the proposed development. These measures will be included with the objective to reduce the potential for impacts upon physical process pathways and receptors. The measures will evolve throughout the development process as the EIA progresses and in response to consultation. The developer is committed to the implementation of these measures and also various standard sectoral practices and procedures.

These measures are therefore considered an integrated part of the NISA design and have therefore been considered with respect to those impacts which can be scoped in or out.

Measures adopted as part of the project may include:

- Route selection and micro-sitting to avoid significant impacts to coastal and seabed features;
- Cable burial risk assessment to inform front-end engineering works;
- Development of, and adherence to, a Code of Construction Practice (CoCP);
- Development of, and adherence to, an appropriate Construction Environmental Monitoring Programme (CEMP), which will include a Marine Pollution Contingency Plan (MPCP); and
- Development of and adherence to, a Decommissioning Plan.

The requirement and feasibility of any mitigation measures will be dependent on the significance of the effects upon physical processes and will be consulted upon with statutory consultees throughout the EIA process.

5.2.7 Proposed Approach to EIA

The scenarios upon which the physical process assessments will be based will be defined in accordance with the design envelope approach (**Section 2.5**). Key considerations in defining the ‘worst case scenario’ for the physical process assessments include the installation methodologies, development programmes, project structures and geographic footprint. Once defined, and alongside the definition of the baseline environment, the likely significant effects on physical process pathways and receptors will be described and assessed. The physical process assessment will consider the magnitude and duration of the impact, the reversibility of the impact and the timing and frequency of the activity.

The outputs from these assessments will be used to inform other EIA topic assessments, for example benthic and intertidal ecology. The significance of any changes will be evaluated against the likely naturally occurring variability in, or long-term changes to, the physical environment within the project lifetime due to natural cycles, for example storm events, and/ or climate change.

5.3 Marine Water and Sediment Quality

5.3.1 Introduction

This section of the Scoping Report provides an explanation of current understanding on the existing marine water and sediment quality conditions (hereafter referred to as MW&SQ) and the approach to be adopted for the EIAR.

5.3.2 Policy and Guidance

The key EU Directives and Irish legislation of relevance which will be considered in the EIA with respect to MW&SQ are:

- Directive 2000/60/EC of the European Parliament and the Council of 23 October 2000 establishing a framework for Community action in the field of water policy, known as the Water Framework Directive (WFD):
    - The WFD was transposed into Irish law by means of a number of statutory instruments. The European Communities (Environmental Liability) Regulations 2008 (S.I. 547 of 2008) came into force in Ireland in April 2009.
- Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive (MSFD)):
    - The MSFD was transposed into Irish law by means of The European Communities (Marine Strategy Framework) Regulations 2011 (SI 249 of 2011) and subsequently amended by the European Communities (Marine Strategy Framework) Regulations 2017 (SI 265 of 2017) (hereafter referred to as the MSFD Regulations).
- Directive 2006/7/EC of the European Parliament and of the Council of 15 February 2006 concerning the management of bathing water quality and repealing Directive 76/160/EEC (known as the revised Bathing Waters Directive (rBWD):
    - The rBWD was transposed into Irish law by means of the Bathing Water Quality Regulations 2008 (SI 79 of 2008) (hereafter referred to as the Bathing Water Regulations (BWR)).
- Directive 2006/113/EC of the European Parliament and of the Council of 12 December 2006 on the quality of required of shellfish waters;
    - The Shellfish Water Directive was transposed into Irish law by means of the European Communities (Quality of Shellfish Waters) Regulations 2006 (SI 268 of 2006) (hereafter referred to as the Shellfish Water Regulations). The Shellfish Regulations were subsequently amended by the European Communities (Quality of Shellfish Waters) (Amendment) Regulation 2009 (SI 55 of 2009) and the European Communities (Quality of Shellfish Waters) (Amendment)(No.2) Regulation 2009 (SI 464 of 2009).
- Directive 91/271/EC of the European Parliament and of the Council of 21 May 1991 concerning urban waste-water treatment;

- The Urban Waste-Water Treatment Directive (UWWTD) was transposed into Irish law through the Urban Waste Water Treatment Regulations, 2001 (SI 254 of 2001), which lists nutrient sensitive waters as an update to the Environmental Protection Agency Act, 1992 ((Urban Waste Water Treatment) Regulations, 1994 as amended in 1999).

The approach adopted for the MW&SQ assessment of the proposed development will be informed by a number of guidance documents listed in **Section 2.6.3** of this Scoping Report, as well as the following guidance of specific relevance to MW&SQ:

- Assessment of the environmental impacts of cables (The Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR, 2009);
- Water Framework Directive assessment: estuarine and coastal waters [guidance] (Environment Agency, 2017);
- Guidelines for the assessment of dredge material for disposal in Irish waters (Marine Institute, 2006)
- Irish Coastal Protection Strategy Study (OPW, 2013); and
- Review of cabling techniques and environmental effects applicable to the Offshore Wind Farm industry technical report (BERR, 2008).

5.3.3 Data Sources and Baseline Methodology

The understanding of the receiving environment (pre-development) baseline has been developed using a range of publicly available data sources. A more detailed baseline characterisation of the environment will be provided within the NISA EIAR. The project intends to supplement publicly available data and published literature with a project specific survey campaign. The data sources considered for this initial review of baseline environment characterisation are presented in **Table 5.3**.

Table 5.3: Data sources to inform the MW&SQ EIAR

Source	Summary	Location
Chemical Parameters		
Marine Institute	The Marine Institute have a series of buoys which collect physio-chemical data including salinity, temperature and dissolved oxygen. Buoys within the study area have been identified and analysed to support the scoping.	Regional and project coverage.
Marine Institute	Initial characterisation of the marine environment for MSFD, 2012	National report
Sediment Type		
Marine Institute	The INFOMAR programme covered most of the site and included multibeam bathymetry, backscatter and seabed sampling data.	Regional and project coverage.
Ireland's Marine Atlas	This data set is used to identify any sources of pollution and/ or contamination in the marine environment such as waste water outfalls. In	Regional and project coverage.

Source	Summary	Location
	addition, dumping at sea sites within the study area can be identified.	
Centre for Environment, Fisheries and Aquaculture Sciences (Cefas)	Annual average of non-algal Suspended Particulate Matter (SPM) data were available across the study area (Cefas, 2016). These data are based on the satellite derived Ifremer OC5 algorithm (Gohin *et al*, 2011). The daily images of non-algal SPM from 1/1/1998 to 31/12/2015 were averaged into 12 monthly means for the 18 years (216 fields).	Regional and project coverage.
Water Framework Directive		
DHPLG, 2018	River Basin Management Plans (RMBP)	National report
Marine Institute	Contaminated sediment monitoring for WFD	National dataset
EPA	Water Quality Reports 2013 to 2018 Report	National report
EPA	Water Quality in 2019 - an indicators report	National report
EPA	Bathing Water Quality Reports 2015 to 2019	National report
EPA	Urban Waste Water Treatment in 2019 Report	National report
Department of Housing, Local Government and Heritage	Ireland: Programme of Measures Summary Report (2016)	National report
Sea-Fisheries Protection Authority	2020/2021 List of Classified Bivalve Mollusc Production Areas in Ireland	National dataset

Through collation of available data sources and published literature (**Table 5.3**), it has been possible to gain an understanding of the baseline MS&WQ parameters which are of importance to the pathways and receptors within the study area for the purposes of scoping. This understanding will be further developed following completion of project specific surveys and the detailed baseline characterisation in following phases of the EIA process.

5.3.4 Receiving Environment

5.3.4.1 Overview

This section provides a high-level summary of the baseline marine water and sediment quality conditions that are currently present within a relevant study area. The study area is defined as the NISA OWF plus a buffer of 20km.

The Irish Sea is characterised by a high degree of spatial and temporal (both annual and inter-annual) variability in suspended sediment concentrations (SSC). The annual average surface Suspended Particulate Matter (SPM) across the array area is of the order of approximately 5 mg/l, increasing to 18 mg/l at discrete locations along the coast (Cefas, 2016). For more details regarding SSC in context with the proposed development, see **Section 5.2**.

The concentrations of dissolved contaminants in seawater samples are often low or below detection limits. A variety of contaminants may be present in seawater, including:

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

Radioactive isotopes are relatively soluble in seawater and are dispersed throughout the eastern Irish Sea. The most significant source of artificial radionuclides in the Irish marine environment is the discharge of low-level radioactive waste from the Sellafield Nuclear Fuel Reprocessing Plant on the northwest coast of England. The EPA concluded that while levels of artificial radioactivity in the Irish environment remain detectable, they are low enough to pose no health risk to the Irish population (EPA, 2017).

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. The superficial seabed sediments within the array are classified as mud to sandy mud, with the seaward extent of the development area coinciding with a deep-water mud basin (Golding et al., 2004). Areas of sand, coarse sediments and rock patches present with increasing distance to shore (INFOMAR, 2021)[5]. Therefore, given the presence of fine particle sizes within the study area, there is the potential risk of disturbing seabed sediments which may have a historical accumulation of contaminants. A full characterisation of the risk of contamination within the seabed sediments in the study area will be provided in the EIAR; including consideration of the Marine Institute WFD monitoring data and project specific data (see **Table 5.3**).

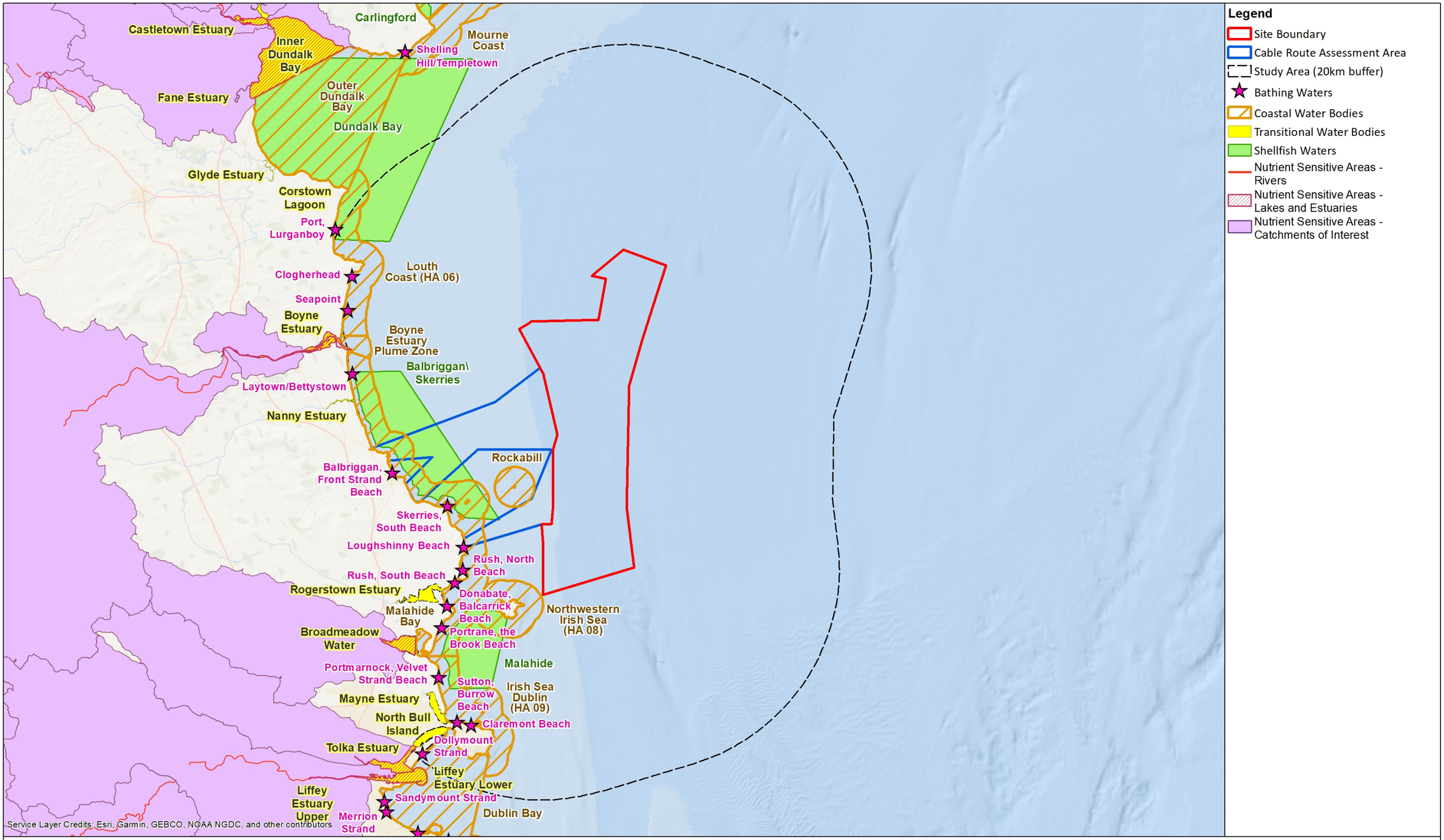
5.3.4.2 Designations

Full characterisation of Irish waters to one nm will be undertaken, in the next stages of the EIA, as required by the WFD and the MSFD. With respect to NISA, 1 nm extends into the Export Cable Corridor Search Area. This stretch of coastline covers multiple coastal and transitional waters (EPA, 2019). Each water body designated by the WFD has an assigned ecological status. The ecological status is assigned by considering the biological, hydromorphological, chemical and specific chemicals. These water bodies and protected areas are designated under the legislation detailed in **Section 5.3.2**. These designated areas are proposed to be assessed as receptors in the EIAR. Within the study area the following designated areas have been identified (**Figure 5.6**).The EIAR will include detailed information on those designated water bodies, of which there are

- Six coastal water bodies and five transition water;
- 15 Bathing Waters;
- Three Shellfish Waters; and

[5] INFOMAR, 2021. https://www.infomar.ie/maps/interactive-maps/seabed-and-sediment

- Four bodies designated under Urban Waste-Water Treatment Directive.



Client

Statkraft

0 5 10 km

Datum: WGS84 Projection: UTM30N
EPSG: 32630

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Issue	Date	By	Chkd	Appd
1	18/05/2021	SM	BB	GB

Project Title
North Irish Sea Array Offshore Wind Farm

Scale
1:350,000@A3

Date
18 May 2021

Drawing Title
Marine Water & Sediment Quality

Drawing Status
For Issue

Figure No.
Fig 5.6

Issue
1

5.3.5 Potential Impacts

The potential impacts of the proposed development will ultimately depend upon the characteristics of the project, including the turbine foundation dimensions and the location of landfall. Impacts which are to be considered throughout the project development are presented in **Table 5.4**.

Table 5.4: Impacts proposed to be scoped into the assessment for MS&WQ arising from the proposed development.

Potential Impact	Project Phase		
	Construction	O&M	Decommissioning
Deterioration in water quality due to re-suspension of sediments Temporary increases may occur as a result of construction (i.e. seabed levelling) and operation and maintenance (i.e. cable maintenance) activities. This in turn may result in a reduction of water clarity and potentially the resuspension of nutrients and contaminants.	✓	✓	✓
Accidental spills The project has the potential to result in accidental spills during all phases. If an accidental spill were to occur, this may lower the water quality in the study area.	✓	✓	✓

5.3.6 Potential Mitigation Measures

Mitigation measures will be considered throughout the design process of the proposed development. These measures will be included with the objective to reduce the potential for impacts upon MS&WQ pathways and receptors. The measures will evolve throughout the development process as the EIA progresses and in response to consultation. The developer is committed to the implementation of these measures and also various standard sectoral practices and procedures. These measures are therefore considered an integrated part of the NISA design and have therefore been considered with respect to those impacts which can be scoped in or out.

Measures adopted as part of the project may include:

- Cable burial risk assessment to inform front-end engineering works;
- Development of, and adherence to, an appropriate Construction Environmental Monitoring Programme (CEMP), which will include a Marine Pollution Contingency Plan (MPCP);
- Development of and adherence to a Scour Management Plan (SMP): and
- Development of and adherence to, a Decommissioning Plan.

The requirement and feasibility of any mitigation measures will be dependent on the significance of the effects upon physical processes and will be consulted upon with a range of consultees throughout the EIA process.

5.3.7 Proposed Approach to EIA

The scenarios upon which the MW&SQ assessments will be based will be defined in accordance with the design envelope approach (**Section 2.5**). Key considerations in defining the 'worst case scenario' for the MW&SQ assessments, for example, the installation methodologies resulting in the greatest volume of seabed sediments disturbed. Once the worst case scenario is defined, and alongside the characterisation of the baseline environment, the likely significant effects on MW&SQ receptors will be described and assessed. The MW&SQ assessment will consider the sensitivity of receptors, the magnitude and duration of the impact, the reversibility of the impact and the timing and frequency of the activity.

The outputs from these assessments will be used to inform other EIA topic assessments, for example benthic and intertidal ecology. The significance of any changes will be evaluated against the potential for deterioration of WFD water bodies and protected areas. An evaluation of the potential impacts on water quality in Natura 2000 sites will be provided in the NIS.

5.4 Benthic and Intertidal Ecology

5.4.1 Introduction

This section focuses on the benthic subtidal and intertidal ecological resources of relevance to the proposed development. It presents an understanding of the current baseline condition of the environment and then describes the potential effects that may arise from the construction, operation and maintenance, and decommissioning of the proposed development with respect to benthic species and habitats up to the HWM tide mark. The proposed scope of the EIAR is then set out along with the proposed methodology for EIA assessment.

5.4.2 Policy and Guidance

The assessments will be designed to comply with guidance that is relevant to the design and acquisition of data standards in terms of data quality and coverage of the baseline surveys set out in **Section 2.6.3**, along with industry guidance on benthic and intertidal ecology methodology (**Section 5.4.3**).

In addition, a number of other guidance documents are available from jurisdictions / countries with established offshore renewable energy sectors where comprehensive guidance has been developed. This guidance will be used to inform the assessment of the potential impacts:

- Guidance on Survey and Monitoring in Relation to Marine Renewables Deployments in Scotland Volume 5: Benthic Habitats (Scottish National Heritage, (SNH), 2011);
- Guidelines for EIA in Britain and Ireland. Marine and Coastal, Final Document (CIEEM, 2018);

- Guidance note for EIA in respect of FEPA and CPA requirements (Cefas, 2004b);
- Guidelines for data acquisition to support marine environmental assessments of offshore renewable energy projects (Cefas, 2011); and
- Guidance on Environmental Considerations for Offshore Wind Farm Development (OSPAR, 2008).

5.4.3 Data Sources and Baseline Methodology

For the purposes of this benthic subtidal and intertidal ecology scoping exercise, the benthic ecology study area encompasses the proposed development footprint as indicated within **Figure 5.7**. The study area also encompasses a wider ZoI which represents the modelled tidal ellipse that describes the maximum distance over which suspended sediments resulting from the proposed development during construction and operation / maintenance may be carried over a single tidal cycle.

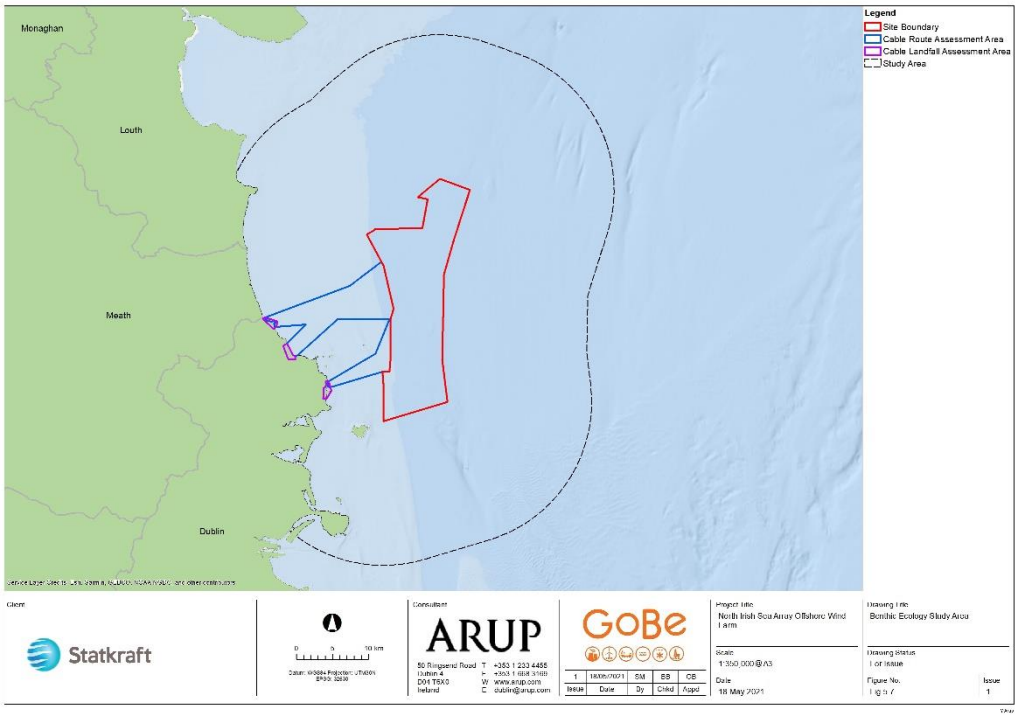


Figure 5.7: NISA OWF benthic ecology study area including the project footprint and ZoI.

A high-level desk based review has been undertaken to collate and analyse any existing, publicly available datasets describing the bethic and intertidal features that may be present within the proposed development and the study area. This has included a review of the following data sources:

- Designated site with qualifying features of a benthic ecology nature;
- Species and habitats of conservation importance protected under the relevant conservation legislation;

- The benthic communities characterising the intertidal and subtidal areas, including priority, rare, protected, invasive or endangered species; and
- Species or habitats sensitive to potential impacts associated with offshore wind development.

Data sources have included:

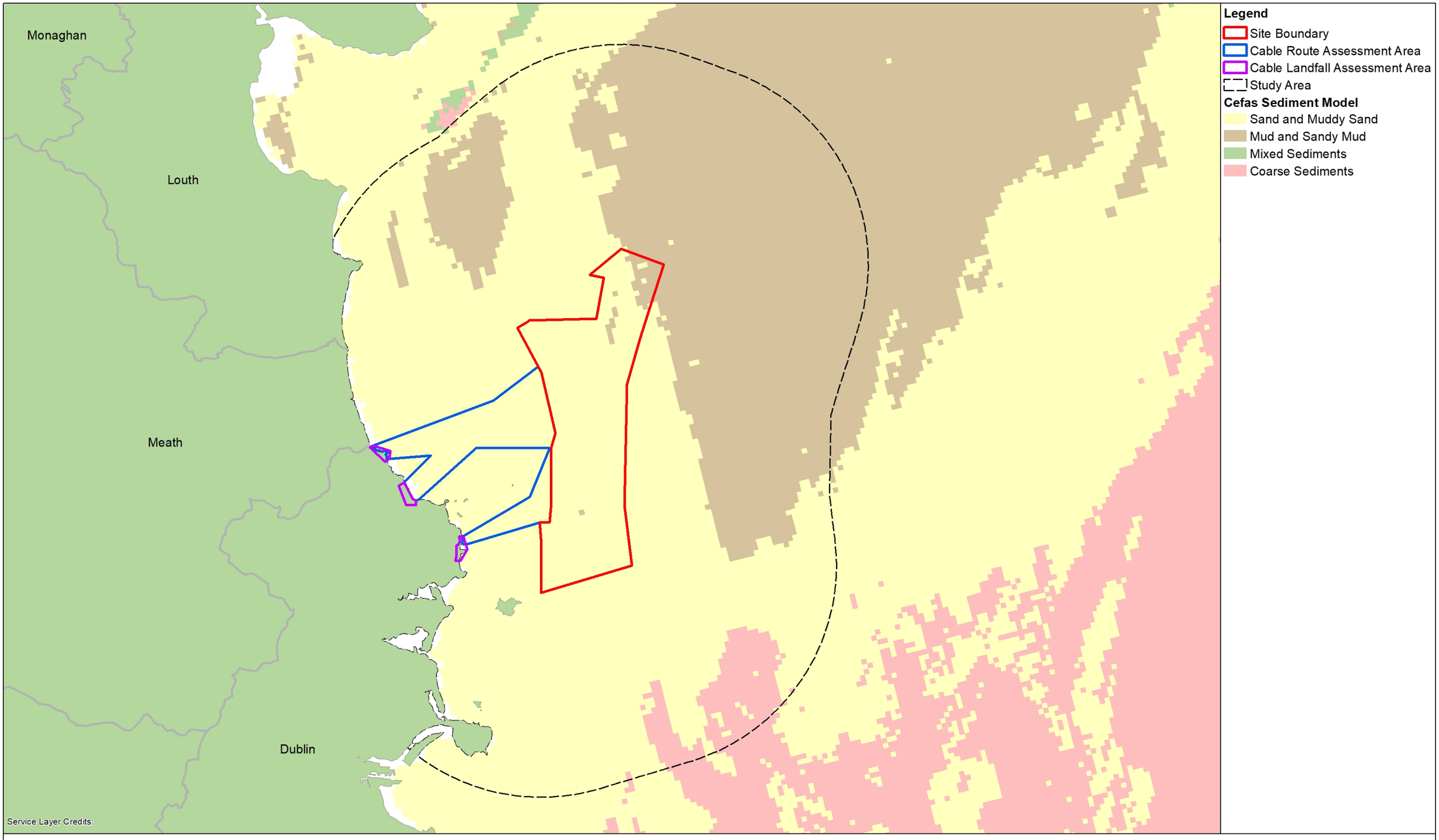
- EMODnet broad-scale seabed habitat map for Europe AKA EUSeaMap (EUSeaMap, 2016);
- Integrated mapping for the sustainable development of Ireland's marine resource (INFOMAR, 2006-2016);
- Benthic surveys of sandbanks in the Irish Sea (Roche et al., 2007);
- Sensitivity and mapping of inshore marine biotopes in the southern Irish Sea (SensMap): Final report (Ecoserve, 2001); and
- Marine sites, habitats and species data collected during the BioMar survey of Ireland (Picton et al. 1997).

5.4.4 Receiving Environment

The deskbased review of literature and publicly available data sources that has been undertaken to preliminarily characterise the benthic ecology baseline is presented below. Data presently available will be supplemented by site-specific surveys which are due imminently.

Up to four broadscale subtidal sediment habitats have been identified as potentially present within the array area, these are: subtidal mud, subtidal sand, subtidal mixed sediments and subtidal coarse sediments. The subtidal mud and sand sediment habitats account for the greatest proportion of the study area, whilst the coarser sediments occur over a much smaller area in the southwest of the study area (see **Figures 5.8-5.10**).

The same four broadscale subtidal sediment habitats that have been identified within the array area are also present within the export cable route (ECR) corridors currently under consideration. In addition, rock and other hard substrata is also present both intertidally and subtidally at the proposed landfalls. Within the intertidal area at all ECR options, high and moderate energy infralittoral and intertidal rock gives way to intertidal mixed/course sediments and sands in more sheltered embayment's (EMODnet, 2016). At headlands and in more exposed locations the bedrock and boulders dominate both the shallow infralittoral and intertidal at landfall.



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Issue	Date	By	Chkd	Appd
1	18/05/2021	SM	BB	GB

Project Title
North Irish Sea Array Offshore Wind Farm

Scale
1:350,000@A3

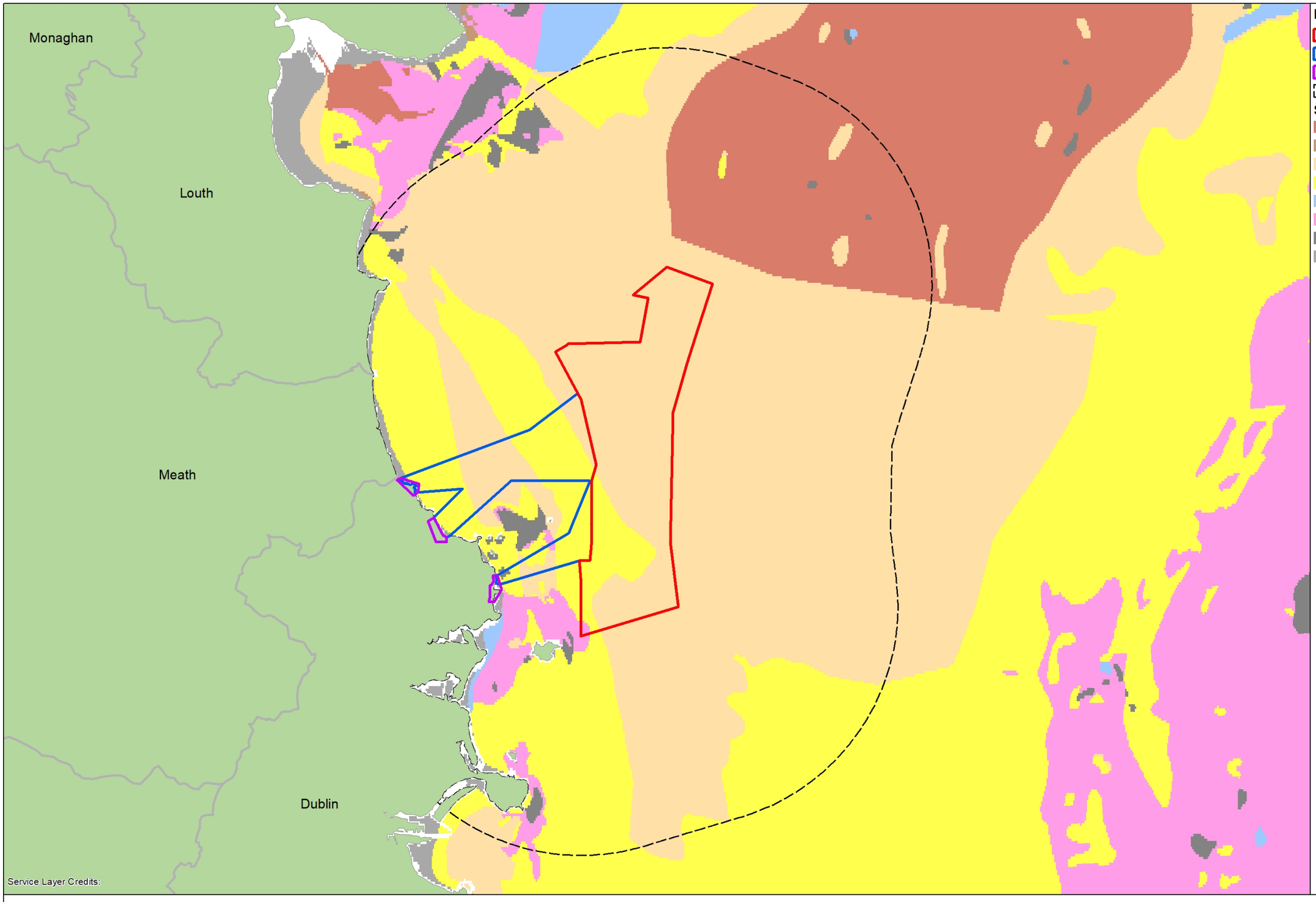
Date
18 May 2021

Drawing Title
Cefas Sediment Model

Drawing Status
For Issue

Figure No.
Fig 5.8

Issue
1



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1	18/05/2021	SM	BB	GB

Project Title
North Irish Sea Array Offshore Wind Farm

Scale
1:350,000@A3

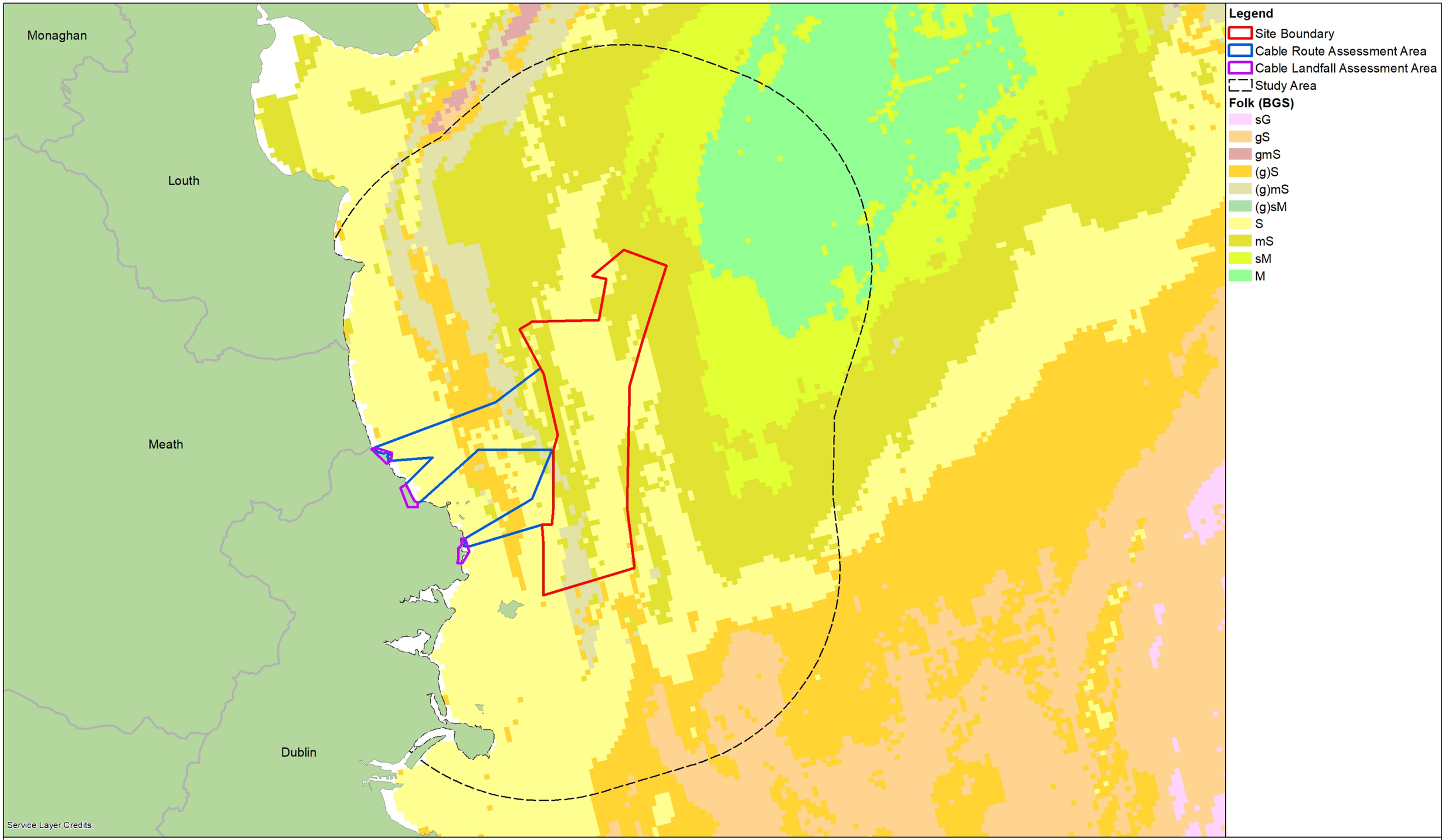
Date
18 May 2021

Drawing Title
Seabed Substrate (EUSeaMap)

Drawing Status
For Issue

Figure No.
Fig 5.9

Issue
1



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Datum: WGS84 Projection: UTM30N
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Issue	Date	By	Chkd	Appd
1	18/05/2021	SM	BB	GB

Project Title
North Irish Sea Array Offshore Wind Farm

Scale
1:350,000@A3

Date
18 May 2021

Drawing Title
Folk (BGS)

Drawing Status
For Issue

Figure No.
Fig 5.10

Issue
1

5.4.5 Potential Impacts

A range of potential impacts on benthic subtidal and intertidal ecology have been identified, which may arise during construction, operation (and maintenance) and decommissioning phases of the proposed development.

The following impacts have been considered as part of the scoping assessment and based on current understanding of source-receptor-pathway. Based on the expected magnitude of impacts, no potential significant effect is anticipated on benthic subtidal and intertidal ecology and it is proposed not to include these impacts in the detailed assessment:

- Noise pollution on benthic ecology during foundation installation - It is generally accepted that the particle motion component of noise is most relevant to benthic species. While there are few studies looking at reactions of benthic invertebrates and in particular polychaetes and infaunal bivalves, it is likely that particle motion will dissipate near the noise source. In addition, the noise will be temporary in nature and conditions will return to baseline following cessation of piling;
- Accidental pollution - The magnitude of an accidental spill will be limited by the size of chemical or oil inventory on construction vessels. In addition, released hydrocarbons would be subject to rapid dilution, weathering and dispersion and would be unlikely to persist in the marine environment. The likelihood of an incident will be reduced by implementation of a Construction Environmental Management Plan (CEMP) and Marine Pollution Contingency Plan (MPCP); and
- Indirect disturbance of benthic species from electromagnetic fields (EMF) generated by inter-array and export cables - EMFs are likely to increase above background levels in close proximity to the cables only. As the cable is likely to be buried or protected across most of the array area and ECC, any behavioural responses would be further mitigated. Furthermore, monitoring at OWFs to date has not recorded any changes in invertebrate behaviour resulting from EMF exposure.

The potential impacts that are proposed to be scoped into the EIAR are detailed in **Table 5.5**, along with a description of any proposed additional data collection (e.g. site-specific surveys) and / or supporting analyses (e.g. modelling) required to facilitate an impact assessment. The cells shaded in grey indicate that, based on the information currently available, there is no source-receptor-pathway for that phase of the development.

Table 5.5: Impacts proposed to be scoped in to the assessment for benthic subtidal and intertidal ecology.

Potential Impact	Project Phase		
	Construction	O&M	Decommissioning
Increased suspended sediment and turbidity Sediment disturbance arising from construction activities, such as cable laying and foundation installation, operational activities (such as cable remedial works) and decommissioning may result in adverse effects on benthic communities through smothering. The assessment will be informed by the findings of the physical processes modelling of the extent of any sediment plumes and subsequent sediment deposition.	✓	✓	✓
Loss of habitat (damage and/or loss to habitats and non-mobile species) The proposed activities will be considered in terms of long term habitat loss and alteration. Consideration will be given to the sensitivity of key species within study area to habitat loss and habitat change.	✓	✓	✓
Habitat disturbance There is the potential for direct habitat disturbance during construction and maintenance activities in the array area and along the export cable corridor, due to, for example, cable laying and foundation installation.	✓	✓	✓
Changes in physical processes The presence of the subsea infrastructure can result in potential effects on benthic communities arising from scour effects, changes in sediment transport and wave and tidal current regimes. The assessment will be informed by the findings of the physical processes modelling and assessment.		✓	
Reduction in water and sediment quality through release of contaminated sediments and/or accidental contamination The impacts of changes to water and sediment quality resulting from development activities on benthic communities will be undertaken. The assessment will be informed by the findings of the physical processes modelling and the marine water quality and sediment assessment.	✓	✓	✓
Colonisation of hard substrate Man-made substructures (foundations and associated scour/cable protection) on the seabed are expected to be colonised by a variety of marine organisms. This can result in an increase in local biodiversity and alterations to the prevailing benthic habitats and communities.		✓	
Introduction of marine invasive non-native species (INNS) Increased risk of introduction or spread of marine INNS due to increased vessel movements during all phases of the project (e.g. ballast water) which may facilitate the spread of non-native species and may subsequently impact biodiversity and benthic ecology of the area.	✓	✓	✓

5.4.6 Potential Mitigation Measures

As part of the design process for the proposed development, a number of designed-in measures are proposed to reduce the potential for impacts on benthic subtidal and intertidal ecology receptors. These will evolve over the development process as the EIA progresses and in response to consultation.

The need for mitigation will also be dependant upon the findings of the site-specific benthic and intertidal surveys that will be completed across the extents of the array area and along the preferred export cable route.

Measures to be adopted as part of the project may include:

- Avoid direct significant impacts to ecologically important sandbanks and potential reefs as far as practicable through route selection and micro-siting;
- Cable burial risk assessment to inform frontend engineering works. Cable burial will be the preferred option for cable protection;
- Development of, and adherence to, a Code of Construction Practice (CoCP);
- Development of, and adherence to, an appropriate Construction Environmental Monitoring Programme (CEMP), which will include a Marine Pollution Contingency Plan (MPCP); and
- Development of, and adherence to, a Decommissioning Plan (DP).

The requirement and feasibility of any mitigation measures will be dependent on the significance of the effects on benthic subtidal and intertidal ecology and will be consulted upon with statutory consultees throughout the EIA process.

5.4.7 Proposed Approach to EIA

5.4.7.1 Characterisation of the Receiving Environment

The study area to be applied to the EIA will be reviewed and refined as necessary to reflect the baseline characteristics and key receptors subsequently identified as having connectivity (directly or indirectly). Information from the Physical Processes Technical Appendix and Fish and Shellfish EIA Chapter will inform the assessment of the maximum distance suspended sediments may travel during construction of the proposed development.

The baseline description of the receiving environment will include a comprehensive understanding of the study area and will establish the spatial distribution and abundance of species within subtidal reef, subtidal sediments and littoral habitats and the presence of any European, national or locally protected or sensitive species or habitats.

Benthic sediment data for the nearshore portions of the study area is available from survey efforts focused on compliance with both the Water Framework Directive and the EU Habitats Directive. Key data sources include surveys and conservation assessments undertaken by NPWS as a part of a baseline mapping programme of the extent, distribution and broad community complexes of selected subtidal reef within Natura 2000 sites in Ireland.

The EIAR baseline will incorporate data collected through the Marine Monitoring of six Annex I Habitats (Scally et al.,2020), which provides the most recent conservation assessment of relevant features in Irish marine SACs.

In order to comply with the DHPLG guidance (2018), the existing data sources will be supplemented through completion of site-specific benthic ecology and intertidal surveying which will be completed across the proposed development including along the preferred export cable route following receipt of appropriate foreshore licencing.

Subtidal benthic habitats will be sampled via a combination of targeted benthic infaunal grab sampling and drop-down video (DDV) surveys as agreed during stakeholder consultation if possible. Sediment samples will also be collected for contaminants and particle size analysis. This data will be analysed and assessed and will feed into the production of a Technical Appendix that will, in turn, underpin the EIA.

The DCAAE (2017) guidance also requires the intertidal benthic habitats to be characterised by surveys which will be undertaken via MNCR inertidal walkover surveys appropriately designed to assess the full zonation and species composition of the habitat.

The assessment of potential impacts on benthic subtidal and intertidal ecology receptors will consider the magnitude and duration of the impact, the reversibility of the impact and the timing and frequency of the activity. The sensitivity of different receptors to each impact will be derived from the Marine Evidence based Sensitivity Assessment (MarESA) where possible. The sensitivity assessment of the species will take into account the current status of the species, and its importance (locally, regionally, nationally or internationally).The assessment will also consider likely naturally occurring variability in, or long-term changes to, the benthos within the project lifetime due to natural cycles and/ or climate change. This will enable a reference baseline level to be established against which the potentially modified benthic receptors can be compared, throughout the project lifecycle.

Assessment criteria will be set out and applied in accordance with technical EIA standards and guidance and will consider the sensitivity of the receptor (using the Marine Evidence based Sensitivity Assessment (MarESA) [6] four-point scale of high, medium, low and not sensitive), the magnitude of the impact (as defined by the extent, duration , frequency, probability and consequences of the impact and the resulting significance of the 'effects' upon benthic receptors, with a definition of significance then provided.

5.5 Fish and Shellfish Ecology

5.5.1 Introduction

This section of the scoping report sets out the approach to the characterisation of the fish (including elasmobranchs) and shellfish species of commercial and conservation importance within the study area.

[6] http://www.marlin.ac.uk/species/sensitivity_rationale

The fish and shellfish study area proposed for the EIAR will be reviewed and defined further, but the study area considered in this Scoping Report comprises the proposed development and a zone of influence (ZoI) of 20km. This section also presents the intended scope of and approach to the assessment of impacts to fish and shellfish.

5.5.2 Policy and Guidance

The assessment will comply with the requirements of the EU EIA Directive 2011/92/EU; EIA Directive 2014/52/EU; and the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018. It will also comply with guidance set out in **Section 2.6.3** of this Scoping Report.

In addition, a number of other guidance documents specific to the considerations of fish and shellfish ecology are available from jurisdictions/countries with established offshore renewable energy sectors including:

- Guidelines for Data Acquisition to Support Marine Environmental Assessments of Offshore Renewable Energy Projects (Cefas, 2011).

Furthermore, for the purposes of the assessment of underwater noise effects on fish and shellfish receptors, the most recent available guidance document is:

- Sound Exposure Guidelines for Fishes and Sea Turtles: A Technical Report prepared by ANSI-Accredited Standards Committee S3/SC1 and registered with ANSI (Popper et al., 2014).

5.5.3 Data Sources and Baseline Methodology

5.5.3.1 Desktop Data

The key data sources which will be considered for use in the assessment are shown below in **Table 5.6** (this list is not comprehensive and other sources may be identified for the EIAR). Where data availability allows, data covering the previous 10 years will be used to inform the baseline to avoid in so far as possible the baseline covering only a single point in time.

Table 5.6: Data sources used to inform fish and shellfish ecology scoping.

Data sources / publications	Reference / source location
International Council for the Exploration of the Sea (ICES) International Bottom Trawl Survey (IBTS)	ICES
Celtic Sea Trout Project (CSTP)	CSTP (2016)
Celtic Seas ecoregion fisheries overview	ICES (2020)
National Parks and Wildlife Service protected sites service	NPWS
Irelands Marine Atlas- Key Fish Species Spawning and Nursery Areas	Marine Institute (2013)
Fisheries Sensitivity Maps in British Waters; Spawning and nursery grounds of selected fish species in UK Waters	Coull et al. (1998); Ellis et al. (2010)
An Inventory of Irish Herring Spawning Grounds	O'Sullivan et al. (2013)

Data sources / publications	Reference / source location
Ireland Red List (No. 11 and No. 5)	Clarke et al. (2016) King et al. (2011)
Irish Bottom fish survey	https://oar.marine.ie/handle/10793/57
Atlas of Commercial Fisheries around Ireland	https://oar.marine.ie/handle/10793/1432
Atlas: Commercial fisheries for shellfish around Ireland	https://oar.marine.ie/handle/10793/1243

In so far as is possible, further data sources and published information will be sought from appropriate sources such as NPWS, Inland Fisheries Ireland and the Marine Institute to aid in informing the baseline characterisation.

5.5.3.2 Site-Specific Surveys

Particle size analysis (PSA) data from the benthic surveys will help identify potential areas of preferred habitat for specific species (i.e. sandeel and herring). NISA have been undertaking Afloat surveys to identify the static fisheries in around the area of the NISA project area. These surveys commenced in August 2020 and have been undertaken on an approximately monthly basis since (weather permitting) and remain ongoing. During the survey a vessel traverses the areas and records observation of fishing activities. Survey details will be provided in the EIAR.

5.5.4 Receiving Environment

The Irish Sea and the area around NISA support a wide range of fish and shellfish species, with spawning and nursery grounds recognised to be present within the locale.

Fish species which are known to be present in the area include: herring (*Clupea harengus*); sandeel (*Ammondytes spp* and *Hyperoplus lanceolatus*); cod (*Gadus morhua*); haddock (*Melanogrammus aeglefinus*); ling (*Molva molva*); sole (*Solea solea*); sprat (*Sprattus sprattus*); mackerel (*Scomber scombrus*); plaice (*Pleuronectes platessa*); and whiting (*Merlangus merlangus*). A number of elasmobranch species are also known to occur, primarily ray species: *Raya clavate*; *R. montagui*; and *R. brachyiura*.

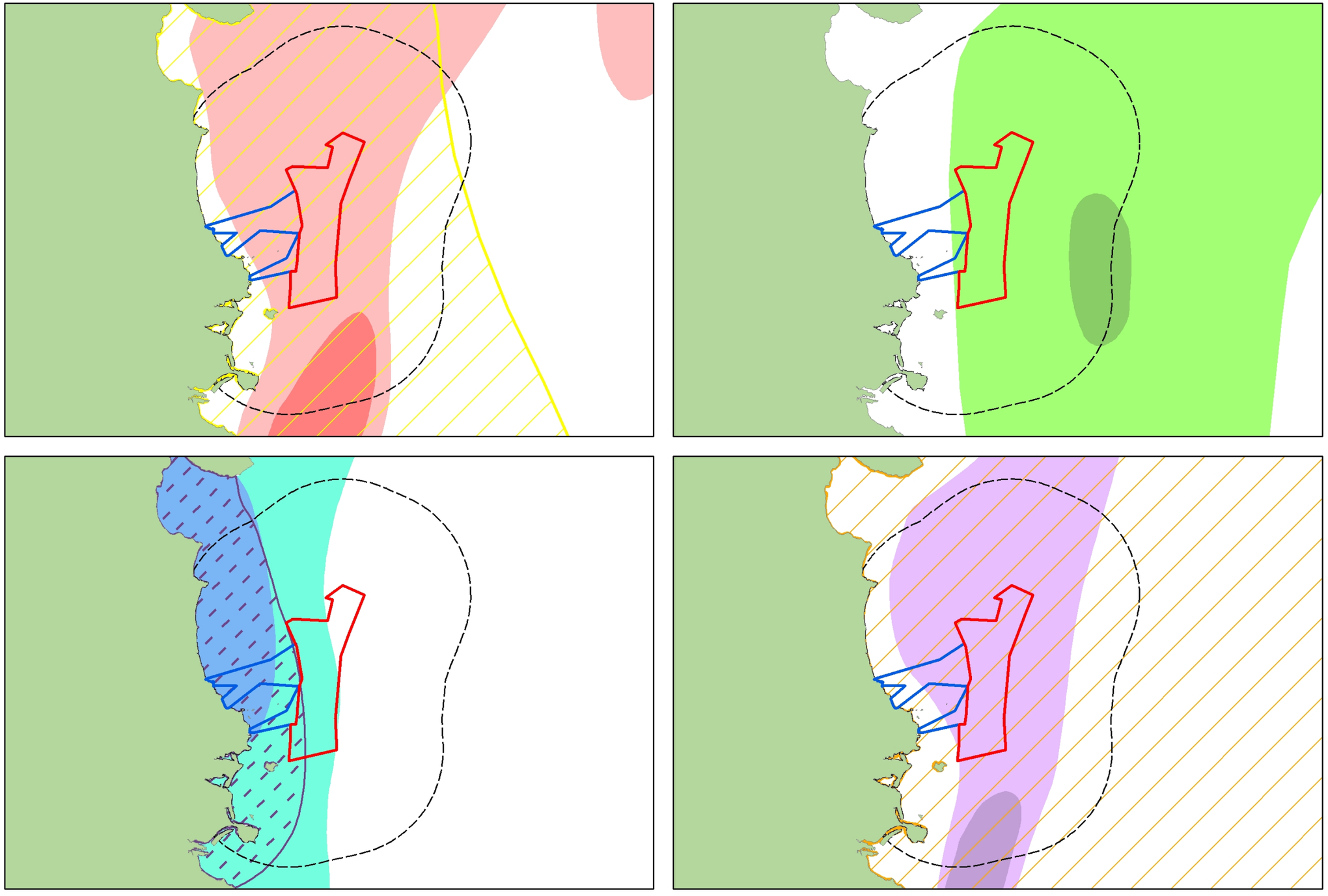
Species identified in the Stock Book (Marine Institute, 2020[7]) as being of commercial interest in the Irish Sea include: cod, haddock, whiting, plaice, sole, Nephrops (*Nephrops norvegicus*), rays and herring. Other commercially important shellfish species known to be present in the area include: whelk (*Buccinum undatus*), blue mussel (*Mytilus edulis*), crab (*Cancer pagurus*), lobster (*Hommarus gammarus*) and razor clam (*Ensis sp.*) (Ireland's Marine Atlas, 2016[8]).

Those species known to spawn in the area around NISA include: cod, ling, mackerel, plaice, sandeel, sole, whiting and haddock.

[7] https://oar.marine.ie/handle/10793/1660
[8] https://atlas.marine.ie/#?c=53.9108:-15.9082:6

Distribution of the key species based on different available data is presented in **Figure 5.11 – Figure 5.13**.

Migratory fish are known to be present within the study area. Atlantic Salmon (*Salmo salar*) are known to occur within the River Liffey. Two other rivers which flow through Dublin, the Dodder and Tolka, also have populations of salmon, although much smaller than the population of the Liffey. River systems flowing into Dublin Bay (Liffey, Tolka and Dodder) are also reported to support sea trout (*Salmo trutta*). European eel (*Anguilla anguilla*) has been documented in Tolka and Liffey river systems flowing into Dublin Bay and the Lower Liffey is a migratory corridor for sea lamprey (*Petromyzon marinus*) and river lamprey (*Lampetra fluviatilis*) known to occur in the wider Liffey Catchment.



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Datum: WGS84 Projection: UTM30N
EPSG: 32630

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Issue	Date	By	Chkd	Appd
1	18/05/2021	SM	BB	GB

Project Title
North Irish Sea Array Offshore Wind Farm

Scale
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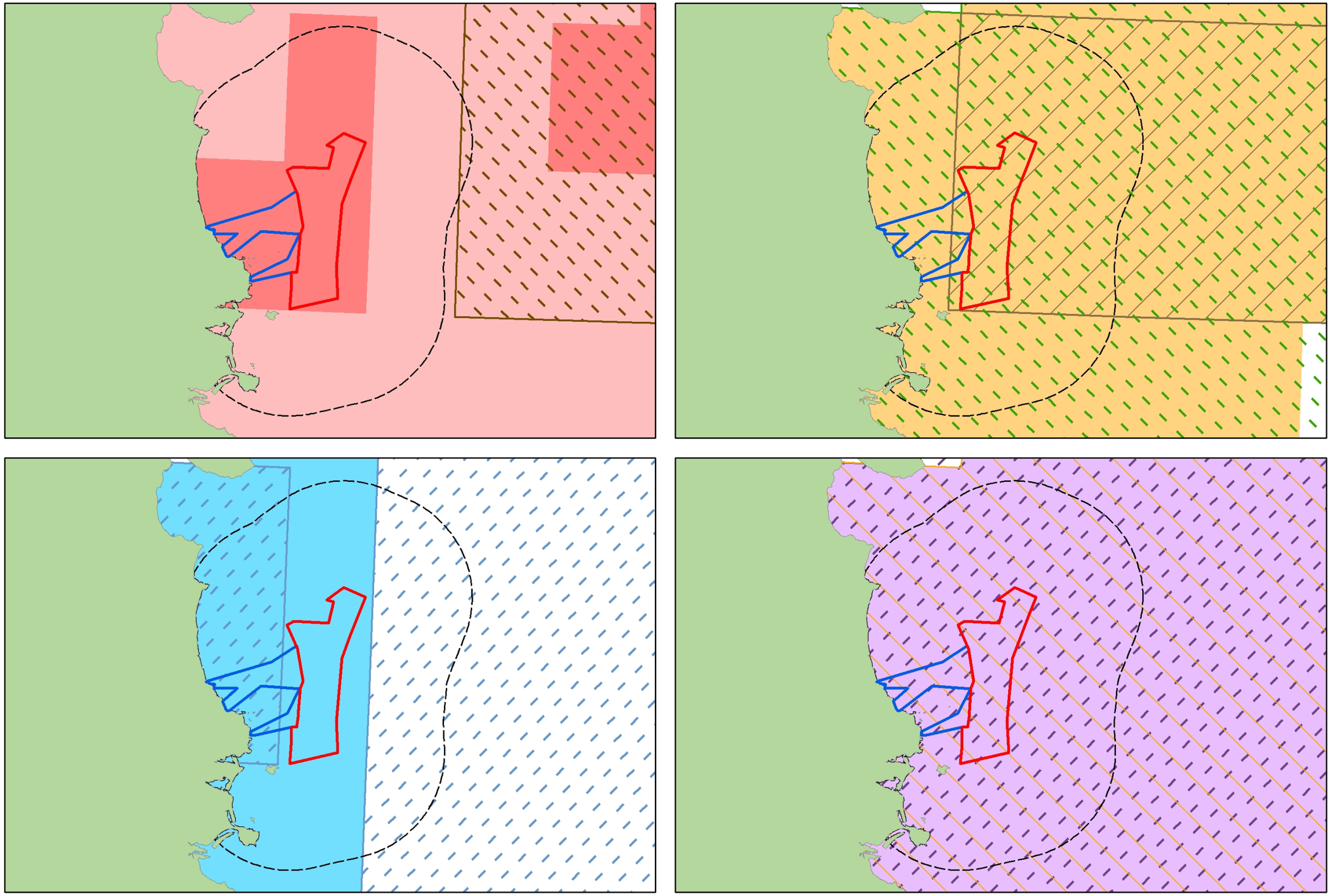
Date
18 May 2021

Drawing Title
Spawning Grounds for Fish and Shellfish
(Coull et al 1998)

Drawing Status
For Issue

Figure No.
Fig 5.11

Issue
1



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Project Title
North Irish Sea Array Offshore Wind Farm

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1:750,000@A3

Date
18 May 2021

Drawing Title
Spawning Grounds for Fish and Shellfish
(Ellis et al 2010)

Drawing Status
For Issue

Figure No.
Fig 5.12

Issue
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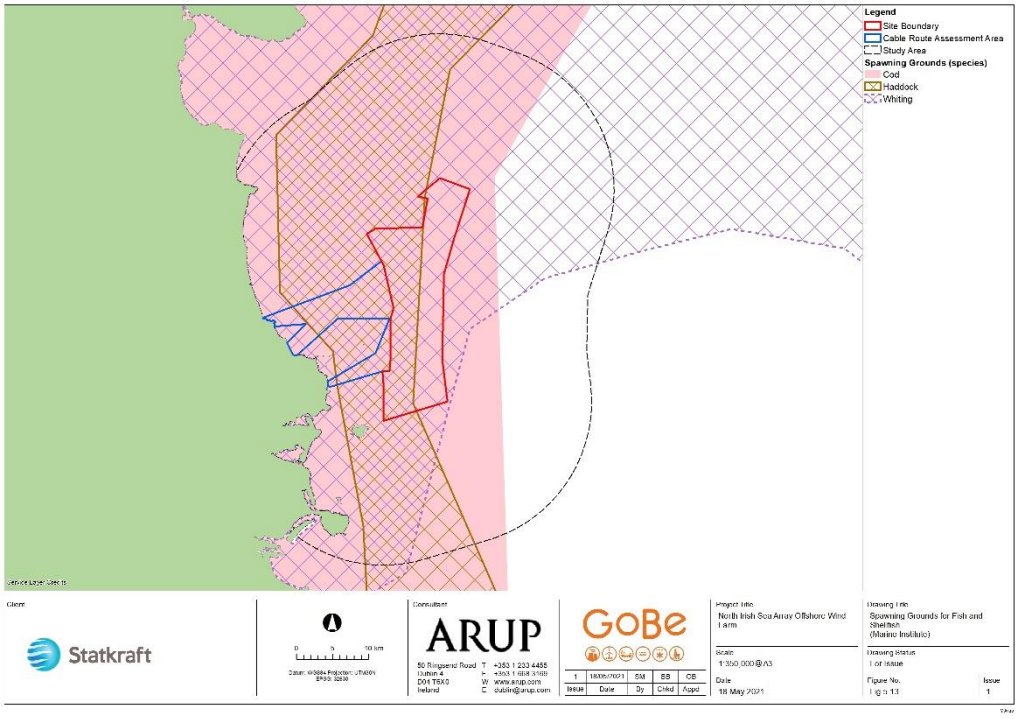


Figure 5.13: Cod, haddock and whiting spawning grounds (source Marine Institute, 2020).

5.5.5 Potential Impacts

The DCCAE 2017 and CIEEM 2019 guidance was used to aid in identifying the scope of the proposed assessment, with only those impacts for which it is considered there is the potential for significant effects scoped into the assessment within the EIAR.

Impacts which are to be considered throughout the project development are presented in **Table 5.7**. The cells shaded in grey indicate that there is no source-receptor-pathway for that phase of the development.

Table 5.7: Potential impacts upon fish and shellfish ecology arising from the proposed development.

Potential Impact	Project Phase		
	Construction	O&M	Decommissioning
Increased suspended sediment and turbidity arising from the installation of offshore wind infrastructure. The extent of any sediment plumes and subsequent deposition will be modelled and assessed for the proposed development. The results will be utilised to inform the assessment of impacts on fish and shellfish through consideration of the scale, both spatially and temporally to determine any potential for smothering of habitats or impacts on demersal spawning fish.	✓	✓	✓

Potential Impact	Project Phase		
	Construction	O&M	Decommissioning
Loss of habitat (disturbance, displacement or exclusion of mobile species and loss of sessile species). Consideration will be given to the sensitivity of key fish and shellfish species within Dublin Array study area to habitat loss and habitat change. Consideration will be given to any species known to use the area for a particular part of their life cycle where a change in habitat could limit the availability of suitable habitat;	✓	✓	✓
Reduction in water and sediment quality through release of contaminated sediments and /or accidental contamination. The EIAR will include an assessment of water and sediment quality, incorporating a WFD assessment. An assessment of potential impacts on stocks will be undertaken against background levels and the potential for re-suspension of contaminants present.	✓	✓	✓
Introduction of additional underwater noise and vibrations through the installation of turbine foundations by piling in particular (but also noise from other construction activities). Underwater noise has the potential to impact on fish and shellfish species ranging from behavioural effects to physical injury/mortality. Given the commercial importance of shellfish to the area, a comprehensive desk top study will be undertaken of all information available relating to their sensitivity to noise but also particle motion effects).	✓		
Increased hard substrate and structural complexity. This may occur as a result of the introduction of turbine foundations, scour protection and cable protection has the potential to create fish aggregating device and reef effects.		✓	
Potential barriers to movement through the presence of turbines and EMF from export cables and inter-array cables. This potential impact will be assessed taking into consideration natural background levels, together with knowledge on the behavioural responses of fish and shellfish gained from monitoring studies of operational wind farms across Europe.		✓	

5.5.6 Potential Mitigation Measures

Mitigation measures will be considered throughout the design process of the proposed development. These measures will be included with the objective to reduce the potential for impacts upon fish and shellfish ecology pathways and receptors. The measures will evolve throughout the development process as the EIA progresses and in response to consultation. The developer is committed to the implementation of these measures and also various standard sectoral practices and procedures. These measures are therefore considered an integrated part of the NISA design and have therefore been considered with respect to those impacts which can be scoped in or out.

Measures may include management of construction activities to avoid sensitive spawning grounds or requirements for noise mitigation measures where possible.

The requirement and feasibility of any mitigation measures will be dependent on the significance of the effects upon fish and shellfish and will be consulted upon with a range of consultees throughout the EIA process.

5.5.7 Proposed Approach to EIA

Having established the baseline, the scenarios on which the assessments will be based will be defined in accordance with the design envelope approach as set out in **Section 2.5**. The geographic footprint and the installation methodologies will be key considerations in defining the 'worst case scenario' for fish and shellfish receptors. Following this, the likely significant effects on receptors will be described and assessed. The fish and shellfish assessment will consider the magnitude and duration of the impact, the reversibility of the impact and the timing and frequency of the activity.

The effects on spawning of noise sensitive fish and shellfish receptors from noise and vibration impacts during the construction phase will be considered. Site-specific predictive noise modelling will be undertaken of the noise generated by pile driving and other construction and maintenance activity to assess the potential for noise disturbance on spawning fish and shellfish receptors.

Where appropriate, the fish and shellfish ecology assessment will utilise the conclusions from other receptor assessments, for example physical process, benthic ecology and commercial fisheries, or will inform those assessments.

5.6 Marine Mammal Ecology

5.6.1 Introduction

This section provides information on marine mammal species relevant to the proposed NISA project. It considers potential effects resulting from the construction, operation and maintenance and decommissioning of the NISA development area and the offshore ECC. This section also aims to set out the proposed scope of, and approach to, the assessment of impacts on marine mammals.

5.6.2 Policy and Guidance

Marine mammal species in the Irish Sea are protected by several European Directives and National Regulations, notably the Habitats Directive 92/43/EEC. This has since been transposed into Irish law thought the European Communities (Birds and Natural Habitats) Regulations 2011.

The Wildlife Act, 1976 and the Wildlife Act, 2000 are the principal national legislations for the protection of wildlife in Ireland. These aim to conserve a representative sample of important ecosystems, provide protection to and conservation of wild flora and fauna, and provide the necessary services to accomplish these aims. In 1991, all Irish waters were declared a whale and dolphin sanctuary, which included a ban on hunting in Irish waters. However, no legislation has been enacted to support this declaration.

The following marine mammal species are listed under Annex II of the Habitats Directive (Council Directive 92/43/EEC) and are concluded to be '*animal species of community interest whose conservation requires the designation of special areas of conservation (SACs)*':

- Harbour porpoise (*Phocoena phocoena*)
- Bottlenose dolphin (*Tursiops truncatus*)
- Grey seal (*Halichoerus grypus*)
- Harbour seal (*Phoca vitulina*)

There are several marine mammal SACs in the Irish Sea (**Figure 5.15**):

- Harbour porpoise: Rockabill to Dalkey Island SAC (RoI), North Channel SAC (NI), North Anglesey Marine SAC (Wales) and the West Wales Marine SAC (Wales);
- Bottlenose dolphin: Lleyn Peninsula and the Sarnau SAC (Wales) and the Cardigan Bay SAC (Wales);
- Grey seal: Lambay Island SAC (RoI), Saltee Islands SAC (RoI), Lleyn Peninsula and the Sarnau SAC (Wales) and the Cardigan Bay SAC (Wales);
- Harbour seal: Murlough SAC (NI) and Strangford Lough SAC (NI).

In addition to the general legislation listed above and guidance set out in **Section 2.6.3** of this Scoping Report, the following receptor-specific guidance and key references will be used to inform the EIAR for marine mammals:

- JNCC (2020). Guidance for assessing the significance of noise disturbance against Conservation Objectives of harbour porpoise SACs (England, Wales and Northern Ireland). JNCC Report No. 654;
- IWDG (2020). Offshore Wind Policy Document. Published by the Irish Whale and Dolphin Group, 2020;
- Southall, et al. (2019). Marine mammal noise exposure criteria: Updated scientific recommendations for residual hearing effects. Aquatic Mammals 45(2);
- NPWS (2014). Guidance to manage the risk to marine mammals from man-made sound sources in Irish waters;
- EPA (2011). Assessment and Monitoring of Ocean Noise in Irish Waters
- JNCC et al. (2010). The protection of marine European Protected Species (EPS) from injury and disturbance: Guidance for the marine area in England and Wales and the UK offshore marine area.

As well as various reports and publications available in the per reviewed and grey literature.

5.6.3 Data Sources and Baseline Methodology

The marine mammal Study Area varies depending on the species, considering individual species ecology and behaviour. For all species, the Study Area covers the NISA development and is extended over an appropriate area considering the scale of movement and population structure for each species.

For each species, the area considered in the assessment is largely defined by the appropriate species Management Unit (MU). Cetacean MUs were defined by IAMMWG (2015) as "*a geographical area in which the animals of a particular species are found to which management of human activities is applied. An MU may be smaller than what is believed to be a 'population' or an 'ecological unit' to reflect spatial differences in human activities and their management*". Therefore, the MU scale is advised as the most appropriate scale against which to assess and manage human activities. The baseline characterisation will include a description of the study area in the context of the marine mammal species present, site usage, marine mammal abundances and their corresponding degrees of spatial and temporal variation.

A variety of data sources will be considered as part of a desk-based study to describe the receiving environment, including both peer-reviewed literature and 'grey' literature such as other development submissions and reports. Published literature on marine mammal ecology, distribution, and potential impacts of offshore developments will also be considered. Due to the highly mobile nature of marine mammals, it is necessary to consider the occurrence of these species in the wider region, including into other national jurisdictions. The data utilised here will provide context to the NISA project area both temporally and spatially within the wider species MUs, aiming to identify any connectivity present between the NISA development and designated sites.

The project undertook boat-based marine mammal surveys commencing in October 2019. However, due to restrictions imposed by the coronavirus pandemic, boat based surveys were halted and marine mammals are currently recorded as part of the monthly aerial-based surveys which have been ongoing since March 2020. Details recorded include species, number, and behaviour. It is considered that these surveys shall be sufficient to provide density estimates for the most frequently recorded marine mammal species.

The most useful data is density surfaces/estimates for each of the most common marine mammal species, ideally using data collected in the local area (site-specific surveys) and data from the wider area where site-specific information is not available (e.g. SCANS III, ObSERVE, SMRU seal habitat preference maps). These density surfaces/estimates are necessary to estimate the number of individuals of each marine mammal species which have the potential to be affected by different potential impacts as a result of the construction, operation, maintenance and decommissioning of the NISA project.

5.6.4 Receiving Environment

Currently, over 26 known species of marine mammals are present in waters around Ireland (Wall et al. 2013). Six main species have been concluded to occur regularly in the Irish Sea including: harbour porpoise, bottlenose dolphin, Risso's dolphin, minke whale, harbour seal and grey seal (**Table 5.8**).

Table 5.8: Key marine mammal data sources examined*.

Data source	Years	Method	Main species
ObSERVE (Stratum 5) (Rogan et al. 2018)	2015-2017	Aerial line transect survey	Harbour porpoise, bottlenose dolphin, Risso's dolphin, minke whale & pinnipeds
SCANS III (Block E) (Hammond et al. 2017)	2016	Aerial and vessel visual survey	Harbour porpoise, bottlenose dolphin, Risso's dolphin & minke whale
Various IWDG surveys (Berrow et al. 2008, O'Brien et al. 2009, Berrow et al. 2011, Berrow et al. 2012, Berrow and O'Brien 2013, O'Brien and Berrow 2016)	2008 onwards	Various (photo ID, visual and acoustic surveys)	Harbour porpoise & bottlenose dolphin
Various seal count studies (Cronin et al. 2004, Cronin et al. 2007, Ó Cadhla et al. 2007, Morris and Duck 2019)	2003 onwards	Aerial survey	Grey seal & harbour seal
Seal habitat preference maps (Carter et al. 2020)	2005 - 2019	Telemetry and count data	Grey seal & harbour seal
* Note this includes some of the key marine mammal data sources available for the area of interest but is not an exhaustive list of all data sources expected to be available. A full and comprehensive assessment of all relevant data sources will be included in the baseline characterisation technical report.			

Details on the abundance estimates for the management units (MUs) of each of these species has been listed below (**Table 5.9**).

Table 5.9: Main marine mammal species recorded in the Irish Sea. Cetacean management unit information sourced from IAMMWG (2021 in prep), Seal abundance (count data) sourced from Morris and Duck (2019).

Species	Management Unit (MU)	Abundance estimate
Harbour porpoise	Celtic and Irish Seas	62,517 (95% CI: 48,324 – 80,877)
Bottlenose dolphin	Irish Sea	293 (95% CI: 108 – 793)
Risso's dolphin	Celtic & Greater North Seas	12,262 (95% CI: 5,227 – 28,764)
Minke whale	Celtic & Greater North Seas	20,118 (95% CI: 14,061 – 28,786)
Harbour seal	East Ireland	131 seals counted onland. Assume 72% of the total population are available to count during August surveys (Lonergan et al. 2013). Scaled population estimate ~182
Grey seal	East Ireland	418 seals counted onland. Assume 23.9% of the total population are available to count during August surveys (Russell et al. 2016). Scaled population estimate ~1,750

5.6.5 Potential Impacts

Guidelines proposed by DCCAE (2018) have been utilised to identify the potential impacts relevant to offshore renewable energy projects to inform the scope of the assessment for NISA. The following potential impacts on marine mammals as a result of the proposed NISA development and within each of these phases (**Table 5.10**) will be taken into consideration.

Table 5.10: Potential impacts to be scoped into assessment of marine mammal species as a result of the proposed NISA development.

Potential impact	Construction	O&M	Decommissioning
Auditory injury from piling: Underwater noise generated from piling may result in both hearing damage and auditory injury in marine mammal species.	✓		
Behavioural disturbance from piling: Underwater noise generated from piling may result in both the behavioural disturbance and displacement of marine mammal species.	✓		
Behavioural disturbance from other activities: Underwater noise generated by other construction and decommissioning activities (such as dredging, trenching, cable laying, cutting etc) may result in both the behavioural disturbance and displacement of marine mammal species.	✓		✓
Vessel collision risk: Increased vessel presence in the area creates a potential for increased collision risk for marine mammal species.	✓	✓	✓
Vessel disturbance: Increased vessel presence in the area creates a potential for increased disturbance for marine mammal species.	✓	✓	✓
Prey availability and distribution: Indirect impacts on marine mammal species such as changes in their prey availability and distribution as a result of offshore development phases is possible.	✓	✓	✓
Increased concentrations of suspended sediment: Changes in water quality resulting from offshore windfarm development phases may impact marine mammal species foraging activity.	✓	✓	✓

5.6.6 Potential Cumulative Effects

The general approach to assessing the cumulative effects on environmental receptors is outlined in **Section 2.8** and **Section 5.1.2**. The most significant cumulative effects on marine mammal species are likely to include construction noise, either from concurrent or consecutive offshore developments. Concurrent developments are likely to affect a greater area, while consecutive developments are likely to have a longer duration, with a shorter range of impact. These noise impacts can either be direct impacts (disturbance, auditory injury) or indirect (displacement of prey species).

It is necessary to consider that even if a piling programme is scheduled for many months, the actual duration of pile driving would be limited to a few hours per pile given the experience of other projects. A range of realistic scenarios for cumulative underwater noise impacts will be developed for the CEA, based on publicly available information, liaison with other developers where possible, as well as consultation with the regulators and stakeholders.

5.6.7 Potential Mitigation Measures

The execution of any mitigation measures is subject to an assessment of both the technical and commercial feasibility of such measures. Measures adopted as part of the project may include:

- Development of, and adherence to, a CoCP;
- Development of, and adherence to, a Vessel Management Plan (including defined vessel navigational routes, a vessel code of conduct to reduce collision risk and minimize disturbance and identification and avoidance of sensitive areas where possible);
- Implementation of a piling Marine Mammal Mitigation Protocol (to minimize the risk of auditory injury);
- Implementation of a decommissioning Marine Mammal Mitigation Protocol (to minimize the risk of auditory injury);
- Development of, and adherence to, an appropriate PEMMP; and
- Development of, and adherence to, a Decommissioning Plan.

5.6.8 Proposed Approach to EIA

The proposed EIA methodology for marine mammals will be based on guidelines outlined by CIEEM (2019) and DCCAE (2017). At the core of these assessments is the ability to rule out that impacts from the development will have a significant effect on the specified receptors. These all involve assessing the potential magnitude and severity of each impact on receptors and also an assessment of the population level consequences of these impacts.

The assessment work will aim to be quantitative where possible. Due to this, the proposed approach to EIA assessment will involve three main stages including:

- A description of the spatial and temporal distributions of key marine mammal species;
- An assessment of the spatial distribution of potential impacts from offshore development (piling noise etc);
- The integration of key species and potential impacts spatial data in order to estimate the number of marine mammals which have the potential to be exposed to such impacts.

For marine mammals, a fully robust and quantitative assessment of the potential impact of underwater noise as a result of the offshore wind farm construction will be carried out; with the focus on noise from the pile driving for foundation installation.

The quantitative noise impact assessment will combine the most up to date spatially explicit estimates of density for each species with estimates of the spatial and temporal extent of 'impact footprints' for each noise related impact (displacement and permanent threshold shift (PTS) in hearing) in order to provide a quantitative prediction of the number of animals at risk. This information will also take into account the best available scientific evidence on the movement and behaviour of marine mammals, both under baseline conditions and in response to piling noise.

The spatial extent of the impact area (impact footprints) will be determined by noise modelling. The temporal extent will be determined by the project programme and the detailed construction parameters. The noise modelling will incorporate information on the likely source levels for piling (dependent on pile type and diameter) and the predicted propagation of the sound (dependent on bathymetry, substrate type etc.) to predict the area over which sound levels may be above certain thresholds or criteria that would be predicted to cause an effect. This assessment will combine the best available knowledge on the response of animals to pulsed sound with modelled noise fields to predict the degree of cumulative exposure likely to individuals over piling events and calculate the probability of animals receiving a dose high enough to cause injury (PTS) or behavioral disturbance.

5.7 Offshore Ornithology

5.7.1 Introduction

The purpose of this chapter of the Scoping Report is to provide detailed information on the offshore and migratory ornithological receptors of relevance to NISA. This section sets out the approach to the characterisation of seabird distribution and usage across the offshore and intertidal development area and within the wider context of the Irish Sea, incorporating any connectivity to designated conservation sites further afield as required. It considers the potential effects of construction, operation, maintenance and decommissioning including offshore infrastructure, cable routes and landfalls of the project on these receptors and also summarises the intended scope of, and approach to, the assessment of effects on offshore ornithology for the NISA EIAR.

5.7.2 Policy and Guidance

The assessment will comply with the relevant design and acquisition of data standards guidance in terms of the data quality and the coverage of the baseline as set out in **Section 2.6.3** of this Scoping Report.

In addition to this legislation and guidance, the following will be considered as part of the ornithological proposed method of assessment, which will be used to determine the significance of effects on important ornithological features (IOFs):

- Ramsar Convention on Wetlands of International Importance (1971);
- Bonn Convention on the Conservation of Migratory Species of Wild Animals 1979, as amended;

- Burke, B. (2018) Trialling a Seabird Sensitivity Mapping Tool for Marine Renewable Energy Developments in Ireland. BirdWatch Ireland, Kilcoole, Co. Wicklow;
- Maclean *et al*. (2009) A review of assessment methodologies for offshore wind farms; and
- King *et al*. (2009) Developing guidance on ornithological cumulative impact assessment for offshore wind farm developers.

5.7.3 Data Sources and Baseline Methodology

For the purposes of the baseline characterisation, the zone of influence will define the offshore ornithology study area. This represents a realistic maximum spatial extent of potential impacts on receptors. In addition, to account for any indirect effects on prey availability, the study will take account of the numerical modelling that informs the relevant receptor chapters for underwater noise modelling and hydrodynamic modelling, as well as the conclusions made for fish and shellfish ecology and benthic subtidal ecology impact assessments.

The description of the baseline environment will be informed using desk-based assessment including use of scientific and 'grey' literature, this will be further supplemented with site specific survey data. The description of the baseline environment will be used to provide:

- Characterisation of bird species, number, distribution, flight height, activity and behaviour for birds on the water and in flight;
- Information on designated conservation sites for bird species in close proximity to NISA which have the potential to be most likely affected by the activities associated with the proposed windfarm development;
- Information on designated sites from further afield which may potentially have some interaction with the site based on the foraging ranges of species of qualifying interest. Breeding seabirds can travel considerable distances during the breeding season to forage and connectivity between designated sites and offshore windfarms is largely a function of distance and species-specific foraging ranges during the breeding season. Therefore, the EIAR will consider statutory designated sites within Ireland and other jurisdictions that have potential connectivity with the NISA development site when assessing potential impacts to bird species and impacts on the broader biogeographic populations; and
- Relevant literature on seabird ecology and distribution and on the potential impacts of wind farms will also be considered.

5.7.3.1 Desk-based assessment

Published literature will be used for informing the offshore ornithological assessment in order to provide temporal and spatial context to the project area in the Irish Sea and identify any connectivity with designated sites. These data sources include, but are not limited to those summarised in Table 5.11**.**

Table 5.11: Summary of existing data sources for offshore ornithology.

Data source	Description of literature
Seabird population sizes, distributions and seasonal movements	
Seabird Monitoring Programme database (co-ordinated by the JNCC)	Most up to date seabird colony counts dataset for seabird colonies around Ireland and the UK. The most recent census of breeding colonies in Ireland is anticipated to be completed in the 2021 breeding season.
Cummins *et al*. 2019	The Status of Ireland's Breeding Seabirds: Birds Directive Article 12 Reporting 2013 – 2018
Mitchell *et al*. 2004	Seabird populations of Britain and Ireland: results of the Seabird 2000 census
Jessopp *et al*. 2018	The seasonal distribution and abundance of seabirds in western Irish Sea 2016
Rogan *et al*. 2018	Aerial surveys of cetaceans and seabirds in Irish waters: occurrence, distribution and abundance in 2015 – 2017 (obSERVE)
Pollock *et al.* 1997	The distribution of seabirds and cetaceans in the waters around Ireland', JNCC Report, No. 267
Stone *et al*. 1995	An atlas of seabird distribution in north-west European waters
Waggitt *et al*. 2019	Distribution maps of cetacean and seabird populations in the North-East Atlantic
Wakefield *et al*. 2017	Breeding density, fine-scale tracking and large-scale modelling reveal the regional distribution of four seabird species (shag *Phalacrocorax aristotelis*, guillemot *Uria aalge*, razorbill *Alca torda* and kittiwake *Rissa tridactyla*)
Seabird breeding ecology, foraging ranges and behaviour	
Woodward *et al*. 2019	An updated review of the seabird foraging ranges stated in Thaxter *et al*. (2012).
Cleasby *et al*. 2015	Three-dimensional tracking of gannets: flight height and vulnerability to offshore wind farms using foraging range, density and altitudes.
Furness *et al*. 2018	Nocturnal flight activity of northern gannets *Morus bassanus* and implications for modelling collision risk at offshore wind farms.
Guilford *et al.* 2008	GPS tracking of the foraging movements of Manx Shearwaters *Puffinus puffinus* from various breeding SPAs (Special Protection Areas)
Dean *et al*. 2015	GPS tracking of the foraging movements of Manx Shearwaters *Puffinus puffinus* from various breeding SPAs
Snow and Perrins, 1998	Birds of the Western Palearctic: an account of European, Middle Eastern and North African birds
Hutchinson, C.D. (1989)	Birds In Ireland.
Wakefield *et al*. 2013	Foraging distributions of tagged gannets from UK colonies, demonstrating that gannets from neighbouring colonies forage in largely mutually exclusive, colony specific home ranges.
Ecology of migratory species	
Boland and Crowe, 2012	Irish wetland bird survey: waterbird status and distribution 2001
Burke *et al*. 2018	Estimates of waterbird numbers wintering in Ireland, 2011/12 – 2015/16

Data source	Description of literature
Crowe and Holt, 2013	Estimates of waterbird numbers wintering in Ireland 2006/07 to 2010/11
Crowe *et al*. 2005	Ireland's wetlands and their waterbirds: status and distribution
Crowe *et al*. 2012	Irish wetland bird survey: results of waterbird monitoring in Ireland in 2010/11
Glahder *et al*. 1999	Satellite tracking of Greenland white-fronted geese *Anser albifrons*
Robinson *et al*. 2004	Wintering information relating to the distribution and abundance of light-bellied brent geese *Branta bernicla* in Ireland
Warren *et al*. 1992	Wintering site interchange amongst Greenland white-fronted geese (*Anser albifrons flavirostris*) captured at Wexford Slobs, Ireland
Wernham, 2002	The migration atlas: movements of the birds of Britain and Ireland
Landfall site species ecology	
Burke and Crowe 2016; Burke *et al*. 2017	BirdWatch Ireland post-breeding tern report 2016; 2017
Irish Wetland Bird Survey (I-WeBS) data	Data collected to monitor wintering waterbird populations at their wetland sites across the Republic of Ireland. I-WeBS is coordinated by BirdWatch Ireland and funded by the National Parks and Wildlife Service
Boland *et al*. 2014; Crowe *et al*. 2016; Lewis *et al*. 2016; Lewis *et al*. 2017; and Burke *et al*. 2018	Irish Wetland Bird Survey: Results of Waterbird Monitoring in Ireland, years 2012/13, 2013/14, 2014/15, 2015/16 and 2016/17
Collision and displacement	
Althouse *et al*. 2019	Evaluating response distances to develop buffer zones for staging terns
Band 2012	Avian collision risk modelling
Cutts *et al*. 2013	Waterbird disturbance mitigation toolkit informing estuarine planning and construction projects
Dierschke *et al*. 2016	Seabirds and offshore wind farms in European waters: avoidance and attraction
Dierschke *et al*. 2016	Possible behavioural, energetic and demographic effects of displacement of red-throated divers
Drewitt and Langston 2006	Assessing the impacts of wind farms on birds
Fleissbach *et al*. 2019	A ship traffic disturbance vulnerability index for northwest European seabirds as a tool for marine spatial planning
Furness *et al*. 2013	Assessing vulnerability of marine bird populations to offshore wind farms
Garthe and Huppop 2004	Scaling possible adverse effects of marine wind farms on seabirds: developing and applying a vulnerability index
Johnston *et al*. 2014	Modelling flight heights of marine birds to more accurately assess collision risk with offshore wind turbines
Masden *et al*. 2009	Impacts of wind farms on migrating birds

Data source	Description of literature
Masden 2015	Developing an avian collision risk model to incorporate variability and uncertainty
McGregor *et al*. 2018	A stochastic collision risk model for seabirds in flight
SNCBs 2014	Joint response from SNCBs to Marine Scotland Science Avoidance Rate Paper
SNCBs 2017	Joint SNCB Interim Displacement Advice Note: Advice on how to present assessment information on the extent and potential consequences of seabird displacement from Offshore Wind Farm (OWF) developments January 2017
Skov *et al*. 2018	ORJIP bird collision avoidance study
Vallejo *et al*. 2017	Responses of common guillemot and harbour porpoise to an offshore wind farm
Apportioning	
SNH 2018	Interim guidance on apportioning impacts from marine renewable developments to breeding seabird populations in SPAs
Furness 2015	Non-breeding season populations of seabirds in UK waters
Cook and Robinson 2015	The scientific validity of criticisms made by the RSPB of metrics used to assess population level impacts of offshore wind farms on seabirds
Population modelling	
Horswill and Robinson 2015	Review of Seabird Demographic Rates and Density Dependence
Conservation status	
Gilbert *et al.* 2021	Birds of Conservation Concern in Ireland 4: 2020 – 2026

5.7.3.2 Site-specific Data

A minimum 24-month programme of data collection, designed to provide a robust dataset suitable for informing the Natura Impact Assessment (NIA) process, began in late September 2019 and is currently underway, with completion of the two-year baseline period expected in September 2021. The intention was to undertake surveys on a monthly basis however due to frequent and prolonged unsuitable weather conditions in the Irish Sea over the winter 2019/2020 period, it was not possible to undertake a survey in every calendar month. Three boat-based surveys were undertaken in November 2019, January 2020 and March 2020. These surveys cover the 'Early winter', 'Mid-winter' and 'Late winter' periods. Therefore, despite not having been able to carry out a boat survey every month, the baseline surveys undertaken in the winter of 2019/20 meet the survey requirements by representing each of the winter survey periods.

Boat-based surveys covered both the proposed NISA OWF development area and a 4 km surrounding buffer. The total area was surveyed via the use of 16 east/west orientated transects, spaced 2.3 km (1.24 NM) apart. Due to restriction imposed as a result of the Covid pandemic, these were replaced with aerial surveys in March 2020.

In additional to the boat/aerial based survey effort, supplementary coastal wildfowl migration surveys were conducted during the autumn and spring migration periods to quantify the movements of migratory geese and swans from SPA populations which are considered to have potential connectivity to the NISA OWF. Two coastal VP locations were selected from which to scan for migrating wildfowl.

Survey efforts are ongoing. Full results of these survey efforts will be presented in the EIAR.

5.7.4 Receiving Environment

Ireland is regionally important for breeding bird populations.

In the latest review of the conservation status of birds in Ireland (BOCCI 4) (Gilbert *et al*., 2021), it was found that 25.6% of Ireland's regularly occurring bird species are now on the Red list, with 23 species newly Red listed (with only 6 leaving the list). From the species moving from Amber to Red list, 11 of these are of high conservation concern from a global and/or European perspective, which elevates their priority for conservation consideration in Ireland. Two groups of species, seabirds (puffin *Fratercula arctica*, kittiwake *Rissa tridactyla* and razorbill *Alca torda*) and waders (oystercatcher *Haematopus ostralegus*, bar-tailed godwit *Limosa lapponica*, black-tailed godwit *Limosa limosa* and knot *Calidris canutus*) make up many of these now internationally important Irish populations.

Based on previous site survey reports and knowledge from other offshore wind farm assessments elsewhere in Ireland and the UK, there are several seabird species that are likely to be key species of focus for the EIAR for NISA due to their sensitivity to potential development effects. The likely species and their conservation designations are listed in **Table 5.12** below.

Table 5.12: Summary of key seabird species to be considered in the EIAR and their BOCCI and EC Birds Directive conservation designations.

Key species	Key season	BOCCI listing and EC Birds Directive conservation designations
Manx shearwater (*Puffinus puffinus*)	Breeding season – individuals migrate south for the non-breeding season, leaving the Irish Sea.	BOCCI Amber-listed Migratory species
Gannet (*Morus bassanus*)	Breeding season – majority of gannets move south during the non-breeding season.	BOCCI Amber-listed Migratory species
Shag (*Phalacrocorax aristotelis*)	Predominately breeding season.	BOCCI Amber-listed Migratory species
Herring gull (*Larus argentatus*)	All year.	BOCCI Amber-listed Migratory species
Great black-backed gull (*Larus marinus*)	Predominately breeding season, however some individuals are present all year around.	BOCCI Green-listed Migratory species

Key species	Key season	BOCCI listing and EC Birds Directive conservation designations
Kittiwake (*Rissa tridactyla*)	Displacement – predominately breeding season. Collision risk – all year around.	BOCCI Red-listed Migratory species
Little gull (*Hydrocoloeus minutus*)	Non-breeding season.	BOCCI Amber-listed
Common tern (*Sterna hirundo*)	Migration seasons – individuals migrate south for the non-breeding season, leaving the Irish sea.	BOCCI Amber-listed Annex I and migratory species
Arctic tern (*Sterna paradisaea*)	Migration seasons – individuals migrate south for the non-breeding season, leaving the Irish sea.	BOCCI Amber-listed Annex I and migratory species
Roseate tern (*Sterna dougallii*)	Breeding and migration seasons – individuals migrate south for the non-breeding season, leaving the Irish sea.	BOCCI Amber-listed Annex I and migratory species
Guillemot (*Uria aalge*)	Predominately breeding season.	BOCCI Amber-listed Migratory species
Razorbill (*Alca torda*)	Predominately breeding and post-breeding season.	BOCCI Red-listed Migratory species

A number of Special Protection Areas (SPAs) and Ramsar sites (belonging to the Natura 2000 site network) are within the vicinity of the proposed development. The NISA NIS Screening Report will consider, in full, any potential interaction between project related impacts and the designated features of Natura 2000 sites.

In addition to breeding seabirds, there are a number of migratory wildfowl, waders and passage migrant species that potentially may be recorded within the NISA development area at certain times of the year. These may be sensitive to the impacts arising from the proposed development, therefore potential impacts on these species will also be considered in the assessment.

5.7.5 Potential Impacts

DCCAE 2017 and 2018 guidelines have been used to inform the scope of the assessment for NISA and these identify the potential impacts relevant to offshore renewable energy projects. Consideration will be given to the potential impacts, presented in **Table 5.13**, that the proposed development including each phase of the development, will have on birds. Source-receptor-pathways are marked below by ticks and crosses for each phase of the development. For instance, the presence of the project infrastructure may be required for an impact, therefore would only be applicable to the operational phase of the proposed development and not be applicable to the construction and decommissioning phases.

Table 5.13: Potential impacts on offshore ornithology arising from the proposed development.

Potential Impact	Project Phase		
	Construction	O&M	Decommissioning
Disturbance from construction, maintenance, and decommissioning activities Construction, maintenance, and decommissioning activities such as increased vessel activity and installation works may result in direct disturbance or displacement of birds from important habitats, feeding and roosting areas.	✓	✓	✓
Operational disturbance and displacement from the array area The presence of the turbines and associated infrastructure has the potential to disturb and displace birds from within and around the array. This would have the potential to reduce the area available to birds for feeding or loafing.		✓	
Collision risk There is a risk of birds in flight colliding with rotating turbine blades. The susceptibility of species to collision risk depends upon physiological and behavioural characteristics of the species, in addition to the project design specifications.		✓	
Indirect impacts on prey species include those resulting from underwater noise (e.g. during piling) or the generation of suspended sediments (e.g. during preparation of the seabed for foundations) that may alter the distribution, physiology or behaviour of bird prey species and thereby have an indirect effect. These mechanisms could potentially result in less prey being available in the area adjacent to active construction works to foraging seabirds.	✓	✓	✓

5.7.6 Potential Mitigation Measures

A range of embedded mitigation measures, which are designed to minimise environmental effects, will be included within the project design parameters as part of an iterative process and these often relate to site layout, turbine height and blade clearance heights of turbines. Depending on the outcomes of site-specifc ornithological surveys, data analysis, collision risk assessment and displacement studies for key species, further specific mitigation may be required in consultation with key stakeholders. These may include the following options or a combination of these:

- Revisions to site layout and/or WTG parameters;
- Further post-consent bird monitoring programmes or the installation of cameras to verify significance of effects arising post-construction.

The adoption of any specific mitigation measures will be subject to specific detailed technical assessment and based upon outcomes of data analysis and modelling studies within the EIAR for individual key bird species, along with stakeholder engagement and consultation.

5.7.7 Proposed Approach to EIA

The site-specific survey data will be analysed and modelled in order to inform the baseline reporting which will be used for the ornithological impact assessment. The EIAR will include the following data analysis, following available industry guidance:

- **Breeding seabird regional reference populations** for breeding colonies within foraging range of NISA will be identified using relevant metrics as defined by Woodward *et al*. (2019) and other information where available. Populations will be determined for colonies which are identified to contribute to each species regional population, using the Seabird Monitoring Programme (SMP) colony count database, alongside Cummins *et al*. (2019) and any other relevant available information;
- **Distance analysis** will provide monthly population and bird density estimates for the key species. The analysis will follow a standard methodology for assessment of birds based on Buckland *et al*. (1993; 2001; 2004) distance sampling technique and the outputs will be monthly estimates of birds on the water and in flight for each of the key species. Maps showing seasonal species distributions will also be produced. In line with the guidance, the average density of flying birds along with a population estimate based on this density and the total area of the study area will be presented;
- **Collison risk modelling (CRM)** will be undertaken using industry-standard approaches (i.e., Band, 2012 or Stochastic CRM) to predict potential collision rates. The population-level impacts of the resulting potential additional mortality will be considered. The exact option and version of the collision risk model to be used, avoidance rates, flight height data, nocturnal activity rates and parameters for modelling will be based upon the best available evidence and will be agreed with stakeholders and clearly defined within assessment process;
- **Displacement analysis** will be undertaken using the SNCB matrix approach (JNCC, 2017). Species that will be included within the displacement analysis, including the species-specific mortality rates and displacement rates, will be based upon best available evidence and will be finalised once surveys are completed;
- **Apportioning** of the collision and displacement effects according to breeding colonies for each species will be undertaken following the SNH (2018) interim guidance, based on the distance, foraging area proportion and size of each colony; and

5.8 Offshore Designated Sites

5.8.1 Introduction

This section of the Scoping Report sets out the approach to the characterisation of offshore designated sites and presents the intended scope of and approach to the assessment of impacts on offshore designated sites.

Individual assessments completed for other environmental chapters of the EIAR will cross-reference to many of the designated sites presented within this chapter.

The assessments carried out on particular topical receptors associated with these designated sites will complement the nature conservation assessment, where the site and its ecosystem are addressed as a whole receptor.

For this scoping assessment, marine and intertidal designated sites that are connected to the boundary of the proposed development and the wider offshore regional extents are included within the baseline, which therefore includes offshore sites and those with site boundaries in the intertidal zone extending up to the High Water Mean (HWM) time mark.

The study area proposed for the EIAR will be reviewed and defined through reference to each individual technical discipline, with regard to the refinement of the offshore project design and components, the identification of additional impact pathways and in response to feedback from consultation. **Figure 5.14** illustrates the study area considered in this Scoping Report, which comprises the proposed development and a ZoI of 20km as defined within the Benthic and Intertidal Ecology chapter (**Section 5.4**) and the Fish and Shellfish (**Section 5.5**). Ornithology and Marine Mammal receptors tend to be mobile and have variable ranges (due to foraging and migration patterns), therefore it is not possible to apply a 'blanket' ZoI to these receptors. However, it is still a useful tool to identify the nearby designated sites.

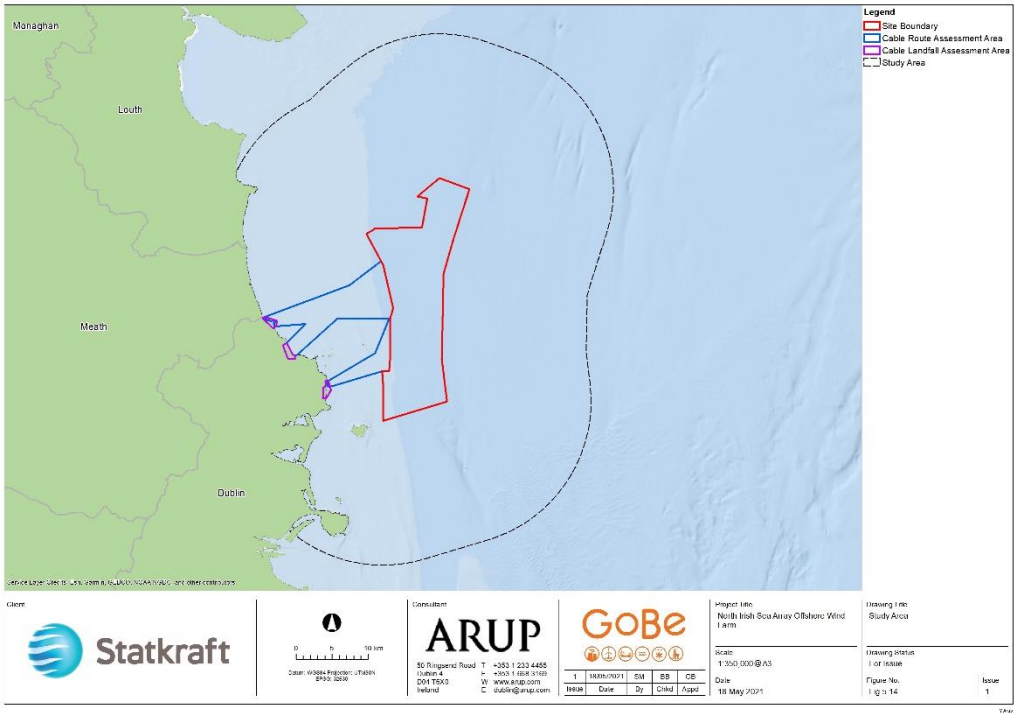


Figure 5.14: Designated Sites study area.

5.8.2 Policy and Guidance

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

Relevant policy and guidance are set out in **Sections 2.2** and **2.6.3** of this Scoping Report. The data acquisition and impact assessment included in the EIAR will also rely on the additional guidance relevant to specific nature conservation receptors, as well as more general resources that could be applied to specific types of designations (be it national or international), for example:

- OSPAR (2008). Guidance on Environmental Considerations for Offshore Wind Farm Development. Ref. 2008-3.

5.8.3 Data Sources and Baseline Methodology

The proposed approach to baseline characterisation and the methodology is set out in Section 2.3. Whilst this has informed the approach that will be used in this offshore designated sites section, it is necessary to set out how this methodology will be applied and adapted as appropriate, to address the specific needs of the assessment.

All designated sites (both existing and proposed) at European, national and local levels, which have features that could be impacted by the proposed development will be identified. It is anticipated that the current list of sites will be amended following consultation with relevant consultees and stakeholders. Further details on this are set out in **Section 3**. For European Sites, the AA screening process will build upon the ongoing ornithological, marine mammal and benthic surveys in order to add or remove sites as necessary depending upon connectivity (see **Section 2.4**).

A desk-based review of publicly available literature from statutory bodies such as the National Parks and Wildlife Service (NPWS) of the Department of Housing Local Government and Heritage (DHLGH), has been used to detail the extent, location, character and any associated conservation and management objectives of subtidal and intertidal designated sites. Regional and site-specific studies will also be key sources of information to this chapter. For example, specific datasets on the presence of potential Annex I features such as biogenic and geogenic reef will be used to map and assess the extent of these feature as part of the EIA.

5.8.4 Receiving Environment

There are several international, national and local designations (statutory and non-statutory) of relevance to NISA offshore, along the coastline and onshore. This section provides an overview of the designated sites relevant to the intertidal and offshore works. The onshore designated sites are addressed within Section 5 of this scoping report.

5.8.4.1 National Marine Planning Framework (NMPF)

The Government of Ireland has recently (May 2021) published the NMPF, which is a national plan for Ireland’s maritime area and will contribute to the effective management of marine activities and more sustainable use of Ireland’s marine resources. The NMPF will enable the Government of Ireland to manage its seas more strategically and efficiently and it will provide the framework to inform decisions about the current and future development of the maritime area, aiming to integrate needs (DHLGH, 2019).

The aim is to provide a single plan for the entire maritime area, with the possibility of more detailed regional plans being produced at a later date (DHLGH, 2019).

5.8.4.2 Water Framework Directive (WFD)

The WFD (200/60/EC) establishes a framework for an integrated approach to the protection, improvement and sustainable use of Europe's water bodies, and requires all member states to achieve good ecological and chemical status of their water bodies (including coastal waters up to 1 nautical mile (nm) offshore) by 2015. Under the WFD, the Environment Protection Agency (EPA) is responsible for monitoring water quality and reports in Ireland. More detail on sites relevant to the WFD are covered in **Section 5.3**.

5.8.4.3 Natura 2000 sites

Natura 2000 European Network designations in Ireland, defined in S.177R of the Planning and Development Act 2000, as amended. The following paragraphs provide an overview of Natura 2000 sites designated under the Habitats Directive and Birds Directive. Relevant sites in the vicinity of NISA are presented in **Figure 5.15**.

Special Areas of Conservation (SACs)

SACs are sites designated under the Habitats Directive, as they make a significant contribution to conserving the habitat types and species identified in Annexes I and II of the Directive. SACs identified as potentially being of relevance to the proposed development are detailed in **Table 5.14**.

Table 5.14: SACs of relevance to the proposed development.

Site	Location	Features or description
Baldoyle Bay SAC	Approximately 13.5km south of NISA development boundary	The site is designated for Annex I habitats including estuaries, tidal mudflats and sandflats, *Salicornia* mud, Atlantic and Mediterranean salt meadows. The site is also an important bird area and part of it is a SPA, as well as being a Statutory Nature Reserve.
Boyne Coast and Estuary SAC	Approximately 16km west of NISA development boundary	The site is of considerable conservation interest as a coastal complex that supports good examples of Annex I habitats, and for the important bird populations that it supports. The designated Annex I habitats include estuaries, tidal mudflats and sandflats, *Salicornia* mud, Atlantic and Mediterranean Salt Meadows.
Carlingford Shore SAC	Approximately 28km north of NISA development boundary	The site has a wide diversity of habitats including Annex I perennial vegetation of stony banks and drift lines habitat. The wide area of intertidal flats within the site is internationally important for birds and is designated as a SPA. EU Habitats Directive Annex II species, grey seal is present at the site.
Clogher Head SAC	Approximately 16.5km north-west of NISA development boundary	This site supports one of the best-known examples of coastal heath in Co. Louth. It contains two habitats listed on Annex I of the EU Habitats Directive, vegetated sea cliffs and dry heath, and supports a good diversity of coastal heath plants.

Site	Location	Features or description
Codling Fault Zone SAC	Approximately 20.5km south-east of NISA development boundary	The site is of high conservation importance, due to the presence of the Annex I habitat submarine structures made by leaking gases and its associated fauna.
Dundalk Bay SAC	Approximately 29.7km north-west of NISA development boundary	The site is designated for Annex I habitats including estuaries, tidal mudflats and sandflats, *Salicornia* mud, Atlantic and Mediterranean salt meadows.
Howth Head SAC	Approximately 26.5km south-west of NISA development boundary	The site supports two Annex I of the EU Habitats Directive, vegetated sea cliffs and dry heath. The site is also of scientific importance for its seabird colonies.
Ireland's Eye SAC	Approximately 12km south of NISA development boundary	The site is designated for two Annex II habitats, sea cliffs and shingle, which support nationally important seabird colonies.
Lambay Island SAC	Lies approximately 1.9km to the south-west of NISA development boundary	The site has Annex I vegetated sea cliffs, that hold internationally important populations of seabirds. The site is also of conservation importance for the populations of Annex II listed grey seal and common seal species.
Malahide Estuary SAC	Approximately 10km south-west of NISA development boundary	The site is designated for Annex I habitats including estuaries, tidal mudflats and sandflats, *Salicornia* mud, Atlantic and Mediterranean salt meadows. The site is important ornithologically, with an internationally significant population of brent goose.
North Dublin Bay SAC	Approximately 16km south of NISA development boundary	The site is designated for Annex I habitats including estuaries, tidal mudflats and sandflats, *Salicornia* mud, Atlantic and Mediterranean salt meadows.
Rockabill to Dalkey Island SAC	Lies adjacent to the south-west of NISA development boundary	The site designation represents a key habitat for the Annex II species harbour porpoise, and Annex I reef habitat within the Irish Sea.
Rogerstown Estuary SAC	Approximately 8km south-west of NISA development boundary	The site is an internationally important waterfowl site and has been a breeding site for little terns. It is designated for Annex I habitats including estuaries, tidal mudflats and sandflats, *Salicornia* mud, Atlantic and Mediterranean salt meadows.

Special Protection Areas (SPAs)

SPAs are sites designated under the EU Directive on the Conservation of Wild Birds. Under the Directive, Member States of the EU have a duty to safeguard the habitats of migratory birds and certain particularly threatened bird species. SPAs considered of relevance to the proposed development are detailed in **Table 5.15.**

Table 5.15: SPAs of relevance to the proposed development.

Site	Location	Features or description
Baldoyle Bay SPA	Approximately 16km west of NISA development boundary	This site is of high conservation importance for the following species: brent goose, shelduck, ringed plover, golden plover, grey plover and bar-tailed godwit. Wetlands form part of the SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.
Boyne Estuary SPA	Approximately 16km west of NISA development boundary	This site is of conservation interest for the following species: shelduck, oystercatcher, golden plover, grey plover, lapwing, knot, sanderling, black-tailed godwit, redshank, turnstone and little tern. Wetlands form part of the SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds, with parts of the SPA designated as Wildfowl Sanctuary.
Carlingford Lough SPA	Approximately 28km north-west of NISA development boundary	This site is of international importance for its brent goose population. Of note is the occurrence of Annex I bar-tailed godwit. Wetlands form part of the SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds
Dalkey Islands SPA	Approximately 14km south-west of NISA development boundary	This site is of conservation interest for the following Annex I species: roseate tern, common tern and Arctic tern. The SPA is used by these tern species as a major post-breeding / pre-migration autumn roost area.
Dundalk Bay SPA	Approximately 21.5km north-west of NISA development boundary	One of the most important wintering waterfowl sites in the country and regularly supports more than 20,000 waterbirds. The site is of conservation interest for the following species: great crested grebe, greylag goose, brent goose, shelduck, teal, mallard,

Site	Location	Features or description
		pintail, common scoter, red-breasted merganser, oystercatcher, ringed plover, golden plover, grey plover, lapwing, knot, dunlin, black-tailed godwit, bar-tailed godwit, curlew, redshank, black-headed gull, common gull and herring gull. Wetlands form part of the SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds, with parts of the SPA designated as Wildfowl Sanctuary.
Howth Head Coast SPA	Approximately 26.5km south-west of NISA development boundary	This site is of high ornithological importance and conservation interest as it supports a nationally important population of kittiwake. It is also a traditional nesting site for the Annex I species peregrine falcon.
Ireland's Eye SPA	Approximately 12km south of NISA development boundary	The site is of high ornithological importance and special conservation interest for the following species: cormorant, herring gull, kittiwake, guillemot and razorbill. Several pairs each of Shelduck, Oystercatcher and Ringed Plover breed. The island is also a traditional site for peregrine falcon, a species that is listed on Annex I of the EU Birds Directive. In winter small numbers of greylag goose and pale-bellied brent goose graze on the island and it is used as a roost site by gulls and some waders.
Lambay Island SPA	Lies approximately 1.9km to the south-west of NISA development boundary	The site is of conservation interest for the following species: fulmar, cormorant, shag, greylag goose, lesser black-backed gull, herring gull, kittiwake, guillemot, razorbill and puffin. The site is also of special conservation interest for holding and assemblage of over 20,000 breeding seabirds. Along with the presence of Annex I peregrine falcon at the site.

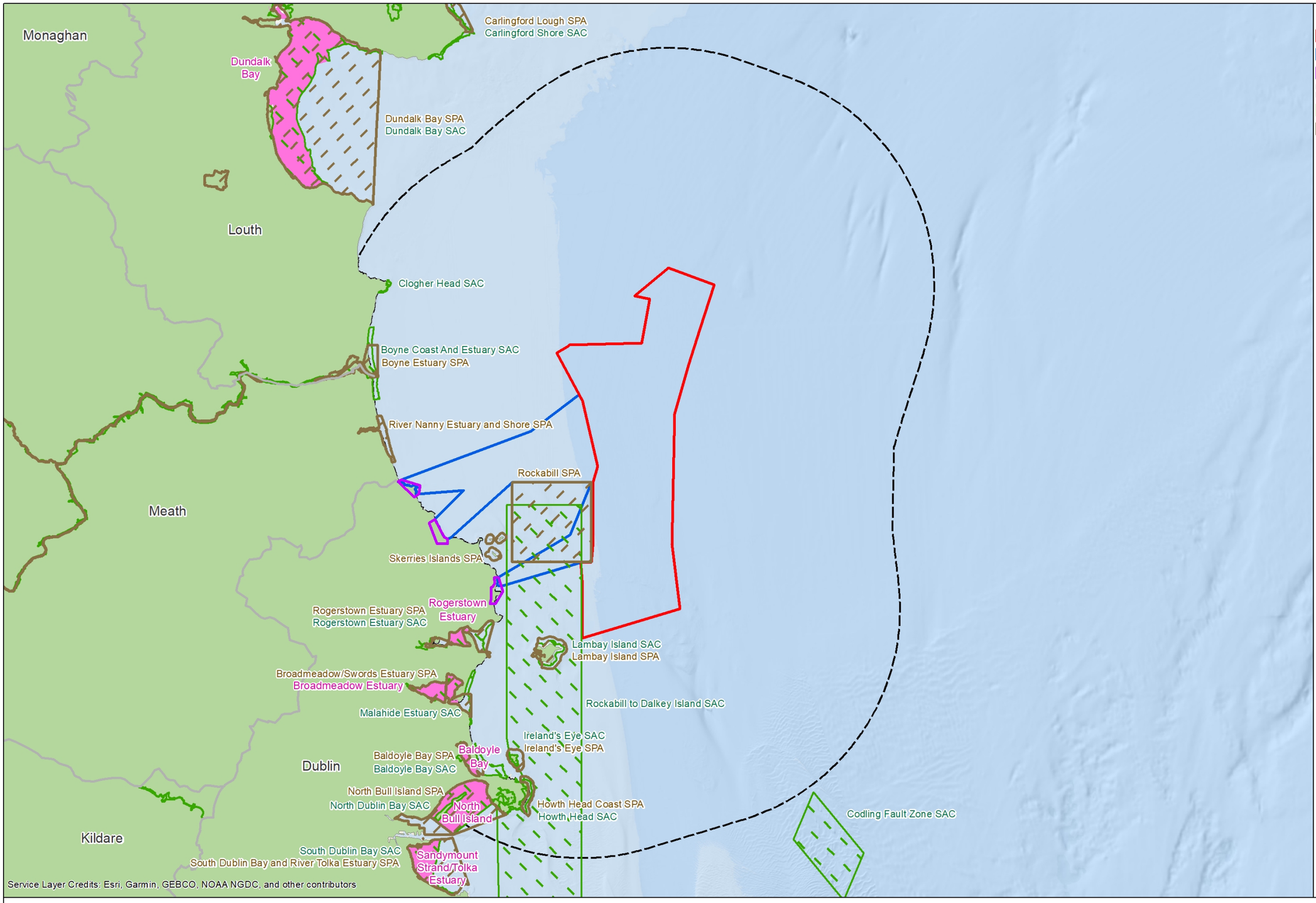
Site	Location	Features or description
Malahide Estuary SPA (also know as the Broadmeadow / Swords Estuary SPA)	Approximately 10km south-west of NISA development boundary	The site provides both feeding and roosting areas for a range of wintering waterfowl and is of high conservation importance for the following species: great crested grebe, brent goose, shelduck, pintail, goldeneye, red-breasted merganser, oystercatcher, golden plover, grey plover, knot, dunlin, black-tailed godwit, bar-tailed godwit and redshank. Wetlands form part of the SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.
North Bull Island SPA	Approximately 16km south of NISA development boundary	The site is of conservation interest for the following species: brent goose, shelduck, teal, pintail, shoveler, oystercatcher, golden plover, grey plover, knot, sanderling, dunlin, black-tailed godwit, bar-tailed godwit, curlew, redshank, turnstone and black-headed gull. The site is also of special conservation interest for holding an assemblage of over 20,000 wintering waterbirds. Wetlands form part of the SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds, with the site also designated as a Wildfowl Sanctuary.
River Nanny Estuary and Shore SPA	Approximately 17.5km west of NISA development boundary	The site is of conservation interest for the following species: oystercatcher, ringed plover, golden plover, knot, sanderling and herring gull. Wetlands form part of the SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.
Rogerstown Estuary SPA	Approximately 8km south-west of NISA development boundary	The site is of conservation interest for the following species: greylag goose, brent goose, shelduck, shoveler, oystercatcher, ringed plover, grey plover, knot, dunlin,

Site	Location	Features or description
		black-tailed godwit and redshank. Wetlands form part of the SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds. The SPA is also designated as Wildfowl Sanctuary.
Rockabill SPA	Lies adjacent to the south-west of NISA development boundary	This site is of ornithological importance as it supports the most important roseate tern colony in Europe. The site also supports nationally important breeding populations of common tern and Arctic tern and a nationally important wintering population of purple sandpiper. All three species of tern which occur are listed on Annex I of the Birds Directive.
Skerries Islands SPA	Approximately 8.2km west of NISA development boundary	Comprising of three islands this site is of high ornithological importance for both breeding seabirds and wintering waterfowl. The site is of conservation interest for the following species: cormorant, shag, brent goose, purple sandpiper, turnstone and herring gull. Wetlands form part of the SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds. There is also the presence of Annex I golden plover and short-eared owl at the site.
South Dublin Bay and River Tolka Estuary SPA	Approximately 22.5km south-west of NISA development boundary	The site is of conservation interest for the following species: brent goose, oystercatcher, ringed plover, grey plover, knot, sanderling, dunlin, redshank, black-headed gull, including Annex I species, bar-tailed godwit, roseate tern, common tern and Arctic tern. Wetlands form part of the SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

Site	Location	Features or description
		It is also a significant site for wintering gulls, with a nationally important population of black-headed gull, but also common gull and herring gull

Ramsar

Ramsar sites are wetlands of international importance that have been designated and protected by the NPWS under the International Ramsar Convention (the Convention on Wetlands of International Importance), for containing representative, rare or unique wetland types or for their importance in conserving biological diversity. Ramsar sites of relevance to the proposed development include Baldoyle Bay, Broadmeadow Estuary, Dundalk Bay, North Bull Island, Rogerstown Estuary and Sandymount Strand/Tolka Estuary.



Client

Statkraft

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Datum: WGS84 Projection: UTM30N
EPSG: 32630

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Issue	Date	By	Chkd	Appd
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North Irish Sea Array Offshore Wind Farm

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18 May 2021

Drawing Title
International Designated Sites

Drawing Status
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Fig 5.15

Issue
1

5.8.4.4 Statutory National Designations

At a national level and within the vicinity of the proposed development include OSPAR Marine Protected Areas (MPAs), Natural Heritage Areas (NHAs), Refuges for Fauna and Statutory Nature Reserves.

Under the OSPAR Convention to Protect the Marine Environment of the North-East Atlantic, Ireland committed to establishing marine protected areas to protect biodiversity (i.e., OSPAR MPAs). MPA designations are determined by the DHLGH however, currently, there is no definition or legislation of MPAs in Irish law (Marine Protected Area Advisory Group, 2020). Therefore, Ireland has designated a number of its SACs (under the EU Habitats Directive) as OSPAR MPAs for marine habitats. The OSPAR MPAs of relevance to the proposed development are presented in **Table 5.16** and **Figure 5.16**.

The basic designation for wildlife in Ireland is the NHA. This is an area considered important for the habitats present or which holds species of plants and animals whose habitat needs protection. Under Section 18 of the Wildlife Amendment Act (2000), NHAs are designated by ministerial order and legally protected from damage from the date they are formally proposed for designation. The NHA of relevance to the proposed development is presented in **Table 5.16 and Figure 5.16. There** are also ten proposed NHA (pNHA) which include the following sites:

- Baldoyle Bay pNHA;
- Howth Head pNHA;
- Ireland's Eye pNHA;
- Lambay Island pNHA;
- Malahide Estuary pNHA;
- North Dublin Bay pNHA;
- Portrane Shore pNHA;
- Rockabill to Dalkey Island pNHA;
- Rockabill Island pNHA; and
- Rogerstown Estuary pNHA.

Refuges for Fauna are designated by ministerial order under Section 17 of the Wildlife Act 1976 as amended by Section 28 of the Wildlife (Amendment) Act 2000. The designation’s main use in Ireland has been in protecting breeding bird species on marine cliffs and small islands where there is no threat of potentially damaging activities due to these site’s inaccessibility. The Refuge for Fauna of relevance to the proposed development is presented in **Table 5.16 and Figure 5.16.**

Statutory Nature Reserves are areas important to wildlife that has received protection under Ministerial Order via the Wildlife Act (1976) and Wildlife Amendment Act (2000). The Statutory Nature Reserves of relevance to the proposed development are presented in **Table 5.16 and Figure 5.16.**

Table 5.16: Statutory national designations of relevance to the proposed development.

Site	Location relative to NISA	Features or description
Dundalk Bay OSPAR MPA	Approximately 29.7km north-west of NISA development boundary	The site is designated for Annex I habitats including estuaries, tidal mudflats and sandflats, *Salicornia* mud, Atlantic and Mediterranean salt meadows.
Malahide Estuary OSPAR MPA	Approximately 10km south-west of NISA development boundary	The site is designated for Annex I habitats including estuaries, tidal mudflats and sandflats, *Salicornia* mud, Atlantic and Mediterranean salt meadows. The site is important ornithologically, with an internationally significant population of brent goose.
North Dublin Bay OSPAR MPA	Approximately 16km south of NISA development boundary	The site is designated for Annex I habitats including estuaries, tidal mudflats and sandflats, *Salicornia* mud, Atlantic and Mediterranean salt meadows.
Skerries Islands NHA	Approximately 8.2km west of NISA development boundary	Comprising of three islands this site is of high ornithological importance for both breeding seabirds and wintering waterfowl.
Rockabill Island Refuge for Fauna	Lies 1.6km west of NISA development boundary	Rockabill Island is designated for roseate tern and protects the roseate tern, their eggs and their nests from human destruction and modification.
Baldoyle Estuary Nature Reserve	Approximately 13.5km south of NISA development boundary	The reserve is of international importance as a wintering area for brent geese. Wading birds that winter at Baldoyle include black-tailed godwits, redshanks and curlews.
North Bull Island Nature Reserves	Approximately 16km south of NISA development boundary	The reserves are of international scientific importance for brent geese and also on botanical, ornithological, zoological and geomorphological grounds.
Rogerstown Estuary Nature Reserve	Approximately 8km south-west of NISA development boundary	the reserve's brackish grasslands and inter-tidal creeks are extremely important for birds, providing safe roosting sites for thousands of wintering wildfowl and waders.

5.8.4.5 National Biodiversity Action Plan (NBAP)

The United Nations Convention of Biological Diversity (also referred to as the Rio Convention) and entered into force in 1993. It was the first treaty to provide a legal framework for biodiversity conservation and included calls for national strategies and action plans to 'conserve, protect and enhance biological diversity'.

Ireland launched its first NBAP in 2002 with much at the NBAP legislated for by the Wildlife Act, 1976, as amended by the Wildlife (Amendment) Act, 2000. The third NBAP for Ireland which covers a five-year period between 2017-2021, provides a framework to track and assess progress towards Ireland's Vision for Biodiversity (Department of Tourism, Culture, Arts, Gaeltacht, Sport and Media (DTCAGSM), 2017).

The NBAP captures the objectives, targets and actions for biodiversity that will be undertaken by a wide range of government, civil society and private sectors to achieve Ireland's Vision for Biodiversity (DTCAGSM, 2017).

The NBAP 2017-2021 has seven objectives including to "*Conserve and restore biodiversity and ecosystem services in the marine environment*" and to "*Expand and improve management of protected areas and species*". The NBAP notes that pressures from human activities on Ireland's coastal and marine biodiversity and ecosystem services arise from a growing range of sources including nutrient and chemical discharge from human activities and through direct physical disturbance and habitat degradation.

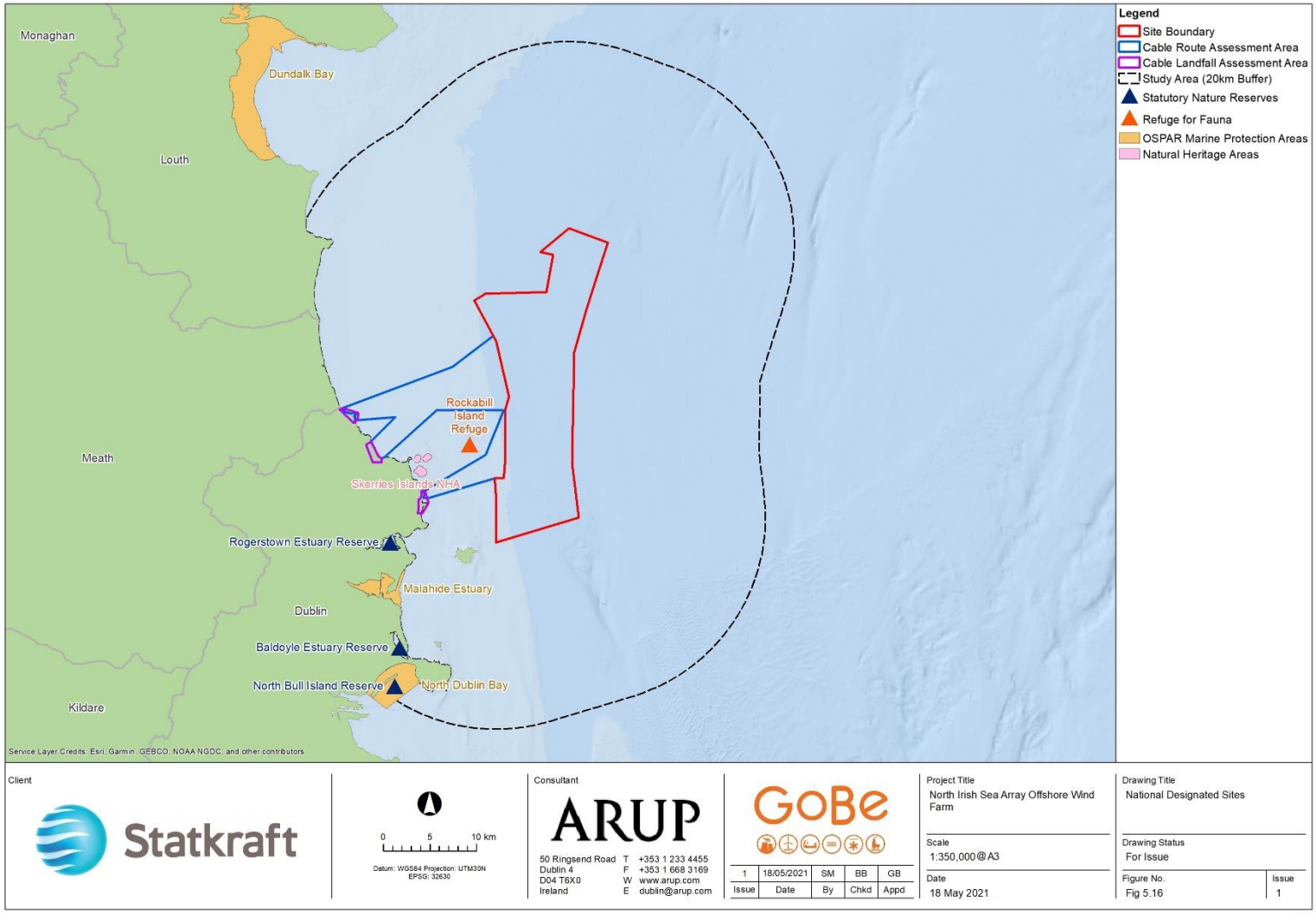


Figure 5.16: National designated sites.

5.8.5 Potential Impacts

Consideration will be given to the following potential impacts on infrastructure and other uses arising from the proposed development and within each phase of development as presented in **Table 5.17**. The cells shaded in grey indicate that, based on the information currently available there is no source-receptor-pathway for that phase of the development. For instance, the impact may require the presence of project infrastructure and so would not be applicable to the construction and decommissioning phases of the proposed development.

Table 5.17: Potential impacts proposed to be scoped in for the Designated Sites EIAR chapter.

Potential Impact	Project Phase		
	Construction	Operation and Maintenance	Decommissioning
Direct impact to designated features from the subsea export cable corridor (southern option) The impacts to the features of designated sites will be assessed within corresponding benthic and intertidal ecology, offshore ornithology and the marine mammal ecology chapters.	✓	✓	✓
Temporary increase in suspended sediment and sediment deposition on designated features The ecological features of designated sites will be assessed within the benthic and intertidal ecology chapter and the fish and shellfish ecology chapter.	✓		✓
Impacts to mobile features of designated sites Mobile features of designated sites such as birds and marine mammals will be assessed within the offshore ornithology and marine mammal ecology chapters.	✓	✓	✓
Long-term effects to physical processes and seabed composition from infrastructure The impacts associated with long-term changes to physical processes and seabed composition will be assessed in the marine geology, oceanography and physical processes chapter and benthic and intertidal ecology chapter.		✓	

It should be noted that if the northern or central subsea export cable corridor options are selected as detailed in **Section 4** the "*Direct impact to designated features from the subsea export cable corridor*" will no longer be considered applicable as these two subsea export cable corridor options do not physically overlap any designated site. Therefore, this impact has the potential to be scoped out of further assessment in the EIAR.

5.8.6 Potential Mitigation Measures

As part of the design process for the array area and subsea export cable corridor, a number of embedded mitigation measures are anticipated to reduce the potential for impacts on offshore designated site receptors. These will evolve over the development process as the EIA progresses and in response to consultation and potentially from the provision of further data.

Potential mitigation measures that may be considered as part of the proposed development may include:

- Site-specific ecological and ornithological surveys to fully identify the existing populations and communities of species and habitats and their extents and distribution.
- Through an iterative design process, sympathetic micrositing and routeing of cabling and locating of wind turbine foundations so as to avoid, or reduce, potential effects upon designated sites and their features.
- The inter-array cables will typically be buried at a target burial depth of 1m below the seabed surface. The final depth of the cables will be dependent on the seabed geological conditions and the risks to the cable (e.g., from anchor drag damage).
- Following physical processes modelling, a Scour Protection Management Plan will be developed. It will include details of the need, type, quantity and installation methods for scour protection.
- Where possible, cable burial will be the preferred option for cable protection. Cable burial will be informed by the cable burial risk assessment and detailed within the Cable Specification Plan.
- Monitoring of vessel traffic will be undertaken for the duration of the construction period.
- A Vessel Management Plan (VMP) will be developed pre-construction.
- Preparation of a Marine Mammal Mitigation Protocol (MMMP) which will be implemented during construction. The MMMP will include details of soft starts to be used during piling operations with lower hammer energies used at the beginning of the piling sequence before increasing energies to the higher levels.
- Preparation of a Marine Pollution Contingency Plan (MPCP) which will outline procedures to protect personnel working and to safeguard the marine environment and mitigation measures in the event of an accidental pollution event arising from offshore operations relating to NISA. The MPCP will also include relevant key emergency contact details.

The requirement and feasibility of any mitigation measures will be dependent on the significance of the effects on offshore designated sites and will be consulted upon with statutory consultees throughout the EIA process.

5.8.7 Proposed Approach to EIA

The EIAR will consider the potential impacts of the construction, operational and maintenance and decommissioning phases of the proposed development on offshore designated site receptors.

All designated sites at European, national and local levels, which have features that could be impacted by development will be identified. The baseline information on designated features will be informed by the technical assessments provided in relevant aspects of the EIAR (as listed in **Section 5.8.1**) as well as the AA which will be undertaken.

Consultation will be held with relevant statutory and non-statutory organisations as necessary, as set out in **Section 3**. Key consultees of relevance to the Offshore Designated Sites chapter include the NPWS under the DHLGH, the Marine Institute, Irish Whale and Dolphin Group and Birdwatch Ireland. Consultee responses will be fully considered and addressed as far as possible, and where relevant the scope of the assessment and current list of sites will be modified accordingly within the EIAR to reflect stakeholder engagement and consultation exercises.

5.9 Commercial Fisheries

5.9.1 Introduction

This section of the Scoping Report identifies the commercial fisheries receptors of relevance to the NISA project area. It describes the potential effects from construction, operation (including maintenance) and decommissioning of the offshore components of the NISA project on commercial fisheries and sets out the proposed scope of the EIA. The proposed methods for the EIA are also presented.

Commercial fisheries interfaces with other aspects and as such, should be considered alongside the Fish and Shellfish Ecology and Shipping and Navigation assessments.

5.9.2 Policy and Guidance

The commercial fisheries impact assessment will comply with EIA regulations and guidance set out in **Section 2.6.3** of this Scoping Report. Specific to the assessment of impacts to commercial fisheries, the following guidance will also be considered:

- Best Practice Guidance for Fishing Industry Financial and Economic Impact Assessments (United Kingdom Fisheries Economic Network [UKFEN] and Seafish, 2012);
- Economic Impact Assessments of Spatial Interventions on Commercial Fishing: Guidance for Practitioners. Second Edition (Seafish and UKFEN, 2013);
- Fisheries Liaison with Offshore Wind and Wet Renewables group (FLOWW) Recommendations for Fisheries Liaison: Best Practice guidance for offshore renewable developers (FLOWW, 2014);
- FLOWW Best Practice Guidance for Offshore Renewables Developments: Recommendations for Fisheries Disruption Settlements and Community Funds (FLOWW, 2015);
- Options and opportunities for marine fisheries mitigation associated with wind farms (Blyth-Skyrme, 2010a);

- Developing guidance on fisheries Cumulative Impact Assessment for wind farm developers (Blyth-Skyrme, 2010b); and
- Guidance on Environmental Considerations for Offshore Wind Farm Development (OSPAR, 2008).

While much of the above listed guidance has been developed in relation to the UK, they are applicable to global offshore wind farm developments where commercial fisheries interactions are assessed.

5.9.3 Data Sources and Baseline Methodology

The NISA project area is located within the northern portion of the ICES Division 7a (VIIa) (Irish Sea) statistical area[9]. For the purpose of recording fisheries landings, ICES Division 7a is divided into statistical rectangles which are consistent across all Member States operating in the Irish Sea.

The NISA array area and export cable corridor assessment area are located within ICES rectangles 36E3 and 36E4, which represents the commercial fisheries study area for this scoping exercise. The study area is shown in **Figure 5.17**.

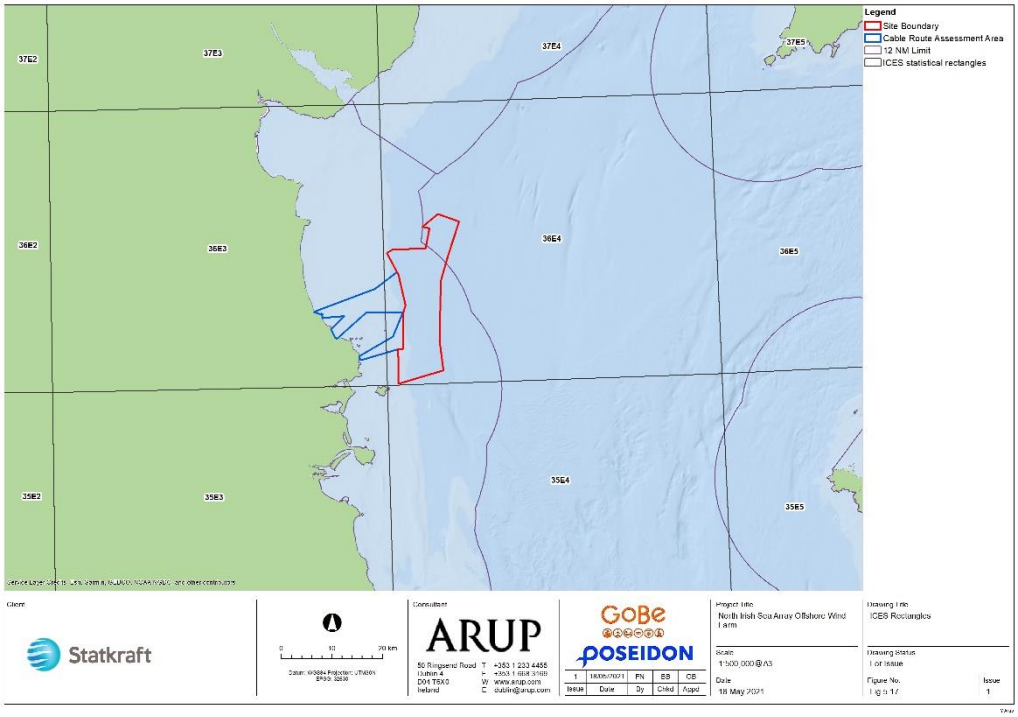


Figure 5.17: Commercial fisheries study area, comprising ICES rectangles 36E3 and 36E4.

An initial desk-based review of literature and data sources was undertaken to support this scoping exercise, as presented in **Table 5.18** below.

[9] ICES standardise the division of sea areas to enable statistical analysis of data. Each ICES statistical rectangle is '30 min latitude by 1-degree longitude' in size (approximately 30 x 30 nautical miles). A number of rectangles are amalgamated to create ICES statistical areas.

Table 5.18 also identifies additional sources of information that would be expected to inform assessment in the EIAR.

Table 5.18: Key sources of commercial fisheries data.

Source	Summary	Temporal and spatial coverage
Landings statistics		
Sea Fisheries Protection Agency (SFPA)	Landings statistics data for Irish-registered vessels, with data query attributes for: year, species, ICES division and weight of landing (kg).	2015-2019 Irish vessels All sea areas
European Union (EU) Data Collection Framework (DCF) database	Landings statistics for EU registered vessels with data query attributes for: landing year; landing quarter; ICES rectangle; vessel length; gear type; species; and, landed weight (tonnes)	2012-2016 All EU vessels (including UK) Irish Sea and ICES rectangles 35E3 and 35E4
Marine Management Organisation (MMO)	Landings statistics data for UK-registered vessels, with data query attributes for: landing year; landing month; vessel length category; ICES rectangle; vessel/gear type; port of landing; species; live weight (tonnes); and value.	2015-2019 UK vessels Irish Sea and ICES rectangles 35E3 and 35E4
SFPA (to be sourced for EIAR)	Landings to Irish ports with data query attributes for species, landed value and landed weight.	2015 – 2019 Irish vessels Irish ports
Spatial data and Vessel Monitoring System (VMS) data		
International Council for the Exploration of the Sea (ICES)	VMS data for EU registered vessels <12m in length with data query attributes for time fishing at a resolution of 1/200th of an ICES rectangle amalgamated for a variety of mobile and static gear types.	2017 All EU vessels (including UK) Irish Sea and ICES rectangles 35E3 and 35E4
Scientific, Technical and Economic Committee for Fisheries (STECF) (to be sourced for EIAR)	Spatial landings data for all EU Member State vessels (including UK) fishing in the Irish Sea indicating value of landings in 2019 by gear type, including, otter trawl, beam trawl, pots and dredge.	2019 EU vessels Irish Sea
ICES (to be sourced for EIAR)	VMS polygon data showing the outer extent of historical king scallop fishing activity in the Irish Sea with individual jurisdiction for British, Northern Irish and Irish vessels.	UK and Isle of Man: 2009-2017 Northern Ireland: 2012-2016 Ireland: 2012-2019 UK and Irish vessels Irish Sea
Marine Institute (to be sourced for EIAR)	Polygon data showing the outer extent of fishing activity for potting vessels <15m in length.	Irish vessels Irish Sea and wider Irish coast
Other data and information		
Marine Institute	Western Irish Sea *Nephrops* Grounds annual survey reports.	Annually up to 2020

Source	Summary	Temporal and spatial coverage
(to be sourced for EIAR)		Western Irish Sea *Nephrops* Grounds
Marine Institute (to be sourced for EIAR)	The Stock Book, providing information on stock status and scientific advice for species exploited by the Irish fishing fleet.	Annually up to 2020 Irish waters
Marine Institute (to be sourced for EIAR)	Atlas of commercial fisheries around Ireland. Atlas of commercial fisheries for shellfish around Ireland.	Published 2014 and 2017 Irish waters
ICES	Stock assessments for key species being landed.	Annually up to 2020
EU Market Observatory for Fisheries and Aquaculture (EUMOFA)	First sales value of species landed by EU Member States and the UK.	Data available across long-term time series All EU Member States (including UK)

It should be noted that the quantitative datasets identified in **Table 5.8** may not capture all fishing activity in the commercial fisheries study area. For instance, the VMS datasets only covers vessels ≥12 m (ICES data) in length. However, other published data does provide a useful insight into fishing activity undertaken in inshore areas (e.g., Marine Institute publications) and consultation with fisheries stakeholders and industry is expected to further inform assessment in the EIAR. Consultation will be undertaken to seek to corroborate the findings of desk-based baseline data analysis and to provide insight into specific fishing grounds and activity of any vessels active in the area. Consultation will also be important to inform gear specifications for vessels active in the area, which will allow a full understanding of how they may be affected.

NISA have been undertaking Afloat surveys to identify the static fisheries in around the area of the NISA project area. These surveys commenced in August 2020 and have been undertaken on an approximately monthly basis since (weather permitting) and remain ongoing. During the survey a vessel traverses the areas and records observation of fishing activities. Survey details will be provided in the EIAR.

5.9.4 Receiving Environment

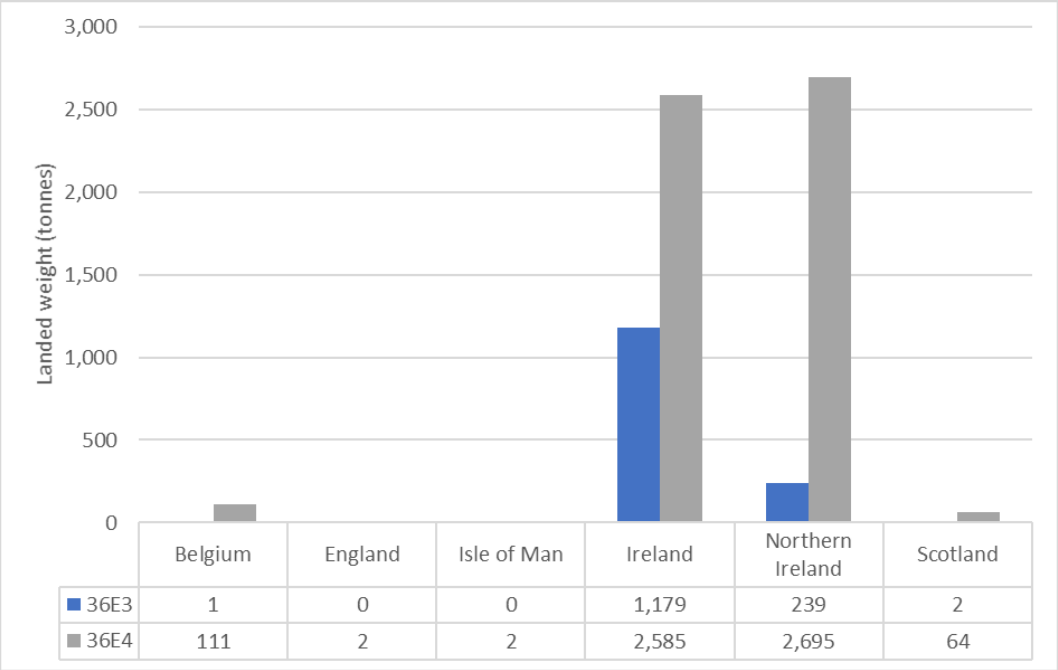
Landings data from the sources identified in **Table 5.8** above indicates that fishing activity in the commercial fisheries study area is dominated by vessels from Ireland and Northern Ireland, targeting shellfish species and in particular deploying otter trawls to catch *Nephrops norvegicus* (also referred to as Norway lobster or Dublin Bay prawn).

An overview of fishing activity in ICES rectangle 36E3, within which the NISA export cable corridor assessment areas are located, and ICES rectangle 36E4, within which the NISA array area is located, is provided in **Table 5.19**.

Table 5.19: Overview of fishing activity in ICES rectangles 36E3 and 36E4, which comprise the commercial fisheries study area.

ICES rectangle 36E3	ICES rectangle 36E4
Nationality of fishing vessels	
Ireland Northern Ireland	Northern Ireland Ireland Low levels of activity by other EU vessels (Belgium) and other UK vessels (Scotland)
Fishing vessel size	
Majority of landings by vessels between 10-15m length	Majority of landings by vessels over 15m length
Key species and target method (i.e. gear type)	
Razor clam (dredging) Nephrops (otter trawling) Brown crab (potting) Cockles (dredging) Whelk (potting)	*Nephrops* (otter trawling) Relatively small volumes of other species landed (dredging and potting)
Total landings volumes – Irish vessels (2015-2020 annual average based on SFPA, 2021)	
920 tonnes	2,970 tonnes
Total landings volumes – UK vessels (2015-2019 annual average based on MMO, 2020)	
180 tonnes	2,660 tonnes
Total landings volumes – Other EU vessels (2012-2016 annual average, based on EU DCF, 2021)	
-	100 tonnes (Belgian vessels only)

Total landings from ICES rectangle 36E4 are significantly higher than those from ICES rectangle 36E3 (**Figure 5.18**). *Nephrops* account for 80% of the total volume of landings from ICES rectangle 36E4 (**Figure 5.20**), with a variety of fish and shellfish species accounting for the remaining 20% (EU DCF, 2021). Landings of razor clams *Ensis* spp. and *Nephrops* each account for approximately 30% of the total volume of landings from ICES rectangle 36E3 (**Figure 5.19**), with other shellfish species accounting for the remainder (EU DCF, 2021).



	Belgium	England	Isle of Man	Ireland	Northern Ireland	Scotland
36E3	1	0	0	1,179	239	2
36E4	111	2	2	2,585	2,695	64

Figure 5.18: Average annual landings (2012-2016) from the commercial fisheries study area, by vessel nationality and ICES rectangle (EU DCF, 2021).

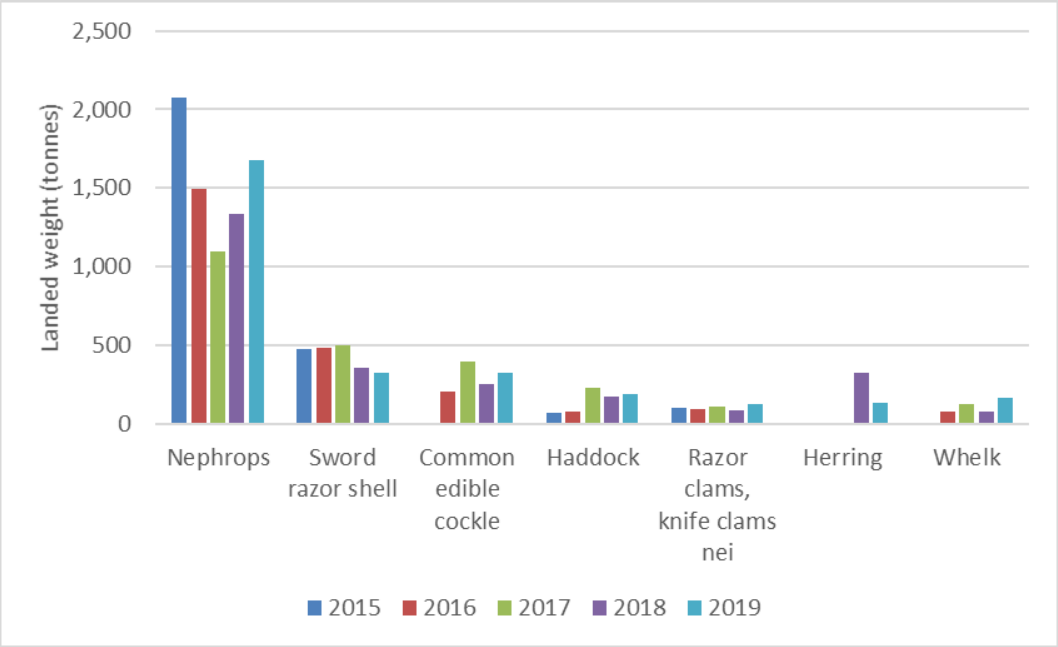


Figure 5.19: Top seven species by landed weight, landed from the commercial fisheries study area by Irish vessels (SFPA, 2021).

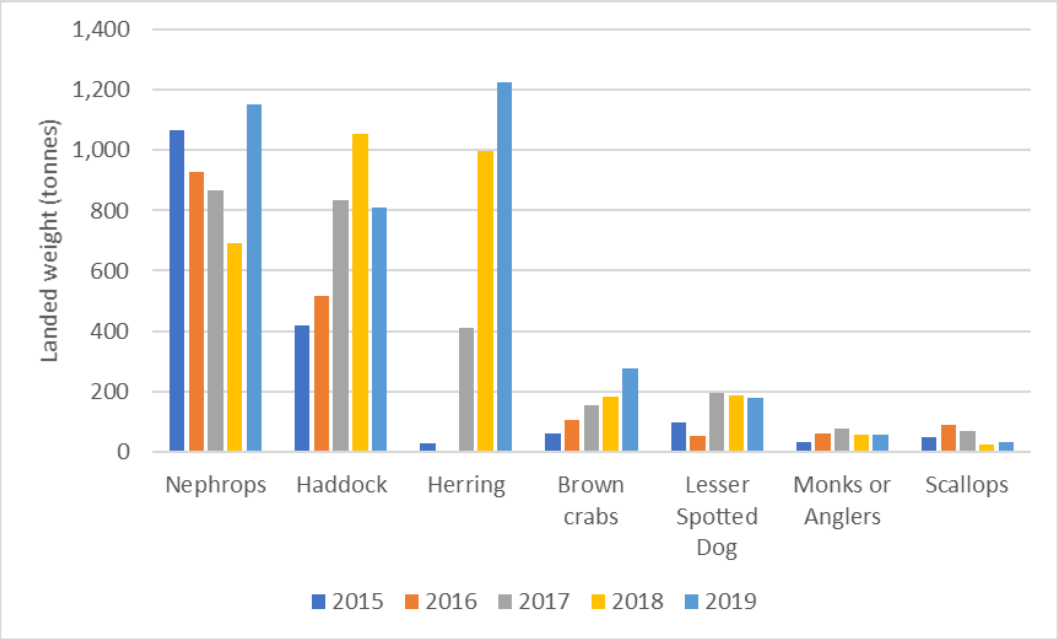


Figure 5.20: Top seven species by landed weight, landed from the commercial fisheries study area by UK vessels (MMO, 2020).

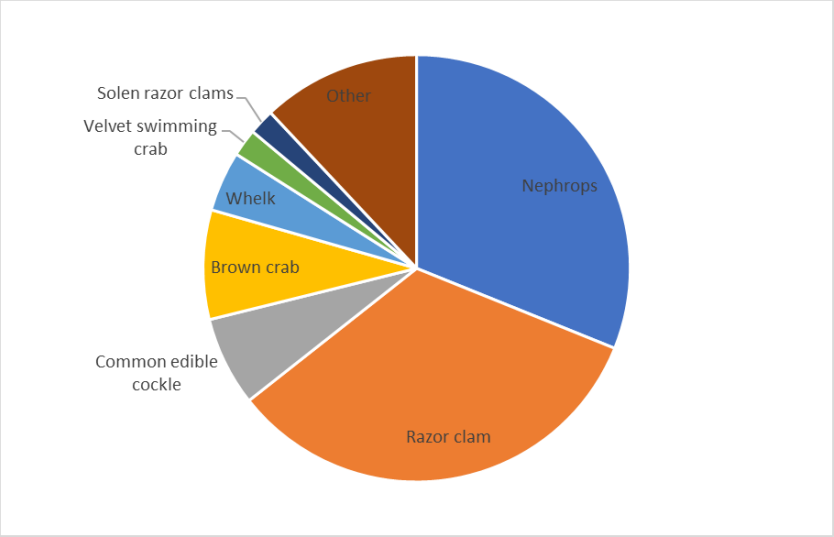


Figure 5.21: Species composition of average annual landings (2012-2016) from ICES rectangle 36E3 (EU DCF, 2021).

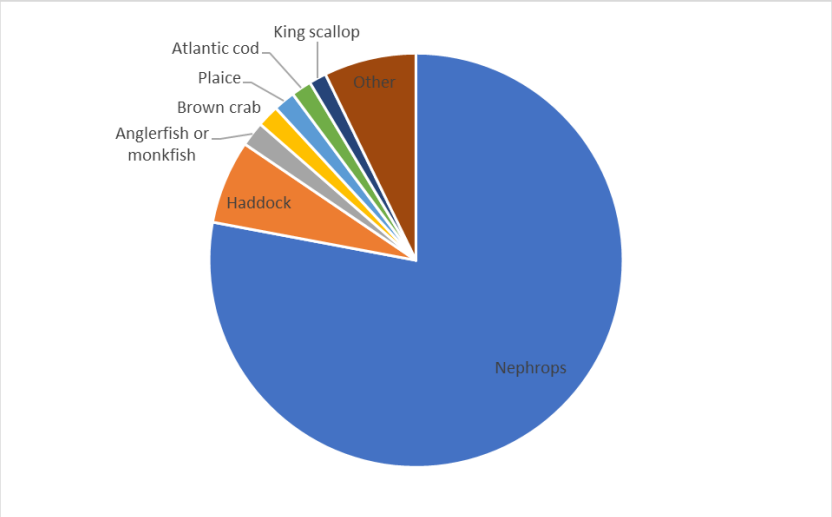


Figure 5.22: Species composition of average annual landings (2012-2016) from ICES rectangle 36E4 (EU DCF, 2021).

The study area overlaps with recognised 'Western Irish Sea' *Nephrops* grounds within the Irish Sea West Functional Unit 15. *Nephrops* are taken in a highly targeted fishery, exclusively using demersal otter trawls, that operates year-round with landings peaking in late summer and autumn. Stock assessments indicate that the Western Irish Sea *Nephrops* stock is currently being exploited sustainably. Landings of *Nephrops* are made to ports along the east coast of Ireland (e.g. Howth), and to Kilkeel and Portavogie in Northern Ireland. Haddock *Melanogrammus aeglefinus* are also targeted by demersal otter trawlers.

Dredging for shellfish species takes place in the commercial fisheries study area. In inshore waters, hydraulic dredges are used to target razor clams and cockles *Cerastoderma edule*. Some mechanical dredging for king scallop also takes place further offshore.

Potting for shellfish species also takes place in the commercial fisheries study area, targeting brown crab *Cancer pagurus*, whelk *Buccinum undatum*, velvet swimming crab *Necora puber* and lobster *Homarus gammarus*.

In addition to landings data, VMS data from 2017 have also been obtained for the study area and surrounding ICES rectangles. The VMS data indicates that there is significant demersal otter trawl activity across the study area and notably across the NISA array area (**Figure 5.23**). Data also confirms the presence of dredging activity in the study area, with inshore activity shown in **Figure 5.24** associated with razor clam and cockle fisheries.

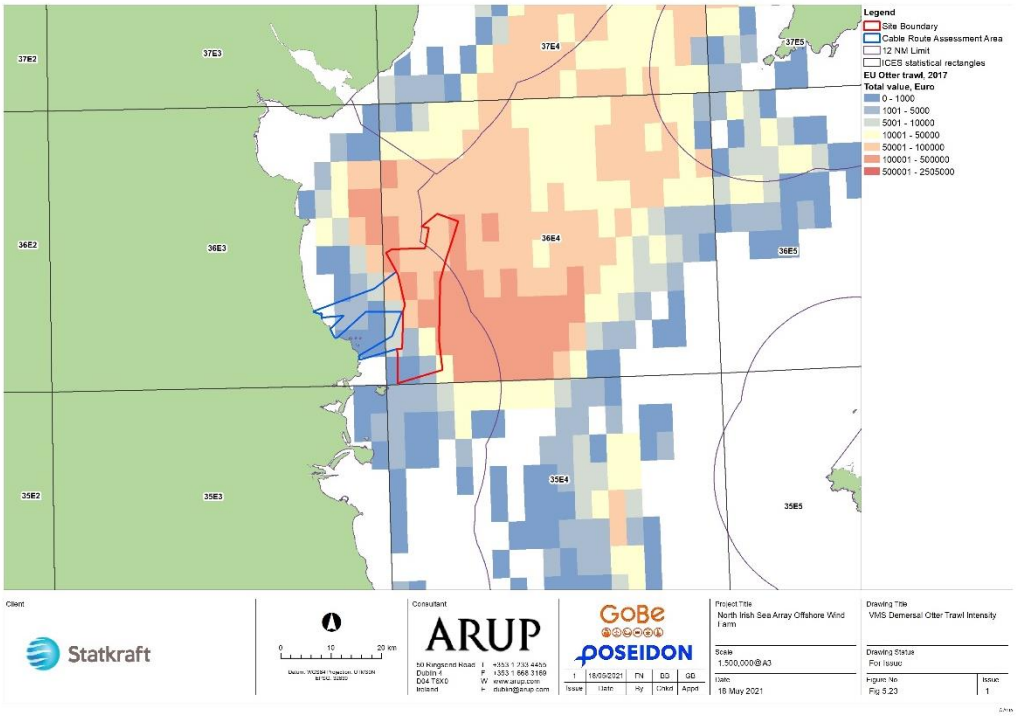


Figure 5.23: VMS data for UK vessels (≥ 12 m) using demersal otter trawls within the study area in 2017 indicating value of catch (ICES, 2018).

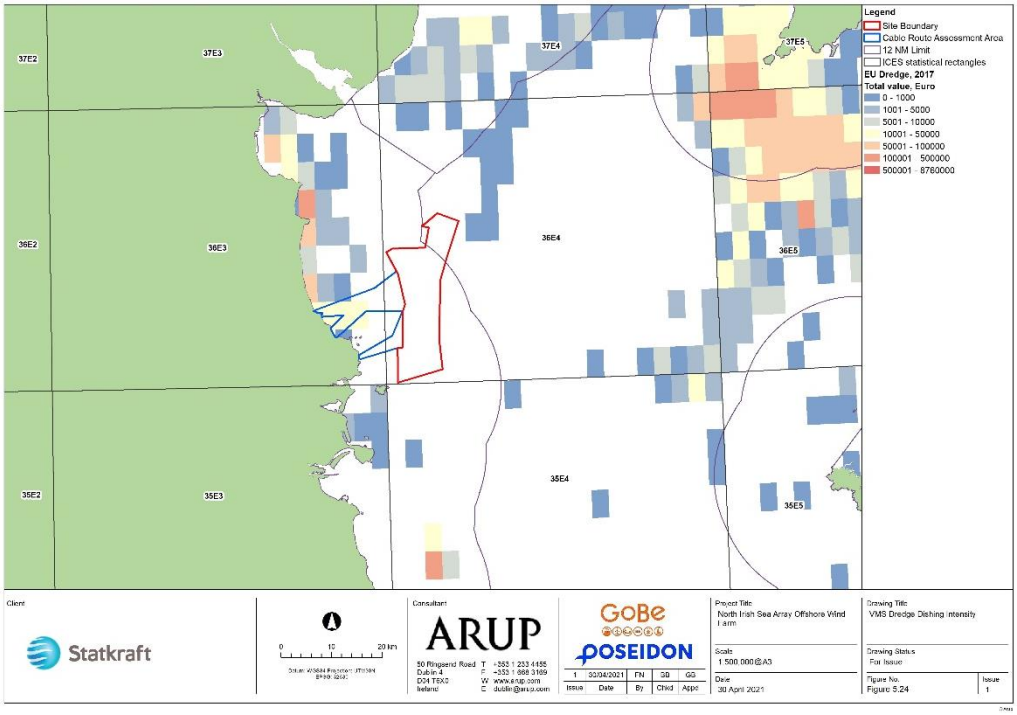


Figure 5.24: VMS data for UK vessels (≥ 12 m) using dredges within the study area in 2017 indicating value of catch (ICES, 2018).

5.9.5 Potential Impacts

A range of potential impacts on commercial fisheries have been identified which may occur during the construction, operation and maintenance, and decommissioning phases of the NISA project. These impacts include those issues identified as requiring consideration in the guidance documents listed above.

The impacts that have been scoped into the NISA EIA are outlined in **Table 5.20**, together with a description of any proposed additional data collection and/or supporting analyses to enable an assessment of the impact.

Table 5.20: Impacts proposed to be scoped in to the assessment for commercial fisheries.

Potential Impact	Project Phase		
	Construction	O&M	Decommissioning
Increases in suspended sediment concentrations and underlying seabed levels. Temporary increases may occur as a result of construction (i.e seabed levelling) and operation and maintenance (i.e. cable maintenance) activities. This in turn may result in variations in the underlying bed levels and changes to the seabed sediment type.	✓	✓	✓
Reduction in access to, or exclusion from, established fishing grounds. Installation / O&M / decommissioning activities and physical presence of constructed NISA infrastructure leading to reduction in access to, or exclusion from, established fishing grounds. Potential for some loss of fishing opportunities, though effect is expected to be localised, and the operational range of relevant fleets will not typically be limited to the NISA project area.	✓	✓	✓
Displacement leading to gear conflict and increased fishing pressure on adjacent grounds. Displacement of fishing activity from the NISA project area leading to gear conflict and increased fishing pressure on adjacent grounds. Potential for displacement of fishing activity, though effect is expected to be short-term and localised, and the operational range of relevant fleets will not typically be limited to the NISA project area.	✓	✓	✓
Displacement or disruption of commercially important fish and shellfish resources. Installation / O&M / decommissioning activities leading to displacement or disruption of commercially important fish and shellfish resources.	✓	✓	✓
Physical presence of infrastructure leading to gear snagging. Standard industry practice and protocol (e.g. seabed infrastructure will be buried and/or marked on nautical charts) will minimise the risk of gear snagging, but it remains likely to be an area of industry concern. Relevant during decommissioning should any infrastructure be left in-situ.		✓	✓
Increased vessel traffic associated with the NISA project within fishing grounds, leading to interference with fishing activity.	✓	✓	✓

Potential Impact	Project Phase		
	Construction	O&M	Decommissioning
Movement of vessels associated with the NISA project adding to the existing volume of marine traffic in the area, leading to interference with fishing activity.			
Additional steaming to alternative fishing grounds for vessels that would otherwise fish in the NISA project area. This impact will be localised to safety zones and installed structures and therefore limited deviations to steaming routes are expected. Given adequate notification (see 'Potential Mitigation Measures'), it is expected that vessels, which typically have an operational range beyond that of the NISA project, will be in a position to avoid temporary construction/decommissioning areas and installed infrastructure with no or minimal impact on their steaming times, but it remains likely to be an area of industry concern.	✓	✓	✓

5.9.6 Potential Mitigation Measures

Embedded mitigation relevant to commercial fisheries will be determined throughout the ongoing development process and will be presented in the EIAR. Measures adopted are likely to include:

- Ongoing liaison with fishermen throughout all stages of the project including the following:
  - NISA Fisheries Liaison Officer (FLO) will continue to maintain effective communications between the project and fishermen;
  - Appropriate liaison with relevant fishing interests via the FLO and other relevant parties to ensure that they are fully informed of development planning and any offshore activities and works; and
  - Timely issue of notifications including Notice to Mariners (NtMs) and other navigational warnings to the fishing community to provide advance warning of project activities and associated Safety Zones and advisory safety distances.
- Lighting and marking of the project in accordance with relevant industry guidance and as advised by relevant stakeholders and marking of the project on nautical charts.
- Where practicable, cable burial will be the preferred means of cable protection.

5.9.7 Proposed Approach to EIA

Detailed analysis of baseline datasets (see Table 5.18) will be undertaken to characterise long-term (i.e. over several years) patterns in commercial fisheries activity across the study area and predict potential impacts upon future commercial fishing activities.

Consultation with the commercial fishing industry will be undertaken to ground-truth available baseline data and gain further understanding of fishing activity by smaller vessels across the inshore portion of the study area. Analysis of data and the results of consultation will provide an extended baseline characterisation of the study area, which will underpin impact assessment.

Consultation is ongoing and will not only seek to support characterisation of the receiving environment, but to identify key stakeholder concerns to inform the impact assessment. Engagement to support the EIA process currently involves:

- Communication with fisheries organisations, including (but not limited to), the Irish Fish Producers Organisation and the National Inshore Fisheries Forum (NIFF), Irish South and East Fish Producers Organisation (ISEFPO) and Irish South and West Fish Producers Organisation (IS&WFPO) to discuss to discuss proposed data sources and understand stakeholder concerns;
- Communication with the local fishing industry to discuss proposed data sources to inform the EIAR, understand gear types, working patterns / seasonality, target species and distribution of activity in the study area, and understand stakeholder concerns. It is envisaged that this may include meetings held at local ports and use of confidential questionnaires to gather detailed baseline information;
- Communication with the SFPA, Bord Iascaigh Mhara (BIM) and the Marine Institute to acquire all available baseline data; and
- Ongoing fishing activity surveys.

The commercial fisheries impact assessment will follow the EIA methodology set out in **Section 2** of this Scoping Report and specific to commercial fisheries, will follow the guidance set out in **Section 5.9.2** above.

Impacts will be assessed for each relevant fleet/fishery active in the study area, and where relevant, impacts associated with the array area and the offshore export cable corridor will be separately assessed. Assessment will also be informed by the outcomes of the Fish and Shellfish Ecology, and Shipping and Navigation impact assessments. The conclusions presented in the relevant EIAR chapters regarding impact significance will be taken into account in determining the magnitude of impact on commercial fisheries.

Likely significant effects will be described and the assessment will include consideration of potential significant cumulative and transboundary effects.

5.10 Shipping and Navigation

5.10.1 Introduction

This chapter relates to the impacts upon marine navigation receptors which may arise from the construction, operation, and decommissioning of NISA OWF. The output of the scoping process will feed into the Navigational Risk Assessment (NRA) which will be produced in support of the EIAR.

Figure 5.25 presents NISA OWF, the proposed export cable corridors and the 10nm buffer which comprise the study area used within the shipping and navigation chapter.

This study area is standard for marine navigation assessments as it is considered to be large enough to capture all relevant features and vessel routeing which may be impacted, while remaining site specific to the project being studied.

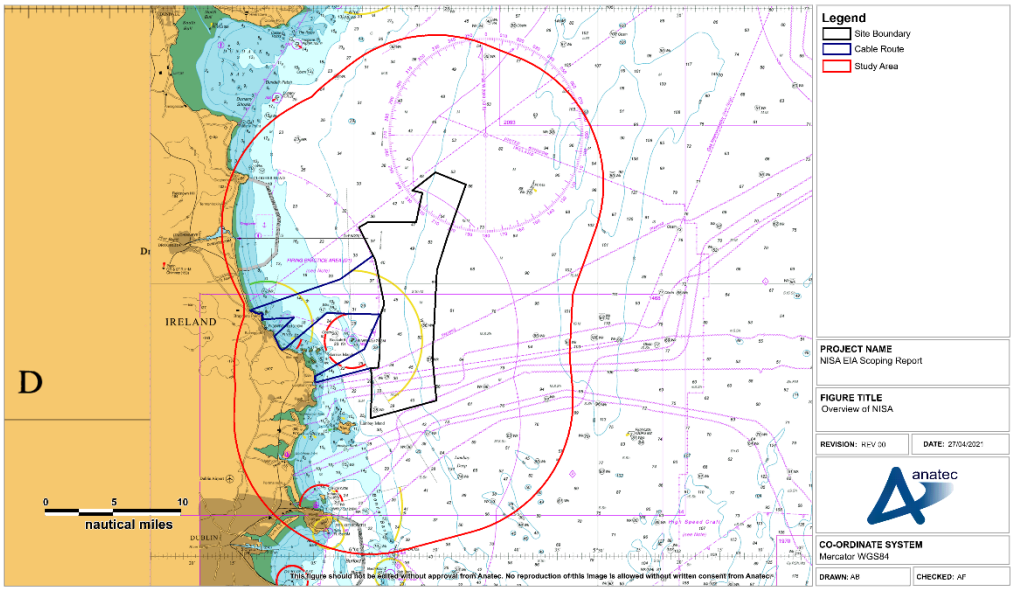


Figure 5.25: Shipping and navigation study area.

5.10.2 Policy and Guidance

Guidance outlined in **Section 2.6.3** will be largely applicable to Shipping and Navigation impact assessment. DCCAE 2017 Guidance provides a reference for existing information and good practice, it also outlines the guidance that is available for shipping and navigation. This includes:

- Maritime and Coastguard Agency (MCA) Safety of Navigation: Offshore Renewable Energy Installations (OREIs) – Guidance on United Kingdom (UK) Navigational Practice, Safety and Emergency Response (2021) (Marine Guidance Note (MGN) 654)[10];
- MCA Methodology for Assessing the Marine Navigational Safety Risks of Offshore Wind Farms[11]; and
- International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) Recommendation O-139 on the Marking of Man-Made Offshore Structures (IALA, 2013).

As good practice within the offshore renewable energy installation development process, the assessment will consider MGN 654 (MCA, 2021). This is the primary guidance document from the MCA for UK Offshore Renewable Energy Installations (OREI) developers when considering marine navigation issues.

[10] Previously MGN 543
[11] Now contained in MGN 654 as Annex 1: Methodology for Assessing the Marine Navigational Safety & Emergency Response Risks of Offshore Renewable Energy Installations.

Given no such corresponding comprehensive guidance from the Irish specific to marine navigation is available at the time of writing it is proposed that MGN 654 is used as the primary guidance document to support the development of the NRA and subsequent assessment of marine navigation impacts in the EIS.

This is considered an acceptable approach based on other projects given that the overarching Irish guidance (DCCAE, 2017) references MCA guidance as relevant for marine navigation issues and this has been confirmed in past consultation with the key national navigational stakeholders within Ireland.

5.10.3 Data Sources and Baseline Methodology

5.10.3.1 Data Sources

The following data sources have been used to inform the preliminary marine navigation baseline assessment undertaken for the scoping exercise:

- 14 days of Automatic Identification System (AIS) data collected from satellite receivers during July 2019;
- 14 days of AIS data collected from satellite receivers during December 2019;
- United Kingdom Hydrographic Office (UKHO) Admiralty charts 1121, 1411, and 1415;
- UKHO Admiralty Sailing Directions – Irish Coast Pilot NP40 (UKHO, 2013); and
- Irish Cruising Club, East and North Coasts of Ireland Sailing Directions, 12th Edition 2014 (Irish Cruising Club, 2014).

Vessels associated with temporary operations (i.e., surveys) have been removed from the analysis to ensure that the focus is on permanent traffic.

AIS carriage and broadcast is not compulsory for fishing vessels of less than 15 metres (m) or recreational vessels. It should therefore be considered that such traffic is likely to be underrepresented within the assessment undertaken for this scoping exercise; however, it is noted that smaller vessels are increasingly observed to utilise AIS voluntarily given the associated safety benefits. On this basis and noting that AIS is generally accepted as being comprehensive for other vessel types above 300 tonnes, the available data are considered as fit for purpose for providing the high-level baseline assessment presented in this scoping exercise.

It is noted that the AIS data periods chosen are prior to the COVID 19 pandemic to avoid any effects relating to vessel movements associated with the downturn in trade movement and restrictions on recreational activity. The data periods are also pre-Brexit which may affect commercial shipping and fishing in the Irish Sea; this will be considered further within the NRA.

The AIS data considered within this scoping exercise provides coverage of the study area and is considered as providing a comprehensive picture of commercial traffic. However, assessment based purely on AIS is likely to under-represent fishing vessels below 15m in length and recreational vessels, given that AIS carriage and broadcast is not mandatory for such vessels.

5.10.3.2 Baseline Methodology

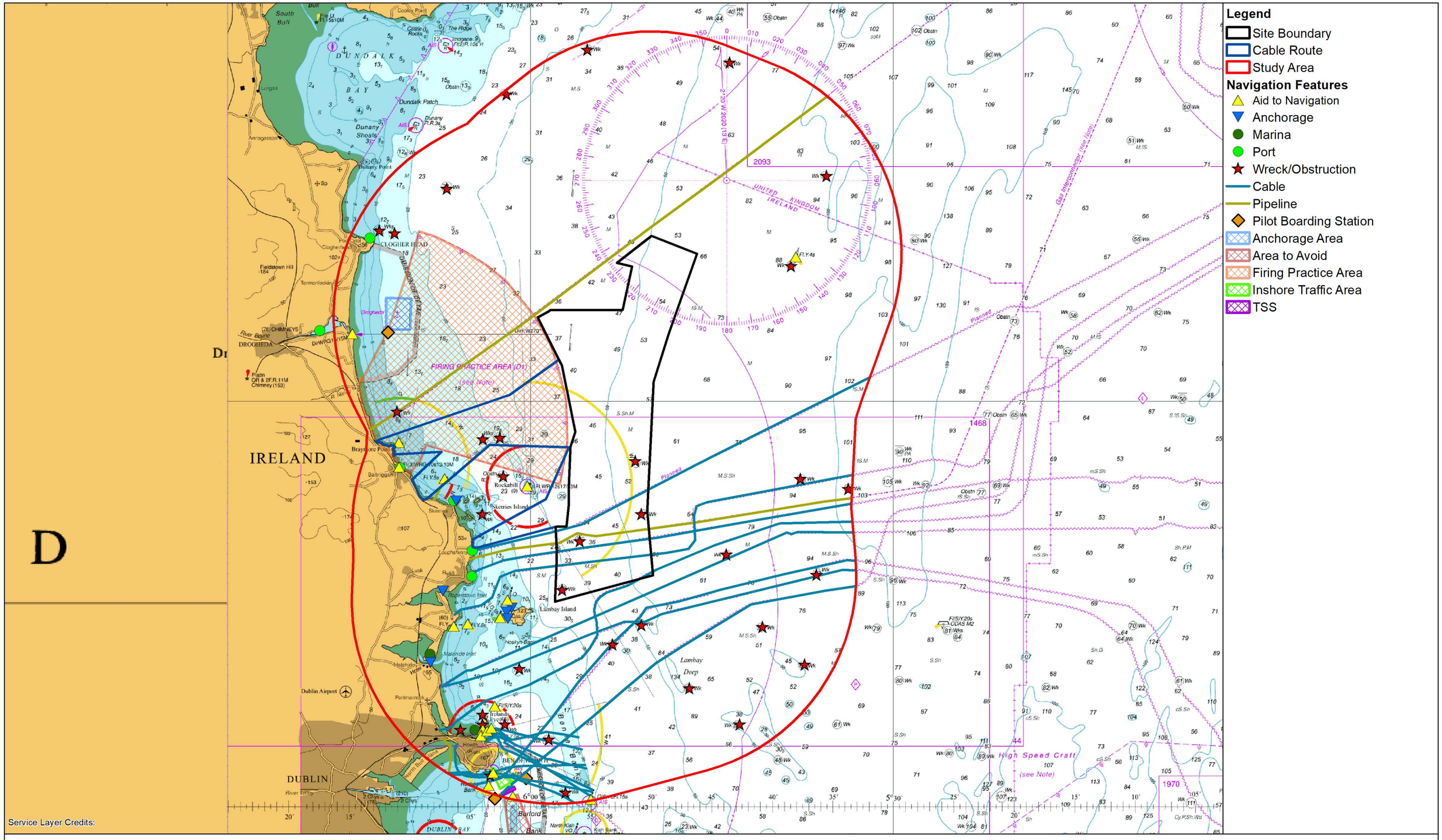
The aspects of the NISA OWF design parameters that are relevant to marine navigation receptors include the number of, layout of, indicative separation distances and blade clearance height (above LAT) of WTGs and OSP, along with the types and dimensions of foundations (as outlined in Section 3.4).

In addition to the WTGs, substations and their associated foundations, there will be inter-array cables connecting the turbines and substations and export cabling within the export cable corridor of up to 175km in length.

For the NRA, marine traffic surveys in line with the requirements of MGN 654 will be considered along with extensive consultation with local fishing and recreational stakeholders, to ensure that a comprehensive picture of such traffic is obtained. Post scoping consultation will be undertaken with the Department of Transport, Tourism, and Sport (DTTAS) Marine Survey Office and the Commissioner of Irish Lights to determine the nature of the dedicated survey and whether recording of non-AIS traffic should be considered.

5.10.4 Receiving Environment

This section presents the baseline environment for navigational features, which have been identified via a review of Admiralty Charts and Sailing Direction (UKHO, 2013) as per **Section 5.10.3**. An overview of the navigational features deemed relevant to the scoping exercise are shown in **Figure 5.26**.



Client

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0 8 16 km

Datum: WGS84 Projection: World Mercator
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Issue	Date	By	Chkd	Appd
1	18/05/2021	DS	AF	SW

Project Title
North Irish Sea Array Offshore Wind Farm

Scale
1:550,000@A3

Date
18 May 2021

Drawing Title
Navigational Features

Drawing Status
For Issue

Figure No.
Figure 5.26

Issue
1

The shoreline is marked with Aids to Navigation (AtoN) with AtoN also marking the approach to the Port of Dublin. There are 45 charted[12] wrecks and obstructions located within the study area with four situated within the site and two situated within the cable route.

The port of Drogheda is located approximately 10nm to the west of the site boundary. Also, of importance to vessel movements within the study area, albeit outside of the study area, are the Port of Dublin 13nm to the south west and Dundalk approximately 20nm to the north west of the site boundary. The northern pilot boarding stations for the Port of Dublin are also located 9nm and 10nm to the south of the site boundary. Several smaller ports and marinas, used mostly by smaller vessels (fishing and recreational), are also located to the west of the site.

There are 19 subsea cables located within the study area with the majority of these located in the southern half: four cross the site boundary. There are also four pipelines located within the study area, one of which crosses the site boundary.

An anchorage area associated with the port of Drogheda is located approximately 6nm to the west of the study area. Several anchorages for smaller vessels are also located within the south eastern section of the study area.

A Department of Defence (DoD) firing practice area is located adjacent to the western boundary of the site. No restrictions are placed on the right to transit the firing practice range at any time with the firing practice range operating a clear range procedure.

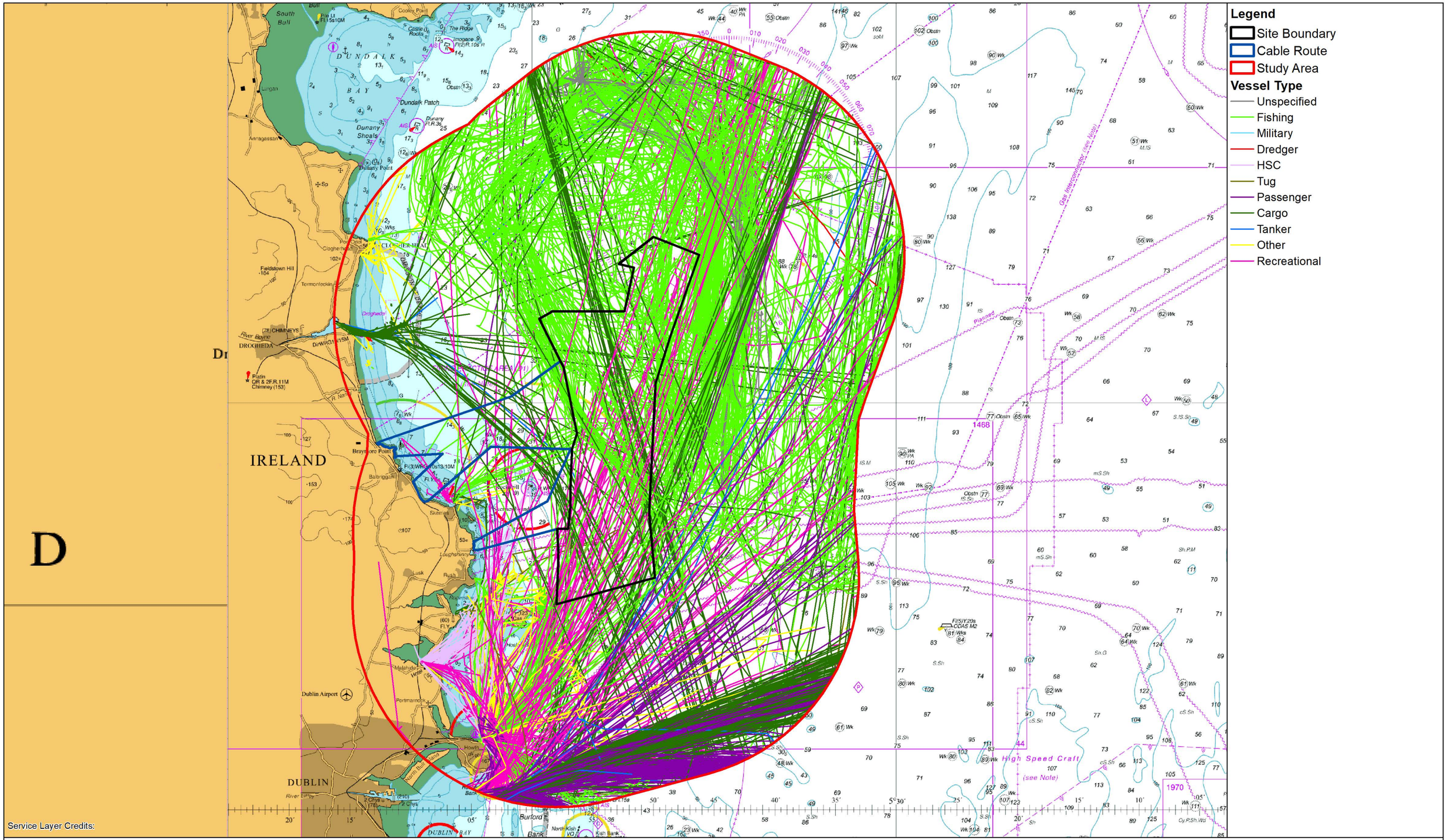
A Traffic Separation Scheme (TSS) and an inshore traffic area are present approximately 9-10nm to the south of the site boundary. These are both associated with the Port of Dublin to manage traffic associated with the port.

Whilst not within or in proximity to the study area (and hence not shown in **Figure 5.26**), the TSS associated with the Irish Sea are still considered relevant navigational features given that vessels will generally position themselves on courses in advance in order to enter into the correct lane. On this basis, the TSSs which influence vessel routeing in the area most prominently are considered to be:

- Off Skerries TSS – 35nm east;
- Liverpool Bay TSS – 76nm east;
- Off Tuskar Rock TSS – 76nm south;
- Off Smalls TSS – 99nm south.

The marine traffic data collected during the summer and winter survey periods (see **Section 5.10.3**) are presented in **Figure 5.27** and **Figure 5.28**, respectively.

[12] Note some wrecks are not charted.



Service Layer Credits:

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Datum: WGS84 Projection: World Mercator
EPSG: 3395

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Issue	Date	By	Chkd	Appd
1	18/05/2021	DS	AF	SW

Project Title
North Irish Sea Array Offshore Wind Farm

Scale
1:550,000@A3

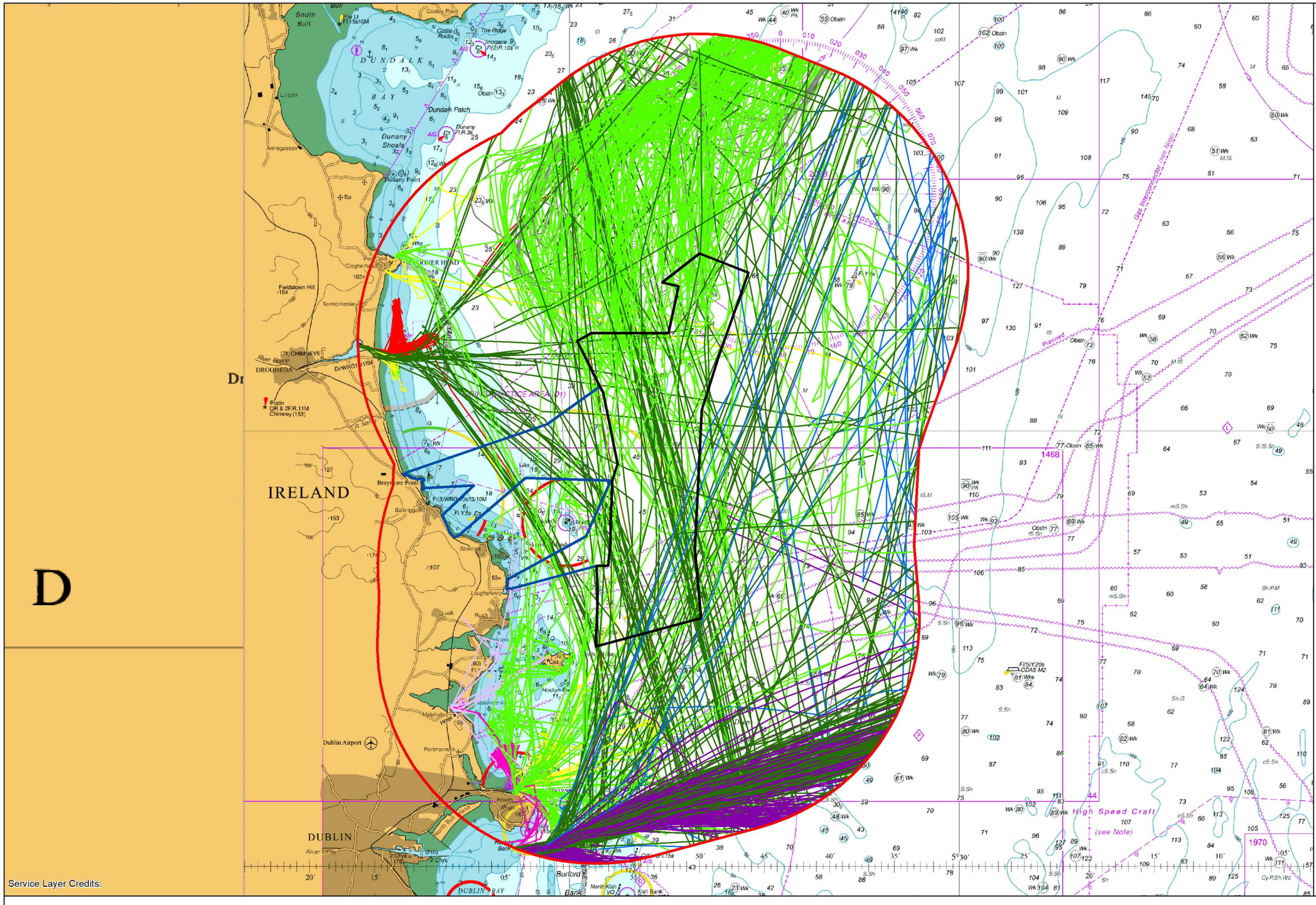
Date
18 May 2021

Drawing Title
14 Days Summer 2019 (Vessel Type)

Drawing Status
For Issue

Figure No.
Figure 5.27

Issue
1



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Datum: WGS84 Projection: World Mercator
EPSG: 3395

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anatec

Issue	Date	By	Chkd	Appd
1	18/05/2021	DS	AF	SW

Project Title
North Irish Sea Array Offshore Wind Farm

Scale
1:550,000@A3

Date
18 May 2021

Drawing Title
14 Days Winter 2019 (Vessel Type)

Drawing Status
For Issue

Figure No.
Figure 5.28

Issue
1

Fishing vessels were recorded both transiting and actively fishing within the study area, mostly within the northern section of the study area during both survey periods. Furthermore, fishing vessels were also recorded within the site itself both transiting and actively engaged in fishing. The fishing vessels recorded used several marinas, harbours and ports on the east coast of Ireland (**Figures 5.27** and **5.28**).

Recreational activity was mostly observed during the summer survey period, with these vessels generally utilising the Port of Dublin and marinas at Howth and Malahide. Reference to the Irish Sailing Club's Sailing Direction also indicates that the Skerries has a sheltered area in which recreational vessels are able to anchor, and that Balbriggan harbour is also used by recreational vessels, although there are dangers in the vicinity such as sandbanks and rocks. A number of recreational races are also known to occur during summer within the study area.

Limited (maintenance) dredging was recorded during the winter survey period near the entrance to the Port of Drogheda and the associated anchorage (see **Figure 5.28**).

A preliminary anchoring assessment has been performed on the two survey periods. Anchoring activity was detected during both survey periods at the charted anchorage near Drogheda (**Figures 5.27** and **5.28**).

5.10.5 Potential Impacts

The DCCAE 2017 Guidance provides an indicative list of the impacts that should be considered for marine navigation when producing the EIAR. These are:

- Allision risk[13] (surface);
- Displacement of shipping; and
- Collision risk caused by reduced visibility of other vessels.

The guidance also requires consideration of reduced trade supply however the focus of this assessment is marine navigation and safety, not potential commercial impacts which will be considered separately as required and are also considered within other chapters, where appropriate.

Following the results of the baseline assessment (**Section 5.10.4**) and based on experience of other wind farm marine navigation assessments, impacts that have been identified as requiring inclusion in the EIAR are listed in **Table 5.21.**

[13] The guidance refers to this as "collision risk". It is assumed that this refers to vessel to structure contacts given that it mentions surface and subsurface scenarios. For the purposes of clarity in this scoping exercise and subsequent impact assessments, vessel to structure contacts are referred to as "allisions" and vessel to vessel contacts as "collisions", as per the recognised marine navigation terminology.

Table 5.21: Impacts proposed to be scoped in to the assessment for shipping and navigation.

Potential Impact	Project Phase		
	Construction	O&M	Decommissioning
Increased vessel to vessel collision risk between third-party vessels resulting from displacement. Displacement of shipping activity from the NISA project area leading to increased shipping intensity in adjacent waters.	✓	✓	✓
Increased vessel to vessel collision risk between a third-party vessel and a project vessel. Movement of vessels associated with the NISA project adding to the existing volume of marine traffic in the area, leading to interference with other shipping.	✓	✓	✓
Reduced access to local ports. Installation / O&M / decommissioning activities and associated vessel traffic may lead to reduced access to local ports and cause disruption to regular traffic.	✓	✓	✓
Reduction of under keel clearance as a result of cable protection; and **Anchor interaction with subsea cables.** Standard industry practice and protocol (e.g. seabed infrastructure will be buried and/or marked on nautical charts) will minimise the risk. The impacts may also be relevant during decommissioning should any infrastructure be left in-situ.		✓	✓
Interference with communications and position fixing equipment from the development; and **Electromagnetic interference with magnetic compasses from subsea cables.** Potential impacts upon VHF communication channels, interference to existing radar signals and / or radar clutter, preventing safe vessel navigation control.		✓	
Reduction of Search and Rescue (SAR) capability due to increased incident rates. Increase in the overall number of vessels and traffic associated with all stages of the project may put additional pressure on SAR operations therefore increasing potential risks for other sea users.	✓	✓	✓

5.10.6 Potential Mitigation Measures

Embedded mitigation measures relevant to marine navigation under consideration for the NISA project at this stage are listed below. The need for any additional mitigations required beyond those considered embedded will be identified and defined as part of the NRA/EIA process.

- Appropriate marking on nautical charts;
- Promulgation of information as required by local and national requirements;

- Buoyed area during the construction period in agreement with the Commissioner of Irish Lights;
- Implementation of advisory safe passing distances during construction and periods of major maintenance;
- Suitable implementation and monitoring of cable protection (via burial, or external protection where burial to a suitable burial depth as identified via a risk assessment is not feasible);
- Lighting and marking of the site during all periods in agreement with the Commissioner of Irish Lights and in line with IALA O-139 (IALA, 2013);
- Compliance of all project vessels with international marine regulations as adopted by the Flag State, notably the International Regulations for Preventing Collisions at Sea (COLREGs) (International Maritime Organization (IMO)), 1972) and the International Convention for the Safety of Life at Sea (SOLAS) (IMO, 1974);
- Blade clearance of at least 22m above HAT (in line with industry good practice);
- Liaison with the Irish Coast Guard in relation to Search and Rescue (SAR) resources to ensure suitable emergency response plans and procedures are in place;
- Consideration of navigation safety and SAR in WTG design and layouts, including acceptable levels of Supervisory Control and Data Acquisitions (SCADA) system; and
- Guard vessel(s) as required by risk assessment.

5.10.7 Proposed Approach to EIA

The output of this scoping exercise will feed into the NRA which will be drafted in support of the EIA. This is in line with the DCCAE guidance (DCCAE, 2017) which recommends that an NRA be produced as the method of assessment for marine navigation impacts.

The baseline data collected for the NRA (**Section 5.10.4**) will be supported by formal consultation process including a hazard workshop. The hazard workshop is a standard and effective consultation activity, as recommended under MGN 654, undertaken as part of the development of an NRA for offshore windfarm developments. The workshop allows a working group of local users and stakeholders (identified from the baseline and statutory consultees) to further risk assess marine traffic movements and the potential interactions within the project area. The output of the hazard workshop, the hazard log, will be used as the basis of the impact assessment undertaken within the NRA and EIAR.

The findings of the NRA will then inform the EIA for shipping and navigation receptors, and the EIA for shipping and navigation will use the IMO Formal Safety Assessment (FSA) Methodology (IMO, 2018) which is an internationally recognised approach for assessing impacts to marine navigation receptors. The methodology is centred on risk control and assesses each impact in terms of its frequency and consequence in order that its significance can be determined as either “broadly acceptable”, “tolerable”, or “unacceptable”.

Any impact assessed as "unacceptable" will require additional measures implemented beyond those considered embedded (see **Section 5.10.6**) in order that the impact is reduced to "tolerable" or "broadly acceptable" parameters.

5.11 Offshore Archaeology and Cultural Heritage

5.11.1 Introduction

This section of the Scoping Report addresses the archaeology and cultural heritage receptors of relevance to the proposed development.

5.11.2 Policy and Guidance

Under the EU Environmental Impact Directive 85/337/EC and 97/11/EC, pre-development archaeological assessment in the marine environment is required. The following legislation applies to archaeological and cultural heritage located within Irish Territorial Waters (up to 12nm from the coast).

5.11.2.1 National Monuments (Amendment) Acts 1930 to 2004

This provides a specific legislative basis for the protection of archaeological monuments, areas and archaeological objects. The Minister of Arts, Heritage, Gaeltacht and the Islands is required to establish and maintain both a 'Register of Monuments and Places' and 'Record of Historic Monuments' under the terms of the 1987 and 1994 Amendments Acts respectively.

Under Section 1 of the 1987 Act, all monuments dating to before AD 1700 and any monument meeting specific criteria of interest are automatically defined as 'historic monuments'.

Under Section 3 of the 1987 Act, wrecks greater than 100 years old and any other object (being an archaeological object) found underwater are to be reported and protected. The Act also allows the imposition of an Underwater Heritage Order to protect sites of historical, archaeological or artistic importance. This can include wrecks less than 100 years old.

Section 2 (1) of the 1994 Act, provides that *there shall stand vested in the State the ownership of any archaeological object found in the State after the coming into operation of this section where such object has no known owner at the time when was found.*

Section 23 (3) to (7) of the 1930 Act, provides that *the finder of an archaeological object must make a report of the finding to the Director of the NMI within a reasonable period from the time of finding.*

5.11.2.2 Merchant Shipping (Salvage and Wreck) Act 1993

The Director of the National Museum of Ireland (NMI) has a statutory role regarding dealing with notifications from receivers of unclaimed wreck and the retention on behalf of the state of unclaimed wreck if it is of archaeological interest. Under Section 2 (1), 'wreck' includes jetsam, flotsam, lagan and derelict found in or on the shores of the sea or any tidal water or harbour.

5.11.2.3 Heritage Council Acts 1995 and 2018

These Acts established a statutory 'Heritage Council', the functions of which include proposing policies and priorities for the identification, protection and preservation of the national heritage.

5.11.2.4 International Conventions

The UNESCO Convention on the Protection of Underwater Cultural Heritage was concluded in 2001 and is a comprehensive attempt to codify the law internationally, with regards to underwater cultural heritage. The Republic of Ireland abstained in the vote on the final draft of the Convention, however, it has stated that it has adopted the Annex of the Convention, which governs the conduct of archaeological investigations, as best practice for archaeology. Although the Republic of Ireland is not a signatory, the Convention entered into force on 2nd January 2009 having been signed or ratified by 20 member states. It has since been ratified or accepted by an additional 40 states.

The European Convention on the Protection of the Archaeological Heritage (Revised) 1992 (also referred to as the Valletta Convention) tackle various aspects such as: Article 1 deals with the inventorying and protection of sites and areas; Article 2 deals with the mandatory reporting of chance finds and providing for 'archaeological reserves' on land or underwater; Article 3 promotes high standards for all archaeological work undertaken by suitably qualified people; Article 4 requires the conservation of excavated sites and the safe-keeping of finds; and Article 5 is concerned with consultation that should take place between planning authorities and developers to avoid damage to archaeological remains.

The Valletta Convention was ratified by the Republic of Ireland in 1997. The convention binds the State to implement protective measures for the archaeological heritage within the jurisdiction of each party, including sea areas.

5.11.2.5 Marine Guidance

Guidance outlined in **Section 2.6.**3 will be largely applicable to Offshore Archaeology impact assessment. The following specific guidance will be used in undertaking any future archaeological work:

- Framework and Principles for the Protection of the Archaeological Heritage (Department of Arts, Heritage, Gaeltacht and the Islands, 1999);
- Architectural Heritage Protection; Guidelines for Planning Authorities (Department of Arts, Heritage and the Gaeltacht, 2004);
- The Code of Practice for Seabed Developers (The Joint Nautical Archaeology Policy Committee (JNAPC), 2006);
- Conserving Ireland's Maritime Heritage, Proposing Policies and Priorities for the National Heritage (The Heritage Council, 2006);
- Collaborative Offshore Wind Research into the Environment (COWRIE), Historic Environment Guidance for the Renewable Energy Sector (Wessex Archaeology, 2007);
- Guidance for Assessment of Cumulative Impact on the Historic Environment from Offshore Renewable Energy (Oxford Archaeology, 2008);

- Our Seas - A shared resource: High level marine objectives (DEFRA, 2009);
- Military Aircraft Cash Sites: Archaeological guidance on their significance and future management (English Heritage (now Historic England), 2002);
- Environmental Archaeology: A Guide to the Theory and Practice of Methods, from Sampling and Recovery to Post-excavation (English Heritage (now Historic England), 2011);
- Ships and Boats: Prehistory to Present: Designation Selection Guide (English Heritage (now Historic England), 2012);
- Marine Geophysical Data Acquisition, Processing and Interpretation Guidance Notes (English Heritage (now Historic England), 2013);
- Geoarchaeology: Using earth sciences to understand the archaeological record (Historic England, 2015); and
- Standard and Guidance for Desk Based Assessment (Chartered Institute for Archaeologists, revised 2017).

5.11.3 Data Sources and Baseline Methodology

5.11.3.1 Study Area

The archaeological study area that has been assessed within this Scoping Report is defined by the extent of the NISA development area and the offshore ECC (hereafter referred to as the archaeological study area).

Archaeological and cultural heritage assets located within the NISA development area can be characterised as comprising four fundamental categories:

- seabed prehistory;
- maritime archaeology;
- aviation archaeology; and
- intertidal heritage assets.

The baseline data has been supplemented by records of charted wrecks and obstructions held by United Kingdom Hydrographic Office (UKHO) and from the Irish Underwater Archaeological Unit (UAU) National Monuments Services online database for other maritime archaeological receptors located within the NISA archaeological study area) to inform intertidal and other maritime archaeological receptors, up to High Water Mean tide (HWM).

5.11.3.2 Baseline Data

For this Scoping Report, the baseline of known archaeological and cultural heritage assets within NISA refers to data obtained from the UKHO archives, which contains records relating to charted wrecks and other seabed obstructions that are considered navigational hazards. The UKHO data obtained covers the extent of the archaeological study area along with an additional buffer.

Data for the location of assets has also been downloaded from the Wreck Viewer webpage (https://www.archaeology.ie/underwater-archaeology/wreck-viewer, accessed April 2021).

The Wreck Viewer and Wreck Inventory of Ireland Database, which holds records of known and potential wreck sites, is maintained by the UAU as part of National Monuments Services (NMS) for Ireland. The NMS is responsible for implementing legislation in relation to the protection of monuments and sites, including historic wrecks and underwater archaeological sites.

Record and Monument of Places (RMPs) curated by the NMS were consulted for counties Louth, Meath and Dublin. These comprise a database of all recorded terrestrial and marine archaeological sites, findspots and archaeological events within the county and offshore.

The datasets used in this assessment have been presented in World Geodetic Systems (WGS) 1984 datum.

This data collection has been completed in line with Chartered Institute for Archaeologists' (CIfA) Standard and guidance for historic environment desk-based assessment (CIfA 2014, updated 2020). This information has fed into the initial stages of the cable route selection and will be supplemented by a full desk-based assessment undertaken as part of the impact assessment process.

This scoping does not include any data from pre-construction or pre-planning surveys directly link to the NISA development.

5.11.3.3 Data Validity

Updates, additions and edits to the data held by the UKHO, NMS and local Historic Environment Record (HER) offices are completed frequently. The data in this scoping is the result of data requests to these datasets in April 2021. It is recommended that a review of these data sources be carried out as part of a baseline data update should Offshore Archaeology and Cultural Heritage remain scoped in following this brief assessment.

5.11.4 Receiving Environment

Marine archaeology receptors will be considered against the following two categories:

- Seabed Prehistory: for example, palaeochannels and other features that contain prehistoric sediment, and derived early prehistoric artefacts and ecofacts e.g. handaxes;
- Maritime Archaeology: maritime archaeological sites consist broadly of vessel remains, wreckage and submerged vessel/cargo debris; and
- Aviation Archaeology: this comprises all military and civilian aircraft crash sites and related wreckage.

Intertidal heritage assets located within the archaeological study area up to HWM within the three identified potential landfall areas have been assessed for this scoping report. All points and polygons of an archaeological nature have been included within the assessment.

5.11.4.1 Seabed Prehistory

The entire north-west European landscape and seascape has been shaped by fluctuations in global climate. Alternating warm (interglacial and interstadial) and cold (glacial and stadial) conditions and the associated rise and fall in relative sea level have influenced both the evolution of the landscape as well as the suitability of these landscapes for hominin exploitation at various times in the past. As sea levels rose Ireland would have been disconnected from Great Britain (Edwards and Brooks, 2006).

Palaeogeographic models suggest that much of the UK and Ireland continental shelf was inundated around 7000 years ago (Sturt et al., 2013) corresponding with peat deposits preserved extensively on the coasts of England, Wales and Isle of Man (Hazell, 2008).

Post-glacial sea rise and resultant changes in the shorelines would have led to a general picture of submergence and loss of coastal archaeology in Ireland in the Mesolithic period (Bolton, 2012), reflected in the substantial Mesolithic archaeology from terrestrial contexts preserved along coasts (Westley and Woodman 2020; Bell and Warren, 2013; Waddington and Pedersen, 2007).

A recent review of submerged prehistory potential within Irish and Northern Irish waters (Westley and Woodman 2020) identified a narrow corridor of potential along the east coast, extending up to 8 km from the current coastline along the 20 m contour, with occasional further extensions e.g., the Codling Bank and the Arklow Bank area where finds consisting of two worked undiagnostic lithics (flint nodules) were recovered during aggregates dredging (Campbell, 2003).

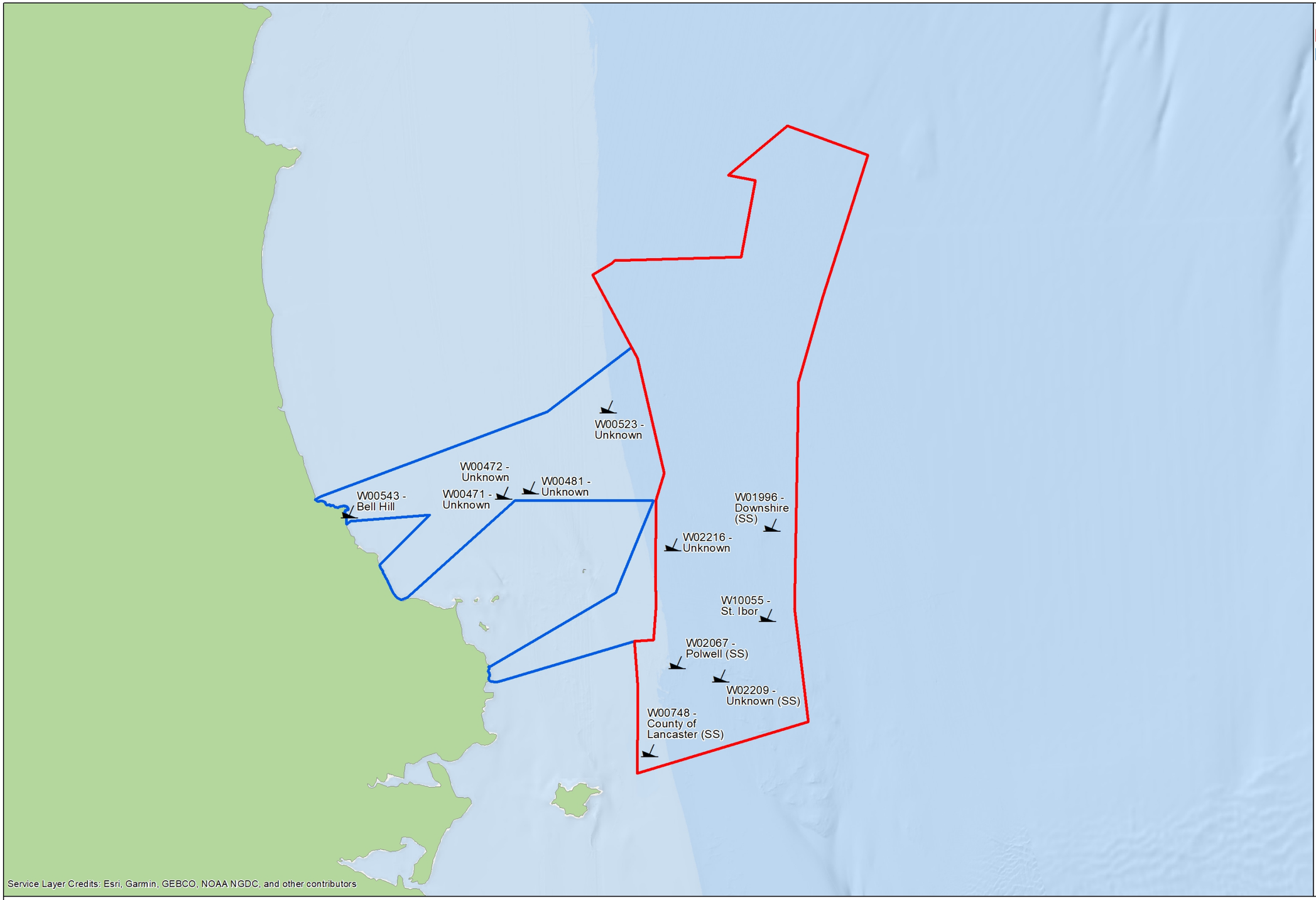
There is therefore potential for deposits relating to submerged prehistory within the inshore sections of the offshore ECC. The NISA development area is not thought to have significant potential for submerged prehistory.

5.11.4.2 Maritime Archaeology

Maritime archaeological sites can be considered to comprise two broad categories; the remains of vessels that have been lost as a result of stranding, foundering, collision, enemy action and other causes, and those sites that consist of vessel-related material. Wreck related debris includes (but is not limited to) equipment lost overboard or deliberately jettisoned such as fishing gear, ammunition and anchors or the only surviving remains of a vessel such as its cargo or a ballast mound. Shipwrecks on the seabed provide an insight on the types of vessels used in the past, the nature of shipping activity in the wider area and the changing usage of the marine environment through different periods. Such remains are considered more likely in sediments which promote the preservation of wreck sites (e.g. finer grained sediments that are not subject to high levels of mobility), particularly where such sediments have seen limited, recent disturbance.

There are six identified wrecks within the NISA development area and a further five identified wrecks within the offshore ECC (**Figure 5.29**). These are mostly iron ships and barges relating to the late 19th and early 20th century mercantile marine operations within the Irish Sea. Two of these vessels, SS *Downshire* and SS *Polwell*- both colliers, are definite WWI U-boat casualties sunk in 1918, while another is a fishing vessel, the St Ibor, which sank in 1973.

The wreck of SS *County of Lancashire*, which sank in 1901 with the loss of 8 crew, was identified by divers in 1996, while the wreck of the 500 ton iron barque *Bell Hill* is located 300 m from the shore at Newhaven Point where it was wrecked in 1875.



Client

Statkraft

0 2.5 5 km

Datum: WGS84 Projection: UTM30N
EPSG: 32630

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Issue	Date	By	Chkd	Appd
1	18/05/2021	SM	BB	GB

Project Title
North Irish Sea Array Offshore Wind Farm

Scale
1:200,000@A3

Date
18 May 2021

Drawing Title
Wreck Locations

Drawing Status
For Issue

Figure No.
Fig 5.29

Issue
1

There is also the potential for the presence of archaeological material of a maritime nature, currently uncharted, to exist within the NISA development area and the offshore ECC.

This is signified by the records of over 3,000 Documented Losses within the NMS Wreck database for the approaches to Dublin, with only a very small number having been identified and located reliably. Documented Losses are records for ships or aircraft that are known to have wrecked or crashed offshore, but their remains on the seafloor have yet to be located. These Documented Losses are often grouped together by their general area of loss into Maritime Named Locations, and often relate to vessels reportedly lost or for which no physical wreck remains have ever been identified.

Given the importance of the area for crossings between Ireland and Britain and for transiting voyages north to south through the Irish Sea, there is potential within the archaeological study area for further previously unidentified maritime archaeology, spanning early prehistory to the present day.

5.11.4.3 Aviation Archaeology

Marine aviation archaeology receptors comprise the remains or associated remains of military and civilian aircraft that have been lost at sea. Evidence is divided into three primary time periods based on major technological advances in aircraft design: Pre-1939; 1939-1945; and post-1945.

There are no known aircraft remains charted within the archaeological study area. However, there is potential for the discovery of previously unknown aircraft material dating from the early 1900s to the present day. Aircraft crash sites that are 100 years old will be protected under the National Monuments (Amended) Act 1987. Under the Protection of Military Remains Act 1986, all British aircraft that crashed while in military service are automatically protected. It is also possible that aircraft crash sites may be represented within the Documented Losses discussed above.

5.11.4.4 Intertidal Heritage Assets

The potential for archaeological assets within the intertidal zone relates in part of the potential for submerged prehistory discussed above. Mesolithic activity has been encountered within a roughly 4 km wide coastal strip along the east coast of Ireland, but is not commonly found further inland, as most of Mesolithic activity would have taken place in the coastal areas which are now submerged by the sea (Stout, 1994: 4), as discussed above in the Seabed Prehistory section.

Therefore, there is the potential for important archaeological material to be discovered within the intertidal sections of the offshore ECC.

5.11.5 Potential Impacts

Impacts upon archaeological assets are by their nature different from those upon ecological or other human environmental receptors. Assets would either be damaged or destroyed during construction if there is a pathway for impact. This impact will be permanent and there will be no way to replace the resource. As such the impact would be of major significance.

Therefore, for this topic, impacts will largely be prevented through appropriate layout of the wind farm infrastructure. Wherever possible, infrastructure will be sited such that it avoids possible conflict with archaeological assets.

In any case, from the perspective of a safe functioning plant it is necessary to avoid archaeological assets (particularly those made of metal) that could damage equipment.

Table 5.22: Impacts proposed to be scoped in to the assessment for offshore archaeology and cultural heritage.

Potential Impact	Project Phase		
	Construction	O&M	Decommissioning
Direct physical disturbance. The installation of the foundations for the wind turbines, potential scour protection and cables have the potential to cause direct disturbance and damage to known and undiscovered artefacts of marine archaeological significance. Seabed preparation prior to installation also has the potential to cause direct disturbance. Similar impacts may occur as a result of anchoring and jack-up activities associated with the construction works. Direct impacts during operation could occur as a result of routine maintenance activities if these disturb the seabed, however as areas will already have been disturbed during construction there will be limited scope for impact and any impacts are likely to be of lower magnitude than during construction.	✓	✓	✓
Indirect physical disturbance. As marine archaeological assets have often survived as a result of a stable environment, changes to hydrodynamic and sedimentary process could trigger renewed degradation as a result of changes in physical, biological or chemical processes. Changes to hydrodynamic and sedimentary process during the operational phase could also trigger renewed degradation as a result of the changes in physical processes. Thus, changes in sediment transport or localised scour could have indirect impacts upon marine archaeological assets	✓	✓	✓

5.11.6 Potential Cumulative Effects

The general approach to assessing the cumulative effects on environmental receptors is outlined in **Section 2.8** and **Section 5.2.1**. Individual known archaeological receptors within the NISA development area and the offshore ECC will not be subject to direct impacts from other known plans or projects as they are discrete and there will be no physical overlap of different infrastructure. Given that indirect impacts are likely to be highly localised and small scale, it is not considered likely that there are pathways for cumulative indirect effects.

There is potential though for cumulative effects through the additive effect of small impacts across many projects. Although individual assets are discrete, taken together they could have collective heritage value, therefore multiple impacts upon similar assets could have a cumulative additive effect.

In addition, there is potential for multiple developments to affect the larger-scale archaeological features such as palaeolandscapes.

However, implementation of mitigation on each project should reduce the impacts upon unknown assets.

5.11.7 Potential Mitigation Measures

The primary method of mitigation when dealing with the unknown archaeological resource is the precautionary principle, based on the prevention of damage to receptors by proactively putting in place protective measures rather than attempting to repair damage after it has occurred. Therefore, provision is necessary for a series of mitigation measures to ensure that significant direct physical impacts would not occur during the construction, operation or decommissioning of the wind farm and associated infrastructure. Future applications would build these measures into the application and would thus ensure impacts are minimised. The following measures are expected, subject to further assessment as part of the EIA, to be included as embedded mitigation in the application:

- Pre-construction/design stage geophysical and geotechnical survey data will be subject to review by a qualified archaeologist and / or Archaeological Contractor;
- Direct physical impact on all sites of cultural heritage interest identified will be avoided where possible through micrositing of both turbines and installation equipment (e.g. jack-ups);
- Where cultural heritage assets may potentially be subject to direct or indirect impacts, Archaeological Exclusion Zones (AEZs) will be implemented to prevent potential impacts from anchoring or installation of jack-up vessels;
- The implementation and monitoring of the AEZs will be maintained through the Written Scheme of Investigation (WSI), which will cover the approach to unknown assets, and Protocol for Archaeological Discoveries (PAD);
- Archaeological monitoring (licensed under the National Monuments Acts 1930-2004) of all seabed disturbance works, in line with the Framework and Principles for the Protection of the Archaeological Heritage (DAHGI, 1999)
- Should it not be possible to avoid sites of cultural heritage interest, a full programme of archaeological investigation, which may include diver survey or Remotely Operated Vehicle (ROV) investigation, will be undertaken to identify the nature and extent of these sites. Subject to these investigations an appropriate mitigation strategy will be agreed with NMS.
- No mitigation is currently proposed for indirect physical impacts.

5.11.8 Proposed Approach to EIA

As a full assessment of the UKHO, NMS and relevant datasets has not as yet been completed, this should be scoped into the EIA. Given the potential for previously unknown assets related to Documented Losses within the NISA archaeological study area, a section of the EIA will assess these alongside the located wrecks.

With regards to the NISA archaeological study area, pre-construction/design stage geophysical and geotechnical surveys (licensed under the National Monuments Act 1930-2004) are to be carried out to inform the submerged prehistory and seabed features, including magnetometer and sub-bottom profile surveys.

Archaeological assessment of the datasets of these surveys is recommended to be completed to support the archaeological baseline from documented sources.

An intertidal walkover survey with associated metal detecting survey completed by a suitably qualified archaeological contractor is recommended for the landfall sites as part of the EIA.

Any geophysical surveys/metal detecting will require a Detection Device Consent, available through the NMS.

5.12 Aviation and Radar

5.12.1 Introduction

This chapter considers the aviation and radar receptors that are present within the immediate and surrounding vicinity of the proposed development and identifies the potential significant effects that may occur in relation to these receptors as a result of the construction, operation / maintenance and decommissioning of NISA. A desk-based baseline characterisation has been undertaken to identify these key receptors, the results of which have been used to identify potential effects upon aviation and radar, together with any potential mitigation measures that may be required as part of the EIA process.

5.12.2 Policy and Guidance

Guidance outlined in **Section 2.6.3** will be largely applicable to the Aviation and Radar impact assessment. The following specific guidance will be used in the following policy and guidance documents are relevant and will be referenced within the EIA process, along with any other emerging or relevant documents that are subsequently identified during stakeholder engagement:

- CAA (2021). Regulations made under powers in the Civil Aviation Act 1982 and the Air Navigation Order 2016. CAP 393. The Office of the General Counsel.
- Civil Aviation Authorities (CAA) (2020). Safeguarding of Aerodromes. CAP 738. Safety and Airspace Regulation Group. Third Edition.
- CAA (2019). Air Traffic Services Safety Requirements. CAP 670. Safety Policy. Third Edition.
- CAA (2019). Licensing of Aerodromes, Eleventh Edition. CAP 168. Safety Regulation Group.
- CAA (2018). Standards for offshore helicopter landing areas. CAP 437.
- CAA (2016). UK Flight Information Services, Version 2.3. CAP 774. Safety and Airspace Regulation Group.
- CAA (2012). CAA Policy and Guidelines on Wind Turbines. CAP 764. Safety & Airspace Regulation Group. Fourth Edition.
- IAA (2015). Aeronautical Services Advisory Memorandum (ASAM). Guidance Material on Off-Shore Wind Farms. ASAM No: 018, Issue 2, January 2015.

- IAA (2005). Statutory Instruments, S.I No. 215 of 2005. (Obstacles to Aircraft in Flight) Order.
- IAA (2004). Statutory Instruments, S.I 72 of 2004. (Rules of The Air) Order.
- IAA (1999). Statutory Instruments, S.I No. 423 of 1999. (En Route Obstacles to Air Navigation) Order.
- International Civil Aviation Organisation (ICAO) (Various). Guidance on standards and recommended practices (https://www.icao.int/safety/SafetyManagement/Pages/GuidanceMaterial.aspx).
- Some aeronautical data is publicly available from the Defence Forces including Casement Aerodrome Aeronautical Information and Casement Aerodrome Charts (https://www.military.ie/en/public-information/publications/), which include the Dublin area.

5.12.3 Data Sources and Baseline Methodology

5.12.3.1 Data Sources

This scoping assessment has been informed by a high-level desk-based review of publicly available, existing data sources and through an online literature review of the aviation features that comprise each key receptor (**Table 5.23**). Details of civil aviation airports, military aerodromes / airfields and other general aviation facilities have been gathered and documented as part of the baseline characterisation. No consultation has taken place with Regulatory Authorities, stakeholders or interested parties as part of this scoping exercise.

Table 5.23: Data sources used to inform Aviation and Radar

Source	Summary	Location
Dublin Airport	Provision of details on the operational aspects of the airport.	https://www.dublinairport.com/
Defence Forces	Information pertaining to the Casement Aerodrome and the current operational practices.	(https://www.military.ie/en/public-information/publications/
International Civil Aviation Organisation	Review of relevant guidance and technical requirements / operational procedures associated with aviation.	https://www.icao.int/safety/SafetyManagement/Pages/GuidanceMaterial.aspx)
IAA	Review of aviation operation systems, legislation and offshore wind guidance documents associated with the Republic of Ireland.	https://www.iaa.ie/
List of airports in the Republic of Ireland - Wikipedia	List of airports (commercial airports, licenced aerodromes, military airfields and other facilities) within County Meath and County Dublin of relevance to the proposed development, details of airport operation and link to specific web pages for each airport.	https://en.wikipedia.org/wiki/List_of_airports_in_the_Republic_of_Ireland#:~:text=Airports%20%20%20%20City%20served%20%2F%20Location,%20Moneygall%20Aerodrome%20%2027%20more%20rows%20

Source	Summary	Location
Integrated Aeronautical Information Packages	Aviation charts for Dublin Airport showing various operational information including departure, arrival, approach and runway layout details. Information on radar services (ENR 1.6 Radar Services and Procedures).	http://iaip.iaa.ie/iaip/aip_eidw_charts.htm

5.12.3.2 Baseline Methodology

The general approach to the scoping methodology is set out in Section 2 and this has been applied, and adapted as appropriate, to address the specific needs of the civil and military aviation assessment.

The assessment of potential impacts on civil and military aviation has been based on the maximum design parameters identified in **Section 4**. The key parameters include the number of wind turbines (up to 36), the spatial extent of the turbines (i.e. the size of each pod and the overall array) and the maximum blade tip height (320m).

This assessment considers all civil and military aviation receptors and, where available, details of associated radar systems within operational range of NISA. For each identified receptor, the physical obstruction and/ or radar effect, and then subsequently the operational impacts will be considered with any other potential impacts. The operational impacts will be assessed by considering the orientation of approach and departure flight paths, physical safeguarding of flight, airspace characteristics and relevant flight procedures.

The EIAR chapter for aviation and radar will be supported by more detailed desk-based studies, consultation and information gathering that will identify and examine in greater detail the civil and military aviation receptors. Studies will be undertaken by an aviation specialist, supplemented with consultation and meetings with specific stakeholders in order to provide a detailed understanding of potential impacts on operational processes.

5.12.4 Receiving Environment

The study area that has been applied to this scoping assessment has been defined by the maximum operating ranges of each of the aviation features and radar systems that have been identified and this will vary from system to system, depending on whether this is civil, military and national air traffic services receptors. The study area for scoping is illustrated within **Figure 5.30** which shows the main aviation receptors that are potentially associated with radar features. No specific radar data is available at this time.

There are a number of aviation features that fall within the study area, namely Dublin Airport, Weston Airport, Baldonnel / Casement Aerodrome, Gormanston Military Base, Ballyboughal Airfield and other smaller aerodromes with uncontrolled airspace / no radar systems.

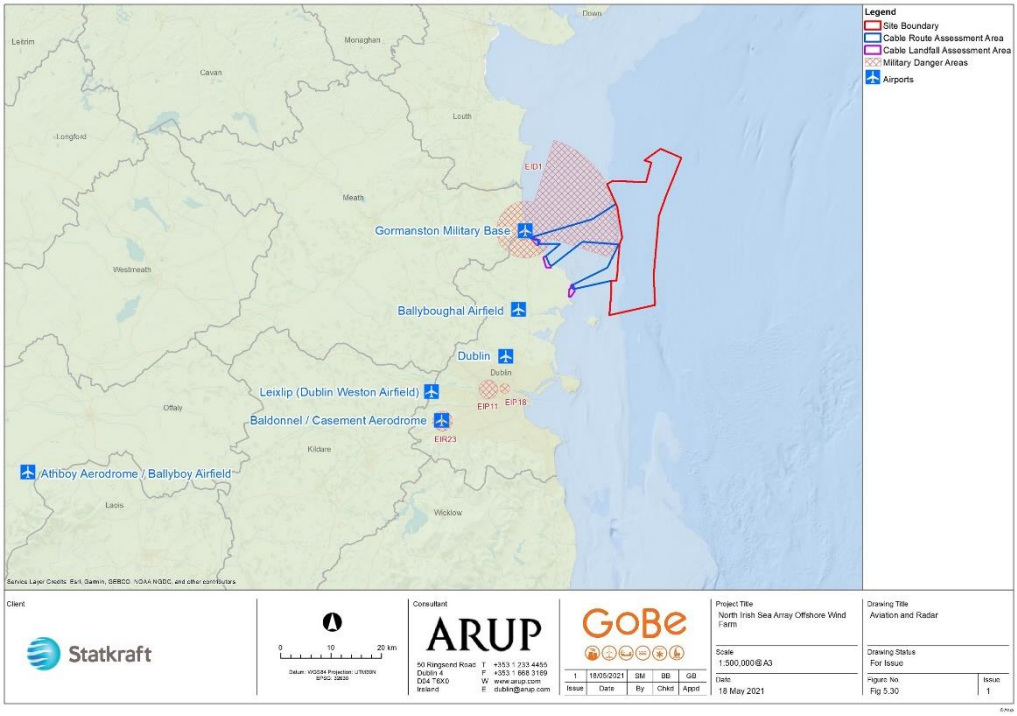


Figure 5.30: Location of aviation and radar receptors.

Three main aviation stakeholders have been identified in relation to the proposed development: the Irish Aviation Authority (IAA), Dublin Airport plc (DAA) and Defence Forces. The IAA are responsible for the management of Irish controlled airspace, the safety regulation of Irish civil aviation and the oversight of civil aviation security in Ireland. This includes air traffic control, search and rescue (SAR) duties and provision of aeronautical information. Dublin Airport is licenced to operate 24 hours a day, seven days a week, with no operating restrictions, while the Defence Forces are the armed forced of Ireland and includes the Army, Naval Services, Air Corps and Reserve Defence Forces.

5.12.4.1 Civil Receptors

Dublin Airport

Dublin Airport is the main civil aviation airport in the vicinity and is located approximately 7km north of Dublin, 3km south of Swords and 22km to the south west of NISA. Operated by Dublin Airport Authority (DAA), the airport uses the ICAO code of EIDW, has been in operation since 1940 and comprises of two main runways and two terminal buildings. The Dublin Airport controlled airspace overlaps with, or partly overlaps with the proposed development. The holding position for flights waiting to land appears to be located immediately west of Dublin Airport over the coastal waters, south of NISA, at a height of 3,000ft. There are various approaches to the airport including close to Clogher Head / Dunary Point (north west / south west direction) and to the south of the proposed development (from east/west directions). Other approach routes are present that approach Dublin Airport from over the mainland from west to east (**Figure 5.31**).

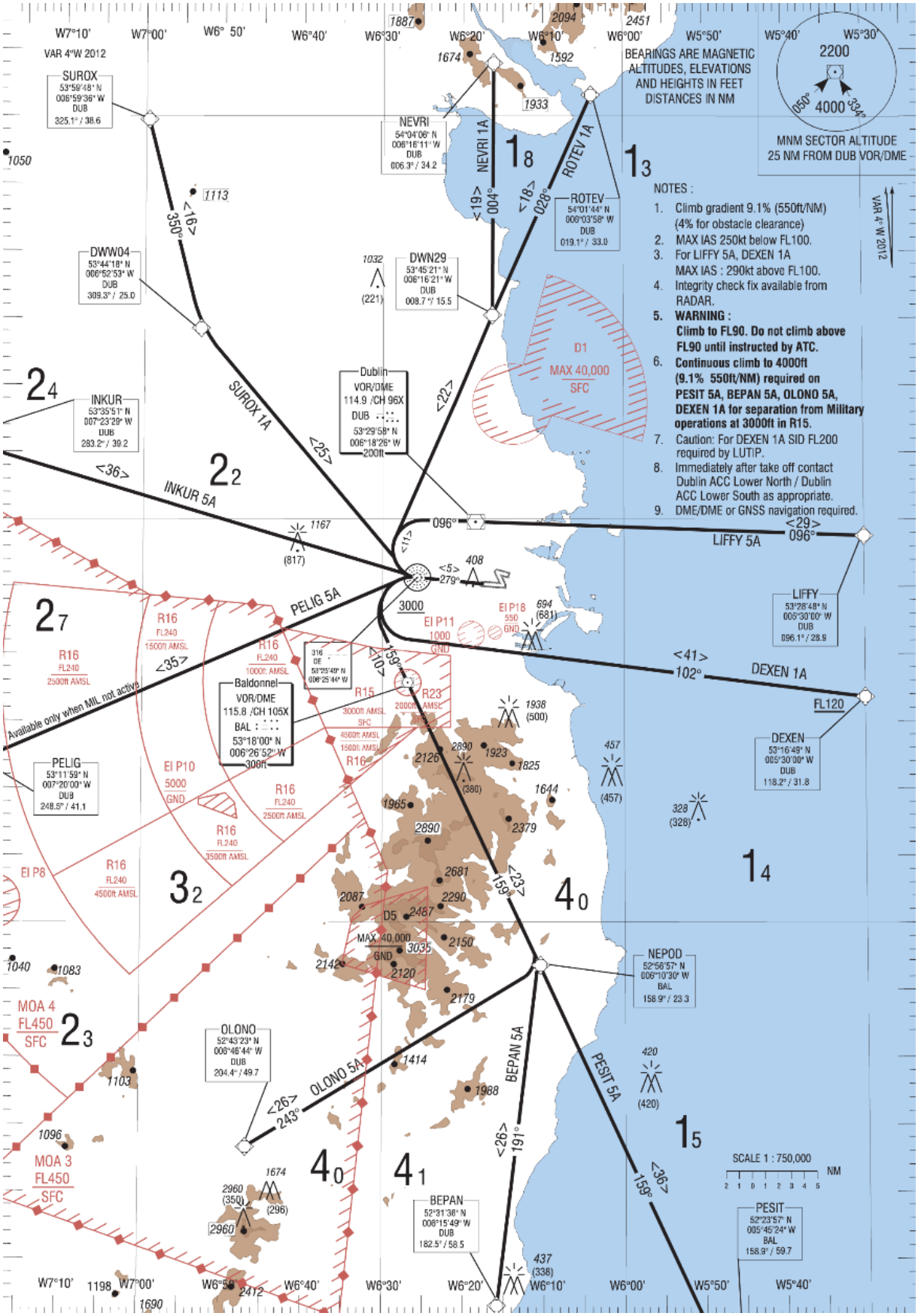


Figure 5.31: Approaches regularly used for Dublin Airport.

Weston Airport

Weston Airport, also referred to as Dublin Weston Airport, has been in operation since the 1930's and is located between Leixlip, County Kildare, and Lucan, Dublin, approximately 15km west of Dublin. It is approximately 38km in distance from the proposed development. Aviation traffic is primarily private commercial flight training also taking place, along with business/executive travel.

Ballyboughal Airfield

Ballyboughal Airfield lies north of Dublin Airport and within the Dublin Airport control zone which is class C airspace and requires a flight plan. The airfield operates a grass runway ICAO code is EIBB and is approximately 18km from the proposed development.

Other General Aviation

Additional, smaller aerodromes are present within County Meath and County Dublin. Athboy Aerodrome, also referred to as Ballyboy Airfield, is located north east of Athboy in County Meath.

The aerodrome is licensed by the Aeronautical Services Department of the Irish Aviation Authority, is located outwith controlled airspace and one grass runway (11/29) of 600m in length and 18m wide. The airfield is popular with visiting light aircraft and gliders and is a popular first stop for pilots crossing the Irish Sea. The aerodrome is approximately 119km from the proposed development.

There are other small airfields (Trim Aerodrome and Trevet Airfield) present within County Meath which comprise grass runways, are further away and not covered by radar or air traffic control. These receptors are not considered any further in this assessment since there will be no radar interference associated with the proposed development.

5.12.4.2 Military

There are two military aviation receptors that have been identified, comprising Gormanston Camp and Casement Aerodrome. Military receptors are also covered in **Section 5.13** Infrastructure and Other Users).

Gormanston Camp

Gormanston Camp is a military base located between Balbriggan and Drogheda along the coastline of County Meath. It is approximately 18km west of NISA. The onshore camp covers approximately 260 acres of ground used for air-ground and air-defence training. The airfield was closed officially from 2002 but it is still used extensively for Air to Ground Firing and local army activities. Both runways at the airfield are unserviceable (originally three runways), however, it is believed since Gormanston tower and approach is still active, the tarmac runway is still in a good enough condition to be used in an emergency.

An adjacent danger area (Danger Area D1) is present from the coastline opposite the camp and extends out to sea covering a danger area from sea surface level to 4,000 feet altitude (**Figure 5.30 and 5.31**).

Casement Aerodrome, Baldonnel

Casement Aerodrome (formerly known as Baldonnel) is located approximately 12 km to the south west of Dublin and approximately 39km from NISA at its closest point. This is a military airfield which serves as the headquarters and sole airfield of the Irish Air Corps, although it is sometimes used for other government purposes. The aerodrome is also the base for the Garda Air Support Unit who provide specialist support including search and rescue (SAR).

Casement Aerodrome operates under the Airport ICAO code of EIME and operates two runways (runway orientation 05/23 and 11/29) with respective lengths of 1,463m and 1,829m. Additional aerodrome information shows Prohibited and Restricted Areas to the west of the aerodrome.

In Ireland, the IAA provides Air Traffic Services (ATS) and air traffic management services to aircraft flying within Irish airspace. The IAA operates a number of primary surveillance radar (PSR) and secondary surveillance radar (SSR) systems positioned to provide maximum coverage of the Republic of Ireland (ROI) and surrounding airspace. The airspace above NISA is of operational significance to the IAA with aircraft climbing and descending to/from the country's airports, en-route aircraft transiting through the airspace and the provision of alerting and SAR services.

Primary radar heads are located at Cork, Dublin and Shannon and provide radar coverage across most of the Irish airspace. Aircraft operating in the Shannon Flight Information Region (FIR) and Upper Information Region (UIR) are equipped with and operate a SSR transponder. There are several Monopulse SSR (MSSR) radar stations located in the country, including two stations at Dublin.

5.12.5 Potential Impacts

There are three types of risk associated with aviation and above sea infrastructure:

- Radar risk – a radar is likely to be affected by the development;
- Obstruction risk – the development is tall enough to obstruct low flying aircraft; and
- Other risk – anything that is not a radar or obstruction risk.

As the offshore inter-array and export cabling will be below sea-level, there will be no potential significant effects associated with subsea infrastructure and therefore only above sea infrastructure is considered in the assessment.

The airspace above the proposed development is likely to be relatively busy due to the close proximity to Dublin Airport and the presence of approaches / take off paths within the surrounding area. The air space above will also be busy in relation to flight traffic travelling to other parts of the Republic of Ireland as well as non-commercial / recreation flying with small aircraft heading to smaller nearby airfields / aerodromes.

The potential impacts that have been identified are set out within **Table 5.24.**

Table 5.24: Potential impacts proposed to be scoped in for aviation and radar.

Potential Impact	Project Phase		
	Construction	Operation and Maintenance	Decommissioning
Potential for radar interference due to wind turbine visibility Potential impacts upon en-route radar and air traffic control safeguarding areas due to the presence of turbines with maximum tip height of up to 320m. This could cause interference to existing radar signals and / or cause radar clutter, preventing air traffic control from being able to decipher and control aircraft safety.	✓	✓	
Potential interaction with low flying aircraft The propose development is located close to the main approaches and departure flight paths for Dublin Airport and may also impact upon Weston Airport. Low flying aircraft may also be associated with the Casement Aerodrome and the associated Danger Area. There are also potentially SAR activities within the area.		✓	
Cumulative effects arising from offshore wind farm development within the wider region Other proposed developments within the region including Codling Bank (and extension), Dublin Array, Braymore Point, Clogher Head, Oriel and Cooley Point are likely to present a cumulative impact to aviation and radar both in terms of radar interference and interaction with flight paths. If all development were to proceed there may be potential significant effects upon radar and aviation operations along the East coast of the Irish Sea.	✓	✓	

5.12.6 Potential Mitigation Measures

Depending on the outcome of any future EIA process, there are several types of measures that can be implemented in order to reduce or mitigate and potential effects upon aviation and radar. The mitigation measures that are likely to be adopted in relation to NISA are as follows:

- Early stakeholder engagement – consultation and engagement in the early stages of project design development will enable to determination of the likelihood of significant radar interference and effect upon low flying aircraft and activity;
- Project design and layout – following consultation and engagement an iterative design process will be continued to ensure that a fully considered turbine layout is adopted. This process has already started with the design currently adopting a ‘pod’ layout. This will take into consideration technical assessment of visibility to Dublin Airport and other key receptors; and

- Project specific lighting requirements – As well as the implementation of industry standard lighting requirements within the wind farm array, any additional specific lighting requirements that are identified during consultations will be taken into consideration and applied if deemed necessary / possible in terms of other environmental factors such as seascape, landscape and visual impact or shipping and navigation.

5.12.7 Proposed Approach to EIA

Following scoping, the EIA assessment will initially be informed by the completion of a desk-based study and an Aviation Risk Assessment which will identify the potential aviation risks associated with the proposed development. This assessment will determine a risk classification associated with each identified aviation and radar receptor, along with the provision of a summary chart presenting a visual interpretation of each identified risk in relation to each key stakeholder.

This Aviation Risk Assessment will then assist with fully informing and setting out the baseline characterisation for the proposed development. This baseline reporting will also feed into the iterative project design process at this time.

Consultation and stakeholder engagement (via virtual meetings) will take place with the key stakeholders identified within this scoping report (DAA, IAA and Defence Forces), along with any others subsequently identified during the baseline characterisation.

A preliminary aviation and radar technical assessment will then be completed confirming the key receptors and assessing the potential effects upon these receptors along with any management or mitigation measures that may be required. The assessment will consider impacts including physical obstruction (collision risk), radar interference and instrument flight procedures (at a high level). Along with setting out the key guidance and industry standards, airport and radar details will be set out (based on available information and reasonable assumptions) with the following assessments:

- Obstacle Limitations Surfaces assessment;
- Radar impact assessment – PSR;
- Radar impact assessment – SSR;
- Impact on instrument flight procedures (high-level);
- Impact on minimum safe altitudes; and
- Impact on surveillance minimum altitude charts.

An assessment of cumulative effects (as outlined in **Section 5.12.4**) and transboundary effects (if relevant) on aviation receptors will also be undertaken as part of the impact assessment process. Given the international nature of aviation transboundary effects are inherent within the assessment.

The EIAR Chapter will conclude with a high-level summary of potential effects, an overview of any radar mitigation requirements (or options) and any other appropriate management measures (as outlined in **Section 5.12.5**). Relevant examples of where wind farms and airports/radar coexist will be referred to throughout the EIAR as required.

5.13 Infrastructure and Other Users

5.13.1 Introduction

This section of the Scoping Report sets out the approach to the characterisation of existing offshore infrastructure and other users. This section presents the intended scope of and approach to the assessment of impacts on infrastructure and other users.

Shipping and Navigation receptors are addressed separately within **Section 5.10**, Aviation and Radar receptors in **Section 5.12**, Commercial Fisheries receptors in **Section 5.9** and Socio-Economic, Tourism and Recreation receptors in **Section 7.7**.

5.13.2 Policy and Guidance

Guidance outlined in **Section 2.6.3** and certain documents listed under other topics of **Chapter 5** subsections of this Scoping Report will be used to guide the impact assessment and ensure the Infrastructure and Other Users chapter of the EIAR complies with standards of data quality and coverage of the receiving environment baseline.

Whilst consideration of the National Marine Planning Framework (NMPF) will be intrinsic to all of the offshore chapters in the EIAR; this chapter will also focus on the use of maritime space under the Maritime Area Planning (MAP) legislation to ensure the suitability of the area of offshore wind development in relation to other activities and assets.

5.13.3 Data Sources and Baseline Methodology

The assessment of potential impacts upon infrastructure and other users receptors will be based on the 'worst case scenario' as identified from the design envelope (see **Section 2.5**). The key parameters will be the layout of the offshore wind farm, the number and size of offshore structures, the type and size of foundations used, as well as the timing and duration of the proposed offshore works.

The EIAR chapter for infrastructure and other users will be supported by a desk-based study which will identify detail on the infrastructure and other users receptors within the study area. Studies will be undertaken in parallel with consultation and meetings with specific stakeholders (as required) in order to obtain a detailed understanding of the receiving environment and potential impacts. For each of the identified receptors, impacts will be considered throughout the construction, operation and decommissioning phases of the proposed development.

5.13.3.1 Data Sources

Table 5.25 presents the key data sources which have been collated and analysed to inform the baseline characterisation. This information has been developed into a detailed characterisation of the receiving baseline environment, which will form the basis of the assessment for the purposes of the EIA.

Table 5.25: Key sources of infrastructure and other users data.

Source	Summary	Coverage of NISA array area and export cable corridor
Ireland's Marine Atlas	Oil and gas infrastructure	Full coverage of the study area
Kingfisher Information Service – Offshore Renewable & Cable Awareness (KIS-ORCA)	Offshore cables and pipelines	Full coverage of the study area
Ireland's Marine Atlas	Marine aggregates	Full coverage of the study area
Ireland's Marine Atlas	Disposal and dredging sites	Full coverage of the study area
Irish Aviation Authority	Military exercise and training areas	Full coverage of the study area
Ireland's Marine Atlas	Other offshore wind farms (OWFs)	Full coverage of the study area
Ireland's Marine Atlas	Carbon Capture Storage (CCS) and natural gas storage	Full coverage of the study area
Ireland's Marine Atlas	Wastewater treatment and disposal	Full coverage of the study area

5.13.4 Receiving Environment

The infrastructure and other users which should be considered for assessment in an offshore renewable energy EIA are detailed in Table 4 of the guidance (DCCAE, 2017). For completeness, a review of the NMPF (Department of Housing, Local Government and Heritage (DHLGH) previously known as the Department of Housing Planning and Local Government, 2019) has also been considered. The assets and activities have been considered in the scope of the EIA assessment. The identified assets and activities of relevance for the Infrastructure and Other Users EIA assessment are:

- Oil and gas infrastructure;
- Cables and pipelines;
- Aggregates;
- Dredging and disposal areas;
- Defence and security;
- Other OWFs and renewable energy projects;
- CCS and natural gas storage; and
- Wastewater treatment and disposal.

The following maritime assessments and activities of relevance will be assessed within different EIAR chapters:

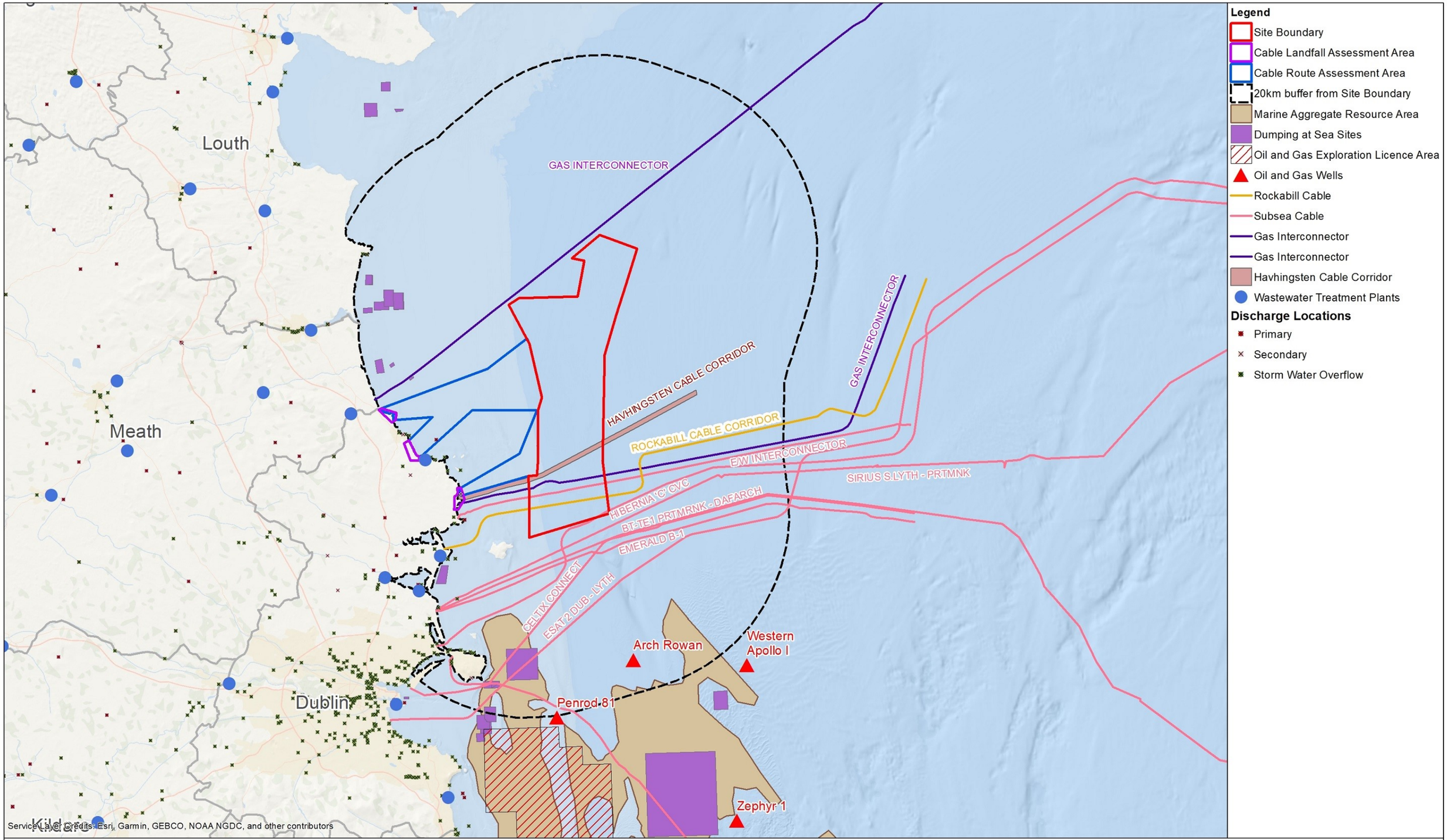
- Aquaculture and Fisheries (see **Section 5.9**: Commercial Fisheries);
- Ports, Harbours and Shipping (see **Section 5.10**)
- Safety at Sea (see **Section 5.10**: Shipping and Navigation); and
- Sports and Recreation and Tourism (see **Section 6.7**).

Given the absence of a receptor-source-pathway for impacts to occur the material asset types included in **Table 5.26** have not been considered any further:

Table 5.26: Activities and infrastructure assets not proposed for further consideration in the EIAR.

Type of activity	Asset / Constraint	Description
Oil and gas	Exploration licence (SEL 2/11)	Licence, this licence expired in August 2020 (DECC, 2020). In February 2021, DECC confirmed it would no longer be accepting new applications for exploration licences for natural gas or oil.
	Four oil well heads: Western Apollo I (33/17-1), Arch Rowan (33/17-2A), Penrod 81 (33/21-1) and Zephyr 1 (33/22-1).	With the closest well located approximately 18km south of NISA, these are defined as 'Dry Holes' by DECC (2020) – a well where no significant reserves of oil were found. All four wells are plugged and abandoned.
Marine aggregates	There are no licensed sites for marine aggregates in Irish waters and all aggregates used commercially are from terrestrial sources (DHLGH, 2018; 2019). Significant marine aggregate deposits have been identified in the Irish Sea, with potential for exploitation in the future, but the relevant area is located south of the proposed development (**Figure 5.32**).	
CCS and natural gas storage	The use of geological formations for the capture and storage of carbon is currently prohibited under S.I. No. 575/2011 – European Communities (Geological Storage of CO2) Regulations 2011 (Government of Ireland, 2011). At the time of writing the Kinsale Head Gas Field is subject to a feasibility assessment to develop Ireland's first CCS, the Ervia Cork Carbon Capture Utilisation and Storage (CCUS) project (Ervia, 2021). The Ervia CCSU site is sufficiently far from NISA that no source-receptor pathway exists to enable interaction between the two activities.	
	Kinsale Energy Shannon Liquified Natural Gas (proposed)	Kinsale Energy is the only natural gas storage facility utilising the Southwest Kinsale Head Gas Field. Shannon Liquefied Natural Gas proposes to construct a receiving terminal including the connection to the gas transmission system near Ballylongford, County Kerry. Both of these developments are sufficiently distanced from NISA that no impacts are anticipated.

Figure 5.32 – 5.34) present the identified assets through analysis of publicly available data sources. A more detailed analysis will be undertaken for the characterisation of the baseline for the EIA.



Client

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Datum: WGS84 Projection: UTM30N
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Issue	Date	By	Chkd	Appd
1	18/05/2021	SM	BB	GB

Project Title
North Irish Sea Array Offshore Wind Farm

Scale
1:400,000@A3

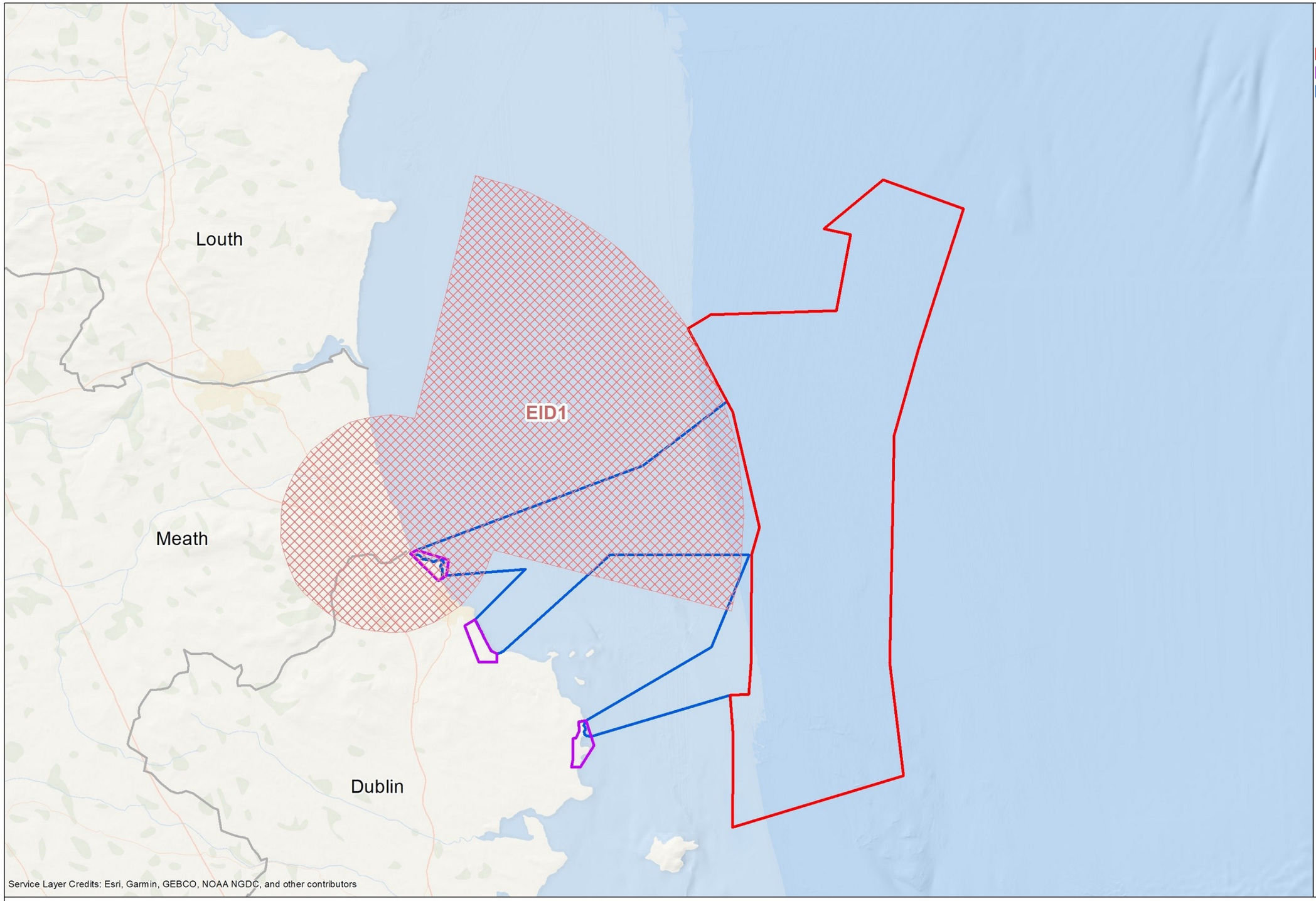
Date
18 May 2021

Drawing Title
Marine Infrastructure and Dumping Sites

Drawing Status
For Issue

Figure No.
Fig 5.32

Issue
1



Legend

- EID1 Danger Area
- Site Boundary
- Cable Landfall Assessment Area
- Cable Route Assessment Area

Client

Statkraft

0 5 10 km

Datum: WGS84 Projection: UTM30N
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Issue	Date	By	Chkd	Appd
1	18/05/2021	SM	BB	GB

Project Title
North Irish Sea Array Offshore Wind Farm

Scale
1:200,000@A3

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18 May 2021

Drawing Title
Military Danger Areas

Drawing Status
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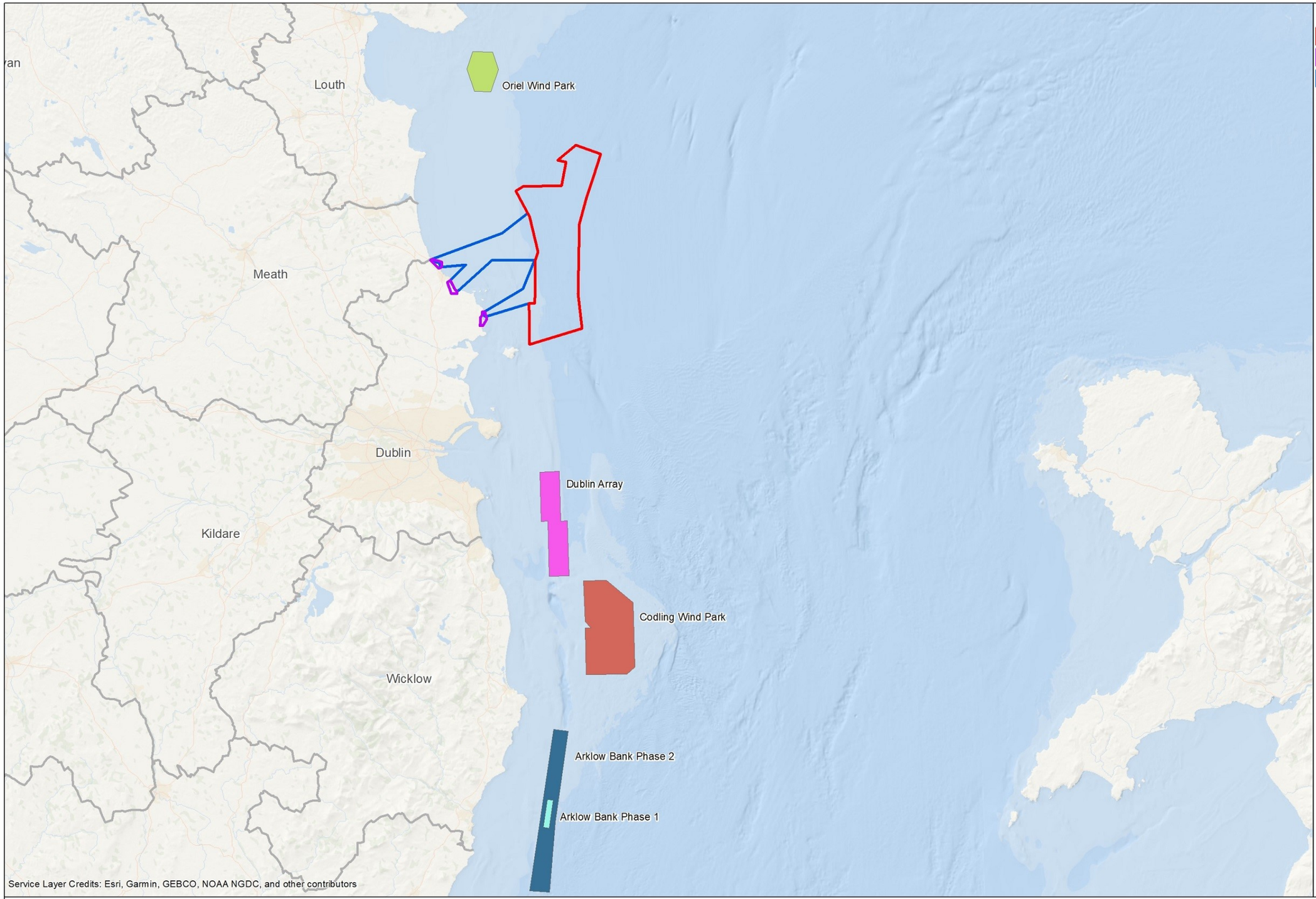

Client

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Issue	Date	By	Chkd	Appd
1	18/05/2021	SM	BB	GB

Project Title
North Irish Sea Array Offshore Wind Farm

Scale
1:650,000@A3

Date
18 May 2021

Drawing Title
Offshore Wind Farms

Drawing Status
For Issue

Figure No.
Fig 5.34

Issue
1

5.13.4.1 Cables and Pipelines

Ireland is connected by several existing and proposed submarine power and telecommunications cables and gas pipelines to the UK, continental Europe and the USA. Through GIS analysis of publicly available data sources, various, cables and pipelines in the vicinity of the study area have been identified in **Figure 5.32**; **Table 5.27** includes those assets that will be considered in the EIAR.

Table 5.27: Submarine infrastructure assets relevant to NISA EIAR.

Asset	Type of asset	Status
Havhingsten (Celtix Connect)	Telecommunications cable	In planning
Rockabill	Telecommunications cable	Active
East-West Interconnector	Power cable	Active
Hibernia ‘C‘	Telecommunications cable	Active
Interconnector 1 Scotland to Ireland IC1	Gas pipeline	Active
Interconnector 2 Scotland to Ireland IC2	Gas pipeline	Active

5.13.4.2 Dredging and Disposal Sites

The Foreshore and Dumping at Sea (Amendment) Act 2009 ((EPA, 2009) makes it the function of the EPA to issue Dumping at Sea Permits. A number of active sites are located west of the proposed development (see **Figure 5.32**). However, as the location of the Offshore Export Cable Corridor and landfall are still under consideration, the relevance of these dredging and disposal sites will be considered when more information is available.

All capital and maintenance dredging works, with the potential to arise in cumulative effects with the proposed development will be identified and assessed within the EIAR. These projects will be identified during the production of the ‘long list’ and ‘short list’ of cumulative projects.

5.13.4.3 Defence and Security

The principal charted areas for this purpose are off the northwest and the south coasts of Ireland (Irish Aviation Authority, 2021). The array area of the proposed development site is not located in a restricted military area; however, it is located in the vicinity to Danger Area EID1 (**Figure 5.33**), which lies to the west of the proposed development and comprises of the lands of Gormanston Aerodrome and the air and sea areas contained within a radius of 3nm centred on the aerodrome and is a military firing range. This will be further confirmed in the EIAR.

5.13.4.4 Offshore Wind Farms

There are a number of projects which have been identified by the DHLGH and the DECC as ‘Relevant Projects’ under Marine Planning and Development Management legislation (see Figure 5.34).

In addition to the Relevant Projects which are anticipated to submit new development consent applications to An Bord Pleanála in the Irish Sea, Arklow Bank Wind Park will also be considered. Depending on the timescales of the NISA development and the progress of other applications, the list of the projects included in **Table 5.28** may be amended for the EIAR.

Table 5.28: Existing, proposed and potential offshore wind projects relevant to NISA EIAR.

Project	Developer / Operator	Capacity	Status
Arklow Bank Wind Park	GE Energy	25.2MW	In operation
Arklow Bank Wind Park Phase 2	SSE Renewables	up to 520MW	Pre-application
Oriel Wind Park	Parkwind, ESB	up to 375MW	Pre-application
Dublin Array	RWE, Saorgus Energy	up to 900MW	Scoping
Codling Wind Park	Fred. Olsen Renewables, EDF Renewables	up to 1,500MW	Scoping

5.13.4.5 Wastewater and Disposal

Within the vicinity of the proposed development are numerous wastewater treatment works (see **Table 5.29**). Further details of these developments and any known point sources of wastewater (see **Figure 5.32**) will be assessed in the EIAR both in terms of impacts to these assets and water quality.

Table 5.29: Wastewater Treatment Works located within the vicinity of the study area.

Code	Wastewater Treatment Works	Category of Waste	Status
D0023	**Balbriggan**	**Urban wastewater**	**Active**
D0265	Clogherhead	Urban wastewater	Active
D0021	Malahide	Urban wastewater	Active
D0114	Portrane-Donabate	Urban wastewater	Active
D0034	Ringsend	Urban wastewater	Active
D0119	Rush	Urban wastewater	Active

5.13.5 Potential Impacts

Consideration will be given to the following potential impacts on infrastructure and other users arising from the proposed development and within each phase of development as presented in **Table 29 and 30.** The cells shaded in grey indicate that, based on the information currently available (Chapter 3: The Proposed Development), there is no source-receptor-pathway for that phase of the development. For instance, the impact may require the presence of project infrastructure and so would not be applicable to the construction and decommissioning phases of the proposed development.

Table 5.30: Potential impacts proposed to be scoped in for the infrastructure and other users EIAR chapter.

Potential Impact	Project Phase		
	Construction	Operation and Maintenance	Decommissioning
Direct disturbance and damage to existing or proposed infrastructure. The impact of the proposed activities has the potential for physical disruption or damage to existing or proposed infrastructure. Owners and operators of all infrastructure will be consulted and where appropriate legal agreements will be put in place to mitigate any impact on existing infrastructure as appropriate.	✓	✓	✓
Indirect disturbance of assets. The impact of the project infrastructure may affect other operators' assets, for instance affecting the thermal ratings of neighbouring cables. Owners and operators of all infrastructure will be consulted to ensure appropriate and adequate separation distances are implemented (where appropriate).		✓	

Based on the currently available information, a number of impacts are proposed to be scoped out of the EIAR for infrastructure and other users.

The potential for impacts to occur on oil and gas infrastructure through the proposed NISA lifetime has been scoped out from further assessment. As detailed above in **Section 5.13.4** this is due to the fact that there is no spatial overlap of the proposed development with active oil and gas infrastructure at this time or in the future.

The potential for impacts to occur on marine aggregates through the proposed NISA lifetime has been scoped out from further assessment. As detailed above in **Section 5.13.4** this is due to the lack of spatial overlap of the proposed development with known active or planned marine aggregate extraction at this time.

The potential for impacts to occur on CCS and natural gas storage through the proposed NISA lifetime has been scoped out from further assessment.

As detailed above in **Section 5.13.4** this is due to the lack of spatial overlap of the proposed development with known active or planned CCS and natural gas storage projects at this time.

5.13.6 Potential Mitigation Measures

Given the nature of this topic, as part of the design process for the array area and export offshore cable corridor, a number of embedded mitigation measures are anticipated to reduce the potential for impacts on infrastructure and other users receptors. These will evolve over the development process as the EIA progresses and in response to consultation and potentially from the provision of further data.

Potential mitigation measures that may be considered as part of the proposed development may include:

- Promulgation of information providing advance warning and accurate location details of construction, maintenance and decommissioning operations, associated Safety Zones and advisory passing distances through Notices to Mariners (NtM).
- Crossing and proximity agreements with known existing pipeline and cables operators will be sought.
- A Vessel Management Plan (VMP) will be developed pre-construction.
- Navigational aids and marine charting.
- Advisory clearance distances and Safety Zones of up to 500m in radius will be sought during construction, maintenance and decommissioning phases around installation vessels; and Advisory Safety Zones of 50m for incomplete structures at which construction activity may be temporarily paused.
- The use of guard vessels to ensure adherence with Safety Zones or advisory passing distances, as defined by risk assessment, to mitigate any impact which poses a risk to surface navigation during construction, maintenance and decommissioning phases. Such impacts may include partially installed structures or cables, extinguished navigation lights or other unmarked hazards.
- Development of, and adherence to, a Decommissioning Plan.

The requirement and feasibility of any mitigation measures will be dependent on the significance of the effects on infrastructure and other users and will be consulted upon with statutory consultees throughout the EIA process.

5.13.7 Proposed Approach to EIA

Having established the baseline of the receiving environment, the scenarios on which the assessments will be based will be defined in accordance with the design envelope approach. The geographic footprint and the installation methodologies will be key considerations in defining the ‘worst case scenarios’ for infrastructure and other users receptors. Following this, the likely significant effects on receptors will be described and assessed.

For the purposes of this topic, the DCCAE 2017 guidance states that the study area for the assessment of infrastructure and other users will not necessarily correspond with any ecological or visual zones of influence given the infrastructure are fixed in nature or occur within defined licenced boundaries. Given the fixed nature of these assets, the study area will identify the spatial footprint of the project and the potential for overlap with existing or potential fixed infrastructure.

For example, as the position of existing offshore cables and pipelines are well known, the study area can be reduced to those exact locations within the project development boundary. For each receptor described in this chapter, the spatial variability has been considered and an appropriate baseline description of that receptor’s study area is provided.

As part of the baseline and assessment of infrastructure and other users within the EIA, a comprehensive desk study will be undertaken to establish the current status of known and planned infrastructure within the study area. The baseline characterisation will rely on data pertaining to existing licences or as-built infrastructure. The baseline will be defined through a detailed desktop review of existing and planned licences, studies, applications and datasets. In addition, GIS mapping of current or proposed operations and features will be undertaken. A timeline for future activities associated with existing or planned infrastructure will be established.

In addition to identifying relevant data sources, the guidance also identifies the need for early consultation with key stakeholders and other asset owners and developers. This is particularly relevant for fixed infrastructure (e.g., oil and gas and offshore wind farm assets) to confirm the status of projects and to establish the spatial extent of any overlap with NISA. The Developer will undertake consultation with all relevant offshore developers, operators and marine users to ascertain any concerns relating to the proposed development and to ensure all relevant baseline data sources are captured for current and planned infrastructure developments. Consultation will be held with key stakeholders as necessary, as set out in **Section 3**.

6 Onshore EIA Topics - Scoping

6.1 Overview

There are a number of topics related specifically to the proposed onshore infrastructure associated with the proposed development. These topic specific assessments will be included in Volume 4 of the EIAR. The approach to the scoping of these assessments is outlined below.

6.2 Air Quality

6.2.1 Introduction

The proposed development falls within the following air quality zones, as outlined in Schedule 18 of the Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011):

- Zone A – Dublin Conurbation
- Zone C – other cities and large towns
- Zone D – rural Ireland

In particular, the proposed 220kV substation at Belcamp is located within Zone A, with two of the proposed landfall locations, north of Skerries and Braymore being located (at least partially) in Zone C. The onshore cable route at the northern end is primarily within zone D, with the southern extents within Zone A.

6.2.2 Proposed Guidance and Methodology

The assessment of air quality will address the effect of the proposed development on ambient air quality. The outputs of the assessment will be compared to limit values provided in the following documents:

- Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011); and
- Technical Instructions on Air Quality (TA Luft, 2002).

6.2.3 Data Sources and Receiving Environment

The chapter will provide information on the air quality baseline recorded in Zone A, C and D in the vicinity of the proposed development, as measured by the EPA.

The proposed 220 kV substation site at Belcamp is located adjacent to the existing Belcamp substation, This site for the proposed substation is a greenfield site, to the east of the M50/M1 interchange at Dublin Airport, just off (to the north) of the R139 regional road. There is suburban residential development to the south of the R139 in the vicinity of the proposed substation. Also to the south, close to the proposed substation, is Saint Michaels House/Belcamp Training Centre. Craobh Chiarain GAA club is also nearby, to the east/south east. Much of the area to the east, north and west of the proposed development, is agricultural land.

Given the location of the substation site, adjacent to the R139 and close to the M1/M50 interchange, it is likely the site and surrounds are already subjected to traffic related air quality effects.

The indicative cable corridor zone(s) between the landfalls and the proposed 220kV substation are almost exclusively along the public road network. Given the location of these routes (within the Greater Dublin Area), there is existing residential development, including ribbon development, along these route corridors.

Three landfall options are being considered, at Skerries (North), Skerries (South) and Braymore Point. The landfall at Skerries (North) is located to the north west of Skerries near the R127 between Skerries and Balbriggan. The landfall will be located in a greenfield site, close to the coast. Residential development in the vicinity is primarily within Skerries, to the southeast, with Ardgillan Castle and demesne (including Ladys Stairs) also located to the west/southwest.

The landfall at Skerries (South) is located again, in a greenfield area, close to the coast, on the southern outskirts of Skerries. There is ribbon development close by, along the R128, with more significant residential development to the north within Skerries.

The landfall at Braymore Point is located in a greenfield area, close to the coast around Braymore Point. There is little residential development in this area, although there are market gardens to the west (east of the R132) and community allotments to the west of the R132 on the Knockagin Road. Trinity Care Nursing Home is also located just to the west of the R132, on the Dublin/Meath border. There are also a number of beaches along the coastline in the vicinity.

6.2.4 Potential Impacts and Proposed Approach to EIA

Potential impacts on air quality associated with the construction of the proposed development will be as a result of construction activities and construction traffic accessing the site.

The construction dust assessment will focus on any sensitive air quality receptors in the local area, which generally comprises receptors such as residences, schools, hospitals and similar receptors.

Monitoring and mitigation measures will be implemented to minimise dust nuisance. Mitigation measures will be proposed, where appropriate, to minimise significant adverse air quality impacts. Dust deposition monitoring will be carried out at the site boundary to ensure dust levels are minimised.

The assessment of traffic-related pollutant emissions during the construction phase will follow the ‘Design Manual for Roads and Bridges’ (DMRB) methodology (Highways Agency (UK), 2017). A screening assessment will be carried out and traffic-related pollutants, namely carbon monoxide (CO), benzene, nitrogen oxides (NOx), nitrogen dioxide (NO2) and particulate matter (PM10 and PM2.5) will be quantified where traffic volumes on the road network are predicted to increase by greater than 5% during the operational phase and 10% during the construction phase.

The only new air emissions sources expected during the operational phase relate to the likely provision of standby generation at the proposed onshore 220 kV substation. Potential emissions impacts from these generators will be assessed in the EIAR, however, due to the irregular use of this generator, no significant impacts are likely.

Once the proposed development is operational, it is not expected there will be a significant increase in traffic volumes. It is unlikely that there will be a significant operational impact on air quality.

The operational lifetime of the proposed development is likely to be considerable (c. 35 years). At the end of its operational life, if decommissioned, it is likely that all below ground infrastructure would remain in place, with only the above ground infrastructure (including the 220kV substation and any required onshore substation (at/near the landfall) to be demolished and removed. The potential impacts on air quality from this phase, such as dust and emissions from the traffic generated, will also be assessed.

It is expected that the proposed development will have a positive indirect and cumulative effect on air quality as the NISA project will provide a clean, renewable source of energy with the view to reduce reliance on non-renewable energy sources. The proposed development therefore has the potential to contribute towards emissions reductions from fossil fuel power generation.

6.3 Climate

6.3.1 Data Sources and Baseline Environment

Climate data will be obtained from Met Éireann (weather) and the EPA (carbon). Ireland is bound by commitments to reduce greenhouse gas emissions from as far back as the EU Climate Change and Renewable Energy Package in December 2008.

The provisional estimates of greenhouse gas emissions for the period 1990- 2019 from the EPA[14] indicate that Ireland will exceed its 2019 annual limit set under the EU Effort Sharing Decision (ESD). Nonetheless, in 2019 emissions decreased by 4.5% in 2019 compared to 2018.

Emissions in the Energy Industries sector show a decrease of 11.2% in 2019, which is attributable to a 69% decrease in coal and an 8% decrease in peat used in electricity generation. Electricity generated from wind increased by 16.0% in 2019.

6.3.2 Potential Impacts and Approach to EIA

The Programme for Government has committed to a 7% reduction in greenhouse gas emissions annually during the 2020s.

[14] Ireland's Provisional Greenhouse Gas Emissions 1990-2019

During the construction phase of the development, there is the potential for an indirect impact on climate due to the generation of embodied carbon and emissions from construction plant. These potential emissions will be quantified and assessed in the EIAR.

The proposed 220 kV substation may contain sulphur hexafluoride gas, which has significant greenhouse gas potential. If present, there will be no routine emissions of this gas and the mitigation measures and improvements in operation and maintenance to manage this risk will all be addressed in the EIAR, covering all phases of the development, including decommissioning.

It is envisaged that the proposed development will have a significant positive direct effect on climate once operational, providing a clean, renewable source of energy with the view to reducing reliance on non-renewable energy sources. The proposed development has the potential to contribute significantly towards reducing greenhouse gas emissions.

6.4 Land and Soils

6.4.1 Introduction

The land and soils chapter of the EIAR will cover the potential impacts of the proposed development on land, soils, geology and hydrogeology. The assessment will determine the likely significant effects on land, soils and geology associated with the construction, operation and decommissioning of the onshore aspects of the proposed development.

The approach to the assessment of these aspects is outlined below.

6.4.2 Land, Soils and Geology

6.4.2.1 Guidance and Baseline Methodology

In determining the impacts of the proposed development on the baseline geological conditions, a number of documents and sources will be referred to including information from previous ground investigations in the area, where relevant and available. If required, a ground investigation programme will be completed to fill data gaps in from the desktop study and provide the required information to adequately characterise the environment.

Land, soils and geology will be described under a number of criteria, where relevant including their removal, erosion or extraction; stability/ground conditions; suitability for growing plants; value as a material asset and use as a resource. The bedrock and subsoil types, their mineralogy and engineering properties, degree of weathering and vertical and horizontal extent will be described.

Any structural, geological and geomorphic features will be identified and described.

Each soil type present on site will be described in terms of its classification, soil profile, site characteristics (relief, slope, vegetation, etc.), drainage conditions and properties such as texture, structure, colour and root development.

6.4.2.2 Potential Impacts

The assessment of the likely significant impacts on the land, soils and geology environment will take account of both the importance of an attribute and the magnitude of the effects on it.

Potential significant impacts to land, soils and geology associated with the proposed development include:

- Removal of soil and rock from the ground during construction, including crossings, could result in ground movement and a risk of settlement to buildings, infrastructure or utilities in the immediate vicinity;
- There is potential for contamination hotspots to be uncovered along the cable route;
- Leakage or spillage of construction or decommissioning related materials on site during the construction and decommissioning stages, respectively, could cause ground contamination in the soil.
- There is a potential impact on the marine environment and coastal processes during the proposed cable installation (Horizontal Directional Drilling or other method) at the landfall.

The operational phase has little potential for negative land, soils and geology impacts.

During construction the potential impacts on land, soils and geology would be associated with activities such as excavation and trenching. Additionally, consideration will be given to the potential consequences and mitigation of accidents, such as spillage of fuels, on soil quality.

Potential effects on the geological environment will be assessed by classifying the importance of the relevant attributes at key constraints and their locations. The likely magnitude of any effect will then be quantified. This effect will be assessed through the review of the construction methodology.

Following the assessment of impacts, specific mitigation measures will be developed to avoid, reduce and, if possible, remedy any significant adverse effects on land, soils and geology during the construction, operation and decommissioning of the proposed development.

The cumulative effects of the proposed development, in terms of land, soils and geology will also be assessed as part of the EIAR.

6.4.3 Hydrogeology

6.4.3.1 Guidance and Baseline Methodology

In determining the effects of the proposed development, a number of documents and sources will be referred to including information from previous ground investigations in the area, where relevant and available and groundwater monitoring data collected by the EPA and GSI.

The hydrogeological properties of the strata present at the sites and along the cable route will be described, consistent with the descriptions of soils and geology. The impacts of any structural, geological and geomorphic features on the hydrogeological environment will be identified and described. The hydrogeological assessment will comprise a detailed review of the site investigation data to determine the unsaturated zone thickness, direction of groundwater flow and characteristic water quality which will be used to prepare a Conceptual Site Model. It will inform the design of the proposed development.

Consistent with the soils and geology assessment, the extent of any groundwater contamination will be assessed and, where necessary, the effects on the environment and potential site users will be described. If necessary, the assessment will quantify the volume of soil to be removed in order to reduce the groundwater contamination to an acceptable environmental level. Should any groundwater remediation be required this will be assessed alongside the effects of the proposed development.

6.4.3.2 Receiving Environment

The groundwater bodies along the indicative cable corridor zone(s) are mostly at Good status under the Water Framework Directive. However two small groundwater bodies are at Poor status (IE_EA_G_086 (associated with licenced site P0480-02, Dublin Aerospace Ltd) which the route may transect, and IE_EA_G_062 (associated with licenced site P0014-03, associated with Sk Biotek Ireland Limited, which the route will probably not intersect).

There are a number of landfills in the area both active (at Ballally and the Naul) and historic (Nevitt Landfill), which the assessment will need to consider in text context of the influence on groundwater flow paths and quality.

The cable route transects the Source Protection Area for the Bog of the Ring groundwater supply wells which supply water to Balbriggan. The boreholes abstract from a confined bedrock aquifer overlain by thick subsoils so it is not expected that the shallow excavations or directional drilling would result in significant effects.

The route transects the hydrological catchment to a number of SACs (Rogerstown Estuary (000208), Malahide Estuary (000205), Baldoyle Bay (000199). A review of the qualifying interests for these sites do not indicate any groundwater dependant ecosystems and therefore the potential for direct likely significant effects appears unlikely, however there is a potential for indirect effects as a result of the hydraulic connection between groundwater and surface water bodies that ultimately drain to these habitats.

6.4.3.3 Potential Impacts

The assessment of likely significant hydrogeological impacts will take account of both the importance of an attribute and the magnitude of the effects on it. Potential impacts associated with the proposed development include:

- Trenching, horizontal directional drilling and deep excavations during the construction phase could permanently alter any underlying aquifers and have the potential to impact on the groundwater environment by altering groundwater flow directions and reducing storage in the aquifer along and in the vicinity of the proposed development;
- Any dewatering associated with construction could also potentially impact the groundwater environment and any surface water feature dependant on the groundwater by lowering the water table;
- Altering the groundwater flow direction temporarily or permanently could change the direction of any groundwater contamination that may currently exist; and
- Leakage or spillage of construction or decommissioning related materials on site during the construction and decommissioning stages, respectively, could cause ground contamination in the groundwater.

The operational phase has little potential for negative effects on the hydrogeological environment.

Potential impacts (including cumulative effects) on the hydrogeological environment will be assessed and the magnitude of any effect will be quantified. This effect will be assessed through the review of the construction methodology.

Following the assessment of the likely significant effects, if necessary, specific mitigation measures will be developed to avoid, reduce and, if possible, remedy any significant adverse effects on the hydrogeological environment during the construction of the proposed development.

6.5 Water

6.5.1 Policy and Guidance

The Water Framework Directive (WFD, 2000/60/EC) establishes a framework for the protection of all waters including rivers, lakes, estuaries, coastal waters and groundwater, and their dependent wildlife/habitats under one piece of environmental legislation. The WFD aims to achieve Good status for all water bodies. The EPA define the status of water bodies in Ireland with the most status being defined for 2018.

6.5.2 Data Sources and Receiving Environment

The indicative cable corridor zone(s) will transect the following WFD river water bod subcatchments from north to south: Matt_010, Ballough Stream_010&020, Ballyboghil_020, Turvey_010, Broadmeadow_040, Ward_040, Gaybrook_010, Sluice_010 and Mayne_010. All of these river water bodies are either poor or moderate status or are unassigned.

The significant pressures identified by EPA in this area are Agricultural land use, urban runoff, hydromorphology, effluent from Wastewater Treatment Plants.

The transitional water bodies located downstream of the routes include the Rogerstown Estuary, which is at Bad status and the Malahide Estuary (the WFD transitional water body is named Broadmeadow Water) which is at Poor status.

Significant pressures identified by the EPA include agriculture for the Rogerstown Estuary, domestic waste water for both estuaries and urban waste water for Malahide Estuary.

6.5.3 Methodology

The hydrological assessment will include the following:

- A regional overview and characterisation of the hydrological environment;
- Assessment of likely significant effects on the existing hydrological environment;
- Provide appropriate monitoring and mitigation measures and provide an assessment of residual effects; and

Current water protection legislation will also be reviewed, and details of baseline water quality data presented where available.

A Flood Risk Assessment will be undertaken for the proposed development in accordance with *"The Planning System and Flood Risk Management. Guidelines for Planning Authorities"* (DEHLG, 2009).

The flood risk assessment will address the risk of flooding elsewhere in the catchment, as a result of to the proposed development, as well as the risk of the development flooding.

6.5.4 Potential Impacts

Construction in close proximity to and across watercourses has the potential for the following impacts on water quality, species and habitats:

- Direct removal of riverine and bankside habitat;
- Creation of barriers to fish movement;
- Short-term construction impacts;
- Pollution from road run-off;
- Pollution from accidental hazardous spillage; and
- Impacts on river geomorphology.

The hydrological assessment will address the likely significant effects, both positive and negative, of the proposed development on surface watercourses and features in proximity to the site. Likely significant effects will be assessed during the construction, operation and decommissioning of the proposed development.

During construction and decommissioning, there is the potential for pollution of surface and ground water features from sediment loading and polluting substances entering watercourses/aquifers/marine environment, e.g. as a result of surface water runoff or spills on-site.

Mitigation measures will be proposed where necessary and include measures to protect water bodies.

The measures will include employing best practice construction methods for undertaking work adjacent to, on, under and over watercourses, and for adequately dealing with surface water run-off and controlling the sources of pollution, including relevant CIRIA guidance. Significant effects on natural watercourses and flood risk during construction will also be minimised by applying sound design principles and by following good work practices.

6.6 Biodiversity

6.6.1 Introduction

This section of the EIA scoping relates to the onshore biodiversity assessment for the proposed development, including terrestrial and freshwater ecology.

6.6.2 Policy and Guidelines

The work will be undertaken with full account of legislation, policy and guidance relating to species and habitat protection, importance and survey protocol. The guiding legislation, policy and guidance includes the following:

Legislation

- EU Habitats Directive 92/43/EEC, European Communities (Natural Habitats) Regulations 1997, European Communities (Birds and Natural Habitats) Regulations 2011
- Environmental Impact Assessment Directive (2011/92/EU)
- Environmental Impact Assessment Directive (2014/52/EU)
- EU Birds Directive 79/409/EEC
- Bern and Bonn Convention
- The Wildlife Act (1976) as amended
- Flora (Protection) Order, 1999

Policies and plans

- DoCHG (2017) National Biodiversity Action Plan 2017 - 2021
- Eastern River Basin District, River Basin Management Plan 2009 - 2015
- River Basin Management Plan for Ireland 2018 - 2021

Guidance

- EPA (2017). Revised Guidelines on the information to be contained in Environmental Impact Statements. Draft report August 2017. Environmental Protection Agency, Dublin
- CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Chartered Institute of Ecology and Environmental Management (CIEEM)

6.6.3 Data Sources and Baseline Methodology

Desk based review of biological records

A desktop study will be undertaken to gather information on the likely distribution of species in the general area prior to the field survey visits, so that a targeted approach to surveying can be undertaken. This desktop study will include reviewing the biological records for the area, undertaken utilising information available from the National Biodiversity Data Centre (NBDC), as well as the NBDC bat suitability index (Lundy et al. 2011).

Data / consultation requests will also be made to NPWS, Bat Conservation Ireland and Birdwatch Ireland, Inland Fisheries Ireland, and Fingal County Council as appropriate.

Field surveys to be undertaken

Surveys undertaken at the landfall areas will include:

- Habitat surveys to Fossitt level 3 and to identify any potential Annex I habitats;
- Bat Potential Roost Feature (PRF) survey;
- Terrestrial mammals signs surveys, including badger and otter;
- Surveys for terrestrial Invasive Alien Species (IASs).
- Breeding bird surveys, including inshore seabirds / waders as necessary;
- Bat activity surveys;
- Winter bird surveys.

Surveys undertaken along the cable route and at the substation will include:

- Habitat surveys to Fossitt level 3 and to identify any potential Annex I habitats;
- Bat Potential Roost Feature (PRF) survey;
- Terrestrial mammals signs surveys, including badger and otter;
- Surveys for terrestrial Invasive Alien Species (IASs).
- Breeding bird surveys, including inshore seabirds / waders as necessary; and
- Winter bird surveys, where appropriate, notably in the vicinity of SPAs, in order to inform the Natura Impact Statement.

The requirement for bat activity surveys along the cable route and substation will be assessed following the initial walkover surveys.

6.6.4 Potential Impacts

The potential impacts associated with the proposal are likely to mostly relate to the construction phase, with potential impacts possible relating to the operational phase of the substation. Likely potential impacts are highlighted below.

6.6.4.1 Construction phase

Landfall / Onshore substation

Construction phase potential impacts are likely to include:

- Potential disturbance to inshore feeding / nesting birds.
- Potential disturbance to nesting passerines resulting from works in vicinity of trees / hedgerows or loss of nest sites.
- Potential disturbance to badgers or damage to badger setts.
- Potential loss of habitats, including hedgerows.

Cabling and/or 220kv Substation works

In addition to those potential impacts outlined about, construction phase potential impacts are likely to include:

- Potential impact on watercourses either by trenching (if directional drilling not used) or pollution.
- Potential loss of bat roosts if mature trees are felled to facilitate cabling.
- Potential disturbance of wintering birds, including within, and adjacent to, SPAs.

6.6.4.2 Operational phase

Operational phase potential impacts are likely to include:

- Lighting disturbance (notably on bats).
- Potential for noise disturbance (relevant to 220kv Substation).

6.6.5 Potential Mitigation Measures

Table 6.1 below highlights potential mitigation approaches linked to potential impacts that may arise on key ecological features as a result of surveys and the proposed works.

Table 6.1: Proposed Mitigation Approaches

Category	Feature	Potential Impact	Possible Mitigation Measures
Designated Statutory Sites	Rogerstown Estuary SPA Malahide Estuary SPA	Potential disturbance of bird species during construction where cabling lies close to SPA.	- If necessary, potential limitations on timing and extent of works, could be investigated in specific locations with potential to result in disturbance.

Category	Feature	Potential Impact	Possible Mitigation Measures
	Malahide Estuary SAC Rogerstown Estuary SAC	Potential impact on water quality and hydrologically linked habitats resulting from pollution events.	- Good practice in relation to working near water must be adhered to in order to prevent water pollution of the SACs during the construction and the operation of the Proposed Development.
	Malahide Estuary pNHA Rogerstown Estuary pNHA	Potential disturbance of bird species during construction where cabling lies close to SPA. Potential impact on water quality and hydrologically linked habitats resulting from pollution events.	- If necessary, potential limitations on timing and extent of works could be investigated in specific locations with potential to result in disturbance. - Good practice in relation to working near water must be adhered to in order to prevent water pollution of the SACs during the construction and the operation of the Proposed Development.

Category	Feature	Potential Impact	Possible Mitigation Measures
Protected / Notable Habitats **(likely examples)**	Broad-leaved woodland	Loss of habitat	If removing broad-leaved plantation woodland is unavoidable, the following should be adhered to: - Avoid where possible, sections of woodland with semi-mature / mature trees; - Retain connectivity where possible; - Integrate woodland into the development as boundary features to ensure their long-term management and retention; - New planting should link existing landscape features such as patches of woodland to watercourses or ponds; - New planting should be with native species; and some non-native species can be acceptable in an urban environment where screening is required. However, they should not be used in rural areas or for replacement of hedgerows of higher biodiversity value; Any woodland removal must be undertaken outwith the breeding bird season where possible.

Category	Feature	Potential Impact	Possible Mitigation Measures
	Running Water	Pollution. Damage to river / stream beds	Avoid working instream and near the banks of any river, stream or drain identified within the Ecology Survey Area - Good practice in relation to working near water must be adhered to in order to prevent water pollution during the construction and the operation of the Proposed Development. - Maintain appropriate natural buffer zones to watercourses - If any in-river works are undertaken (eg culverting) these will need to be under appropriate licenses ensuring continued fish passage and avoidance of removal of benthic substrate
	Hedgerows		

Category	Feature	Potential Impact	Possible Mitigation Measures
		Loss of hedgerows. Damage to hedgerows during construction.	If removing hedgerows is unavoidable, the following should be adhered to where possible: - Avoid hedgerows with large trees, those that are species rich or those that are town boundaries. If these types of hedgerows are to be lost, surveys of protected and priority species is always required; - Retain connectivity where possible; - Retain hedgerows where they form a significant element of the landscape character; - Integrate hedgerows into the development as boundary features or part of the open space provision to ensure their long-term management and retention; - New planting should link existing landscape features such as patches of woodland to watercourses or ponds; - New planting should be with native species; and some non-native species can be acceptable in an urban environment where screening is required. However, they should not be used in rural areas or for replacement of hedgerows of higher biodiversity value; Any hedgerow removal must be undertaken outwith the breeding bird season, where possible.
Protected / Notable Bird Species	Assemblage of wintering birds associated with nearby SPAs	Potential disturbance of ex situ Qualifying Interest bird species (eg golden plover)	- Avoid works on any field identified as foraging habitat for QI wintering birds during wintering season.

Category	Feature	Potential Impact	Possible Mitigation Measures
(likely examples)	Yellowhammer / farmland passerinces	Impact on breeding habitat. Disturbance during nesting season / destruction of nests	- Avoid hedgerow loss as far as possible - No vegetation clearance during bird nesting season
Protected / Notable Mammals **(likely examples)**	Otter	Potential disturbance of otters in cabling locations in proximity to watercourses	Avoid otter holts and habitat surrounding holts. If works near otter holts are unavoidable the following mitigation is required: - Apply appropriate buffers to works with potential to disturb otters / holts. - Undertake any potentially disturbing works under license. - Avoid impact on holts and retain associated habitats (including woodland and scrub) - Provide adequate protection zones during construction and operation of the development. Good practice in relation to working near water must be adhered to in order to prevent water pollution during the construction and the operation of the Proposed Development.
	Badger	Potential disturbance of badgers or damage to setts during cabling works	Avoid badger setts. If works near setts are unavoidable the following mitigation is required: - Apply appropriate buffers to works with potential to disturb badgers or damage to setts. - Undertake any potentially disturbing works under license. - Provide adequate protection zones during construction and operation of the development.

Category	Feature	Potential Impact	Possible Mitigation Measures
	Bats	Potential loss of roosts or foraging habitat	Avoid impacts on bats and their roosts through design of the Proposed Development. Where bats are present on or near a site the following mitigation measures should be applied as a minimum: - Retain all roosting sites and foraging corridors - Retain lines of mature vegetation, water features and areas of woodland - Ensure that lighting does not illuminate habitat features or any bat roosts in the area. - Plant native species of trees and shrubs to provide foraging habitat and to help retain connections with the existing lines of trees and hedgerows in the surrounding area; a helpful tool in achieving connectivity is to look at aerial photographs of the area. - When creating grassland areas within a site include native rough grass and wild flower seed mix where possible as this will provide a flower rich habitat that attracts insects and in turn provides feeding areas for bats. - If there is a river or stream within the site or on the boundary of the site consider planting native trees along the river or stream to provide a wildlife corridor and create dark areas for feeding bats.

Category	Feature	Potential Impact	Possible Mitigation Measures
Protected Aquatic Species **(likely example)**	Atlantic salmon	Potential pollution or damage to benthic habitat	- Avoid working instream and near the banks of any river, stream or drain where possible - Good practice in relation to working near water must be adhered to in order to prevent water pollution during the construction and the operation of the Proposed Development. - Maintain appropriate natural buffer zones to watercourses, for invertebrate prey items If any in-river works are undertaken (eg culverting) these will need to be under appropriate consultation with IFI ensuring continued fish passage and avoidance of removal of benthic substrate
Invasive Alien Species	Alien invasive plant species (eg Japanese knotweed) have the potential to occur at any location within the works.	Potential spread of IASs	If working near invasive alien plant species is unavoidable, the following should be adhered to: - An Invasive Species Management Plan will be required. - As each species has a different life cycle, including different methods of propagation, different management methods are required. Available best practice guidance should be considered when dealing with plans. - Where disposal off the site is considered necessary, it should be acknowledged that an appropriate license will be required.

6.6.6 Proposed Approach to EIA

The impact assessment methodology applied will follow the Chartered Institute of Ecology and Environmental Management 'CIEEM' guidance (CIEEM 2018). The following list (Table) provides a useful summary of the process for undertaking an EcIA, as detailed in the CIEEM guidance document.

Table 6.2: Proposed Impact Assessment Methodology

Task	Description
• Scoping	• Determining the matters to be addressed in the EcIA, including consultation to ensure the most effective input to defining the scope.
• Establishing the baseline	• Collecting information and describing the ecological conditions in the absence of the proposed project, to inform the assessment of impacts.
• Important ecological features	• Identifying important ecological features (habitats and species) that may be affected, with reference to a geographical context in which they are considered important.
• Impact assessment	• An assessment of whether important ecological features may be subject to potential impacts and characterisation of these impacts and their effects. • Assessment of potential residual ecological impacts of the project remaining after mitigation and the significance of their effects, including cumulative effects.
• Avoidance, mitigation, compensation & enhancement	• Incorporating measures to avoid, reduce and/or compensate potential ecological impacts, and the provision of ecological enhancements.
• Monitoring	• Monitoring impacts of the development and evaluation of the success of proposed mitigation, compensation and enhancement measures.

6.6.6.1 Identifying ecological features within the zone of influence

Information acquired during the desk-study and field surveys determines the ecological features potentially affected by the proposed development, and as such occur within its 'zone of influence'. The zone of influence depends on the likely impacts of the proposed development or activity and the presence of ecological connections that provide a pathway for such impacts to an ecological feature of interest which is sensitive to such impacts.

6.6.6.2 Evaluating ecological features within the zone of influence

Those ecological features which occur within the zone of influence such as nature conservation sites, habitat or species will be evaluated in geographic hierarchy of importance. The following categories will be used: Geographic frame of reference used to determine value of ecological resources (NRA 2009).

Table 6.3: Ecological Features – Importance and Criteria

Importance	Criteria
International Importance	• 'European Site' including Special Area of Conservation (SAC), Site of Community Importance (SCI), Special Protection Area (SPA) or proposed Special Area of Conservation. • Proposed Special Protection Area (pSPA). • Site that fulfils the criteria for designation as a 'European Site' (see Annex III of the Habitats Directive, as amended).

Importance	Criteria
	• Features essential to maintaining the coherence of the Natura 2000 Network. • Site containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive. • Resident or regularly occurring populations (assessed to be important at the national level) of the following: o Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and/or o Species of animal and plants listed in Annex II and/or IV of the Habitats Directive. • Ramsar Site (Convention on Wetlands of International Importance Especially Waterfowl Habitat 1971). • World Heritage Site (Convention for the Protection of World Cultural & Natural Heritage, 1972). • Biosphere Reserve (UNESCO Man & The Biosphere Programme). • Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979). • Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979). • Biogenetic Reserve under the Council of Europe. • European Diploma Site under the Council of Europe. • Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 293 of 1988).
National Importance	• Site designated or proposed as a Natural Heritage Area (NHA). • Statutory Nature Reserve. • Refuge for Fauna and Flora protected under the Wildlife Acts. • National Park. • Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA); Statutory Nature Reserve; Refuge for Fauna and Flora protected under the Wildlife Act; and/or a National Park. • Resident or regularly occurring populations (assessed to be important at the national level) of the following: o Species protected under the Wildlife Acts; and/or o Species listed on the relevant Red Data list. o Site containing 'viable areas' of the habitat types listed in Annex I of the Habitats Directive.
County Importance	• Area of Special Amenity. • Area subject to a Tree Preservation Order. • Area of High Amenity, or equivalent, designated under the County Development Plan. • Resident or regularly occurring populations (assessed to be important at the County level) of the following: o Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; o Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; o Species protected under the Wildlife Acts; and/or

Importance	Criteria
	○ Species listed on the relevant Red Data list. ○ Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance. • County important populations of species; or viable areas of semi-natural habitats; or natural heritage features identified in the National or Local BAP; if this has been prepared. • Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or populations of species that are uncommon within the county. • Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.
Local Importance (Higher Value)	• Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared; • Resident or regularly occurring populations (assessed to be important at the Local level) of the following: ○ Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; ○ Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; ○ Species protected under the Wildlife Acts; and/or ○ Species listed on the relevant Red Data list. • Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality; • Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.
Local Importance (Lower Value)	• Sites containing small areas of semi-natural habitat that are of some local importance for wildlife; • Sites or features containing non-native species that are of some importance in maintaining habitat links.

The status of a species as requiring protection at an international level (such as otter) does not necessarily impose an international conservation value on any single example of that species found at the site. Approaches to attributing nature conservation value to species have been previously developed for some species groups such as birds and bats. The approach to attributing nature conservation value to bat populations and foraging habitats is adapted from Wray et al. 2010. Bird species conservation status is attributed by the Birds of Conservation Concern (BoCCI) list (Gilbert et al, 2021).

Only Important Ecological Features (i.e. those features evaluated as being of Local Importance (Higher Value) or greater) within the zone of influence will be assessed with respect to potential impact.

6.6.6.3 Identification and Characterisation of Impacts

When describing ecological impacts reference will be made to the following characteristics;

- positive or negative;
- extent;
- magnitude;
- duration;
- timing;
- frequency; and,
- reversibility.

However, the assessment only needs to describe those characteristics relevant to understanding the ecological effect and determining the significance; and as such does not need to incorporate all stated characteristics (CIEEM 2018).

6.6.6.4 Significant Impacts on important ecological features

For the purpose of EcIA, 'significant effect' is an effect that either supports or undermines biodiversity conservation objectives for those ecological features which have been identified as being an important feature of the site ("Important Ecological Features"). Conservation objectives may be specific (e.g. for a designated site) or broad (e.g. national/local nature conservation policy). As such effects can be considered significant in a wide range of geographic scales from international to local. Consequently, 'significant' effects will be qualified with reference to the appropriate geographic scale (CIEEM 2018).

6.6.6.5 Assessment of residual impacts and effects

After characterising the potential impacts of the development and assessing the potential effects of these impacts on the 'Important Ecological Features', mitigation measures will be proposed to avoid and / or mitigate the identified ecological effects. Once measures to avoid and mitigate ecological effects have been finalised, assessment of the residual impacts and effects will be undertaken to determine the significance of their effects on the 'Important Ecological Features'.

6.7 Traffic and Transportation

6.7.1 Introduction

The traffic impact assessment will address the traffic impacts on the road network from the construction and operation of the NISA project. The assessment will include the supply of materials, plant and equipment and the wind turbine components, construction of substations and landfall site area works, the cable laying operations and the components of the substations and transition stations. Traffic arising from the construction and operations workforce will also be addressed.

6.7.2 Guidance and Assessment Methodology

A traffic impact assessment will be conducted in accordance with the National Roads Authority (NRA) (now TII) Traffic and Transport Assessment (TTA) Guidelines, 2014.

The methodology for the traffic impact assessment will include a review of the existing traffic patterns and an estimation of the traffic volumes which will be generated by the construction of the onshore cable, the landfall and the converter station. The traffic generated by the construction workforce and by the transport of materials and equipment will be predicted.

6.7.3 Data Sources and Baseline Methodology

If feasible, a suite of traffic surveys are likely to be required across the applicable traffic area of influence of the scheme. In the event that it is not possible to carry out traffic surveys (due to ongoing restrictions associated with Covid-19) then interrogation of the NTA's Eastern Regional Model which covers the Greater Dublin Area will be carried out to determine if suitable traffic flows can be extracted from same.

6.7.4 Potential Impacts and Approach to EIA

The potential disruption to the road network during the delivery of specific materials and components, and the installation of the cables and the availability of alternative routes will be assessed. The traffic distribution pattern on the local road network during construction will be examined and impacts determined. Recommendations will be made to mitigate any potential traffic impacts on the road network.

The onshore study area applicable to the NISA project has an extensive network of national, regional and local roads. The onshore cable routes (yet to be confirmed) are likely to be alongside or within existing roadways. It will be an objective for the cable routes to avoid towns and villages where feasible, given that these roads typically form the confluence of approach routes and therefore experience more traffic flow and consequently have a more significant disruptive impact.

The cable routes will avoid motorways and national primary and secondary roads where feasible. Generally, it is anticipated that the converter station will be accessed by lightly trafficked rural roads.

The greatest potential for traffic impact from Greenlink is during the construction phase which will give rise to additional traffic on the road network for delivery of materials, plant and wind turbine blades, as well as the potential impacts arising from road closures or lane closures due to cable installation works.

Depending on the routes and construction methodology, installation of the cables may require partial or full road closures and traffic may have to use alternative routes. Where the cable route diverges from the road, the impacts would be reduced.

Once the NISA project is in operation, the potential for a traffic impact is significantly reduced.

The operations and maintenance workforce will be minimal, so that the impact on any particular road would be insignificant. Decommissioning of the project will also be considered as part of the traffic and transportation assessment.

6.8 Archaeology, Architectural and Cultural Heritage

6.8.1 Introduction

This section describes the scope of works and methods to be applied in the identification and assessment of archaeological, architectural and cultural heritage impacts associated with the proposed development. A high-level overview of the baseline conditions is included, together with the proposed methodology and a scope of work likely to be required to undertake a detailed assessment of the impact of the proposed development as part of the EIAR.

6.8.2 Policy and Guidelines

The assessment of the archaeological, architectural and cultural heritage resource will be conducted under the relevant legislation and planning frameworks applicable to the Republic of Ireland. These include:

- National Monuments Acts, 1930-2004
- The Planning and Development (Strategic Infrastructure) Bill, 2006
- The Planning and Development Acts 2000 to 2017
- Heritage Act, 1995, as amended
- Guidelines on the information to be contained in Environmental Impact Statements, 2003, EPA
- Advice Notes on Current Practice (in preparation of Environmental Impact Statements), 2003, EPA
- Draft Advice Notes on Current Practice (in preparation of Environmental Impact Statements), 2015, EPA
- Guidelines on the information to be contained in environmental impact assessment reports (Draft August 2017), EPA
- Frameworks and Principles for the Protection of the Archaeological Heritage, 1999, (formerly) Department of Arts, Heritage, Gaeltacht and Islands
- Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act, 2000 and the Local Government (Planning and Development) Act 2000

6.8.3 Data Sources and Baseline Methodology

The assessment will adopt the following approach:

An assessment of the impact of the proposed development by a comprehensive study of the potential direct, indirect, residual and cumulative effects of the proposed development. This will include, where applicable, visual impacts on archaeological, architectural and cultural heritage assets.

Full consultation with the relevant statutory bodies will be carried out during the course of the assessment.

A systematic search will be undertaken of all readily available and relevant documentary sources.

These will include, but are not exclusive to the:

- Record of Monuments and Places for County Dublin;
- Sites and Monuments Record for County Dublin;
- Register of Protected Structures (County Fingal/ Dublin City);
- National Inventory of Architectural Heritage;
- Relevant Industrial Heritage Surveys;
- Monuments in State Care Database;
- Preservation Orders;
- Register of Historic Monuments;
- Topographical files of the National Museum of Ireland;
- Cartographic and written sources relating to the study area;
- Relevant County and Local Area Plans;
- Excavations Bulletin (1970-2020)

The desktop assessment will be followed by a field inspection of the proposed development area. The field survey will confirm the accuracy of the information collected during the desktop study and will also assess any additional previously unrecorded sites of archaeological, architectural and cultural heritage merit, which could be significantly affected by the development.

6.8.4 Receiving Environment

The proposed cable route scheme will travel through the northern part of County Dublin, predominantly within the Local Authority area of County Fingal. The cable route will be confined, for the most part, to the local road network. The landscape is characterised by numerous archaeological sites dating to the prehistoric, early medieval and medieval periods and includes settlements established in the early medieval period, such as Swords, Lusk and Donabate. This landscape also contains numerous protected structures, which comprise scattered vernacular dwellings, larger country houses, bridges and multiple structures listed within the existing towns and villages. Many of these structures are also listed in the National Inventory of Architectural Heritage, although listing alone within this inventory does not confer statutory protection.

Another important cultural heritage element of the receiving environment is designed landscapes. North County Dublin contains multiple demesne landscapes, which were often established during the late 18th and early 19th centuries in association with large country houses. These landscapes possess multiple defining features that can cover large areas, including entrance avenues, gate lodges and formal entrances, demesne boundary walls, tree belts.

Significant landscapes within the area of the proposed development include those associated with Ardgillan Castle, Malahide Castle, Newbridge and multiple demesnes (and associated houses) in the Balgriffin/Belcamp area.

6.8.5 Potential Impacts

Potential impacts upon the archaeological resource may arise due to excavation works associated with the landfall portion of the cable route and construction of the cable route itself. Excavations works may have a direct and negative impact on the recorded and previously unrecorded archaeological resource, especially in any greenfield areas, or where the cable route crosses existing watercourses. Impacts have the potential to range from moderate to profound in scale.

Potential impacts upon the architectural heritage resource are less likely, as the cabling route will avoid upstanding buildings, although it remains possible that construction works may result in indirect negative (and temporary) impacts on the setting of structures that possess architectural heritage merit and potential direct impacts where the cable route may cross an existing watercourse via a protected bridge. It is also possible that construction works associated with laying the cable may result in a direct negative impact on demesne landscapes, especially where the cable route travels along the road network adjacent to demesne landscapes with associated boundaries walls. Direct and indirect impacts have the potential to range from moderate to significant in scale.

The mitigation measures that will be detailed in relation to the archaeological and cultural heritage resource will remove any negative impacts as any archaeological remains will be fully preserved by record. As such there will be no cumulative impact on the archaeological resource. Mitigation measures that relate to the architectural heritage resource will aim to remove or reduce impacts on structures or their settings. As such, the potential remains that cumulative impacts may occur in relation to the architectural heritage resource, dependant on the nature of the additional development. All developments that cumulatively may affect the architectural heritage resource will be assessed during the course of the EIAR.

6.8.6 Potential Mitigation Measures

Dependant on the results of the baseline assessment, along with an assessment of the proposed methods of construction, mitigation carried out in relation to the archaeological resource will result in the preservation in-situ or by record of any archaeological remains. Mitigation, in the first instance will consist of avoidance of impacts by design. If impacts cannot be avoided, mitigation will consist of a programme of archaeological monitoring (and archaeological test trenching or underwater assessment, if required), which may lead to a programme of archaeological excavation, should any remains of archaeological significant be identified. All works will be carried out under licence to the National Monuments Service of the Department of Housing, Local Government and Heritage.

Mitigation with regards to the architectural heritage resource, in the first instance will consist of avoidance of impacts by design. If impacts cannot be avoided, mitigation will consist of a programme of built heritage survey and recording prior to the commencement of construction. This will provide a record of the structure and/or its setting, prior to any alterations associated with the development.

7 Wider Scheme Impact EIA Topics - Scoping

7.1 Overview

There are a number of topics which have wider scheme impacts across both offshore and onshore infrastructure associated with the proposed development. These topic specific assessments will be included in Volume 5 of the EIAR. The approach to the scoping of these assessments is outlined below.

7.2 Seascape, Landscape and Visual

7.2.1 Introduction

The purpose of this section of the EIA Scoping Report is to describe the scoping methodology and present outcomes of the initial desk study and fieldwork stages and also to establish the scope of work and methods applied in the identification and assessment of seascape / landscape and visual impacts associated with the proposed NISA Offshore Wind Farm. It will present key seascape, landscape and visual receptors and highlight potential effects that will be assessed. Another key element of the seascape/landscape and visual scoping is the selection of the preliminary set of representative Viewshed Reference Points (VRPs), from which, it is intended to prepare photomontage simulations of the development and undertake the visual impact assessment.

7.2.2 Policy and Guidelines

The European Landscape Convention promotes the protection, management and planning of European landscapes and organises European co-operation on landscape issues. The Convention was ratified by Ireland in 2002. As one of the obligations under the convention, a draft National Landscape Strategy was issued for public consultation by the *Department of Arts, Heritage, Regional, Rural and Gaeltacht* Affairs, Following consideration of submissions, The 'National Landscape Strategy for Ireland 2015-2025' was published in mid-2015 by the Department of Arts, Heritage and the Gaeltacht.

County level Landscape Character Assessments for Fingal, Meath and Louth (all contained within the respective County Development Plans) will be a key consideration. In all cases, these Landscape Character/Seascape Assessments have also been integral to the development of wind energy strategies / policy contained within the CDPs though not necessarily in relation to offshore developments.

Ireland has a high level strategy document entitled 'Offshore Renewable Energy Development Plan (Feb 2014) prepared by the Department of Communications, Energy and Natural Resources. This has a brief reference to 'Plan Level Mitigation Measures', which include some items relating to Seascape.

Onshore wind energy development within the Republic of Ireland is undertaken in accordance with the Department of the Environment, Heritage and Local Government Wind Energy Development Guidelines (2006/2019 revision).

Recommendations on the siting and design of wind energy developments are provided in Chapter 6 of the current/draft revised Guidelines based on six potential landscape character types. One of these landscape types is 'Coastal' however none relate to offshore development. Nonetheless, the principles of this guidance will still be a consideration of the landscape and visual assessment.

The Seascape/Landscape and Visual Assessment of the proposed NISA Offshore Wind Farm will be undertaken in accordance with the Landscape Institute and the Institute of Environmental Management and Assessment publication entitled 'Guidelines for Landscape and Visual Impact Assessment' – Third Edition (2013). This is recognised as the principal best practice guidance for landscape and visual assessment of all forms of development in Ireland and the UK.

Regard will also be given to the overarching Environmental Impact Assessments guidelines and advice notes set out by the EPA.

Other relevant SVIA and wind energy specific guidance that will be considered includes:

- Scottish Natural Heritage (SNH) Offshore Renewables – guidance on assessing the impact on coastal landscape and seascape (2012)
- Scottish Natural Heritage (SNH) Visual representation of wind farms: Best Practice Guidelines (version 2.2 - 2017)
- Scottish Natural Heritage (SNH) Guidance on Landscape/Seascape Capacity for Aquaculture (2008)

The most relevant landscape and visual policies with regard to the proposed wind farm development are contained with the County Development Plan for County Louth, Meath and Fingal.

Louth County Development Plan (2015-2021)

The Louth Landscape Character Assessment 2002 (forms part of the current Louth County Development Plan) includes several coastal landscape character areas that are situated within the study area. The most sensitive of these is the 'Carlingford Lough Mountains including West Feede Uplands' which has been identified as being of 'International Importance'. Other notable sensitive landscape character areas include the 'Boyne and Mattock Valley' which is identified as of 'National Importance' and is situated in the western extents of the study area.

The current Louth County Development Plan also includes sensitive landscape designations in the form of Areas of Outstanding Natural Beauty (AoNB) and Areas of High Scenic Quality (AHSQ). Both of the AoNB designations occur on or adjacent to the coastline within the study area and include the 'Carlingford and Feede Mountains AoNB' and 'Clogherhead and Port Oriel AoNB'. The nearest and most relevant AHSQ designations within the study area include; Dunany AHSQ, Collon Uplands (AHSQ), Feede Mountains and Cooley Area (AHSQ) and Boyne Valley / King Williams Glen (AHSQ).

Appendix 11 of the current Louth County Development Plan includes Map 11.1 which identifies Scenic Route, Views and Prospects. A modest number of these occur along the coastline and are oriented in the direction of the proposed development.

Meath County Development Plan (2013 - 2019 extended)

Two landscape character areas within county Meath occur within the western extents of the study area and include 'LCA 7 – Coastal Plain' and 'LCA 8 – Nanny Valley'. LCA 7 – Coastal Plain is identified with a 'Moderate' landscape value; 'High' landscape sensitivity; and a 'Regional' landscape importance whilst LCA 8 – Nanny Valley has been categorised with a 'Very high' landscape value; 'High' landscape value and 'Regional' landscape importance.

Map 9.5.1 of the current Meath County Development Plan identifies views and prospects in County Meath. Only one identified viewpoint is located immediately along the coastline whilst a number of viewpoints are located further inland. It is important to note that the high number of viewpoints in the vicinity of Slane relate to the Brú na Bóinne UNESCO world heritage site.

Fingal County Development Plan (2017 - 2023)

The Fingal County Development Plan identifies a number of Landscape Character Types (LCTs) within the current County Development Plan, the most relevant of which include the 'Coastal Type' and 'Estuary Type'. Both of these LCTs are identified with an 'Exceptional' landscape value and a 'High' landscape sensitivity. Other notable LCTs within the study area include the 'High Lying Type' which is categorised with a 'High' landscape value and a 'High' landscape sensitivity.

The Fingal County Development Plan also identifies 'Highly Sensitive Landscapes'. Much of the coastline encompasses this designation in addition to some inland areas including Naul, Coutlough and Kinsealy. Dublin Bay is recognised by UNESCO as a Biosphere and comprises of a core zone including areas such as Tolka and Baldoyle Estuaries, Booterstown Marsh, Howth Head, North Bull Island, Dalkey Island and Irelands Eye. Howth Head and North Bull Island are also designated with a Special Amenity Area Order (SAAO) which protects "outstanding landscapes, nature and amenities."

Within the Fingal Development Plan, Sheet No. 14 – 'Green Infrastructure 1' identifies views and prospects 'to be preserved'. A high number of these occur along the coastline throughout and in the surrounds of the settlements of Rush, Skerries, Malahide and most notably around Howth Head.

Northern Ireland

It should be noted that a consultation draft of the Northern Ireland Regional Landscape Character Assessment (NIRLCA) 2015 is currently available online, however, this has not yet been adopted. This draft document is prepared at a broader scale than the original (and still relevant) Landscape Character Assessment from 2000 and divides Northern Ireland's landscape into 26 no. Regional LCAs compared to the 130 no. from the earlier document. The nearest and most relevant landscape character area is LCA 25 – Mourne and Slieve Croob.

Northern Ireland Landscape Character Assessment 2000:

- LCA 73 Kilkeel Coast: "The attractive wetland and mudflat landscapes, the open coastal fringe, and the river mouths of rivers are the most sensitive coastal landscapes."

- LCA 74 Kingdom of Mourne: "The national importance of this scenic landscape is reflected by its AONB status. Its open character and highly distinctive landscape pattern is crucial as a setting to the Mournes."
- LCA 75 Mourne Mountains: "The Mourne Mountains are a high quality landscape which is in relatively good condition….the fragile upland ecosystem and the open skylines which are prominent in views from all around would be highly sensitive to change."

The Mourne Area of Outstanding Natural Beauty (AoNB) occurs in the northern extent of the study area. The designation also encompasses a large proportion of the coastal landscape surrounding the Mourne Mountains.

7.2.3 Data Sources and Baseline Methodology

The SLVIA will consist of a combination of 'Desk Study' and fieldwork in order to understand the nature of the receptors within the study area and the nature of likely impacts that are likely to occur as a result of the proposed development. The Desk Study element proceeds fieldwork as the latter is used to scope-in or scope-out potentially affected receptors that are identified as part of the desk study.

On the basis of the Scottish Natural Heritage Guidance on Assessing the Impact on Coastal Landscape and Seascape (2012), a 60km radius search area will be initially used, however, this is mainly in relation to identifying relevant cumulative developments i.e. that might be seen at distances of up to 30km when the proposed development is within 30km. It is very likely, given the difficulty in viewing and depicting offshore turbines at distances in excess of 40km, that the principal study area will not exceed **40km** and there will still be a particular focus on receptors within 20km. The final study area radius can be agreed in consultation with the planning authority as is the overriding protocol in GLVIA (2013).

Establishing the seascape/landscape baseline includes consideration of the geographic location and seascape/landscape context of the proposed offshore wind farm site as well as the essential seascape character and salient features of the wider Study Area. The visual baseline is more population based, but still overlaps with elements of the seascape/landscape baseline. The visual baseline is discussed in relation to; centres of population and houses; transport routes and; public amenities and facilities.

7.2.3.1 Desktop Study

The desktop study will comprise of the following:

- Review of a Zone of Theoretical Visibility (ZTV) map, which indicates areas from which the development is potentially visible in relation to terrain within the Study Area;
- Review of relevant County Development Plans, particularly with regard to sensitive landscape and scenic view/route designations;
- Online review of tourism, recreational and heritage features within the study area that may be potential visual receptors.

- Selection of potential Viewshed Reference Points (VRPs) from key visual receptors to be investigated during fieldwork for actual visibility and sensitivity;
- Production of wireframe images of the development at each potential viewpoint (illustrating the turbines in a bare-ground context) to aid fieldwork / viewpoint selection.

7.2.3.2 Fieldwork

Fieldwork will comprise of the following:

- Examination of the salient landscape/ seascape character of the site and its immediate surrounds as well as the wider study area.
- Investigation of potential viewpoint locations identified at the desk study stage and selection / rejection of each.
- Selection of other relevant viewpoints that may not have been apparent from the desk study (local monuments, walkways etc.)
- Capture high quality base photography from which to prepare photomontages of the proposal.
- Examine the route of the proposed grid connection options and all other onshore infrastructure such as the proposed 220kV substation.
- Preparation of a viewpoint selection report and associated map for consultation purposes (Planning Authorities) indicating the intended VP selection set and study area to be used for the preparation of photomontages to support the visual impact assessment.

7.2.4 Receiving Environment

The NISA site is located southeast of the Cooley Peninsula, Dundalk Bay and Clogher Head (County Louth), the latter being the only notable, yet modest headland, all the way to its southern extents off shore from Skerries in North County Dublin. Aside from those coastal features identified above, this is a relatively indistinct, but heavily populated stretch of coastline, generally backed by gently rising agricultural farmland. Major transport corridors including the M1 motorway and the Dublin – Belfast railway line also runs along this section of coastline, albeit set back from the shore by several kilometres.

Aside from designated scenic routes / views in the relevant county development plans, other key visual receptors consist of outdoor recreational amenity features, tourism and heritage features and centres of population. Some of these key receptors are set out below.

Walking/Cycling Routes:

- The Ulster Way (Mourne Way) – Situated within the Mourne AoNB, this is a 59km section of the Ulster Way that passes through the Mourne Mountains from Rostrevor to Newcastle.
- Carlingford Greenway – A 6km trail located on the southern banks of Carlingford Lough linking the settlements of Omeath and Carlingford.

- Tain Way (National Waymarked Way) – A 40km walking trail situated in the uplands of the Cooley peninsula located in the Carlingford and Feede Mountains AoNB.
- Howth Head (National Loop Walks) – Includes several popular looped walks around Howth Head peninsula with views afforded across Dublin Bay and its surrounding area.

Recreational / Amenity / Heritage features:

- Brú na Bóinne – Designated as a UNESCO World Heritage Site, the Brú na Bóinne complex is located along the river Boyne valley in County Meath and is one of the world's most important prehistoric landscapes dating from the Neolithic period.
- King John's Castle Carlingford – remnants of a 12th Century Castle in Carlingford, County Louth.
- Ardgillan Castle and Demesne – Situated between Skerries and Balbriggan adjacent to the coastline and comprises of local walking trails and gardens.
- Lambay Island (Irelands Eye) – The largest island of the east coast of Ireland comprising of a small 16th Century Fort. The island is a private island but hosts tours and retreats during the summer months.
- Malahide Castle – 12th Century Castle and Gardens located just south of Malahide Estuary.
- Links Golf Courses – A number of links golf courses occur along the eastern coastline within the study area and often afford uninterrupted views out across the coastline.

Settlements within the study area:

- The largest and most notable settlement within the study area is Dublin City which is situated in the outer south-western periphery of the study area. The northern suburban parts of Dublin include the coastal settlements of Howth, Malahide, Donabate, Skerries and Balbriggan. The nearest of these to the proposal site are Rush, Skerries and Balbriggan.
- Other large settlements include Drogheda and Dundalk which are situated in the northwest of study area.
- Other notable coastal settlements include Kilkeel, Warrenpoint, Carlingford, Blackrock, Clogherhead, Bettystown and Laytown.

7.2.5 Potential Impacts

As described in the Scoping Methodology Section (7.2.3.1), analysis of ZTV maps provides the basis for initial desk based VP selection, as these maps identify from where in the study area the development is potentially visible in a bare-ground scenario. Importantly, they also indicate areas where there is no potential for visibility, which can then be confidently scoped-out of further investigation / assessment. Overall, there is potential mid-range (10-20km) and long range (20km+) views of the development, but with the highest potential for significant landscape and visual impacts to occur for those receptors along the immediate coastline. Views of the proposed offshore development from beyond 30km, though feasible, could only occur in very clear viewing conditions.

At such distances, any visual impacts from the proposed development is considered very unlikely to have potential for significant effects, even at highly sensitive receptor locations.

Potential landscape and visual impacts could also occur in respect of ancillary development such as grid connection, proposed substations (onshore and/or offshore) and the proposed cable transition joint pits.

7.2.6 Potential Mitigation Measures

In the case of offshore wind energy developments, the main mitigation measures open to the developer, relate to the siting and arrangement of turbines (as opposed to screening). Considerable feasibility and design optimisation work has already been completed for the NISA project One of the key outcomes of this work is the use of three distinct turbine clusters to relieve the overall lateral extent of the development. A grid arrangement has been used to provide a sense of perspective and order to the layout.

7.2.7 Assessment Methodology

In accordance with the Guidelines for Landscape and Visual Impact Assessment (2013), the method for estimating the significance of landscape impacts and visual impacts is very similar. This is summarised in Figure 7.1.

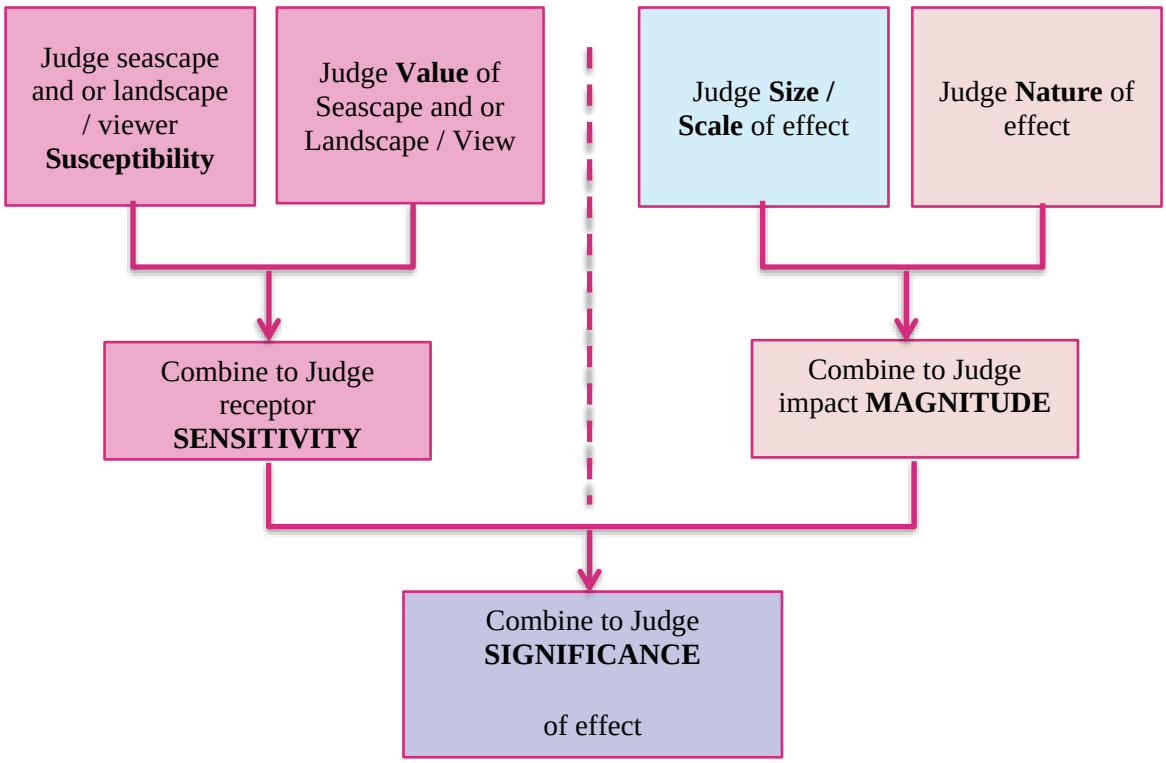

Figure 7.1: Method for assessing Seascape/Landscape Impact Significance and Visual Impact Significance (based on GLVIA – 2013)

7.2.7.1 Assessment Criteria for Seascape Impacts

The sensitivity of the seascape/landscape to change is the degree to which a particular landscape receptor (Seascape/Landscape Character Area (LCA) or feature) can accommodate changes or new features without unacceptable detrimental effects to its essential characteristics. Landscape Value and Sensitivity is classified using the following criteria (Table 7.1).

Table 7.1: **Seascape/Landscape Value and Sensitivity**

Sensitivity	Description
Very High	Areas where the seascape/landscape character exhibits a very low capacity for change in the form of development. Examples of which are high value seascapes and iconic sections of the coastline, protected at an international or national level (World Heritage Site/National Park), where the principal management objectives are likely to be protection of the existing character.
High	Areas where the seascape character exhibits a low capacity for change in the form of development. Examples of which are high value landscapes and iconic sections of the coastline, protected at a national or regional level (Area of Outstanding Natural Beauty), where the principal management objectives are likely to be considered conservation of the existing character.
Medium	Areas where the seascape character exhibits some capacity and scope for development. Examples of which are seascapes and/or landscapes which have a designation of protection at a county level or at non-designated local level where there is evidence of local value.
Low	Areas where the seascape character exhibits a higher capacity for change from development. Typically this would include lower value, non-designated seascapes and/or landscapes that may also have some elements or features of recognisable quality, but are generally utilitarian in nature.
Negligible	Areas of seascape character that highly industrialised and utilitarian in nature where there would be a reasonable capacity to embrace change. Management objectives in such areas could be focused on change, creation of seascape/landscape improvements and/or restoration to realise a higher seascape value.

The magnitude of a predicted seascape/landscape impact is a product of the scale, extent or degree of change that is likely to be experienced as a result of the proposed development. The magnitude takes into account whether there is a direct physical impact resulting from the loss of seascape/landscape components and/or a change that extends beyond the proposal site boundary that may have an effect on the landscape character of the area, see Table 7.2.

Table 7.2: Magnitude of Seascape/Landscape Impacts

Magnitude of Impact	Description
Very High	Change that would be large in extent and scale with the loss of critically important seascape/landscape elements and features, that may also involve the introduction of new uncharacteristic elements or features that contribute to an overall change of the seascape/landscape in terms of character, value and quality.
High	Change that would be more limited in extent and scale with the loss of important seascape/landscape elements and features, that may also involve the introduction of new uncharacteristic elements or features that contribute to an overall change of the seascape/landscape in terms of character, value and quality.

Magnitude of Impact	Description
Medium	Changes that are modest in extent and scale involving the loss of seascape/landscape characteristics or elements that may also involve the introduction of new uncharacteristic elements or features that would lead to changes in seascape/landscape character, and quality.
Low	Changes affecting small areas of seascape/landscape character and quality, together with the loss of some less characteristic seascape/landscape elements or the addition of new features or elements.
Negligible	Changes affecting small or very restricted areas of seascape/landscape character. This may include the limited loss of some elements or the addition of some new features or elements that are characteristic of the existing seascape/landscape or are hardly perceivable.

The significance of a seascape/landscape impact is based on a balance between the sensitivity of the seascape/landscape receptor and the magnitude of the impact. The significance of seascape/landscape impacts is arrived at using the following matrix (Table 7.3).

Table 7.3: Seascape/Landscape and Visual Impact Significance Matrix

	Sensitivity of Receptor				
Scale/ Magnitude	*Very High*	*High*	*Medium*	*Low*	*Negligible*
Very High	Profound	Profound-substantial	Substantial	Moderate	Slight
High	Profound-substantial	Substantial	Substantial - moderate	Moderate-slight	Slight-imperceptible
Medium	Substantial	Substantial - moderate	Moderate	Slight	Imperceptible
Low	Moderate	Moderate-slight	Slight	Slight-imperceptible	Imperceptible
Negligible	Slight	Slight-imperceptible	Imperceptible	Imperceptible	Imperceptible

*Orange shaded cells are considered to equate with ‘significant’ impacts in EIA terms where that impact is also deemed to be of a ‘Negative’ quality.

7.2.7.2 Assessment Criteria for Seascape/Landscape Impacts

As with the seascape/landscape impact, the visual impact of the proposed wind farm will be assessed as a function of receptor sensitivity versus magnitude. In this instance, the sensitivity of visual receptors, weighed against the magnitude of visual effects.

This relationship is expressed in the same significance matrix as for Seascape/Landscape impacts provided at Table 7.3 above.

7.2.7.3 Viewpoint Selection Process

An initial set of around 40-50 viewpoints will be generated from desktop baseline studies covering the range of designated and non-designated visual receptors discussed in sections 7.2.2 and 7.2.4. These will be investigated and refined using emerging Zone of Theoretical Visibility (ZTV) mapping, in combination with fieldwork and as part of consultation with statutory and non-statutory bodies.

7.3 Noise and Vibration (including underwater)

7.3.1 Introduction

There is potential for noise and vibration impacts during both the construction and operational phases of the proposed development. Both the onshore and offshore aspects have the potential to impact on both human and ecological receptors.

During the construction phase, the main aspects of the proposed development likely to generate noise are as follows:

- Onshore – construction of the proposed substation and onshore cable route (including works at the landfall) resulting in potential impacts on residential receptors
- Offshore – installation of the offshore foundations, other substructures, seabed preparation activities, the laying of offshore cables and vessel noise resulting in potential impacts on ecological receptors.

During the operational phase, the main aspects of the proposed development likely to generate noise are as follows:

- Onshore – operation of the proposed 220 kV substation (and onshore substation at landfall if required), resulting in potential impacts on residential receptors;
- Offshore – operation and maintenance of the wind turbines (e.g. scour protection maintenance, reburial of cabling and vessel noise resulting in potential impacts on ecological receptors.

7.3.2 Proposed Guidance and Methodology

The assessment of noise and vibration will have consideration of all relevant guidance including:

- BSI, 2014a. BS5228-1:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites (Part 1 – Noise).
- BSI, 2014a. BS5228-2: 2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites (Part 2 – Vibration).

- Department of Arts, Heritage and the Gaeltacht, 2014, Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters
- Institute of Environmental Management and Assessment (IEMA), 2014. Guidelines for environmental noise impact assessment.
- Popper, A. N., Hawkins, A. D., Fay, R. R., Mann, D., Bartol, S., Carlson, Th., Coombs, S., Ellison, W. T., Gentry, R., Hal vorsen, M. B., Lokkeborg, S., Rogers, P., Southall, B. L., Zeddies, D. G. and Tavolga, W. N. (2014). 'ASA S3/SC1.4 TR-2014 Sound Exposure Guidelines for Fishes and Sea Turtles. A Technical Report Prepared by ANSI-Accredited Standards Committee S3/SC1 and Registered with ANSI', New York: Springer International Publishing, 33–51.
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7.3.3 Data Sources and Receiving Environment

Onshore noise and vibration monitoring will be carried out at sensitive receivers to determine the baseline environment. The receiving environment in this regard is described in Section 6.2 above.

Little current information is available on the underwater noise emissions that currently prevail within the proposed development and surrounding area, however the Irish Sea is a busy shipping area, with commercial fishing taking place along with regular cargo, tanker and recreational traffic (Section 5.10) and a level of background noise will be present in the marine environ. The proposed WTGs are located between c. 12 to 24 km offshore, off the coast of Louth, Meath and north County Dublin. The offshore export cables will connect the offshore pods, to the proposed landfall(s).

7.3.4 Potential Impacts and Proposed Approach to EIA

Potential impacts from noise and vibration associated with the construction of the proposed development will be as a result of construction activities onshore and offshore and construction traffic accessing the site onshore. The operational phase will be assessed through the consideration of noise from the proposed turbines offshore and the from the substation onshore.

The onshore noise and vibration impact assessment will focus on any sensitive noise and vibration receptors in the local area, which generally comprises receptors such as residences, schools, hospitals and similar receptors.

The offshore underwater noise modelling is used to inform the assessment of potential effects upon sensitive ecological receptors, with specific reference to the marine mammal, benthic ecology and fish and shellfish chapters of the EIAR (Sections 4.4, 4.5 and 4.6 of this Scoping Report).

The underwater noise modelling determines the levels of noise arising from construction of the proposed development through the modelling of piling scenarios (using different pile sizes and different hammer energies) to determine likely noise levels associated with specific activities. assessment will be provided to the project ecologist for consideration.

Monitoring and mitigation measures will be implemented to minimise noise and vibration impacts. Noise and vibration monitoring will be carried out at the site boundary to ensure dust levels are minimised.

The approach for the underwater noise modelling will include the use of Subacoustech's INSPIRE broadband modelling software, to accurately determine the sound from a noise source at range using the source level of the noise and the transmission loss that defines the sound propagation with range. The scope of the modelling to be undertaken will be determined through liaison with the relevant technical topic leads (e.g. marine mammals and fish ecology) and modelling will be completed for two locations, with two pile sizes modelled as well as two different hammer energies. A less detailed modelling methodology will be used for other low-level noise sources such as vessel noise and cable laying / seabed preparation. If required underwater noise modelling can also be undertaken in relation to any subsequent UXO clearance work that may be required.

The offshore modelling will be presented in a Technical Appendix to the EIAR, which will then be referenced as relevant within the individual specialist topic chapters. The EIAR will not contain a standalone underwater noise assessment chapter.

7.4 Resource and Waste Management

A description of the likely surplus materials and wastes types to be generated in from proposed development, and mitigation measures regarding its handling and management, will be provided as part of the assessment.

Waste will be generated by the proposed development during construction. This waste is likely to include waste generated from on shore and at sea excavation and construction activities. The operational phase will generate waste including maintenance materials and end of life electrical components. It is not likely that the quantities will be significant. Appropriate measures will be identified to deal with any contaminated waste material associated with the proposed development which arise on shore, including quantification of volumes and treatment/disposal mechanisms. The decommissioning phase will generate demolition waste as the wind turbines and associated infrastructure is removed as appropriate.

Mitigation measures will be identified where appropriate to minimise the amount of resources used, identify opportunities to use recycled materials within the scheme, reduce the quantity of waste sent for disposal and to promote circular sustainable waste management practices. Where practicable, on-site re-use of materials arising from construction will be prioritised.

Mitigation measures will require that waste is re-used, recycled or recovered, that resource efficiency is increased and that all waste generated will be managed in accordance with the principles of the waste hierarchy, project and site management plans and relevant statutory requirements.

Particular attention will be paid to at sea legislation and best practice regarding resource and waste management.

7.5 Material Assets

This assessment will examine the likely significant effects of the construction, operation and decommissioning of the proposed development on assets of material value, including land use and ownership, built services, utilities and infrastructure. Typical services, utilities and infrastructure likely to be located in the vicinity of the proposed development include:

- Electricity;
- Gas;
- Foul and storm water drainage;
- Water supply; and
- Telecommunications.

The material assets chapter will provide a description of the material assets (not discussed in other chapters) and outline any likely significant effects on those material assets during construction, operation and decommissioning.

Where appropriate, the relevant authorities, statutory undertakers and service providers will be consulted, and agreements will be reached on mitigation measures. Mitigation measures will prioritise the continued supply of services and utilities throughout construction, operation decommissioning phases, and solutions will be developed to mitigate significant effects arising from the relocation or diversion of utilities and services.

7.6 Population and Human Health

7.6.1 Introduction

This section of the scoping report sets out the approach to the assessment of population and human health aspects of the proposed development. The population and human health assessment will examine the likely significant effects of the construction, operation and decommissioning of the proposed development on the local community and wider population.

A number of the specialist chapters (both offshore and onshore) cover aspects which relate to population and human health, including Seascape, Landscape and Visual, Noise, Air Quality, Climate, and Traffic and Transportation. These will be referenced in the Population and Human Health chapter as relevant.

7.6.2 Baseline Methodology and Data Sources

A baseline study of all available information within the study area will be undertaken. Relevant data from the Central Statistics Office as well as relevant information from local development plans, will be used to identify existing and future population and human health trends in the study area.

7.6.3 Potential Impacts

The potential impacts on human health from the underground high voltage alternating current cables and the substation will be assessed. This will include the potential for health effects from electromagnetic fields generated by the electrical equipment. No significant effects on human health and safety are anticipated as a result of the proposed development.

Other effects relevant to human wellbeing such as noise, vibration, air quality and visual impacts, will also be considered when classifying effects, but will be addressed in more detail in the relevant assessment chapters of the EIAR as detailed above. Impacts on amenity will be considered in the Seascape, Landscape and Visual Impact chapter, with impacts on commercial fisheries also addressed in the relevant chapter.

The construction and decommissioning of the proposed development have the potential to have short-term negative effects on residential amenity for the duration of the construction and decommissioning phases.

Once the onshore cables, overhead line and substation are operational, the potential for significant effects on residential amenity is likely to be low. Impacts on amenity from the offshore infrastructure (once operational) are dealt with in the Seascape, Landscape and Visual Impact and Infrastructure and Other Users chapters as well as in the Socio-economic, Tourism and Recreational Amenity chapters.

Mitigation measures will be recommended as required to avoid or reduce significant adverse effects during the construction and decommissioning phase. As the development will be designed to EU and Irish standards for such installation, it is not anticipated that any additional mitigation measures will be required for the operational phase.

During the operational phase, the development will provide a significant positive effect to the local environment as it will provide power from a renewable source.

7.7 Socio-Economic, Tourism and Recreation

This section of the scoping report describes the approach to the assessment of socio-economic, tourism and recreation associated with the proposed development. Some of potential effects on these aspects will be assessed in other chapters, such as construction stage, temporary effects on commercial fisheries, shipping and navigation, traffic and transportation.

This assessment will focus on the aspects such as:

- Socio-economic and employment effects during construction, operation and decommissioning; and
- Other impacts such as on tourism, recreation and amenity and nearby businesses

The main-land uses in the area will be described using Corine 2012 land cover data and this data will be verified by subsequent walkovers and drive-by surveys. All areas of scenic beauty in addition to heritage, culture and leisure facilities in the areas will be identified. A review of the main recreational activities in the area likely to be affected will be conducted.

Residential amenities and recreational facilities such as coastal amenities (beaches, watersports, etc.), forestry in public ownership, walking paths and sports facilities will be recorded and potential impacts assessed.

A baseline study of all available information, including other plans and projects within the study area will be undertaken. Data from the Central Statistics Office, Fáilte Ireland, local and regional plans (RSES and county development plans), as well as other local authority database information will be used to define the socio-economic baseline.

An assessment will be conducted to ascertain any potential impacts that may arise which could directly or indirectly affect land use, tourism recreational activity or an amenity. This assessment will be prepared giving cognisance to other disciplines such as cultural heritage, infrastructure and other users, hydrology and ecology.

7.8 Major Accidents and Disasters

Major accidents and natural disasters and the risk of consequential significant adverse effects on the environment will be addressed.

It is considered that a major accident means an event on or off site that threatens immediate or delayed serious damage to human health, welfare and/or the environment and requires the use of resources beyond those of the Developer or its contractors to manage. A disaster is considered a naturally occurring phenomenon such as an extreme weather event like a storm, flood, or extremely low or high temperature, or ground-related hazardous event, including a subsidence, landslide or earthquake, with the potential to cause an event or situation that meets the definition of a major accident.

The terms major accident and natural disaster comprise events which happen either internally or externally to the proposed development, where the presence of the proposed development could contribute to serious damage. Serious damage includes the loss of life or permanent injury and/or permanent or long-lasting damage to an environmental receptor which cannot be restored through minor clean-up and restoration efforts.

Given the nature of the construction activities (particularly offshore), the operation of the turbines and the need for exclusion zones, the operation of the substation at high voltages and the potential vulnerability of the offshore infrastructure, landfall site, cable route and substation site to natural disasters, including extreme weather, flooding, coastal erosion and sea level rise, an assessment of major accidents and natural disasters is proposed. The assessment will determine the level of hazard posed and probability of events that may result in serious damage to receptors.

The assessment will identify risks, define relevant receptors and categorise relevant risks that may result in significant effects on those receptors, including population and human health, biodiversity, land, soil, water, air and climate, material assets, cultural heritage and landscape.

Specifically, the assessment will draw on other chapters to identify, describe and evaluate in the appropriate manner, the credible worst case direct and indirect effects.

The assessment will identify the vulnerability of the proposed development to risks, credible source-pathway-receptor linkages and the likelihood of serious damage to environmental receptors.

Mitigation measures will be outlined to eliminate, reduce, isolate and control significant credible risks and associated significant adverse effects. It is anticipated that there will be an appropriate risk management structure in place to mitigate and ensure that the risk of major accidents and natural disasters is as low as reasonably practicable for the proposed development.

8 Structure and Content of the EIAR

8.1 Information to be Included in an EIAR

An EIAR is best defined as *"a statement of the effects, if any, which the proposed development, if carried out, would have on the environment"* (EPA, 2017). As outlined in Article 5(3)(a) of the EIA Directive, the EIAR must be prepared by competent experts. Annex IV of the EIA Directive specifies the information to be provided in an EIAR, as follows:

"1. Description of the project, including in particular:

a) a description of the location of the project;

b) a description of the physical characteristics of the whole project, including, where relevant, requisite demolition works, and the land-use requirements during the construction and operational phases;

c) a description of the main characteristics of the operational phase of the project (in particular any production process), for instance, energy demand and energy used, nature and quantity of the materials and natural resources (including water, land, soil and biodiversity) used;

d) an estimate, by type and quantity, of expected residues and emissions (such as water, air, soil and subsoil pollution, noise, vibration, light, heat, radiation) and quantities and types of waste produced during the construction and operation phases.

2. 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.

3. A description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the project as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge.

4. A description of the factors specified in Article 3(1) likely to be significantly affected by the project: population, human health, biodiversity (for example fauna and flora), land (for example land take), soil (for example organic matter, erosion, compaction, sealing), water (for example hydromorphological changes, quantity and quality), air, climate (for example greenhouse gas emissions, impacts relevant to adaptation), material assets, cultural heritage, including architectural and archaeological aspects, and landscape.

5. A description of the likely significant effects of the project on the environment resulting from, inter alia:

a) the construction and existence of the project, including, where relevant, demolition works;

b) the use of natural resources, in particular land, soil, water and biodiversity, considering as far as possible the sustainable availability of these resources;

c) the emission of pollutants, noise, vibration, light, heat and radiation, the creation of nuisances, and the disposal and recovery of waste;

d) the risks to human health, cultural heritage or the environment (for example due to accidents or disasters);

e) the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources;

f) the impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change;

g) the technologies and the substances used.

The description of the likely significant effects on the factors specified in Article 3(1) should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the project. This description should take into account the environmental protection objectives established at Union or Member State level which are relevant to the project.

6. *A description of the forecasting methods or evidence, used to identify and assess the significant effects on the environment, including details of difficulties (for example technical deficiencies or lack of knowledge) encountered compiling the required information and the main uncertainties involved.*

7. *A description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment and, where appropriate, of any proposed monitoring arrangements (for example the preparation of a post-project analysis). That description should explain the extent, to which significant adverse effects on the environment are avoided, prevented, reduced or offset, and should cover both the construction and operational phases.*

8. *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. Relevant information available and obtained through risk assessments pursuant to Union legislation such as Directive 2012/18/EU of the European Parliament and of the Council (*) or Council Directive 2009/71/Euratom (**) or relevant assessments carried out pursuant to national legislation may be used for this purpose provided that the requirements of this Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies.*

9. A non-technical summary of the information provided under points 1 to 8.

10. A reference list detailing the sources used for the descriptions and assessments included in the report.

Section 4 of the EPA Draft Guidelines outlines the information to be presented in an EIAR as follows:

"To assist assessment and increase clarity and the systematic organisation of information in an EIAR; it is good practice to separately describe the:

i) key alternatives considered

ii) proposed project

iii) receiving environment

iv) likely significant effects

v) mitigation and monitoring measures and

vi) residual effects.

A non-technical summary must also be provided.

The receiving environment and the effects of the project are explained by reference to its possible effects on a series of environmental factors:

- *Population and Human Health*
- *Biodiversity*
- *Land & Soils*
- *Water*
- *Air*
- *Climate*
- *Material Assets*
- *Cultural Heritage*
- *Landscape*
- *Interactions."*

Further detail on the proposed scope of the assessments is provided in Sections 4, 5 and 6.

8.2 EIAR Structure

A grouped format structure is proposed for the EIAR. The report will comprise 'front end' chapters and 'assessment' chapters for each environmental aspect for both the offshore and onshore infrastructure. It is considered that this structure makes it easy to understand the proposed development and investigate topics of interest in the assessment chapters.

The EIAR will be prepared in eight volumes as follows:

Volume	Contents	Outline
Volume 1	Non-Technical Summary	This summarises the findings of the EIAR in a clear, accessible format that uses non-technical language and supporting graphics. The non-technical summary describes the proposed development, receiving environment, effects and mitigation measures and relevant aspects of the EIAR in a manner that can be easily understood by the general public.
Volume 2	Introductory Chapters	The front end chapters provide the relevant project context; including an introduction, planning and policy context, EIA methodology, alternatives considered as well as a description of the proposed development and proposed construction strategy.
Volumes 3 & 4	Assessment Chapters for offshore and onshore	Assessment chapters for each environmental aspect in accordance with Article IV of the EIA Directive for the offshore and onshore infrastructure, respectively, providing a description of the relevant environmental aspects and likely significant effects.
Volume 5	Assessment chapters for wider scheme aspects	Assessment chapters for wider scheme aspects shared between the offshore and onshore infrastructure, such as Seascape, Landscape and Visual Impact, Noise and Vibration, etc.
Volume 6	Summary Chapters	Summary of the effects described under each chapter from Volume 3, 4 and 5.
Volumes 7 & 8	Technical Appendices	Technical appendices, offshore and onshore, that support and are cross-referenced with Volumes 3, 4 and 5. This may include other relevant drawings, modelling outputs, background reports and/or supporting documents.

The EIAR will be prepared by competent experts, make use of the latest and most appropriate scientific methodology and assessment procedures, and support the correct interpretation of data. Information on the competent experts will be provided.

8.3 Indicative Table of Contents

An indicative table of contents for the EIAR is presented below. The final version will be informed by the responses to the scoping process and any further modifications considered appropriate to account for the iterative EIA process.

VOLUME 1 - NON-TECHNICAL SUMMARY

VOLUME 2 – INTRODUCTORY CHAPTERS

Preface

Chapter 1	**Introduction**	
	1.1	Introduction
	1.2	Overview of the Proposed Development
	1.3	Need for the Proposed Development
	1.4	Overview of the Planning Process
	1.5	Project Team
	1.6	Overview of Consultation Undertaken

	5.6	Onshore Infrastructure (incorporating description of the main onshore components and the construction process)
	5.7	Construction Phasing and Programme
	5.8	Operation and Maintenance (onshore and offshore)
	5.9	Repowering
	5.10	Health and Safety
	5.11	Waste Management
	5.12	Decommissioning Activities (onshore and offshore)
	5.13	References

VOLUME 3 – OFFSHORE CHAPTERS

Chapter 6	**Marine Geology, Oceanography and Physical Processes**	
	7.1	Introduction
	7.2	Policy and Guidance
	7.3	Consultation
	7.4	Design Basis for Assessment
	7.5	Impact Assessment Methodology
	7.6	Baseline Environment
	7.7	Likely Significant Effects
	7.8	Mitigation Measures and Monitoring
	7.9	Transboundary and Inter-Related Effects
	7.10	Cumulative Effects
	7.11	Residual Effects
	7.12	References

Note: The following assessment chapters will follow the same structure as Chapter 7 above.

Chapter 7	**Marine Water and Sediment Quality**
Chapter 8	**Benthic and Intertidal Ecology**
Chapter 9	**Fish and Shellfish Ecology**
Chapter 10	**Marine Mammal Ecology**
Chapter 11	**Offshore Ornithology**
Chapter 12	**Offshore Designated Sites**
Chapter 13	**Commercial Fisheries**
Chapter 14	**Shipping and Navigation**
Chapter 15	**Offshore Archaeology and Cultural Heritage**
Chapter 16	**Aviation and Radar**
Chapter 17	**Infrastructure and Other Uses**

VOLUME 4 – ONSHORE CHAPTERS

Chapter 18	**Air Quality**
Chapter 19	**Climate**
Chapter 20	**Land and Soils (includes soils, geology and hydrogeology)**
Chapter 21	**Water (includes hydrology, surface water quality and flooding)**
Chapter 22	**Biodiversity**

Chapter 23 Traffic and Transportation

Chapter 24 Onshore Archaeology, Architectural and Cultural Heritage

VOLUME 5 – WIDER SCHEME ASPECTS

Chapter 25 Seascape, Landscape and Visual

Chapter 26 Noise and Vibration (including underwater)

Chapter 27 Resource and Waste Management

Chapter 28 Material Assets

Chapter 29 Population and Human Health

Chapter 30 Socio-Economic, Tourism and Recreation

Chapter 31 Major Accidents and Disasters

VOLUME 6 – SUMMARY

Chapter 32 Summary of Transboundary Effects

Chapter 33 Summary of Inter-Related Effects

Chapter 34 Summary of Cumulative Effects

Chapter 35 Summary of Mitigation, Monitoring and Residual Effects

VOLUME 7 – TECHNICAL APPENDICES (OFFSHORE)

VOLUME 8 – TECNHINCAL APPENDICES (ONSHORE)

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Appendix A

List of Consultees

This EIA Scoping Report will be sent to the following bodies:

- An Bord Pleanála – SID unit
- An Taisce
- An Chomhairle Ealaíon
- Bat Conservation Ireland
- Birdwatch Ireland
- Coastwatch
- Commissioners of Irish Lights
- Commission for Regulation of Utilities
- Department of Agriculture, Food and the Marine
- Development Applications Unit: The National Parks and Wildlife Service and the National Monuments Service (Department of Housing, Local Government and Heritage)
- Department of Defence (Kildare)/Defence Forces
- Department of Environment, Climate and Communications
- Department of Housing, Local Government and Heritage
- Drogheda Port Company
- Dublin Airport Authority
- Dublin City Council
- Dublin Port Company
- Eastern and Midland Regional Assembly
- Earth Mining Division, Department of Environment, Climate and Communications
- Eco Advocacy (Meath)
- Eirgrid
- Environmental Protection Agency
- Environmental Pillar (Irish Environmental Network – IEN)
- Fingal County Council
- Fingal Public Participation Network
- Health and Safety Authority
- Health Services Executive
- Geological Society of Ireland
- Irish Wildlife Trust
- The Irish Coastguard
- Inland Fisheries Ireland
- Irish Aviation Authority
- Irish Cruising Association

- Irish Chamber of Shipping
- Irish Maritime Operations Centre (NMOC) of the Irish Coast Guard – Marine Rescue
- Coordination Centre (MRCC) of the Irish Coast Guard
- Irish Sailing Association
- Irish Whale and Dolphin Group (IWDG)
- Louth County Council
- Louth Public Participation Network
- Louth Environmental Network (sub-group of En Pillar/IEN)
- Marine Institute
- Marine Survey Office
- Meath County Council
- Meath Public Participation Network
- National Biodiversity Data Centre
- Office of Public Works
- Sea Fisheries Protection Authority
- Transport Infrastructure Ireland
- Warrenpoint Port