NISA

North Irish Sea Array

North Irish Sea Array
Offshore Wind Farm

Environmental Impact Assessment Report

Volume 1

Non-Technical Summary

2024

Statkraft

CIP
Copenhagen Infrastructure Partners

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ARUP

Note: This is a cropped image of **VP20 (Project Option 1) Photomontage.** Full verifiable images provided in Volume 7B1 of the EIAR.

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1. Introduction

1.1 Introduction

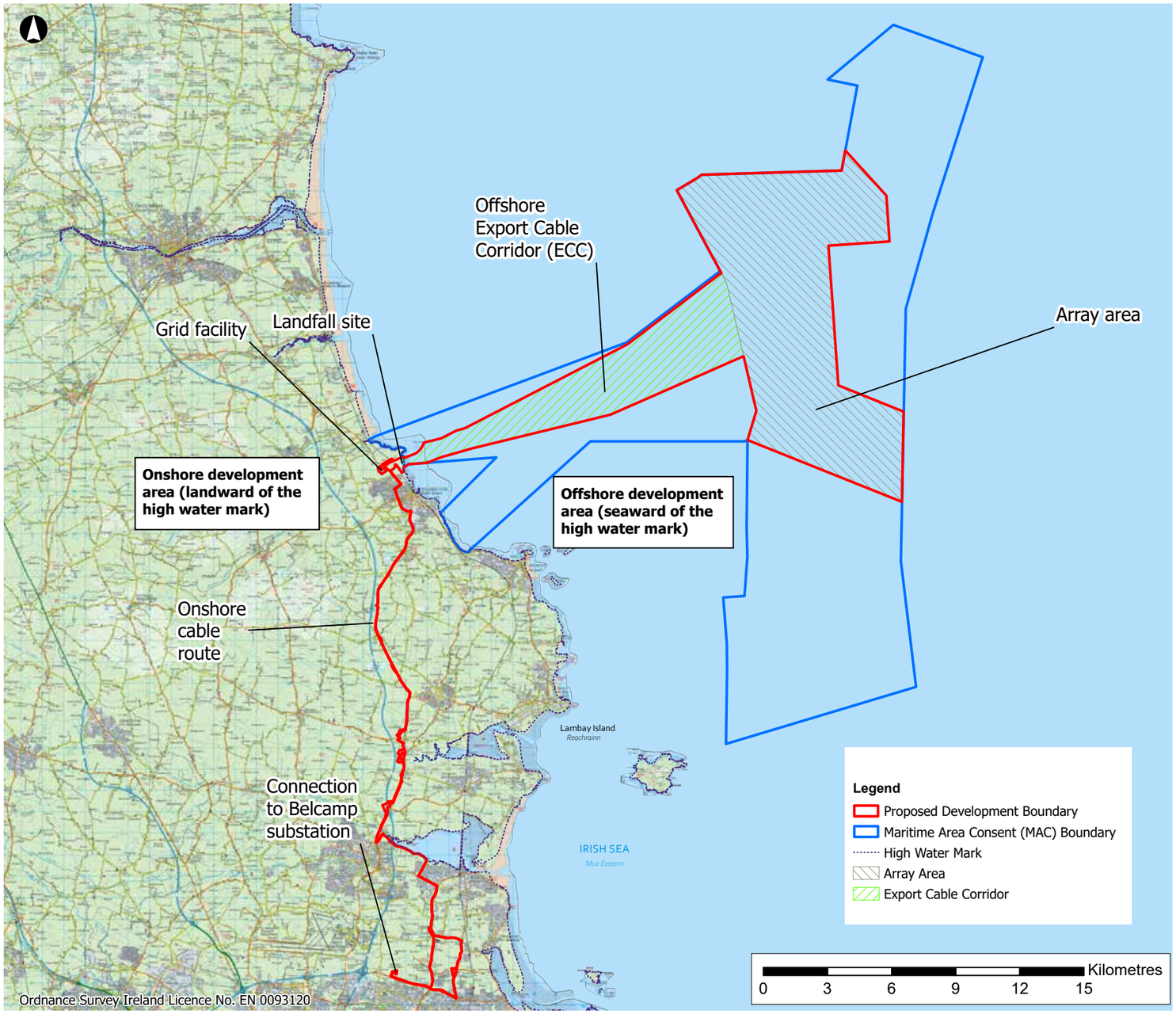
North Irish Sea Array Windfarm Limited (Ltd) (hereafter referred to as 'the Developer') is proposing to develop the North Irish Sea Array (NISA) Offshore Wind Farm (hereafter referred to as the proposed development). The Developer is a 50/50 joint venture between Statkraft Ireland Ltd and Copenhagen Infrastructure Partners P/S.

The proposed development will include offshore infrastructure (wind turbine generators (also referred to as WTGs or turbines) and their foundations, an offshore substation platform with foundation and subsea cabling) in the Irish Sea off the coast of Counties Dublin, Meath and Louth and onshore infrastructure (transition joint bays, onshore cables, a grid facility and connection to the national electricity transmission network) in County Dublin (Fingal and Dublin City Council administrative areas). Full details of the proposed development infrastructure is provided in Section 5 below. The location of the proposed development is illustrated on Figure 1 of this Non-Technical Summary (NTS).

This document is a Non-Technical Summary (NTS) of the Environmental Impact Assessment Report (EIAR). This NTS, which forms Volume 1 of the EIAR summarises, in non-technical language, the EIAR, including the key sensitive receptors (i.e., the aspects of the environment which could be affected by the proposed development), the assessment of likely significant effects on these receptors, the mitigation and monitoring measures proposed to avoid or reduce these effects, and any likely significant residual effects arising from the proposed development.

The EIAR has 38 chapters and associated technical appendices which are included in Volumes 2-12.

Figure 1 Location of the proposed development



1.2 Background

Two principal over-arching consents are required for the development of offshore renewable energy projects in Ireland. The first is the Maritime Area Consent (MAC) which is required to occupy the maritime area, and the second is the development consent (planning permission) required to allow for the development of that area with the infrastructure of the proposed development.

The Developer was granted a MAC (Ref: 2022-MAC-005) in December 2022. The MAC boundary is illustrated in Figure 1 of this NTS.

The Developer has submitted an application for permission for the proposed development to An Bord Pleanála under Section 291 of the Planning and Development Act 2000, as amended (the "Planning Acts") to carry out the proposed development.

This EIAR supports the application for permission to An Bord Pleanála, which if granted, will enable the construction, operation, maintenance and decommissioning of the proposed development. An Bord Pleanála will carry out an environmental impact assessment (EIA) of the proposed development as required under the Planning Acts and the EIA Directive. Several other supporting documents have been submitted as part of the application including a Natura Impact Statement (NIS), planning drawings and a planning report. A decision on the application will be made by An Bord Pleanála under Section 293 of the Planning Acts.

The proposed development was successful in the first Offshore Renewable Energy Support Scheme (ORESS 1) auction in August 2023. ORESS 1 is the first offshore auction run under the Government of Ireland's Renewable Electricity Support Scheme and is a pivotal component of the Programme for Government and the Climate Action Plan 2024. The ORESS1 contract guarantees consistent revenue for the duration of the support scheme (up to 20 years).

1.3 Consultation Undertaken

1.3.1 Statutory pre-application consultation

Statutory pre-application consultations have been undertaken by the Developer with An Bord Pleanála (as detailed in Section 2.7 of Chapter 2 of Volume 2 of the EIAR and in Appendix 1.2 of Volume 8 of the EIAR).

The Developer requested an opinion on design flexibility (for details of the proposed development unlikely to be confirmed at the time of making the application) under section 287A of the Planning Acts. In February 2024, An Bord Pleanála issued its opinion on design flexibility, (the "DF Opinion"). Full details regarding the DF Opinion and how this is reflected in the EIAR is provided in Sections 2.7 and 2.8 of Chapter 2 of Volume 2 of the EIAR. Further details are also provided in Section 5.2.1 of this NTS below.

1.3.2 Wider consultation

In addition to statutory pre-application consultations with An Bord Pleanála, consultations have also been undertaken with the relevant coastal planning authorities, other statutory bodies, the public, fisheries organisations and other stakeholders. Extensive consultation has been undertaken with a range of stakeholders during the development of the EIAR and application in order to:

- Provide information on the proposed development;
- Ascertain and understand the views of stakeholders; and
- Seek input from stakeholders on the design, construction, operation and decommissioning assessment aspects of the proposed development.

Upon finalisation of the EIAR Scoping Report, informal scoping consultation was carried out from 20 May 2021 to 30 June 2021 and feedback was sought from more than 40 consultees.

At a very early stage in the design of the proposed development, the Developer initiated a stakeholder engagement campaign with statutory bodies, the public and other relevant organisations. There has been wide stakeholder consultation throughout the development process to include Fingal, Dublin City, Meath and Louth County Councils, relevant statutory bodies, fisheries organisations and other interested coastal and marine bodies, utility and service providers, and landowners in addition to residents and businesses in proximity to the proposed development. Where practicable, the information and advice received during the consultation process was incorporated into the design of the proposed development and addressed in the relevant chapters of the EIAR.

To date, the Developer's community liaison team has:

- Has had over **1,500 engagements** with local stakeholders;
- Hosted **17 public consultation event**s in seven coastal communities;
- Developed and promoted **three virtual consultation** rooms;
- Established a **dedicated project website** for the proposed development (www.northirishseaarray.ie);
- **Engaged on a personal basis with people** in order to give them the opportunity to consider and discuss the proposed development;
- **Engaged with local community groups**;
- Contacted and met with **local and national elected representatives**; and
- Carried out ongoing **engagement with local authorities**.

An Bord Pleanála, upon conclusion of the pre-application consultation with the Developer directed that relevant authorities of the United Kingdom, Northern Ireland, Wales, Scotland and Isle of Man should be notified of the planning application for the proposed development. Notifications of the planning application have been sent to these authorities.

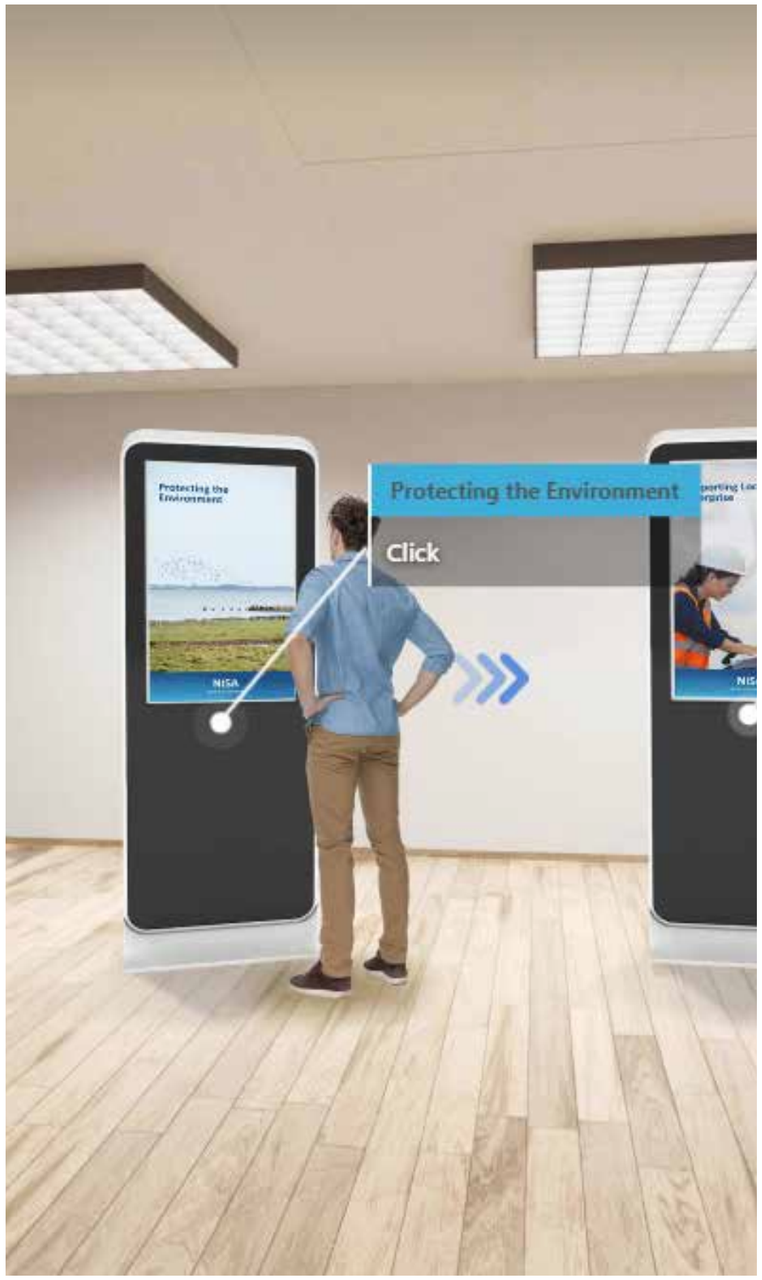
During the pre-application consultations with An Bord Pleanála, the Developer stated that developers from the east coast 'Phase One' projects (North Irish Sea Array, Oriel Wind Park , Dublin Array Offshore Wind Farm, Codling Wind Park, and Arklow Bank Phase 2) have collaborated to share appropriate levels of information. An Bord Pleanála supported this approach, highlighting that it is important to have ongoing communication in this regard and that there is a consistency in approach and methodology used. The detail of this collaboration is provided within each technical chapter of the EIAR as appropriate.

Consultation undertaken prior to submission of the planning application is detailed further in Appendix 1.2 of Volume 8 of the EIAR.

1.3.3 Statutory public consultation on the planning application

Upon lodgement of the application, the planning application, EIAR, the NIS and public notices can be viewed or downloaded from the following website: https://northirishseaarraysid.ie/

The public can make submissions on the application for consideration by An Bord Pleanála as part of the decision-making process (Refer to Section 33 below on Next Steps for further details).



1.3.4 Community Benefit Fund

In accordance with ORESS 1, it is a requirement that all offshore wind projects provide a community benefit fund for local areas. The Community Benefit Fund established for the proposed development will commence once the proposed development is in construction. The fund will be established and administered in accordance with ORESS 1 Community Benefit Funds Rulebook for Generators and Fund Administrators with an independent Fund Administrator appointed.

It is estimated that the funding will be approximately €4 million per annum for 20 years.

2. EIA and Methodology for the preparation of an EIAR

2.1 EIA legislation and guidance

The EIAR has been prepared in compliance with Council Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment as amended by Directive 2014/52/EU (the Environmental Impact Assessment (EIA) Directive).

The EIA Directive requires that public and private projects that are likely to have significant effects on the environment are subject to an environmental impact assessment (EIA) prior to development consent being given.

Article 5 and Annex IV of the EIA Directive and Schedule 6 of the Planning and Development Regulations 2001, as amended (the "Planning Regulations"), specify the information to be contained in an EIAR in relation to this proposed development.

The prescribed classes of development and thresholds that trigger a mandatory EIA and the provision of an EIAR by the Developer are set out in Schedule 5 of the Planning Regulations.

The class under Schedule 5 that is relevant to the proposed development is:

Part 2 Class 3 Energy Projects

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

The proposed development will have more than 5 Wind Turbine Generators (WTGs - also referenced in this NTS as "Turbines")) and will have a total output greater than 5MW. Therefore, it exceeds the threshold and the competent authority, An Bord Pleanála must carry out an EIA.

This EIAR has been prepared with due regard to the Environmental Protection Agency (EPA) and European Commission guidance on EIAR.

2.2 Structure of EIAR

The EIAR has 12 volumes as follows:

Volume 1 Non-Technical Summary (this document).

Volume 2 contains the "introductory chapters" (Chapters 1-9) which include the EIAR methodology, policy context, need for the development, a description of the reasonable alternatives and the project description and construction strategy for both offshore and onshore infrastructure of the proposed development.

Volume 3 contains the "offshore chapters" (Chapters 10-20) which assess various aspects of the marine environment seaward of (below) the high-water mark.

Volume 4 contains the "onshore chapters" (Chapters 21-26) which assess various aspects of the terrestrial environment landward of (above) the high-water mark.

Volume 5 generally contains the "wider scheme chapters" (Chapters 27-34) which assess elements of the proposed development which encompass both onshore and offshore infrastructure. Whilst strictly not "wider scheme", Offshore Bats (Chapter 35) are also included within Volume 5.

Volume 6 contains the 'summary chapters' (Chapters 36-38) which summarise the mitigation, monitoring and likely significant residual effects of the assessments described in Volumes 3-5, transboundary effects, and a summary of cumulative and inter-related effects.

Volumes 7A and 7B contain all of the figures and photomontages prepared for the EIAR.

Volumes 8-12 contain all technical appendices for introductory chapters, offshore chapters, onshore chapters, wider-scheme chapters and summary chapters, respectively. This includes modelling outputs, background reports and / or supporting documents.

2.3 EIAR Process, Assessment of Effects and Mitigation and Monitoring Measures

EIA is a process of systematically identifying the potential impacts and resultant effects (both beneficial and adverse) of a proposed development throughout all phases, including construction, operation and decommissioning. The potential impacts identified for each phase of a development are assessed for the development in isolation and cumulatively with other nearby developments.

The methodology adopted and applied within the EIAR has been developed based upon the experience of technical experts with reference to the EIA Directive and industry good practice guidance and principles.

The assessments undertaken in preparing the EIAR evaluate the construction, operation, and decommissioning phases of the proposed development, with the likelihood, extent, magnitude, duration and significance of potential likely significant effects described. The interactions of effects between different environmental aspects and the potential for cumulative impacts to arise were also considered.

The EIAR focuses on likely significant effects, i.e. those that are probable or likely to occur.

Each of the assessment chapters (Volumes 3-5 of EIAR) sets out how significance is determined for that particular environmental topic and highlights where varying degrees of significance have been assigned for different factors. The assessment chapters also highlight where alternative guidance to the EPA guidance, or professional judgement has been used.

The magnitude of impact and significance of the likely environmental effects are evaluated, and where required, appropriate measures to mitigate potential adverse effects are proposed. This involves an iterative approach in which a feedback loop is used to initially assess a significant adverse effect, followed by incorporation of mitigation measures to avoid impacts or to reduce impacts to acceptable levels in order to reduce the magnitude of the impact. Where feasible, this process is repeated until the effect is no longer significant.

2.4 Transboundary Effects

In accordance with the EIA Directive, An Bord Pleanála must determine whether the proposed development is likely to have significant effects on the environment of other states. The EIAR has considered and assessed transboundary effects on member states of the European Union and other states that are party to the Transboundary Convention (named the "Espoo Convention") arising from the construction, operation and decommissioning of the proposed development. The results of the transboundary effects assessment for each environmental topic are summarised below in Sections 7 to 32 of this NTS.

No likely significant transboundary effects have been identified.

2.5 Cumulative and Inter-related Effects

Although the proposed development may not result in significant residual effects in isolation, when the proposed development is considered cumulatively with other developments in the vicinity, significant residual effects may occur. A long list of "other existing and/or approved projects" which were deemed to be potentially relevant to be included in the cumulative impact assessment was compiled (see Volume 6, Chapter 38: Cumulative and Inter-related Effects). This includes consideration of other offshore and onshore projects, such as offshore wind projects in Ireland designated as the "Phase One projects".

A screening exercise of the "long list" was carried out in order to determine whether each of those other projects have the potential to give rise to likely significant cumulative effects for each of the environmental topics in combination with the proposed development. The results of the cumulative effects assessment for each environmental topic are summarised below in Sections 7 to 32 of this NTS.

The inter-related (or interactions) between different environmental effects, for example a deterioration in water quality in a stream caused by the proposed development having an effect on fish, have been considered throughout the individual environmental topic chapters in the EIAR.

3. Need for the Proposed Development

3.1 Policy Context

Renewable energy, climate change and marine policy at International, European, national and regional level shows that the proposed development not only aligns with these policies at all levels but will be essential in achieving the actions, objectives and targets set out in these policies.

Following its commitment to the United Nations Framework Convention on Climate Change, the Kyoto Protocol and the Paris Agreement, the European Union is continuously developing a comprehensive climate policy framework. Within this framework, European member states are legally obliged to achieve the goal of being climate neutral by 2050.

Under the 2020 EU Strategy for Offshore Renewable Energy, offshore renewable energy was recognised as core component of Europe's energy system for climate neutrality by 2050. This includes targets of 60GW of offshore wind by 2030, and 300GW by 2050. However, following the disruption in the global energy market caused by Russia's invasion of Ukraine, the EU issued the REPowerEU Plan in 2022 with the aim to rapidly reduce EU dependence on Russian fossil fuels. In January 2023, the EU countries agreed to increase these targets to adapt new long-term goals for the deployment of offshore renewable energy which includes a revised target of 111GW of total offshore renewable energy capacity by 2030, and 317GW by 2050. The European Wind Power Action Plan and European Wind Charter were both issued following the revised climate targets to provide Member States with a roadmap of commitments to meet the target of 111GW of total offshore renewable energy capacity by 2030. Ireland signed up to the European Wind Charter and pledged indicative targets of 20GW of offshore wind energy by 2040.

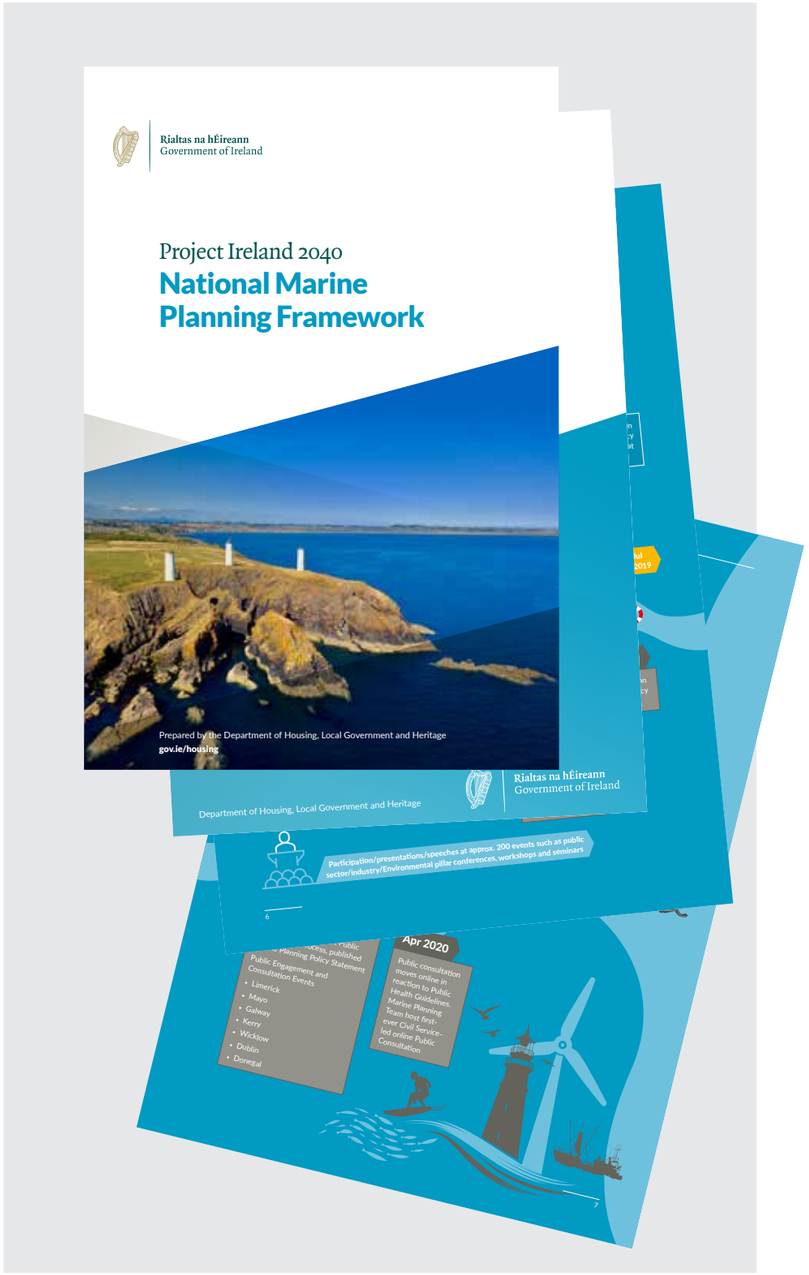
In response to the European climate targets, Ireland committed to a target of 5GW of offshore wind energy in the Climate Action Plan 2023, with the Climate Action Plan 2024 establishing a roadmap for how this will be delivered.

Ireland published the National Marine Planning Framework (NMPF) in 2021. The NMPF covers all of Ireland's maritime area and includes several key marine planning policies, of which offshore renewable energy is one. From an offshore renewable energy perspective, the NMPF directly compliments the 2014 publication of the Offshore Renewable Energy Development Plan (OREDP) which aimed to sustainably develop Ireland's offshore renewable energy resources by providing the planning framework upon which to develop.

The county development plans for the coastal planning authorities of relevance to the proposed development (Fingal County Council, Dublin City Council, Meath County Council, and Louth County Council) further enable the development of offshore renewable energy within their respective coastal waters.

The above policies and plans emphasize the essential contribution offshore wind will make to meeting European, national and local climate and renewable energy targets. The proposed development supports and is key to the delivery of multiple national and international policies and plans in relation to the production of renewable energy.

As an offshore wind project, the proposed development will deliver a significant proportion of Ireland's target of 5GW offshore renewable electricity and 80% of total electricity from renewables by 2030, thus contributing also to achieving the relevant EU objectives and targets. As a significant indigenous energy source, the proposed development will help meet Ireland's security of supply requirements and the EU's objective to move away from imported fossil fuels. The proposed development will support the specific objectives of the NMPF in that it will contribute to the decarbonisation of electricity generation while enhancing the security of energy supply in Ireland.



3.2 Need for the Proposed Development

In its latest report, the Intergovernmental Panel on Climate Change (IPCC) (2023) presents a narrowing window to mitigate and reduce the probability of catastrophic events that could result from climate change. Therefore, any delay in reducing carbon emissions will result in higher global temperatures resulting in greater environmental and social challenges and as such it is critical to advance the acceleration of renewable energy projects such as the proposed development. As a key pillar of Ireland's renewable energy pipeline, it is essential for the proposed development to proceed to contribute to mitigating climate change.

This is a crucial moment in the delivery of offshore wind and achieving Ireland's target of at least 80% renewable electricity by 2030 and reaching net zero no later than 2050. The need for the proposed development is driven by key climate change, energy infrastructure, energy security, emission reductions and economic development targets at Irish and European levels.

In the event that all Phase One projects (including the proposed development) are completed, additional projects will still be required to meet the 5GW offshore wind target by 2030 so it is essential that the projects are taken forward, in turn ensuring a security of energy to Ireland in addition to supporting the delivery of affordable electricity for the consumer.

In the absence of the proposed development, there is no realistic pathway by which Ireland can meet binding climate and environmental targets for 2030 and beyond. With the urgency surrounding the climate crisis which is evident in Ireland on a more frequent basis, it is imperative that these targets are achieved. As an essential contributor to achieving Ireland's offshore wind commitments, the need for the proposed development is clear and demonstrable.

In 2024, the Department of Enterprise, Trade and Employment published Powering Prosperity: Ireland's Offshore Wind Industrial Strategy. The Strategy seeks to capitalise on the economic opportunities inherent in the 2050 target of 37GW of offshore renewable energy. The proposed development will support a large number of employment opportunities across its lifecycle both offshore and onshore. In addition, there will be opportunities for local, regional and national supply chains to benefit from.

Locally, the project will establish a Community Benefit fund of €2/MWh generated for community benefit projects. In the case of the proposed development, this is expected to amount to €4 million per annum for 20 years from the commencement of construction and will reach approximately €80 million for the community.

Climate change and the climate emergency cannot be disputed at a global, national or local scale. International treaties, and EU and Irish Government policy are responding to the climate change challenge with binding targets to reduce greenhouse gas (GHG) emissions and develop renewable sources of electricity. It is essential that the proposed development proceeds in order to ensure these targets are achieved while also achieving security of an indigenous energy supply for Ireland, in addition to supporting the delivery of affordable electricity for the Irish consumer.

4. Alternatives Considered

In accordance with the EIA Directive, the EIAR is required to describe the reasonable alternatives considered for the proposed development in relation to design, technology, location, size and scale, taking into account the effects of options on the environment. and indicate the main reasons for selecting the chosen option, including a comparison of the environmental effects.

The main alternatives considered for the proposed development are detailed below.

4.1 Do Nothing alternative

The 'do-nothing' scenario refers to what would happen if the proposed development was not advanced. The 'do-nothing' alternative is not a reasonable alternative as it does not meet the project objectives and does not advance the security of supply in Ireland, support the delivery of offshore wind in Ireland and Europe nor support addressing the climate emergency.

4.2 Offshore

4.2.1 Overview

The design evolution of the proposed development has incorporated numerous drivers from a number of different disciplines (technical, environmental, economic and social). All of which have been considered when selecting the location, project infrastructure and layout for the project presented within the planning application. Throughout all stages of the project development / refinement process (which began in 2008) the Developer has also taken views of stakeholders into consideration when taking project design decisions. This process is illustrated in Image 1 of this NTS below.

To satisfy the project objectives and contribute towards the Irish Governments climate targets for 2030 and beyond, the Developer identified that an offshore wind farm with fixed bottom foundations (attached to the seabed by piles or other rigid connection method) was the only reasonable alternative which could deliver a meaningful contribution within the timescale required. The decision was largely based on the lack of large scale alternative technologies (i.e. floating wind) installed globally and also the water depths off the East Coast of Ireland (which at approximately 60m or less were considered a limiting factor to installation of floating foundations). Government policy for the deployment of offshore renewables also supported the development of such a project off the East Coast of Ireland.

4.2.2 Site Selection

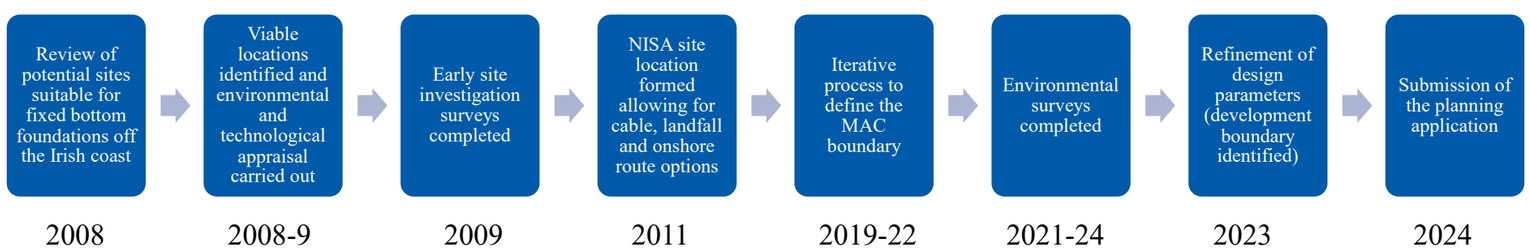
When deciding the extent of the offshore development area (i.e. the area within which the wind turbine generators (WTGs), the offshore substation platform (OSP) and inter-array cable(s) will be located), numerous feasibility studies, site specific surveys and consultation with stakeholders were undertaken over more than 12 years to inform the current project location. Key considerations included seabed and wind resource characteristics, water depths, distance to shore, overlapping foreshore licences, shipping and navigation features, ornithology and commercial fishing activities.

Such considerations informed the extent of the Foreshore Licences awarded to the project and subsequently a number of site-specific surveys were undertaken (including intrusive seabed surveys, ecological surveys, marine traffic surveys). The results of these surveys, and the designation of the North West Irish Sea candidate Special Protection Area (cSPA) in summer 2023, informed the extent of the offshore development area presented in the planning application which is equivalent to approximately 36% of the original MAC extent and is a smaller proportion of the cSPA.

4.2.3 Layout and Proposed Infrastructure

The layout and proposed infrastructure of the proposed development was determined by considering feedback from stakeholders, results of site-specific survey, wind resources, avoidance of existing infrastructure and commercial fisheries activities. The WTGs presented have been selected based on the WTG models anticipated to be available to the Developer at the time of construction. These considerations resulted in the selection of Project Option 1 and Project Option 2 (Refer to Sections 5.2.1 and 5.2.2 below for further details).

Image 1 Project Development / Refinement process



4.2.4 Offshore Export Cable Corridor

The offshore export cable corridor was refined following the selection of a landfall point, feedback from landowners onshore and the preference to minimise the length of the export cable from the offshore substation platform to the landfall point, which in turn reduces the environmental impact of the project.

Significant consideration has been given to develop an environmentally acceptable and feasible offshore windfarm which delivers on the Government's binding climate targets and also delivers benefits on a local, regional and national scale while addressing the climate emergency and advancing the security of supply in Ireland.

4.3 Onshore

4.3.1 Introduction

To deliver the power generated offshore to the transmission network, there is a need for onshore infrastructure. The three key aspects of the onshore infrastructure for which alternatives were considered were:

- Landfall site selection
- Grid Facility (comprising the 220kV onshore substation and compensation station) site selection and
- Onshore cable route options

EirGrid, in its role as Transmission System Operator (TSO), determined that the existing Belcamp 220 kV substation, located at Belcamp in north County Dublin was the most suitable location for connection to the existing electricity transmission network and issued a Grid Connection Assessment (the first step in obtaining a full Connection Agreement) for the proposed development on this basis. Consequently, no alternative grid connection locations were investigated by the Developer as no such locations were identified by EirGrid as preferable to the Belcamp 220 kV substation.

4.3.2 Landfall Site Selection

The landfall is the transition point between onshore and offshore infrastructure. Before landfall sites could be assessed, it was necessary to identify the key constraints associated with the landfall. These included proximity to the array offshore, consideration of the topography and water depth, the need for sufficient space to locate the transition joint bay (TJB) and a horizontal directional drilling (HDD) pit onshore (if HDD is the preferred methodology), avoidance of designated sites where practicable, avoidance of known archaeological features and areas of geophysical constraints, the local road network for construction access and deliveries of components, coastal erosion risk and engagement with landowners.

The constraints assessment included multiple site visits and landowner engagements to enable feasible landfall site options to be identified. Three feasible landfall sites at Bremore Point, Skerries North and Skerries South were identified in 2020, which met the basis of design requirements. A comparative assessment of the three potential landfall site areas was undertaken which included technical, cost, landowner and environmental criteria, The landfall site at Bremore Point was selected as the preferred option as it had the least technical, cost, landowner and environmental constraints at this early stage of the project. In terms of environmental criteria, at the time of site selection, there were no European sites in the vicinity and no significant environmental constraints were identified other than archaeological/heritage constraints. Following selection of this landfall, the boundary of the landfall site at Bremore Point was further refined to reduce impacts on archaeological heritage constraints.

4.3.3 Grid Facility Site Selection

A grid facility is required to take the power coming ashore and process it for onward connection to the existing transmission network.

Once the preferred landfall location at Bremore Point was identified by the Developer and shared with EirGrid, the location and fundamental design of the grid facility were specified by EirGrid and stipulated by the provisions of the Grid Connection Assessment. EirGrid carried out studies of the transmission system to determine the most suitable location to connect renewable energy generation projects. In this case, EirGrid determined that a location close to the landfall at Bremore in north county Dublin is required for this purpose. The grid facility will comprise two substations – the 220kV Compensation Substation and the Bremore 220kV Substation.

EirGrid's decision on the Bremore location was also driven by its requirement as the transmission system operator to future proof the transmission network and to design the Bremore 220kV Substation (part of the proposed grid facility) to accommodate potential future connections from other projects (e.g. other renewable energy generators, electricity demand customers or grid services infrastructure). The proposed development was designed to comply with EirGrid's requirements, and this is consistent with the approach taken in grid facility site selection. Given that the grid facility was to be located at Bremore, the next step was to identify key constraints (basis of design) for the proposed grid facility site. Criteria for site selection included land use zoning, screening/views of coastline, supportive engagement with landowners, archaeology and biodiversity and proximity to landfall etc. When these constraints were considered, in parallel with the requirement for the grid facility to be located at Bremore and from initial landowner engagement, it became evident that the number of feasible sites was limited. Two potential sites were identified for further consideration located west and east of the R132 road. It was clear from the constraints included in the basis of design above, that there was no significant differentiator between the two sites, with the key differentiators being in respect of two criteria, namely land use zoning and landscape/ visual impact. The site on the west of the R132 road was selected as the preferred location as it had the least land use zoning and landscape and visual impacts.

4.3.4 Onshore Cable Routing

Onshore export cables are laid between the landfall and the grid facility, with the onshore cables then laid from the grid facility to the connection to the existing transmission network at Belcamp substation in north County Dublin. The key design objectives for the onshore cable routing assessment have been primarily informed by the EirGrid Functional Specification which includes the requirement that underground cables are as standard routed within the reserve of public roads and the routing of cables through private lands shall only be considered if other options have been exhausted. In addition to the EiGrid requirements above, other key constraints which informed the study area and basis of design for the route options assessment included avoidance of the Rogerstown Estuary and Malahide Estuary and a crossing of the M1 motorway would be required.

The route selection process for the onshore cable route is illustrated below in Image 2.

With that in mind, a number of different onshore cable route options along the public road network were initially identified for assessment. These were the shortest and most direct routes from the grid facility to Belcamp Substation, which also avoided key environmental constraints such as the designated sites at Malahide and Rogerstown Estuaries. Numerous site visits were carried out as part of the assessment to review the onshore cable route options on the ground, to compare and contrast these and to investigate the constructability challenges associated with major infrastructure crossings. An emerging preferred route was chosen at the conclusion of this assessment. However, following further design and technical analysis as the project concept design developed and following extensive stakeholder consultation, the emerging preferred route was re-examined in order to reduce constructability challenges. These challenges included significant conflicts with key infrastructure planned for MetroLink rail track along the R132 south of Swords, and the Aviation Fuel pipeline along Stockhole Lane.

Following the initial cable route options assessment, the design development, extensive stakeholder consultation and refinement of the cable route, the final onshore cable route was chosen which had the least constructability challenges.

Image 2 Route Selection Process for Onshore Cable Route

Note: This is a cropped image of **VP24 (Project Option 1) Photomontage.** Full verifiable images provided in Volume 7B1 of the EIAR.

5. Description of the Proposed Development

5.1 Overview of the Proposed Development

Image 3 below provides an overview of the proposed development, which is divided into offshore and onshore infrastructure as follows:

- Offshore infrastructure located within the offshore development area (this is where the offshore wind turbines and offshore cables will be located).
- Offshore wind turbine generators (WTGs, also referenced in this NTS as "Turbines") and their foundations located within the array area;
- Inter-array cables, which transmit the electricity produced by the WTGs, will connect the WTGs to the Offshore Substation Platform (OSP);
- An OSP and its foundations located within the array area; and
- Offshore export cable(s), located within the offshore cable export corridor (ECC) which will deliver the generated power from the OSP to shore.

Onshore infrastructure located within the onshore development area (this is where the offshore cables come ashore and change to onshore export cables, and then onshore cables which eventually connect into the existing transmission network).

- Offshore export cable(s) to the landfall transition joint bays (TJBs);
- Transition joint bays (TJBs) where the offshore and onshore export cables are joined;
- Onshore export cable(s) from the TJBs to the grid facility;
- A Grid Facility, comprising a compensation substation and a new 220kV Bremore substation,
- Onshore cable(s) from the grid facility to the Belcamp substation; and
- A connection from the onshore cable(s) to the national electricity transmission network at Belcamp substation.

The offshore export cables come ashore and change to onshore cables at the TJBs close to the shoreline at Bremore Bay beach in Bremore, north of Balbriggan, Co. Dublin.

The overall location of the proposed development (onshore and offshore) is illustrated in Figure 1. The proposed development boundary is the area within which all offshore and onshore infrastructure will be located and is the 'red line' boundary for the purposes of the planning application is illustrated in Figure 1.

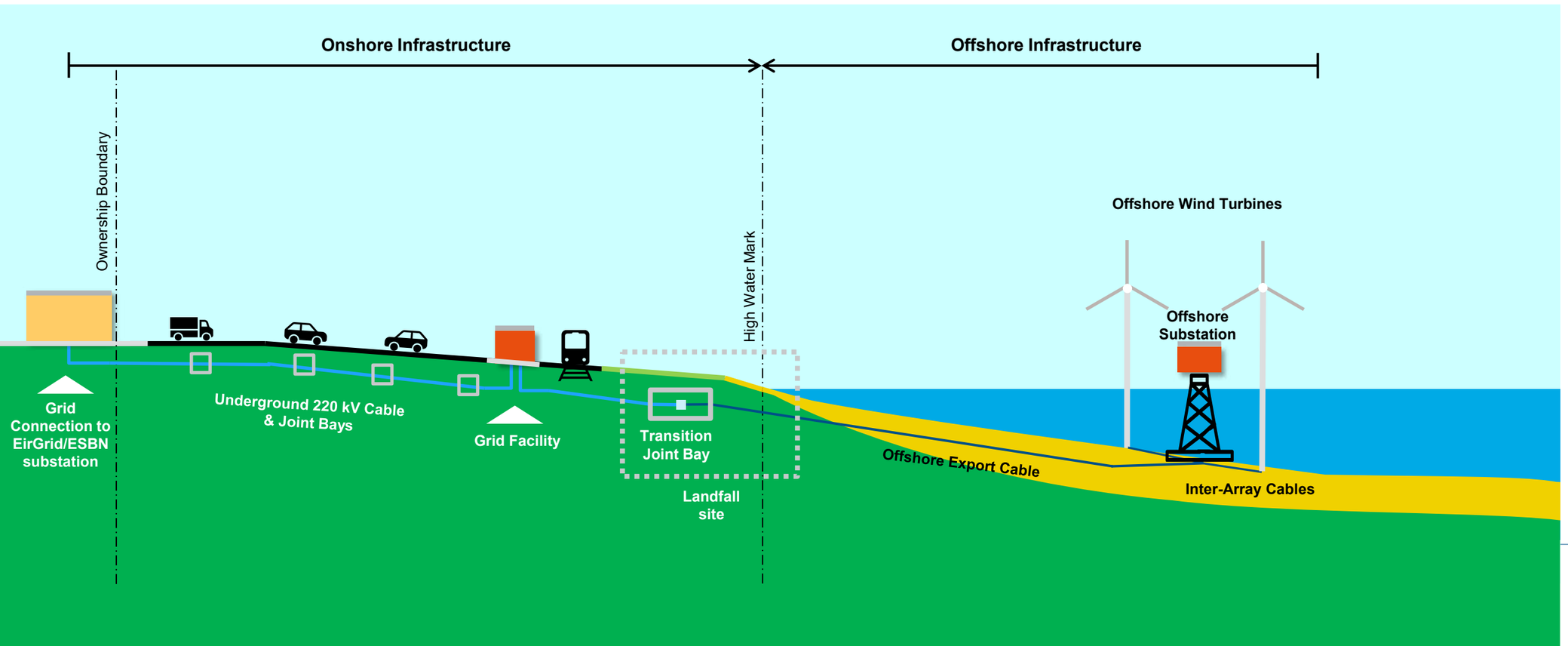


Image 3 Infrastructure of the proposed development (not to scale)

5.2 Offshore Infrastructure

5.2.1 Design Flexibility Opinion

As noted in Section 1.3.1 above, An Bord Pleanála issued its opinion to the Developer on design flexibility in 2024 (the "DF Opinion"). The DF Opinion confirms the details of the proposed development which are unlikely to be confirmed at the time of the proposed application, and which may therefore be confirmed after the Developer's proposed application under section 291 has been made. The DF Opinion confirmed flexibility for the following aspects of the proposed development:

Wind Turbine Generators (WTG) (also referenced in this NTS as "Turbines") – model, number and dimensions (tip height, rotor diameter, rotor swept areas, nacelle height and hub heights);

- Turbine foundations – type and pile dimensions;
- Offshore substation platform – foundation types and dimensions (height above sea level, length and width);
- Siting of infrastructure – fixed location with limit of deviation (turbines, foundations, export cable and offshore substation platform location); and
- Offshore cabling – subsea cable size and subsea cable length.

Further information on the requirement for flexibility of the proposed development is included in Volume 2, Chapter 2 of the EIAR.

5.2.2 Project Options and Design Flexibility

The proposed development includes two project options for consideration in the planning application. At detailed design post-consent stage, just one option will be chosen as the preferred option and subsequently constructed.

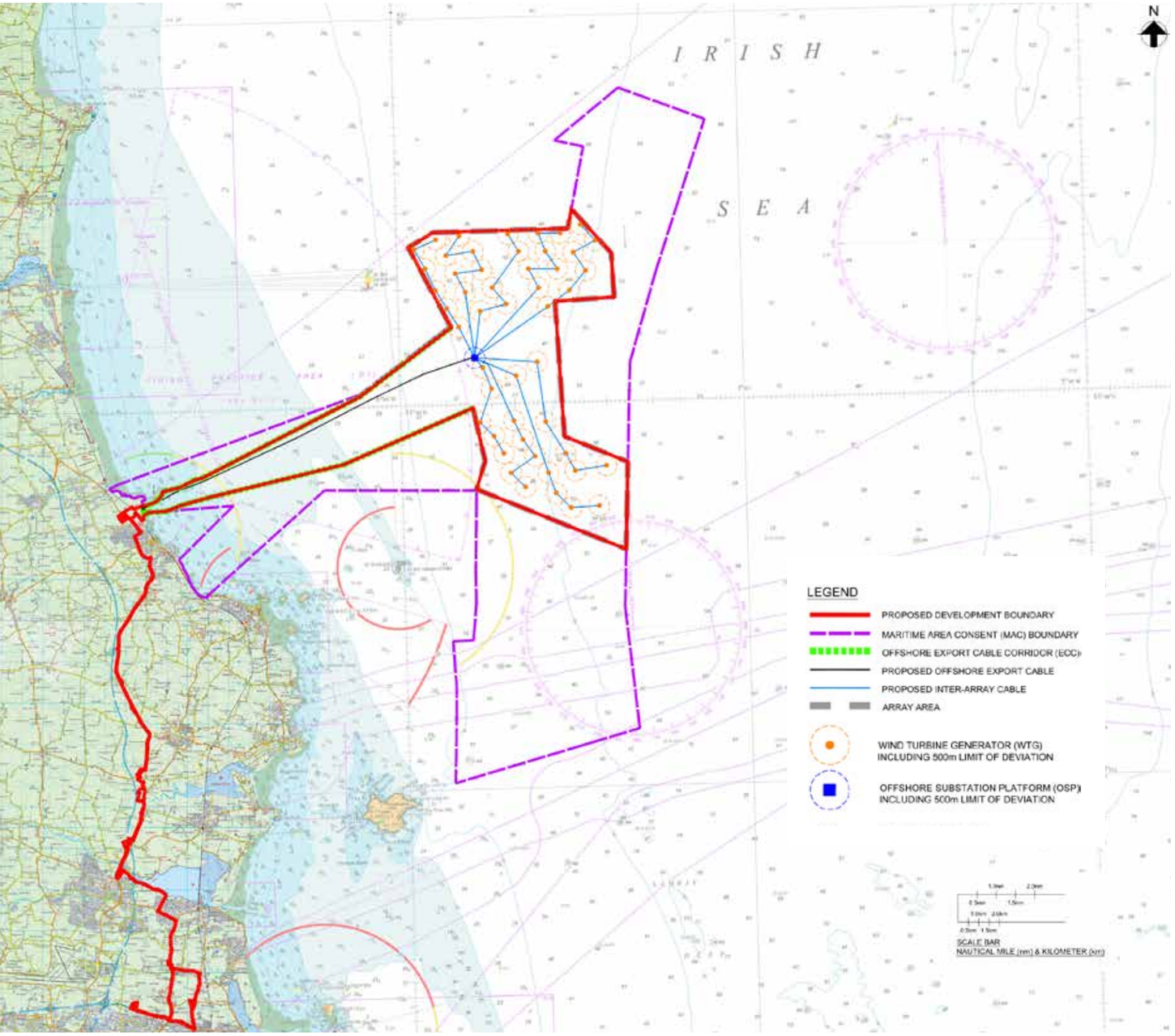
An overview of the key parameters of the two project options are provided in Table 1. The layout for each project option is illustrated in Figure 2 (Project Option 1) and Figure 3 (Project Option 2).

Table 1 High Level Overview of the two Project Options for the proposed development.

Parameter	Project Option 1	Project Option 2
Number of Wind Turbine Generators (WTGs) (Turbines)	49	35
WTG tip height (m above lowest astronomical tide)	290	316 outside aviation restricted zone, 311 inside aviation restricted zone*
Rotor Diameter (m)	250	276
Hub height (m above lowest astronomical tide)	165	178
WTG Foundation type	Monopiles	Monopiles or multi-leg pin piled jackets (hereafter referred to as 'jackets')
Number of OSPs	1	1
OSP foundation type	Monopile(s) or jacket foundation	Monopile(s) or jacket foundation
Offshore export cable length (km)	18	18
Inter-array cable length (km)	111	91

*An aviation restricted zone (of 312m LAT) has been identified by the Developer due to the partial overlap of the array area with a Dublin Airport controlled airspace meaning 13 turbines will have a 5m reduction in tip height due to being within the aviation restricted zone. This is further detailed in Volume 3, Chapter 19: Aviation and Radar.

Figure 2 Proposed Layout – Project Option 1 (49 wind turbine generators)



5.2.3 Wind Turbine Generators (WTGs)

As detailed above, the two project options are as follows:

Project Option 1: 49 WTGs with 250m rotor diameter

Project Option 2: 35 WTGs with 276m rotor diameter

Two unique WTG models are considered for each project option. For the two models, the WTGs considered will follow the traditional offshore WTG design with three blades and a horizontal rotor axis as shown in Image 4. The blades will be connected to a central hub, forming a rotor which turns a shaft connected to the generator or gearbox. These are connected to the nacelle situated adjacent to the rotor hub, supported by a tower structure affixed to the transition piece or foundation. The main design parameters for the two WTG models are outlined in Table 1.

The layout of the WTGs is illustrated in Figure 2 for Project Option 1 and Figure 3 for Project Option 2. The WTGs will be located within 500m of the position indicated in Figures 2 and 3. Extensive preliminary surveys and engineering design have been conducted to inform the siting of WTGs. The final siting of the WTGs will be confirmed through further detailed site investigations, detailed design and consultations with various stakeholders which will inform the final layout design.

Accounting for the proposed 500m limit of deviation in the final siting of the WTG, the nearest WTG from shore is 13km for Project Option 1 and 12.3km for Project Option 2.

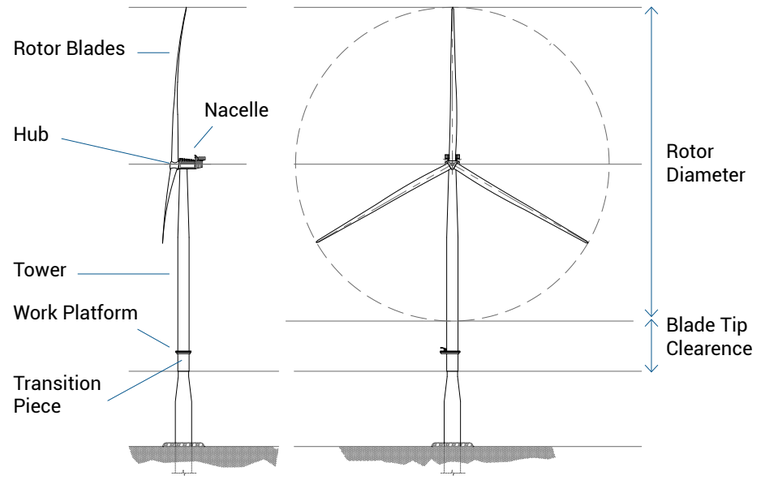


Image 4 Typical WTG Components – not to scale

5.2.4 Offshore Substation platform (OSP)

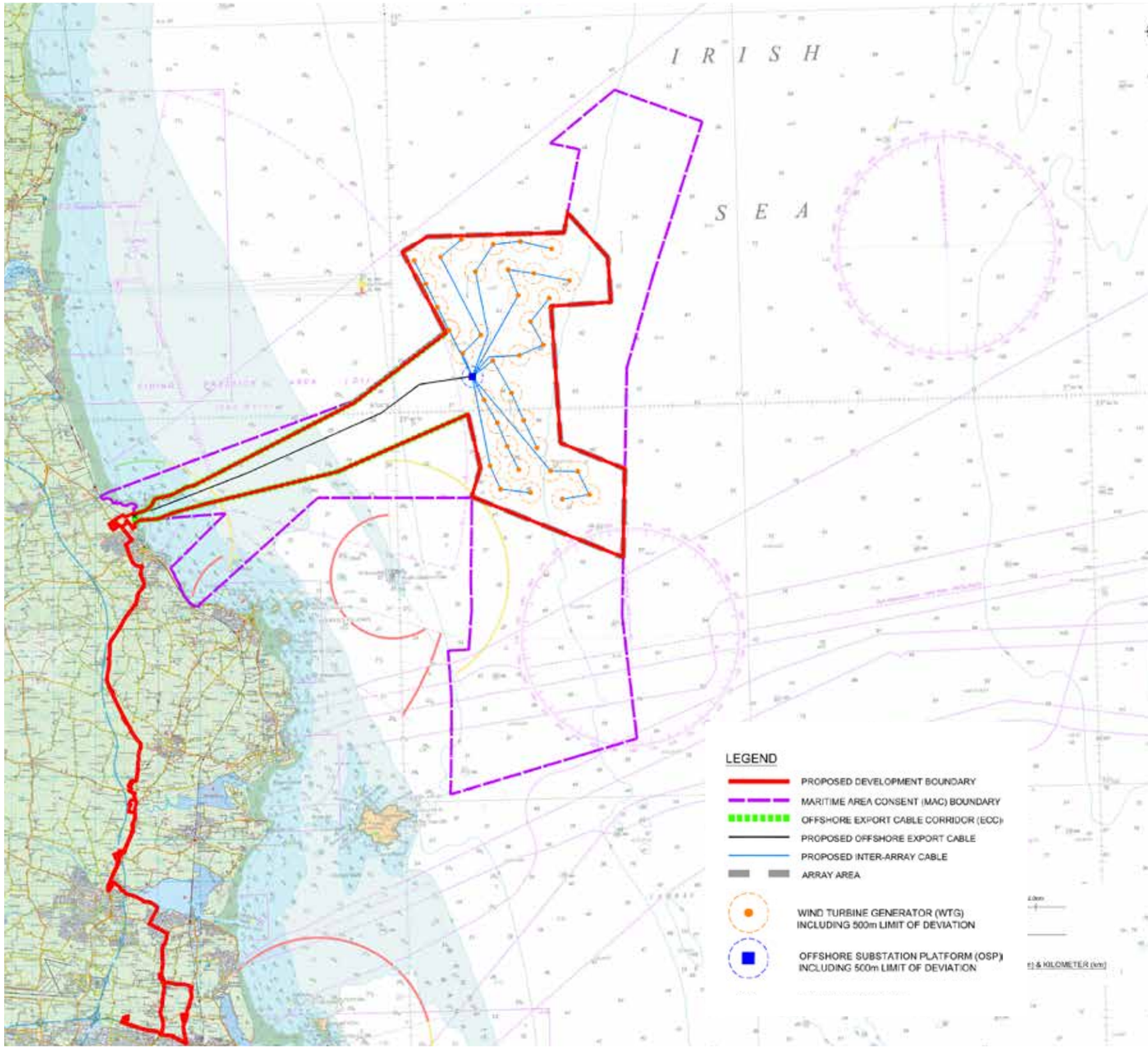
An OSP, as shown in Image 5, is a hub where all the energy produced by the WTGs is brought together via 66kV or 132kV inter-array cables and stepped up by transformers to 220kV high voltage alternating current (HVAC) for export onshore via the offshore export cables. The OSP comprises of a topside, which is a steel platform with multiple levels which will house electrical equipment including transformers, switchgear, back-up diesel generators and additional power supply for lights, safety systems and data and control system. The decks will be either open with modular equipment or the structure may be fully clad.

The location of the OSP for the two project options is illustrated in Figure 2 for Project Option 1 and Figure 3 for Project Option 2. As with the final siting of the WTGs, the final siting of the OSP will also be within 500m of the position indicated in Figures 2 and 3. Accounting for the proposed limit of deviation in the final siting of the OSP, the closest it will be from shore is 14.8km for Project Option 1and 14.4km for Project Option 2.

The OSP will be typically unmanned. However, it will be designed for temporary refuge with an emergency shelter.

Image 5 Typical OSP on monopile foundation (Source: Arup)

Figure 3 Proposed Layout – Project Option 2 (35 wind turbine generators)



5.2.5 Substructures and Foundations

Foundations are required to support WTGs and the OSP. These structures will be fixed to the seabed and will be designed to withstand wave and wind forces and a wide range of weather conditions in the offshore environment. The foundation types that are being considered include:

WTG foundations:

- Project Option 1: monopiles; and
- Project Option 2: monopiles or jacket foundations (three or four leg design, with pin piles).

OSP foundations (for Project Option 1 and 2):

- A four-legged jacket foundation with pin piles;
- One monopile; and
- Two monopiles.

A monopile (the most common foundation type for offshore wind farms) comprises a single tubular steel section which is typically driven into the seabed via a hammer or drilling or a combination of both. Image 6 shows a WTG on a monopile above the water line.

Jacket foundations are being considered for Project Option 2 only for the WTGs and for both project options for OSP foundations. Jacket foundations typically consist of three or four main legs, connected to a lattice structure with welded tubular steel cross-braces with each leg secured to the sea floor using a driven or drilled pin-pile. Image 7 shows a WTG on a jacket above the water line.

The final selection of foundation type will depend on detailed design.

Image 6 Typical WTG on a Monopile foundation (Source: Arup)

Image 7 Typical WTG on a Jacket foundation (Source: CIP)

5.2.6 Offshore Inter-Array Cables

In order to carry the electricity generated by the WTGs, subsea inter-array cables will link a group of WTGs together into strings within the array area and connect these strings to the OSP. Inter-array cables will have a nominal operating voltage of between 66kV and 132kV. The inter-array cables will consist of a number of power conductor cores, made of copper or aluminium, with an integrated fibre optic communication cable and will be wrapped in layers of insulating material and protective armour. Cables will be buried in a trench, where practicable, to protect them. Where burial is not practicable, additional cable protection techniques will be used.

5.2.7 Offshore Export Cable

In order to bring electricity ashore, two 220kV High Voltage Alternating Current offshore export cables will be routed from the OSP to the landfall site.

The offshore export cables will be located within the export cable corridor (ECC) as shown on Figures 2 and 3. The cables will be brought to the shoreline at the landfall site where they will connect to the onshore export cables at the Transition Joint Bays (TJB). The final selection of cable size and route will depend on detailed design. The cables will be buried in a trench, where practicable, to protect them. Where burial is not practicable, additional cable protection techniques will be used.

5.2.8 Landfall Site

The landfall site is located north of Balbriggan and immediately south of Bremore Point in the townland of Bremore in north County Dublin. The landfall site encompasses Bremore Beach, agricultural fields behind, a section of the Dublin to Belfast railway line and the R132 road. The offshore export cables will be routed beneath the beach to a transition joint bay (TJB) located onshore. Section 5.3.1 below describes the onshore infrastructure at landfall. The location of the landfall site is illustrated on Figure 4 of this NTS.

5.2.9 Operation and Maintenance Facility

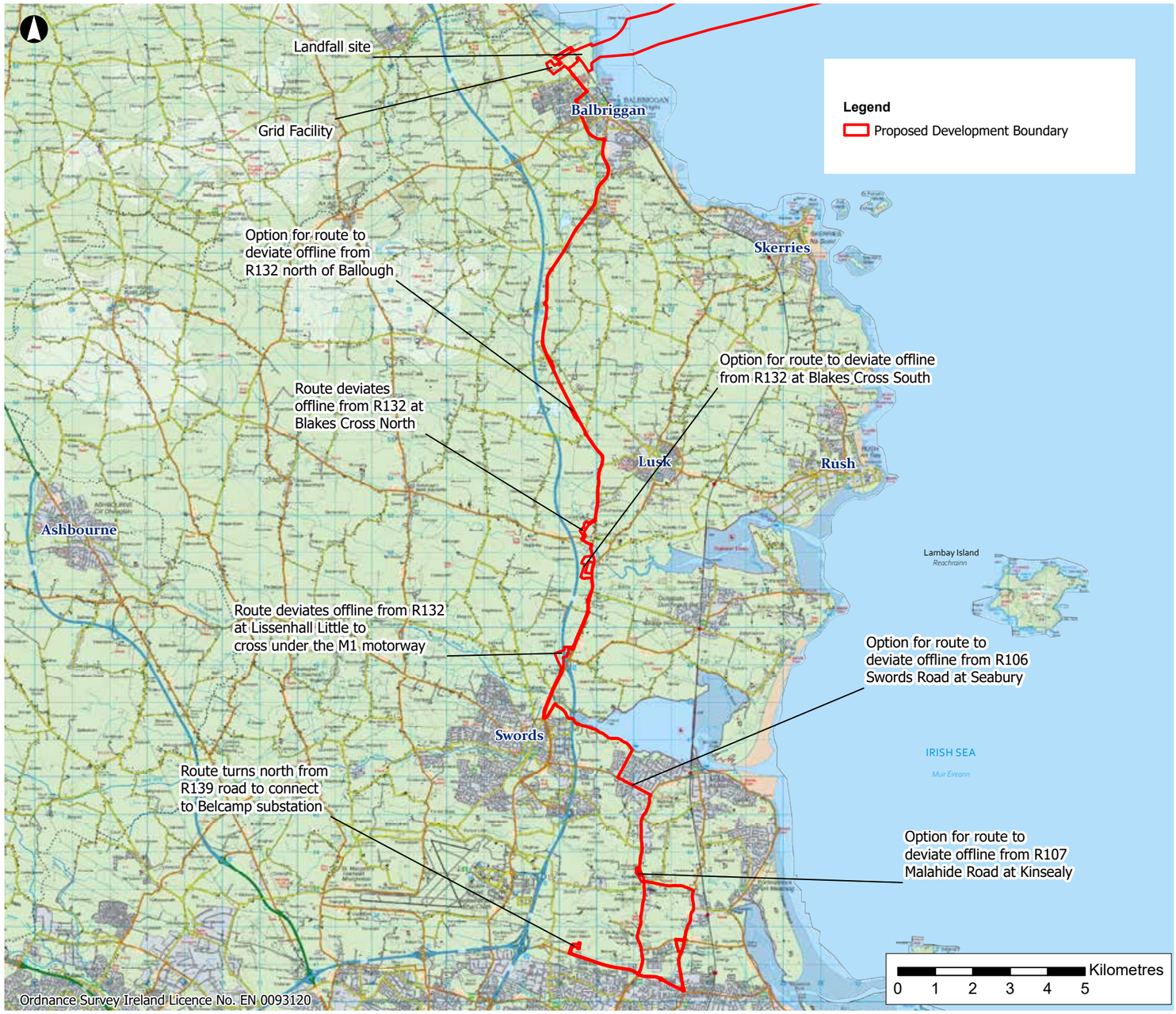
The Operation and Maintenance activity will commence following commissioning and will be managed from a local onshore operation and maintenance facility for the 35 year duration of the proposed development. The operation and maintenance facility will be subject to separate planning/permitting consents and is not included within this planning application, however, it is considered within the cumulative impact assessment of the EIAR.

5.2.10 Decommissioning

The Maritime Area Planning Act 2021 sets out an obligation for the holder of a Maritime Area Consent to decommission or re-use offshore infrastructure as part of its rehabilitation of the maritime area, once the proposed development has reached the end of its operational life. At the end of the operational life of the proposed development, which is anticipated to be 35 years, it is anticipated that all structures above the seabed will be completely removed.

The approach to decommissioning has been documented in the Rehabilitation Schedule (Appendix 6.2 of Volume 8 of the EIAR) which will be subject to consultation with the Maritime Area Regulatory Authority (MARA) and relevant stakeholders as required.

Figure 4 Overview of Onshore Infrastructure



5.3 Onshore Infrastructure

5.3.1 Landfall site

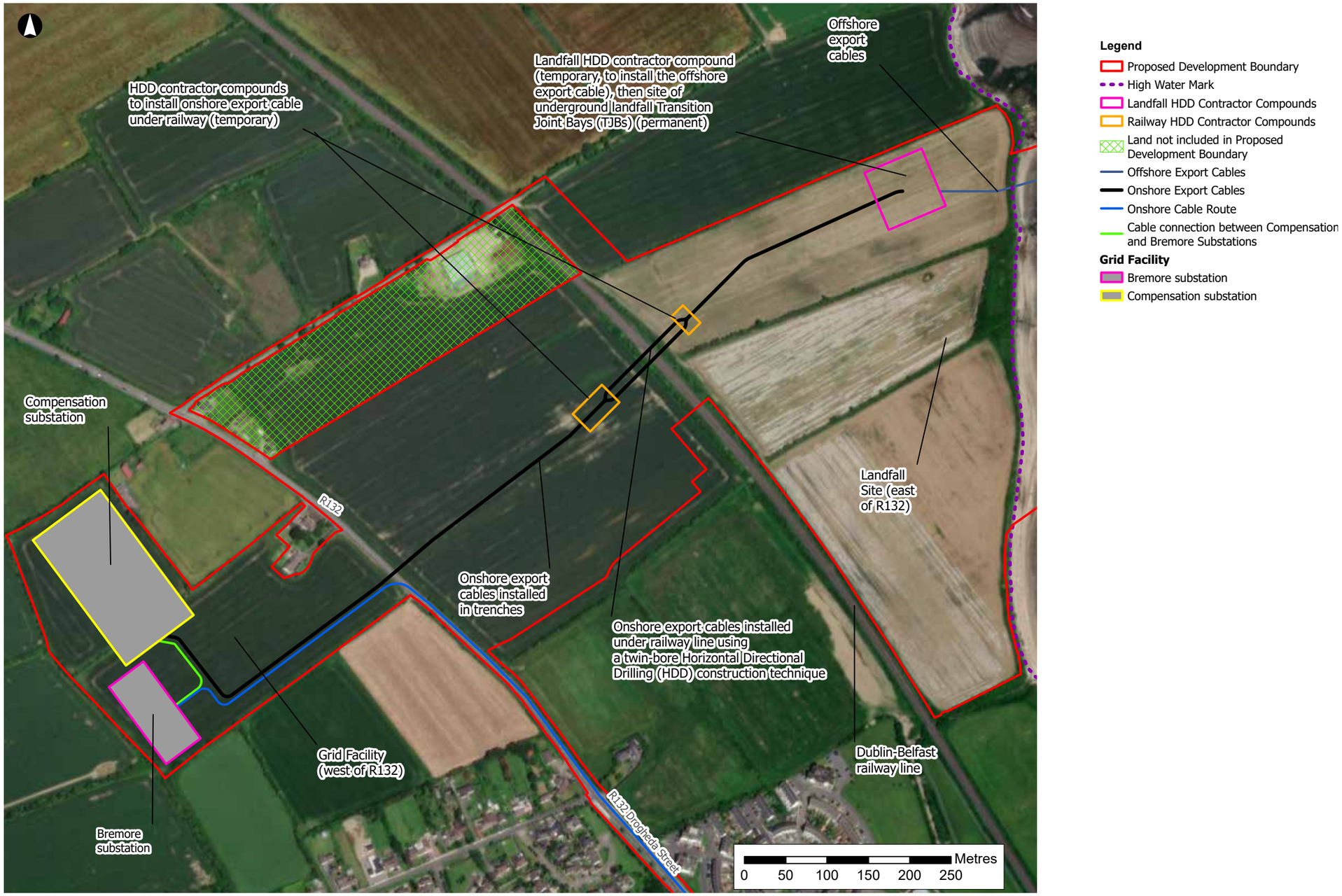
As noted in Section 5.2.9 above, the landfall site is where the two offshore export cables reach the shore and extend landward from the high-water mark as far as the grid facility. The landfall site encompasses Bremore Beach, agricultural fields behind, a section of the Dublin to Belfast railway line and the R132 road. The location of the landfall site is illustrated on Figure 4 and Figure 5 of this NTS.

The infrastructure includes:

- An underground crossing of the offshore export cables underneath the beach via a Horizontal Direct Drilling (HDD) technique. HDD is a construction technique which involves drilling a tunnel / duct under a constraint (e.g., a waterway) through which the export cable is pulled through;
- Transition Joint Bays (TJBs) which will contain the connections between the offshore export cables and the onshore export cables. The TJBs will be located close to the shoreline and will be installed once the offshore export cable HDD has been completed; and
- From the TJBs, the onshore export cables will be laid in ducts in trenches through agricultural fields, will cross under the Dublin-Belfast railway line (via HDD) to the R132 road and then laid in trenches to connect to the grid facility.

Construction activities at the landfall are described in Section 6.2 below.

Figure 5 Onshore Infrastructure at Landfall site and Grid Facility



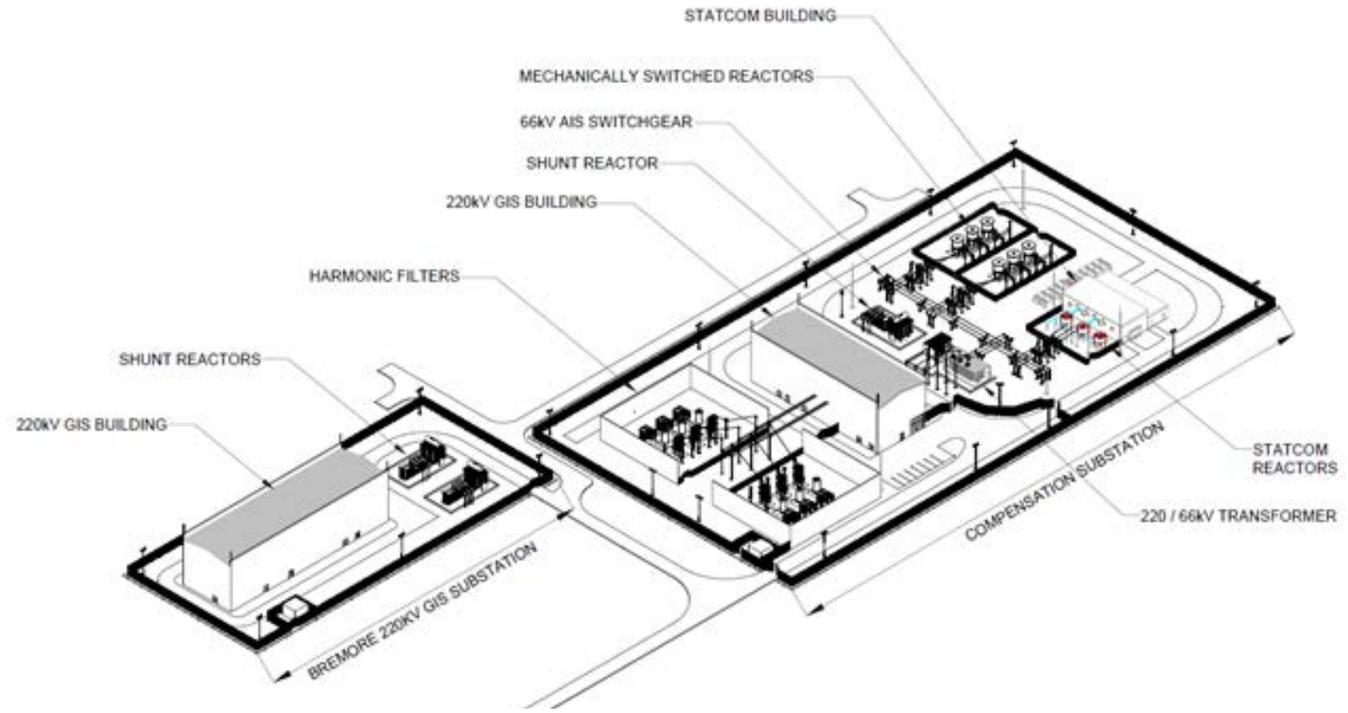
5.3.2 Grid Facility

The grid facility will be located in two fields currently in agricultural use, in the townland of Bremore, Co. Dublin. The function of the grid facility will be to receive power delivered from the offshore substation platform via the offshore and onshore export cables and process it so that it is suitable for feeding into the electricity grid. The grid facility will be comprised of two separate elements as follows:

- The compensation substation will be contained within a rectangular compound approximately 100m by 190m.
- The Bremore substation will be contained within a smaller adjacent rectangular compound approximately 50m by 115m.

Both the compensation and Bremore substation compounds will include a building of approximately 17m in height (plus 3m lightning rods). The compensation substation will receive the onshore export cables from the landfall site. Two cables will then connect the compensation substation to the Bremore substation before the onshore cables exit the Bremore substation. An overview of the proposed grid facility layout is shown in Image 8 below. Both the compensation substation and Bremore substation compounds will be contained within a wider grid facility compound, with additional infrastructure such as utilities (including water supply, drainage network etc), security fencing, external lighting, site access and landscaping.

Image 8 Proposed grid facility which comprises the Compensation Substation and Bremore 220kV GIS Substation.



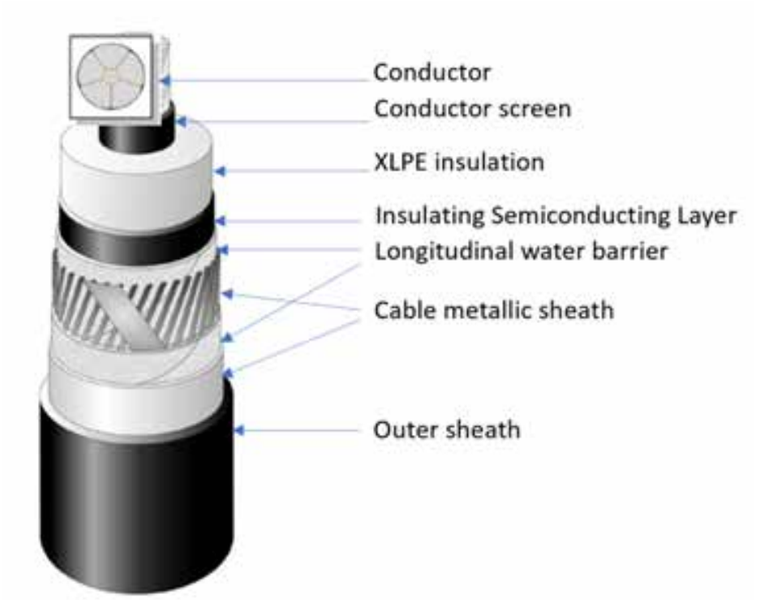
5.3.3 Onshore cable route

Two 220kV HVAC cables will be laid underground from the grid facility just north of Balbriggan to the grid connection point at an existing electrical substation at Belcamp on the northern outskirts of Dublin. Each cable will comprise the electrical cables, earthing and communications cables. The onshore cable route runs for approximately 33-35km between the proposed grid facility and the grid connection point at Belcamp. For most of the route – approximately 29km out of the 33km – the cables will be laid in ducts in a trench in the footprint of existing roads including the R132 road, the R106 road and other local roads. The full route is shown on Figure 4.

Towards the southern end of the cable route, two options for the route are included – one along the R107 road and one via the R124 road. The alternative route will provide flexibility to ensure integration with other existing and future utilities infrastructure (including the planned route for power cables associated with the Metrolink project). The route via the R124 road would add approximately 2km to the overall cable route (hence the cable route will be approximately 33 – 35km). This alternative route is shown on Figure 4.

See Image 9 illustrating a typical three core cable design.

Image 9 Typical Onshore Export Cable core (Source: Statkraft)



The onshore cables will be placed in buried underground ducts laid either in:

- A single trench of width 1400mm with six cables arranged in a double trefoil (triangular) arrangement, or
- Two narrower trenches of width 1100mm each with three cables in each arranged in a trefoil arrangement, or
- A single trench of width 2275mm with the six cables arranged in a flat formation.

Typical trench details are shown on planning drawing 281240-ARP-ONS-XX-DR-PL-3000 Typical cable trench details in Appendix 7.1 of Volume 8 of the EIAR.

The cable route will cross a number of watercourses, as well as the M1 Motorway, gas transmission pipelines and the East-West Interconnector (EWIC) along its length. The construction methodology to be adopted for these crossings will vary and is discussed in the Chapter 9 of Volume 2 of the EIAR. Horizontal directional drilling will be used where standard open cut trenching techniques are not possible.

The majority of the onshore cable route is within public roads but also includes seven locations where the route may, or will, move offline (i.e. outside the public road curtilage within third party lands) from the road as illustrated on Figure 4:

- To the north of Ballough, the route includes an option to go offline from the R132 in order to cross a watercourse (Aldrumman stream).
- At Blakes Cross north, the route goes offline from the R132 in order to cross a watercourse (Ballough stream) and to cross the East-West Interconnector.
- At Blakes Cross south, the route includes an option to go offline from the R132 in order to cross two watercourses (Deanestown stream and Ballyboghill stream).
- At Lissenhall Little, the route goes offline from the R132 in order to cross under the M1 motorway.
- In Seabury, the route includes an option to go offline from the R106 Swords Road in order to cross a watercourse (Gaybrook stream).
- At Kinsaley, the route includes an option to go offline from the R107 Malahide Road in order to cross a watercourse (Sliuce stream).
- At Belcamp, the route turns north offline from the R139 in order to connect into the Belcamp substation.

5.3.4 Operation and Maintenance and Decommissioning

The onshore infrastructure will require ongoing maintenance during the operational lifetime of the project. The operational life of these assets will be approximately 35 years. Once the proposed development has reached the end of its operational life it is anticipated it will be decommissioned. The compensation substation at the grid facility will be decommissioned when the proposed development ceases operation. However, the infrastructure from the Bremore substation within the grid facility to the existing Belcamp substation will be under the ownership of ESB Networks, forming part of the transmission system and therefore will not be decommissioned.

6. Construction of the Proposed Development

6.1 Offshore Construction

6.1.1 Construction programme and sequencing

Subject to obtaining planning permission and the relevant permits and licences, construction of the offshore infrastructure of the proposed development is expected to commence in 2027, with completion expected in 2029. Offshore construction may take place 24 hours per day, 365 days per year.

Offshore construction is anticipated to be undertaken following the indicative sequence below:

- Detailed site investigations;
- Pre-construction surveys;
- Seabed preparation;
- Landfall Horizontal Direction Drilling for export cable;
- Offshore export cable installation and cable protection installation;
- Foundation installation and scour protection installation;
- Inter-array cable installation and cable protection installation
- OSP installation; and
- WTG installation.

Mitigation measures to minimise the impact of the construction phase of the proposed development on the environment are set out in an Offshore Environmental Management Plan (the Offshore EMP), which is included as part of the EIAR in Volume 8, Appendix 6.1 of the EIAR.

6.1.2 Construction ports

The wind turbine generators and foundation components will be brought to site via a construction port. Transportation and delivery of large components (e.g. WTG blades) to the construction port via roads is not anticipated. At the construction port, the components will be stored and, in some instances, assembled before being transferred to the offshore development area using the vessels.

There are a number of suitable ports under consideration by the Developer on the island of Ireland, in Great Britain and in France. A multi-port approach may be taken to remove the risk of a single point of failure to the proposed development. An Irish port is the preference, to support the development of the offshore industry in Ireland. However, this will depend on the rate of the required development being undertaken, to enable the relevant ports to cater for the construction and maintenance of offshore wind farms. All feasible locations will be considered when making the final decision.

6.2 Onshore Construction

6.2.1 Construction programme and sequencing

Subject to obtaining planning permission and the relevant permits and licences, construction of the onshore infrastructure of the proposed development is expected to commence in 2026/27, with completion expected in 2028/29 (circa 24 months of construction). Mitigation measures to minimise the impact of the construction phase of the proposed development on the environment are set out in an Onshore Construction Environmental Management Plan, which is included as part of the EIAR in Volume 8, Appendix 9.1.

Construction of the proposed development will require temporary landtake to accommodate construction activities in addition to the permanent land take required to accommodate the onshore infrastructure of the proposed development. Land will be temporarily required to accommodate on-site activities such as contractor compounds, associated access tracks, off-road sections of the onshore cable route for HDD and local construction working areas.

6.2.2 Landfall site

The works at the landfall site will comprise:

- Horizontal directional drilling (HDD) of the offshore export cables from the high-water mark (transition between offshore and onshore) to the location of the landfall transition joint bays (TJBs), including HDD contractor compounds and associated works;
- Construction of the landfall TJBs and the jointing of the offshore and onshore export cables; and ancillary infrastructure such as an access track, entrance and marker posts; and
- Laying the onshore export cables via open cut trench from the location of the TJBs to the grid facility, including an HDD crossing of the Dublin-Belfast railway line, construction of joint bays, HDD contractor compounds and associated works.

The overall construction duration for the landfall HDD will be 10 months, with the overall construction of the railway HDD being c. two to three months. These two activities may take place consecutively or may overlap, with the overall construction duration anticipated to be approximately 12-13 months.

The HDD works for both the offshore export cables and the crossing of the Dublin-Belfast railway line will generally continue 24 hours a day. Drilling of both bores may be carried out simultaneously to accelerate the works programme.

6.2.3 Grid Facility

It is expected that construction and commissioning works at the grid facility site will take approximately 24 months with certain activities taking place in parallel.

6.2.4 Onshore Cable route

It is expected that construction works along the onshore cable route will take approximately 24 months, with some activities, at different locations, taking place in parallel. However, for most of the cable route, the duration of works would be much less than 24 months. Installation of the onshore cable will be undertaken on a rolling basis. Where no obstacles or constraints exist within or near the onshore cable route, it is expected that progress rates for the trench excavation and installation of ducts will be up to:

- 80m/day in farmland and on road sections with full road closure;
- 60m/day on roads with single lane closure; and
- 30m/day on roads maintaining two-way traffic.

These progress rates may reduce where obstructions and underground utility services are encountered. In particularly congested areas (i.e. significant utilities presence or where any utilities may need to be re-located), the progress rates will likely be reduced, but progress rates in these areas have been considered in the overall construction programme.

Connection to the Belcamp substation is expected to take a total of two months and is planned to be carried out near the end of the cable laying/pulling programme.

6.2.5 Working Hours

The normal construction working hours for the onshore infrastructure of the proposed development works will be 7am to 7pm: Monday to Saturday. All construction works will be carried out during normal working hours with the following specific exceptions:

- HDD works at the landfall HDD contractor compound and the railway HDD contractor compound, both of which will require 24-hour working; and
- HDD works at a number of watercourse crossings, which may require 24-hour working.

Residents and school communities will be notified of any activities involving 24-hour a day working nearby.

It may be necessary, due, for example, to weather constraints, specialist subcontractor availability or the nature of the activity, to undertake certain activities, other than HDD works, outside of the normal construction working hours. Any other construction outside of the normal construction working hours will be agreed in advance with Fingal County Council and Dublin City Council. The scheduling of such works will have regard to nearby sensitive receptors, who will be notified in advance.

7. Marine Geology, Oceanography and Physical Processes

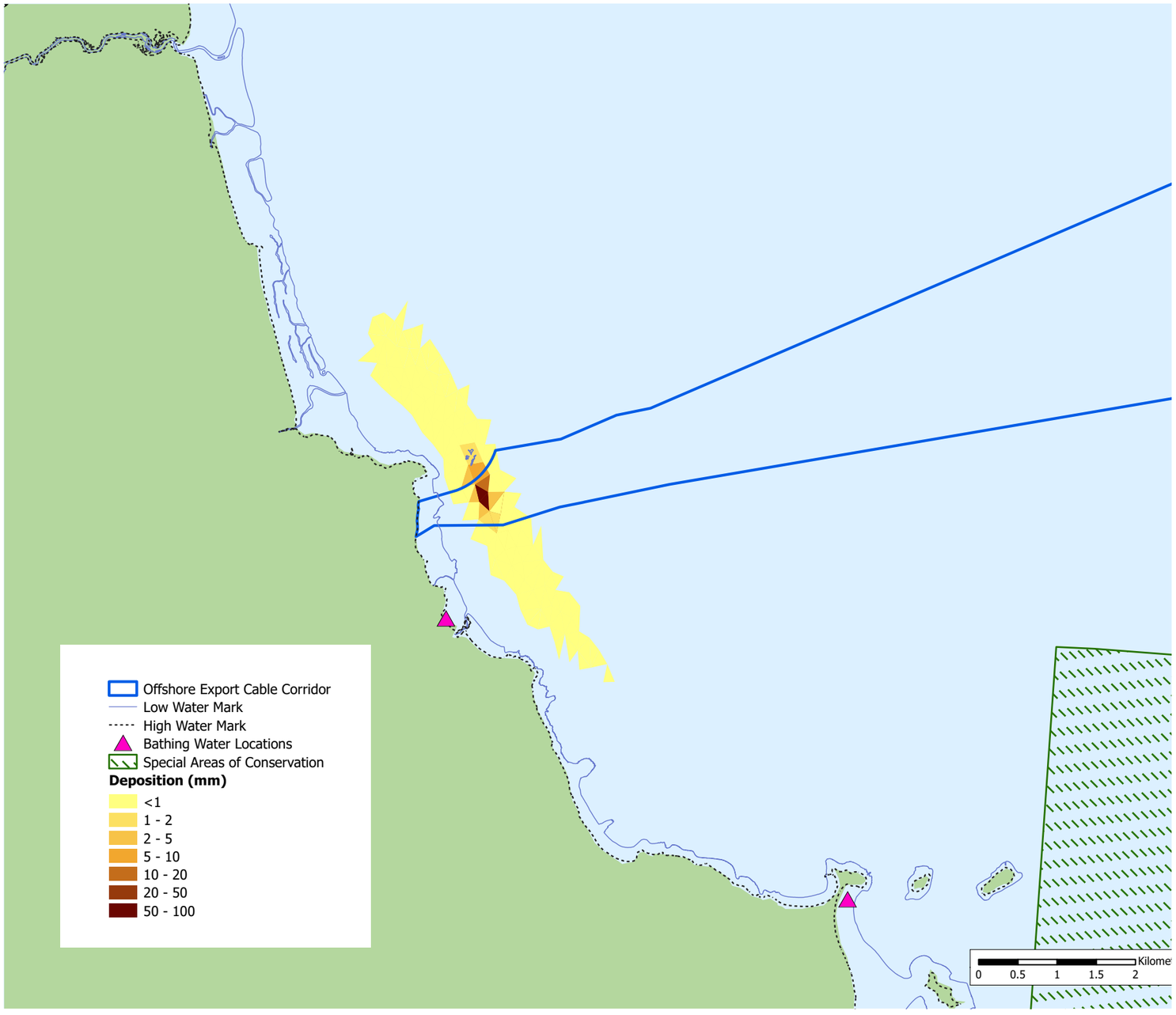
An assessment of likely significant effects from the proposed development in relation to Marine Geology, Oceanography and Physical Processes has been undertaken for the construction, operation, and decommissioning phases. This topic considers offshore marine processes, and nearshore and coastal processes, for simplicity the term “marine processes” is used in the assessment and is inclusive of issues relating to marine geology, oceanography and physical processes (i.e. waves, tides and seabed sediments) at either location.

An understanding of the existing marine processes baseline has been developed using a combination of publicly available data as well as supplementary metocean (i.e. wind, wave, tides, current and climate characteristics) and geophysical surveys data collected within the study area of the proposed development.

The extent of the marine processes area of impact is seaward of the high-water mark. The study area encompasses the zone of influence (ZoI), which in this case is 12km, with no measurable effects expected beyond this point. This represents the average distance travelled by the tidal flow on a mean spring tide (when the high tides are highest, and low tides are lowest). The assessment of potential effects on marine processes has been made with specific reference to relevant legislation and guidance.

The array area where the turbines will be located and the subtidal areas of the export cable corridor, can be considered as a region of net deposition of fine sediments (fine sands, silts, and muds) which is mostly unaffected by the influence of waves or tides and has generally low concentrations of suspended sediment. Tidal current speeds are powerful enough to move fine sands and silts. Sea surface suspended sediment concentrations within the study area are relatively low, meaning there is a low concentration of sediment within the water column. The location with the highest sea surface suspended sediment concentrations is Dundalk Bay and the lowest levels are during the summer months.

Figure 6 HDD Exit Pits Sediment Deposition



There are no sandbank features within the study area and local environmental conditions across the offshore development area are considered unfavourable for the formation of sandbanks(i.e. sand that is formed into a series of dunes or ridges on the seabed by the action of waves or tidal currents) since the local sediments are too fine and the tidal conditions too weak.

There are two types of impact that the proposed development may have on the marine processes and they can be categorised as either:

Seabed disturbance - mechanical activities (such as clearance of debris, boulders etc. from the seabed, seabed levelling for foundations or cable laying .and seabed excavation during construction or partial removal of buried structures during decommissioning) which could impact marine processes receptors directly or indirectly directly or which could lead to short-term increases in turbidity in the form of sediment plumes; or

Blockage - medium to long-term impacts developing from a layout of fixed foundation structures during the operational phase, which can modify wave energy transmission or develop flow wakes which potentially increase local turbulence and mixing. This could impact marine receptors along coastlines.

The impact assessment relied on the results of quantitative modelling of the proposed development in relation to marine processes,

Potential receptors which would be sensitive to impacts on marine processes include:

- Adjacent coastline, including beaches, cliffs and headlines;
- Estuaries;
- Nearshore islands;
- Seabed, including designated features (e.g. habitats listed in Annex 1of the Habitats Directive - reefs within the Rockabill to Dalkey Island Special Area of Conservation etc.), adjacent licensed dumping at sea spoil sites; and
- Marine water body, including stratification and fronts.

The type of potential impact that the proposed development may have on marine processes receptors:

- Physical changes from seabed clearance activities and seabed levelling;
- Physical changes from increased suspended sediment from foundation and cable installation activities;
- Nearshore changes due to Horizontal Directional Drilling activities; and
- Physical changes to marine processes including wave and tidal processes due to the presence of infrastructure during the operational phase.

The use of Horizontal Directional Drilling at the landfall ensures that there will be no direct impacts to the adjacent coastline. Indirect impacts from increased suspended sediments will be short term and reversible, and largely within the subtidal environment. Figure 6 shows the modelling results of sediment deposited as a result of the horizontal direction drilling exit pit, indicating that sediment is deposited in the subtidal and avoids the intertidal environment. Changes to physical processes in the subtidal environment due to the presence of infrastructure in the array area and export cable corridor during the operational phase will be highly localised to the areas surrounding the infrastructure.

The impact assessment concluded the significance of all potential effects to be at most slight which is not significant in EIA terms. As such, no additional mitigation measures are considered necessary and residual effects remain as not significant in EIA terms. Potential transboundary effects occur only from the north of the array area into UK waters during spring tides. Otherwise the rest of the array area, export cable corridor and during the rest of the tidal cycle will not reach to this extent. The assessment concluded that likely significant transboundary effects will not arise.

The cumulative assessment identified other projects where there was a potential pathway of impact. However due to the direction of tides, there will not be an impact. Therefore, the assessment concluded that likely significant cumulative effects will not arise.

Note: This is a cropped image of **VP13 Photomontage (Project Option 1).** Full verifiable images provided in Volume 7B1 of the EIAR.

8. Marine Water and Sediment Quality

An assessment of likely significant effects from the proposed development in relation to Marine Water and Sediment Quality has been undertaken for the construction, operation, and decommissioning phases.

An understanding of the existing marine water and sediment quality baseline has been developed using a combination of a desk-based review as well as benthic (i.e. the community of organisms that live in, on or near the seabed), geophysical and metocean surveys data collected within the study area of the proposed development.

The extent of the marine water and sediment quality area of impact is seaward of the high-water mark. The study area for marine water and sediment quality is determined by the zone of influence of the proposed development which is 12km around the offshore development area. This represents the average distance travelled by the tidal flow on a mean spring tide (when the high tides are highest, and low tides are lowest). Beyond the zone of influence, no measurable effects are expected. The assessment of potential effects on marine water and sediment quality has been made with specific reference to relevant legislation and guidance.

The main characteristics of the baseline environment include coarser sediments in the seabed nearer to landfall and finer sediments further offshore towards the array area. A wide range of sediment types from muds to coarse sediments are present within the array area. The offshore export cable corridor is characterised mainly by sand, with small portions of silt and gravel. The intertidal area is characterised by a mix of boulders and rocky outcrops, with shingle and sand at the top of the shore. Baseline sediment contamination levels (metals, hydrocarbons and organic pollutants) have also been examined. In general, there are low contaminant concentrations within the sediments sampled in the study area with the exception of four samples where exceedances above lower action levels were reported.

These results have been taken into account as part of the impact assessment stage.

Potential receptors which would be sensitive to marine water and sediment quality impacts are:

- Bathing Waters (eight): dependent on bacterial counts;
- Shellfish Water Protected Areas (two);
- Water Framework Directive WFD water bodies (six coastal and two transitional): these are internationally designated sites under the Water Framework Directive; and
- Non-designated waters.

The type of potential impact that the proposed development may have on marine water and sediment quality can be categorised as either:

- Seabed disturbance – mechanical activities (such as seabed clearance, seabed levelling and seabed excavation during construction, repair/replacement of cables at operation stage or partial removal of buried structures during decommissioning) which lead to short-term increases in turbidity in the form of sediment plumes; or
- Accidental releases – accidental short-term spill/ releases of materials or chemicals into the marine environment which lead to contamination.

All impacts have been judged in terms of their likely significant effect to the above receptors.

For construction, deterioration in water quality due to suspended sediment concentrations by drilling or sediment resuspension, spills of chemicals or materials and sediment bound contaminants were all assessed as not significant for any receptors.

For the operational phase, deterioration in water quality due to sediment suspension and accidental releases or spills of materials or chemicals were both assessed as not significant for any receptors.

For decommissioning, deterioration in water quality due to sediment suspension, and accidental releases or spills of materials or chemicals were both assessed as not significant for any receptors.

Mitigation measures to minimise the risk of an adverse impact on water quality have been incorporated into the design of the proposed development and will be implemented during the construction, operation and decommissioning phases. Some additional mitigation measures have been identified to further reduce likely significant effects which include the production of an Offshore Environmental Management Plan and a Cable Burial Risk Assessment. With the incorporation of these mitigation measures, the residual effects remain as not significant in EIA terms.

No transboundary effects have been identified. This is because the predicted changes to the key physical process pathways (i.e. tides, waves, and sediment transport) are not anticipated to be sufficient to influence identified receptors at this distance from the proposed development, with the Ireland-UK border being located 13.6km north and 36.5km east of the offshore development area.

The assessment concluded that likely significant cumulative effects will not arise as a result of the proposed development in combination with all other projects screened into the assessment. Due to the distance of the other projects from the proposed development, any increases in suspended sediment are expected to be within natural variations present across the study area and any contaminants disturbed are expected to rapidly disperse from the point of release with high dilution levels achieved.

9. Benthic Subtidal and Intertidal Ecology

An assessment of likely significant effects from the proposed development in relation to benthic subtidal and intertidal ecology (i.e. the community of organisms that live in, on or near the seabed) has been undertaken for the construction, operation, and decommissioning phases.

The extent of the benthic subtidal and intertidal ecology area of impact is seaward of the high-water mark. The study area is determined by the zone of influence of the proposed development which is 12km around the offshore development area. The assessment of likely significant effects on benthic subtidal and intertidal ecology has been made with specific reference to relevant legislation and guidance.

An understanding of the existing benthic subtidal and intertidal ecology baseline has been developed using a combination of a desk-based review as well as site-specific benthic surveys undertaken within the offshore development area. Figure 7 shows the sampling locations from the site-specific benthic survey.

The array area is generally homogenous and dominated by soft sediments including muddy sand and sandy mud. The communities within the array area were characteristic of relatively fine sediments dominated by annelids (marine worms), while sites to the south of the array area (where sediments were coarser) were dominated by molluscs (such as marine snails) and echinoderms (such as starfish and sea urchins).

The offshore export cable corridor is also a homogenous seabed characterised predominantly by sand with small but increasing proportions of silt and gravel evident further offshore. The communities present across the offshore export cable corridor include molluscs and polychaetes, while further inshore echinoderms and molluscs dominated. At nearshore sites, molluscs and polychaetes were the dominant groups.

The intertidal element of the study area consists of sandy substrate, rocky outcrops, with areas of boulders and shingle also identified. The community identified was dominated by bivalves (e.g. mussels) and polychaetes.

No species or habitats listed in Annex I of the Habitats Directive were identified during the surveys and no Special Areas of Conservation overlap with the offshore development area. The biotope “Seapens and burrowing megafauna in Atlantic circalittoral fine mud" (Code MC6216), which is listed under the Convention for the Protection of the Marine Environment of the North-East Atlantic list of threatened and/or declining species and habitats was identified outside of the proposed development boundary.

The type of potential impact that the proposed development may have on benthic and intertidal ecology includes:

- Increased suspended sediment concentrations which may lead to smothering of the benthic ecology;
- Release of contaminants affecting the water and sediment quality;
- Introduction of Marine Invasive Non Native Species;
- Physical disturbance to the seabed; and
- Temporary and permanent habitat loss.

Direct impacts to benthic subtidal receptors are highly localised, within the footprint of offshore development area. As no designated sites with benthic ecology features or Annex I habitats directly overlap with the array area or export cable corridor there will be no direct impact on any designated sites. The use of Horizontal Directional Drilling at the landfall ensures that there are no direct impacts to intertidal habitats.

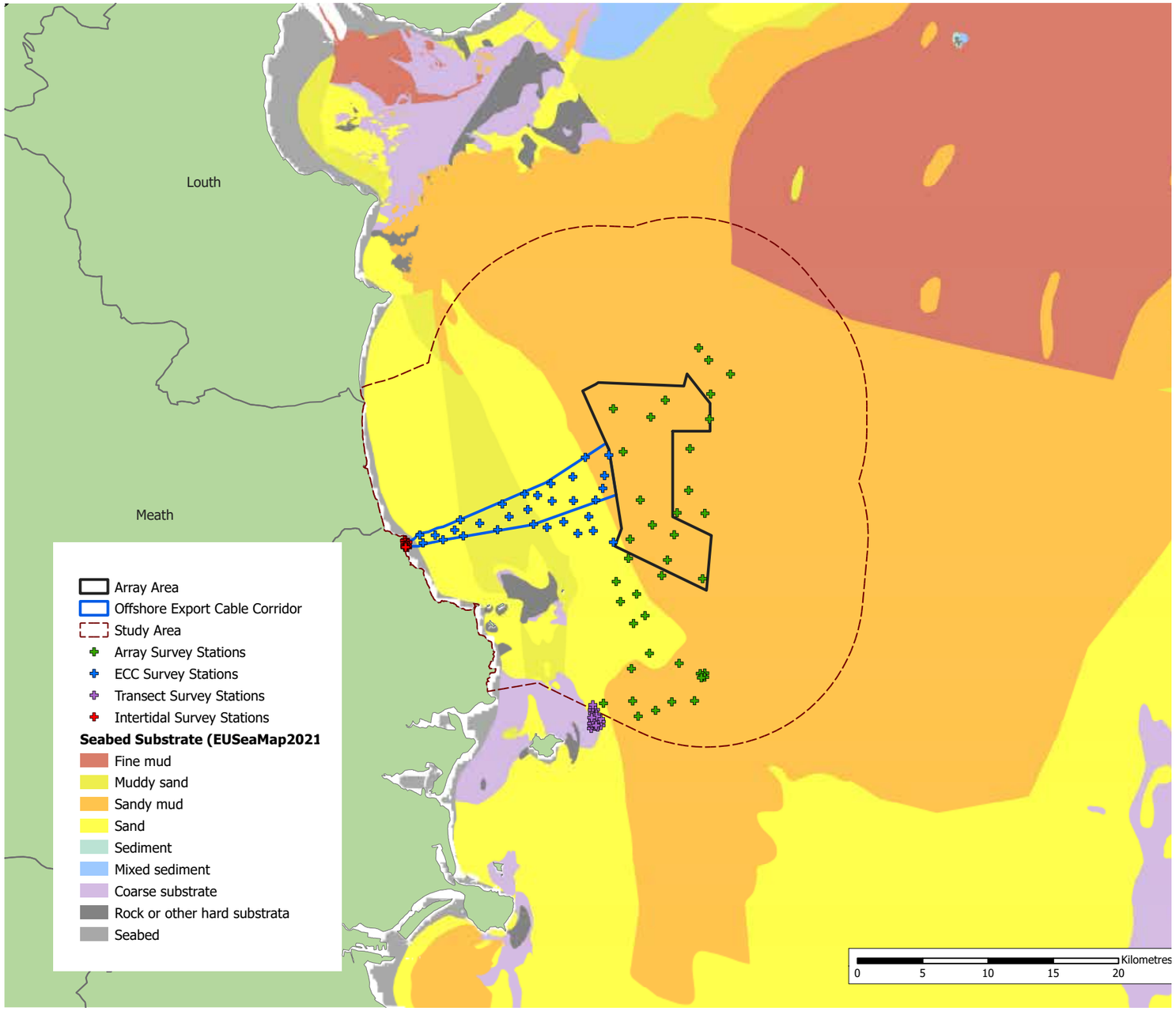
Indirect impacts are contained within the 12km zone of influence and are temporary and reversible, with any increased suspended sediment being rapidly dispersed into the water column or settling on the seabed and any disturbed contaminants rapidly diluted in the water column.

The impact assessment deemed the significance of the impacts to be, at most, slight which is not significant in EIA terms. As such no additional mitigation measures are considered necessary and residual effects remain as not significant in EIA terms.

No transboundary effects have been identified as the key physical process pathways (i.e. tides, waves, and sediment transport) are not anticipated to be sufficient to influence identified benthic receptors at this distance from the proposed development, with the Ireland-UK border being located 13.6km north and 36.5km east of the offshore development area.

The cumulative assessment identified proposed projects that had a potential pathway for cumulative impact however due to the direction of tides and the distance, there is no pathway for cumulative impacts. Therefore, the assessment concluded that likely significant cumulative effects will not arise.

Figure 7 Site Specific Benthic Subtidal and Intertidal Survey Campaigns



10. Fish and Shellfish Ecology

An assessment of the likely significant effects from the proposed development in relation to fish and shellfish ecology has been undertaken for the construction, operation, and decommissioning phases.

An understanding of the existing fish and shellfish ecology baseline has been developed using a combination of publicly available data as well as supplementary benthic ecology and geophysical surveys data collected within the study area of the proposed development.

The extent of the fish and shellfish ecology area of impact is seaward of the high-water mark. The study area has been established to capture the greatest extent of potential direct and indirect effects on fish and shellfish receptors and consists of the offshore development area and the surrounding zones of influence. The zones of influence have been defined by the following spatial scales:

- A sedimentary zone of influence for impacts related to seabed disturbance events of 12km; and
- An underwater noise zone of influence of 70km.

Within the study area, the most common groundfish include whiting, haddock, common dab, and plaice. Other species include Norway pout, grey gurnard, and common dragonet. Pelagic fish like Atlantic herring and European sprat are also abundant. Among elasmobranch species, small-spotted catshark is the most common.

In the study area, Norway lobsters (also called Dublin Bay prawn) live in burrows, especially in the finer sediments in the north and along the offshore export cable corridor. These lobsters belong to the western Irish Sea population and are found in fine sediments from the north to the south of the Western Irish Sea Mud Belt. The area also supports a productive Nephrops (prawn) fishery. Other shellfish recorded include bivalves, sea snails, and crustaceans like hermit crabs and brown crabs. Surrounding areas have high densities of brown shrimp and green crabs, with decapod crustaceans and molluscs commonly found in the region including whelk, brown shrimp, and brown crab.

In Irish waters, five types of marine turtles have been recorded. However, no turtle species were recorded during the site-specific surveys.

Spawning and nursery areas overlap with the study area for species like Atlantic cod, plaice, and whiting, while others like lemon sole and haddock have less intense activity in the region. Larval data further confirm high intensity spawning for cod, plaice, and whiting in the area. The study area is mostly unsuitable for Sandeel spawning grounds, characterised by sandy sediments, while herring nursery areas overlap with the array area and offshore export cable corridor. Commercially important species like Nephrops and various shellfish are abundant, particularly around the array area. Additionally, diadromous species like Atlantic salmon, sea trout, European eel, and lampreys may pass through the area during migrations to and from freshwater bodies, with some rivers nearby serving as important habitat for their life cycles.

Based on the information provided in the baseline characterisation, various valued ecological receptors within the fish and shellfish study area were assessed. These included species that exhibit spawning, nursery, and migratory behaviour within the area, as well as those of commercial, conservation, and ecological importance. Furthermore, the effects on species that might be particularly sensitive to specific impacts of offshore wind farm development, such as electro-magnetic fields and underwater noise, were considered.

The type of potential impact that the proposed development may have on the fish and shellfish can be categorised as either:

- Damage and loss of habitat and seabed;
- Increased suspended sediment concentrations;
- Release of contaminants effecting the water and sediment quality; and,
- Underwater noise and vibration leading to injury, behavioural differences and death.

The likely significant effects on fish and shellfish ecology for each stage of the proposed development were considered. The environment in the vicinity of the proposed development is naturally dynamic, and as such will exhibit some level of natural variation and change over time whether the proposed development proceeds or not. Consequently, the identification and assessment of likely significant effects was undertaken in the context of natural change, both spatial and temporal. Considering these natural changes and the potential for impacts upon fish species from damage to habitats and increases in sediments during the construction phase as a result of installation activities, it was deemed there were no significant effects identified. There were also no significant effects identified as a result of the creation of underwater noise and vibration from impact piling or unexploded ordinance clearance.

Most of the effects will not be transboundary except for the potential sediment plumes (as a result of the installation activities associated with the foundations), which may reach UK waters. However these plumes are predicted to be imperceptible in UK waters relative to natural background levels. Potential mortality or recoverable injury to fish and shellfish receptors due to underwater noise from impact piling and unexploded ordinance clearance are predicted to be restricted to areas within Irish waters. Therefore, there will be no significant transboundary effects. All the potential impacts assessed, including cumulative, were determined to have no likely significant effects. As such no additional mitigation measures are considered necessary and residual effects remain as not significant in EIA terms.

11. Marine Mammal Ecology

For marine mammal ecology, an assessment of likely significant effects from the proposed development during the construction, operation and decommissioning phases has been undertaken.

The marine mammal study area for the proposed development varies depending on the species. However, for all species, the study area covers the offshore development area and is extended over an appropriate wider area considering the scale of movement and population structure for each species.

A number of designated Special Areas of Conservation sites have been identified that are relevant to the likely significant effects on marine mammals as these sites are designated to ensure protection of marine mammal species.

A desk-based review of local data sources was undertaken alongside a review of the site specific data which was collected via digital aerial survey methods over a 29-month period.

The data available have confirmed the likely presence of harbour porpoise, bottlenose dolphin, common dolphin, minke whale, harbour seal and grey seal in the offshore development area and the wider study area and, therefore, these species were considered within the quantitative impact assessment.

The type of impact that an activity may have on the marine mammal ecology can be categorised as either:

- Disturbance from underwater noise generated by various construction activities or clearance of unexploded ordnance (bombs or mines on the seabed) leading to auditory injury (affecting the hearing) which can result in death;
- Increased likelihood of collision due to increased vessel numbers resulting in injury or death;
- Change in prey availability;
- Increased suspended sediment concentrations resulting in reductions in water quality, reductions in prey species and benthic habitats and the potential for barrier effects which can impact migratory movements; and,
- Reductions in water quality due to release of contaminated sediment.

Potential impacts upon the marine mammal species considered in the assessment include the potential for auditory injury and behavioural disturbance or displacement of the species from the proposed development as a result of underwater noise resulting from construction activities including pile driving activities or the clearance of unexploded ordinance during the construction phase. These behavioural disturbances could occur over large ranges. In addition, disturbance to prey species is also considered as well as disturbance from vessel movements during all phases of the project.

Due to the highly mobile nature of marine mammal species, particularly those considered within this assessment, there is potential for transboundary impacts to occur as the marine mammals may travel to the offshore development area from designated sites located within other states. Therefore, the assessment of transboundary impacts is inherent in the assessment of the impacts on marine mammals.

The cumulative impacts considered are the potential for underwater noise during construction and decommissioning and the potential for disturbance from vessel activity during all phases of the development. All potential impacts, including transboundary and cumulative, were deemed not significant in EIA terms, with the exception of an auditory injury as a result of a high order detonation carried out during unexploded ordnance clearance which was assessed as moderate (significant) for minke whales. This is due to the magnitude of the injury and the increased sensitivity of minke whales compared with other potential receptors. To ensure no significant effects occur, additional mitigation measures have been identified to further reduce potential effects which include the production of an Offshore Environmental Management Plan, a Marine Mammal Mitigation Protocol and an Environmental Vessel Management Plan. With the incorporation of these mitigation measures, the residual effects remain as not significant in EIA terms.

Mitigation measures to minimise the risk of an adverse impact on marine mammals have been incorporated into the design of the proposed development and will be implemented during the construction, operation and decommissioning phases. Additional mitigation measures were identified including use of Marine Mammal Observers, passive acoustic monitoring, acoustic deterrent devices and at-source noise abatement if required. With the application of this mitigation, the residual effect on minke whale is reduced to not significant in EIA terms.

Additionally, the proposed development is committed to participating in the 'East Coast Monitoring Group (ECMG), to discuss and agree potential strategic monitoring initiatives in relation to marine mammals. The need for strategic monitoring, and the level of participation by individual projects, will be determined by the conclusion of the EIAR process, in consultation with statutory and technical stakeholders, and with a focus on validation and evidence gathering.

The ECMG group is made up of the developers of the five east coast Phase One projects, (Oriel Wind Park, NISA Wind Farm, Dublin Array Offshore Wind Farm, Codling Wind Park, and Arklow Bank Phase 2).

12. Offshore Ornithology

An offshore and intertidal ornithology assessment of likely significant effects arising from the proposed development during the construction, operation and decommissioning phases has been completed.

Irish and European legislation and guidelines have been followed when assessing the potential likely significant effects of the proposed development on offshore and intertidal ornithology. A desk based study using various publicly available data and information sources were used to inform an assessment of the potential effects on ornithology. Alongside the desk based review, the Developer has undertaken extensive site-specific data collection, including digital aerial surveys over a 29-month period to characterise the baseline and identify which bird species were present in the array area and export cable corridor, seven offshore vessel surveys undertaken across the array area, six coastal surveys and 24 months of landfall surveys.

The extensive site-specific surveys recorded 26 bird species in the array area.

The type of impact that activities associated with the proposed development may have on offshore and intertidal bird species can be categorised as either:

Collision – birds directly colliding with the turbines or offshore substation platform resulting in injury or death;

Disturbance and displacement – birds avoiding the array area and being displaced due to the physical presence and the activity of the turbines as well as displacement from vessel movements;

Indirect impacts on prey – the proposed development impacting the availability and the location of prey which has a detrimental effect on the bird species affected; and

Impacts due to pollution –potentially causing direct mortality, through ingestion or indirect mortality, through impact on energy exertion.

A number of designated Special Protection Area sites have been identified that are relevant to the likely significant effects on bird species as these sites are designated to ensure protection of bird species under the European Birds and Habitats Directives. Where the designated sites are considered, the assessment summarise the impacts made on the qualifying interests of these sites.

Across 24 months of landfall surveys, 64 bird species were observed, with waders and gulls being the most commonly recorded species groups, and common scoter being the most commonly recorded species.

Six designated sites have been identified which are considered highly relevant to the bird species noted in the assessment:

- North-West Irish Sea candidate Special Protection Area;
- Rockabill Special Protection Area;
- Lambay Island Special Protection Area;
- Ireland's Eye Special Protection Area;
- Skerries Island Special Protection Area; and
- Boyne Estuary Special Protection Area;

The array area and offshore export cable corridor are located within the North-West Irish Sea candidate Special Protection Area, which covers an area of 2,333km2 and is designated for 21 species of seabirds.

All construction phase potential impacts were deemed as not significant in EIA terms. These impacts included disturbance and displacement, indirect impacts due to impacts on prey, and impacts due to pollution.

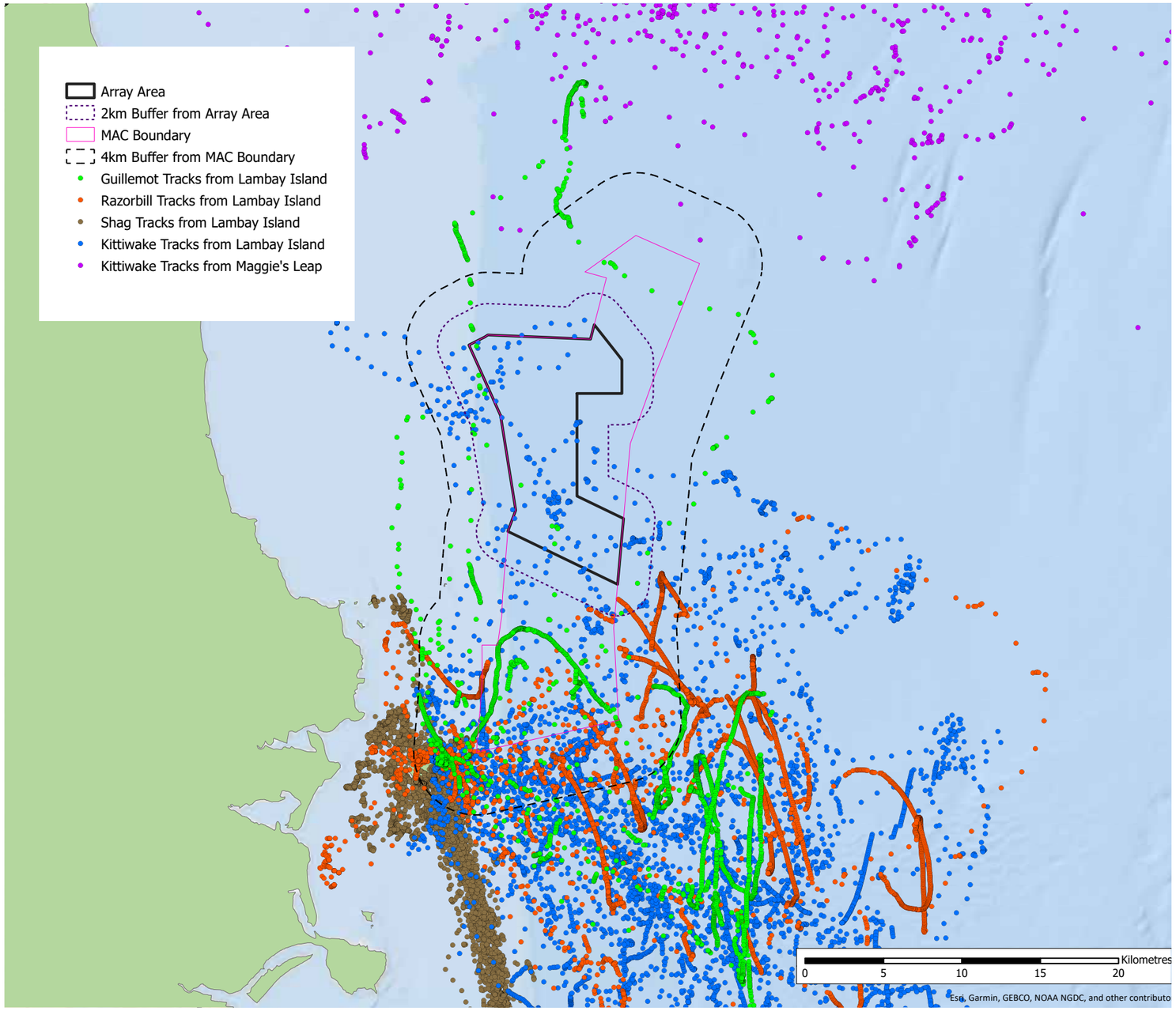
All operational phase impacts were deemed as not significant in EIA terms. These impacts included disturbance and displacement (due to vessel movements); collision risk, combined collision risk and displacement risk migratory collision risk, and indirect impacts due to impacts on prey.

All decommissioning impacts were deemed as not significant in EIA terms. These impacts included disturbance and displacement (array area and export cable corridor), indirect impacts due to impacts on prey, indirect impacts due to impacts on prey, and impacts due to pollution.

There is low risk for the proposed development to have transboundary impacts. Due to the mobile nature of birds the assessment of transboundary impacts is inherent in the assessment of impacts on birds. There were no significant transboundary impacts determined.

The potential for cumulative impacts is species-specific as the impacts are dependent upon the individual sensitivities of each species, where the birds have originated from, and their potential to interact with other wind farms (i.e. on migratory or foraging travel). The cumulative assessment considered that birds may already be habituated to on-going activities within the area and therefore these may be considered to be part of the baseline conditions to avoid double-counting or over-estimation of potential impacts. However, to represent a precautionary approach, operational wind farms were included in the cumulative effects assessment despite the habituation of birds to these impacts. The cumulative assessment also considered wider cumulative impacts with other proposed offshore wind farms including the other East Coast Phase One projects. To understand the cumulative impacts of these East Coast projects on bird species the East Coast Phase One developers collaborated, sharing data and preparing a joint assessment method statement to ensure consistency in approach. The cumulative assessment confirmed that there were no significant cumulative effects noted on any bird species.

Figure 8 Bird Tracking Data sourced from BirdWatch Ireland (BWI)



The Developer, through the project design process on review of the site-specific baseline data, where possible avoided bird high density hot spots that may indicate foraging areas. This is shown in Figure 8 which presents tracking data of some bird species that were recorded during the site specific digital aerial surveys. The extent of the array area was reduced to increase the distance between the array area and Rockabill Special Protection Area, which reduced the connectivity between the proposed turbines and the Special Protection Area.

Through design evolution, the Developer increased the turbine air draft (the gap between the bottom of the turbine blade and the water) which reduces the collision risk to key vulnerable bird species by up to 80%, as this reduces the swept area that is at collision risk height for those birds.

As the impact assessment deemed the significance of all of the impacts to be not significant in EIA terms, no additional mitigation measures are considered necessary and residual effects remain as not significant in EIA terms.

The proposed development is committed to participating in the 'East Coast Monitoring Group' (ECMG), to discuss and agree potential strategic monitoring initiatives in relation to offshore ornithology. The need for strategic monitoring, and the level of participation by individual projects, will be determined by the conclusions of the EIAR process, in consultation with statutory and technical stakeholders, and with a focus on validation and evidence gathering.

Note: This is a cropped image of **VP30 (Project Option 1) Photomontage.** Full verifiable images provided in Volume 7B1 of the EIAR.

13. Commercial Fisheries

An assessment of likely significant effects arising from the proposed development in relation to commercial fisheries has been undertaken for all phases of development (construction, operation and decommissioning).

The study area for the assessment includes the offshore development area and a regional study area. Irish and European legislation and guidelines have been followed when assessing the likely significant effects of the proposed development on commercial fisheries. A number of data sources have informed the assessment including various landing statistics, spatial data and vessel monitoring system data alongside site specific shipping data collected as part of the shipping and navigational assessment baseline.

The assessment relied on the latest available published datasets. These datasets revealed that in the local study area, landings by Irish registered vessels primarily consist of Nephrops (Dublin Bay prawn), sword razorshell, cockle, and whelk.

The type of impact that an activity may have on commercial fisheries can be categorised as either:

Increased vessel activity – vessel traffic can restrict the activity of fishing vessels;

Disturbance, displacement and reduction to access – activities and the physical offshore wind farm structures affecting access to fishing grounds; and

Gear snagging – potential increased chance of gear snagging on marine infrastructure.

During the construction phase, potential impacts to Irish demersal otter trawlers (fishing for species which occur on the seabed) from construction activities leading to reduced access to fishing grounds were assessed to be significant, in EIA terms. Significance of effects for UK demersal otter trawlers and all other fleets were assessed to be not significant in EIA terms.

In relation to displacement from fishing grounds leading to gear conflict and increased fishing pressure on adjacent grounds, Irish demersal otter trawlers and UK demersal otter trawlers are expected to experience significant effects. However, for all other fleets, including those using different fishing methods, no significant effects were determined.

With regard to construction activities leading to disturbance of commercially important fish, Irish demersal otter trawlers significant impacts were determined, whereas for all other fleets not significant effects were determined.

Construction vessel traffic leading to increased interference with fishing activity was not deemed as significant in EIA terms to any receptors.

During the operational phase, the physical presence of the array area infrastructure leading to reduction in access from established fishing grounds was assessed as significant for Irish demersal otter trawlers. For UK demersal otter trawlers and all other fleets no significant effects were determined.

In relation to all other operational impacts including the physical presence of the export cable reducing access to grounds, displacement to adjacent grounds leading to gear conflict, disruption to fish and shellfish resource from maintenance activities, interference with activities due to increased vessel traffic and the potential for gear snagging, no significant effects were identified for any fleet.

The effects of decommissioning activities are expected to be the same or similar to the effects from the construction phase.

The impact assessment considers transboundary receptors, and significant effects were identified in relation to UK demersal otter trawlers, in the absence of mitigation measures. However, with the implementation of the Fisheries Management and Mitigation Strategy, described below, residual effects on UK demersal otter trawlers will not be significant in EIA terms.

A wider study area was used when considering cumulative effects. The cumulative assessment considers potential impacts on commercial fisheries when considering the proposed development in combination existing and approved projects. There is potential for a cumulative reduction in access to or exclusion from established fishing grounds as a result of construction activities associated with the proposed development and other projects. While some projects may cause localised displacement or disruption to the Irish demersal trawls and Irish potting fleets and slight effects for all other fleets, overall cumulative effects on commercial fisheries are deemed to be not significant in EIA terms.

The Developer has prepared a Fisheries Management and Mitigation Strategy to mitigate against the significant effects identified upon specific fisheries. The Fisheries Management and Mitigation Strategy will be implemented during construction, operation and decommissioning. The mitigation measures outlined in the Fisheries Management and Mitigation Strategy involve ongoing fisheries liaison, timely notifications, lighting and marking agreements, buoyed construction areas, and protocols for dropped objects and cable burial. Guard vessels and advisory safe passing distances will be used during construction. Snagging protocols outlined in industry guidance will be followed. These measures aim to minimise impacts on marine users and ensure coexistence with fishing activities. The Fisheries Management and Mitigation Strategy also outlines the approach that will be undertaken by the Developer with the fishing industry in relation to disturbance payments related to the construction phase.

The implementation of these mitigation measures will effectively mitigate any significant effects, ensuring residual effects will not be significant in EIA terms.

14. Shipping and Navigation

For Shipping and Navigation, an assessment of likely significant effects from the proposed development during the construction, operation and decommissioning phases has been undertaken.

Three seasonal shore-based vessel traffic surveys were conducted, consisting of one summer survey (14 days in July 2022) and two winter surveys (14 days in December 2021 and 14 days in December 2023). Publicly available data sources have also been used to inform the assessment.

Drogheda Port is the closest commercial port to the proposed development. Situated on the River Boyne, the entrance to the port, at the mouth of the river, is approximately 9 nautical miles (nm) (1 nautical mile = 1.852km) west of the array area. Drogheda Port caters for regional industry and agriculture and also acts as a relief port for Dublin. Important to shipping and navigation and vessel traffic movements in the region, Dublin Port is situated 20nm south-west of the array area. Dublin Port handles almost 50% of all trade in Ireland. It handles Roll-On/Roll-Off cargo (vehicles which drive on and off the ship), passenger vessels, Lift-On/Lift-Off cargo (containers) and liquid cargo, and is the Irish terminus for vehicle and passenger ferries. Figure 9 shows key navigational features surrounding the offshore development area, including Drogheda Port.

A total of 251 incidents were responded to by the Royal National Lifeboat Institution within the study area between 2012 and 2021, corresponding to an average of 24 incidents per year, noting approximately 82% occurred within 2nm of the Irish east coast, including a large proportion clustered near Skerries Harbour. It is noted that no incidents occurred within the array area and six incidents occurred within the export cable corridor.

The type of impact that an activity may have on shipping and navigation can be categorised as either:

Collision and displacement risk – the possibility of vessels being displaced or colliding with the proposed development or associated offshore infrastructure or vessels;

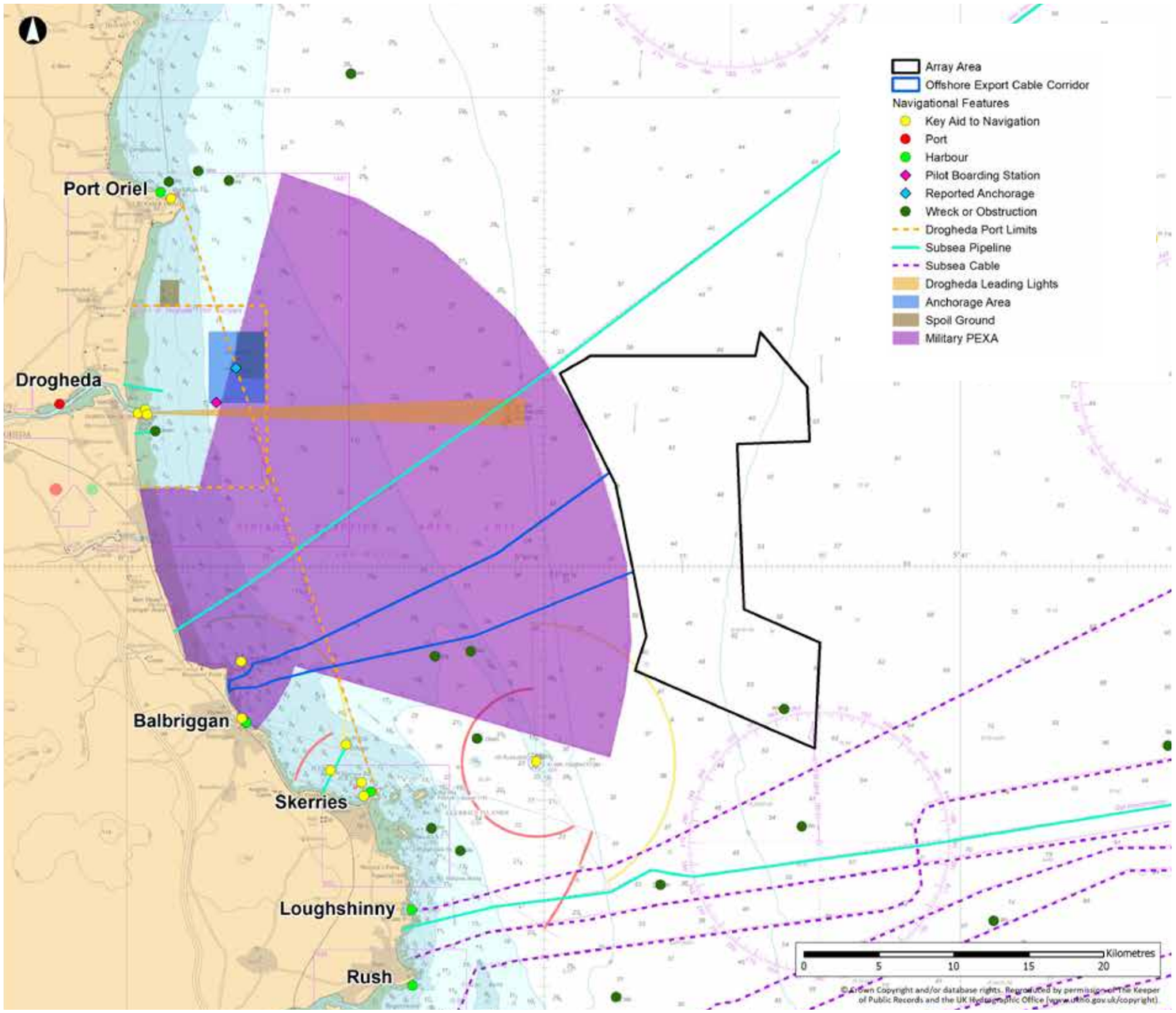
Reduced access to ports – the presence of the proposed development and associated vessels may reduce access to local ports .

Embedded mitigation measures that are considered good practice for offshore wind developments include notifications of construction works and maintenance work through Notifications to Mariners, a buoyed construction area, the use of guard vessels, appropriate lighting and marking of infrastructure, advisory safety zones around infrastructure and advisory safe passing distances around vessels. With the implementation of these embedded mitigation measures, the impact assessment considered that all potential impacts will not be significant in EIA terms. No additional mitigation measures are considered necessary and residual effects remain as not significant in EIA terms.

Vessel traffic movements are transboundary in nature, including vessel routeing in the Irish Sea. Therefore the transboundary assessment is intrinsic to the assessment of shipping and navigation receptors. Other states feature in the main commercial routes as port destinations including the UK and beyond. There were no significant transboundary effects identified.

The cumulative effects assessment determined all the cumulative effects from shipping and navigation have been deemed not significant in EIA terms.

Figure 9 Key Navigational Features



15. Offshore Archaeology and Cultural Heritage

The archaeology and cultural heritage of the offshore development area and immediate surrounding area has been assessed. A desktop assessment of the proposed development and the study area, which was extended by a 1km buffer from the offshore development area, was undertaken to capture records of known offshore archaeology and cultural heritage while making allowances for marine heritage records which often have imprecise locations.

The baseline understanding of offshore archaeology and cultural heritage was developed through site-specific surveys. Site-specific geophysical surveys included magnetometer, sidescan sonar, sub-bottom profiler, multibeam echosounder, multibeam backscatter and bathymetry surveys. In addition to the site-specific surveys, a desk-based review was undertaken to inform the baseline for offshore archaeology and cultural heritage. Key data sources used include the Wreck Inventory of Ireland Database and the Sites and Monuments Record from National Monuments Service.

The site-specific geophysical data identified three features of palaeogeographical (geographical features from the geological past) interest in the array area. The archaeological assessment identified one shipwreck location within the array area, a total of nine possible wreck or debris locations within the offshore export cable corridor and four wreck locations within the wider study area. Two aircraft losses have been recorded within the study area. Additionally, various other potential archaeological maritime features were noted within the export cable corridor and wider study area.

The baseline assessment determined that there is the possibility of discovering maritime craft spanning from the Mesolithic (Middle Stone Age circa 7000 to 4000BC) to the modern period, including previously unrecorded wreck sites.

The type of impact that an activity may have on offshore archaeology and cultural heritage can be categorised as either:

- Direct physical disturbance to known and potential offshore archaeology and cultural heritage receptors; and:
- In-direct disturbance to unknown and potential offshore archaeology and cultural heritage receptors caused by the hydrodynamic (waves and tidal currents) and sedimentary regime changes due to the proposed development.

The impact assessment determined there is potential for significant effects on offshore archaeology and cultural heritage. These are in relation to direct physical disturbance of known and potential archaeological receptors during construction and operational phases.

Mitigation measures for the proposed development include conducting archaeological reviews of geophysical and geotechnical datasets to identify potential sites, establishing archaeological exclusion zones to protect high-value archaeological assets, and implementing protocols for archaeological discoveries to manage unexpected discoveries. These measures will be applied during construction, operation, and decommissioning phases to minimise direct and indirect disturbances to archaeological receptors. Archaeological exclusion zones and protocols for archaeological discoveries systems will be consistently employed across all phases, effectively safeguarding archaeological heritage throughout the project lifecycle.

With regards to residual effects, the mitigation measures outlined above will reduce the magnitude of potential impacts. Construction-related direct physical disturbances to archaeological receptors will be reduced from significant to not significant. Similarly, during the operational phase, direct physical disturbances will be reduced from significant to not significant after the implementation of archaeological exclusion zones and the use of protocols for archaeological discoveries. Overall adoption of mitigation strategies will effectively lower any residual effects on offshore archaeology and cultural heritage to not significant in EIA terms.

There will be no direct effects on offshore archaeology and cultural heritage receptors beyond the offshore development area which is entirely within Irish waters. The indirect effects identified above have all been evaluated as having effects which are not significant in EIA terms. Therefore, there will be no transboundary effects on offshore archaeology and cultural heritage.

The cumulative assessment screening process eliminated all other projects from the cumulative effects assessment as there was an absence of an impact pathway from projects included in the longlist to effect offshore archaeology and cultural heritage receptors. Therefore, there is no potential for cumulative effects on marine cultural heritage receptors as a result of the proposed development.

16. Aviation and Radar

An assessment of likely significant effects from the proposed development has been completed in relation to Aviation and Radar during the construction, operation and decommissioning phases.

In considering the spatial coverage of the aviation and radar study area, the overriding factor is the potential for turbines within the array area to have an impact on civil and military aviation and radars, taking into account the required radar operational ranges. The study area focusses on the turbines rather than any of the other infrastructure e.g. s cables as these would not have an impact on aviation and radar receptors.

Baseline data was collected through a desktop review to understand the existing radars (both military and civil) in the vicinity of the array area. Military training and danger zones were also identified and considered. The operational range considered for the study area includes the primary surveillance radar installed on civil and military airfields which have a range of between 40nm (approximately 74km) and 60nm (111km). All radar equipped airfields within 60nm (111km) of the array area are therefore included in the assessment. The aviation and radar study area also covers designated airspace in the immediate vicinity of the offshore development area, including airspace associated with Dublin Airport and military Danger Areas.

Ireland is within a region of airspace known as the Shannon Flight Information Region. The Shannon Flight Information Region airspace is regulated by the Irish Aviation Authority and AirNav Ireland is responsible for providing Air Traffic Control services within it. The offshore development area is within the Shannon Flight Information Region.

Dublin Airport is the nearest licensed aerodrome and lies 31.6km south-west of the array area. It is a busy international airport with parallel east-west runways and a third runway oriented north-south. The proposed offshore development area is below the Dublin Control Area (a defined area of controlled airspace around Dublin Airport with varying lower limits but a common upper limit of Flight Level 245, approximately 24,500ft above mean sea level (amsl) (approximately 7,468m). Below the Dublin Control Area and in the immediate vicinity of Dublin Airport is the Dublin Control Zone.

Special use airspace is airspace designated for specific activities such that limitations on airspace access may be imposed on other non-participatory aircraft. Special use airspace in the form of the Gormanston Danger Area EID1 lies to the immediate west of the array area,. This airspace extends vertically from the surface up to 40,000ft amsl (12,192m) and is used by the Irish Air Corps as a firing range at times and dates notified by the Department of Defence. In relation to radar, the Shannon Flight Information Region has a network of radar facilities at nine sites across Ireland. Primary coverage for the Dublin, Shannon and Cork terminal areas is provided by primary surveillance radar and longer-range secondary surveillance radars provide coverage for enroute airspace.

The closest licensed civil airfields with radar are at Dublin, Isle of Man, Belfast City and Belfast Aldergrove. The closest radar equipped military airfields are at Casement, and Royal Air Force Valley, 95km south-east of the offshore development area in the UK.

There are currently two weather radars operated by Met Éireann in Ireland, located at Dublin Airport and Shannon Airport. The Dublin weather radar is approximately 30km south-west of the proposed offshore development area. The Shannon weather radar is outside the study area.

The type of impact that an activity may have on the aviation and radar can be categorised as either:

Interference with radar – impacts to civilian and military Primary Surveillance Radars - which could in turn affect the effectiveness of surveillance services due to interference on radar displays;

Creation of an obstacle in the environment - a physical obstruction to aircraft utilising the airspace in the vicinity of the array area or vessels within firing-range activities within Gormanston Danger Area (EID1); and

Increased air traffic – the possible slight increase in air traffic associated with support activities brings with it a potential minor risk of aircraft collision in the airspace around the proposed development.

Despite the presence of military and civil aviation and radar with the potential to be impacted by the proposed development, due to both the height of the turbines and the distances from aviation receptors, the impact assessment concluded that all project level potential impacts upon aviation and radar will not result in significant effects in EIA terms.

The airspace around the offshore development area is used by international civil aviation., Consequently, the consideration of transboundary impacts is integral to the assessment of aviation and radar. No significant transboundary effects from the proposed development have been identified.

There is potential for a cumulative effect where radars detect the rotating blades of turbines from multiple offshore wind developments that are in their operational phase. This could result in a significant increase in interference being generated on radar displays over a larger area. However, the highest cumulative effect rating of moderate effect was noted in the cumulative assessment, which is deemed not significant in EIA terms.

As the impact assessment considers that all potential impacts will not be significant in EIA terms, no additional mitigation measures are considered necessary and residual effects remain as not significant in EIA terms.

17. Infrastructure and Other Users

This topic consists of an assessment of likely significant effects from the proposed development on infrastructure and other users of the marine space that occur seaward of the high-water mark. The assessment covers the construction, operation, and decommissioning phases of the proposed development.

Irish and European legislation and guidelines have been followed when assessing the potential impacts of the proposed development on existing infrastructure and other marine users present within the vicinity of the proposed development. This assessment has not required further site-specific survey work, as receptor information and data for this topic is collected through desk-based study and consultation with relevant stakeholders.

The extent of the infrastructure and other users area of impact is seaward of the high-water mark. The study area is based on the tidal excursion zone and specifically sediment plume pathways and covers the offshore development area plus a 12km buffer. The assessment captured and described all potential infrastructure and users of the coastal and offshore environment that are present in the study area. Exclusions to this included vessel traffic (which is captured within the Shipping and Navigation assessment), use by commercial fisheries (captured in the Commercial Fisheries assessment), use of the airspace above the marine environment (captured in the Aviation and Radar assessment), and beaches and bathing waters (captured by both the Tourism and Recreation and Marine Water and Sediment Quality assessments).

The type of impact that an activity may have on existing infrastructure and/ or other marine users can be categorised as:

Displacement – direct or indirect displacement due to activities and the presence of the physical offshore wind farm; and

Disturbance – from noise increases and decrease in water clarity due to increased suspended sediments in the water column.

Subsurface structures linked with oil and gas production were considered. However, the closest structure is 91km from the offshore development area at the nearest point and the closest manifold and wellhead are 134km from the proposed development at the nearest point. There are no active subsurface oil and gas production structures within the study area.

Non-navigational buoys may be placed to mark an area being used for a non navigational purpose such as to mark fishing gear or metocean equipment. No non-navigational buoys have been identified following a review of known databases, however these buoys are not always licensed and can be transient in nature.

There are a total of seven active cables and gas pipelines that transect the study area but none intersect the offshore development area. Therefore, no likely significant effects are predicted as a result of the proposed development upon cables or gas pipelines.

Recreational activities like recreational sailing, angling and other water sports have been considered in the assessment. In terms of other users there are no aquaculture sites, or wave and tidal projects, carbon capture utilization and storage infrastructure, aggregates, or historic licences recorded. All potential effects will be not significant in EIA terms.

No transboundary effects have been identified. This is because any likely significant effects on infrastructure and other marine users are anticipated to be within 12km of the offshore development area.

The assessment specifically considers whether any of the approved developments in the local or wider area have the potential to alter the significance of effects associated with the proposed development upon existing infrastructure or other marine. No cumulative effects were noted.

The impact assessment has concluded that all potential effects will be not significant in EIA terms. As such no additional mitigation measures are considered necessary and residual effects remain as not significant in EIA terms.

18. Offshore Bats

An assessment of likely significant effects from the proposed development during the construction, operation and decommissioning phases has been undertaken in relation to bats found in the marine environment, referred to as offshore bats.

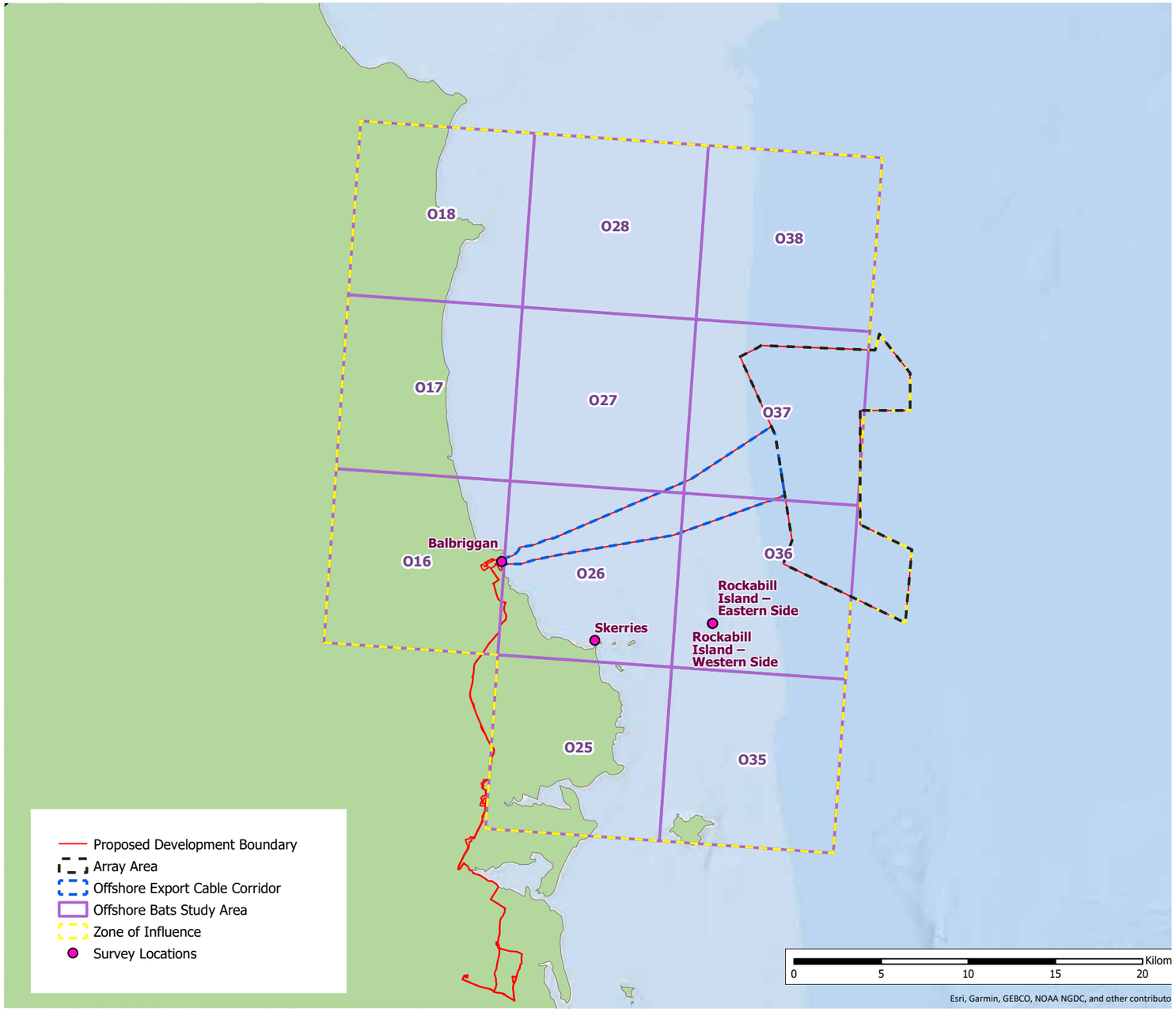
Irish and European legislation and guidelines have been followed when assessing the likely significant effects of the proposed development on offshore bats. Various publicly available information sources including information sources from UK, Europe and America (due to the lack of information on bats in the offshore environment in Ireland) were used to inform the baseline for offshore bats. Baseline data was also collected through site-specific surveys, including:

- A bat detector installed on a survey vessel traveling within the offshore development area;
- Bat detectors installed at coastal locations including at the landfall at Balbriggan and Skerries Harbour; and
- A bat detector on the island of Rockabill.

The location of the static bat detectors (excluding the detector on the vessel) are shown on Figure 10.

There are nine resident species of bat in Ireland and two vagrant species that have been identified as present at least once in Ireland After undertaking the review, it was identified that although several of the species found in Ireland migrate within the country, only two species have been identified as having potential for migrating offshore to neighbouring countries It is not known (at the time of writing) what proportion of the Irish resident bat populations may migrate across the Irish Sea, as the majority of European based literature available on the offshore migration of bats is centred around the North Sea.

Figure 10 Offshore Bats Study Area and Zone of Influence



The type of impact that an offshore activity may have on offshore bats can be categorised as either:

Collision and barotrauma – direct collision and barotrauma (pressure change) which can result in the death of bats; and

Displacement and disturbance – this can occur with bats during migration or bats foraging offshore for prey, due to sound or artificial light at night.

It is assumed that there is the potential for interactions between bat species and the offshore development area due to infrastructure proximity to locations that may have bat populations and that migration across the Irish Sea cannot be ruled out. Studies demonstrate that bats do not avoid offshore turbines and can stay hunting close to the turbines due to the accumulation of flying insects which are attracted to the turbine lighting. In addition, there is the potential for bats to be attracted to offshore turbines. The assessment of likely significant effects determined that the turbines are located too far offshore for coastal foraging bats. However, interactions between potential migratory bats or bats that may be present on Rockabill Island could not be ruled out.

No significant effects in EIA terms have been identified for all activities, with the exception of collision and barotrauma. Likely significant effects to a potential bat roost on Rockabill could not be ruled out, and therefore in line with the precautionary principle, have been assumed could occur.

A robust monitoring program is therefore needed to determine and understand the baseline in more detail. The Developer has committed to further vessel and headland surveys as well as further surveys of the buildings at Rockabill island to determine if a bat roost is present. All of the monitoring data will provide further baseline information on bats and assist in determining if there is an interaction between bats on Rockabill and the offshore development area.

The proposed development is committed to participating in the 'East Coast Monitoring Group' to discuss and agree potential strategic monitoring initiatives in relation to offshore bats. The need for strategic monitoring, and the level of participation by individual projects, will be determined by the conclusions of the environmental impact assessment process, in consultation with statutory and technical stakeholders, and with a focus on validation and evidence gathering.

A screening of transboundary impacts has been carried out and has identified that there is no potential for significant transboundary effects with regard to offshore bats from the proposed development upon the interests of other states. There are several offshore wind projects in the UK and the Isle of Man waters that are operational and in the planning stages. However, due to their positioning north and south of Wales and not to the west (between Wales and the proposed development), there is no predicted impacts from the projects to bats traveling east of the proposed development to Wales (shortest direct route) or vice versa. The distance to the UK offshore wind projects is also beyond the foraging distance for the resident Irish bat species.

There is the potential for other projects, including other offshore wind farm projects to cumulatively interact with bat species alongside the proposed development. The cumulative effects considered are the increased noise levels, vessel activity and infrastructure presence, increased artificial noise, alteration to prey distribution, collision and barotrauma. These potential effects are deemed to be not significant in EIA terms.

19. Land and Soils

An assessment of the likely significant effects of the proposed development on land and soils has been undertaken for the construction, operation, and decommissioning phases. This topic considers onshore (i.e. landward of the high-water mark) land, soil, geology, and hydrogeology (groundwater). For simplicity the term “land and soils” is used in the assessment.

An understanding of the existing land and soils baseline has been developed using a combination of publicly available information, site walkovers, and a project-specific site investigation. A conceptual site model was created based on the baseline environment information. The model was used to identify the baseline environment as a passive geological or hydrogeological environment which exhibits historically stable geological and hydrogeological conditions.

The study area for land and soils extends 2km from the onshore development area (encompassing the landfall site, the onshore cable route, and the grid facility site). The assessment of potential effects on land and soils has been made with specific reference to relevant legislation and guidance.

The site is relatively low-lying and gently undulating and typically falls towards the coastline. Soils are variable across the study area with a predominantly agricultural land use. There are minor deposits of alluvium (soils deposited by flowing water) associated with watercourses with marine sediments along the coast. Made ground, referring to soil altered or placed by human activity, is associated with urban areas and infrastructure within the study area. The underlying subsoil across the study area is predominantly glacial tills (deposited by glaciers) derived from a variety of sources. The subsoils importance ranking ranged from ‘Low’ to ‘Medium’. No significant soil or subsoil contamination was found across the study area. The bedrock geology of the region is predominantly underlain by Lower Carboniferous limestones along with older Silurian sedimentary rocks and Ordovician volcanics.

No Geological Heritage Areas were identified within the onshore development area. There are seven Geological Heritage Areas located within the 2km radius of the proposed development.

The study area is predominantly underlain by locally important (LI) and poor (PI) aquifers. An aquifer is an underground layer of water-bearing rock, fractures in rock, or subsoil that can provide wells with a good flow of water (LI) or a moderate or low flow of water (PI). The LI aquifers have been designated a ‘Medium’ importance ranking whereas the PI aquifers are assigned a ‘Low' importance ranking.

The impact assessment identified construction phase activities which may have a potential impact on the land and soil baseline environment. These activities include earthworks, horizontal directional drilling (HDD), storage or transmission of leachable and/or hazardous materials, excavation of materials above the water table, excavation of materials below the water table, and lowering of groundwater levels by pumping or discharge.

During construction phase, these activities may have an effect of the baseline environment due to:

- Loss or damage of topsoil, loss of rock, loss or damage of proportion of Geological Heritage Areas, loss of future quarry or sand or gravel pit reserves;
- Loss or damage of a proportion of aquifer, damage of the aquifer due to accidental spills, change to groundwater regime, damage to groundwater protection zones, loss or damage of a groundwater dependant habitat; and
- Excavation of potentially contaminated ground, earthworks haulage and effects on surrounding ground.

All impacts have been judged in terms of their potential effect on the baseline environment as detailed above. The significance of these potential impacts during the construction phase, prior to the implementation of mitigation measures range from imperceptible to moderate adverse.

A suite of mitigation measures has been included in an Onshore Construction Environmental Management Plan to reduce the above potential impacts. With the employment of these mitigation measures and standard good construction practices, it is considered that there will be no significant residual effects on land and soils as a result of the construction of the proposed development (i.e. not significant in EIA terms).

The operational phase of the proposed development will have an overall imperceptible long-term effect on land and soils . With the implementation of the proposed design, no additional mitigation measures for land and soils are considered necessary for the operation of the proposed development.

With the successful implementation of the above mitigation measures, there will be no significant residual effects on land and soils as a result of the construction, operation, or decommissioning phases of the proposed development (i.e. not significant in EIA terms).

The assessment has also concluded that no likely significant cumulative effects, arising from the proposed development in combination with other projects, are predicted for Land and Soils. Finally, considering the nature of the proposed development, and the distance to the nearest international boundary, no transboundary effects on land and soils are predicted.

20. Water

An assessment of likely significant effects from the proposed development in relation to water has been undertaken for the construction, operation, and decommissioning phases. This topic considers the impacts of the proposed development on onshore surface water quality and flooding (i.e., landward of the high-water mark), for simplicity the term "water" is used in the assessment. Effects on water due the proposed development are summarised below, including effects identified through the Water Framework Directive (WFD) assessment which has been completed alongside the main water assessment.

An understanding of the existing water baseline has been developed using a combination of publicly available information, site walkovers, and a project-specific water quality monitoring. The assessment of potential effects on water has been made with specific reference to relevant legislation, guidance and WFD catchments. The WFD catchment boundaries as defined by the Draft River Basin Management Plan for Ireland 2022-2027 were used in the assessment.

The study area lies within the Eastern River Basin District regional catchment, and the Nanny-Delvin and Liffey and Dublin Bay Water Framework Directive catchments as illustrated in Figure 11 of this NTS.

Figure 11 Water Assessment Overview

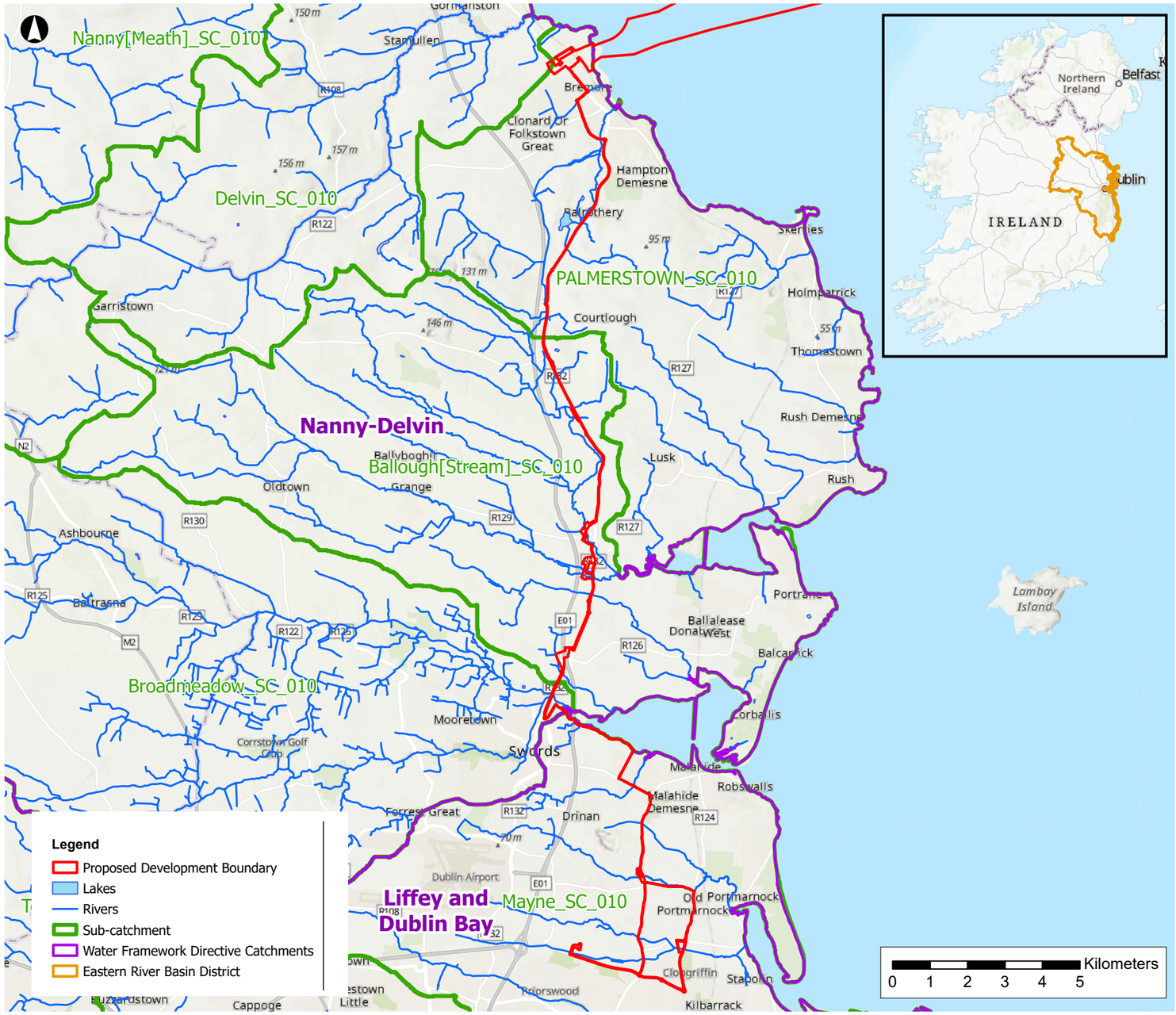


Figure 12 Flood Risk Assessment: Fluvial Flood Extent at landfall and grid facility

The onshore cable route crosses 24 watercourses at 25 locations between the grid facility in Bremore and the grid connection point at Belcamp. In its monitoring under the Water Framework Directive, the Environmental Protection Agency (EPA) has determined that the majority of watercourses along the onshore cable route and at the grid facility have “Poor” to “Moderate” water quality status. Site specific water quality monitoring was conducted at six water crossing locations where EPA data was not available at all or inadequate / obsolete. The key pressures, identified by the EPA, on these waterbodies have also been considered as part of the impact assessment. The watercourses along the cable route are hydrologically connected to a number of proposed Natural Heritage Areas (pNHAs) and Special Areas of Conservation (SACs) including Malahide Estuary pNHA and SAC and Rogerstown Estuary pNHA and SAC. The biological river quality ratings of the watercourses in the study area have generally been classified as moderately to slightly polluted which indicates that the overall water quality is unsatisfactory.

A standalone flood risk assessment has been completed for the onshore development area of the proposed development. There are no watercourses near the landfall and grid facility sites and these two sites are at low risk of river flooding as illustrated in Figure 12 of this NTS. In some areas within the onshore development area boundary along the onshore cable route, the watercourses are predicted to overtop their banks during certain flood events, and flood nearby roads where the onshore cable route is proposed. The landfall and grid facility are at higher elevation than the predicted extreme seawater levels and therefore at low risk of coastal flooding. The majority of the onshore cable route and the onshore infrastructure is located outside coastal and tidal flood risk, in areas with a low Annual Exceedance Probability (AEP) (i.e. less than 0.1% AEP), with the exception of two locations (Malahide Estuary and Mayne Estuary). The landfall site and grid facility are located on higher grounds than the surrounding agricultural land, with low likelihood of overland flows entering from surrounding lands. Surface water runoff on the onshore cable route is not considered to have a likely significant effect, due to the existing road drainage as well as the nature of development (underground cables in ducts). Geological Survey of Ireland Groundwater flooding maps do not show any groundwater flooding in the onshore development area.

The potential impacts that the proposed development may have on baseline surface water quality and the hydrological regime include:

- Potential hydrological impacts include potential for disruption of local drainage systems due to construction works at watercourse crossings, potential risk for flooding during excavations, potential for increased flood risk to upstream receptors during in-stream works, effects on the hydromorphological and hydraulic characteristics of watercourses through modifications to the channel dimensions and change in the natural flow regime.
- Potential water quality impacts relate to silty water runoff, contamination of waterbodies due to substances such as oil spills, grease) and potential release of non-toxic bentonite drilling fluid during Horizontal Directional Drilling (HDD) works.

Given the nature of the proposed development, the potential for impacts on the surface water are for the most part associated with the construction phase. As a result, likely significant impacts during operational and decommissioning stage will not arise. All impacts have been judged in terms of their potential effects on the relevant receptors. The significance of the potential impacts to water during the construction phase, and prior to the implementation of mitigation measures range from imperceptible to significant adverse.

A suite of mitigation measures has been included in the Onshore Construction Environmental Management Plan to reduce the above potential impacts. With the employment of these mitigation measures and standard good construction practices, it is considered that there will be no significant residual effects on water as a result of the construction of the proposed development (i.e. not significant in EIA terms).

The assessment has also concluded that no likely significant cumulative effects, arising from the proposed development in combination with other projects, are predicted for water. Finally, considering the nature of the proposed development, and the distance to the nearest international boundary, no transboundary effects on water are predicted.

Note: This is a cropped image of **VP21 (Project Option 1) Photomontage.** Full verifiable images provided in Volume 7B1 of the EIAR.

21. Biodiversity

Biodiversity encompasses plants, animals, fungi, bacteria, habitats and ecosystems, An assessment of likely significant effects from the proposed development in relation to onshore biodiversity has been undertaken for the construction, operation, and decommissioning phases. This topic considers the impacts of the proposed development on onshore biodiversity (i.e. landward of the high-water mark) in north County Dublin, stretching from the landfall site north of Balbriggan to the grid connection point at Belcamp, Swords.

An understanding of the existing biodiversity has been developed using a combination of publicly available information and site-specific ecological surveys. All site surveys were undertaken in compliance with prevailing good practice guidelines. The impact assessment followed 'Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine' (2018, CIEEM). Surveys included habitat surveys, specialised surveys of the habitats listed in Annex I of the Habitats Directive (referred to below as 'Annex I habitats'), terrestrial mammal surveys, otter surveys, amphibian and reptile surveys, bat surveys, breeding bird surveys, wintering waterbird surveys, and, aquatic and fisheries surveys. Where survey limitations are identified, while not considered to affect the validity or robustness of the impact assessment, a precautionary approach has been taken at an appropriate scale, and mitigation measures included to fully protect protected species and habitats. A large proportion of the onshore cable route will be contained within the public road corridor, these sections have limited ecological value and therefore were typically not surveyed.

The focus of the ecology study area was therefore on the lands which are not in the public road corridor (offline sections) such as at the landfall and grid facility and also where the onshore cable route needs to cross watercourses on lands adjacent to the public road corridor. Due to the nature of the construction activities at these locations, ecological features such as habitats or species have the potential to be impacted by the works. The offline sections in the ecology study area included the landfall site and grid facility, the M1 motorway crossing, the tie-in to the existing substation at Belcamp and onshore cable route crossings of the following watercourses: Aldrumman Stream, Ballough Stream, Deanstown Stream, Ballyboghill Stream, Gaybrook Stream and Sluice Stream.

A number of important ecological features have been identified as having an ecological value assessed as of local importance. These include habitats such as drainage ditches, wet grassland/ marsh, dry calcareous and neutral grassland, dry meadows and grassy verges, hedgerows, treelines, and mixed broadleaved woodland, and fauna such as badger, small mammals (pygmy shrew, hedgehog, Irish hare), otter, smooth newt and common frog, common lizard, foraging/commuting bats, and roosting bats. Important ecological features are identified as having an ecological value regional/county importance. These include habitats such as embryonic dunes, lowland depositing river, and Annex I habitat embryonic shifting dunes and fauna such as breeding birds and aquatic and fish species.

Wintering birds were assessed as having an ecological value of county/national importance. Important ecological features identified as having an ecological value of national importance were national designated sites (NHAs/pNHAs), shingle and gravel banks, sedimentary sea cliffs and corresponding Annex I habitats perennial vegetation of stony banks and vegetated sea cliffs of the Atlantic and Baltic coasts. European designated sites (both Special Protection Areas and Special Area of Conservation) were assessed as having international importance ecological value.

As per the relevant guidelines, potential likely significant effects have been assessed for important ecological features listed above. An impact is considered to be ecologically significant if it is predicted to affect the integrity or conservation status of an important ecological feature at a specified geographical scale.

Construction phase impacts that could result in potentially significant impacts include:

- temporary and permanent habitat loss and fragmentation, degradation of habitats, water quality impacts arising from surface water run-off of sediments and/or pollutants, temporary creation of a barrier to movement at watercourse crossings;
- disturbance and displacement of fauna; loss of nesting/ roosting sites, spread of non-native invasive species, and temporary lighting impacts from construction compounds.

Operational phase impacts that could result in potentially significant impacts include:

- surface water run-off of sediment and/or pollutants at hardstanding locations (i.e., substations), disturbance and displacement of fauna during maintenance works, and lighting impacts at the grid facility.

Decommissioning phase impacts that could result in potentially significant impacts include:

- surface water run-off of sediment and/or pollutants at hardstanding locations (i.e., substations), disturbance and displacement of fauna, loss of nesting/roosting site, temporary lighting impacts, water quality impacts arisin from surface water run-off of sediments and/or accidental pollution spill.

In the absence of mitigation measures, and taking a precautionary approach to the assessment, significant impacts at a local to national geographical scale have been identified. These include potential impacts on habitats, mammals, amphibian and reptiles, bats, breeding birds, wintering birds, and aquatics and fisheries.

Where significant impacts were identified, mitigation measures have been proposed for the construction, operational and decommissioning phases to avoid or reduce identified potential impacts on important ecological features arising from the proposed development.

An extensive suite of mitigation measures has been included in the EIAR (and in particular within the Habitat and Species Management Plan and in the Onshore Construction Environmental Management Plan) to reduce the above potential impacts. This includes the appointment of a suitably qualified ecological clerk of works to ensure all of the ecological mitigation measures are implemented during the construction phase of the onshore infrastructure of the proposed development. Of note, mitigation measures for habitat loss include the planting of hedgerows at the grid facility and at Blakes Cross North, planting of species-rich grassland at the landfall, measures to avoid dispersal of invasive species and an exclusion zone at the landfall site to avoid disturbance of Annex I habitats. Habitat enhancement measures for yellowhammer and meadow pipit are included at the grid facility and at Blakes Cross North. Species specific measures to ensure the protection of species including badger, otter, amphibians, bats, breeding birds, wintering waterbirds, fish and aquatic species are also included.

With the employment of these mitigation measures, it is considered that there will be no significant residual effects on biodiversity at any geographical scale as a result of the construction, operation or decommissioning of the proposed development (i.e. not significant in EIA terms).

The assessment has also concluded that there will be no likely significant cumulative effects arising from the proposed development in combination with other projects. Considering the nature of the proposed development and the distance to the nearest international boundary and the nature of the works occurring landward of the high-water mark, no transboundary effects on biodiversity are predicted.

22. Traffic and Transportation

An assessment of the likely significant effects of the proposed development in relation to Traffic and Transportation has been undertaken for the construction, operation, and decommissioning phases. This topic considers the impacts of the proposed development on traffic and transportation on land for the onshore infrastructure (i.e., landward the high-water mark). Note that all offshore infrastructure components will be delivered to the offshore development area by sea.

The existing baseline has been established through a review of the local transport network using a combination of publicly available information, site walkovers and traffic count surveys. There are a number of different road types within the proposed development boundary, including both regional and local roads.

Given that much of the onshore infrastructure of proposed development will be underground (with the exception of the grid facility) and in the footprint of the public road, most impacts on traffic and transportation will arise during the construction of the onshore infrastructure. Construction traffic will be associated with compound establishment, excavation and import/export of materials along the public road network, deliveries of construction equipment and infrastructure components and construction staff commuting to and from site.

For the landfall site and grid facility, construction is expected to take approximately 24 months, however most of the traffic generation will be related to the earthworks phase which will be of much shorter duration. Along the 33-35km onshore cable route, construction is also expected to take approximately 24 months but works in any one location will be much less than this due to the rolling nature of the construction works (i.e. trench excavation, installation of cables, reinstatement of lands).

Temporary road closures will be required to facilitate the construction of the onshore cable routes. Depending on the local road widths, including any footpaths; and other constraints such as road-side trees, local infrastructure and street furniture, these will either be full or partial (single lane) road closures.

In the case of full road closures, local property access will be maintained for cars, pedestrians, cyclists and service/emergency vehicles through the contractor's implementation of safe traffic management measures. Local diversion routes have been identified to maintain local community accessibility by car and active modes. Strategic diversion routes have also been identified to mitigate the impact on local roads and will be recommended for general 'through' traffic as far as possible. Bus diversion routes and bus stop relocations have been identified to ensure access to bus services is reasonably maintained where feasible. The strategic diversion routes will limit the volume of diverted general 'through' traffic using the bus diversion routes.

There will also be rolling temporary partial (single lane) closures (each approximately 200 – 300m in length) along the remainder of the onshore cable route. For temporary partial road closures, traffic flow will be maintained with the use of rolling temporary stop/go traffic signals along each section. Local diversion routes have been identified that will alleviate congestion along the corridor. Local property access will be maintained for cars, pedestrians, cyclists and service/emergency vehicles throughout. Buses will be prioritised at stop/go locations where possible. Strategic diversion routes will not be required for these partial closure locations.

Extensive mitigation measures will be implemented to minimise the effects of the proposed development on traffic and transportation. These measures and a Construction Traffic Management Plan are detailed in the Onshore Construction Environmental Management Plan which is contained in Appendix 9.1 of Volume 8 of the EIAR. Following consultation with An Garda Síochána, Fingal County Council and Dublin City Council, the Construction Traffic Management Plan will be further developed by the contractor, prior to the commencement of construction, to ensure that construction traffic will be managed and monitored safely and efficiently throughout the construction phase.

Potential significant effects on local and strategic diversion route operations and bus services during road closures have been identified and additional mitigation measures have been incorporated to minimise these effects as follows:

- The duration of full road closures will be limited by assigning multiple construction crews to route sections along the length of the cable route. Multiple crews working simultaneously will add to the efficiency of the construction work. This additional mitigation measure will reduce the duration of full road closures to between 1 and 4 weeks, depending on the route section. Whilst the additional crews will reduce the duration of full road closures, the residual impact on local diversion route operations and strategic diversion route operations will remain negative, significant, and temporary for most locations identified.
- Bus services will be prioritised at stop/go lane closures along partial road closures. However, bus services could potentially still incur significant delays along heavily trafficked routes. The likelihood of bus services incurring delays will be reduced by diverting the bus services onto local diversion routes. The appropriate bus route or local diversion route will be determined the operator. The residual impact on bus services would reduce to negative, moderate and temporary.

With the implementation of the mitigation measures, there will remain a temporary significant residual effect, during the construction phase, on local and strategic diversion route operations, from both the partial and full road closures associated with the proposed development.

It is expected that the operational phase of the proposed development will generate infrequent traffic flows with occasional visits required for inspection, maintenance and emergency repair works, therefore. The proposed development will generate minimal traffic movements and activities and will not result in any likely significant effects during its operation. Decommissioning phase effects will be similar to those assessed in the construction phase but to a lesser extent as the Bremore substation and the onshore cable route from the grid facility to the grid connection point at Belcamp will remain in operation. Therefore, no significant effects are predicted during the decommissioning phase.

The assessment identified the potential for temporary significant cumulative effects arising if the construction phase of the proposed development overlaps with the construction phase of other projects, which also require full road closures, in close proximity to the onshore development area (due to the diversion routes as described above for the proposed development alone).

All equipment and components that must be transported from an overseas suppliers' plants to a port for shipment to the proposed development in Ireland will be transported on the national road network / TEN-T network of that country, which has been designed to accommodate such loads. Given this, and the fact that the likely increase in traffic volumes due to the transport of equipment and components for the proposed development is expected to be low or negligible, the significance of the effect of this construction traffic impact on traffic operations overseas will be negative, slight, and temporary. Therefore, there are no likely significant transboundary effects on Traffic and Transportation.

23. Onshore Archaeological, Architectural and Cultural Heritage

An assessment of the likely significant effects of the proposed development has been undertaken on the archaeological, architectural and cultural heritage assets that occur landward of the high-water mark regardless of whether the impact arises as a result of the onshore or offshore infrastructure of the proposed development. The assessment covers the construction, operation, and decommissioning phases.

A detailed desktop and walkover survey of the onshore development area was carried out as part of the assessment. In addition, a programme of geophysical survey was carried out at the landfall and grid facility sites, followed by targeted test trenching. These works were carried out under licence from the National Monuments Service of the Department of Housing, Local Government and Heritage.

During the geophysical survey and test trenching, seven areas of archaeological potential were identified at the landfall site and four areas of archaeological potential were identified at the grid facility site. A total of 36 Archaeological Heritage sites (AH) are recorded within the onshore study area around the onshore development area. These comprise sites that are listed in the Record of Monuments and Places (RMP), proposed RMP sites and sites that have been subject to archaeological excavation and therefore exist as 'record only'. There are a total of 28 Protected Structures (BH) and groups of Protected Structures (BH) recorded within the study area of the onshore development area. A total of 34 designed landscapes (DL) have been identified within the study area of the onshore development area.

Construction phase impacts that could result in potentially significant impacts include:

- Direct impacts to known archaeological assets through disturbance from construction activities including ground-breaking, excavation and trenching;
- Direct impacts to unknown archaeological assets from construction activities including groundbreaking, excavation and trenching;

Operational phase impacts that could result in potentially significant impacts include:

- Indirect impacts upon the setting of cultural heritage assets through the addition of the proposed development infrastructure into the landscape.

No impacts are predicted upon the archaeological, architectural, and cultural heritage resource as a result of the decommissioning of the onshore development. This is due to the fact that no new excavations (ground disturbances) will be introduced in order to decommission onshore infrastructure.

The scenario with the greatest potential impact would mean that it is possible that all seven areas of archaeological potential at the landfall site will be affected. Alternatively, all or some of the areas, may be preserved in-situ. If direct, negative impacts occur during the construction stage, this has the potential to result in very significant effects at each area of archaeological potential.

It is acknowledged that the preservation in-situ of archaeological remains is the preferred method in which to conserve the archaeological resource. To that end, every effort will be made during detailed design to avoid directly affecting the identified archaeological areas within the landfall site.

Following detailed design at the landfall site, a further programme of archaeological test trenching will be carried out within the refined development footprint with the aim of identifying any smaller archaeological remains that may survive within the onshore development area, which were not identified during geophysical survey or the first phase of archaeological testing.

Construction within the grid facility site will not result in any construction impacts on recorded archaeological or architectural sites as any such sites are located outside of the onshore development area.

The four areas of archaeological potential at the grid facility have been identified comprising an enclosure, twos areas of burnt mound activity and one field system. It is likely that ground disturbances associated with the construction of the proposed grid facility will result in direct, negative impacts on these areas of archaeological potential and this has the potential to result in very significant effects at each area of archaeological potential. A ruined post medieval well has also been identified in the grid facility area, which will be directly and negatively impacted upon, the effect of which is moderate.

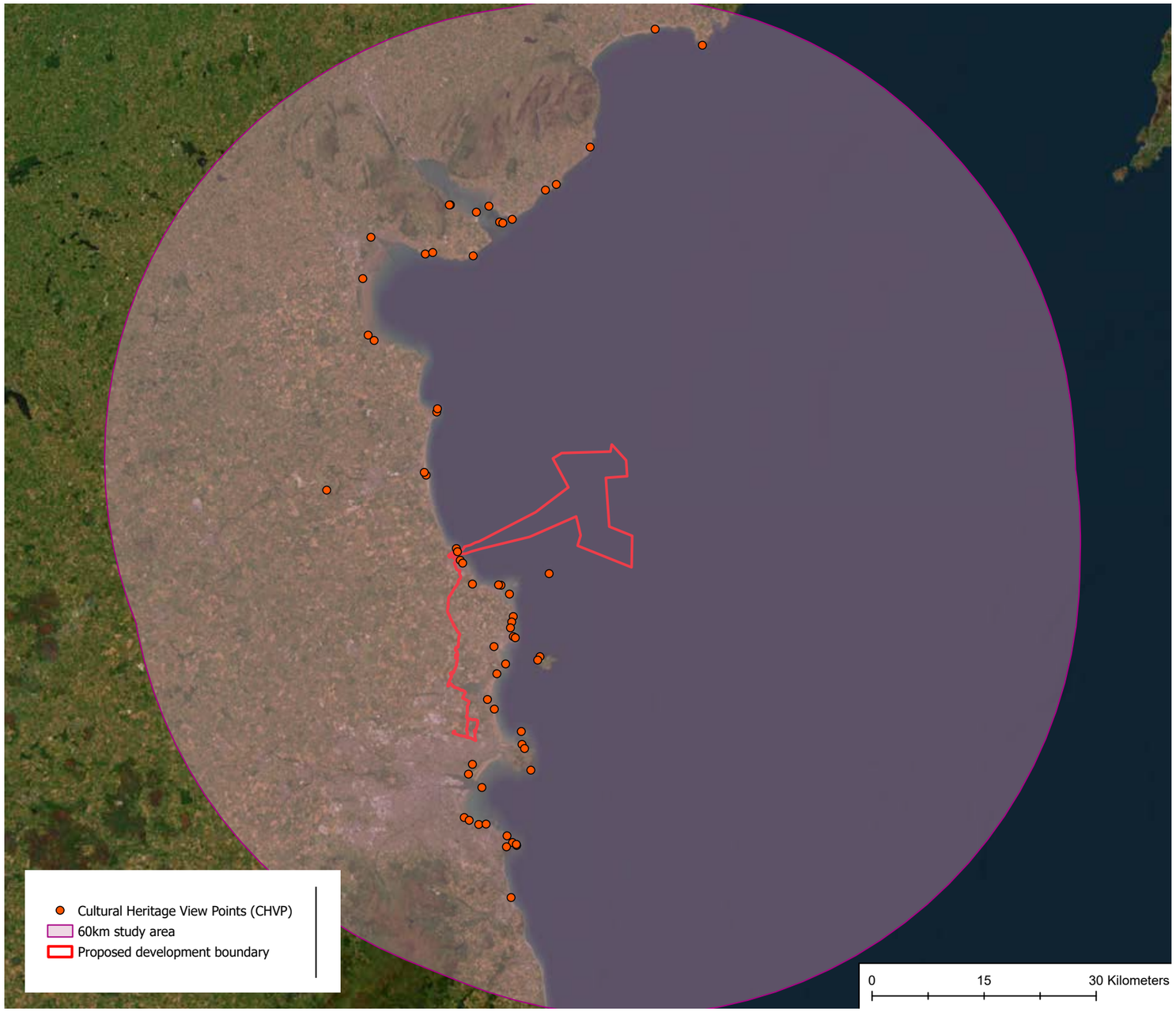
It is acknowledged that the preservation in-situ of archaeological remains is the preferred method in which to conserve the archaeological resource. The location of the grid facility includes the identified areas of archaeological potential but potential impacts on these areas could not be avoided by the footprint of the required infrastructure.

If it is not possible to avoid direct impacts on the areas of archaeological potential, the archaeological remains will be preserved by record prior to the commencement of construction. This will be carried out under licence, issued by the National Monuments Service of the Department of Housing, Local Government and Heritage. Full provision, within the programme of works, will be made for the resolution of any archaeological remains, both on site and during the post excavation process.

Development within the landfall site or grid facility will not result in any impacts (construction and operation) on any architectural heritage sites or any protected structure sites.

In the absence of mitigation measures, the construction of the onshore cable route may have a potential direct, negative impact on a recorded holy well site (very significant effect), albeit the site is located within an existing road embankment. There may also be a potential direct, negative significant effect (in the absence of mitigation measures) on the ecclesiastical enclosure associated with St Doolagh's, where the existing road crosses the possible extent of the enclosure .

Figure 13 Location of CHVP within the 60km study area of the offshore turbines



All ground works at these locations will be subject to archaeological monitoring under licence as issued by the Department of Housing, Local Government and Heritage. If archaeological remains are identified, further mitigation will be required such as preservation by record or in-situ. Impacts on the recorded cross at St Doolagh's will be avoided as the cross will be hoarded off and protected during construction works in order to preserve the feature in-situ.

The construction of the onshore cable route has the potential to directly and negatively impact on four recorded milestones (in the absence of mitigation). Effects have the potential to be very significant. Mitigation will ensure the preservation in-situ of these features as the stones will be hoarded off during construction, thus removing any potential negative effects.

Potential direct very significant impacts are possible in relation to Daws Bridge and a road bridge north of Kinsaley (both listed in the Record of Protected Structures (RPS)) if the onshore cable route directly crosses the bridges instead the alternative option of crossing the watercourses offline of the road. The impact rating assigned is because excavations within the bridge structure may lead to impacts on the structure itself (Bridge at Kinsaley), or carrying out HDD beneath, may affect the foundations (Daws Bridge).

Should the onshore cable route cross these bridges, detailed design will be subject to assessment and supervision of a Grade 1 Conservation Architect. Archaeological monitoring may be required for the works. Any archaeological works will be carried out under licence as issued by the Department of Housing, Local Government and Heritage.

It remains possible that ground works associated with the laying of the onshore cable in greenfield areas that have not been identified as having any obvious archaeological potential, may still have direct, negative and permanent impacts upon unknown archaeological sites that may survive beneath the current ground level. In the absence of mitigation measures, effects may range from moderate to profound negative in significance, based on the nature and extent of any remains that may be present.

Note : This is a cropped image of **VP20 (Project Option 1) Photomontage.** Full verifiable images provided in Volume 7B1 of the EIAR.

All greenfield areas that are required for the construction of the onshore cable route, will be subject to a programme of geophysical survey, followed by a programme of archaeological testing, prior to the commencement of construction in any one area. These programmes of investigation will be carried out under licence from the National Monuments Service. Depending on the results of the assessments in these area, further mitigation may be required, such as preservation in-situ or by record. Any further mitigation will require the agreement of the National Monuments Service.

With the exception of potential impacts at three sites (Holy well, ecclesiastical enclosure and cross at Saint Doolagh's), no recorded monuments will be directly impacted by the construction of the onshore cable route. The route will travel through several Zones of Notification associated with the monuments. Whilst these zones do not define the extent of archaeological remains, they represent an area in proximity to the RMP that requires two months notification to be issued to the National Monuments Service (under Section 12 of the National Monuments Act), if works are proposed within that area. It is possible that features associated with the monuments extend into the roads, where extensive works have not already occurred. Where the onshore cable route passes through the zones associated with Seatown Castle (within areas of archaeological potential at two watercourse crossings) and St Nicholas' Church and graveyard there remains some potential that excavation works may have direct, negative and permanent impacts upon archaeological sites that may survive beneath the current road level. The magnitude of impact may be very high and effects may range from moderate to profound negative in significance, based on the nature and extent of any remains that may be present.

All excavation works within the zones of notification for Seatown Castle and St Nicholas' Church will be subject to archaeological monitoring under licence, as issued by the National Monuments Service.

A draft Cultural Heritage Mitigation Strategy detailing the mitigation measures, which will be implemented, of recording in situ, further surveys and excavations and recording, has been appended in the EIAR. This document will remain a live document and will require updating by the relevant heritage contractors during the project at pre-construction and construction stages.

Following the completion of mitigation measures, the construction and operation of the onshore development will not result in any significant effects upon the archaeological, architectural, and cultural heritage resource (i.e. not significant in EIA terms).

As part of this assessment, the potential impact of the proposed offshore infrastructure (e.g. turbines and the offshore substation platform) on the setting of onshore archaeological, architectural, and cultural heritage assets, was considered. The study area for this exercise is 60km from the array area, as defined by the Zone of Theoretical Visibility mapping, prepared for the Seascape, Landscape and Visual assessment.

In order to provide a meaningful assessment of potential impacts on cultural heritage sites within the defined 60km study area, all recorded and previously unrecorded sites of archaeological, architectural and cultural heritage significance that have a direct relationship with the coast were assessed, along with sites of international heritage value (UNESCO World Heritage Sites). This included the archaeological, architectural and cultural heritage sites in Northern Ireland as the study area extends into County Down. In total, sixty-two cultural heritage sites were identified, and the predicted effects assessed. The location of these sites (referenced as Cultural Heritage View Points CHVP) are illustrated on Figure 13 of this NTS. The significance of effect at nine sites will be neutral. Where indirect negative impacts have been identified, the significance of effect is imperceptible at six sites; not significant at a further nineteen sites; slight at nineteen sites and moderate at nine sites. It is not possible to mitigate these effects due to the visual scale of the turbines and as such the residual impacts will be the same as the predicted impacts laid out this assessment. Ten of the sixty-two sites are located within County Down and the significance of effect at these ten sites are imperceptible or not significant. As a result, no likely significant transboundary effects on onshore archaeology, architectural and cultural heritage are predicted.

No impacts are predicted upon the archaeological, architectural and cultural heritage resource as a result of the decommissioning of the onshore development. This is due to the fact that no new excavations (ground disturbances) will be introduced in order to decommission onshore infrastructure. The decommissioning of the offshore infrastructure will remove indirect negative impacts on the setting of coastal archaeological, architectural and cultural heritage sites.

The assessment also concluded that no likely significant cumulative effects, arising from the proposed development in combination with other projects, are predicted for onshore archaeological, architectural, and cultural heritage.

24. Material Assets

An assessment of likely significant effects from the proposed development has been undertaken on the following material assets that occur landward of the high-water mark:

- Land use (such as severance, loss of Rights of Way or amenities, conflicts, or other changes likely to ultimately alter the character and use of the surroundings) and properties;
- Onshore utilities (such as electricity, telecommunications, gas, water supply, foul and surface water drainage); and
- Bridges.

The assessment of likely significant effects from the proposed development on material assets that occur seaward of the high-water mark have been considered in the infrastructure and other marine users assessment (Section 17 above).

The potential for significant effects on material assets will primarily be during construction phase of the onshore infrastructure and will consist mainly of local re-routing of existing services and utilities, if required, as well as temporary effects on land use and properties.

Construction of the proposed development will require temporary and permanent land take. During construction, a negative, moderate and short-term effect on land-use will arise due to the temporary change of land-use from the original zoning objectives. The footprint of the proposed development, together with all construction works, will be within the proposed development boundary. Therefore, there will not be a direct effect on properties or land use outside the proposed development boundary.

Electricity and a watermain connection (as agreed with Uisce Éireann) will be provided to the grid facility. To facilitate the construction and operation of the grid facility, ESB overhead lines will be re-routed. The construction methodologies for this re-routing have been discussed and will be agreed with ESB during construction and any disruption, including any power outage affecting neighbouring users, will be minimal. Therefore, any disruptions to the electricity supply will be minimal and localised with no anticipated disruption. The supply of electricity and water for the construction is predicted to have a slight, negative and short-term effect on supplies in the local area, which is not significant in EIA terms.

The construction of the onshore cable route will cross or run adjacent to several existing high voltage electricity lines including the East West Interconnector, high pressure gas pipelines, including Interconnector 1 and Interconnector 2, telecommunications services, watermains, surface water drainage systems and foul sewers. The construction methodologies for these crossings have been discussed and will be agreed with the relevant stakeholders during construction and any disruption will be minimal. Therefore, there will be a slight, negative and short-term effect on utilities which is not significant in EIA terms.

The onshore cable route crosses underneath the Dublin – Belfast railway line and the M1 motorway. Both crossings have been discussed in detail with the asset owners and final construction details will be agreed with Irish Rail and Transport Infrastructure Ireland prior to construction. As a result, the proposed development will have a negative, not significant and temporary effect on nationally important road and rail infrastructure which is not significant in EIA terms.

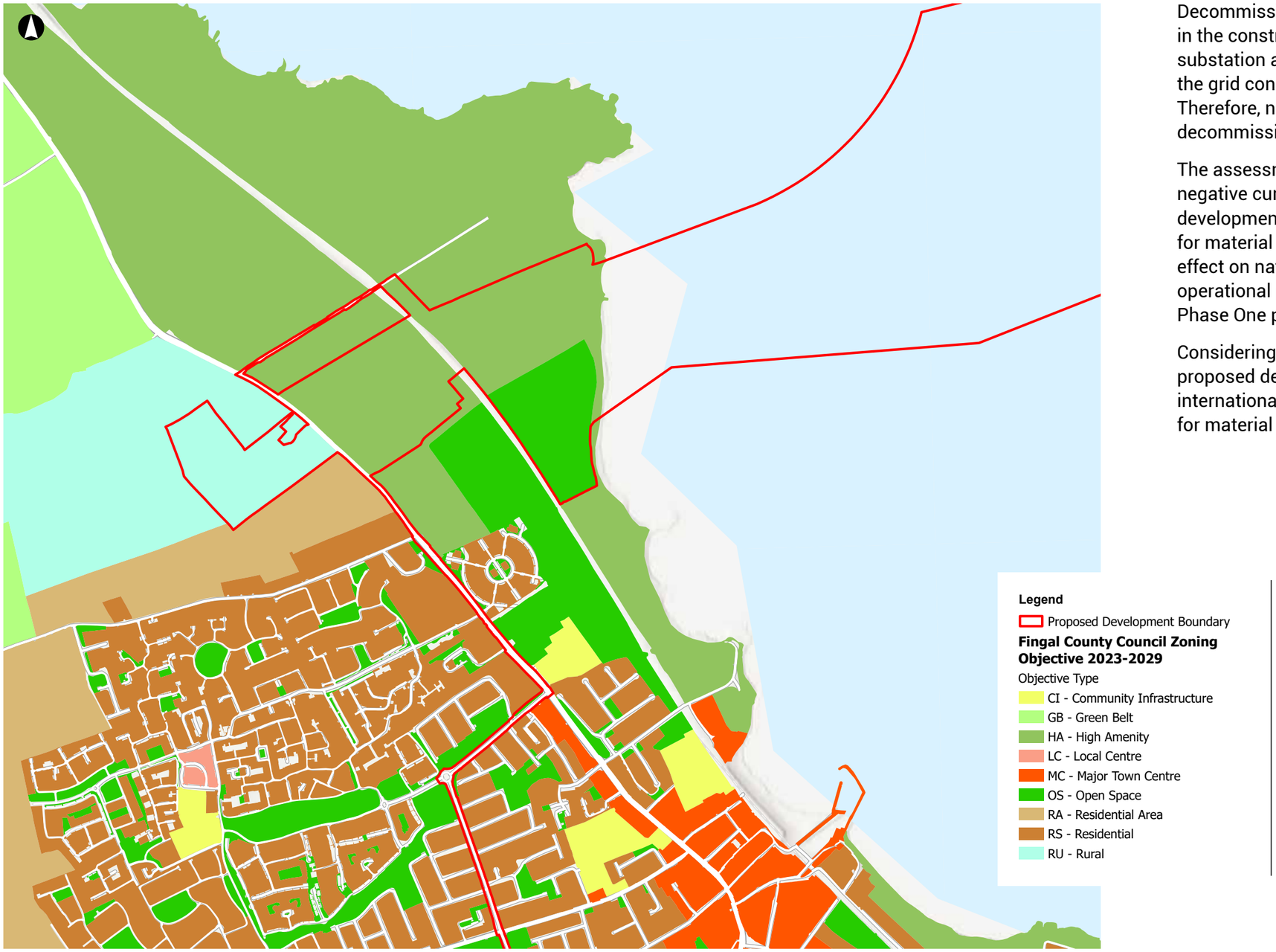
The proposed watercourse crossing methods have been designed such that they will not negatively impact the structural integrity of any of the bridges crossed by the onshore cable route. Therefore, a negative, not significant and short-term effect on bridge infrastructure during construction is anticipated which is not significant in EIA terms.

The potential for significant effects during the operational phase will consist mainly of utility requirements at the grid facility including electricity, potable water, foul water infrastructure, telecommunications and surface water drainage. No likely significant negative effects are predicted during the operational phase.

Approximately 2.48ha of permanent land take for the grid facility will not be available for other uses and will differ from the zoning designation of these lands in the Fingal County Development Plan 2023-2029 as 'Rural'. However, the remaining 6.05ha will continue to comply with the zoning objectives as 'Rural'. The land use zoning at the landfall and grid facility is illustrated in Figure 14 of this NTS. Therefore, the effect on land use during the operational phase is determined as negative, moderate and permanent.

The proposed development will provide a significant source of offshore renewable energy off the east coast of Ireland. Overall, the operation of the proposed development will have a significant, positive, and long-term effect on electricity supply in Ireland.

Figure 14 Land Use Zoning: Landfall site and grid facility



Decommissioning phase effects will be similar to those assessed in the construction phase but to a lesser extent as the Bremore substation and the onshore cable route from the grid facility to the grid connection point at Belcamp will remain in operation. Therefore, no significant effects are predicted during the decommissioning phase.

The assessment also concluded that no likely significant negative cumulative effects arising from the proposed development in combination with other projects, are predicted for material assets. A likely significant direct positive cumulative effect on national electricity supply is predicted during the operational phase from the proposed development and other Phase One projects.

Considering the nature of the onshore infrastructure of the proposed development, and the distance to the nearest international boundary, no transboundary effects are predicted for material assets.

25. Air Quality

An assessment of the likely significant effects of the proposed development on air quality has been undertaken for the construction, operation, and decommissioning phases.

Pollutants relevant to the assessment include dust emissions which might arise during construction as well as pollutants related to the combustion of fossil fuels due to traffic emissions and energy generation, i.e. nitrogen oxides and particulate matter.

Construction of the offshore infrastructure is unlikely to result in significant impacts to air quality as a portion of the works will take place subsea, with little opportunity of dust generation. In addition, the offshore infrastructure of the proposed development is located in the Irish Sea, a large body of water and so, any potential airborne pollutants produced are likely to be dispersed widely resulting in no adverse effects. As such, the offshore construction phase was not considered further in the assessment,

The study area for the air quality assessment is focused on sensitive receptors, i.e., human beings, flora and fauna, in proximity to onshore construction works. The baseline air quality environment is determined from published data outlining background pollutant levels from the years 2018-2021.

Activities that could result in potentially significant impacts include:

- Dust generation from construction activities including groundbreaking, excavation and trenching,
- Increases in pollutant levels from construction traffic

An assessment of the risk of dust impacts was carried out based on the potential dust emission magnitude and the sensitivity of the area. Based on the risk identified, it was concluded that the direct impact on air quality during the construction phase has the potential to be negative, significant, and short-term in proximity to the works, in the absence of mitigation measures.

There is one location at the R132 road where construction traffic has the potential to result in a significant increase in traffic flows due to traffic diversions and numbers of anticipated construction vehicles. At this location, pollutant increases were assessed at the nearest human and ecological receptors and are considered neutral.

In addition, a number of road diversions will occur during the construction phase as a result of road closures to accommodate the onshore cable route construction works. The R132 road and Flemington Lane are predicted to result in the maximum total traffic flow and change in traffic flow, respectively. There is a potential for a maximum impact rating of moderate adverse and temporary effects to occur at the most affected receptors (those closest to the onshore cable route construction works).

The operational phase of the proposed development will result in a positive impact on air quality due to a reduction in fossil fuelled electricity generation. The results of the assessment demonstrate that the proposed development will have a positive, moderate, and long-term impact on air quality during the operational phase, though not one which is defined as a likely significant effect.

Mitigation measures will be implemented during the construction phase to minimise any dust impacts offsite. These measures are detailed in the Onshore Construction Environmental Management Plan. There is predicted to be a negative, slight and short-term residual effect on air quality during the construction phase, but not one which would constitute a likely significant effect (i.e. not significant in EIA terms). Dust deposition monitoring will be carried out at the nearest receptors to the works during the construction phase to ensure the effectiveness of mitigation measures.

Decommissioning phase effects will be similar to those assessed in the construction phase but of a lesser extent as the Bremore substation and the onshore cable route from the grid facility to the grid connection point at Belcamp will remain in operation. Therefore, no significant effects are predicted during the decommissioning phase.

The assessment concluded that no likely adverse significant cumulative effects on air quality are predicted during the construction, operation or decommissioning phases of the proposed development. Cumulatively with other Phase One offshore energy projects, a positive impact will arise on air quality due to the reduction in pollution from non-renewable power generation.

Considering the nature of the proposed development, and the distance to the nearest international boundary, no transboundary effects on air quality are predicted.

26. Climate

The climate impact assessment considers the likely significant effects due to the construction, operation and decommissioning of the proposed development. In addition, an assessment of the proposed development's vulnerability and resilience to climate change (i.e. a climate change risk assessment) is included.

The climate assessment for the construction phase estimates the potential greenhouse gas (GHG) emissions, i.e., carbon dioxide equivalent (CO2 eq), due to the proposed development.

The potential impacts on climate are based on the national implications of changes in carbon emissions due to the proposed development, considering Ireland's climate commitments and carbon budget. Therefore, the study area is defined as Ireland for the assessment.

The assessment of the proposed development's vulnerability to climate change is based on likelihood and consequence. Likelihood refers to how likely the identified climate hazards are to occur over the lifetime of the proposed development. Consequence refers to the severity or magnitude of the impact associated with the climate risk.

The baseline climate is based on published data by the Environmental Protection Agency EPA from 2019 and 2021.

The total embodied carbon predicted to be generated during the construction phase of the proposed development is c.657,000 tonnes of CO2 equivalent (eq). Assuming a three-year construction period, this amounts to c. 219,000 tonnes of CO2eq per annum. The level of impact during the construction phase is considered to be minor adverse considering that the proposed development's greenhouse gas impacts will be mitigated through 'good practice' measures. This aligns with an impact rating of slight adverse which is not significant in EIA terms in accordance with the EPA guidelines. However, overall, through its lifecycle, the proposed development is fully in line to achieve Ireland's trajectory towards net zero and its contribution to this, a predicted reduction in emissions of 9,872,520 tonnes of CO2eq over the project's operational phase, results in a likely positive significant effect on climate in EIA terms.

The assessment also considered the effect of extreme climate events upon the proposed development. The probability and frequency of a lightning strike is an unmitigated scenario are considered to have the potential to be minor with mechanical damage to a blade. However, due to the proposed development design, these events are mitigated to reduce the likelihood to rare (approximately once in the proposed development's operating life) with the magnitude of consequence can be classed as minor as there may be a slight impact on operations. The significance of impact is mitigated to an acceptable level and does not constitute a significant effect (i.e. not significant in EIA terms).

The climate assessment concluded that a significant beneficial impact on climate will occur during the lifecycle of the proposed development relative to Ireland's carbon budgets. Although the beneficial effects on climate as a result of the proposed development can be deemed as significant in national terms, at an EU level the effects are considered not significant. Therefore, transboundary effects due to the proposed development are predicted to be not significant from a climate perspective.

Given there is a beneficial impact on climate predicted from the proposed development, there is no potential for any adverse cumulative impacts associated with identified projects. A cumulative significant positive impact is likely to arise particularly when considered in the context of other Phase One Projects. No likely significant adverse cumulative effects on climate are predicted during the construction, operation or decommissioning phases of the proposed development.

27. Seascape, Landscape and Visual

Chapter 29 of Volume 5 of the EIAR presents an assessment of likely significant effects from the proposed development in relation to seascape, landscape and visual impacts during the construction, operation and decommissioning phases. Part I of the chapter assesses the Seascape, Landscape and Visual Effects of the proposed offshore elements, whilst Part II of the chapter assesses the Landscape and Visual Effects of the onshore elements of the proposed development.

Seascape Impact Assessment relates to the introduction of new offshore elements which may alter the seascape character of the array area itself and the perceived character of the wider seascape through visibility of these changes. Landscape Impact Assessment relates to changes and/or additions to the characteristics and defining elements of areas of landscape, including their visual attributes. Visual Impact Assessment relates to assessing effects on views and visual amenity experienced by people who are resident at particular locations or engaged in particular activities, which influences their sensitivity to visual change. This includes daytime and night time visual amenity. Cumulative seascape, landscape and visual impact assessment is concerned with additional changes to the seascape, landscape or visual amenity caused by the proposed development in conjunction with other permitted and proposed developments.

The methodology employed in the Seascape impact assessment for Part I (offshore elements) and the Landscape impact assessment for Part II (onshore elements) is the same as both assessments are covered by the overarching Guidelines for Landscape and Visual Impact Assessment (2003). The assessment is also informed by other seascape and landscape impact assessment related guidance specific to offshore wind energy development as well as relevant pre-existing landscape and seascape assessments as set out in section 29.21 of the chapter.

Part I – Seascape, landscape and visual assessment of proposed offshore elements

The study area for the assessment of the proposed offshore elements consists of a 'principal study area' – 40km from the array area, used for the assessment of the offshore infrastructure from the proposed development in isolation and a 'cumulative study area' – 60km from the array area, used for the cumulative assessment of the offshore infrastructure of the proposed development.

Bare-ground Zone of Theoretical Visibility mapping based on a Digital Terrain Model has been prepared to the full extent of each of the relevant study areas identified above. This includes cumulative Zone of Theoretical Visibility mapping to 60km radius from the array area and standard tip height and hub height Zone of Theoretical Visibility mapping for the principal study area to 40km. In addition, Zone of Theoretical Visibility mapping based on Digital Surface Model data, which accounts for screening by the likes of vegetation and buildings, is provided for the principal study area.

Consideration was given to the seascape, landscape and visual related policies, objectives and designations in the Louth, Meath, Fingal, Dublin City and Dún Laoghaire Rathdown County Development Plans.

In terms of baseline context, the offshore infrastructure of the proposed development is located off the east coast of Counties Louth, Meath and Dublin, generally aligned with the coastline from Dunany Point and Clogher Head (Co. Louth), south to offshore from Skerries in north County Dublin. The array area lies at distances ranging between approximately 12.3km (southern end) to 17km (northern end) from the nearest sections of the coastline. The northern and southern extents of the study area are framed by variable coastline and upland areas, while the western (central) section is, aside from those coastal features identified above, principally shallow coastal farmland with dunes backed by gently rolling farmed fields interspersed with varying sized coastal settlements and lined by coastal one-off housing.

In terms of potential effects, the operational phase seascape effects and visual effects from the turbines and offshore substation platform within the array area are of most consequence in relation to seascape, landscape and visual effects. Operational phase cumulative effects for these aspects of the proposed development are also a key consideration. For all other aspects of the development, the only material impacts are temporary / short term and they will have very limited potential for visibility during the Operational Phase.

The operational phase seascape effects from the turbines and offshore substation platform within the array area were assessed on the basis of those Seascape Character Areas from the Regional Seascape Character Assessment (2020) along with the underlying coastal Landscape Character Areas from the relevant County Development Plans that fall within the 40km radius principal study area. Whilst inland Landscape Character Areas were initially considered in the baseline sections, the vast majority of these were scoped out of the seascape assessment due to the limited potential for significant seascape effects to occur in relation to such distant landscape units with limited or no intervisibility with the offshore infrastructure and a landscape context that is not materially influenced by the coast or sea views. The operational phase Seascape effects from the proposed turbines and offshore substation platform were highest for Seascape Character Area (SCA)16 – 'North Eastern Irish Sea Islands and Beaches', and the associated coastal Landscape Character Areas that fall between Clogher Head and Skerries. However, the assessed effects are not considered to be significant in EIA terms.

Note : Full verifiable images provided in Volume 7B1& 7B2 of the EIAR.

Figure 15 Photomontage VP13 (Project Option 1) Clogherhead Beach, Co. Louth

Figure 16 Photomontage VP20 (Project Option 1) Gormanston Beach, Co. Meath

Note : Full verifiable images provided in Volume 7B1& 7B2 of the EIAR.

Figure 17 Photomontage VP21 (Project Option 1) Balbriggan Beach, Co. Dublin

Figure 18 Photomontage VP24 (Project Option 1) Amenity Area Skerries, Co. Dublin

Note : Full verifiable images provided in Volume 7B1& 7B2 of the EIAR.

Figure 19 Photomontage VP30 (Project Option 1) Portmarnock Beach, Co. Dublin

The operational phase visual effects from the turbines and offshore substation platform within the array area were assessed from a series of 37 viewpoint locations representing a range of visual receptors types including scenic designations, centres of population, coastal residential receptors, major transport routes and heritage / amenity features within the principal 40km radius study area. A further 10 viewpoints were selected within the 40km – 60km radius cumulative study area to inform the cumulative visual impact assessment. The montages from five viewpoints are illustrated in Figures 15 to 19.

As with the assessed seascape impacts, the highest visual impacts from the turbine and offshore substation platform were generally deemed to be from coastal receptor locations between Clogherhead and Skerries. These typically consist of Irish Sea views from broad and relatively unenclosed beaches where the proposed turbines are seen in a simple offshore scenario. Viewing distances to the nearest turbines from this section of shoreline range consistently from approximately 17-18km for the viewpoints that track the sweeping coastline between Clogherhead to Balbriggan. The closest views of the array area is at Skerries where the nearest turbines are just over 13km away.

In terms of cumulative effects, the scenario changes north to south from one where the Oriel Array is the most dominant with the proposed development array area in the distant background. From Dunany Bay Beach to Skerries the array area of the proposed development takes over as the more dominant of the two, but in a scenario where they combine to occupy a notable portion of the open seaward horizon albeit a subordinate proportion to that which is left undeveloped. It is along this stretch of the coastline that the proposed development contributes most to cumulative impacts. From Skerries southwards, Oriel plays little part in the cumulative assessment, but the northern end of the Dublin Array begins to emerge around Howth Head. Once Dublin Array and Codling Wind Park come more prominently into view in the Dublin Bay context, the proposed development has become a distant background feature of the discrete coastal context north of Howth Head and it makes very little contribution to the overall cumulative effect.

Overall, the assessment for concludes that there will not be any significant seascape, landscape, visual or cumulative effects arising from the offshore elements of the proposed development.

Part II – Landscape and Visual Assessment of proposed Onshore Elements

The 'onshore development area' is within the proposed development boundary landward of the high-water mark and constitutes the landfall, the Transition Joint Bay (TJB), the grid facility, and the onshore cable route from the grid facility to the grid connection point at Belcamp Substation.

For the grid facility, which is the only overt above ground feature of the onshore infrastructure, a 3km radius study area has been applied on the basis of potential visibility and the potential for significant effects being extremely unlikely beyond such distances even in the context of highly sensitive receptors (viewers/viewing locations) due to factors of scale, distance and context. For the landfall and underground onshore cable route, a lesser 500m buffer either side of the alignment defines the study area.

Consideration was had to the landscape and visual related policies, objectives and designations of the Meath, Fingal and Dublin City Development Plans, which are all at least partly contained within the onshore study areas.

In terms of onshore infrastructure, the landfall site is within coastal farmland between Bremore Head and the settlement of Balbriggan that descends gently to the east from the R132 coast road. The grid facility is contained within hinterland farmland on the opposite (western) side of the R132 road and immediately north of the Balbriggan.

The onshore cable route tracks the road network south from the grid facility, through the urban and peri urban areas of Balbriggan before following the R132 road as it runs parallel to the M1 motorway through farmland and rural / industrial sites such as the M1 Business Park. It diverts through farmland at Blakes Cross before rejoining the R132 road and crossing the M1 Motorway at Lissenhall. It then crosses back under the M1 Motorway to follow Estuary road along the southern side of the Malahide Estuary before passing through the urban environs of east Malahide. It follows the R107 regional road south out of Malahide through rural residential areas that include the settlement of Kinsealy before veering west along the R139 road, which marks the northern outskirts of Dublin City, in the direction of the grid connection point at Belcamp substation. There is also an alternative route option towards the southern end of the onshore cable route that diverts east along Chapel Road at Kinsealy and then follows Hole in the Wall Road south to pick up the R139 road at Donaghmede. From there it will return west to Northern Cross to rejoin the common cable route section along the R139 road to Belcamp Substation.

Mitigation measures for the grid facility are proposed in the form of a recessive colour scheme that blends into the background for the substation buildings and perimeter screen planting to bolster existing hedgerows and establish new hedgerows and woodland thickets. There is also a landscape mitigation plan prepared in respect of a section of the onshore cable route which diverts from the road through farmland at Blake Cross. Although a relatively minor amount of vegetation disturbance will occur in this area, the replacement planting will contribute to balancing biodiversity loss in the context of the overall onshore development.

In terms of landscape effects, the presence of the grid facility will increase the scale and intensity of development at the urban rural interface of Balbriggan. The highest magnitude of landscape impact is deemed to be for the site and its immediate context being predominantly to the west of the R132 road, which serves as a divide to the more sensitive coastal context further east. The level of effect dissipates with distance and wider context across the study area.

The visual impact significance, arising from the operational phase of the two substations in the grid facility, is considered to be higher than the landscape impact significance as there are residential receptors and a designated scenic route in the immediate vicinity. Eight viewpoints were selected specifically to assess the visual impacts from the Grid Facility within its 3km radius study area. The viewpoint from the R132 north east of the site (VP50) is illustrated in Figure 20 below.

When viewed from the Flemington Lane at the northern perimeter of Balbriggan, substantial screening is provided by foreground dwellings, albeit those same dwellings will be afforded clearer views from their rear gardens. The clearest view of the proposed substation structures is from the R132 regional road directly to the east of the grid facility site between the nearest residential properties to the site on the western side of the R132 road. Part of this is also a designated scenic route, but the visual amenity associated with this scenic route clearly relates to elevated sea views in the opposite direction (east) of the grid facility site. From here the proposed grid facility structures will rise in silhouette above the subtle plateau farmland that forms a near skyline.

Figure 20 Photomontage of Grid Facility (VP50) R132 northeast of the site

Note : Full verifiable images provided in Volume 7B1& 7B2 of the EIAR.

The prominent industrial form of the substation structures will result in mid-range negative effects at this location prior to the establishment of mitigation screen planting and introduction of a recessive colour scheme. Thereafter, the significance of impact is deemed to reduce.

In relation to the landfall and onshore cable route, the main landscape and visual effects will be temporary / short term during the construction phase as there will be almost no visibility of the infrastructure above ground during the operational phase. There will be some temporary and permanent loss of vegetation for the offline sections of the onshore cable route where it deviates from the road network to facilitate watercourse and road crossings. However, such effects will be localised and minor and vegetation will be reinstated insofar as possible.

Decommissioning phase effects will be similar to those assessed in the construction phase but of a lesser extent as the Bremore substation and the onshore cable route from the grid facility to the grid connection point at Belcamp will remain in operation. Therefore, no significant effects are predicted during the decommissioning phase.

None of the landscape and visual effects assessed in relation to the proposed onshore elements are deemed to be significant in EIA terms.

There is the potential for visual impacts in County Down in Northern Ireland as the wind turbine generators are likely to be visible from there in clear viewing conditions. Four standard viewpoints and one cumulative viewpoint were selected within Northern Ireland for assessment. In all cases the viewing distances were upwards of 35km away and the resulting significant of effect was deemed slight-imperceptible or lower, which is not significant in EIA terms. There is no potential for transboundary effects arising from the onshore elements of the proposed development. Therefore, there are no likely significant transboundary effects predicted from the proposed development on seascape, landscape and visual.

28. Noise and Vibration

The noise and vibration assessment considers likely significant effects on sensitive receptors associated with the construction, operation and decommissioning of the proposed development.

The primary receptor type considered in the assessment are nearby residents. The effects on fauna are considered in the onshore biodiversity assessment and the impacts of underwater noise generated by the construction of the offshore infrastructure was considered in the assessments of effects on migratory fish and marine mammals.

The study area for potential onshore noise & vibration effects is 300m from any works within the onshore development area, to ensure that all possible effects are identified. The noise study area is illustrated in Figure 21 of this NTS.

Potential effects from offshore infrastructure (specifically the turbines) to onshore receptors close to the shoreline was also assessed. For the assessment of these potential effects, the closest sensitive receptors to the turbines – those on Red Island, Skerries were considered (Refer to Figure 21 of this NTS).

The baseline noise environment around the landfall and grid facility areas and alongside the Malahide Estuary was quantified using site specific noise surveys. Along the rest of the onshore cable route, a precautionary assumption of a low baseline was assumed for the assessment.

Activities that could result in potentially significant impacts include:

- Noise from construction works at the grid facility and landfall site, including some 24-hour working for Horizontal Direct Drilling,
- Noise from construction works along the onshore cable route,
- Noise from construction traffic and changes in flows on existing roads during the construction phase
- Noise from offshore construction activities,
- Vibration from the construction phase works,
- Operational noise from the grid facility, and
- Operational noise from the wind turbine

At the landfall site and grid facility, a combination of distance from the construction works and mitigation in the form of temporary noise barriers results in predicted construction noise levels being below the threshold noise level values for potential effects at nearby residential properties. No likely significant effects are therefore predicted.

Along the onshore cable route, construction works will primarily be delivered as a 'rolling' linearly-progressing construction works programme along the 33-35km-long onshore cable route. Whilst these works are likely to result in local adverse effects to nearby residents as the works advance along the onshore cable route, these effects will be temporary in nature and hence not constitute a likely significant effect. Temporary noise barriers around the construction activities will be provided to mitigate noise to schools along the onshore cable route.

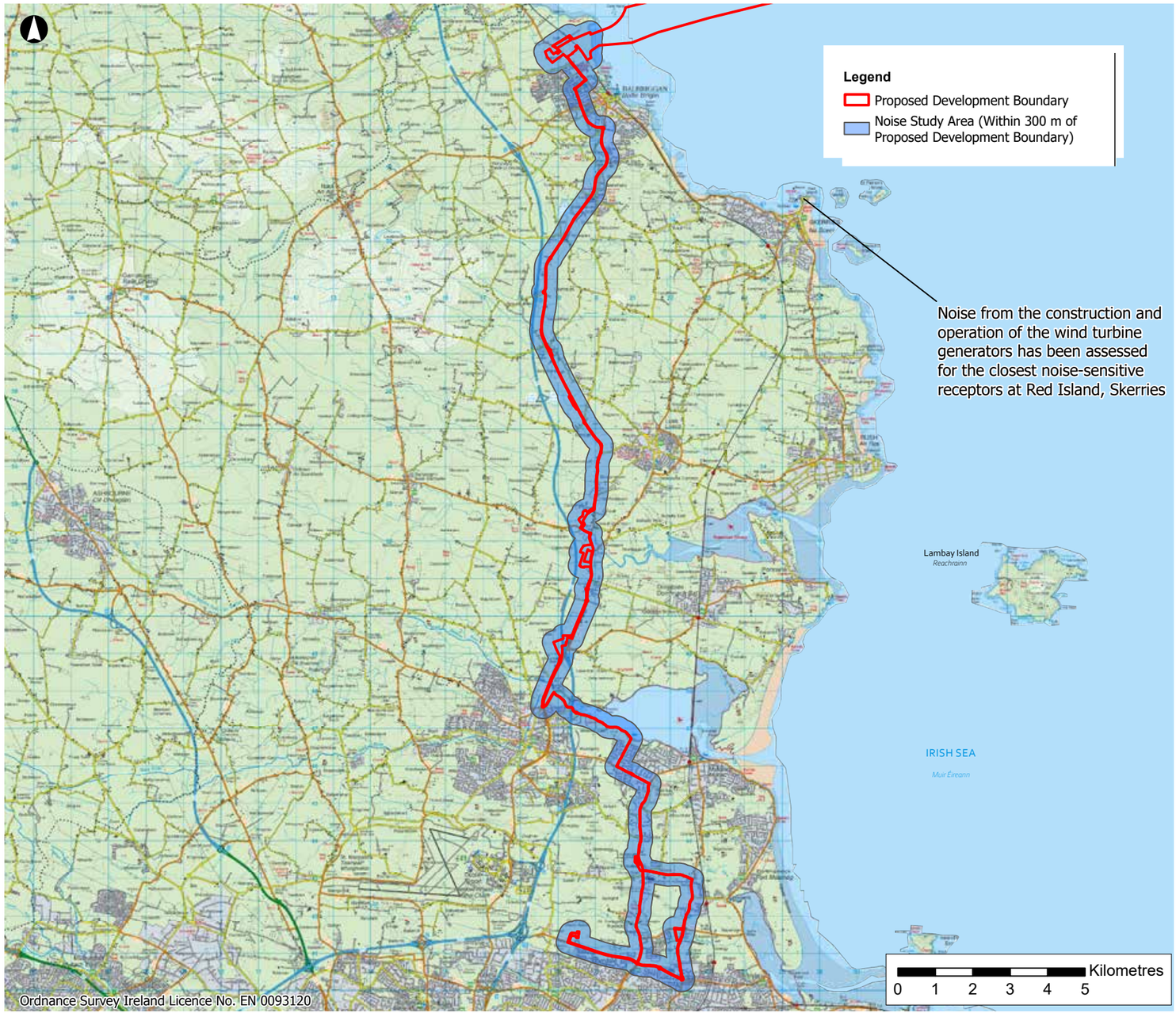
Road traffic noise increases resulting from the addition of construction traffic associated with the proposed development were assessed. Due to the small relative increases in overall traffic flows, no adverse effects were identified. Potential effects from increased traffic on both strategic and local diversion routes during temporary road closures were also assessed. No adverse effects were identified along strategic diversion routes but adverse effects were identified along local diversion routes. These will be temporary in nature and so will not constitute a likely significant effect.

Noise from offshore construction activities – that is the piling of foundations for the wind turbine generators, was assessed. This assessment was based on a night-time assessment on the basis that this is the most noise-sensitive time of the day and that piling activities may occur at any time of the day. The assessment assumed metrological conditions favourable to noise propagation. A slight adverse effect is predicted to onshore residents closest to the array area if piling is active throughout the night, but the predicted noise levels are not of sufficient magnitude to constitute a likely significant effect (i.e. not significant in EIA terms).

Operational noise from the grid facility was assessed. Through a combination of low-noise equipment selection and/or noise barriers, adverse effects to nearby residential properties will be avoided, and so no likely significant effects are predicted (i.e. not significant in EIA terms).

Operational noise from the wind turbine generators was assessed. Due to the relatively large distance from turbines to the shore (over 12km), the predicted noise levels at the closest residences are comfortably below the threshold for adverse effects and so no likely significant effects were identified.

Figure 21 Noise Study Area



Vibration from construction works was assessed and no adverse effects are predicted.

Decommissioning phase effects will be similar to those assessed in the construction phase but to a lesser extent as the Bremore substation and the onshore cable route from the grid facility to the grid connection point at Belcamp will remain in operation. Therefore, no significant effects are predicted during the decommissioning phase (i.e. not significant in EIA terms).

Mitigation measures including noise barriers at specific locations, general measures to minimise noise during construction works, and measures relating to communication and community liaison will be implemented in order to minimise the effects of the proposed development on communities. These measures are all contained within the Onshore Construction Environmental Management Plan.

Overall, no likely significant effects have been identified arising from noise and vibration from the proposed development (i.e. not significant in EIA terms).

The assessment has also concluded that no likely significant cumulative effects (effects arising from the proposed development in combination with other projects) are predicted for Noise and Vibration.

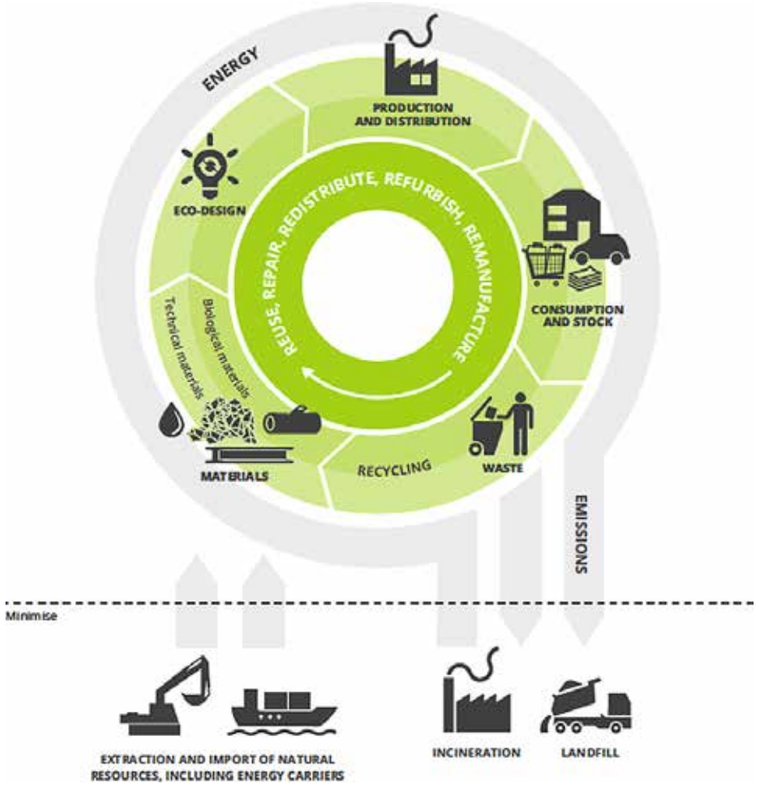
Considering the nature of the proposed development, and the distance to the nearest international boundary, no transboundary effects on noise and vibration are predicted. Effects due to underwater noise are assessed as part of the Fish and Shellfish Ecology and Marine Mammal Ecology EIAR topics and are described in sections 10 and 11 above. Neither assessment concluded that there will be any likely significant transboundary effects.

29. Resource and Waste Management

The management of resources and the potential for waste to be generated during the construction, operational and decommissioning phases of both the offshore and onshore elements of the proposed development was assessed.

The legislative context implements the waste hierarchy, which promotes waste prevention, reuse, recycling and recovery over disposal. More recently, the principles of the circular economy have become embedded in legislation so as to maintain materials and resources in the economy for as long as possible, thereby minimising waste.

Image 10 Simplified model of circular economy for materials and energy (Source: EEA 2016)



Throughout the design for the proposed development, consideration has been given to the minimisation of resource usage and the generation of waste through retention of material on site and material reuse.

The study area for resource and waste generation from the proposed development comprises the areas and activities within the proposed development boundary. A desk study of current practices for waste and by-product management in Ireland was completed and data were gathered on the types and quantities of waste and by-product generation and management from the proposed development;

Aspects considered in the assessment of resource use and waste management for the construction phase included the following:

Offshore:

- Offshore seabed preparation – including waste generated from unexploded ordnance clearance, boulder clearance and sand wave clearance;
- Offshore installation – including waste generated from the excavation of subsea sediment during the construction of the wind turbine generator and offshore substation platform foundations, and during the cable installation works;
- Offshore resource use – including the import and use of resources for the construction of new infrastructure;
- Offshore general construction waste – including waste generated from and in relation to the construction of new infrastructure; and
- Offshore municipal waste – including the generation of municipal waste materials by construction workers on vessels.

Onshore:

- Onshore site clearance – including waste generated from the removal of vegetation and fencing;
- Onshore excavation – including waste generated from the excavation of below ground material such as soil and stones at the landfall site, the grid facility and throughout the onshore cable route;
- Onshore resource use – including the import and use of resources for the construction of new infrastructure, such as the onshore cables, foundations, substation, permanent access track and road paving;
- Onshore general construction waste – including waste generated from and in relation to the construction of new infrastructure / buildings; and
- Onshore municipal waste – including the generation of municipal waste materials by construction workers from, for example, site offices and welfare facilities.

Aspects considered in the assessment of resource use and waste management for the operational phase included the following:

- Waste generated from maintenance activities related to the offshore substation platform, wind turbine generators, inter-array, offshore export cable and onshore grid facility;
- Resource use – including the import and use of resources for maintenance activities related to the offshore substation platform, wind turbine generators, inter-array, offshore export cable and onshore grid facility; and
- Municipal waste generated from workers completing maintenance activities during the operational phase.

Minor quantities of waste will be generated from the offshore seabed preparation works. Waste arising from offshore installation works will be managed in line with the dumping at sea permit that will be sought by the Developer from the Environmental Protection Agency ahead of construction commencing.

The construction materials needed for the construction of the offshore elements of the proposed development are readily available both nationally and internationally and will have a minimal impact on the environment. The most likely type of general construction waste from the offshore infrastructure construction works will be grouting from foundation construction and surplus cabling segments. Only minor quantities of these materials will be generated. Minor quantities of municipal waste will also be generated by construction workers on vessels during the construction phase.

There is adequate capacity for the management of all waste arising from the construction of the offshore infrastructure for the proposed development.

From an onshore perspective, site clearance works will generate minor quantities of vegetation and other waste material (e.g., fences). It is estimated that there will be approximately 300,500 tonnes of material excavated to facilitate the construction of the onshore infrastructure for the proposed development. It is estimated that approximately 72,600 tonnes of this material will be reused on site and approximately 227,900 tonnes of this material will be exported from the site. This represents a small percentage of such waste generated in Ireland each year and there is sufficient capacity within the region to manage this waste. Excavation waste generated will include materials such as topsoil, subsoil and crushed stone. General construction waste generated during the construction of onshore infrastructure will include surplus soil and stone, concrete and surplus cable ducting. Minor quantities of municipal waste will also be generated by construction workers from site offices and welfare facilities.

The construction materials needed for the construction of the onshore elements of the proposed development are readily available both locally and nationally and will have a minimal impact on the environment.

No significant negative effects on resource and waste management are predicted as a result of the construction of the proposed development (i.e. not significant in EIA terms).

A suite of mitigation measures will be implemented by the contractor, and a Construction Resource and Waste Management Plan (CRWMP) has been prepared to appropriately manage the construction of the proposed development.

Minor quantities of construction and demolition waste materials and municipal waste will be generated from maintenance activities during the operational phase, while minor quantities of resources will be required. There is adequate treatment capacity for the types of waste that will be generated during the operational phase.

No significant negative effects on resource and waste management are predicted as a result of the operation of the proposed development (i.e. not significant in EIA terms).

The operational life of the proposed development is anticipated to be up to 35 years. Once the proposed development has reached the end of its operational life, a decision will be made regarding decommissioning. A rehabilitation schedule will be prepared taking into consideration the latest technological advances as well as legislative and environmental requirements at the time of decommissioning.

A variety of construction and demolition waste materials will be generated from both the offshore decommissioning works (e.g., the decommissioning of the wind turbine generators and foundations) and the onshore decommissioning works (e.g., the decommissioning of the compensation substation).

The predicted quantities of waste streams arising from the decommissioning phase are considered to be minor within the context of the national generation of waste materials. There is expected to be adequate treatment capacity for the types of waste that will be generated during the decommissioning phase.

No significant negative effects on resource and waste management are predicted as a result of the decommissioning of the proposed development (i.e. not significant in EIA terms).

The cumulative impact assessment presents an outcome of a direct, negative, significant and short-term cumulative effect on the capacity of waste management facilities and waste industry trends in Ireland during the construction phase due to an increased demand on waste recovery and/or disposal sites. This is as a result of the cumulative effect of the proposed development with another project.

No likely significant transboundary effects are predicted from the offshore and onshore construction, operation and decommissioning phases of the proposed development. Whilst offshore waste generated during the construction of the proposed development will be managed at the appropriate port facility before being sent for recycling, recovery or disposal, these quantities are not predicted to be significant.

30. Population and Human Health

The population and health assessment has considered impacts on community resources and the social, economic and environmental factors affecting health and wellbeing (known as health determinants) as a result of the proposed development.

The sensitivity of users of community resources and the population affected by the proposed development has been considered, with a particular focus on groups who may be more vulnerable to change. The assessment has been based on the magnitude of impacts and sensitivity of receptors, in accordance with topic-specific guidance.

The assessment has used the following definition of health, from the World Health Organization: 'a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity'.

The study area for the population and human health assessment comprises the onshore communities that will be potentially affected by the proposed development's onshore infrastructure through its impacts on health determinants and community resources. Impacts upon marine users as a result of the offshore infrastructure were considered throughout the offshore assessment chapters. Baseline data has been obtained from publicly available sources including the Central Statistics Office, Google Maps, Open Street Map, Department of Education school maps, and information contained in local and county development plans. This information has been used to compile a profile of the community resources present in the study area and the socio-economic and health status of the population. The communities in the study area are generally average or above average in terms of affluence, but there are also areas of social deprivation along the onshore cable route, which are generally associated with poorer health outcomes. An electromagnetic frequency (EMF) assessment has also been undertaken.

The population assessment has considered effects on the users and occupiers of residential properties, community assets such as schools, hospitals, sports facilities, local shops and services, community land, local businesses and public rights of way. The impacts on these resources may arise as a result of changes to amenity and/or accessibility.

The construction of the proposed development will result in dust, noise and vibration, visual impacts and increases in Heavy Goods Vehicles (HGVs) on local roads. The combination of environmental impacts and increased HGV traffic has the potential to affect local amenity in proximity to construction sites, including at residential properties, public parks and open spaces, leisure facilities and neighbourhood centres. These activities will have negative, temporary significant effects.

Accessibility and journey patterns will be impacted by full and partial road closures along the onshore cable route during construction, resulting in the temporary diversion of vehicle traffic and bus services. Pedestrians will be affected by footpath closures and diversions and cyclists may be required to dismount. This may reduce people's ability to access local community facilities and services. These activities will have negative, temporary significant effects.

Potential population effects during the operational phase of the proposed development were assessed as imperceptible.

The assessment of health and wellbeing effects during construction has considered impacts on health determinants, including accessibility, active travel, neighbourhood amenity, green space and employment. The potential for significant effects on health and wellbeing is limited as the impacts of construction are short term and not significant.

The health and wellbeing of certain groups are more likely to be adversely affected by temporary impacts on accessibility. For example, older people and people on low incomes are more likely to rely on bus services to access services and facilities, people with health problems or disabilities are likely to rely on access to support from family, friends and health and social services, and children may be affected by impacts on routes to school.

Impacts on neighbourhood amenity and the quality of green spaces during construction will be short term and as such are not considered to significantly affect health and wellbeing.

The creation of jobs and benefits to the local economy during construction have the potential to result in employment and training opportunities for people in the study area. The effect on health and wellbeing will depend on the extent to which these opportunities are taken up by people who are currently on low incomes or unemployed, and the nature of these opportunities (e.g. skilled or unskilled roles).

During the operational phase, the number of direct new jobs created is not considered to have an overall beneficial effect on the health and wellbeing of the population. However, the wider economic benefits of the proposed development, estimated at €5,085,728 of Gross Value Added (GVA) per year, combined with a commitment to provide a Community Benefit Fund of approximately €4 million per annum for 20 years, would result in a positive, significant and long-term effect on economic regeneration at a regional level which is likely to benefit the health and wellbeing of the population.

Implementation of the mitigation measures proposed in the Air Quality, Noise and Vibration, Traffic and Transportation and the Seascape, Landscape and Visual Chapters will help to avoid or minimise adverse population and human health effects of the construction, operation and decommissioning of the proposed development. During construction, the implementation of an Onshore Construction Environmental Management Plan will reduce adverse effects and a dedicated community liaison officer provided by the Developer will provide a direct link between the project and local communities.

During construction, significant residual adverse population effects were identified as a result of temporary impacts on accessibility and journey patterns cause by traffic diversions along the onshore cable route in Ballbriggan, rural communities in Fingal, and communities along the Malahide Road including Seabury, Kinsealy and Portmarnock. No significant residual health and wellbeing effects were identified during construction.

During operation, a significant residual positive health and wellbeing effect was identified across the wider study area as a result of economic regeneration generated by the proposed development, and the Community Benefit Fund. The effect on health and wellbeing from EMF has been assessed as imperceptible.

During the construction phase, potential cumulative effects from onshore projects were identified in locations where cumulative traffic and transport impacts occur in conjunction with significant effects on accessibility and journey patterns. Due to the nature of those projects which were screened in, the assessment concluded an outcome of potentially significant, negative and temporary effect due to the significant negative cumulative traffic effects predicted.

During the operational phase, given that the Phase One projects will also be each providing a Community Benefit Fund, it is considered reasonable to assume that a cumulative positive significant (or greater) on health and wellbeing effect at a regional level will arise.

Considering the nature of the proposed development, and the distance to the nearest international boundary, no significant transboundary effects on population and human health are predicted.

31. Socioeconomics, Tourism and Recreation

An assessment of likely significant effects from the proposed development in relation to socio-economic, tourism and recreation has been undertaken for the construction, operation, and decommissioning phases.

The socio-economic impacts of the proposed development are considered at varying spatial levels according to the nature of the effects considered. The potential economic impacts arising from the proposed development (i.e. employment and GVA generation) (GVA being a measure of the value that producers or developers add to the local economy) are considered at a regional level which comprises the Eastern and Midland Region in Ireland. For impacts on tourism and recreational activities, the study area has been determined as all areas within the proposed development boundary (both onshore and offshore) in addition to residential, commercial, leisure and industrial areas adjacent to the grid facility site and along the onshore cable route.

Data from the Central Statistics Office, Fáilte Ireland, local and regional plans (Regional Spatial and Economic Strategy and County Development plans), as well as other local authority database information were used to define the socio-economic and tourism baseline of the study areas.

The tourism facilities have been classified into parks and open spaces, beaches and coastal trails and sports facilities.

Activities that could result in potentially significant impacts include:

- Direct employment generated through the construction and routine operation of the proposed development,
- Indirect employment created and/or sustained in suppliers to the proposed development. These jobs represent the combined effects through the supply chain as initial suppliers make purchases from their suppliers and so on,
- Induced employment supported by the wages and salaries of workers employed both directly by the proposed development, and indirectly by suppliers to the proposed development, and
- Impacts upon tourism and recreation including direct impacts upon local tourism businesses as a result of the proposed development.

Described below is the range of likely socio-economic, tourism and recreation effects arising from the construction, operation, and decommissioning of the offshore and onshore infrastructure of the proposed development:

The Developer undertook an independent and detailed study of the expected employment creation as a result of the proposed development. During construction, there will be 1181 jobs created, positively impacting employment and generating €59,495,675 in Gross Value Added (GVA), thereby contributing positively to the region's economy in the short term.

Therefore, the impact on employment and GVA during the construction phase is considered to be positive, short-term and significant.

The construction of offshore wind turbines and offshore substation platform may briefly affect the scenic views for tourists but will not significantly impact maritime tourism as there are no existing recreational boat trips in the area. Temporary safety zones will be in place around the offshore construction sites. However, construction in the offshore area will not significantly affect recreational boating as the advisory safety zones, will mainly be around individual structures.

Overall, the impact on tourism is expected to be minor due to the short-term and neutral nature of the effect, and the low sensitivity of the environment. In terms of onshore construction, access to part of Bremore Beach will be restricted for up to four months during installation of the cable at the landfall for safety reasons. However, pedestrian access to Bremore Beach will be maintained to the south of the proposed development boundary at the landfall site to allow for public enjoyment of the remainder of Bremore Beach. Installation of the cable at the landfall is not expected to affect marine water quality or designated bathing beaches. Onshore construction might disrupt walking and cycling routes The overall level of significance of the impact on tourism is estimated to slight, temporary negative.

The construction of both offshore and onshore development areas will bring workers to the region, temporarily, potentially increasing demand for local infrastructure like accommodation and healthcare facilities. However, the overall effect is expected to be minimal.

While road diversions during construction may impact the local communities' access to recreational amenities, efforts will be made to maintain access through appropriate diversions. This might moderately affect traffic and accessibility temporarily. However, there will not be significant effects on recreational, community, and social facilities in the long term.

Therefore, the overall impact on offshore tourism and recreation during the construction phase is expected to be neutral and short-term (i.e. not significant in EIA terms).

During operation, there will be 2,768 jobs created, positively impacting employment and generating €107,564,781 in GVA, thereby contributing positively to the region's economy in the long term. A Community Benefit Fund will be established which is expected to contribute €4 million per annum for 20 years to support local communities. This fund will allow communities to develop new and existing initiatives in their area throughout the duration of the operational phase. Therefore, the overall impact on employment and GVA during the operational phase is considered to be positive, long-term and significant.

The operation and maintenance of both onshore and offshore infrastructure of the proposed development is not expected to affect tourism sites, including those near the landfall site and along the cable route. There will not be any significant visual or landscape effects on tourism areas during the operational phase. There might be opportunities for marine tourism to visit the offshore development area. The impact is considered low as will be neutral and long-term, and the environmental sensitivity is low. Overall, the effect on tourism sites from operation and routine maintenance operations is deemed not significant.

The operation of the proposed development will not disrupt recreational facilities along the onshore cable route. There will be minimal impact on visual aspects and traffic. Overall, the effect of the operation of the proposed development on recreational amenities is considered low and not significant.

During decommissioning, there will be 79 jobs created, positively impacting employment and generating €3,630,745 in GVA, thereby contributing positively to the region's economy in the short term. Therefore, the overall impact on employment and GVA is considered to be positive, short-term and moderate. It is also noted that decommissioning the proposed development will result in the loss of jobs created during the operational phase. Therefore, a negative, permanent, and significant impact on employment and GVA as a result of the loss of these jobs is expected.

The decommissioning of the proposed development might temporarily disrupt tourist activity onshore, but it will be localized and short-lived. Any marine tourism associated with trips to the offshore wind farm will also stop. While the impact is considered medium due to its negative and permanent nature, the overall significance is slight given the low sensitivity of the environment. During the decommissioning phase, there may be minor disruption from decommissioning traffic onshore. However, accessing social and community facilities should not be significantly affected. The impact is expected to be low, being temporary and negative, with the environment's low sensitivity resulting in an overall insignificant effect.

As the significant effects noted as a result of the proposed development are generally positive and beneficial no mitigation measures are proposed.

Given that the Phase One projects will also each be providing Community Benefit Funds, it is considered reasonable to assume that a cumulative positive significant (or greater) effect will arise. No likely significant cumulative effects are predicted to tourism and recreation receptors.

No negative transboundary effects are anticipated from the proposed development on socioeconomics, tourism or recreation. It is noted that the manufacturing of the components for the proposed development will be undertaken overseas, which will support existing, or create new employment in the production facilities. However, the scale of such employment is unlikely to be significant relative to the total employment in the countries, in which they are located. Therefore, there are no negative significant transboundary effects on socio-economic, tourism and recreation predicted.

32. Major Accidents and Disasters

An assessment was undertaken of the likely significant effects on the environment due to the vulnerability of the proposed development to the risk of major accidents and/or disasters during the construction, operation and decommissioning phases. The potential for the proposed development to cause major accidents and/or disasters, and the consequent likely significant effects on the environment, were also addressed.

The following key definitions were used:

Accident – something that happens by chance or without expectation;

Disaster – a natural hazard (e.g. earthquake) or a man-made external hazard (e.g. act of terrorism) with the potential to cause an event or situation that meets the definition of a major accident;

The assessment of major accidents and disasters considered the occurrence of extreme and highly unlikely incidences. These were accident scenarios that would not reasonably be covered by the other specialist assessments in the EIAR.

The study area for the assessment was the area within and adjacent to the proposed development boundary.

A desk-based study was undertaken in order to establish the baseline environment for the risk assessment.

As outlined in guidance, the local, regional and national context was established prior to completion of the risk assessment to obtain a better understanding of the vulnerability and resilience of the area to emergency situations.

The site-specific risk assessment identified and quantified risks from unplanned, but possible and plausible events occurring the construction, operation and decommissioning of the proposed development.

The following steps were undertaken as part of the site-specific risk assessment –

- Risk event identification;
- Risk classification, likelihood, and consequence; and
- Risk evaluation.

Embedded mitigation measures were considered to determine the likelihood of the potential risk events occurring. Mitigation was not applied in determining the consequence rating.

A risk matrix was used to determine the level of significance of each risk event. The risk matrix had three categories – high risk, medium risk and low risk. Major accident and/or disaster risk events that were classified as high or medium risk were brought forward for further consideration.

Twenty eight construction, 18 operation and 16 decommissioning risk events were considered during the site-specific risk assessment. Two construction phase risk events were identified as medium risk, based on the absence of control measures to limit the consequence. All other risk events were classed as low risk and were not considered further.

One medium risk event was a cliff collapse at landfall during HDD activities. This would have the consequence of the loss of a habitat listed in Annex 1 of the EU Habitats Directive. With the implementation of adequate control measures including workforce training and adherence to good industry practice, the consequence should be minimised. No additional mitigation measures were proposed.

The second medium risk event was damage to the Interconnector 1 or 2 gas pipelines during the construction of the onshore cable across it. This event could result in significant loss of life or serious injury, and serious economic and societal consequences. With the implementation of adequate control measures including workforce training, adherence to good industry practice and compliance with the relevant guidance, the consequence should be minimised. No additional mitigation measures were proposed.

It is considered that the control measures which will be in place will limit the consequence of the two Medium Risk events identified in the assessment. Therefore, no likely significant negative residual effects are predicted.

Both project partners Statkraft and CIP operate a zero-harm philosophy across all their projects and have through their existing portfolios developed a series of dedicated standards, policies, procedures and processes to ensure all foreseeable consequences and impacts of their actions are mitigated so far as reasonably practicable. The Developer commits to working collaboratively with all stakeholders to deliver the proposed development safely and responsibly.

The cumulative effects assessment presents an outcome of no likely significant cumulative effects with the potential to cause a major accident or disaster or result in the proposed development being vulnerable to a major accident or disaster during the construction, operation or decommissioning phases of the proposed development.

No transboundary effects in relation to risks of major accidents and/or disasters have been identified, taking into account the information provided in other EIAR Chapters including the Shipping and Navigation Chapter, the Aviation and Radar Chapter and Volume 3, Chapter 20: Infrastructure and Other Users.

33. Next Steps

The planning application, the EIAR and the NIS may be inspected free of charge, or may be purchased on payment of a specified fee (which fee shall not exceed the reasonable cost of making such copy) during public opening hours for a period of eight weeks commencing on 14th of June 2024 at the following locations:

The Offices of An Bord Pleanála,
64 Marlborough Street,
Dublin 1,
D01 V902.

The Offices of Dublin City Council,
Planning Department,
Civic Offices,
Wood Quay,
Dublin 8,
D08 RF3F.

The Offices of Fingal County Council,
Planning and Strategic Infrastructure Department,
County Hall,
Main Street,
Swords,
Co. Dublin,
K67 X8Y2.

The Offices of Meath County Council,
Planning Department,
Buvinda House,
Dublin Road,
Navan,
Co. Meath,
C15 Y291.

The Offices of Louth County Council,
Planning Department,
Millennium Centre,
Dundalk,
Co. Louth,
A91 KFW6.

The application, the EIAR and the NIS have been published on the website created by North Irish Sea Array Windfarm Limited for the purpose of the application:

https://northirishseaarraysid.ie/

The Department of Housing, Planning and Local Government EIA portal: http://housinggovie.maps.arcgis.com/apps/webappviewer/index.html?id=d7d5a3d48f104ecbb206e7e5f84b71f1 provides a link to the application.

Submissions or observations may be made only to An Bord Pleanála, 64 Marlborough Street, Dublin 1, D01 V902 in writing or online on An Bord Pleanála's website www.pleanala.ie during the above-mentioned period of 8 weeks in respect of:

(i) the implications of the proposed development for maritime spatial planning,

(ii) the implications of the proposed development for proper planning and sustainable development, and

(iii) the likely effects on the environment or any European site of the proposed development, if carried out.

Any submissions/observations must be accompanied by a fee of €50 (except for certain prescribed bodies) and must be received by An Bord Pleanála not later than 5.30 p.m. on the 9th of August 2024.

An Bord Pleanála may in respect of an application for permission:

a) grant the permission subject to such modification (if any), to the proposed development as it may specify, or

b) grant the permission in respect of part of the proposed development concerned subject to such modifications (if any) to that part as it may specify,

- and any of the above decisions may be subject to or without conditions,
- or

c) refuse to grant the permission.

Any enquiries relating to the application process should be directed to the Marine Area Planning Section of An Bord Pleanála (Tel, 01 8588100)

NISA

North Irish Sea Array

Statkraft

CIP
Copenhagen Infrastructure Partners

GoBe
APEM Group

ARUP