Environmental Impact Assessment Report

NISA

North Irish Sea Array

Volume 2: Introductory Chapters

Chapter 7
Description of the Proposed Development - Onshore

Statkraft

CIP
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7.1 Overview of the Proposed Development

The North Irish Sea Array (NISA) Offshore Wind Farm, located off the coast of counties Dublin, Meath and Louth (hereafter referred to as the 'proposed development'), is the subject of this Environmental Impact Assessment Report (EIAR). The proposed development is a combination of offshore infrastructure and onshore infrastructure. The proposed development boundary is shown in Volume 7, Figure 1.1. The proposed development is being developed by North Irish Sea Array Windfarm Limited (the Developer).

For clarity, while the proposed development is assessed as a whole in this EIAR, the boundary between onshore and offshore infrastructure is the high-water mark (HWM) as defined by Tailte Éireann mapping[1]. Image 7.1 illustrates the offshore and onshore infrastructure of the proposed development and the interface between each.

For the purposes of the EIAR, the proposed development landward of the HWM (i.e. onshore infrastructure) is described in this chapter. The proposed development seaward of the HWM (i.e. offshore infrastructure) is described in Volume 2, Chapter 6: Description of the Proposed Development – Offshore, (hereafter referred to as the Offshore Description chapter). Both Chapters 6 and 7 should be read together for full details of the proposed development.

The construction of the offshore infrastructure is described in Volume 2, Chapter 8: Construction Strategy-Offshore (hereafter referred to as the Offshore Construction chapter) whilst the construction of the onshore infrastructure is described in Volume 2, Chapter 9: Construction Strategy – Onshore (hereafter referred to as the Onshore Construction chapter). Both Chapters 8 and 9 should be read together for full details of the construction of the proposed development.

This chapter is accompanied by figures which provide an overview of the onshore infrastructure: Figure 7.1 which shows the whole onshore development area, Figure 7.2 which shows the Landfall site and the grid facility and Figure 7.3 which shows the onshore cable route. These figures can be found in Volume 7 of the EIAR. The various elements of the onshore infrastructure are also shown in more detail in the planning drawings which are included as Appendix 7.1 of this chapter.

[1] The High Water Mark used in this EIAR and planning application is the High Water Mark dataset from Tailte Éireann (formerly Ordnance Survey Ireland), published in May 2022. This High Water Mark digital dataset is derived from relevant 6 inch and 25 inch Ordnance Maps with any alterations in accordance with the Boundary Survey Acts Ireland, approved by the Chief Boundary Surveyor and signed off in Privy Council Orders. The dataset also includes changes to HWM brought about by subsequent Maritime Orders

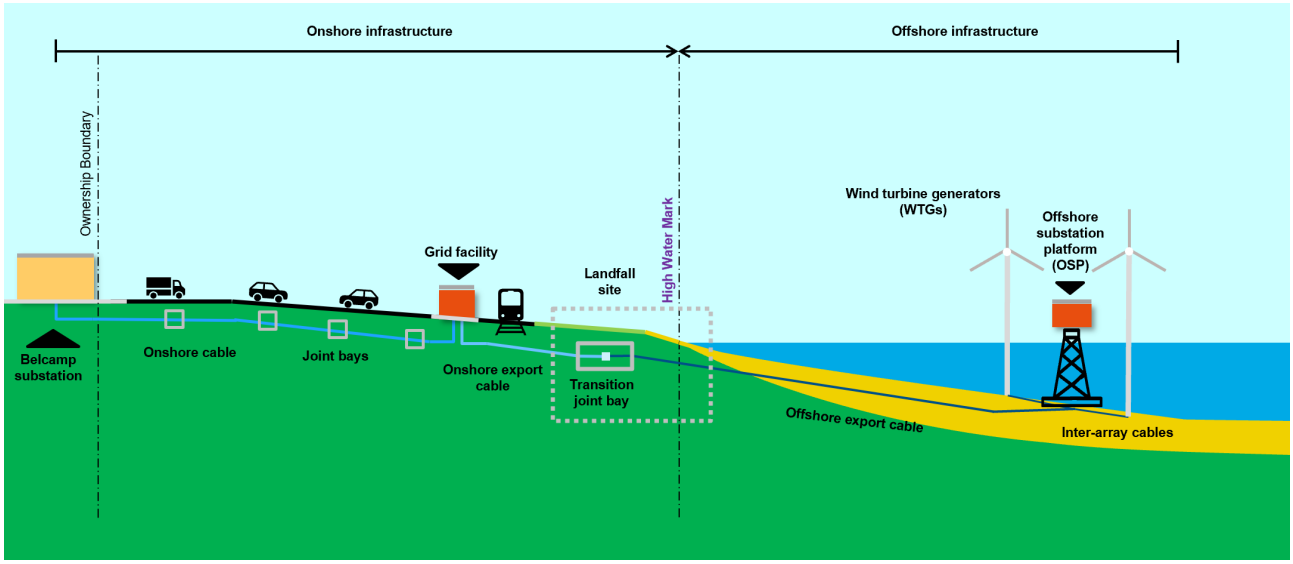

Image 7.1 Infrastructure of the proposed development (not to scale)

7.2 Overview of Onshore Infrastructure

7.2.1 Introduction

This chapter has been prepared in accordance with Part 1 of Annex IV of the EIA Directive (Directive 2014/52/EU) by providing detail on the design parameters that form the basis of the proposed development consent application and has been structured to describe the location, design, operation, and decommissioning of the onshore infrastructure with the construction of onshore infrastructure covered in the Onshore Construction Chapter.

The onshore infrastructure of the proposed development is located within the proposed development boundary landward of the HWM. This is referred to as the 'onshore development area' and is within the jurisdiction of two local authorities: Fingal County Council (FCC) and Dublin City Council (DCC). The proposed development boundary for the onshore infrastructure is shown on Figure 7.1 which highlights the following key elements:

- Landfall site: this is where the 220 kV high voltage alternating current (HVAC) offshore export cables come onshore. The landfall site is described in more detail in Section 7.3 and shown on Figure 7.2. The landfall site will be in the townland of Bremore, north of Balbriggan, Co. Dublin. In terms of the onshore infrastructure, the landfall will comprise of infrastructure landward of the HWM as follows:
  - Offshore export cables from the HWM to the transition joint bays (TJBs);
  - TJBs, which are the point at which the offshore (subsea) export cables transition to the onshore export cables; and
  - Onshore export cables from the TJBs to the grid facility.
- Grid facility: The onshore export cables terminate at the grid facility, which is located in Bremore, just north of Balbriggan and is comprised of two distinct substations on the same site: the compensation substation and the Bremore substation. When the onshore export cables enter the grid facility, they are connected to the compensation substation. A connection is then made between the compensation substation and the Bremore substation. Power leaves the Bremore substation via the onshore cable route. The grid facility is described in more detail in Section 7.4 and shown on Figure 7.2.

- Onshore cable route: 220kV HVAC cables (in two cable circuits) will be laid underground from the grid facility to the grid connection point at the existing substation at Belcamp. Each cable circuit will comprise the electrical cables, earthing and communications cables. The onshore cable route, which is approximately 33-35km[2] in length, is described in more detail in Section 7.5 and shown on Figure 7.3.

7.2.2 Location of onshore infrastructure within the proposed development boundary

North Irish Sea Array Windfarm Limited (hereafter referred to as 'the Developer') has defined a proposed development boundary which provides some necessary local flexibility regarding the placement of project infrastructure. Whilst in some locations this means that the proposed development boundary is larger than the likely final construction footprint, this approach provides confidence that the proposed development will be constructable entirely within the proposed development boundary. The proposed cable infrastructure centreline is shown on Figure 7.3 and on the planning drawings (Appendix 7.1) but remains subject to the final permitted location of other infrastructure and to the tolerance for immaterial deviation from the location shown. Thus, the location for cable infrastructure indicated may change within the proposed development boundary. The EIAR has been authored in line with this approach and presents an assessment of significant effects resulting from the construction, operation and decommissioning of the proposed development within the proposed development boundary.

Most of the onshore infrastructure - with the exception of the grid facility - will be below ground. Access covers to below ground access pits, cable marker posts and a limited number of permanent access tracks will be visible following completion of the works, but the remainder of the lands required for cable construction will be reinstated following completion of the works. The grid facility will be predominantly above ground such as buildings, electrical equipment, access roads, etc. as described in Section 7.4.

The key design parameters of the onshore infrastructure are described in more detail in Sections 7.3 to 7.5.

7.2.3 Land Requirements

7.2.3.1 Land Acquisition

The lands required for the grid facility will be permanently acquired for the purposes of the proposed development. Land will also be permanently acquired at one location along the cable route (Blakes Cross North). At other locations within the proposed development boundary, such as where the offshore export cables make landfall or the onshore underground cable is routed through private lands, wayleave agreements will be made with the relevant landowners. Letters of Consent have been provided by private landowners within the proposed development boundary.

7.2.3.2 Cable Route Wayleaves and Construction Corridor

Where possible, the onshore cable will be laid in the public road in accordance with EirGrid Functional Specifications (CDS-GFS-00-001-R1). The proposed development boundary will generally be limited to the width of the public road but in some instances will encompass off-road sections in private land where it is technically not feasible to maintain the route entirely within the road.

Where the proposed development boundary runs along field boundaries, temporary and permanent access tracks (unless existing tracks in such locations are being utilised) will not be sited within 3m from the edge of the hedgerow vegetation and no other construction works or activities will be sited within 5m of the hedgerow vegetation.

Where the onshore cable route is located within public roads, the removal of any trees or vegetation alongside the road will be avoided as much as practicable.

[2] The final route length depends on which of the alternative route options as detailed herein and included in the consent application, is selected at construction stage.

Permanent wayleaves will be required along the cable route to allow access for future maintenance. In instances where cables are routed across private lands, the width of the permanent wayleave, which has been agreed with the landowners, is approximately 8m and the agreed temporary working width will vary depending on the location. The underground cable will generally be routed along the centreline of the permanent wayleave.

The temporary working width will give sufficient area for the excavation of the trench, storage of topsoil and subsoil arisings plus a haul road for the movement of the excavation equipment and general installation vehicles for the delivery of materials such as ducting, protective covers and bedding. The temporary working width for cable construction will depend on the width of the road or lane. Where feasible, if the road or lane is wide enough, one carriageway will remain open to traffic with localised lane closures if necessary. Further information on working widths is provided in the Onshore Construction chapter.

The proposed cable centreline is shown on Figure 7.3, and in closer detail on the planning drawings (Appendix 7.1). In the event of unforeseen circumstances arising during construction, it may be necessary for the cable to deviate from the centreline position and be positioned anywhere within the proposed development boundary.

Within the permanent wayleave where it crosses farmland, the wayleave agreement allows the planting of crops and shallow rooted plants, to facilitate ongoing agricultural use. The agreement does not allow for planting of deep-rooted plants or construction of buildings.

7.3 Landfall Site

7.3.1 Landfall Location and Context

The landfall site is where the two offshore export cables reach the shore and extends landward from the high water mark (HWM) as far as the grid facility. The site identified for landfall is located north of Balbriggan and as shown on Figure 7.2, it is located immediately south of Bremore Point in the townland of Bremore in North County Dublin.

The landfall site consists of undulating agricultural fields with relatively few dwellings in the immediate vicinity. The Dublin to Belfast railway line passes through the agricultural fields in a north-south direction and the R132 road lies immediately to the west of the landfall site.

Further detail of the landfall site is included in section 6.10.2 of the Offshore Description Chapter.

7.3.2 Landfall Infrastructure Overview

The onshore infrastructure of the proposed development within the landfall site is described in this section and shown on Figure 7.2 and in the planning drawings. As outlined in Section 7.2.1, the infrastructure includes:

- An underground crossing of the offshore export cables underneath the beach via a Horizontal Direct Drilling (HDD) technique.
- Transition Joint Bays (TJBs) – located close to the shoreline and installed once the offshore export cable HDD has been completed – which will contain the connections between the offshore export cables and the onshore export cables.
- From the TJBs, the onshore export cables will be trenched through agricultural fields, cross under the Dublin-Belfast railway line (via HDD) to the R132 and then trenched onwards to connect to the grid facility.

7.3.3 Transition Joint Bays

Two Transition Joint Bays (TJBs) will be located near to the shoreline at the landfall site: the TJBs are where the offshore (subsea) export cables transition to onshore (terrestrial) export cables via an underground crossing, underneath the beach via HDD. Typical drawings of the TJBs are shown on planning drawing 281240-ARP-ONS-XX-DR-PL-3006 *Typical onshore cable joint bay detail* in Appendix 7.1.

The TJBs and their associated construction compound will be located at least 50m from the sea cliffs which form one of the local ecological habitats described in Volume 4, Chapter 23: Biodiversity.

The TJBs are each typically 20m in length, 5m in width and 2.5m in depth. Within each TJB, the three-core offshore export cable is split out and jointed to a single onshore export cable comprising of three single-core cables. The TJBs are underground concrete chambers, which, after cable installation, will be reinstated to the original surface, with marker posts and an access road being the only permanent above ground infrastructure.

The TJBs will be backfilled with sand, with the ducts being locally surrounded in concrete and suitable backfill material being provided immediately below the existing surface layers to be reinstated.

The electrical cables pass through the TJBs with smaller communications chambers provided adjacent to the TJBs to accommodate the fibre optic cables.

Earth link boxes will also be provided adjacent to the TJBs with both the earth link boxes and communications chambers being finished with an access cover at ground level.

7.3.4 Onshore Export Cables

Two 220kV high voltage alternating current (HVAC) underground onshore export cables (comprising of three cores each) will connect the TJBs to the compensation substation within the grid facility. The cables will be contained within protective ducting. Each onshore export cable will also include a fibre optic cable to support the operation and control of the electrical infrastructure, and an earthing cable contained within the same ducting.

The onshore export cable route commences at the TJBs with the cables routed through private lands including an underground HDD crossing of the Dublin-Belfast railway line and an open cut trench crossing of the R132 to connect to the compensation substation within the grid facility. This section of the cable route, from the TJBs to the compensation substation is approximately 1km to 1.5km long, depending on the final landfall and TJBs location.

A typical cross section of one core is shown in Image 7.2 with the following relevant components:

- Conductor: The conductor will be standard compacted aluminium or copper conductor;
- Conductor screen: The extruded layer will be continuous and will cover the surface of the conductor completely;
- XLPE insulation: The dielectric layers over the conductor will be applied by a single pass dry type triple extrusion process;
- Insulation Semiconducting Layer: The outer semi-conducting layer will be extruded non-strippable type. It will be continuous, be uniformly bonded to the insulation and will cover the surface of the core completely;
- Longitudinal Water Barrier: An effective barrier to longitudinal water movement in the screen area will be provided;
- Cable Metallic Sheath: The metallic sheath will be either copper or aluminium wire screen with foil laminate or welded aluminium; and
- Outer Sheath: The black outer sheath will be of HDPE grade.

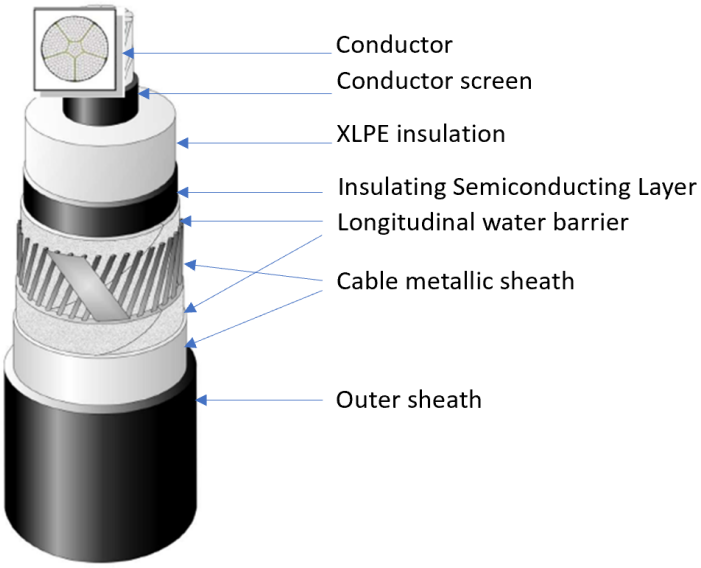

Image 7.2 Typical Onshore Export Cable core (Source: Statkraft)

The metallic sheath will be either copper or aluminium wire screen with foil laminate or welded aluminium. Each cable will be installed within ducts in either flat or trefoil formation, as shown in planning drawing 281240-ARP-ONS-XX-DR-PL-3000 *Typical cable trench details* in Appendix 7.1.

Appropriate protective measures, similar to those described in Section 7.5.4 below, will also be required.

7.3.5 Dublin-Belfast Railway Crossing

Horizontal Direct Drilling (HDD) will be used to enable the onshore export cables to cross underneath the Dublin-Belfast Railway line which is situated between the coastline and the R132 and runs in a north-south direction. Two bores will be drilled: one for each onshore export cable.

The location of the railway HDD crossing is shown on Figure 7.2. As the cables are installed at a greater depth than a typical trench, it may be necessary to increase the cable spacing to maintain the electrical rating of the cables. The depth of HDD's will be dependent on the ground profile and the cable spacing will be dependent upon the cable ratings but subject to final location selection and agreement with Irish Rail, is expected to be at a depth (to adjacent ground level) of approximately 10m with a separation between the two cable circuits at the railway crossing. The expected maximum outer diameter of the HDD bore will be approximately 965mm. The principles of this crossing have been discussed with Irish Rail and further details are provided in the Consultation Report in Appendix 1.2 of Volume 8. Prior to construction, the design and location of the exact crossing point within the proposed development boundary will be determined following further consultation and agreement with Irish Rail.

7.3.6 Permanent Access

Permanent access to the landfall site for maintenance purposes will be from the junction of the R132 and Bell's Lane - where a bituminous bellmouth will be formed to facilitate safe vehicular access along Bell's Lane - then along Bell's Lane to a point just to the east of the Dublin to Belfast railway line. From this point, permanent access tracks will be constructed to the Railway HDD entry site and to the landfall TJBs.

The tracks will be approximately 5 m wide and will consist of crushed stone with a stone blinding surface layer. During the operational phase of the proposed development, traffic using the access track for maintenance is expected to be minimal, other than for maintenance purposes.

7.4 Grid Facility

7.4.1 Grid Facility Site Location and Context

The grid facility will be located across two fields currently under agricultural use, in the townland of Bremore, Co. Dublin, and is shown on Figure 7.2. There are a number of houses in the vicinity of the grid facility site, with two residential dwellings immediately east of the grid facility and another residential dwelling located approximately 100m north-east of the grid facility. Residential dwellings are also located along Bremore Cottages and Dun Saithne View roads to the south, with the closest of these being approximately 150m from the grid facility site.

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.

7.4.2 Grid Facility Infrastructure

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 receives the onshore export cables originating from the landfall site. Two cables will then connect the compensation substation to the Bremore substation before the onshore cables (as described in Section 7.5) exit the Bremore substation.

The compensation and Bremore substations are described in further detail in the following sections.

The proposed grid facility layout is shown below in Image 7.3 and on Figure 7.2, with further detail provided on the grid facility planning drawings included in Appendix 7.1.

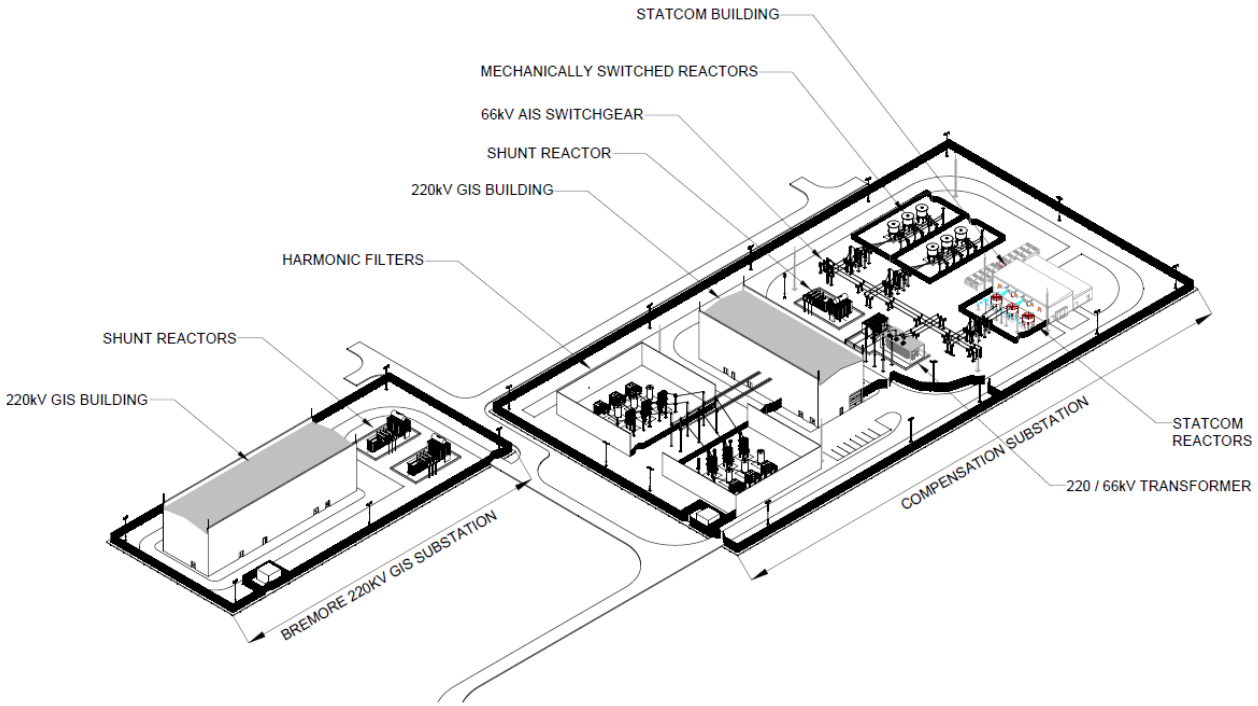

Image 7.3 Proposed grid facility which comprises the Compensation Substation and Bremore 220kV GIS Substation.

7.4.2.1 Compensation substation

The compensation substation will receive the onshore export cables. It will comprise of various high voltage electrical and ancillary equipment, some housed indoors within one of two substation buildings, and the remainder placed outdoors within the substation compound.

There will be two buildings within the compensation substation compound: the larger of the two will be the Gas Insulated Switchgear (GIS) building approximately 17 metres in height and the smaller of the two will be the Static VAR Compensator (Statcom or SVC) building approximately 7 metres in height.

GIS Building

The Gas insulated Switchgear (GIS) building will contain the 220kV GIS equipment, a control and protection room, battery room, welfare facilities, workshop, meeting room, storeroom and cable pit.

The dimensions of the building will be approximately 49m in length, 18.5m in width and 17m in height plus 3m lightning rods. The external finish of the 220kV GIS building within the compensation substation will be selected insulated metal wall cladding, or similar approved, in a matt dark grey/green colour as described in Volume 5, Chapter 29: Seascape, Landscape and Visual.

SVC Building and Associated Control Buildings and Transformers

An SVC (Static VAR Compensator or Statcom) building will be provided within the compensation substation compound, housing equipment and control panels and a 220/66kV transformer per 220kV export cable to ensure the proposed development will comply with the EirGrid Grid Code requirements.

The SVC 220/66kV transformer will step down the transmission system voltage from 220kV to the operating voltage of the SVC unit to allow this unit to function correctly and contribute to EirGrid grid code compliance and power quality requirements.

The dimensions of the SVC building will be approximately 23m long x 18m wide x 6.85m high. The external finish of the building will be metal clad, in a matt dark grey/green colour as described in Chapter 29: Seascape, Landscape and Visual.

Mechanically Switched Reactors

Two Mechanically Switched Reactors combined with the STATCOM will be provided to ensure the proposed development complies with the EirGrid Functional Specifications regarding voltage control and grid stabilisation. The STATCOM would be primarily for dynamic compensation, while the Mechanically Switched Reactors would be for reactive compensation under steady state. The STATCOM controller will control the Mechanically Switched Reactors

The mechanically switched reactors will be located outdoors within the compensation substation compound.

Harmonic Filters

Two sets of harmonic filters will be provided to ensure the proposed development will comply with the EirGrid Grid Code requirements.

The harmonic filters will consist of three lines of interconnected pieces of equipment, a capacitor bank, resistor and reactor. The installed dimensions (approximate) will be:

- Capacitor bank – 12m long x 3.5m wide x 3.5m high
- Resistor – 6m long x 3m wide x 3m high
- Reactor – 7m long x 5m wide x 5m high.

The harmonic filters will be located outdoors within the compensation substation compound. The equipment will be surrounded by a c. 2m high fence to restrict access on one side with 3m high environmental screens on three sides to screen the components.

Shunt Reactor

A shunt reactor will be provided to compensate the reactive power from the cables' and ensure the proposed development will comply with the EirGrid Grid Code requirements. The shunt reactor will be located outdoors within the compensation substation compound.

Lightning Arrestor Mast

Lightning arrestor masts, maximum 30m high, will be provided in the compound. This will ensure the external electrical equipment will be protected from lightning strikes throughout the lifetime of the proposed development.

Standby Generator

For powering the auxiliary systems of the substation there are three independent power supplies (from separate power sources). There will be a 10kV or 20kV supply from the local distribution network to both substations and standby diesel generators, located outdoors within the compensation substation compound, that will be available for operation in the event the normal auxiliary supply is lost. The standby generator will likely be one 2MVA unit housed in a weatherproof enclosure and located upon a concrete bund. Since the latter is a secondary reserve, use will be limited to testing; circa one day per month.

Storage of Liquids and Gases

The coolant, which will be either distilled water or glycol (depending on the contractor employed), will be the only liquid stored in bulk on site, apart from the diesel fuel storage for the standby generator. Coolant will be stored in special standby tanks located in the cooler pump room. The cooler pump room will be adjacent to the SVC building.

7.4.2.2 Bremore substation

Underground cables will connect the compensation substation to the Bremore substation, which is located adjacent, within its own self-contained compound.

The Bremore substation (Image 7.3), will have a footprint of approximately 50m x 115m and will comprise a Gas Insulated Switchgear (GIS) substation building, shunt reactors, and a diesel generator along with other electrical equipment and below/above ground cabling connecting the electrical equipment to each other. Further details on the main components of the Bremore substation are provided below.

GIS Building

The GIS building will contain the 220kV GIS equipment, control and protection rooms, battery room, welfare facilities, workshop, storeroom and cable pit.

The dimensions of the building will be approximately 61m in length, 18.5m in width and 17m in height plus 3m lightning rods. The external finish of the GIS building will be selected insulated metal wall cladding, or similar approved, in a matt dark grey/green colour as described in Chapter 29: Seascape, Landscape and Visual.

Shunt Reactor

A shunt reactor will be provided for each 220kV onshore cable to ensure the proposed development will comply with the EirGrid Functional Specifications. The shunt reactors will be located outdoors within the Bremore substation compound.

Standby Generator

For powering the auxiliary systems of the substation there are two alternative power supplies. There will be a 10kV or 20kV supply from the local distribution network to both substation compounds and standby diesel generators, that will be available for operation in the event the normal auxiliary supply is lost. The standby generator will likely be one 2MVA unit housed in a weatherproof enclosure and located upon a concrete bund. Since the latter is a secondary reserve, use will be limited to testing; circa one day per month.

7.4.3 Ancillary Grid Facility Infrastructure

Both the compensation substation and Bremore substation compounds are contained within a wider grid facility compound, with ancillary infrastructure as described below.

7.4.3.1 Utilities

The grid facility will have the following utility connections:

- **Potable Water**: The grid facility will be operated remotely and will be unmanned during operation. There will be occasional visits for inspection and maintenance. As a result, welfare facilities will be provided for which there will be a potable water supply. This will be provided by a new watermain which will connect to the existing watermain located just outside the grid facility within the R132 and will be laid along the proposed site access road, to the welfare facilities. The proposed connection is expected to be approximately 32mm diameter (subject to confirmation by Uisce Eireann at connection stage). A pre-connection enquiry has been made to Uisce Eireann, with a Confirmation of Feasibility received from Uisce Eireann confirming there is adequate capacity within the existing network to serve the proposed development and is included as Appendix 7.2. The Uisce Eireann pre-connection enquiry reference is CDS23001563.
- **Foul Drainage**: As described above, welfare facilities will be provided for occasional visits to site and as a result foul wastewater generated will be minimal. Foul wastewater will be collected from the welfare facilities, contained in below ground prefabricated tanks (with level indicator alarms) and removed from site periodically, by a licensed service provider, to a local wastewater treatment plant.
- **Surface Water Drainage:** Surface water runoff generated on site will be managed by a new dedicated surface water network. Runoff from impermeable yard areas and site roads will be collected by swales and filter drains before discharging to a series of buried carrier pipes. Runoff from buildings and equipment slabs will be collected by rainwater downpipes/gullies and similarly will be discharged into the carrier pipe network.

  The vast majority of the surface water will discharge to an existing ditch located to the northwest of the site. Due to existing site levels, a small portion of the site near the entrance to the grid facility will discharge locally to the existing roadside drainage network.

  The operational surface water runoff from the site will be restricted to match existing greenfield runoff rates via a flow control device (e.g. Hydrobrake). Attenuation in the form of an attenuation basin will be provided upstream of the flow control device to cater for instances where the instantaneous runoff rate from the site exceeds the restricted runoff rate. The attenuation basin has been sized to cater for all run-off from the grid facility site, with an allowance of 20% for climate change, and restricting outflows to greenfield run-off rates of 2l/ha/sec, in accordance with the Greater Dublin Regional Code of Practice for Drainage Works[3]. The attenuation basin will have a c. 1.5m track around its perimeter for maintenance purposes.

  Water quality will be managed by applying a treatment train approach in line with Sustainable Drainage (SuDS) principles. Filter drains will provide an at source treatment stage for runoff from areas of hard standing. A hydrocarbon interceptor will be provided upstream of the attenuation basin as a secondary treatment stage. Fuel tanks will be located in concrete bunds to ensure any spillages do not inadvertently enter the surface water network. Suitable oil separation systems will be in place on the bund outlet to satisfy the EirGrid functional specifications.

[3] Greater Dublin Regional Code of Practice for Drainage Works, V-06: https://www.dublincity.ie/residential/environment/water-and-wastewater/greater-dublin-regional-code-practice

- **Telecoms and Electrical Supply**: New connections will also be provided to the grid facility for telecoms and electrical supply, from existing utility services adjacent to the site. An existing ESB overhead MV line traverses the grid facility site. Due to the proposed location and height of the compensation substation the line will require a diversion. It is proposed to divert the line within the boundary of the grid facility site.

7.4.3.2 Security Fencing & CCTV

A 2.6m high security palisade fence will be installed around the perimeter of the grid facility compounds and the perimeter of overall site, with perimeter gates for vehicular and pedestrian access. CCTV cameras will be installed along the perimeter for security purposes and will be monitored remotely.

7.4.3.3 External Lighting

The lighting system will provide adequate illumination to allow personnel to move without risk to health and safety. Security lighting will be installed against the building and lighting poles of at least 6m height will be installed for illuminating the external area between buildings, transformer and reactor area and within the perimeter walls.

Under normal operating conditions, external lighting would be switched off during the hours of darkness, to avoid creating any unnecessary glare in the night sky. The exception would be for emergency repairs to outdoor equipment, where high-level illumination would be switched on. The use of motion sensor technology is likely to be implemented to control lighting at access doors, security gates, etc.

7.4.3.4 Permanent Access and Site Surfacing

A new access road, to provide access and egress from the grid facility site will also be provided. This access road will be shared by both substations.

Improvements will be made to the existing field entrance including an entrance gate set back from the public road and a bituminous bellmouth (designed to provide appropriate sightlines) will be formed at the junction where the permanent access track meets the public road, to facilitate safe vehicular access and egress. To facilitate access/egress to the site for abnormal loads (e.g. the transformer delivery), the ground to the northwest of the entrance (within the site) will also be reinforced and the fencing in this area will be removable fencing, to facilitate this abnormal load.

The permanent access road within the grid facility will be approximately 5m in width and will be a compacted stone road with a surface dressing or bitumen finish. The access roads within each of the substation compounds will be reinforced concrete in accordance with the Eirgrid Functional Specifications. Site surfacing (other than site access roads) will consist of clean, hard 300mm natural gravel or crushed stone compacted and lightly rolled. Site surfacing will be placed after installation of services and cables.

Filter drains, connected to the surface water drainage system, described above, will collect surface water run-off from yard areas.

7.4.4 Landscaping

The grid facility will be screened by landscape planting around its perimeter in order to mitigate the visual impact of the new infrastructure: the proposed landscaping and planting is shown on the grid facility landscape plan (planning drawing 281240_MCR_ONS_GF_DR_YE_1010 *Grid facility Landscape Plan* in Appendix 7.1). The proposed perimeter planting measures around the substation compounds have been designed in conjunction with the project ecologists in order to maximise the benefit of both visual screening and to biodiversity. The planting consists of native woodland and hedgerow species which will be planted as a combination of small whips and advanced nursery stock (3-4m high trees) in order to allow for resilient and dense establishment.

Also shown on the landscape plan is an attenuation basin – a sustainable urban drainage (SuDS) design feature which will be provided to the west of the compensation substation will hold water in the event of high rainfall, ensuring discharge to the existing surface water system is at greenfield rates. The attenuation basin will be up to 70m in length and 15m in width.

Photomontages of the proposed grid facility are provided in Volume 7B of the EIAR: these show the proposed grid facility infrastructure as it would be seen from a variety of local vantage points. Refer also to Chapter 29: Seascape, Landscape and Visual Impact Assessment, in Volume X which details the potential landscape and visual effects of the proposed grid facility on the surrounding environment.

7.4.5 Operation and Maintenance at Grid Facility

Both substations will be unmanned and operated remotely. It is expected that one or two vehicles may attend each substation every four weeks for an inspection. Each inspection will be approximately four hours and will occur within normal working hours, however it may be necessary for maintenance personnel to access the site on an ad-hoc basis if required, for example in the event of an electrical fault or outage. Additional annual maintenance will be required throughout the operational phase of the proposed development.

7.5 Onshore Cable Route

7.5.1 Cable Route Location and Context

The onshore cable route runs for approximately 33-35km between the proposed grid facility just north of Balbriggan, to an existing electrical substation at Belcamp on the northern outskirts of Dublin. The majority of the route – approximately 29km out of the 33km – is contained within the footprint of existing roads including the R132, the R106 and other local roads. The full route is shown on Figure 7.3.

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

Further detail regarding the onshore cable route and the cable technology to be utilised is provided in Sections 7.5.2 to 7.5.9 below. All of the works required to install the onshore cable will be located within the proposed development boundary.

7.5.2 Cable Route Description

From the grid facility, two 220kV HVAC cable circuits will be laid underground from the proposed Bremore substation to the existing substation at Belcamp, in either a single trench arrangement (one trench accommodating all electrical cables, fibre-optic and earthing cables) or in twin-trench arrangement (with each cable circuit contained within its own trench). This variation in trench arrangement will be utilised to ensure the cable route can navigate through areas of high utility congestion and minimise the likelihood of disruption during the construction phase associated with works to existing utilities. The onshore cable route is shown on Figure 7.3 across nine sheets and is also presented in in greater detail across the planning drawings 281240-ARP-ONS-CR-DR-PL-1110 through 281240-ARP-ONS-CR-DR-PL-1164 (Appendix 7.1).

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

- To the north of Ballough, the route includes an option to deviate offline from the R132 in order to cross a watercourse (Wx10).
- At Blakes Cross north, the route deviates offline from the R132 in order to cross a watercourse (Wx11).
- At Blakes Cross south, the route includes an option to deviate offline from the R132 in order to cross two watercourses (Wx12 and Wx13).
- At Lissenhall Little, the route deviates offline from the R132 in order to cross under the M1 motorway.
- In Seabury, the route includes an option to deviate offline from the R106 Swords Road in order to cross a watercourse (Wx20).
- At Kinsaley, the route includes an option to deviate offline from the R107 Malahide Road in order to cross a watercourse (Wx22).

- At Belcamp, the route turns north offline from the R139 in order to connect into the Belcamp substation.

Further details of how the onshore cable route traverses watercourses and the M1 are included in Section 7.5.9.

Where the onshore cable route traverses private land, the cable route will be as far as possible adjacent to field boundaries. For some sections, where following the boundary would result in much longer cable runs or would produce excessive cable bends, a more direct route has been selected, adhering to the principle of minimising environmental constraints.

The roads or private land along the onshore cable route will be reinstated and returned to their current use post-construction, although in the case of private lands, future access for inspection and maintenance purposes will be required at particular locations. The chosen route reduces the crossings of roads and watercourses to a practical minimum and avoids significant environmental constraints such as designated sites.

At Blakes Cross north, where the cable route goes off-line to cross a watercourse (Wx11), additional landscaping measures are proposed. The landscaping proposed in this location is shown on planning drawing 281240_MCR_ONS_GF_DR_YE_1011 *Blakes Cross North Landscape Plan* , in Appendix 7.1 and includes the planting of a species rich grassland to the south of the cable route, within the proposed development boundary and the retention and widening of the existing hedgerow along the proposed development boundary. A strip of approximately 8 m width centred around the final cable route alignment (with a minimum of 5 m from the cable trench) will be left without any woody species to allow for cable maintenance.

Once construction is completed, the only visible above ground structures along the onshore cable route will be small marker posts to indicate the location of the cables and manhole covers associated with joint bays, link boxes and communications chambers.

A number of temporary haul routes are required for the construction phase of the proposed development, to enable access to offline areas of construction. These temporary haul routes will be reinstated following completion of construction. A number of permanent access tracks are also required, which will enable access to joint bays and other areas, during the operational phase. These temporary and permanent access tracks/haul routes are identified on the planning drawings as referenced in Section X above and included in Appendix 7.1. Where possible, existing field entrances and access tracks have been utilised.

Where the access tracks/haul routes cross existing drainage channels or field ditches, other than watercourses (refer to Section 7.5.7.2 for details of watercourse crossings), the channel or ditch would be culverted with a suitably sized large pipe or box culvert and the access track / haul routes constructed over. The pipe or culvert for access tracks / haul routes required for construction only will be removed post construction and the channel / ditch reinstated to existing condition, for permanent access tracks the pipe or culvert would be retained.

The following sub-sections describe the proposed route of the onshore cable route, starting at the grid facility and working south to the connection at the Belcamp substation. The onshore cable route is displayed on Figure 7.3. The route sections used in the description of the onshore cable route are the same as those used in the Onshore Construction Chapter and those used in describing the effects of the proposed development in Volume 4, Chapter 24: Traffic and Transportation.

7.5.2.1 Route section 1

The onshore cable route leaves the Bremore substation within the grid facility and proceeds south down the R132/R132 Drogheda Street through the town of Balbriggan to the junction of the R132 and Harry Reynolds Road. The route crosses a watercourse, the Bremore Stream (watercourse crossing Wx01) near this junction.

The length of this route section is approximately 600m and is displayed on sheet 1 of Figure 7.3 as well as on the planning drawings in Appendix 7.1, drawing references 281240-ARP-ONS-CR-DR-PL 1110 to 281240-ARP-ONS-CR-DR-PL 1111.

7.5.2.2 Route section 2

The onshore cable route continues through the town of Balbriggan in a south-west direction, and then south, along Harry Reynolds Road to the junction of Hamilton Road and the R132, with the route crossing a watercourse, the Bracken River (watercourse crossing Wx02) just to the west of this junction. The watercourse crossing will be undertaken using either an in-road open cut trench or inline HDD method.

The length of this route section is approximately 1.8km and is displayed on sheet 1 of Figure 7.3 as well as on the planning drawings in Appendix 7.1, drawing references 281240-ARP-ONS-CR-DR-PL 1111 to 281240-ARP-ONS-CR-DR-PL 1113.

7.5.2.3 Route section 3.1

The onshore cable route continues south along the R132 as it passes through Gardners Hill, Balrothery, Knock Cross and Hedgestown, crossing five watercourses along the way (Wx03 – Knock Stream, Wx04 – Balrothery Stream, Wx05 – Balrickard Stream, Wx06 – Rowans Big Stream, Wx07 – Rowans Little Stream Wx08 – Courtlough Stream and Wx09 Oberstown Stream) to a point just north of the R132 junction with the L1155 Quickpenny Lane.

At this point the onshore cable route includes an option to deviate offline from the road to cross a watercourse (Wx10 – Aldrumman Stream). Alternatively, the cable will continue along the public road (R132).

The length of this route section is approximately 8km and is displayed on sheets 1-2 of Figure 7.3. This section of the route is also displayed in finer detail on planning drawings 281240-ARP-ONS-CR-DR-1113 to 281-240-ARP-ONS-CR-DR- 1124, in Appendix 7.1.

7.5.2.4 Route section 3.2

The onshore cable route continues south along the R132 as it passes to the west of the town of Lusk. It continues south down the R132 through the village of Corduff (Hackett) to a point just north of Blakes Cross.

The length of this route section is approximately 3km and is displayed on sheets 2-3 of Figure 7.3 as well as on the planning drawings in Appendix 7.1, drawing references 281240-ARP-ONS-CR-DR-1124 to 281-240-ARP-ONS-CR-DR- 1129.

7.5.2.5 Route section 4

North of Blakes Cross, the onshore cable route deviates offline from the R132 in order to cross a watercourse, the Ballough Stream (watercourse crossing Wx11). Just south of this watercourse crossing, the onshore cable route will be laid over the East West Interconnector, an electricity interconnector which is buried approximately 8m below ground at the point the onshore cable route will cross it.

The length of this route section is approximately 700m and is displayed on sheet 3 of Figure 7.3. This section of the route is also displayed in finer detail on planning drawings 281240-ARP-ONS-CR-DR-PL-1129 and 281240-ARP-ONS-CR-DR-PL-1130 in Appendix 7.1.

Proposals for landscaping mitigation of part of this route section to be implemented following construction are shown on planning drawing reference 281240_MCR_ONS_GF_DR_YE_1011 in Appendix 7.1.

7.5.2.6 Route section 5

The onshore cable route joins the R129 then continues east along the R129 to the junction with the R132.

The length of this route section is approximately 300m and is displayed on sheet 3 of Figure 7.3 as well as on the planning drawings in Appendix 7.1, drawing reference 281240-ARP-ONS-CR-DR-1130.

7.5.2.7 Route section 6

The onshore cable route continues south along the R132, passing Turvey business park, to a point just north of its crossing point under the M1 motorway.

Towards the north of this route section, at Blakes Cross, the onshore cable route includes an option to deviate offline from the R132 in order to cross two watercourses at water crossings Wx12– Ballough Stream and Wx13 – Ballyboghil Stream. An option is also included for the onshore cable route to continue inline down the R132 without deviating offline.

The Blakes Cross cable contractor compound will be sited offline in this route section during the construction phase.

The onshore cable route then continues south along the R132 to the M1 motorway, including a crossing of the Turvey Stream (watercourse crossing Wx14) along the R132 just south of its junction with Turvey Avenue.

The length of this route section is approximately 3km and is displayed on sheets 3-4 of Figure 7.3. This section of the route is also displayed in finer detail on planning drawings 281240-ARP-ONS-CR-DR-PL-1131 to 281240-ARP-ONS-CR-DR-PL-1135 in Appendix 7.1.

7.5.2.8 Route section 7

The onshore cable route deviates offline from the R132 in order to cross under the M1 motorway just to the north east of the M1 junction 4. Further information on the crossing of the M1 is provided in Section 7.5.9.1.

The length of this route section is approximately 1km and is displayed on sheet 4 of Figure 7.3. This section of the route is also displayed in finer detail on planning drawings 281240-ARP-ONS-CR-DR-PL-1135 through 281240-ARP-ONS-CR-DR-PL-1137 in Appendix 7.1.

7.5.2.9 Route section 8

The onshore cable route continues south along the R132 to the junction with R125/R132/L2141 Spittal Hill. In this section it crosses the Staffordstown Stream (watercourse crossing Wx15), the Broadmeadow River (watercourse crossing Wx16) and the Ward River (watercourse crossing Wx17).

The length of this route section is approximately 1.2km and is displayed on sheet 4 of Figure 7.3 as well as on the planning drawings in Appendix 7.1, drawing reference 281240-ARP-ONS-CR-DR-1137 to 281240-ARP-ONS-CR-DR-1139.

7.5.2.10 Route section 9

The onshore cable route continues north east along L2141 Spittal Hill/Lissenhall to its junction with Estuary Road.

The length of this route section is approximately 400m and is displayed on sheet 4of Figure 7.3 as well as on the planning drawings in Appendix 7.1, drawing reference 281240-ARP-ONS-CR-DR-1139 to 281240-ARP-ONS-CR-DR-1140 .

7.5.2.11 Route section 10.1

The onshore cable route continues east along Estuary Road, past the junction of Estuary Road and Seatown Road, crossing under the M1 and crossing the Seapoint Stream (watercourse crossing Wx18) using either in-road open cut trench or inline HDD methods as far as the junction of Estuary Road and Mantua Road.

The length of this route section is approximately 800m and is displayed on sheet 4of Figure 7.3 as well as on the planning drawings in Appendix 7.1, drawing reference 281240-ARP-ONS-CR-DR-1140 to 281240-ARP-ONS-CR-DR-1141.

7.5.2.12 Route section 10.2

The onshore cable route continues east along Estuary Road alongside the Malahide Estuary, crossing the Greenfields Stream (watercourse crossing Wx19) before it turns south.

The length of this route section is approximately 1.6km and is displayed on sheet 4of Figure 7.3 as well as on the planning drawings in Appendix 7.1, drawing reference 281240-ARP-ONS-CR-DR-1141 to 281240-ARP-ONS-CR-DR-1143.

7.5.2.13 Route section 11

The onshore cable route continues south along Estuary Road through the residential area of Seabury, to the junction of Estuary Road and the R106 Swords Road.

The length of this route section is approximately 800m and is displayed on sheet 4of Figure 7.3 as well as on the planning drawings in Appendix 7.1, drawing reference 281240-ARP-ONS-CR-DR-1143 and 281240-ARP-ONS-CR-DR-1144.

7.5.2.14 Route section 12

The onshore cable route continues east along the R106 Swords Road through the residential area of Seabury, Millview and Ard na Mara, crossing the Gaybrook Stream (watercourse crossing Wx20), to the junction of the R106 Swords Road and the R107 Malahide Road. There is an option to deviate offline into a local amenity area adjacent to the road, to cross the Gaybrook Stream in this location (Wx20).

The length of this route section is approximately 1km and is displayed on sheet 4of Figure 7.3. This section of the route is also displayed in finer detail on planning drawings 281240-ARP-ONS-CR-DR-PL-1144 through 281240-ARP-ONS-CR-DR-PL-1146 in Appendix 7.1.

7.5.2.15 Route section 13

The onshore cable route continues south along the R107 Malahide Road past Mabestown and Streamstown, to the junction of the R107 and L2100 Chapel Road at Kinsealy.

Towards the south of this route section, the route includes an option to deviate offline from the R107 Malahide Road in order to cross the Sluice Stream (watercourse crossing Wx22) using an offline HDD method or an offline open cut trench method. If this option is not utilised, the route would continue inline along the R107 road.

The length of this route section is approximately 2.5km and is displayed on sheets 4-5of Figure 7.3. This section of the route is also displayed in finer detail on planning drawings 281240-ARP-ONS-CR-DR-PL-1146 through 281240-ARP-ONS-CR-DR-PL-1149 in Appendix 7.1.

7.5.2.16 Route section 14

Two alternative onshore cable route options - route sections 14A and 14B - are proposed between the junction of the R107 Malahide Road with Chapel Road and the junction of the R107 Malahide Road with the R139.

Route 14A is the preferred route and will be used if it does not conflict with a potential route for new power cables associated with the Metrolink project, which are also proposed to be laid under the R107 in this route section. In the event that the Metrolink project does proceed with the route along the R107 and the Metrolink power cables cannot be accommodated alongside the onshore cable route infrastructure in route option 14A, route 14B will be followed.

Route section 14A

In this route option, the onshore cable route would continue south down the R107 Malahide Road past St Doolagh's Church and Balgriffen Park to the junction of the R107 Malahide Road and the R139, crossing the Cuckoo Stream (watercourse crossing Wx23A) and the Mayne River (watercourse crossing Wx24A).

The length of this route section is approximately 2.5km and is displayed on sheet 5 of Figure 7.3 as well as on the planning drawings in Appendix 7.1, drawing reference 281240-ARP-ONS-CR-DR-1149 to 281240-ARP-ONS-CR-DR-1152.

Route section 14B

In this route option, the onshore cable route would continue east along Chapel Road to its junction with the R124 Drumnigh Road, then south down Drumnigh Road to its junction with the R123 Moyne Road.

At this point the route would either continue south down the Hole in the Wall road to its junction with Belmayne crossing the Cuckoo Stream (watercourse crossing Wx23C) and the Mayne River (watercourse crossing Wx24C). Alternatively, the route will deviate via Moyne Road, crossing the Cuckoo Stream (watercourse crossing Wx23B), through Balgriffin Park, crossing the Mayne River (watercourse crossing Wx24B) and Belmayne to connect with the junction of Belmayne and the Hole in the Wall Road.

From the junction of the Hole in the Wall Road and Belmayne, the route would continue south along the Hole in the Wall Road to its junction with the R139 Clarehall Avenue, where it would continue west along the R139 Clarehall Avenue to its junction with the R107 Malahide Road.

The length of this route section is approximately 5.5km and is displayed on sheet 5of Figure 7.3 as well as on the planning drawings in Appendix 7.1, drawing reference 281240-ARP-ONS-CR-DR-1157 to 281240-ARP-ONS-CR-DR-1164.

7.5.2.17 Route section 15

The onshore cable route continues west along the R139 to a point near the exiting Belcamp substation, at which point it deviates offline to the north in order to connect into the substation.

The length of this route section is approximately 2.3km and is displayed on sheet 5of Figure 7.3. This section of the route is also displayed in finer detail on planning drawings 281240-ARP-ONS-CR-DR-PL-1153 through 281240-ARP-ONS-CR-DR-PL-1156 in Appendix 7.1.

7.5.3 Onshore Cable Technology

Each of the two onshore cable circuits from the grid facility will comprise of three core cables of triple-extruded dry cured cross-linked polyethylene insulated design. The metallic sheath will be either copper or aluminium wire screen with foil laminate or welded aluminium. See Image 7.2 illustrating a typical cable.

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 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.

For the majority of the route, the double trefoil arrangement will be used in order to minimise the width of trenching required. The options of two narrower trenches and the flat cable formations will be used only where necessary to navigate existing utilities or watercourses.

7.5.3.1 Ducts and Protective Measures

The cable ducts will be plastic High-Density Polyethylene (HDPE). It is anticipated that each power cable duct will have a diameter of approximately 200mm.

The protection measures required for the cables are listed below and will follow EirGrid Functional Specifications (CDS-GFS-00-001-R1):

- Around the cable ducts there will be a thermally suitable compactable granular material such as Cement Bound Granular Mix (CBGM) or weak concrete mix providing mechanical protection.
- Above the cable surround (for both power cable and fibre optic cables) there will be 2.5mm red cable marker strips for the full trench width.
- Above the red cable marker strips and trench backfill, there will be a yellow warning tape, c. 300mm below ground level.
- At joint bays, a concrete slab will be positioned at the bottom of each joint-bay.

- At joint bays, above the joints and the thermal backfill there will be protective covers fitted across the full joint bay.
- At watercourse crossings there will be a concrete slab placed above the cables, below bed level for the full stream width, providing protection to the cables beneath.
- Above-ground marker posts will be placed at regular intervals such as at field boundaries, road crossings and watercourse crossings.

The protective measures at trenchless (HDD) locations will be a HDPE duct and the depth of cover as described in Section 7.5.9.

At offline sections of the cable route, additional protective measures will be applied to the cable trench. This may include concrete tiles or CBGM with a steel mesh or steel plate. The cable trench may also be slightly deeper to provide an increased depth of cover over the cables. These measures will provide protection where farming activities are expected to be performed.

7.5.3.2 Marker Posts

Marker posts or surface marker plates (300mm x 150mm wide) will be installed at the following locations (exact locations to be agreed with EirGrid at detailed design stage):

- At the railway crossing;
- At road crossings;
- In agricultural land, where the marker posts will be located at field edges where cables enter and leave the field;
- At watercourse crossings;
- At joint bays; and
- At changes in direction of the cable route.

7.5.3.3 Joint Bays

The cables will be supplied to site on large reels, with 300m to 800m of cable being carried on a single reel. Joint bays will be required to be installed along the cable route to facilitate cable pulling through pre-installed ducts. These will be underground chambers which will "joint" consecutive lengths of cables into one continuous overall cable. Typically, these will be located at each end of the cable sections delivered to site but may be required to be positioned in closer proximity depending on the complexity of the route and the preference of the landowners. Once the joint has been made the cable will be buried in the same manner as the rest of the underground cable. Further information on the jointing of cables is given in the Onshore Construction Chapter. Indicative locations of the joint bays are shown on planning drawings 281240-ARP-ONS-CR-DR-PL-1110 through 281240-ARP-ONS-CR-DR-PL-1164 *Proposed Onshore Cable Route Map* sheets 10 through 64, found in Appendix 7.1.

As the cable configurations may vary across the cable route (flat and trefoil formation) there are 2 joint bay scheme options considered:

1. A single joint bay scheme where all 6 cables are jointed in a single joint bay of approx. 12m long x 2.6m wide x 2m deep. There may be up to 110 No. of these sized joint bays.
2. A double joint bay scheme where 3 cables are jointed in one joint bay and the other 3 in a separate joint bay. In this option joint bays will be approx. 8m long x 2.6m wide x 2m deep. There may be up to 220 No. of these sized joint bays.

The joint bay is a concrete chamber placed, or blockwork chamber constructed, in the ground where cable sections are jointed together. Typical joint bay details are shown on planning drawing 281240-ARP-ONS-XX-DR-PL-3006 *Typical onshore cable joint bay detail* in Appendix 7.1.

Irrespective of joint bay scheme option selected, each joint bay will comprise of:

- A joint chamber;
- A communications chamber; and
- An earth link box.

7.5.3.4 Communication Chamber

At each joint bay, a communication chamber is required. The fibre optic cables are pulled/jointed at the communication chamber. The communications chamber will be approximately 1.3m long x 0.8m wide x 1.2m deep.

A manhole cover is required at each of the communication chambers as they will need to be accessed occasionally (i.e., approximately once every year, or whenever a fault appears, and a repair is needed) to allow the fibre optic cable to be tested for integrity.

7.5.3.5 Link Boxes

Link boxes will be located along the route at joint bay locations. They will be located in a pit close to the joint bays with an earthing strip surrounding the periphery of the joint bays where the link boxes are installed. The earthing strip is a copper tape approximately 25mm^2 in size and provides an interface to ground via joint bay earth rods. The earth strip connects the cable screen to earth via the link box.

There will be bonding leads (i.e., lower voltage cables) running from the link-boxes to the joints. They will need to be accessed occasionally (i.e., approximately every two years or whenever a fault appears, and a repair is needed) to allow the outer polyethylene layer of the cable to be tested for integrity.

7.5.4 Cable Crossings

The cable route will cross a number of watercourses, as well as the M1 Motorway and various utilities along its length. The construction methodology to be adopted for these crossings will vary and is discussed in the Onshore Construction Chapter. Horizontal directional drilling will be used where standard open cut trenching techniques are not possible.

7.5.4.1 M1 Motorway Crossing

A HDD will be required where the onshore cable route crosses underneath the M1 just north of Junction 4. The proposals have been discussed with Transport Infrastructure Ireland (TII). The crossing point beneath the M1 will be located anywhere along the stretch of M1 motorway located within the proposed development boundary. The M1 HDD crossing, which is approximately 180m in length and 9m deep, is shown on planning drawing 281240-ARP-ONS-CR-DR-PL-1136 and 281240-ARP-ONS-CR-DR-PL-1137 *Proposed Onshore Cable Route Map* – Sheets 36 and 37. When cables are installed at a greater depth than a typical trench it may be necessary to increase the cable spacing to maintain the rating of the cables. The depth of the HDD will be dependent on the ground profile and the cable spacing will be dependent upon the cable ratings. The cable axial spacing at various depths is dependent upon the conductor size selected. The axial spacing between the HDD ducts will be approximately 5m. The expected outer diameter of the HDD bore will be a maximum of 965mm.

7.5.4.2 Watercourse Crossings

The onshore cable route will cross 24 watercourses (with a total 25 watercourse crossings) which are shown on Figure 7.3. Table 7-2 below lists these watercourse crossings. The methods which the onshore cable route will use to cross each watercourses are described in the Onshore Construction Chapter.

Table 7.1 Watercourse Crossings

Watercourse Crossing Ref No.	Watercourse Name
Wx01	Bremore Stream
Wx02	Bracken River
Wx03	Knock Stream
Wx04	Balrothery Stream
Wx05	Balrickard Stream
Wx06	Rowans Big Stream
Wx07	Rowans Little Stream
Wx08	Courtlough Stream
Wx09	Oberstown Stream
Wx10*	Aldrumman Stream
Wx11	Ballough Stream
Wx12*	Deanestown Stream
Wx13*	Ballyboghil Stream
Wx14	Turvey Stream
Wx15	Staffordstown Stream
Wx16	Broadmeadow River
Wx17	Ward River
Wx18	Seapoint Stream
Wx19	Greenfields Stream
Wx20	Gaybrook Stream
Wx21	Hazelbrook Stream
Wx22	Sluice Stream
Wx23**	Cuckoo Stream
Wx24***	Mayne River
Wx25	Mayne River

*Watercourse crossings Wx10, Wx12 and Wx13 will be located either inline within the R132 Road, or offline

**There are three possible locations where the onshore cable route will cross the Cuckoo stream, depending on the route selected: If the cable is routed along route section 14A, it will cross the Cuckoo stream at watercourse crossing Wx23A located on the R107 Malahide Road. If the cable is routed along route section 14B, it will cross the Cuckoo stream either at watercourse crossing Wx23B on the R123 or at watercourse crossing Wx23C on the Hole in the Wall Road.

***There are three possible locations where the onshore cable route will cross the Mayne River, depending on the route selected: If the cable is routed along route section 14A, it will cross the Mayne River at watercourse crossing Wx24A located on the R107 Malahide Road. If the cable is routed along route section 14B, it will cross the Mayne River either at watercourse crossing Wx24B at Balgriffin Park or at watercourse crossing Wx24C on the Hole in the Wall Road.

7.5.4.3 East West Interconnector (EWIC)

As detailed above, the proposed cable route crosses the route of the East-West Interconnector (EWIC), in the R132, north of Blakes Cross. EWIC is a high voltage direct current (HVDC) interconnector, with a power rating of 500 MW, which links the electricity transmission grids of Ireland and Great Britain. EWIC connects the converter stations at Portan, Co Meath in Ireland to Shotton in Wales. At the point where the proposed cable route crosses EWIC, the EWIC cable is at considerable depth, approximately 10 m below ground.

7.5.4.4 Gas Transmission Pipelines

There are two gas interconnector pipelines between Ireland and Great Britain and the proposed cable route will cross these interconnectors at three locations along the route.

The cable route, laid in the R132, will cross Interconnector 2 at two locations. The northern location is between Knock Cross business park and Knock Cross itself, south of a watercourse crossing (Wx04) Balrothery Stream. The southern location is south of the Five Roads and Wx08 Courtlough Stream. Interconnector 2 is a high pressure gas pipeline which links the gas transmission systems in Ireland and Scotland. It extends from Beattock, north of Moffat in Scotland, to the Baldrumman AGI, in Co Dublin, via the pipeline landfall at Gormanstown in County Meath.

The onshore cable route, laid in the R132, will cross Interconnector 1 south of the junction of the R132 with the L1155 Quickpenny Lane. Interconnector 1 is a high pressure gas pipeline which links the gas transmission systems in Ireland and Scotland.

It extends from Beattock, north of Moffat in Scotland, to the Ballough AGI, in Co Dublin, via the pipeline landfall at Loughshinny, in County Dublin. It is a 750mm in diameter, high strength steel pipeline operating at a pressure of 85bar.

7.5.4.5 Aviation Fuel Pipeline

A planning consent (An Bord Pleanala reference PL29N.245738) has been granted for an aviation fuel pipeline between Dublin Port and Dublin Airport and construction has commenced to install this pipeline. The route of the pipeline follows the R139 at Belcamp and the cable route will need to cross this pipeline (if it is installed ahead of construction of the cable) to cross into the existing Belcamp substation.

7.5.5 Connection to the existing Substation at Belcamp

The two 220 kV HVAC onshore cable circuits will connect to the existing transmission network at Belcamp 220kV substation. The connection will be made to either/both of the existing substation or the consented substation extension (a planning application from EirGrid to expand the existing substation at Belcamp was granted in 2023[4], this includes an expansion of the substation infrastructure into land to the north of the existing substation). The onshore cable route into the substation will follow the existing access road and will connect to a spare 220kV bay within either/both of the existing substation compound and the planned the Belcamp extension.

7.6 Operation and Maintenance

The onshore infrastructure will require ongoing maintenance during the operational lifetime of the project. Operation and maintenance will be planned and will be operated from the operation and maintenance facility, see Section 7.7.4 below.

7.6.1 Maintenance of Cables at Landfall

Maintenance of the cables at the landfall will comprise an inspection, typically once every year, by means of the link box and communication chambers located at the TJBs and any other joint bays on the onshore export cable. Maintenance/repairs of cables will be required on an ad-hoc basis in the event of a cable fault occurring.

7.6.2 Operation and Maintenance at Grid Facility

Both substations will be unmanned and operated remotely. It is expected that one or two vehicles may attend each substation every four weeks for an inspection. Each inspection will be approximately four hours and will occur within normal working hours, however it may be necessary for maintenance personnel to access the site on an ad-hoc basis if required, for example in the event of an electrical fault or outage. Additional annual maintenance will be required throughout the operational phase of the proposed development.

[4] Fingal County Council planning application ref: F23A/0040 https://planning.agileapplications.ie/fingal/application-details/94329

7.6.3 Maintenance of Onshore Cables

Maintenance of the cables will comprise an inspection, approximately once every two years or ad-hoc whenever needed in response to a cable fault or issue, by means of the link box and communication chambers, which will be located at every joint bay. Where joint bays are located off road a permanent access track to the joint bay will be provided. Where possible, permanent access tracks will utilise existing access points from the public road. Two new permanent access points are required, at the gird facility and at Blakes Cross. Additionally, temporary access points will be required during construction, as described in the Onshore Construction Chapter.

Where new permanent access points are required (two in total), appropriate sightlines, as per the relevant standards (TII Standard DN-GEO-03060), are being provided. Where existing access points are being used for the operational phase, the use during the operational phase will be minimal, as detailed above, and will not exceed the existing use of the access points.

7.6.4 Operation and Maintenance Facility

An operation and maintenance facility (OMF) will be required to service the proposed development throughout the operational phase of the proposed development. Whilst the OMF will be subject to separate planning/permitting consents and is not included within this planning application for consent, it is considered within the cumulative impact assessment of the EIAR.

The operation and maintenance facility will be located onshore at a suitable coastal location in the vicinity of the proposed development and will comprise an OMF building and associated storage facilities as well as a number of berths, for the vessels required to access the wind farm. Approximately 40 people will be employed at the OMF.

The OMF option being considered, includes the adaption and leasing part of an existing port facility at Greenore.

The operation and maintenance facility option being considered, includes the adaption and leasing of part of an existing port facility at Greenore. The existing Greenore site covers an area of approx. 150,000m^2. it is proposed to be adapted to provide up to three operation and maintenance facilities of which the proposed development will lease just one.

The operation and maintenance facility will comprise of the following:

- Operation and maintenance facility building including a control room, offices, welfare facilities such as mess hall, kitchen, bathrooms, technicians washing and drying facilities, plant & equipment room;
- Warehouse and workshop (approx. 1000m2);
- External storage area5 (approx. 1000m2);
- Berthing facilities to support 3-4 Crew Transfer Vessels (CTVs);
- Vessel bunkering services for fuel and potable water;
- Storage tanks for marine fuel and waste oil; and
- Additional supporting infrastructure such as lighting, perimeter security fencing, access control gates & Close-circuit television (CCTV).

Further details on the operation and maintenance activities and vessels used offshore are provided in the Offshore Description Chapter.

[5] This only applies to Option 1 at the Greenore site.

7.7 Decommissioning

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 or repowered. However, the infrastructure from the grid facility to the existing Belcamp substation will be under the ownership of ESB Networks and operated by EirGrid, forming part of the Transmission System and therefore will not be decommissioned.

The compensation substation at the Grid Facility will be decommissioned when the proposed development ceases operation: however, the Bremore substation will not as it will form part of the wider transmission network owned by EirGrid.

When it becomes appropriate to decommission the proposed development, all above ground structures (i.e. access track, marker posts, link) between the TJBs at the landfall and the grid facility will be removed, and the sites will be returned to their previous state. It is not proposed to remove any planting. The cabling of the onshore export cable between the TJBs and the grid facility will be removed but below ground ducting will remain in place.

Items / equipment which are decommissioned will be removed for appropriate management, based on the waste regulations at the time of decommissioning.

7.8 References

Eirgrid Functional Specifications: https://www.eirgrid.ie/grid/transmission-policies-and-standards

Eirgrid (2024) Eirgrid Grid Code Version 13: https://cms.eirgrid.ie/sites/default/files/publications/Grid-Code-Version-13_0.pdf

Fingal County Council (2023) Application for new electricity transmission infrastructure at the existing ESB Belcamp 220kV substation: https://planning.agileapplications.ie/fingal/application-details/94329