Sure Partners Limited

ARKLOW BANK WIND PARK PHASE 2
ONSHORE GRID INFRASTRUCTURE

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Natura Impact Statement

ARUP

sse Renewables

Contents

1 Introduction

1.1 Purpose of this Report

This report consists of two main sections: Report for Screening for Appropriate Assessment (AA) and Natura Impact Statement (NIS). This report forms part of the planning application seeking permission for consent for the proposed development. The purpose of this report is to provide the information required to enable the competent authority to undertake an AA of the proposed project in accordance with the requirements as set out under Article 6(3) of the Habitats Directive (92/42/EEC).

The Report for Screening for AA is presented in **Section 5** of this report. On the basis of objective information and in view of best scientific knowledge, the possibility of significant effects from the proposed project on European sites cannot be ruled out.

An NIS has therefore been prepared to inform and assist the competent authority, in carrying out its AA as to whether or not the proposed project will adversely affect the integrity of European sites either alone or in combination with other plans and projects, taking into account the conservation objectives of the European sites.

The NIS is presented in **Section 6** of this report. This NIS has examined and analysed, in light of the best scientific knowledge, with respect to those European sites within the zone of influence of the proposed project, the potential impact sources and pathways, how these could impact on the sites' Qualifying Interest (QI) habitats and QI/SCI (Special Conservation Interest) species and whether the predicted impacts would adversely affect the integrity of the European sites.

Measures intended to avoid or reduce the harmful effects of the project, i.e. mitigation measures, are set out within the NIS and they ensure that any impacts on the conservation objectives of European sites will be avoided during the proposed project such that there will be no risk of adverse effects on these European sites.

It has been objectively concluded following an examination, analysis and evaluation of the relevant information, including in particular the nature of the predicted impacts from the proposed project and with the implementation of the mitigation measures proposed, that the proposed development does not pose a risk of adversely affecting (either directly or indirectly) the integrity of any European site, either alone or in combination with other plans or projects, and there is no reasonable scientific doubt in relation to this conclusion. The competent authority will make the final determination in this regard.

1.2 Proposed Development

The Arklow Bank Wind Park (ABWP) is an offshore wind farm, located off the coast of County Wicklow, on the east coast of Ireland. A Foreshore Lease was granted for the development of a wind park on the Arklow Bank in 2002. The Foreshore Lease for Arklow Bank Wind Park covers an area approximately 27km long and 2.5km wide, on an approximately north-south alignment, 6km - 13km offshore, in the Irish Sea, to the east of Arklow Town.

Arklow Bank Wind Park Phase 1 was constructed in 2003 – 2004 consisting of seven wind turbines. Phase 1 is owned and operated by Arklow Energy Limited under a sublease to the Foreshore Lease. Sure Partners Limited (SPL), a wholly owned subsidiary of SSE plc (SSE), is now proposing to develop Arklow Bank Wind Park Phase 2, under the existing Foreshore Lease. This overall Arklow Bank Wind Park Phase 2 Project comprises three distinct elements:

- Offshore Infrastructure;
- Onshore Grid Infrastructure (the proposed development); and
- Operations and Maintenance Facility (OMF).

In order to build out the Project, various terrestrial and maritime approvals are required, including planning approval for the proposed development.

The proposed development, which is the subject of this report, comprises the Arklow Bank Wind Park Phase 2 Onshore Grid Infrastructure (OGI) to be developed as part of the Project.

For the purposes of this report the “proposed development” is the Onshore Grid Infrastructure (OGI).

2 Characteristics of Proposed Development

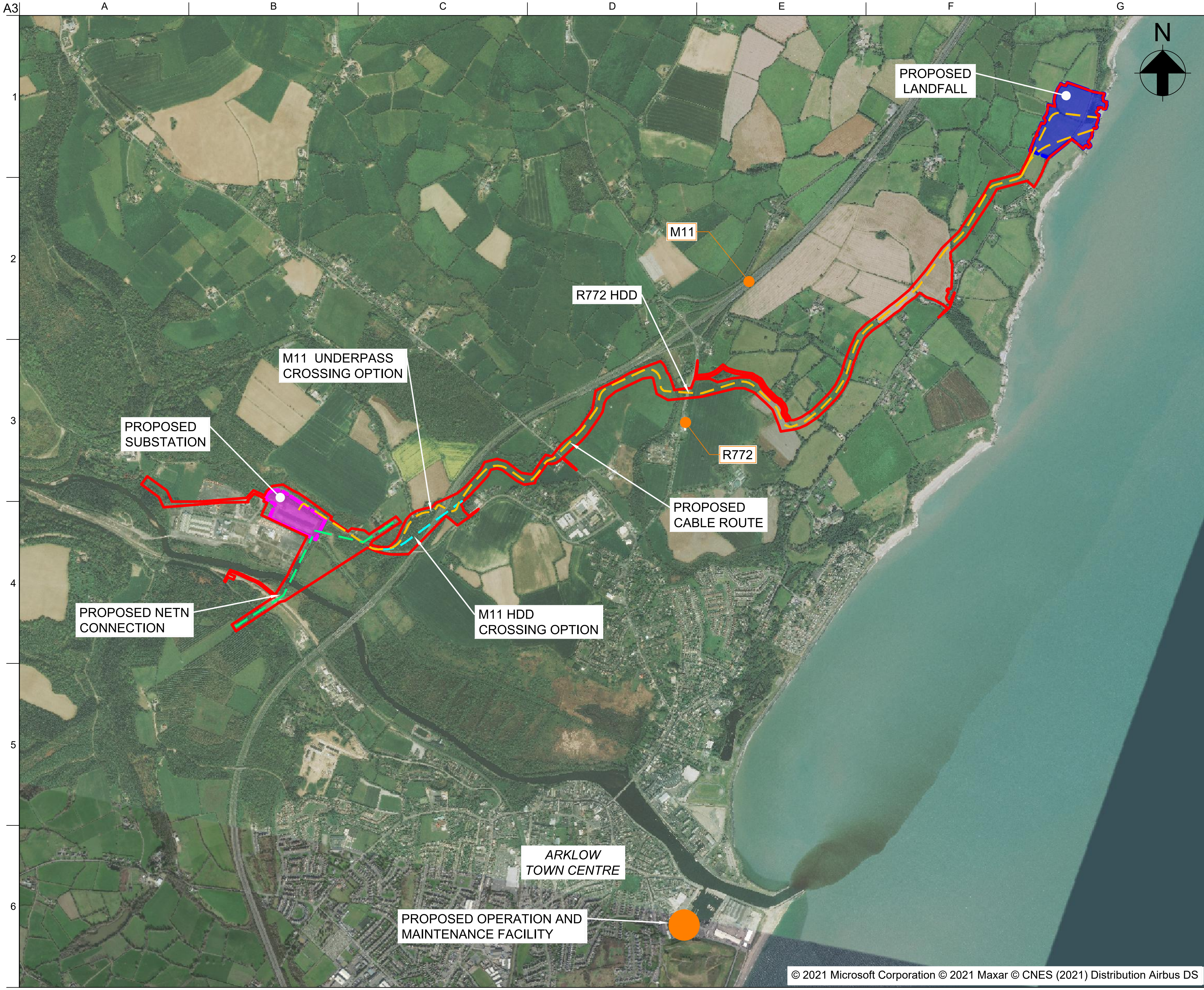
2.1 Overview of Proposed Development

The proposed development will comprise the onshore grid infrastructure including 220kV onshore export cable circuits and fibre optic cables, from the landfall of the offshore export cable circuits at Johnstown North, to a proposed new 220kV substation at Shelton Abbey and an overhead line connection from the new substation to the National Electricity Transmission Network (NETN). An overview of the proposed development is shown in **Figure 1**, providing a schematic showing the connection of the Arklow Bank Wind Park Phase 2 to the transmission network, via the new 220kV substation.

The proposed development will provide:

- Landfall for two offshore export cable circuits from the High Water Mark (HWM) to two Transition Joint Bays (TJB) at Johnstown North, located approximately 4.5km northeast of Arklow Harbour;
- Connection by two underground 220kV high voltage alternating current cable circuits, and fibre optic cables over a distance of c. 6km, from the landfall to the new onshore 220kV substation;
- A new onshore 220kV substation, to be located at Shelton Abbey, north of the Avoca River, approximately 2.1km northwest of Arklow town consisting of two connected compounds:
    1. The transmission compound with the infrastructure to physically connect to the NETN, and
    2. The connection compound with the infrastructure to allow the connection of the windfarm in accordance with EirGrid grid code requirements.
- Flood defence improvement works to the existing Avoca River Business Park flood defences located c. 500m west of the substation site; and
- A 220kV overhead line connection from the new 220kV substation at Shelton Abbey to the existing 220kV transmission network located c. 200m from the substation site.

The proposed construction strategy for the proposed development has been included in **Appendix C** of this report.



LEGEND:

- PROPOSED LANDFALL
- PROPOSED SUBSTATION SITE
- PROPOSED CABLE ROUTE
- PROPOSED M11 CROSSING HDD OPTION
- PROPOSED NETN CONNECTION
- RED LINE BOUNDARY
- PROPOSED OPERATION AND MAINTENANCE FACILITY

Rev	Date	By	Chkd	Appd
P1	08.02.21	SB	EO'G	MW

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Client
Sure Partners Limited

Project Title
Arklow Bank Wind Park
Phase 2
Onshore Grid Infrastructure

Drawing Title
Overview of the Proposed Development

Scale at A3: 1:20,000

Role: Civil

Suitability: For Information

Arup Job No: **271715-00**

Rev: **P1**

Name

Figure 1

Do not scale

2.2 Landfall

The landfall is where the two export cable circuits from the offshore wind farm come onshore, with the boundary for planning purposes being at the foreshore (i.e. high-water mark of ordinary or medium tides, shown as HWM on Ordnance Survey maps).

The landfall comprises:

- Two 220kV export cable circuits, approximately 100 to 180m in length, from HWM, under the R750, to two onshore Transition Joint Bays;
- Transition Joint Bays to allow connection between onshore and offshore circuits;
- A temporary HDD compound and associated access track, in one of two potential locations; and
- Fibre optic cables, for operation and control purposes, laid underground with the export circuits.

There are two adjacent site options for the export cable circuits and associated Transition Joint Bays. The Developer wishes to retain flexibility to use either of these options, dependent on the final offshore export cable route(s) chosen for the Project. Whichever option is chosen, the other option will be used to accommodate a temporary construction compound for the onshore cable route.

The proposed construction strategy of the landfall can be found in **Appendix C** of this report.

2.2.1 Landfall Location and Context

The landfall location is in the townland of Johnstown North, Co. Wicklow, approximately 4.5km northeast of Arklow Harbour, approximately centred on Ordnance Survey Ireland Grid Reference N726779, E677108, adjacent to the regional road R750.

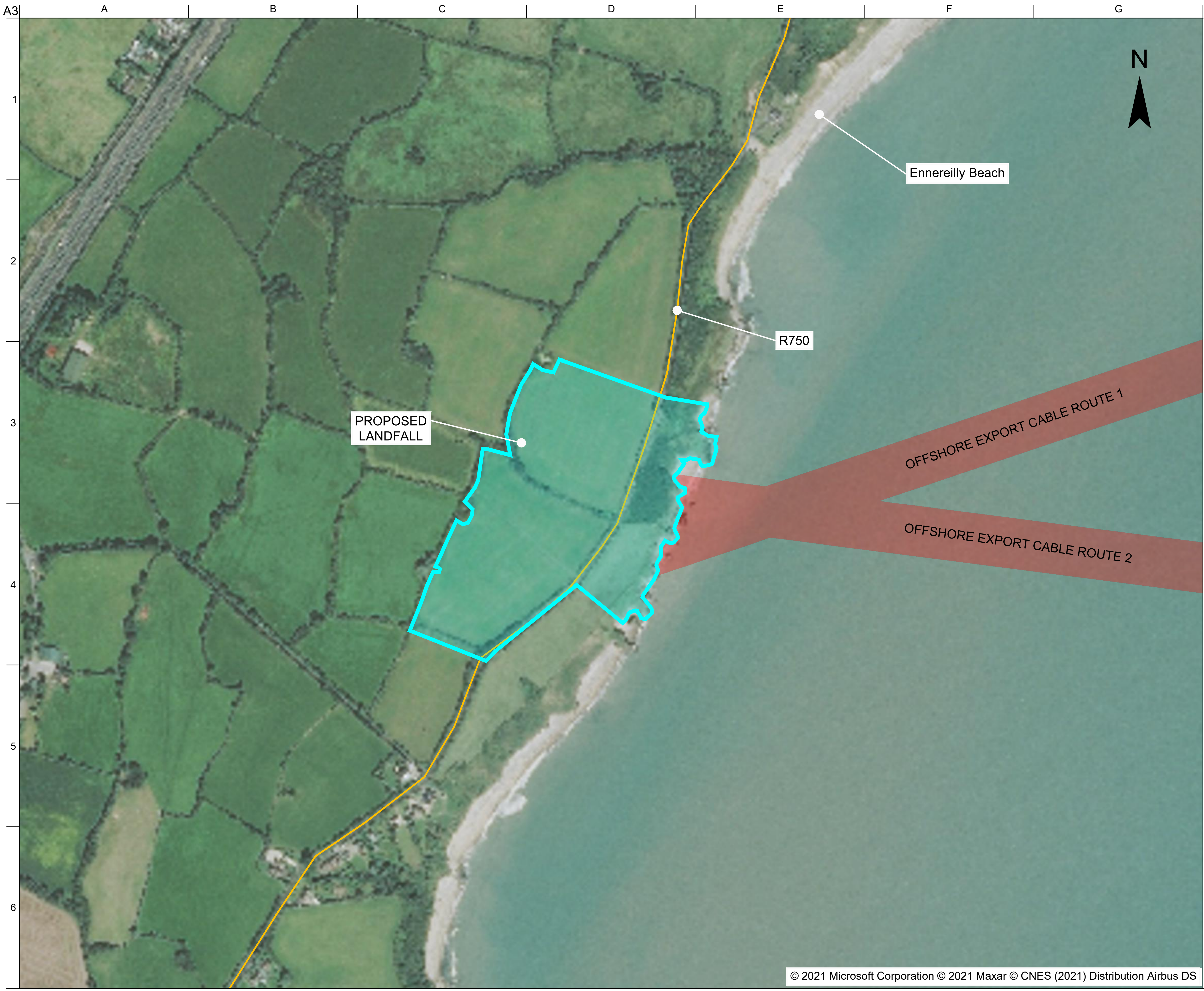
The landfall consists of undulating pasture fields located behind sea cliffs. The surrounding area is farmland in pasture, with relatively few dwellings and no holiday developments in the vicinity.

There is access to Ennereilly Beach from the R750 approximately 350m to the north of the landfall. The M11 motorway lies c. 1km to the west.

The coastline at the landfall consists of relatively low sea cliffs (c. 10 m in height) and small coves. The small coves (each with a steeply sloping shingle beach) are inaccessible at this location.

The location of the landfall is shown on **Figure 3**.

A3



LEGEND:

PROPOSED LANDFALL

OFFSHORE EXPORT CABLE ROUTE

D1	16.02.21	SB	EO'G	MW
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Project Title
Arklow Bank Wind Park
Phase 2
Onshore Grid Infrastructure

Drawing Title
Landfall Location

Scale at A3: 1:5,000

Role: Civil

Suitability: For Information

Arup Job No: 271715-00

Rev: D1

Name
Figure 2

Do not scale

2.2.2 Cable Details

A feasibility assessment determined that HDD was the preferred method to bring the two offshore export cable circuits ashore.

The two offshore cable circuits will be High Voltage Alternating Current (HVAC) circuits. Each circuit, of up to 266mm outside diameter (OD), will consist of a three-core cable i.e. three electrical conductors within the one cable, to ease installation. The cable will also contain two fibre optic cables. The separation distance of the two offshore cable circuits is up to 50m and both will have a minimum depth of cover at the base of the cliffs of 5.5m (and a maximum of 15m).

At the joint between the onshore and offshore cable circuits, the three-core offshore cable is split out and each conductor is jointed to three separate onshore single-core cables at the Transition Joint Bay. Onshore, each set of three cables is normally installed in flat or trefoil formation.

2.2.3 Transition Joint Bays

A Transition Joint Bay is required to enclose and protect the joints between the offshore and onshore export cables. The Transition Joint Bays are buried chambers comprising a concrete plinth, where the cables and joints are anchored, with concrete walls.

The Transition Joint Bays will be located a short distance inland of where the offshore export cables make landfall, approximately 100 to 180m from the HWM. Each Transition Joint Bay will be approximately 20m in length, 5m wide and 2.5m deep. There will be two Transition Joint Bays, one for each cable circuit.

Each Transition Joint Bay comprises the jointing chamber, a communications chamber and an earth link box. The communications chamber and earth link box are covered by manhole covers which need to be accessed at regular intervals for maintenance purposes during the operational phase of the proposed development. Where possible, the joint bays and manhole covers (4 manhole covers in total, 2 for each joint bay) will be positioned near to field boundaries.

Each Transition Joint Bay is backfilled with a layer of stabilised material, typically Cement Bound Granular Mixture (CBGM), for about 600mm around the cables, with suitably excavated material used to backfill above the CBGM material.

Once construction is completed, the only visible structures at the landfall will be two manhole covers for each cable circuit and small cable marker posts, which will indicate the location of the underground cable circuits.

2.2.4 Permanent Access

There will be a permanent access track, consisting of crushed stone, approximately 4.5m wide constructed to the Transition Joint Bays from the existing access point on the R750.

An entrance gate will be set back from the public road and a bituminous bellmouth will be formed at the junction where the permanent access track meets the public road, to facilitate safe vehicular access and egress.

2.2.5 Maintenance of the Cables at the Landfall

Maintenance of the cables at the landfall will comprise an inspection, once every year, by means of the link box and communication chambers located in the Transition Joint Bay.

2.2.6 Decommissioning of Cables at the Landfall

The cables will be decommissioned when the project ceases operation, at the same time as decommissioning of the substations.

On decommissioning, the cables and associated ducts will most likely remain in-situ as there would be more environmental impact in removing these than can be justified by the recycle value of cable material and as is standard industry practice. However, all above ground infrastructure will be removed and these areas fully reinstated.

2.2.6 Biodiversity Enhancement Planting

It is intended that the land along the cable route will be reinstated and returned to its current use post-construction. Where habitat cannot be reinstated, 16,000m^2 of biodiversity enhancement planting will be provided at the landfall to ensure that there is no net-loss of habitat as a result of the proposed development.

The objective of the planting scheme within the biodiversity enhancement area is to create a semi-natural habitat with a diverse woodland structure. This will be achieved by using a mixture of native species to provide a canopy, subcanopy and ground layer as the woodland matures.

2.3 Onshore Cable from Landfall to 220kV Substation

Two 220kV HVAC cable circuits with associated fibre optic communication and earthing cables will be laid underground from the landfall at Johnstown North, to the proposed onshore 220kV substation at Shelton Abbey.

The onshore cable route is c. 6km long, with joint bays positioned at strategic locations along the cable route to facilitate the installation and later the operation and maintenance of the cable circuits during the operational lifetime of the proposed development.

The proposed construction strategy of the onshore cable circuits can be found in **Appendix C** of this report.

2.3.1 Onshore Cable Route Location and Context

The proposed cable route, as shown in **Figure 3**, originates at the Transition Joint Bays at the landfall in Johnstown North and initially heads south-west, crossing a minor road, the L95115, before running adjacent to the R750 in agricultural lands, for c. 2000m until it reaches Ballymoney.

From this point the route continues in a north-westerly direction through agricultural lands, close to field boundaries, for c. 600m.

The route then crosses the Dublin Road (R772) and passes north of the existing Arklow Substation. The route then runs parallel to the M11 for c. 400m and then in a south-westerly direction for c. 500m, close to field boundaries in agricultural lands. The route then crosses the L2180 Beech Road, north west of the Kilbride Industrial Estate.

The route changes to a north-westerly direction, for c. 250m, before continuing in a south-westerly direction alongside the M11 for c. 300m and then crosses the M11. At this point, the route has two options (both of which are assessed in this EIAR). One option will utilise an existing underpass to cross the M11 and join and continue along the L6179 Kilbride Road.

The other option involves crossing the M11 by HDD. Both options meet the L6179 Kilbride Road near the entrance to the Avoca River Business Park before arriving at the proposed new substation at Shelton Abbey. The proposed cable route will be accessible from both ends of the route and, following consultation with landowners, via strategic existing property entrances located along the public road.

The total corridor length is c. 6km and requires five public road crossings, one being the M11 motorway crossing. The route also crosses eight watercourses, namely the Johnstown North, Johnstown South, Ticknock, Coolboy, Templerainy, Kilbride, Kilbride Church and Sheepwalk Streams. Three of these have been identified as permanent flow watercourses (Johnstown North, Templerainy and Kilbride Streams), as shown in **Figure** .

The cable route will traverse agricultural lands, off-road where practicable, to minimise disruption to traffic during cable construction and to avoid, in so far as possible, areas of congested utilities and proximity to residential areas. Where the cable route traverses farmland, the cable route will be adjacent to field boundaries, where feasible. 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 within the red line boundary and adhering to the principle of minimising environmental constraints.

The land along the cable route will be reinstated and returned to its current use post-construction, although future access for inspection and maintenance purposes will be required. The chosen route reduces the crossings of roads and watercourses to a practical minimum and avoids significant environmental constraints.

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

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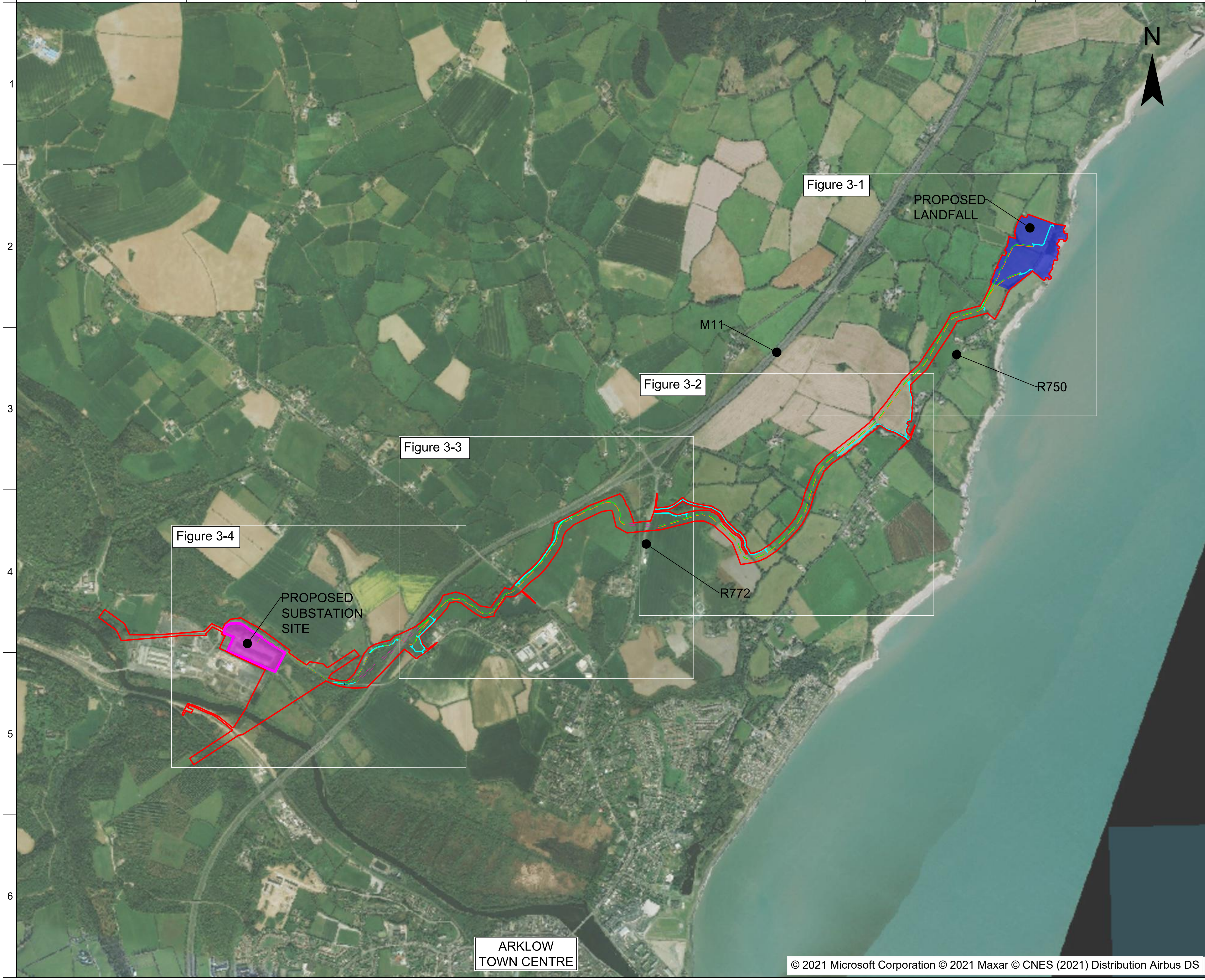

A3

LEGEND:

- PROPOSED LANDFALL
- PROPOSED SUBSTATION SITE
- RED LINE BOUNDARY
- PROPOSED CIRCUIT 1
- PROPOSED CIRCUIT 2
- M11 / R772 HDD CROSSING
- RED LINE BOUNDARY
- PROPOSED PERMANENT JOINT BAY ACCESS TRACK

Rev	Date	By	Chkd	Appd
D1	16.02.21	SB	EO'G	MW

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Client
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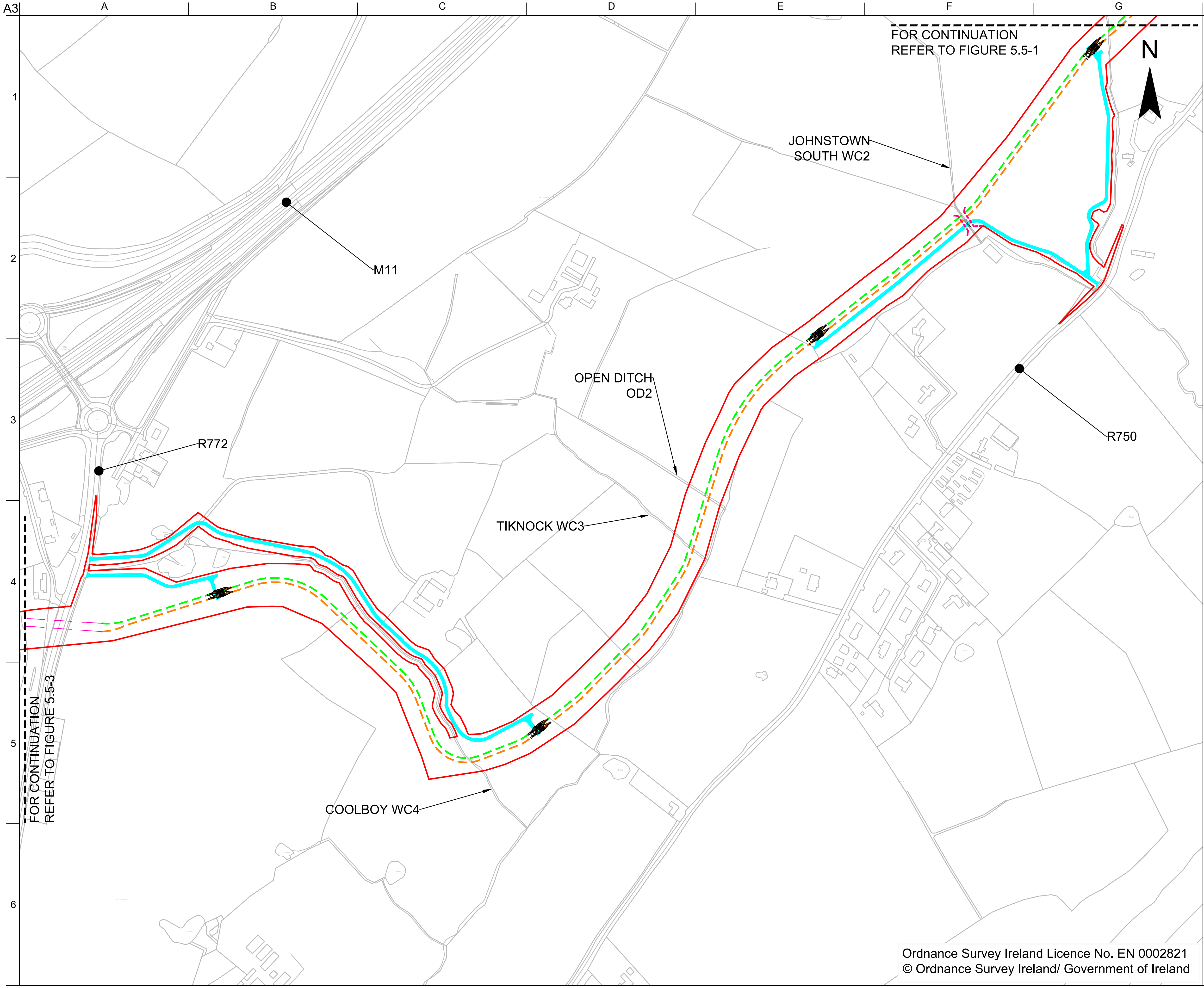
Project Title
Arklow Bank Wind Park
Phase 2
Onshore Grid Infrastructure

Drawing Title
Proposed Cable Route
Keyplan

Scale at A3: 1:20,000
Role: Civil
Suitability: For Information
Arup Job No: 271715-00
Rev: D1
Name: **Figure 3**

Do not scale



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Project Title
Arklow Bank Wind Park
Phase 2
Onshore Grid Infrastructure

Drawing Title
Proposed Cable Route
Sheet 2 of 4

Scale at A3 1:5,000

Role Civil

Suitability For Information

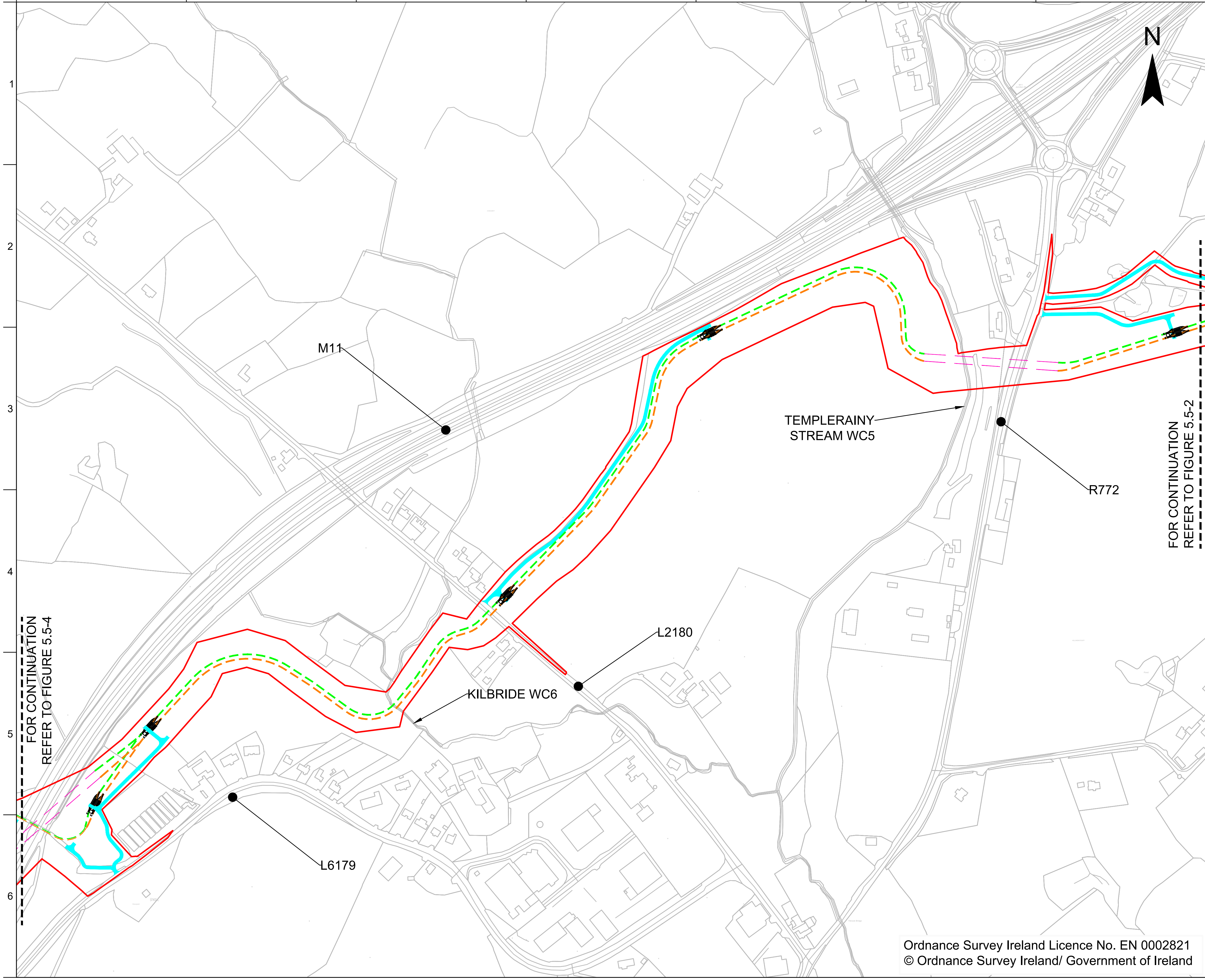
Arup Job No **271715-00**

Rev **D1**

Name

Figure 3-2

Do not scale



LEGEND:

- PROPOSED CIRCUIT 1
- PROPOSED CIRCUIT 2
- M11 HDD CROSSING OPTION
- RED LINE BOUNDARY
- PROPOSED PERMANENT JOINT BAY ACCESS TRACK
- PROPOSED STAGGERED JOINT BAY (TREFOIL)
- PROPOSED PARALLEL JOINT BAY (FLAT FORMATION)

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Phase 2
Onshore Grid Infrastructure

Drawing Title
Proposed Cable Route
Sheet 3 of 4

Scale at A3
1:5,000

Role
Civil

Suitability
For Information

Arup Job No
271715-00

Rev
D1

Name
Figure 3-3

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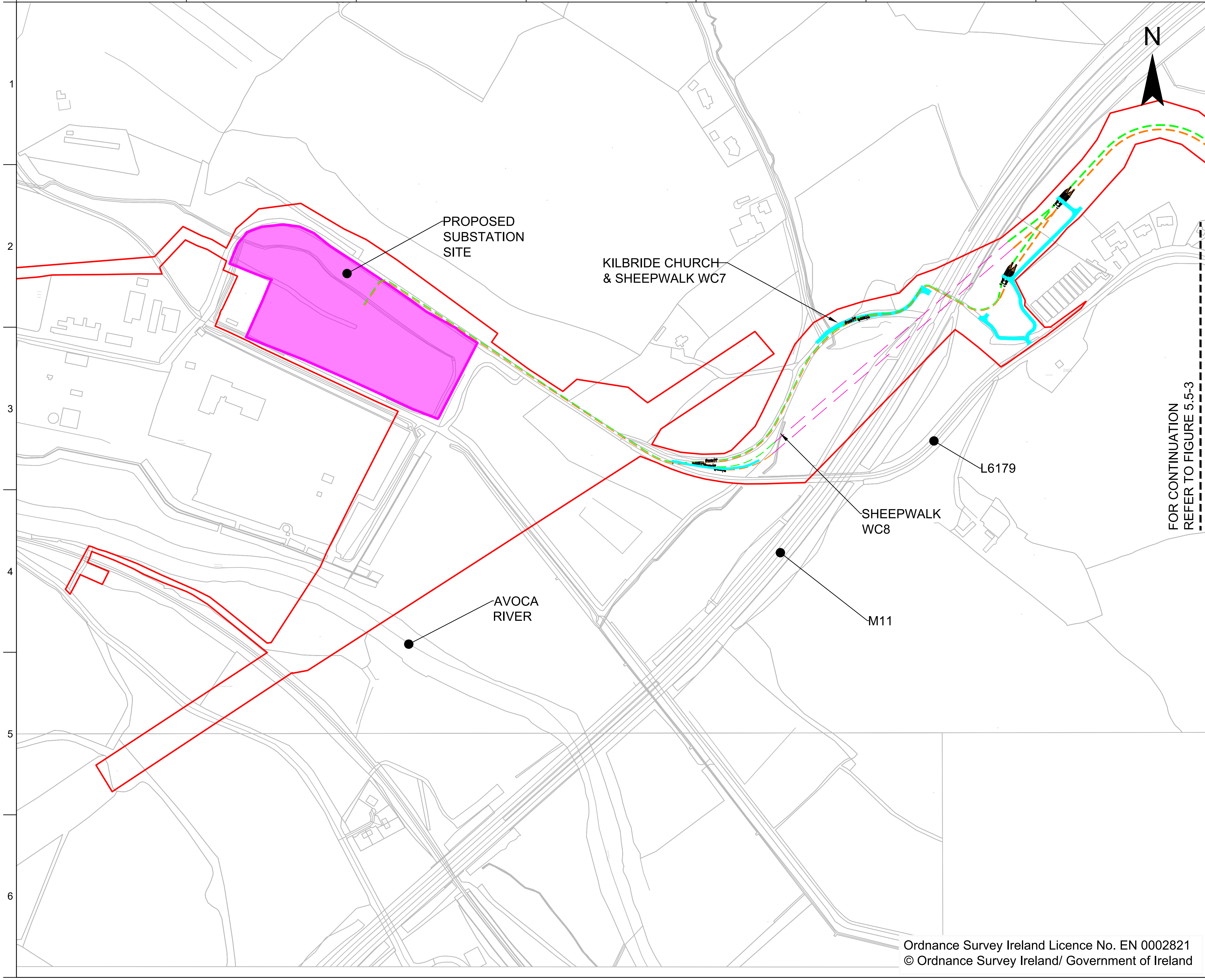

LEGEND:

- PROPOSED SUBSTATION SITE
- PROPOSED CIRCUIT 1
- PROPOSED CIRCUIT 2
- M11 HDD CROSSING OPTION
- RED LINE BOUNDARY
- PROPOSED PERMANENT JOINT BAY ACCESS TRACK
- PROPOSED STAGGERED JOINT BAY (TREFOIL)
- PROPOSED PARALLEL JOINT BAY (FLAT FORMATION)

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Project Title
Arklow Bank Wind Park
Phase 2
Onshore Grid Infrastructure

Drawing Title
Proposed Cable Route
Sheet 4 of 4

Scale at A3: 1:5,000
Role: Civil
Suitability: For Information
Arup Job No: 271715-00
Rev: D1
Name: **Figure 3-4**

2.3.2 Onshore Cable Details

Each of the two cable circuits comprises three power cables, one earthing conductor plus two fibre optic cables. In total therefore, there are six export cables, two earthing conductors plus four fibre optic cables.

The power cables will be single core triple-extruded dry cured cross-linked polyethylene insulated design. The metal sheath will be either lead, corrugated copper or corrugated aluminium or welded aluminium. The proposed cable detail is shown in **Figure** .

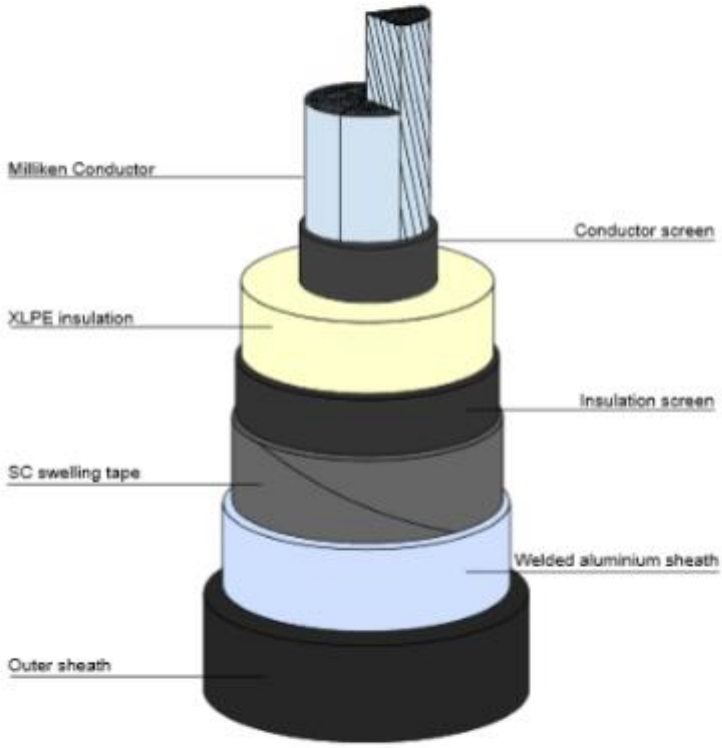


Figure 4. Single Core Onshore Cable

The three cables of each cable circuit will be positioned in a trefoil formation, for HDD road crossings and the roads from the M11 crossing to the substation. For most of the route, however, the cables will be laid in flat formation separated by sufficient spacing to achieve the required electrical rating.

The minimum spacing between the two cable circuits is typically four metres. The minimum spacing will be less than four metres at the pinch points along the cable route, the M11 underpass (if this option is chosen) and the roads from the M11 crossing to the substation. The spacing may be increased for the HDD crossings of the M11 (if this option is chosen) and R772 as explained in **Section 2.3.6.1**.

2.3.3 Ducts and Protective Measures

The cables will be supplied to site on large reels. For the cables laid in a trench, when the ducts have been installed and the trench has been backfilled, the cables will be winched through the ducts.

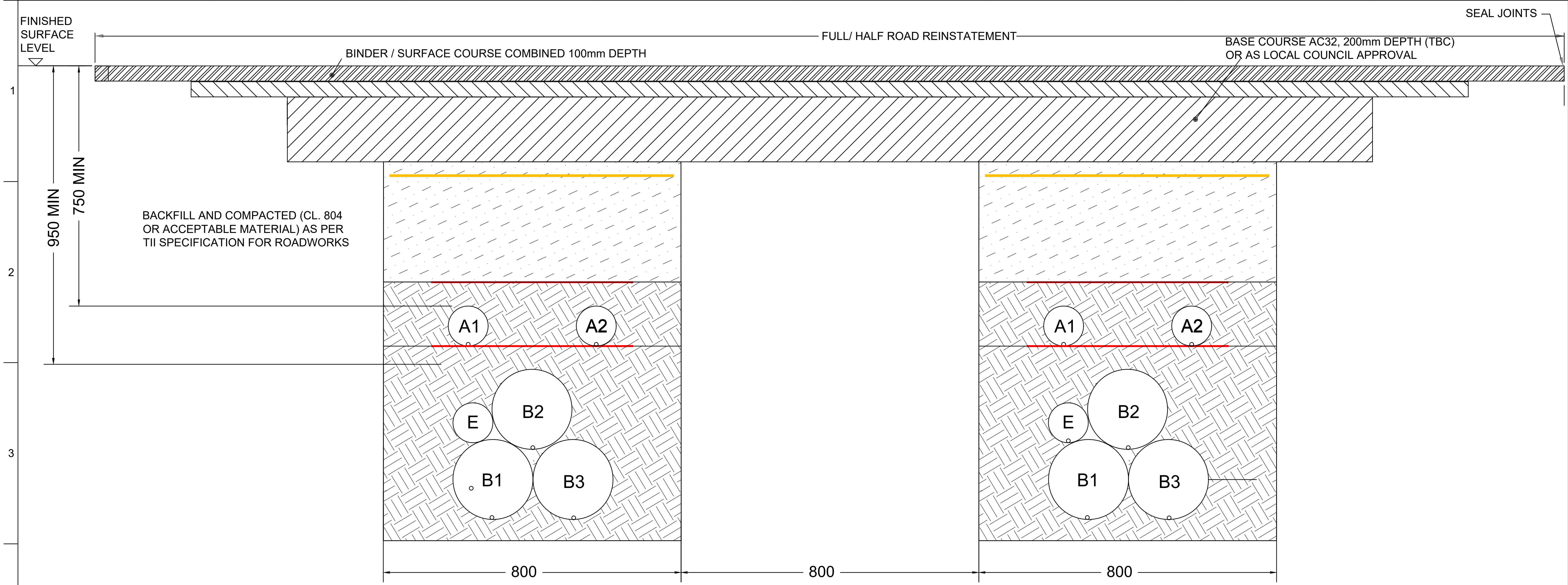
The cable ducts will be plastic, either Polyvinyl Chloride (PVC) or High Density Poly Ethylene (HDPE). It is anticipated that each power cable duct will have a diameter of approximately 250mm. The minimum width per cable trench will be 800mm and the maximum will be 1825mm. The width of the trench will vary with depth of cover (the deeper the cables are buried, the wider the trench may become). The typical maximum trench depth will be 2000mm, except at crossings where the trench will be deeper.

The proposed trench cross sections are shown in **Figure 5** and **Figure 6**.

The protection measures required for the cables are listed below:

- Around the cable ducts there will be a thermally suitable compactable granular material such as Cement Bound Granular Mixture (CBGM or weak concrete mix) providing mechanical protection;
- Above the cable surround (for both cable circuits 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 road crossings the cable ducts will be embedded in cement bound granular mixture;
- At watercourse crossings there will be a concrete slab, below bed level for the full stream width, providing protection to the cables beneath; and
- 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 the HDPE duct and the depth of cover as described in **Section 2.3.6.1.**



TYPICAL ON ROAD CROSS SECTION INDICATING TRENCH FOR 220KV CIRCUIT TREFOIL

SCALE NTS

A= 125mm O.D. HDPE DUCT FOR COMMUNICATIONS, SDR=17.6
B= 250mm O.D. HDPE DUCT FOR HV CABLE, SDR=21
E= 125mm O.D. HDPE DUCT FOR EARTH CONTINUITY CONDUCTOR, SDR=17.6

RED MARKER STRIP
YELLOW MARKER WARNING TAPE
EXISTING SERVICE MARKER STRIP
6mm GALVANISED STEEL PLATE

RAPID HARDENING WET CONCRETE C25/30
CBGM B (CL. 822). COMPACTED TO CL 813.10
BACKFILL COMPACTED (CL. 802 OR ACCEPTABLE MATERIAL)
TOP SPOIL
ACCEPTABLE REINSTATEMENT MATERIAL

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES.

Rev	Date	By	Chkd	Appd
D1	17.02.21	SB	EO'G	MW

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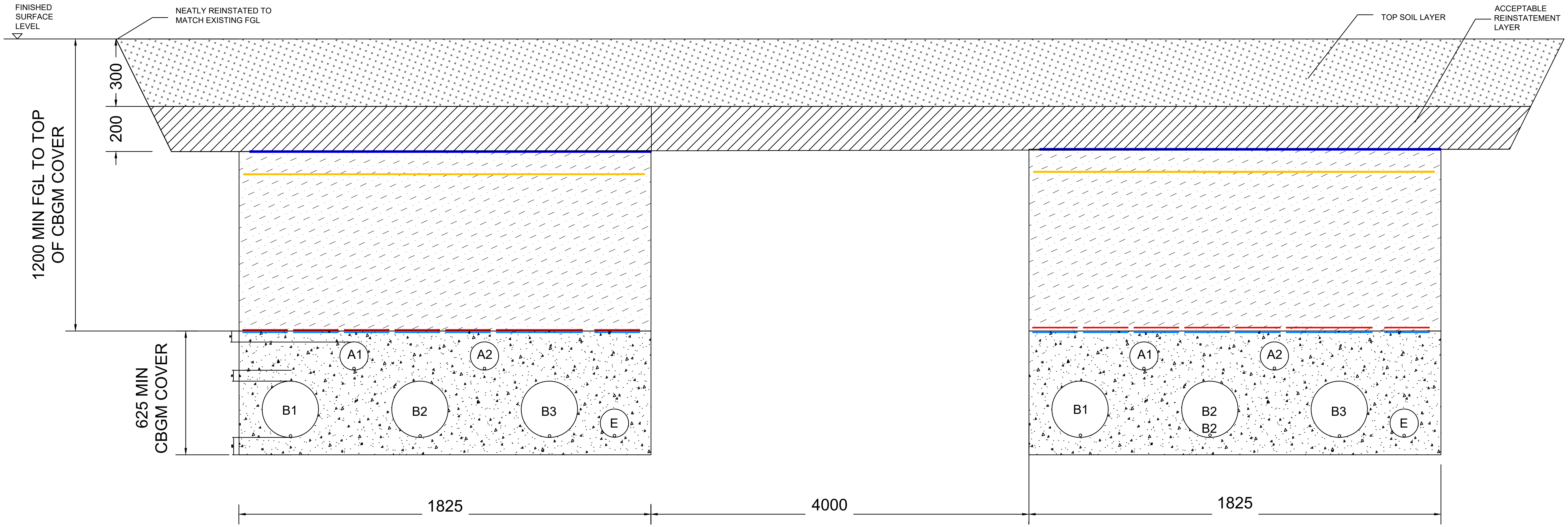
Project Title: Arklow Bank Wind Park Phase 2 Onshore Grid Infrastructure

Client: Sure Partners Limited

Drawing Title: Trench Cross Section Trefoil Arrangement

Scale at A3: NTS
Role: Civil
Suitability: For Information
Arup Job No: 271715-00
Rev: P1
Name: Figure 5



TYPICAL OFF ROAD CROSS SECTION INDICATING TRENCH FOR 220KV CIRCUIT FLAT FORMATION

SCALE NTS

A= 125mm O.D. HDPE DUCT FOR COMMUNICATIONS, SDR=17.6
B= 250mm O.D. HDPE DUCT FOR HV CABLE, SDR=21
E= 125mm O.D. HDPE DUCT FOR EARTH CONTINUITY CONDUCTOR, SDR=17.6

- RED MARKER STRIP
- YELLOW MARKER WARNING TAPE
- EXISTING SERVICE MARKER STRIP
- 6mm GALVANISED STEEL PLATE

- RAPID HARDENING WET CONCRETE C25/30
- CBGM B (CL. 822). COMPACTED TO CL 813.10
- BACKFILL COMPACTED (CL. 802 OR ACCEPTABLE MATERIAL)
- TOP SPOIL
- ACCEPTABLE REINSTATEMENT MATERIAL

NOTES
1. ALL DIMENSIONS ARE IN MILLIMETRES.

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Rev	Date	By	Chkd	Appd

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Project Title: Arklow Bank Wind Park Phase 2 Onshore Grid Infrastructure

Client: Sure Partners Limited

Drawing Title: Trench Cross Section Flat Arrangement

Scale at A3: NTS
Role: Civil
Suitability: For Information
Arup Job No: 271715-00
Rev: P1
Name: **Figure 6**

Do not scale

2.3.3.1 Duct/Cable Surround Material

Material for duct bed and surround, and trench backfill will be an inert, granular and well-compacted thermally suitable material (e.g. cement bound granular mixture) up to the red cable marker strip above the fibre optic cable ducts. This material will provide mechanical protection to the cable and will have the required thermal properties (i.e. a thermal resistivity of approximately 1.0Km/W). For HDD locations, it is not possible to have a specified backfill around the cables and therefore the ducts may be installed at a greater spacing to improve heat dissipation.

The trench backfill above the red cable marker strips will also need to be well compacted and thermally suitable. Most types of soil will be thermally suitable. However, ground types and material that will generally not be thermally suitable are as follows:

- Fuel ash;
- Made ground and rubble; and
- Peat.

The suitability of the cable route will be confirmed by ground investigation works and detailed design, and it is considered there is sufficient scope for micro-routing of the cables, within the planning (red line) boundary, to achieve a route through suitable material.

2.3.4 Joint Bays

The cables will be supplied to site on large reels, with 600m to 800m of cable being carried on a single reel. This results in two jointing bays, one jointing bay per cable circuit, being required every c. 700m of a cable installation and in places, at a closer spacing depending on the complexity of the route and the preferences of the landowners.

The joints between the three cables for each cable circuit will be made at a jointing bay. A maximum of 20 joint bays (10 per cable circuit) will be required along the cable route.

Each joint bay comprises of:

- a jointing chamber;
- a communications chamber; and
- an earth link box.

At each joint bay, the communications chamber and earth link box are covered by manhole covers which need to be accessed at regular intervals for maintenance purposes over the lifetime of the project.

Joint bay locations have been chosen within the planning boundary such that they are located in areas of suitable terrain, close to field boundaries and are easily accessible. It is considered there is sufficient scope for micro-siting of the joint bays, within the planning (red line) boundary.

2.3.4.1 Joint Chamber

The dimensions of each joint chamber along the cable route will be approximately 6m long x 2.5m wide x 2m deep. The joint chamber is a concrete chamber placed, or blockwork chamber constructed, in the ground where cable sections are jointed together. There will be three cable joints in each joint chamber for each cable circuit.

2.3.4.2 Link Box Chamber

A link box per cable circuit will be located along the route close to the joint chambers. Link boxes are used at cable joints and terminations to provide easy access for cable testing and fault location purposes. Indicative dimensions for each link box chamber are 1.3m long x 0.8m wide x 1.2m deep.

There will be an earthing strip around the periphery of each joint bay. The earthing strip is typically a copper tape, approximately $25mm^2$ in area, which provides an interface to ground via joint bay earth rods. The earth strip connects the conductor screen to earth via the link box.

There will be bonding leads (i.e. lower voltage cables) running from the link box to the joint chamber. An inspection chamber with manhole cover is required at each of the link boxes as they will need to be accessed occasionally (i.e. approximately once every year) to allow the outer polyethylene layer of the cable to be tested for integrity.

2.3.4.3 Communication Chamber

At each joint bay a communication chamber is required. The fibre optic cables are jointed in the communication chamber. Indicative dimensions for the communication chamber are 1.3m long x 0.8m wide x 1.2m deep. An inspection chamber with manhole cover is required at each of the communication chambers as they will need to be accessed occasionally (i.e. approximately once every year) to allow the fibre optic cable to be tested for integrity.

2.3.5 Marker Posts

Marker posts will be put in place at the following locations:

- 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; and
- At changes in direction of the cable route.

Marker posts will be similar to that shown in **Figure 7**. Marker posts will be installed with approximately 750mm of the post above ground and 600mm below ground.

Figure 7. Typical Marker Post

2.3.6 Cables Crossings of Obstacles

2.3.6.1 HDD Crossings

HDD works will be required for crossing below certain obstacles where open cut trenching is impractical.

A HDD will be required for the crossing of the R772 (including the Templerainy watercourse) and a second HDD may be required for the crossing of the M11 (including the Sheepwalk watercourse). Should a HDD not be utilised for crossing the M11, the cables will be laid within an existing underpass.

Table 1 provides information on the proposed HDD crossings.

Table 1. Indicative HDD Parameters

Description	Approximate Length of HDD	Maximum Depth of HDD
R772 incl. Templerainy Watercourse	200m	20m
M11 incl. Sheepwalk Watercourse	500m	25m

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 in the range of 4m to 20m. The expected outer diameter of the HDD duct will be a maximum of 800mm.

2.3.6.2 Cable Crossings of Other Obstacles

Other crossings including watercourses, roads one gas pipeline will be constructed using open cut trenched techniques. In the case of road crossings, these will be accompanied by traffic management measures to ensure access to the dwellings and premises is maintained. For watercourses, water flow is maintained by damming and over pumping or using temporary flume pipes.

Table 1 provides information on the types of crossings along the cable route.

Table 1 Other Cable Crossing Types

Description	Crossing Type
L95115 Road	Temporary Open Cut
Johnstown North Watercourse (WC1)	Temporary Open Cut
Johnstown South Watercourse (WC2)	Permanent Culvert
Ticknock Watercourse (WC3)	Temporary Open Cut
Coolboy Watercourse (WC4)	Temporary Open Cut

Description	Crossing Type
L2180 Road	Temporary Open Cut
Kilbride Watercourse (WC6)	Temporary Open Cut
Kilbride Church Watercourse (if using M11 underpass) (WC7)	Temporary Open Cut
Sheepwalk Watercourse (if using M11 underpass) (WC7)	Temporary Open Cut
L6179 Road	Temporary Open Cut
2no. Unnamed Open Ditches (OD1 & OD2)	Temporary Open Cut
1no. 4bar Gas Pipeline	Temporary Open Cut

Should a HDD not be utilised for crossing the M11, the cables will be laid within an existing underpass, which was originally constructed as a service tunnel between agricultural fields. The cables would be laid on the base of the underpass in ducts and encased in concrete.

2.3.7 Permanent Access

Suitable access is required to facilitate safe access of plant and equipment to joint bay locations over the lifetime of the proposed development.

Where a joint bay cannot be accessed by an existing track, a new 4.5m wide permanent access track will be constructed using crushed stone to the joint bay locations. Any access tracks required will be within the planning (red line) boundary (Refer to **Figure 3**).

A permanent access track crosses the Johnstown South watercourse, as shown in **Figure 3**. A precast culvert, minimum diameter of 900mm and 7.5m long, will be installed at this crossing point.

An entrance gate will be set back from the public road and a bituminous bellmouth will be formed at the junction where the permanent access track meets the public road, to facilitate safe vehicular access and egress.

Existing field drainage regimes will be maintained along joint bay access tracks, so access tracks do not adversely affect adjacent lands.

2.3.8 Maintenance of the Cables

Maintenance of the cables will comprise an inspection, once every year, by means of the link box and communication chambers, which will be located at every joint bay.

2.3.9 Decommissioning of Cables

The cables will be decommissioned when the project ceases operation, at the same time as decommissioning of the substations.

On decommissioning, the cables and associated ducts will most likely remain in-situ as there would be more environmental impact in removing these than can be justified by the recycle value of cable material and as is standard industry practice. However, all above ground infrastructure will be removed and these areas fully reinstated.

2.4 Onshore 220kV Substation

2.4.1 Substation Site Location and Context

The site at Shelton Abbey for the proposed onshore 220kV substation is located 2.1km to the west of Arklow town. The site covers an area of approximately four hectares and is part of the Avoca River Business Park. The Avoca River forms the southern boundary of the Avoca River Business Park. The site is currently owned by Crag Digital Avoca Ltd, which has planning permission to develop a data centre on the site and an adjacent area (planning reference 18940). Another application has also been made by Crag Digital Avoca Ltd for this site (Planning Reference 201285).

It is a brownfield site and consists primarily of made ground with most of the site paved with asphalt. The Shelton Abbey Canal and Right of Way track are along the southern boundary. The Right of Way track consists of a mixture of soil and gravel. There is a small area of woodland between the site and the public road.

The Avoca River Business Park was occupied by the Irish Fertiliser Industries (IFI) manufacturing plant until 2003. The IFI plant was the subject of an EPA licence (Register Number: P0031-02). The Avoca River Business Park including, the site of the proposed substation, was removed from the licence through a partial licence surrender and the manufacturing plant was demolished. No licence obligations remain applicable to the proposed substation site. An adjacent area to the east of the Avoca River Business Park remains licensed by the EPA due to presence of a historic landfill.

Figure 8 shows the context of the site and **Figure 9** shows the proposed site layout.

LEGEND:

PROPOSED SUBSTATION SITE

Rev	Date	By	Chkd	Appd
D1	17.02.21	SB	EO'G	MW

ARUP

One Albert Quay
Cork, Ireland
Tel +353 (0)21 422 3200
www.arup.com

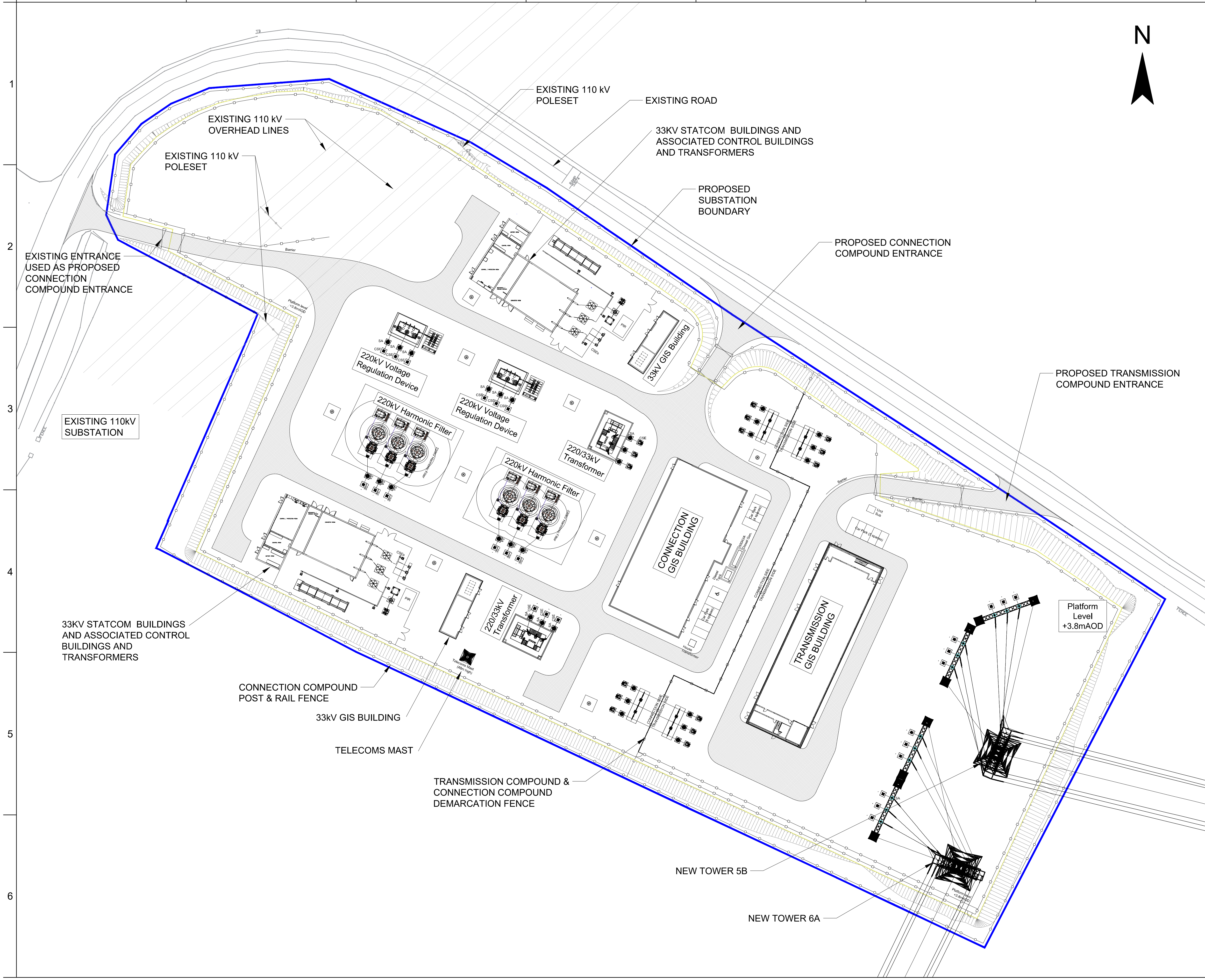
Client
Sure Partners Limited

Project Title
Arklow Bank Wind Park
Phase 2
Onshore Grid Infrastructure

Drawing Title
Proposed Substation Site

Scale at A3: 1:20,000
Role: Civil
Suitability: For Information
Arup Job No: 271715-00
Rev: D1
Name
Figure 8

Do not scale



LEGEND:

- SUBSTATION PLATFORM BOUNDARY
- SUBSTATION BOUNDARY
- PROPOSED EQUIPMENT, OHLs & NEW OHL TOWERS
- EXISTING 110 kV OHLs & POLES
- PALISADE FENCE LINE
- POST & RAIL FENCE LINE
- PROPOSED SUBSTATION COMPOUND ROAD
- INDICATIVE CUT/FILL EARTHWORKS
- PROPOSED LIGHTNING PROTECTION MONOPOLES

Rev	Date	By	Chkd	Appd
D1	17.02.21	SB	EO'G	MW

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Client
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Project Title
Arklow Bank Wind Park
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Onshore Grid Infrastructure

Drawing Title
Proposed Substation Layout

Scale at A3: NTS
Role: Civil
Suitability: For Information
Arup Job No: 271715-00
Rev: D1
Name
Figure 9

Do not scale

2.4.2 Substation Compound (Buildings and Equipment)

Gas Insulated Switchgear (GIS) technology was selected for the proposed substation.

The substation consists of two connected compounds:

- The transmission compound, with the infrastructure to physically connect to the NETN, including:
    - 2 no. new 220kV overhead line towers;
    - 220kV GIS substation building;
    - house transformer;
    - diesel generator; and
    - medium voltage (MV) unit substation.
- The connection compound, with the infrastructure to allow the connection of the windfarm in accordance with EirGrid Grid Code requirements, including:
    - 220kV GIS substation building;
    - 2 no. STATCOM buildings, associated control buildings and transformers;
    - 2 no. harmonic filters;
    - 2 no. voltage regulation devices;
    - telecommunications mast;
    - house transformer;
    - diesel generator; and
    - lightning arrester masts.

Figure 9 presents the layout plan of the proposed substation.

Underground cables will be used to connect the various pieces of electrical equipment within the substation. The underground cables will terminate at a cable sealing end (CSE) and connection to the piece of electrical equipment will be via a surge arrestor (SA) to help protect the equipment.

The overall design and external finishes of the substation buildings will, in so far as possible, conform with the architectural design of the adjacent buildings in the Avoca River Business Park.

A 'loop-in' connection will be made to the existing Lodgewood-Arklow 220kV overhead transmission line via the two new overhead line towers located adjacent to the GIS building in the transmission compound.

The proposed construction strategy of the substation can be found in **Appendix C** of this report.

2.4.3 Transmission Compound Infrastructure

2.4.3.1 Transmission System 220kV Loop-In Connection

There will be two new 220kV overhead line towers in the transmission compound to loop-in the Lodgewood-Arklow 220kV line.

The maximum height of each of the towers will be 40m.

The connection from the two towers into the transmission substation building will be via gantries and underground cables.

2.4.3.2 Transmission System 220kV GIS Substation Building

The transmission system GIS substation building will be a two-storey building. The ground floor of the building will contain the control and protection room, battery room, welfare facilities, workshop, store-room and cable pit. The first floor of the building will contain the 220kV GIS equipment.

The dimensions of the building will be 61m long x 18.5m wide x 17m high. The external finish of the transmission system GIS building will be selected insulated metal wall cladding, or similar approved, in a matt dark grey/green colour.

The transmission substation building will also accommodate a diesel tank and diesel standby generator.

2.4.3.3 Medium Voltage Unit Substation

A back-up electricity supply is required for the transmission compound. This will be via a small unit substation and underground cable circuit from the existing 110kV substation that is immediately adjacent to the new onshore 220kV substation of the proposed development.

The unit substation will be a metal enclosure containing a transformer and switchgear to step down the Medium Voltage (MV) back-up supply from the existing 110kV substation to Low Voltage (LV) required at the transmission GIS building. The typical dimensions for the unit substation will be 3m long x 3m wide x 3m high.

2.4.4 Connection Compound Infrastructure

2.4.4.1 Connection 220kV GIS Substation Building

The Connection GIS substation building will consist of a two-storey building. The ground floor of the building will contain the control and protection room, battery room, welfare facilities, workshop, meeting room, store-room and cable pit. The first floor of the building will contain the 220kV GIS equipment.

The dimensions of the building will be 50m long x 23.75m wide x 17m high. The external finish of the connection 220kV GIS building will be selected insulated metal wall cladding, or similar approved, in a matt dark grey/green colour.

2.4.4.2 STATCOM Buildings and Associated Control Buildings and Transformers

Two STATCOM (Static Synchronous Compensator) buildings housing equipment and control panels with an adjacent compound and 220/33kV transformer will be provided per 220kV export cable circuit to ensure the proposed development will comply with the EirGrid Grid Code requirements.

The STATCOM building will contain the valve module Insulated Gate Bipolar Transistor (IGBT) assembly. The valve modules will consist of power electronics (IGBTs), a Direct Current (DC) capacitor integrated with cooling fluid and fibre interfaces.

The STATCOM compound will contain the pre-insertion resistors (PIR) to limit the current on charging the DC capacitors in the valve module. Also contained in the compound will be the air core current regulators, 33kV air insulted busbars and cooling fan assembly.

The STATCOM control building will contain the control and protection panels required to operate and control the STATCOM devices.

The STATCOM 220/33kV transformer will step down the transmission system voltage from 220kV to the operating voltage of the STATCOM, typically 33kV.

The dimensions of the STATCOM buildings will be approximately 30m long x 23m wide x 10m high at the ridge of 30° pitched roof. The external finish of the building will be plastered render, in a matt dark grey/green colour.

2.4.4.3 Voltage Regulation Device

A voltage regulation device will be provided for each 220kV export cable circuit to ensure the Project will comply with the EirGrid Grid Code requirements.

The voltage regulation device will be approximately 5m long x 2.6m wide x 3.7m high, weighing up to 53t.

2.4.4.4 Harmonic Filter

A harmonic filter will be provided for each 220kV export cable circuit to ensure the proposed development will comply with the EirGrid Grid Code requirements.

The harmonic filter 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; and
- Reactor – 7m long x 5m wide x 5m high.

The equipment will be surrounded by a c. 2m high fence to restrict access.

2.4.4.5 House Transformer

A house transformer, approximately 500kVA in size will be located adjacent to the connection GIS building. The house transformer will provide a LV electricity supply to the connection compound. The house transformer will be approx. 2.5m long x 2.5m wide x 3m high.

2.4.4.6 Lightning Arrestor Mast

Lightning arrestor masts, maximum 30m high, will be provided in the connection compound. This will ensure the external electrical equipment will be protected from lightning strikes throughout the lifetime of the proposed development. The proposed masts are shown on the substation layout in above.

2.4.5 Common Site Infrastructure

2.4.5.1 Storage of Liquids and Gases

The transformers (STATCOM and house) will be oil filled. Each transformer and the diesel oil fuel tank (for the standby generator) will be located within its own impermeable oil tight concrete-walled containment bund. Each containment bund will have a capacity of not less than 110% of the volume of the liquid capacity of the equipment it is supporting.

Rainwater accumulation in each oil containment bund will be drained to a sump and then on to a respective class 1 full retention oil separator for treatment before joining the site main surface water drainage system.

The cooling of the STATCOM valve modules will be administered by a closed loop liquid to air cooling system equipped with a water to air heat exchanger. The coolant, which will be a glycol-based coolant will be the only liquid stored in bulk on site, apart from the fuel storage for the standby diesel generator. Coolant will be stored in special bunded standby tanks located in the STATCOM building.

The transmission compound and connection compound equipment will contain Sulphur Hexafluoride SF6, with design and manufacture of the equipment following industry best practice to contain the gas.

2.4.5.2 Standby Diesel Generator

A standby diesel generator, approximately 500kVA in capacity will be located adjacent to the Connection GIS building. The generator will be in a waterproof enclosure and located on an impermeable containment bund. A double skinned diesel tank with up to 3 days of fuel storage will be located beside the generator.

A second diesel generator and double skinned diesel tank with similar storage capacity will be located within the transmission GIS building.

The diesel generators will be approx. 6m long x 2.5m wide x 3m high.

2.4.5.3 Landscaping

Low level native planting will be incorporated in undeveloped areas, within the overall substation site, to provide soft landscaping.

2.4.5.4 Utilities

The substation will have the following utilities:

- Potable Water;
- Foul Drainage;
- Surface Water Drainage
- Telecoms and IT; and
- Electricity.

Potable water

Potable water for the site will be provided by a new watermain, which will connect to the existing watermain outside the perimeter of the site. This will be laid along the proposed site access road, to the welfare facilities in the connection GIS substation and transmission GIS substation buildings.

A pre-connection enquiry has been made to Irish Water, which has confirmed that a connection can be made to the public water supply, to the southeast of the substation site. Irish Water has advised that the existing 2.3km watermain will be upgraded to facilitate this and other developments at the Avoca River Business Park.

Foul Drainage

There will be infrequent visits by personnel to the substation, therefore, foul wastewater generated will be minimal. Foul wastewater will be collected independently from the welfare facilities in both the transmission 220kV GIS substation building and the connection 220kV GIS substation building.

Foul wastewater will be stored temporarily in respective, appropriately sized, foul wastewater holding tanks and removed from site periodically, by a licensed service provider, to a licensed wastewater treatment facility.

Surface Water Drainage

Surface water drainage infrastructure is already in place on the site, at the Avoca River Business Park. Surface water from the existing site drains to a ditch around the western and northern boundary of the site, and to the canal near the southern boundary of site.

A new surface water drainage network will be constructed to accommodate the proposed development. Appropriately sized hydrocarbon interceptors will be installed at strategic locations along the proposed surface water drainage network to prevent any hydrocarbons from leaving the site of the proposed substation.

The surface water drainage network has been designed to ensure that no flooding or surcharging of the system will occur for all storm events up to and including the 1 in 30 year return period storm event. All buildings and equipment within the site boundary will be protected against flooding for all storm events up to and including the 1 in 200 year return period storm event. The proposed surface water drainage network design includes an allowance for climate change.

There may also be a requirement for the pumping arrangement (used to control the discharge of surface water to the Avoca River) to be replaced. Further, on the northern side of the flood defence embankment, a hydrobrake will be installed to the existing attenuation pond outfall, limiting the existing gravity fed outfall to a maximum greenfield discharge rate of the existing facilities and planned developments within Avoca River Business Park.

Telecoms and Electrical Supply

A new telecommunications mast, maximum 50m high, will be required in the connection compound.

Standby diesel generators will be provided in both the connection and transmission substation compounds. A house transformer will be provided in the connection compound.

The transmission substation compound will also have a Medium Voltage supply as described in **Section 2.4.3.3**.

Security Fencing

Facilities will be provided to ensure adequate security including a secure perimeter around both compounds. These include:

- Boundary Palisade Fencing;
- Posts and Railings;
- Entrance gates; and
- Site lighting and CCTV security measures.

External Lighting

The lighting system will provide directional illumination within the substation to allow personnel to move without risk to health and safety and to prevent light spill. Security lighting will be installed against the building and Glass Reinforced Polymer lighting poles of maximum 6m height will be installed for illuminating the external area within the perimeter fencing.

Under normal operating conditions, external lighting will 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. Motion sensor technology will be used to control lighting at access doors and security gates.

Lighting will be designed to provide minimum lux levels, for security and for safety reasons.

The lighting will comply with EirGrid requirements, which include for outdoors at ground level horizontal illuminance of not less than 2 lux. Lights will be controlled to automatically switch on at 55 lux and off at 110 lux, with manual override.

For emergency lighting, a minimum illumination of not less than 30 lux will be provided in all areas to ensure safe movement of personnel, and safe access to, and egress from any part of the substation buildings.

2.4.6 Permanent Access

Access to both the transmission compound and connection compound will be via the existing road network, from the R772, which is c. 2km to the east, to the L6179 Kilbride Road leading to the private Avoca River Business Park access road. This access route will be used for both construction activities and as the permanent access during the operational phase.

As indicated in **Figure 9**, the transmission compound will have a separate site access from the connection compound. Both access roads will be located along the northern boundary of the proposed site, with new junctions proposed from the private Avoca River Business Park access road.

As shown on **Figure 9**, there will be a number of areas around the substation site which will be finished in an unbound surface. These unbound surfaces will consist of a natural, suitably graded granular crushed stone, generally comprising a maximum particle size of between 30-50mm, to a minimum compacted thickness of 200mm.

Site surfacing will be spread after installation of services and cables. Filter drains, connected to the surface water drainage system will collect surface water run-off from the site road and yard areas.

It is proposed to have 10 car parking spaces in the connection compound and 5 spaces in the transmission compound, for use by the maintenance staff.

2.4.7 Substation Site Remediation

The substation site is currently covered by asphalt underlain by made ground which ranges in thickness from 0.8 to 2.3m. The made ground is underlain by silts and clays which in places include organic peat like material. A gravel aquifer underlies the silts/clay layer, which vary from c. 9.0 to 14.5m thick. This layer is underlain by the shale bedrock which is classified as a Locally Important Aquifer.

Site investigations have found that the composition of the made ground varies throughout the site, from inert to material with elevated levels of heavy metals.

The proposed remediation strategy for the site, following removal of the asphalt, is to cap the made ground with a barrier layer. The barrier layer will minimise the percolation of rainwater through the contaminated material which will minimise leachate generation, act as a gas barrier and also form a physical barrier for site users to prevent dermal contact with the heavy metals in the made ground during site operation.

The current ground level across the site is between 1.38m OD and 2.4m OD. The platform will be built up to a maximum level of 3.8m OD, which meets the minimum recommended level for flood protection and also facilitates the installation of underground services, to ensure that the design objectives and function of both the remedial measures and buried services are met.

In addition to the removal of the existing asphalt, relatively small volumes of made ground in localised areas will be excavated to facilitate the construction of footings, cable duct basements and the installation of drainage pipes.

2.4.8 Improvement Works to Flood Defences

A flood defence embankment protects the Avoca River Business Park from flooding of the Avoca River. Approximately 500m to the west of the substation site, a low point in the existing flood defences requires improvement works to protect the substation buildings, and associated ancillary external equipment, from a mid-range future scenario 1 in 1000 return period flood event.

The substation site flood defence improvement works will include localised raising of the existing flood defence embankment level from c. 5.8m OD to 6.5m OD over a distance of up to 75m (using either cohesive soils, placed and suitably compacted in layers and/or sheet piling as shown in).

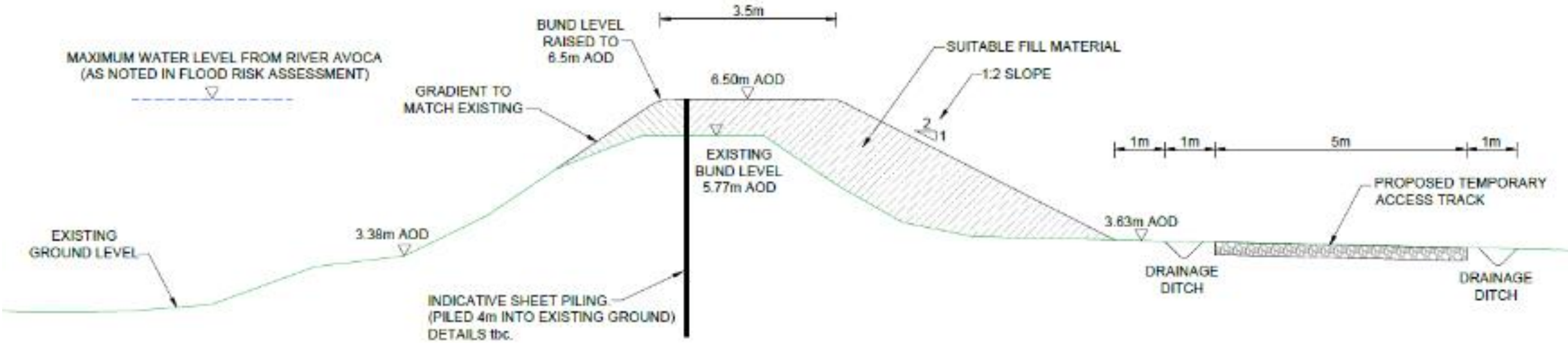

Figure 10. Flood Defence Embankment Cross Section

2.4.9 Operation and Maintenance

The substation will be operated remotely and will be unmanned during operation. It will receive occasional visits for inspection and maintenance.

The transmission compound and connection compound have both been designed to accommodate up to eight people during operation and maintenance. Each compound will require routine operational checks to be carried out six to eight times per month, as well as quarterly inspection visits and further visits for maintenance as and when required (typically once a year in each case).

For typical visits to a compound, it is expected that one or two vehicles may attend, and these visits would take place within normal working hours.

Maintenance visits to a compound will typically require six vehicles per day. This work may be undertaken on a shift pattern to allow 24-hour working.

The standby diesel generators will be available for operation in the event the normal electrical supply is lost, with up to 3 days of fuel storage being located on site. This would be expected to be used once every 5 years for up to 3 days and will be tested for one hour every month as part of routine maintenance.

2.4.10 Decommissioning

The normal asset life of a substation is c. 50 years but it may be extended beyond this, as part of the national grid infrastructure. When the proposed development reaches the end of its useful life, it may be either refurbished and replaced, or it will be decommissioned.

If decommissioned, all buildings and above ground structures on the substation site will be removed.

2.5 Connection to the National Electricity Transmission Network (NETN)

An overhead line (OHL) connection from the new proposed 220kV transmission compound to the existing 220kV NETN will be required. This connection will be via a ‘loop in’ arrangement consisting of a northern tie-in to the transmission network of approximately 270m and a southern tie-in to the transmission network of approximately 350m in length.

The connection is shown in **Figure 11**.

The ‘loop in’ connection will consist of:

- Building a new double circuit lattice steel angle tower, Tower 5A (with maximum height 40m), to the east of the new substation and northeast of the existing Tower 6, and re-stringing the OHL from the existing Tower 5 to this new Tower 5A;

- Stringing a new OHL from the new Tower 5A into the transmission compound to a new tower. The OHL will consist of up to six conductors (three conductors on either side of the towers) and one shield wire with fibre optic wrap. The shield wire is the top wire and is connected to the top of the towers;
- Building a new double circuit lattice steel angle tower, Tower 6B (with maximum height 40m), south of the new substation and the Avoca River and re-stringing the OHL from the existing Tower 8 to this new Tower 6B;
- Stringing a new OHL from the new Tower 6B into the transmission compound to a new tower. The OHL will consist of up to six conductors (three conductors on either side of the towers) and one shield wire with fibre optic wrap. The shield wire is the top wire and is connected to the top of the towers; and
- The existing Towers 6 and 7, to the east and south of the new substation, and the existing OHL span between the new Towers 5A and 6B will be decommissioned. Tower 6 will be removed with the foundation being left in situ to avoid any disturbance of lands as the tower is within a licensed landfill. Tower 7 will be removed including the foundation to c. 1m below ground level.

The proposed construction strategy of the NETN connection can be found in **Appendix C** of this report.

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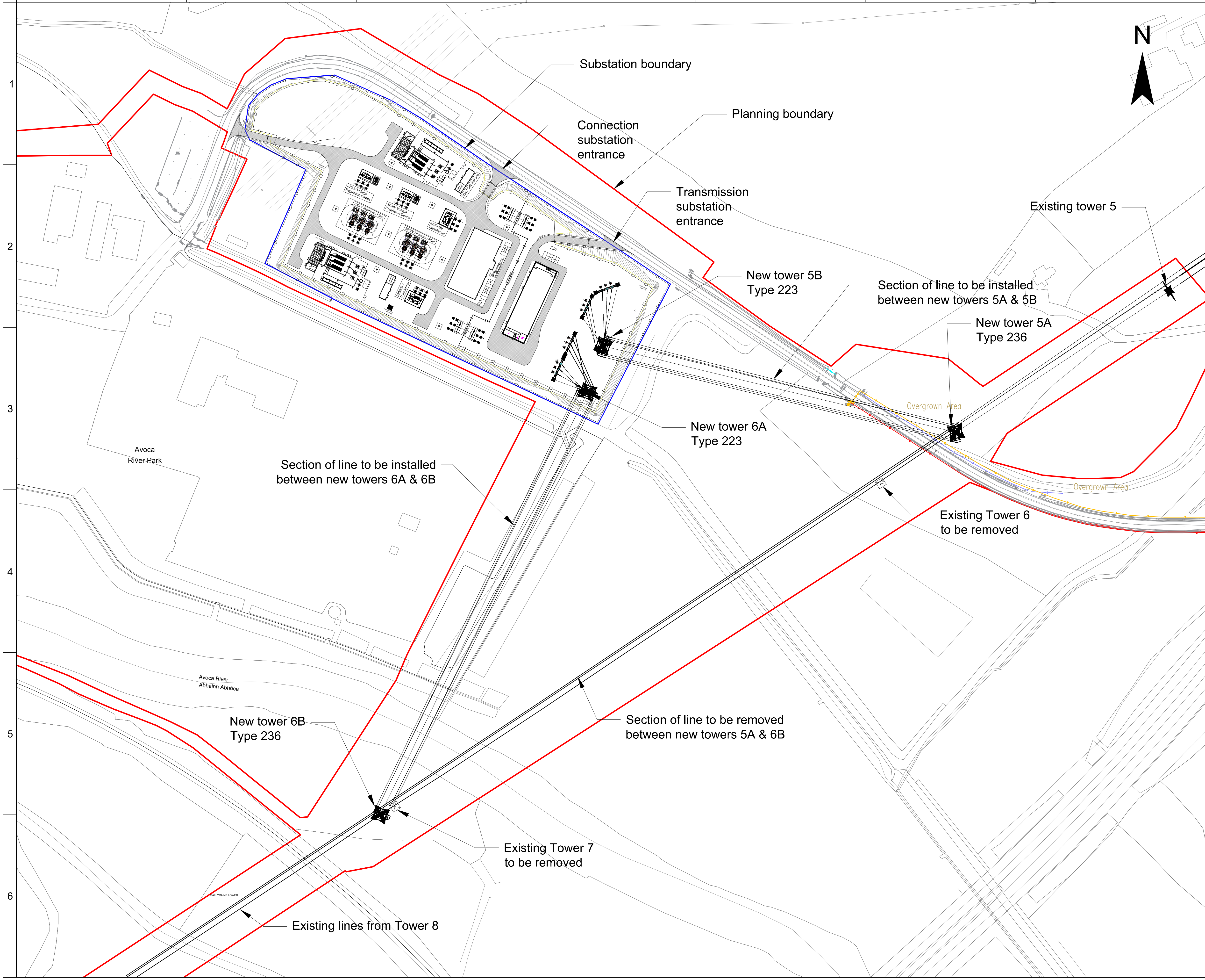

LEGEND:

RED LINE BOUNDARY

SUBSTATION BOUNDARY

PROPOSED SUBSTATION COMPOUND ROAD

Rev	Date	By	Chkd	Appd
D1	17.02.21	SB	EO'G	MW

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Client
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Project Title
Arklow Bank Wind Park
Phase 2
Onshore Grid Infrastructure

Drawing Title
Proposed Loop-In Connection to NETN

Scale at A3 NTS

Role Civil

Suitability For Information

Arup Job No 271715-00

Rev D1

Name
Figure 11

Do not scale

3

3 Methodology

This section provides detail on the adopted methodology and the information gathered to inform the overall assessment process. The proposed development is described in **Section 2**. The ecological baseline of the site and surrounding area is described in **Section 4**.

Stage 1 (AA Screening) is presented in **Section 5** and Stage 2 (AA NIS) is presented in **Section 6**.

3.1 Guidance and Data Sources

This report has been prepared with regard to the following guidance documents, where relevant.

- Managing Natura 2000 Sites: The Provision of Article 6 of the Habitats Directive 92/43/EEC (EC Environment Directorate-General, 2018); [hereafter referred to as MN 2018];
- Assessment of Plans and Projects Significantly Affecting Natura 2000 sites: Methodical Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC (European Commission Environment Directorate-General, 2001);
- Guidance Document on Article 6(4) of the Habitats Directive 92/43/EEC (European Commission, 2007);
- Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities (Department of Environment, Heritage and Local Government, 2010 revision);
- Appropriate Assessment under Article 6 of the Habitats Directive; Guidance for Planning Authorities. Circular NPW 1/10 and PSSP 2/10 (Department of Environment, Heritage and Local Government, 2010);
- Guidelines for Good Practice Appropriate Assessment of Plans under Article 6(3) Habitats Directive (International Workshop on Assessment of Plans under the Habitats Directive, 2011);
- Commission notice Guidance document on wind energy developments and EU nature legislation, (EC 2020) and
- Communication from the Commission on the precautionary principle. European Commission (2000).

Sources of information utilised for this report include the following:

- Ordnance Survey Ireland (OSI) mapping and aerial photography – www.osi.ie;
- Bing aerial photography – www.bing.com/maps;

- Google aerial photography – www.googlemaps.com;
- National Parks and Wildlife Service (NPWS) - www.npws.ie;
- Environmental Protection Agency (EPA) – www.epa.ie;
- Information on environmental water quality data available from EPA, www.catchments.ie;
- National Biodiversity Data Centre – www.biodiversityireland.ie;
- BirdWatch Ireland - www.birdwatchireland.ie;
- Google Earth aerial photography;
- Fossitt (2000) *A Guide to Habitats in Ireland*. The Heritage Council;
- *Arklow Bank Wind Park Phase 2 Offshore Phase 2 Offshore Infrastructure, Stage 2 appraisal to inform an Appropriate Assessment of Implications on European sites Natura Impact Statement (*RPS 2021); and
- *Arklow Bank Wind Park Phase 2 Offshore Phase 2 Offshore Infrastructure, Stage 2 Environment Impact Assessment Report (*RPS 2021).

3.2 Field Survey Methodology

Surveys were carried out at the survey area between June 2019 and February 2021. The survey areas included all lands within the planning boundary as well as any areas of interest in the vicinity e.g., cliffs near landfall site, woodland habitats and the Avoca River. The following surveys were carried out:

- Habitats were mapped according to the classification scheme outlined in the Heritage Council publication *A Guide to Habitats in Ireland (Fossitt, 2000)* and following the guidelines contained in *Best Practice Guidance for Habitat Survey and Mapping* (Heritage Council, 2011). Habitats were cross referenced with Habitats Directive Annex 1 habitats. The main habitat surveys were carried out on the 18 June, 21 July and 30 July 2020. Additional habitat surveys were carried out on the 19 November and 17 December 2020 and 22 January and 17 February 2021;
- The site was surveyed for invasive species and rare floral species. The main surveys were carried out on the 18 June, 21 July and 30 July 2020. Additional observations which were made during subsequent site visits were also recorded where relevant;
- A general mammal survey was carried out in conjunction with the habitat survey. Surveys were conducted on the 18 June, 21 July and 30 July 2020. The survey focused in particular on Otter, Badger and identifying potential roosting sites for bats (NRA 2005a, NRA 2005b and NRA 2008);
- All aquatic habitats were visually assessed during initial habitat surveys. Kick sampling and electrofishing fish assessment surveys were carried out on 25 September 2020; and

- All bird species observed during the habitat survey were recorded (Bibby *et al.* 2000; Gilbert *et al.* 1998). In addition, specialised bird surveys were conducted as follows:
  - Breeding bird survey during the walkover survey of proposed cable route. Surveys were conducted on the 21 May, 18 June, 25 June, 21 July and 30 2020;
  - Winter bird surveys at landfall sites and coastal habitats in the vicinity of the planning boundary. Surveys were carried out on 05 November 2019, 18 November 2019, 16 December 2019, 25 January 2020, 13 February 2020 and 27 March 2020;
  - A survey of cliffs habitats and breeding birds was carried out 300m northwest and southeast of landfall location. Survey was carried out on 21 July 2020. It is noted that this survey was conducted outside the optimal survey period/peak bird activity, therefore both the presence of birds and signs of breeding, including staining of cliffs were used to assess site usage; and
  - Survey of Whooper Swan and Curlew usage of fields to the northeast of the planning boundary. Surveys were carried out on 19 November and 17 December 2020 and 22 January and 17 February 2021.

3.3 Assessment Methodology

The proposed development was analysed and assessed to identify the potential impacts associated with the construction and operational phases that could affect the ecological environment. From this, the Zone of Influence (ZoI) of the proposed development was defined. Based on the identified impacts, and their ZoI, the European sites potentially at risk of any direct or indirect impacts were identified. This assessment was undertaken in consideration of all potential impact sources and pathways connecting the proposed development to European sites, in view of the conservation objectives supporting the conservation condition of the sites' Qualifying Interests (QIs).

Where site-specific conservation objectives have been prepared for a given European site, these include a series of specific attributes and targets against which effects on conservation condition, or integrity, can be measured, i.e. an impact which affects the achievement of favourable conservation condition, as measured by the attributes and targets, is an impact on site integrity.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level. Favourable conservation status of a habitat is achieved when its natural range, and area it covers within that range, is stable or increasing, and the ecological factors that are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and the conservation status of its typical species is favourable.

The Report for Screening for AA determined, on the basis of objective information and in view of best scientific knowledge and in the absence of mitigation measures, that the possibility of significant effects from the proposed project on European sites cannot be ruled out.

An NIS has therefore been prepared to inform and assist the competent authority, in carrying out its AA as to whether or not the proposed project will adversely affect the integrity of European sites either alone or in combination with other plans and projects, taking into account the conservation objectives of the European sites.

Mitigation measures have been included in the NIS to ensure that, in view of the European sites' conservation objectives and beyond reasonable scientific doubt, the proposed development will not adversely affect the integrity of the sites concerned. It is noted that mitigation measures were not taken into account when reaching the conclusions for Stage 1 Screening for Appropriate Assessment.

3.4 Legislative Background

According to the EU Habitats Directive (92/43/EEC) and the EU Birds Directive (2009/147/EC), Member States are required to establish a Natura 2000 network of sites of highest biodiversity importance for rare and threatened habitats and species across the EU.

The Natura 2000 network of European sites includes Special Areas of Conservation (SACs) and Special Protection Areas (SPAs).

SACs are selected for the conservation of Annex I habitats (including priority types which are in danger of disappearance) and Annex II species (other than birds). SPAs are selected for the conservation of Annex I (of the Birds Directive) birds and all migratory birds and their habitats. The Annex habitats and species, for which each site is selected, are the *qualifying interests* (QI) of the site. *Conservation objectives* for the site are defined for these qualifying interests.

A key requirement of the Directives is that the effects of any plan or project, alone, or in combination with other plans or projects, on the Natura 2000 network, should be assessed before any decision is made to allow that plan or project to proceed. This process is known as Appropriate Assessment (AA). The obligation to undertake an Appropriate Assessment derives from Article 6(3) and 6(4) of the Habitats Directive (92/43/EEC) and both involve a number of steps and tests that need to be applied in sequential order.

Article 6(3) is concerned with the strict protection of sites, while Article 6(4) is the procedure for allowing derogation from this strict protection in certain restricted circumstances.

Article 6(3) of the Habitats Directive states:

"*Any plan or project not directly connected with, or necessary to, the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans and projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only having ascertained that it will not adversely affect the integrity of the site concerned and if appropriate, after having obtained the opinion of the general public*".

Article 6(4) states:

"If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of social or economic nature, the Member State shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted.

Where the site concerned hosts a priority natural habitat type and/or a priority species, the only considerations which may be raised are those relating to human health or public safety, to beneficial consequences of primary importance for the environment or, further to an opinion from the Commission, to other imperative reasons of overriding public interest."

The competent authority is required to carry out an Appropriate Assessment, as required by Article 6(3) and 6(4) of the Habitats Directive, as follows:

Stage 1 - Screening for Appropriate Assessment – to assess, in view of best scientific knowledge, if a development, which is not directly connected with, or necessary to, the management of the site, individually or in combination with another plan or project is likely to have a significant effect on the Natura 2000 site.

Stage 2 - Appropriate Assessment – This is required if it cannot be excluded, on the basis of objective information, that the development, individually or in combination with other plans or projects, will have a significant effect on a Natura 2000 site. The Appropriate Assessment must include a final determination by the competent authority as to whether or not a proposed development would adversely affect the integrity of a Natura 2000 site. In order to reach a final determination, the competent authority must undertake examination, analysis and evaluation, followed by findings, conclusions and a final determination. The appropriate assessment must contain complete, precise and definitive findings and conclusions, and may not have lacunae or gaps.

Stage 3 – Assessment of alternative solutions- the process which examines alternative ways of achieving the objectives of the project or plan that avoid adverse impacts on the integrity of the Natura 2000 site.

Stage 4 - Assessment where no alternative solutions exist and where adverse impacts remain - an assessment of compensatory measures where, in the light of an assessment of imperative reasons of overriding public interest (IROPI), it is deemed that the project or plan should proceed.

4 Ecological Overview

4.1 Results of Field Survey

4.1.1 Habitats

Habitats within the planning boundary were surveyed and classified. No rare plant species were recorded within the planning boundary during the site survey and, given the modified nature of the habitats within the proposed development area, are highly unlikely to occur. A current overview of habitats recorded within the planning boundary is outlined in **Table 4** along with any links to Annex I habitats.

Table 4. Habitats recorded within planning boundary

Habitats	Comments
Arable crops (BC1)	This is a highly modified habitat with low species diversity and little value for wildlife. This habitat is not listed as a qualifying interest for European sites.
Improved agricultural grassland (GA1)	This is a highly modified habitat with low species diversity and low value for wildlife. This habitat is not listed as a qualifying interest for European sites.
Dry calcareous and neutral grassland (GS1)	This area has higher species diversity and is therefore of higher ecological value than more intensive agricultural grassland. This habitat has links to the Annex I 'Calcareous grasslands with either high numbers or diversity of orchids correspond to the priority habitat, 'semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometea) (*important orchid sites) (6210)'. However this is not an example of this habitat type. This habitat is not listed as a qualifying interest for European sites within the Zone of Influence.
Treelines (WL2)	The treeline habitats within the site are of moderate quality with moderate diversity. Treelines can provide important habitats for local wildlife such as birds, insects, and mammals. This habitat is not listed as a qualifying interest for European sites.

Habitats	**Comments**
Hedgerows (WL1)	The hedgerow habitats within the site are of moderate quality with moderate diversity. Hedgerows can provide important habitats for local wildlife such as birds, insects and mammals. This habitat is not listed as a qualifying interest for European sites
Mixed broadleaved woodland (WD1)	The woodland habitats on site are generally of moderate diversity with a well-developed ground flora and shrub layer. Woodland can provide important habitats for local wildlife such as birds, insects and mammals. This habitat is not listed as a qualifying interest for European sites
Buildings and artificial surfaces (BL3)	Most extensive example is the substation site. Low value habitat which supports some common early successional species. This habitat is not listed as a qualifying interest for European sites
Scattered trees and parkland (WD5)	Small area of parkland located adjacent to the substation site. This habitat is not listed as a qualifying interest for European sites
Recolonising bare ground (ED3)	Most extensive example is the substation site. Low value habitat which supports some common early successional species. This habitat is not listed as a qualifying interest for European sites
Immature woodland (WS2)	The woodland habitats on site are generally of moderate diversity with a poorly developed ground flora and shrub layer. Woodland can provide important habitats for local wildlife such as birds, insects and mammals including bats. This habitat is not listed as a qualifying interest for European sites
Wet grassland (GS4)	This area has higher species diversity and is therefore of higher ecological value than more intensive agricultural grassland.

Habitats	**Comments**
	This habitat is not listed as a qualifying interest for European sites
Dry meadows and grassy verges (GS2)	This area has higher species diversity and is therefore of higher ecological value than more intensive agricultural grassland. This habitat is not listed as a qualifying interest for European sites
Scrub (WS1)	This area has higher species diversity and is therefore of higher ecological value. This habitat is not listed as a qualifying interest for European sites
Depositing/lowland rivers (FW2) – Avoca River	The Avoca River supports a number of Annex II species of the Habitats Directive i.e. Otter, Atlantic Salmon, Brook Lamprey, River Lamprey and Sea Lamprey as well as other fish species such as Sea Trout, Brown trout and European Eel. This habitat is not listed as a qualifying interest for European sites
Eroding river (FW1) – Templerainy Stream	The Templerainy Stream supports River/Brook Lamprey, an Annex II species of the Habitats Directive and substantial populations of Brown Trout. This stream is also likely to support Otters (although no signs of Otter were recorded within the survey area). This habitat is not listed as a qualifying interest for European sites
Eroding river (FW1) – Kilbride Stream	The Kilbride Stream is small but supports Brown Trout and European Eel. No lamprey species were here recorded during electrofishing surveys. This stream is also likely to support Otters (although no signs of Otter were recorded within the survey area). This habitat is not listed as a qualifying interest for European sites
Eroding River (FW1) – Johnstown North, Johnstown South, Tiknock, Coolboy, Kilbride Church and Sheepwalk	Dry or low flows within the survey area. IFI noted the presence of Brown Trout within the Johnstown North, Johnstown South, Tiknock and Coolboy. These populations are likely to occur in the lower reaches where there is greater flow. This habitat is not listed as a qualifying interest for European sites.

Habitats	Comments
Canal (FW3)	A small canal is located on the southern boundary of the substation site and discharges to the Avoca River upstream of Arklow Bridge. This could potentially provide habitat for amphibian species. This habitat is not listed as a qualifying interest for European sites
Drainage ditches (FW4)	Drainage ditches may connect to higher value habitats and can support some specialised species. A common habitat type and no high value examples were recorded within the survey area. This habitat is not listed as a qualifying interest for European sites
Other artificial lakes and ponds (FL8)	An attenuation pond associated with the Avoca River Business Park could potentially provide habitat for amphibian species such as Common Newt and Common Frog. This habitat is not listed as a qualifying interest for European sites
Rocky sea cliffs CS1	Corresponds loosely to Annex I habitats of the Habitats Directive, ‘Vegetated sea cliffs of the Atlantic and Baltic coasts (1230)’. No rare flora were recorded within this habitat. This habitat is not listed as a qualifying interest for European sites within the Zone of Influence.
Reed and large sedge swamps (FS1)	A small strip of this habitat is located along a section of the Avoca River. This habitat is not listed as a qualifying interest for European sites

Overall, the proposed development will impact on common agricultural habitats with some moderate quality hedgerows, treelines and woodland habitat. No habitats, listed as qualifying interests for the European sites within the zone of the influence of the proposed development, were recorded.

The Annex I habitat, ‘Vegetated sea cliffs of the Atlantic and Baltic coasts (1230)’, occurs along the coast but is not listed as a QI for European sites within the ZOI of the proposed development. It is noted that HDD construction methodology will be utilised to avoid any potential impact on this habitat as drilling will direct the cable under the cliff, avoiding the cliff habitat (Refer to **Section 2.2**).

A number of watercourses were recorded within the planning boundary which have links to the Annex I habitat ‘Watercourses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation (3260)’. No valuable sub-types were recorded within the planning boundary.

The Avoca River supports Atlantic salmon, Sea trout and Brown trout, European eel, and all three species of lamprey listed under Annex II of the Habitats Directive. Three other watercourses i.e., Templerainy Stream, Kilbride River and Johnstown North Stream, within the planning boundary had permanent running water and were of sufficient size to support fish populations.

The Templerainy Stream is the largest watercourse along the cable route and a fish survey recorded both the River/Brook Lamprey within the watercourse. A number of small streams within the survey area were either dry or lacked sufficient depth within the survey area to be of value for fish (Tiknock, Coolboy, Johnstown South, Kilbride Church and Sheepwalk). Although these streams were of insufficient size to be of value for fish at the crossing points, fish species such as Brown Trout and European Eel may occur in deeper pockets of water lower down the catchment and therefore these species could potentially be affected by works upstream.

4.1.2 Invasive Species

Non-native plants are defined as those plants which have been introduced outside of their native range by humans and their activities, either purposefully or accidentally. Invasive non-native species are so-called as they typically display one or more of the following characteristics or features: (1) prolific reproduction through seed dispersal and/or re-growth from plant fragments; (2) rapid growth patterns; and (3) resistance to standard weed control methods.

Where a non-native species displays invasive qualities and is not managed it can potentially: (1) out compete native vegetation, affecting plant community structure and habitat for wildlife; (2) cause damage to infrastructure including road carriageways, footpaths, walls and foundations; and, (3) have an adverse effect on landscape quality.

Regulations 49 and 50 of the European Communities (Birds and Natural Habitats) Regulations 2011, as amended, make it an offence to plant, disperse, allow dispersal or cause the spread of certain species e.g. Japanese knotweed and Rhododendron, keep the plant in possession for purpose of sale, breeding, reproduction, propagation, distribution, introduction or release, keep anything from which the plant can be reproduced or propagated from the species, without a granted licence and keep any vector material for the purposes of breeding, distribution, introduction or release. Regulation 49 deals with the ‘*Prohibition on introduction and dispersal*’ while Regulation 50 deals with the ‘*Prohibition on dealing with and keeping certain species*’. Regulation 50 has yet to be brought into Irish law. Regulation 74 is a transitional provision in relation to Regulation 49 and 50.

The Wildlife (Amendment) Act 2000 states that anyone who plants or otherwise causes to grow in a wild state in any place in the State any species of (exotic) flora, or the flowers, roots, seeds or spores of (exotic) flora shall be guilty of an offence. There is a statutory obligation under S.I. 477 of 2011 of the European Communities (Birds and Natural Habitats) Regulations 2011 to address invasive species in Ireland.

The NBDC also categorizes species listed as invasive in Ireland based on a prioritization risk assessment (Kelly *et al.* 2013). This includes 48 non-native species which are ranked as at risk of having a High Impact and 78 species at risk of having a Medium Impact. While there is a statutory obligation under S.I. 477 of 2011 of the European Communities (Birds and Natural Habitats) Regulations 2011 to address invasive species in Ireland, it should be noted that not all species categorized as high and medium impact by the NBDC are listed under these regulations. However, the NBDC lists identify species that, under the right ecological conditions, may have an impact on the conservation objectives of a European site or impact on a water body achieving good/high ecological status under the Water Framework Directive.

The NBDC online database provides data on the distribution of mammals, birds, and invertebrates within Irish 10km grid squares. The proposed development site is located within grid square (tetrad) T27. **Table 5** lists high impact invasive plant species which have been recorded by the NBDC within grid square T27. It should be noted that this data relates to the entire 10km^2 area and these species will not necessarily occur within the proposed site boundary.

Table 5. NBDC list of high impact invasive plant species

Common Name	Latin Name
Japanese Knotweed	*Fallopia japonica*
Cherry Laurel	*Prunus laurocerasus*
Rhododendron	*Rhododendron ponticum*
Hottentot-fig	*Carpobrotus edulis*

Source: NBDC 16/02/21

The non-native and invasive species Japanese Knotweed (*Fallopia japonica*) and Himalayan Knotweed (*Persicaria wallichii*) were recorded within the planning boundary on the banks of the Avoca River. The medium impact listed species Buddleia (*Buddleia davidii*) was also recorded within the planning boundary between the M11 and the sub-station site. Hottentot Fig (*Carpobrotus edulis*) a high impact listed species, was recorded on sea-cliffs close to the landfall location.

4.2 Water Quality

4.2.1 EPA Water Quality Data

The Environmental Protection Agency (EPA) carries out a biological assessment of most river channels in the country on a regular basis. The assessments are used to derive Q values, indicators of the biological quality of the water. The biological health of a watercourse provides an indication of long-term water quality. As the proposed development site adjoins estuarine and coastal areas, no freshwater biological monitoring data is available for sites downstream of the proposed development. There are no recent EPA monitoring data available for the watercourses which pass through the planning corridor.

4.2.2 River Basin Management Plan for Ireland 2018 – 2021 (2nd Cycle)

The Water Framework Directive (WFD) sets out the environmental objectives which are required to be met through the process of river basin planning and implementation of those plans. Specific objectives are set out for surface water, groundwater and protected areas. The challenges that must be overcome in order to achieve those objectives are very significant. Therefore, a key purpose of the River Basin Management Plan (RBMP) is to set out priorities and ensure that implementation is guided by these priorities.

The second-cycle RBMP aims to build on the progress made during the first cycle. Key measures during the first cycle included the licensing of urban waste-water discharges (with an associated investment in urban waste-water treatment) and the implementation of the Nitrates Action Programme (Good Agricultural Practice Regulations). The former measure has resulted in significant progress in terms both of compliance levels and of the impact of urban waste-water on water quality. The latter provides a considerable environmental baseline which all Irish farmers must achieve and has resulted in improving trends in the level of nitrates and phosphates in rivers and groundwater. It is acknowledged, however, that sufficient progress has not been made in developing and implementing supporting measures during the first cycle.

Overall, RBMP assesses the quality of water in Ireland and presents detailed scientific characterisation of our water bodies. The characterisation process also takes into account wider water quality considerations, such as the special water-quality requirements of protected areas. The characterisation process identifies those water bodies that are At Risk of not meeting the objectives of the WFD, and the process also identifies the significant pressures causing this risk. Based on an assessment of risk and pressures, a programme of measures has been developed to address the identified pressures and work towards achieving the required objectives for water quality and protected areas. Data relating to the watercourses within the study area are provided in **Table 6**. The location of these watercourses relative to the proposed development site is indicated in **Figure 12.** It is noted that the planning boundary spans two sub-catchments, the Redcross_SC_10 and Avoca_SC_020.

Table 6. Water Framework Directive Data – Relevant data

Catchment: Ovoca-Vartry (Code 10) – 2nd Cycle			
This catchment includes the area drained by the Rivers Avoca and Vartry and by all streams entering tidal water between Sorrento Point, Co. Dublin and Kilmichael Point, Co. Wexford, draining a total area of 1,247km². The largest urban centre in the catchment is Bray. The other main urban centres in this catchment are Dun Laoghaire-Rathdown, Arklow, Wicklow Town, Rathnew, Newtown Mount Kennedy, Greystones, Delgany and Kilcoole. The total population of the catchment is approximately 179,100 with a population density of 144 people per km². The higher areas of the Wicklow Mountains are underlain by granite bedrock while metamorphic slates and quartzites underly the eastern coastal part of the catchment.			
Catchment: Ballyteigue-Bannow (Code 13) – 2nd Cycle			
The proposed development site is located within the Redcross_SC_10 and Avoca_SC_020 sub-catchments. Although water quality at Templerainy_Stream_030 is classified at good, this sub-basin is under significant pressure from agriculture. A historic mine site is impacting the biological status of Avoca_030. Wastewater treatment may also be impacting Avoca_030, with a licensed facility within Avoca_030 likely to be causing additional impacts. As action is not yet planned to be taken here, a Less Stringent Objective (LSO) classification is applied. This is because of the long-term legacy issues with historic acid mine drainage.			
Transitional & Coastal Waterbodies relevant to the proposed development			
Waterbody	**Status**	**Risk**	**Objective**
Redcross_030	Review	Unassigned	2027
Templerainy_Stream_030	Good	Review	2027
Avoca_030	Unassigned	At risk	LSO

Source: WFD Ireland map system (https://gis.epa.ie/EPAMaps/Water) & www.catchments.ie. LSO – Less Stringent Objective.

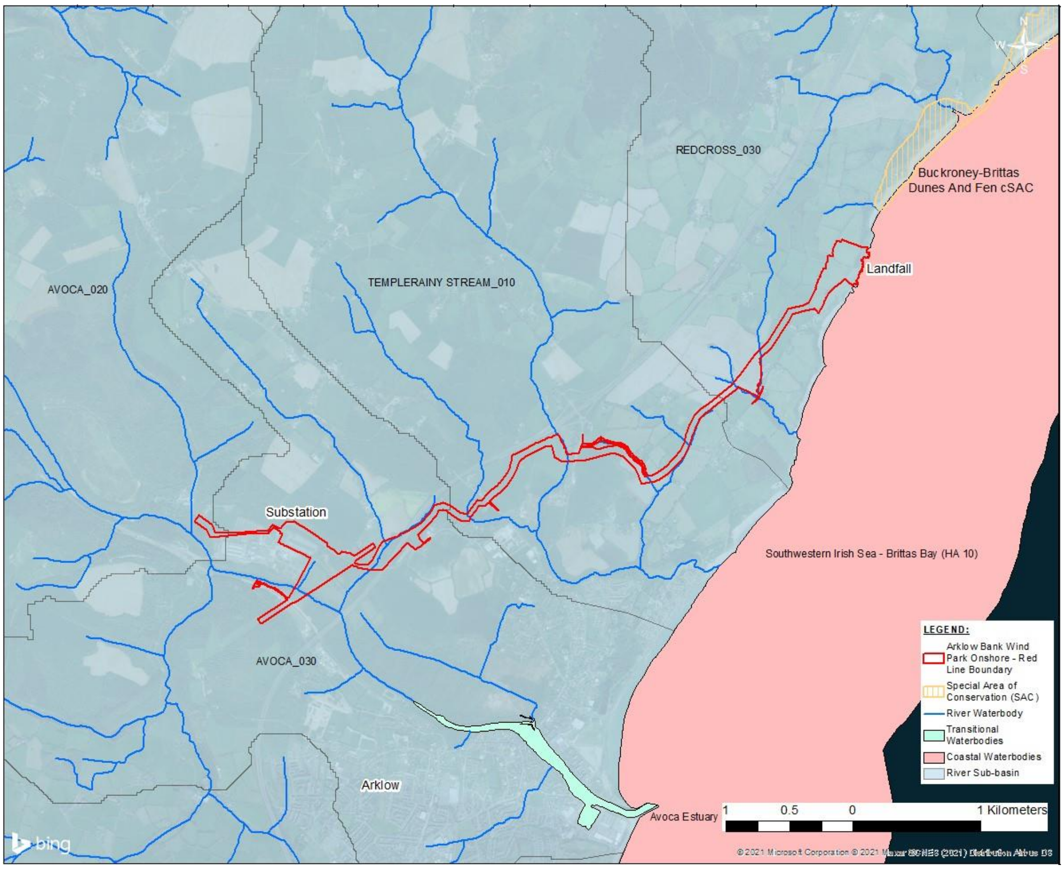

Figure 12. WFD sites in the vicinity of the planning boundary

5 Stage 1 – Screening for Appropriate Assessment

5.1 Introduction

This section contains the information required for the competent authority to undertake screening for AA for the proposed development.

The proposed development is described in detail in **Section 2**. The ecological baseline is described above in **Section 4.**

The aims of this section are to:

- Determine whether the proposed development is directly connected with, or necessary to, the conservation management of any Natura 2000 Sites;
- Provide information and assess the potential for the proposed development to significantly effect on Natura 2000 Sites (also known as European sites); and
- Determine whether the proposed development, alone or in combination with other projects, is likely to have significant effects on Natura 2000 sites in view of their conservation objectives.

The proposed development is not directly connected with, or necessary to the conservation management of any Natura 2000 sites.

5.2 Zone of Influence

The Zone of Influence (ZoI) comprises the area within which the proposed development may potentially affect the conservation objectives or qualifying interests (QI) of a Natura 2000 site. There is no recommended zone of influence, and guidance from the National Parks and Wildlife Service (NPWS) recommends that the distance should be evaluated on a case-by-case basis with reference to the nature, size and location of the project, the sensitivities of the ecological receptors, and the potential for in-combination effects (cumulative).

In ecological and environmental impact assessment, for an effect to occur there must be a risk enabled by having a source (e.g. construction works at a proposed development site), a 'receptor' (e.g. a Special Area of Conservation (SAC) or other ecologically sensitive feature), and a pathway between the source and the receptor (e.g. a watercourse which connects the proposed development site to the SAC).

Consideration is therefore given to the source-pathway-receptor linkage and associated risks between the proposed development and Natura 2000 sites. For a significant effect to occur there needs to be an identified risk whereby a source (e.g. contaminant or pollutant arising from construction activities) affects a particular receptor (i.e. Natura 2000 site) through a particular pathway (e.g. a watercourse which connects the proposed development with the Natura 2000 site).

The identification of risk does not automatically mean that an effect will occur, nor that it will be significant. The identification of these risks means that there is a possibility of environmental or ecological damage occurring. The level and significance of the effect depends upon the nature of the consequence, likelihood of the risk and characteristics of the receptor.

The precautionary principle is applied for the purposes of screening to ensure that consideration and pre-emptive action is undertaken where there is a lack of scientific evidence. It is noted that mitigation measures are not taken into account in the AA screening assessment process.

5.3 Natura 2000 Sites

5.3.1 Natura 2000 Sites within 15km

In accordance with the European Commission Methodological Guidance (MN 2018), a list of Natura 2000 Sites that can be potentially affected by the proposed development has been compiled. All candidate SAC's (cSAC) and SPAs sites within a 15km radius of the proposed development have been identified. These are listed in **Table 7** and illustrated in **Figure 13**. It is noted that use of a 15km radius is a precautionary measure, as impacts at this distance from the proposed development are highly unlikely in the absence of significant emissions with the potential to have an adverse impact on the qualifying interests and conservation objectives for Natura 2000 sites.

It is recognised that following the United Kingdom's departure from the European Union, SACs and SPAs in the UK are no longer considered "Natura 2000 sites" for the purpose of an assessment pursuant to Article 6(3) of the Habitats Directive. However, pursuant to the UK's Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019, those sites still retain the same protection under UK law as they did prior to the UK's exit from the EU. In the circumstances, and consistent with Ireland's obligations as a signatory to the Bern Convention on the Conservation of European Wildlife and Natural Habitats, to which the Birds and Habitats Directives give effect, and in order to ensure the highest level of protection for the species and habitats protected by those Directives, the following assessment includes a full assessment of the UK sites formerly forming part of the Natura 2000 network of sites protected under those Directives. This will enable the competent authority to ensure that there will be no adverse effect on the integrity of those UK sites and the UK national site network.

Table 7. Designated sites within 15km of the proposed development site and their location relative to the proposed development

Natura 2000 sites within the Zone of Influence (ZoI)	Site Code	Distance at the closest point and potential source-pathway-receptor link	Qualifying Interests
Special Area of Conservation (SAC) or candidate Special Area of Conservation (cSAC)			
Buckroney-Brittas Dunes and Fen	000729	320m north. A potential source-pathway-receptor link has been identified between the source (proposed development) and the receptor (Buckroney-Brittas Dunes and Fen cSAC) via a potential pathway (surface water run-off during the construction phase and potential impacts on groundwater).	Annual vegetation of drift lines [1210] Perennial vegetation of stony banks [1220] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with Ammophila arenaria (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] Atlantic decalcified fixed dunes (Calluno-Ulicetea) [2150] Dunes with Salix repens ssp. argentea (Salicion arenariae) [2170] Humid dune slacks [2190] Alkaline fens [7230]
Kilpatrick Sandhills	001742	8.2km south. Due to the distance in involved and the dilution provided in the marine environment no impact pathway exists.	Annual vegetation of drift lines [1210] Embryonic shifting dunes [2110]

Natura 2000 sites within the Zone of Influence (ZoI)	Site Code	Distance at the closest point and potential source-pathway-receptor link	Qualifying Interests
			Shifting dunes along the shoreline with Ammophila arenaria (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] Atlantic decalcified fixed dunes (Calluno-Ulicetea) [2150]
Magherabeg Dunes	001766	10.3km north. Due to the distance involved and the dilution provided in the marine environment, no impact pathway exists.	Annual vegetation of drift lines [1210] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with Ammophila arenaria (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] Petrifying springs with tufa formation (Cratoneurion) [7220]
Slaney River Valley SAC	000781	12.5km southwest. Due to the distance in involved, the lack of hydrological/hydrogeological connection and the dilution provided in the marine environment no impact pathway exists.	**Habitats** 1130 Estuaries 1140 Mudflats and sandflats not covered by seawater at low tide 1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) 1410 Mediterranean salt meadows (*Juncetalia maritimi*)

Natura 2000 sites within the Zone of Influence (ZoI)	**Site Code**	**Distance at the closest point and potential source-pathway-receptor link**	**Qualifying Interests**
			3260 Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation 91A0 Old sessile oak woods with Ilex and Blechnum in the British Isles 91E0 Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)* **Species** 1365 Harbour Seal (*Phoca vitulina*) 1355 Otter (*Lutra lutra*) 1103 Twaite Shad (*Alosa fallax fallax*) 1106 Salmon (*Salmo salar*) 1099 River Lamprey (*Lampetra fluviatilis*) 1029 Freshwater Pearl Mussel (*Margaritifera margaritifera*) 1096 Brook Lamprey (*Lampetra planeri*) 1095 Sea Lamprey (*Petromyzon marinus*)
Deputy's Pass Nature Reserve	000717	13.3 northwest. No impact pathway exists as the QI habitat is terrestrial	Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0]

Natura 2000 sites within the Zone of Influence (ZoI)	Site Code	Distance at the closest point and potential source-pathway-receptor link	Qualifying Interests
Vale of Clara (Rathdrum Wood)	000733	14.5km northwest. No impact pathway exists as the QI habitat is terrestrial	Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0]

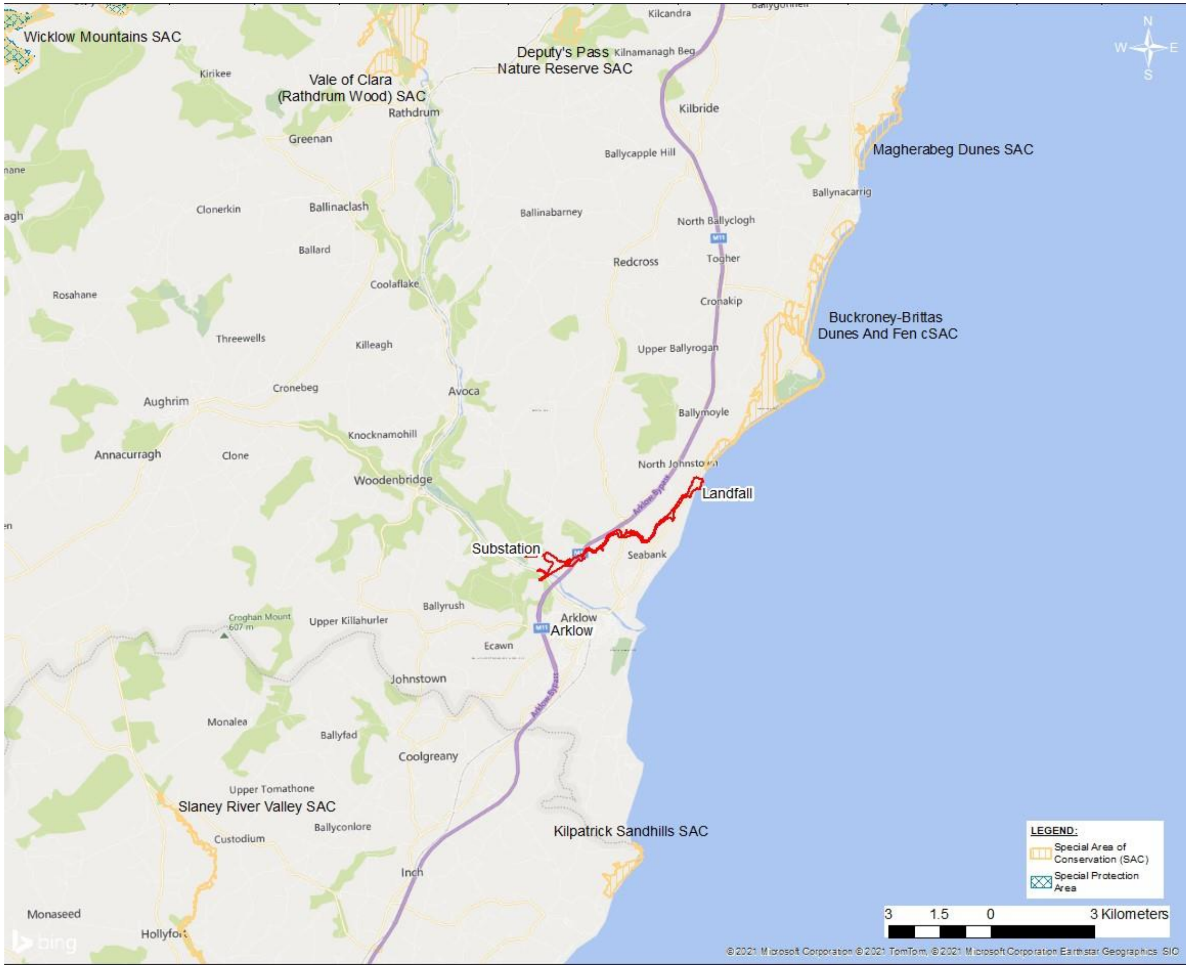

Figure 12. Location of proposed development site in relation to Natura 2000 sites | Not to Scale | Source: EPA Envision mapping (https://gis.epa.ie/EPAMaps/)

With the exception of the Slaney River Valley SAC, there are no faunal qualifying interests for any of the sites listed in **Table 7**. The Slaney River Valley SAC is located 12.5 km southwest of the proposed development site within the Slaney and Wexford Harbour catchment. It is noted that estuarine and marine habitats within the Slaney River SAC are located approximately 55km south of the proposed development site at Wexford Harbour. Given the distances involved and the lack of hydrological or hydrogeological connections, no pathways for impacts on qualifying species within this SAC were identified. Therefore it was considered that no pathway exists by which the proposed development could impact upon the following Natura 2000 sites due to the distances involved and/or the lack of any significant hydrological, hydrogeological or any other relevant connection pathways:

- Magherabeg Dunes SAC;
- Kilpatrick Sandhills SAC;
- Deputy's Pass Nature Reserve cSAC;
- Vale of Clara (Rathdrum Wood) SAC; and
- Slaney River Valley SAC.

Therefore, the Natura 2000 site, which is considered relevant for the purposes of this report, is the Buckroney-Brittas Dunes and Fen cSAC.

The Buckroney-Brittas Dunes and Fen cSAC is located 320m north of the proposed development site. This cSAC is potentially hydrologically connected to the proposed development via the Irish Sea. Groundwater emissions during the construction phase could potentially impact on water quality in the vicinity of the proposed development and subsequently on groundwater dependent qualifying habitats within this cSAC. Therefore, a potential source-pathway-receptor link has been identified between the source (proposed development) and the receptor (Buckroney-Brittas Dunes and Fen cSAC) via a potential pathway (surface water run-off during the construction phase and potential impacts on groundwater).

The Buckroney-Brittas Dunes and Fen cSAC is of considerable conservation significance for the occurrence of good examples of habitats and populations of plant species that are listed on Annexes I and II of the EU Habitats Directive. Further relevant information on Qualifying Interests and Conservation Objectives for the Buckroney-Brittas Dunes and Fen cSAC is provided below, with full site synopsis for this site included in **Appendix A** of this report.

5.3.2 Natura 2000 sites outside 15km

Examining potential pathways outside a radius of 15km, there is no hydrological or hydrogeological connection between the proposed development site and any Natura 2000 site outside the 15km radius.

In order to rule out the potential for *ex situ* impacts on mobile qualifying species, Natura 2000 sites within 20km were also examined i.e., Wicklow Reef SAC (16.3km north, site code 000781, The Murrough Wetlands SAC (17.8km north, site code 002249), Wicklow Head SPA (15.7km north, site code 004127), The Murrough SPA (17.3km, site code 004186). The core foraging ranges of qualifying species (SNH 2016), the habitats within the proposed development site and the results of surveys from the proposed development were considered. No potential *ex situ* impacts were identified for qualifying species in Natura 2000 sites within 20km of the proposed development site. Therefore, no potential impacts on the conservation objectives of these sites were identified.

5.3.3 Buckroney-Brittas Dunes and Fen cSAC (Site Code: 000729)

An extensive sand dune and fen system that covers an 8km stretch of the coastline of Co. Wicklow. The site contains three sand dune systems - Brittas Bay, Buckroney and Pennycomequick. Sediment source is mainly siliceous (low shell fragment content), with maximum carbonate levels of 3.5%. The dunes have cut off the outflow of a small river at Mizen Head and a large fen has developed. Its proximity to Dublin City makes Brittas Bay a very popular recreational area. Parts of the dune systems have already been developed as caravan parks and golf course. Part of the Buckroney dune system has been acquired by National Parks and Wildlife for conservation use.

The site contains a range of well-developed dune types, which are typical of those found in eastern Ireland. The dune systems are fairly extensive in area and generally of good quality. Of particular note are the fixed dunes, the decalcified fixed dunes (*Calluno-Ulicetea*), the humid dune slacks, the dunes with *Salix repens* and the shifting Marram dunes. Buckroney fen is a fine example of a diverse wetland system, including alkaline fen, and is one of the most important examples in eastern Ireland. In addition to five Red Data Book plant species, there are a number of nationally scarce species including an abundance of *Thelypteris palustris* and *Galium uliginosum*. The invertebrate fauna is of high interest, with some rare species including *Machimus cowini*. *Sterna albifrons* has bred at the site in the past.

5.3.4 Natura 2000 sites – Qualifying interests and conservation objectives

The National Parks and Wildlife Service (NPWS) are responsible for the designation of SACs and SPAs in Ireland. The conservation objectives for the Buckroney-Brittas Dunes and Fen cSAC are detailed in:

NPWS (2017) *Conservation Objectives: Buckroney-Brittas Dunes and Fen SAC 000729. Version 1*. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.

The habitats listed as qualifying interests for the Buckroney-Brittas Dunes and Fen cSAC are included in **Table 8**.

Table 8. Qualifying Interests for Buckroney-Brittas Dunes and Fen cSAC

Habitat Code	Habitat	Conservation objective
1210	Annual vegetation of drift lines	Maintain
1220	Perennial vegetation of stony banks	Restore
1410	Mediterranean salt meadows (*Juncetalia maritimi*)	Maintain
2110	Embryonic shifting dunes	Restore
2120	Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes)	Restore
2130	Fixed coastal dunes with herbaceous vegetation (grey dunes)	Maintain
2150	Atlantic decalcified fixed dunes (Calluno-Ulicetea)	Restore
2170	Dunes with Salix repens ssp. argentea (*Salicion arenariae*)	Maintain
2190	Humid dune slacks	Restore
7230	Alkaline fens	Maintain

Restore = Restore favourable conservation condition, Maintain = Maintain favorable conservation condition.

5.4 Potential Impacts

The description of the ecological baseline for the proposed development site was based on a desktop review and direct surveys within the planning boundary and areas proximate to same. The surveys examined all habitats and species within the planning boundary including any potential habitats listed as Qualifying Interests (QI) which inform the designations for the European sites.

5.4.1 Direct Habitat Loss or Habitat Fragmentation during Construction

Any habitat loss or fragmentation of Natura 2000 sites could potentially reduce the extent of habitat and the habitat available for Annex II plant species.

The proposed planning boundary is located approximately 320m from the closest Natura 2000 sites i.e. Buckroney-Brittas Dunes and Fens cSAC. There will be no direct impacts and no habitat fragmentation within European sites as a result of the proposed development. Therefore, there will be no effect on Natura 2000 sites via habitat loss or fragmentation.

5.4.2 Disturbance or Displacement of Qualifying Species during Construction or Operation

Construction works will generate additional noise and activity which could lead to the short-term disturbance/displacement of qualifying species. Potential effects of the proposed development in combination with other projects or plans, could also occur.

The Buckroney-Brittas Dunes and Fen cSAC does not have any faunal species listed as qualifying interests. Therefore, there is no impact pathway on the Buckroney-Brittas Dunes and Fen cSAC via disturbance or displacement.

5.4.3 Emissions to Surface Water During the Construction Phase

Surface water emissions associated with the construction phase could potentially impact on local watercourses via pollution from hydrocarbons (fuels, lubricants etc), cement, mortar, silt and soils. The proposed development is potentially hydrologically connected to the Buckroney-Brittas Dunes and Fen cSAC via the Irish Sea. Although unlikely, given the dilution provided in the marine environment, large-scale silt generation, hydrocarbon spillage, frac-out of HDD drilling fluids or cliff collapse, could result in impacts on the cSAC. Therefore, further investigation is required to determine if emissions to surface water during the construction phase of the proposed development will impact on the conservation objectives of the Buckroney-Brittas Dunes and Fen cSAC.

5.4.4 Emissions to Groundwater

Groundwater emissions during the construction phase could potentially impact on water quality. A layer of contaminated soil was encountered in the site investigation of the substation site. The proposed remediation strategy for the site is to cap the Made Ground with a barrier layer to minimise the percolation of rainwater through the contaminated material which will minimise leachate generation, act as a gas barrier and also form a physical barrier for site users to prevent dermal contact with the hazardous made ground during site operation. This substation site is located c. 5.6km from the Buckroney-Brittas Dunes and Fen cSAC and there is no hydro-geological connection between the contaminated ground and the cSAC. Therefore, even in the absence of proposed remediation works there is no impact pathway for the Buckroney-Brittas Dunes and Fen cSAC or any other Natura 2000 site from this contaminated soil.

The Buckroney-Brittas Dunes and Fen cSAC is located in a separate sub-catchment to the landfall site and is not considered to be hydrogeologically connected to the proposed development. There is not considered to be a potential effect to either the groundwater regime or groundwater quality associated with the cSAC from the construction phase of the works. Therefore following an investigation of groundwater impacts and groundwater dependent habitats within the vicinity, it was determined that there is no potential pathway for groundwater contamination at the proposed development site and therefore no impact pathway to the Buckroney-Brittas Dunes and Fen cSAC. Therefore, there is no pathway for impact on groundwater dependent terrestrial habitats i.e., Humid dune slacks [2190] and Alkaline fens [7230] in the cSAC during the construction phase.

No potential impacts on groundwater during the operational phase have been identified.

5.4.5 Emissions to Water during Operation

Chemical contaminants such as hydrocarbons could potentially impact on water quality and thus could impact on qualifying habitats for the Buckroney-Brittas Dunes and Fen cSAC i.e., Mediterranean salt meadows (*Juncetalia maritimi*) [1410], Humid dune slacks [2190] and Alkaline fens [7230].

Surface water run-off from parking areas and the building roofs of the substation site, will discharge through proposed filter drains and surface water sewers, through a bypass interceptor, to a proposed attenuation pond. Water will be pumped from the attenuation pond into the Avoca River. It is noted that this discharge is located over 5km southwest of the Buckroney-Brittas Dunes and Fen cSAC.

In the unlikely event that contaminants were to leak into the storm water drainage system on the substation site and enter the Avoca River, and from there entered the sea, the dilution available in the river and sea would mean that there would be no potential impact on qualifying habitats within the Buckroney-Brittas Dunes and Fen cSAC.

Foul wastewater will be collected from the welfare facilities in the substation. It will be contained in the units and removed from site periodically, by a licensed service provider, to a local sewage treatment plant, which has adequate capacity. Therefore, there is no impact pathway to Natura 2000 sites and no potential impact from foul water is predicted to occur during operation.

Given the distance of operational discharges from Natura 2000 sites (>5km) and the dilution available in the Irish Sea no potential impacts on the conservation objectives of the Buckroney-Brittas Dunes and Fen cSAC or any other Natura 2000 site will occur due to operational surface water discharges. That is the case in the absence of mitigation measures.

5.4.6 Spread of Invasive Species

The non-native, high-risk invasive species Japanese Knotweed and Himalayan Knotweed were recorded within the planning boundary on the banks of the Avoca River. The medium impact listed species Buddleia was also recorded within the planning boundary between the M11 and the sub-station site. Hottentot Fig, a high impact invasive species, was recorded on sea-cliffs close to the landfall location.

The high-risk invasive species Japanese Knotweed and Himalayan Knotweed were recorded southwest of the substation site on the banks of the Avoca River. Two areas of Japanese Knotweed and one area of Himalayan Knotweed were recorded. Japanese Knotweed and Himalayan Knotweed are spread by plant and rhizome fragments of plants or in contaminated soil. Given the distance of the recorded stands of these species from nearby Natura 2000 sites (>5km) and the lack of direct hydrological or other pathways, there is no potential for impacts from these invasive species on any Natura 2000 site.

Buddleia was recorded near the M11 approximately 5km from the nearest Natura 2000 site. Buddleia is spread by seeds as well as stem and root fragments. Given the distance involved and the lack of direct hydrological pathways, there is no potential for the spread of this species to any Natura 2000 site.

Hottentot Fig was recorded on sea-cliffs close to the landfall location, approximately 250m from the Buckroney-Brittas Dunes and Fens cSAC. It is noted that while this is within the planning boundary, no works will take place within the cliff habitats where Hottentot Fig was recorded. Therefore, there is no pathway for the spread of this species to the cSAC or any other Natura 2000 site.

Given the distance of the nearby Natura 2000 sites from the proposed development site and the lack of direct hydrological or in-combination pathways, there is no potential for impact of these invasive species on any Natura 2000 site.

5.4.7 In-combination Impacts

In-combination (cumulative) impacts or effects are changes in the environment that result from numerous human-induced, small-scale alterations. In-combination impacts can be thought of as occurring through two main pathways: first, through persistent additions or losses of the same materials or resource, and second, through the compounding effects as a result of the coming together of two or more effects.

As part of the Screening for an Appropriate Assessment, in addition to the proposed works, other relevant projects and plans in the region must also be considered at this stage. This step aims to identify at this early stage any possible significant in-combination or cumulative effects / impacts of the proposed development with other such plans and projects on the Natura 2000 sites.

A tiered approach to the cumulative assessment has been undertaken, in which the proposed development is considered in-combination with other projects as follows:

Tier 1 -

- ABWP Phase 2 Offshore Infrastructure;
- ABWP Phase 2 Operations and Maintenance Facility (OMF); and
- EirGrid Upgrade Works; and
- Irish Water Upgrade Works.

Tier 2 -

- Other relevant projects currently under construction;
- Other relevant projects with consent;
- Other relevant projects in the planning process; and
- Other existing projects that were not operational when baseline data were collected.

This tiered approach was adopted to provide an assessment of the ABWP Phase 2 Project as a whole and cumulatively with other projects.

The wide range of existing, under construction and permitted projects in the general vicinity of the proposed development were screened to determine if there was a potential for cumulative effects. A source – pathway – receptor model was used in the screening process, with the receptor being the proposed development.

The pathways considered varied, depending on the environmental topic, and included air, climate, surface or ground waters, habitat or species linkages, road networks, landscape, cultural heritage linkages, resource and waste management facility capacities, population and human health linkages and major accident and disaster zones of risk. Similarly, the length of the pathways varied, depending on their characteristics.

The sources of potential in-combination impact were considered. Existing and permitted projects and projects under construction were identified. Existing projects, which were operational at the time that the baseline studies were undertaken, were excluded, as their impacts are already included as part of the baseline. Existing projects, which were not operational at the time of the baseline studies, were included. A planning search was conducted to identify permitted projects. Permitted projects, the permits of which had expired, were excluded. Projects which, due to their nature or scale were unlikely to result in a cumulative impact, or to which there was no pathway, were excluded. The source of information for the Tier 1 projects was SPL. The sources of information for the Tier 2 projects were Wicklow County Council (WCC) and An Bord Pleanála (ABP)'s planning search websites. These are discussed in **Section 6.3.3** below.

5.5 Stage One Appropriate Assessment Conclusions

5.5.1 Screening of Relevant Natura 2000 Sites and Qualifying Interests/Special Conservation Interests

Potential impacts, although improbable, have been identified for the Buckroney-Brittas Dunes and Fen cSAC. Screening conclusions with regard to the Qualifying Interests for this Natura 2000 sites are provided in **Table 9**.

Table 9. Screening Conclusions

Natura 2000 Site	Qualifying Interest	Potential Impacts	Screened In/Out
Buckroney-Brittas Dunes and Fen cSAC	Annual vegetation of drift lines [1210] Perennial vegetation of stony banks [1220] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] Atlantic decalcified fixed dunes (Calluno-Ulicetea) [2150] Dunes with Salix repens ssp. argentea (*Salicion arenariae*) [2170]	These habitats, which are essentially terrestrial in nature, do not occur within or in proximity to the development footprint and will not be affected by any potential water quality impacts. Therefore, no potential impacts on these habitats have been identified.	Screened Out
	Mediterranean salt meadows (*Juncetalia maritimi*) [1410]	Potential pathway identified due to hydrological link i.e., as part of the cable landfall, it is proposed to use horizontal directional drilling (HDD) under the Johnstown North cliffs, which are located	Screened In

Natura 2000 Site	Qualifying Interest	Potential Impacts	Screened In/Out
		c.320m south of the Buckroney-Brittas Dunes and Fens cSAC. This site is potentially hydrologically connected via the marine waters of the Irish Sea. The primary risk to water quality, although minimal, is from hydrocarbon/chemical spillage and/or frac-out of bentonite during HDD drilling works. HDD works could potentially destabilise the cliff and result in cliff collapse, which could have an impact on qualifying habitats. Impacts from frac-out could potentially arise. Silt impacts on marine waters could inadvertently alter the ecology of this habitat. During the operational phase, surface water from the sub-station will be discharged into the Avoca River which flows into the Irish Sea downstream of the sub-station site. However given the distance from the SAC (>5km) and the dilution available in the Irish Sea, no impact is predicted to occur on this habitat during the operational phase. It is noted that based on the groundwater flows with the planning boundary and the distance from Natura 2000 sites, no potential impact from groundwater contamination of these terrestrial habitats has been identified.	
	Humid dune slacks [2190]	Based on the groundwater flows with the planning boundary and the distance from Natura 2000 sites, no	Screened out

Natura 2000 Site	**Qualifying Interest**	**Potential Impacts**	**Screened In/Out**
	Alkaline fens [7230]	potential impact from groundwater contamination of these terrestrial habitats has been identified.	
Magherabeg Dunes SAC (Site code 001766)	Annual vegetation of drift lines [1210] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with Ammophila arenaria (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] Petrifying springs with tufa formation (Cratoneurion) [7220]	There is no significant hydrological or other connection between the qualifying habitats within the Magherabeg Dunes SAC and the proposed development site. Therefore, no potential impacts or in-combination impacts on this SAC have been identified.	Screened Out
Kilpatrick Sandhills SAC (Site code 001742)	Annual vegetation of drift lines [1210] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] Atlantic decalcified fixed dunes (Calluno-Ulicetea) [2150]	There is no significant hydrological connection between the qualifying habitats within the Kilpatrick Sandhills SAC and the proposed development site. Therefore, no potential impacts or in-combination impacts on this SAC have been identified.	Screened Out
Deputy’s Pass Nature Reserve cSAC	Old sessile oak woods with Ilex and	There is no hydrological or other connection between the Deputy’s Pass Natura Reserve	Screened Out

Natura 2000 Site	**Qualifying Interest**	**Potential Impacts**	**Screened In/Out**
(Site code 000717)	Blechnum in the British Isles [91A0]	SAC and the proposed development site. Therefore, no potential impacts or in-combination impacts on this SAC have been identified.	
Slaney River Valley SAC	**Habitats** 1130 Estuaries 1140 Mudflats and sandflats not covered by seawater at low tide 1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) 1410 Mediterranean salt meadows (*Juncetalia maritimi*) 3260 Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation 91A0 Old sessile oak woods with Ilex and Blechnum in the British Isles 91E0 Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)* **Species** 1365 Harbour Seal (*Phoca vitulina*)	There is no hydrological or other connection between the Slaney Valley SAC and therefore no pathway between aquatic QIs or terrestrial QI habitats the proposed development site. Estuarine/Marine qualifying interests are located approximately 55km south of the proposed development site. Therefore, no potential impacts or in-combination impacts on this SAC have been identified.	Screened Out

Natura 2000 Site	Qualifying Interest	Potential Impacts	Screened In/Out
	1355 Otter (*Lutra lutra*) 1103 Twaite Shad (*Alosa fallax fallax*) 1106 Salmon (*Salmo salar*) 1099 River Lamprey (*Lampetra fluviatilis*) 1029 Freshwater Pearl Mussel (*Margaritifera margaritifera*) 1096 Brook Lamprey (*Lampetra planeri*) 1095 Sea Lamprey (*Petromyzon marinus*)		
Vale of Clara (Rathdrum Wood) SAC	Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0]	There is no hydrological or other connection between the Vale of Clara (Rathdrum Wood) SAC and the proposed development site. Therefore, no potential impacts or in-combination impacts on this SAC have been identified.	Screened Out

5.6 Assessment of Significance

In the absence of mitigation measures, the proposed development could potentially result in significant indirect impacts on the Buckroney-Brittas Dunes and Fen cSAC, in particular on QIs which may be affected by a change in water quality i.e. Mediterranean salt meadows (*Juncetalia maritimi*) [1410]. Refer to the **Table 10** below, which has been used to determine whether significant effects are likely.

Table 10. Assessment of Significance

Does the project have the potential to	**Yes or No**
Reduce the area of key habitats?	No
Reduce the population of key species?	Yes
Change the balance between key species?	No
Reduce diversity of the site?	Yes
Result in disturbance that could affect population size or density or the balance between key species?	No
Result in fragmentation?	No
Result in loss or reduction of key features (e.g. tree cover, tidal exposure, annual flooding, etc.)?	No
Cause delays in progress towards achieving the conservation objectives of the site	Yes
Interrupt progress towards achieving the conservation objectives of the site?	Yes
Disrupt those factors that help to maintain the favourable conditions of the site	Yes
Interfere with the balance, distribution and density of key species that are the indicators of the favourable condition of the site?	Yes
Cause changes to the vital defining aspects (e.g. nutrient balance) that determine how the site functions as a habitat or ecosystem?	Yes
Change the dynamics of the relationships (between, for example, soil and water or plants and animals) that define the structure and/or function of the site?	No
Interfere with predicted or expected natural changes to the site (such as water dynamics or chemical composition)?	Yes

5.7 Screening Conclusions

The aims of this screening section of this report were as follows:

- Determine whether the proposed development, alone or in combination with other projects, is likely to have significant effects on Natura 2000 sites in view of their conservation objectives;
- Provide information on and assess the potential for the proposed development to significantly impact on Natura 2000 Sites (also known as European sites); and
- Determine whether the proposed development is directly connected with, or necessary to the conservation management of any Natura 2000 sites.

It has been objectively concluded that:

- The proposed development is not directly connected with, or necessary to the conservation management of any Natura 2000 sites;
- On the basis of objective information, the possibility of significant effects from the proposed development on European sites cannot be ruled out. There is potential for the proposed development to significantly impact the Buckroney-Brittas Dunes and Fen cSAC, via one QI which may be affected by changes in surface water i.e., Mediterranean salt meadows (*Juncetalia maritimi*) [1410]; and
- The proposed development, alone or in combination with other projects, are likely to have significant effects on Natura 2000 sites whose QI species may be affected by a change in water quality in view of their conservation objectives.

On the basis of objective information and in view of best scientific knowledge, the possibility of significant effects from the proposed project on a European site, the Buckroney-Brittas Dunes and Fen cSAC, cannot be ruled out and therefore an Appropriate Assessment is required.

The NIS has been prepared to inform and assist An Bord Pleanála, to assess, in view of best scientific knowledge, if the proposed development, individually or in combination with another plan or project is likely to have a significant effect on the European site.

6 Stage 2 – Natura Impact Statement

6.1 Introduction

Sections 2 and **4** of this report are relevant to informing the Natura Impact Statement (NIS) in that the proposed development and receiving environment is described in sufficient detail. In **Section 5**, the Zone of Influence (ZoI) of the proposed development and the European sites within the ZoI were identified. Likely significant effects on the Buckroney-Brittas Dunes and Fen cSAC were also identified in **Section 5**. This NIS now examines and analyses, in light of the best scientific knowledge, with respect to those European sites within the zone of influence of the proposed development, the potential effect sources and pathways, how these could impact on the Site's QI habitats and/or QI/SCI species and whether the predicted effects would adversely affect the integrity of the European site.

Mitigation measures are set out within the NIS and ensure that any effects on the conservation objectives of the European site will be avoided during the proposed development such that there will be no risk of adverse effects on these European sites.

6.2 Status of qualifying species and habitats potentially affected by the proposed development - Buckroney-Brittas Dunes and Fen cSAC

6.2.1 Mediterranean Salt Meadows (*Juncetalia maritimi*) [1410]

Mediterranean salt meadows occupy the upper zone of saltmarshes and usually occur adjacent to the boundary with terrestrial habitats. They are widespread on the Irish coastline, however they are not as extensive as Atlantic salt meadows. The habitat is distinguished from Atlantic salt meadows by the presence of rushes such as Sea Rush (*Juncus maritimus*) and/or Sharp Rush (*J. acutus)* A range of species typically found in Atlantic salt meadows; including Sea Aster (*Aster tripolium*), Sea Purslane (*Atriplex portulacoides*), Sea-milkwort (*Glaux maritima*), Saltmarsh Rush (*J. gerardii*), Parsley Water-dropwort (*Oenanthe lachenalii)*, Sea Plantain (*Plantago maritima*) and Common Saltmarsh Grass (*Puccinellia maritima*), are also present.

Mediterranean salt meadow is a qualifying habitat for the Buckroney-Brittas Dunes and Fen cSAC. The overall objective for 'Mediterranean salt meadows' in Buckroney-Brittas Dunes and Fen cSAC is to 'maintain the favourable conservation condition'. This objective is based on an assessment of the recorded condition of the habitat under a range of attributes and targets which are listed in **Table 11**.

A baseline habitat map of all known saltmarsh in the Buckroney sub-site was produced based on the findings of the Saltmarsh Monitoring Project (SMP) (McCorry and Ryle, 2009). A total of 0.17ha of saltmarsh habitat was mapped by the SMP within the Buckroney sub-site. This included an area of 0.08ha which was mapped as Mediterranean salt meadows. However, during the Sand Dunes Monitoring Project (Delaney *et al*., 2013) this area was re-classified as a fixed dune/humid dune slack mosaic. It is important to note that there may be additional areas of un-surveyed saltmarsh present within the cSAC. The general target is that the area of Mediterranean salt meadows should be stable or increasing, subject to natural processes, including erosion and succession. This is a marine dependent habitat which is sensitive to hydrological changes. While the main pressures on this habitat are direct impacts such as overgrazing, this habitat could also be impacted by significant silt or hydrocarbon spillages. Although unlikely, a significant hydrocarbon spillage or silt spillage, for example from a cliff collapse or frac-out, could potentially impact on this habitat via the Irish Sea. Silting up has been identified as potential negative pressure on this habitat (Brophy *et al.* 2019).

Table 11. Mediterranean salt meadows (*Juncetalia maritimi*) [1410]– specific targets

Attribute	Measure	Target
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession.
Habitat distribution	Occurrence	No decline, subject to natural processes
Physical structure: sediment supply	Presence/absence of physical barriers	Maintain or where necessary restore natural circulation of sediments and organic matter, without any physical obstructions
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime
Physical structure: creeks and pans	Occurrence	Maintain/restore creek and pan structure, subject to natural processes, including erosion and succession
Vegetation structure: zonation	Occurrence	Maintain range of saltmarsh habitat zonations including transitional zones, subject to natural processes including erosion and succession
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward
Vegetation structure: vegetation cover.	Percentage cover at a representative sample of monitoring stops	Maintain more than 90% of area outside creeks vegetated
Vegetation composition: typical species and sub-communities	Percentage cover at a representative	Maintain range of sub- communities with typical species listed in Saltmarsh Monitoring Project (McCorry & Ryle, 2009).

Attribute	Measure	Target
	sample of monitoring stops	
Vegetation structure: negative indicator species: *Spartina anglica*	Hectares	There is no record of common cordgrass (*Spartina anglica*) in the SAC and its establishment should be prevented

6.3 Examination and Analysis of Potential Direct and Indirect Impacts on European Sites

As described previously in **Section 5**, the following potential effects have been identified based on a review of the nature and duration of the proposed development and the receiving ecological environment. Potential in-combination impacts are outlined in **Section 6.3.3**. Mitigation measures implemented to counteract these impacts are detailed in **Section 6.4.**

Based on a detailed assessment of potential impacts during construction, operation and decommissioning, the following potential impacts were identified and are assessed in detail below:

- Impacts on water quality; and
- In-combination impacts.

6.3.1 Impacts on Water Quality

6.3.1.1 Impacts on Water Quality during Construction – Surface water run-off

Surface water emissions associated with the construction phase of the proposed development could impact on aquatic habitats via increased silt levels in surface water run-off and inadvertent spillages of potential pollutants.

Inadvertent spillages of hydrocarbon and/or other chemical substances during construction could introduce toxic chemicals or suspended solids into the aquatic environment. Cement pollution of waters results in high alkalinity and raises the pH, which can be toxic to aquatic life. Some hydrocarbons exhibit an affinity for sediments and thus become entrapped in deposits from which they are only released by vigorous erosion or turbulence. Oil products may contain various highly toxic substances, such as benzene, toluene, naphthenic acids and xylene which are to some extent soluble in water. Elevated silt levels may arise in surface water run-off.

During construction of the proposed substation, temporary measures will be provided including de-silting of rainwater run-off and temporary oil interceptors. These will be subject to daily visual inspection to ensure they remain adequate and effective. (See Construction Environmental Management Plan (CEMP) **Appendix B**).

During installation of the onshore cables, a pump will be used to deal with any groundwater or rainwater that collects within the trench. This will be pumped into locations agreed with the landowners and the local authority. Typically, this will be onto adjacent land, not directly into waterways, and through a filter medium. A similar arrangement will apply at joint bays, where a sump will be cast into the concrete base for a pump.

Any groundwater or rainwater that collects in a HDD drilling pit will be pumped away as described above. Any bentonite (or similar HDD drilling head lubrication material) will be handled and removed by the drilling contractor. The drilling fluid, bentonite, will be 5% bentonite clay and 95% water, the volume of bentonite (or similar material) will be approximately 22.5m^3 per bore for the HDD at the landfall and the M11 and 10m^3 per bore for the HDD crossing of the R772. It is non-toxic in nature.

The estuarine QI habitat Mediterranean salt meadows (*Juncetalia maritimi*)) is very unlikely to be affected due to the limited potential for significant effects on water quality resulting from the project, the non-toxic nature of bentonite, the naturally fluctuating levels of silt in the estuarine environment, the robust nature of this habitat and the dilution provided in the aquatic environment.

Following an assessment of the proposed project and construction methodology it has been concluded that that risk of significant effects on the QIs and conservation objectives of the Buckroney-Brittas Dunes and Fen cSAC is extremely low.

In addition, a range of standard mitigation procedures will be employed during construction, as specified in **Section 6.4** which will effectively prevent impacts on water from silt and hydrocarbons.

6.3.2 Impacts on Water Quality from Frac-Out During Construction – HDD Works

Although unlikely, a worst-case scenario could potentially occur whereby the proposed works could result in a significant detrimental change to the marine and freshwater habitats within and adjacent to the proposed development site due to frac-out (inadvertent drilling returns) containing bentonite clay and drilling fluid disposal. This could potentially occur during the horizontal directional drilling (HDD) procedures.

HDD provides a methodology which immediately mitigates environmental risk by removing the majority of environmental interfaces, typically seen with open cut works. While the HDD methodology is designed to minimise environmental impacts, there remains a number of specific environmental concerns particular to this process which need to be evaluated.

Frac-outs are defined as those returns which occur somewhere other than the launch and reception sites at either end of the drilled bore. Typically, drilling fluids are only released at the launch and reception sites of a HDD installation, although inadvertent returns can potentially occur as a result of poor conditions within the drilled bore.

This may be as a result of poor drilling methods, poor drilling mud formulation, issues with stability of the bore in heavy granular soils and significantly fractured strata or insufficient bore depth beneath the overburden.

These can all lead to normal returns to either end of the bore path being restricted or lost entirely and hence an increase in pressure of the drilling fluid in the bore. If normal returns are not regained, it may result in drilling mud being released outside the bore, such as to the surface or the ground, nearby underground infrastructure spaces, the bed of watercourses, or marine environments.

Frac-out is a concern because bentonite is a constituent of drilling fluids which are used in significant quantities during the HDD process and these can have a negative impact on the aquatic and marine environment. Depending upon the particulate dispersion level of the drilling fluid constituents (turbidity), especially bentonite clay, a reduction in the oxygen levels within the water can occur. If the particulate density is high it may lead to the suffocation of aquatic and marine life, especially in slow moving aquatic environments where the particulates have time to settle before full dispersion. To a much lesser extent the risk from inadvertent drilling mud returns may apply to invertebrate life and other fauna and flora at the surface where they occur on land in areas of vegetated ground cover. Silting up has been identified as a potential negative pressure on Mediterranean salt meadows (*Juncetalia maritimi*). Although unlikely given the dilution of the drilling fluid (95% water, 5% bentonite clay) and dilution available within the marine environment, there is the potential for inadvertent drilling fluid returns to impact upon the water quality of the local watercourses/waterbodies if project specific mitigation measures are not implemented.

With regard to the landfall site and the Templerainy Stream crossing, HDD is the proposed method of installation. It is noted that the proposed launch sites for the HDD for the Templerainy Stream crossing and the Johnstown North landfall site are outside the boundaries of European sites. All HDD onshore sites are within low value agricultural land that do not correspond to Annex I or qualifying habitats for Natura 2000 sites.

The environmental risk from bentonite is that in freshwater environments they are not readily dispersed and, having a higher specific gravity (SG) than water, cover the bottom of the watercourse, smothering benthic flora and breeding sites for fauna. In saltwater (marine) environments the bentonite drilling fluid is quickly degraded by ionic exchange between the salts in the seawater and the bentonite clays in the fluid. The bentonite flocculates and is dispersed by currents and wave action with turbidity (discolouration) the only noticeable effect.

In the unlikely event that there was a loss of drilling fluid the effects would be difficult to discern because of the natural silt content and dilution provided in the marine environment. Bentonite drilling fluid is composed of approximately 5% bentonite clay, a natural occurring clay, and 95% fresh water. Depending on ground conditions, polymer additives may be added. The polymer additives (e.g. polyacrylamide (PHPA) and polyanionic cellulose (PAC)) are organic, usually starch or sugar based. These compounds are biodegradable.

Frac out could potentially impact on sea cliffs at Johnstown North, however no significant effects on vegetation would occur due to the non-toxic nature of the drilling fluids. Furthermore, these cliffs are not located with the boundary of a European site and this habitat is not a QI for the Buckroney-Brittas Dunes and Fen cSAC.

Following an assessment of the proposed project and construction methodology it has been concluded that that risk of significant effects on the QIs and conservation objectives of the Buckroney-Brittas Dunes and Fen cSAC arising from HDD works is extremely low.

In addition, a range of standard mitigation procedures will be employed during construction, as specified in **Section 6.4** which will effectively prevent significant effects on the QIs and conservation objectives of the Buckroney-Brittas Dunes and Fen cSAC from occurring.

6.3.2.1 Impacts on Water Quality from Cliff Collapse During Construction – HDD Works

Although unlikely, a worst-case scenario could potentially occur whereby the proposed works could result in a significant detrimental change to the marine environment and habitats adjacent to the proposed development site due to cliff collapse. This could potentially occur at the landfall location during the horizontal directional drilling (HDD) procedures. Cliff collapse could potentially impact on Mediterranean salt meadows (*Juncetalia maritimi*) through increases in sedimentation in surrounding marine waters and silting up effects. This could potentially impact the conservation objectives of the Buckroney-Brittas Dunes and Fen cSAC.

The conceptual design for the landfall HDD at Johnstown North has its minimum depth of cover at the base of the cliffs of 5.5m (and a maximum of 15m). The HDD compound at the landfall site is located c.90m from cliff habitats. According to the risk assessment for the proposed development, the occurrence of cliff collapse from HDD is considered ‘very unlikely’ to occur in that it ‘it is not expected to occur’, as the HDD design at the landfall has ensured an appropriate depth of cover to minimise the risk of cliff collapse. Given the extremely low level of risk of cliff collapse, no significant impact is predicted to occur to the Buckroney-Brittas Dunes and Fen cSAC.

6.3.2.2 Impacts on Water Quality during Decommissioning

Surface water emissions associated with the decommissioning phase of the proposed development could impact on aquatic habitats via increased silt levels in surface water run-off and inadvertent spillages of potential pollutants.

Inadvertent spillages of hydrocarbon and/or other chemical substances during decommissioning could introduce toxic chemicals or suspended solids into the aquatic environment. Cement pollution of waters results in high alkalinity and raises the pH, which can be toxic to aquatic life. Some hydrocarbons exhibit an affinity for sediments and thus become entrapped in deposits from which they are only released by vigorous erosion or turbulence.

Oil products may contain various highly toxic substances, such as benzene, toluene, naphthenic acids and xylene which are to some extent soluble in water. Elevated silt levels may arise in surface water run-off.

The estuarine QI habitat Mediterranean salt meadows (*Juncetalia maritimi*) [1410] is very unlikely to be affected due to the limited potential for significant effects on water quality resulting from the decommissioning process, the naturally fluctuating levels of silt in the estuarine environment, the robust nature of these habitats and the dilution provided in the aquatic environment.

Following an assessment of the proposed project and construction methodology it has been concluded that that risk of significant effects on the QIs and conservation objectives of the Buckroney-Brittas Dunes and Fen cSAC during the decommissioning phase is not significant.

6.3.3 In-combination and Transboundary Impacts

Considering the nature and location of the proposed development as described in **Section 2** no transboundary effects on biodiversity are predicted.

The assessment of in-combination effects has considered likely significant effects that may arise during construction, operation and decommissioning of the proposed development.

The assessment specifically considered whether any of the approved developments in the local or wider area have the potential to exacerbate (i.e. alter the significance of) effects associated with the proposed development based on best scientific knowledge. Existing projects, not identified in this report, are included in the baseline or have been assessed as not having the potential to exacerbate effects.

The in-combination effects addressed include the direct and indirect effects, caused by the interaction of environmental effects. These can cause more significant effects when combined with the effects of the proposed development.

The wide range of existing, under construction and permitted projects in the general vicinity of the proposed development were screened to determine if there was a potential for cumulative effects. A source – pathway – receptor model was used in the screening process, with the receptor being the proposed development.

The sources of potential in-combination impacts were considered. Existing and permitted projects and projects under construction were identified. Existing projects, which were operational at the time that the baseline studies were undertaken, were excluded, as their impacts are already included as part of the baseline. Existing projects, which were not operational at the time of the baseline studies, were included. A planning search was conducted to identify permitted projects. Permitted projects, the permits of which had expired, were excluded. Projects which, due to their nature or scale were unlikely to result in a cumulative impact, or to which there was no pathway, were excluded.

Three projects, which do not have permission, were included in the cumulative assessment as they were considered to be significant projects in close proximity to the proposed development. These are Arklow Flood Relief Scheme, Crag Digital Avoca Ltd data centre new application and the Crag Digital Avoca Ltd 110kV substation application These projects are assessed below in **Table 12**.

Table 12. Potential In-combination Effects

Project/Plan	Key Policies/Issues/Objectives Directly Related to the Conservation of the Natura 2000 Network	Potential In-combination Effects
ABWP Phase 2 Offshore Infrastructure	The offshore infrastructure will be located on and around Arklow Bank, in the Irish Sea off the east coast of Ireland. The Foreshore Lease Area covers an area approximately 27 km long and 2.5 km wide. It is located approximately 6 to 13 km from the shore. The offshore infrastructure will comprise up to 62 wind turbines, with a maximum export capacity of 520 MW. The key components of the offshore infrastructure comprise: Up to 62 wind turbines (each comprising a tower, nacelle and three rotor blades) and associated foundations (steel monopiles or steel tripod); Up to two Offshore Substation Platforms (OSPs) and associated foundations (steel monopiles or steel tripod); A network of inter-array cabling connecting the wind turbines to each other and to the OSPs; Up to two interconnector cables between the OSPs; and Up to two High Voltage Alternating Current (HVAC) offshore export cables utilising the consented offshore export cable routes. The final layout of the offshore infrastructure will be determined prior to construction, following	Potential effects relate primarily to marine habitats and species. The QIs for the Buckroney-Brittas Dunes and Fen cSAC are terrestrial habitats. However, if construction activities associated with the proposed development are occurring at the same time as construction activities associated with the ABWP Phase 2 Offshore Infrastructure in proximity to the landfall location, and accidental pollution events were to occur at the same time and in proximity to each other, there is a risk of cumulative accidental pollution effects. With the application of the measures set out in **section 6.4** of the NIS, and also the pollution prevention measures proposed as part of the CEMP significant cumulative effects will not occur. Therefore there is no pathway for in-combination effects with QIs assessed in this NIS.

Project/Plan	Key Policies/Issues/Objectives Directly Related to the Conservation of the Natura 2000 Network	Potential In-combination Effects
	completion of site investigation surveys and detailed design. Indicative wind turbine layouts have been provided for the EIAR with the worst-case assessed throughout. The final wind turbine layout will adhere to the following layout principles: Principle 1: all surface infrastructure will be located within the Lease Area boundary. No blade overfly or structural overhang is permitted outside of the Lease Area boundary; Principle 2: A minimum spacing of 500 m shall be maintained between blade tip to blade tip of all surface infrastructure (for OSPs, this shall be taken as the outermost point of the infrastructure); Principle 3: wind turbines and OSPs will be located such that there is no overfly or structural overhang within the Arklow Bank Wind Park Phase 1 sublease boundary. Construction of the offshore infrastructure may take place over a duration of five years, however it is anticipated that timescales will be less in practice. It is likely that the offshore Infrastructure components will be fabricated at a number of manufacturing sites across Europe or elsewhere. Suitable ports will be selected which have appropriate existing facilities to handle and process offshore wind farm components. Construction personnel will transit to the location of the offshore infrastructure on installation vessels. Crew transfers may also take place	

Project/Plan	Key Policies/Issues/Objectives Directly Related to the Conservation of the Natura 2000 Network	Potential In-combination Effects
	via Crew Transfer Vessels (CTVs) or helicopter. The Arklow Bank Wind Park Phase 2 Offshore Infrastructure will have a lifetime of 35 years.	
ABWP Phase 2 Operations and Maintenance Facility (OMF)	The Arklow Bank Wind Park Phase 2 will require an Operations and Maintenance Facility (OMF) for servicing the offshore wind farm, and as a base for employees working on its operation. The location of the OMF is Arklow South Dock. The OMF comprises onshore infrastructure, located off South Quay Road and on the quayside, and nearshore infrastructure within Arklow South Dock. The expected timing for the OMF construction is 2023 – 2025. The OMF will comprise of onshore (land based) and nearshore (marine based) infrastructure to service and operate the ABWP project, 24hrs/day and 7days/week, over its operational lifetime. The onshore infrastructure will support the operation of nearshore infrastructure facilities for the safe transfer of personnel and equipment to the offshore environment. The OMF onshore infrastructure includes: • Three to four-storey building (up to 3,050m^2 Gross Floor Area) with stores, offices, mess facilities, and warehousing; • Up to 40m high communication mast; The OMF quayside infrastructure includes:	Given the implementation of best practice standard construction environmental measures for this project and the CEMP for the proposed development, no pathway for in-combination effects with QIs assessed in this NIS are predicted to occur.

Project/Plan	Key Policies/Issues/Objectives Directly Related to the Conservation of the Natura 2000 Network	Potential In-combination Effects
	• Davit cranes for equipment lifting; • Pontoon brow attachments; • Storage tanks, including fuel (100,000l) and oil (5000l) storage; • Associated services and connections including water, wastewater and fuel; and • Fencing, security gates and cameras. The OMF nearshore infrastructure includes: • One pontoon to provide berthing facilities for four Crew Transfer Vessels; • Up to eight Circular Hollow Section (CHS) piles of maximum diameter of 914mm; • Installation of a new quay wall and/or local refurbishment to the existing quay wall; and • Associated services and connections including water, wastewater and fuel. Enabling works for the OMF onshore and nearshore infrastructure includes: • Onshore demolition of an existing two-storey office building; • Nearshore Geotechnical Investigation (GI) up to six boreholes; • Removal of an existing synchrolift and sunken vessels;	

Project/Plan	Key Policies/Issues/Objectives Directly Related to the Conservation of the Natura 2000 Network	Potential In-combination Effects
	• Dredging of up to 6,000m^3 of material from the South Dock; and • The dredged material will require dewatering, with a discharge of up to 4,200m3 into Arklow Harbour. Where necessary the relevant permits / licenses will be obtained in advance. The OMF will be the subject of separate applications for approval to both Wicklow County Council (for the onshore and nearshore infrastructure) and for a foreshore lease to the Department of Housing, Local Government and Heritage for nearshore infrastructure required in the marine environment.	
Eirgrid Grid Upgrade Works	In order to connect 520MW of offshore wind generation to the National Electricity Transmission Network in the Arklow area, it will be necessary to change the operating voltage of the existing Arklow-Ballybeg-Carrickmines overhead 110kV circuit to 220kV. In order to operate this circuit at 220kV, a new connection for the existing Ballybeg 110kV substation will be required. A new Ballybeg 220 kV substation could be "looped" into the existing Arklow-Carrickmines 220 kV circuit. There is enough space to construct this new 220kV station as a GIS station adjacent to the existing 110kV substation at Ballybeg.	Given the implementation of best practice standard construction environmental measures for this project and the CEMP for the proposed development, no pathway for in-combination effects with QIs assessed in this NIS are predicted to occur.

Project/Plan	Key Policies/Issues/Objectives Directly Related to the Conservation of the Natura 2000 Network	Potential In-combination Effects
	The Arklow Bank Onshore Grid Infrastructure proposed 220kV substation will 'loop-in' to the existing 220kV Lodgewood-Arklow-Carrickmines Overhead Line (OHL). As part of the grid upgrade works, EirGrid will consider stringing new conductors on the currently unused side of the 220kV towers, between the new 220kV loop-in transmission substation of this proposed development and the existing Arklow 220kV substation. This 220kV OHL circuit would either terminate in the existing Arklow 220kV substation or this circuit would be connected to an existing circuit at the Arklow 220kV substation and 'by-pass' the substation. There may be the need for an additional tower to bypass the Arklow 220kV substation with the new 220kV OHL circuit. In an initial study, EirGrid highlighted that further network studies would be required to ensure that there would be no system stability issues associated with connecting 800MW to this part of the network in the Arklow area. Subsequent to the study, SPL engaged EirGrid to perform grid stability studies which confirmed that the issues can be managed operationally. This result stands for the Project at its proposed 520MW capacity.	
Irish Water Upgrade Works	To connect the proposed development to Irish Water's water network approximately 2.3km of existing 2inch watermain is required to be upsized to 100mm. The watermain runs from Arklow town in a north-westerly direction towards	Given the implementation of best practice standard construction environmental measures for this project and the CEMP for the proposed development, no pathway for in-combination effects with

Project/Plan	Key Policies/Issues/Objectives Directly Related to the Conservation of the Natura 2000 Network	Potential In-combination Effects
	Shelton Abbey. The works will be carried out by Irish Water.	QIs assessed in this NIS are predicted to occur.
Maintenance and/or repair of Avoca Business Park Flood Embankment	The entire Avoca River Business Park relies on the existing embankment for fluvial flood protection. As a result, these embankments need to be appropriately inspected, maintained and repaired, to prevent the risk of flooding. Investigations are to be undertaken to confirm the existing embankment composition, permeability and stability, so as to inform the required inspection, maintenance and repair programme. Should this investigation determine that works are required to maintain or reinforce the existing embankments, these works will be undertaken in advance of the substation construction, with ongoing maintenance and repair thereafter, subject to regular inspection and monitoring. While a range of approaches could be applied and a targeted approach (where only certain areas of the embankment might require works), in a reasonable worst case scenario, the full length of the embankment may require to be reinforced, similar to the works proposed as part of the proposed development (localised reinforcement of the embankment, using either cohesive soils, placed and suitably compacted in layers and/or sheet piling). If the proposed development is granted approval, one data hall, located on the substation site, will not be built.	Given the implementation of best practice standard construction environmental measures for this project and the CEMP for the proposed development, no pathway for in-combination effects with QIs assessed in this NIS are predicted to occur.

Project/Plan	Key Policies/Issues/Objectives Directly Related to the Conservation of the Natura 2000 Network	Potential In-combination Effects
River Basin Management Plan 2018-2021	The project should comply with the environmental objectives of the Irish RBMP which are to be achieved generally by 2021. • Ensure full compliance with relevant EU legislation • Prevent deterioration • Meeting the objectives for designated protected areas • Protect high status waters • Implement targeted actions and pilot schemes in focus sub-catchments aimed at: targeting water bodies close to meeting their objective and addressing more complex issues which will build knowledge for the third cycle.	The implementation and compliance with key environmental policies, issues and objectives of this management plan will result in positive in-combination effects to European sites. The implementation of this plan will have a positive impact for the biodiversity. No pathway for in-combination effects with QIs assessed in this NIS are predicted to occur.
Inland Fisheries Ireland Corporate Plan 2016 -2020	To ensure that Ireland’s fish populations are managed and protected to ensure their conservation status remains favourable. That they provide a basis for a sustainable world class recreational angling product, and that pristine aquatic habitats are also enjoyed for other recreational uses. To develop and improve fish habitats and ensure that the conditions required for fish populations to thrive are sustained and protected. To grow the number of anglers and ensure the needs of IFI’s other key stakeholders are being met in a sustainable conservation focused manner. EU (Quality of Salmonid Waters) Regulations 1988. All works during development and operation of the	The implementation and compliance with key environmental issues and objectives of this corporate plan will result in positive in-combination effects to European sites. The implementation of this corporate plan will have a positive impact for biodiversity of inland fisheries and ecosystems. No pathway for in-combination effects with QIs assessed in this NIS are predicted to occur.

Project/Plan	Key Policies/Issues/Objectives Directly Related to the Conservation of the Natura 2000 Network	Potential In-combination Effects
	project must aim to conserve fish and other species of fauna and flora habitat; biodiversity of inland fisheries and ecosystems and protect spawning salmon and trout.	
Irish Water Capital Investment Plan 2014-2016	Proposals to upgrade and secure water services and water treatment services countrywide.	Likely net positive impact due to water conservation and more effective treatment of water. No pathway for in-combination effects with QIs assessed in this NIS are predicted to occur.
Water Services Strategic Plan (WSSP, 2015)	Irish Water has prepared a Water Services Strategic Plan (WSSP, 2015), under Section 33 of the Water Service No. 2 Act of 2013 to address the delivery of strategic objectives which will contribute towards improved water quality and biodiversity requirements through reducing: • Habitat loss and disturbance from new / upgraded infrastructure; • Species disturbance; • Changes to water quality or quantity; and • Nutrient enrichment /eutrophication.	The WSSP forms the highest tier of asset management plans (Tier 1) which Irish Water prepare, and it sets the overarching framework for subsequent detailed implementation plans (Tier 2) and water services projects (Tier 3). The WSSP sets out the challenges we face as a country in relation to the provision of water services and identifies strategic national priorities. It includes Irish Water's short, medium and long-term objectives and identifies strategies to achieve these objectives. As such, the plan provides the context for subsequent detailed implementation plans (Tier 2) which will document the approach to be used for key water service areas such as water resource management, wastewater compliance and sludge management. The WSSP also sets out the

Project/Plan	Key Policies/Issues/Objectives Directly Related to the Conservation of the Natura 2000 Network	Potential In-combination Effects
		strategic objectives against which the Irish Water Capital Investment Programme is developed. The current version of the CAP outlines the proposals for capital expenditure in terms of upgrades and new builds within the Irish Water owned assets. The overarching strategy was subject to AA and highlighted the need for additional plan/project environmental assessments to be carried out at the tier 2 and tier 3 level. No pathway for in-combination effects with QIs assessed in this NIS are predicted to occur.
Wicklow County Development Plan 2016-2022	Strategic Environmental Objectives within the development plan include: B1: To ensure compliance with the Habitats and Birds Directives with regard to the protection of Natura 2000 Sites and Annexed habitats and species30 B1: Conservation status of habitats and species as assessed under Article 17 of the Habitats Directive B1: Maintenance of favourable conservation status for all habitats and species included within the Annexes of the Birds and Habitats Directives31 be unaffected by implementation of the Plan32 B2: To ensure compliance with Article 10 of the Habitats Directive with regard to the management of features of the landscape which - by virtue of their linear and continuous	The implementation of the Wicklow County Development Plan 2016-2022 will have a positive impact on biodiversity No pathway for in-combination effects with QIs assessed in this NIS are predicted to occur.

Project/Plan	Key Policies/Issues/Objectives Directly Related to the Conservation of the Natura 2000 Network	Potential In-combination Effects
	structure or their function act as stepping stones (designated or not) - are of major importance for wild fauna and flora and essential for the migration, dispersal and genetic exchange of wild species B2: Percentage loss of functional connectivity without remediation resulting from development provided for by the Plan B2: No significant ecological networks or parts thereof which provide functional connectivity to be lost without remediation resulting from development provided for by the Plan B3: To avoid significant impacts on relevant habitats, species, environmental features or other sustaining resources in designated sites including Wildlife Sites33 and to ensure compliance with the Wildlife Acts 1976-2010 with regard to the protection of species listed within these Acts	
Crag Digital Avoca Limited Avoca River Park , Shelton Abbey & Kilbride , Arklow	Demolition of buildings & structures on site & construction of Data Storage Facility comprising 3 data storage buildings & all assoc site infrastructure: data storage facility 1 (6 Pod Data Centre) located to north of site served by 1 gas generator compound to south of Data Storage building including 5 flues & 2 bunded fuel tanks located to south east & south west of Data Storage building & powered by (-part grid / -part gas) with emergency diesel fuel backup. Data storage facility 2 (8 pod data centre) located to south of Data Storage Facility 1 served by 1 gas generator compound to the south of building incl 6 flues & 2 bunded fuel tanks located to south east &	Discharges from this project at the Avoca River Business Park are governed by strict limits to ensure compliance with quality standards. Given the implementation of best practice standard construction environmental measures for this project and the CEMP for the proposed development, no pathway for in-combination effects with QIs assessed in this NIS are predicted to occur.

Project/Plan	Key Policies/Issues/Objectives Directly Related to the Conservation of the Natura 2000 Network	Potential In-combination Effects
	south west of Data Storage building & powered by (-part grid / -part gas) with emergency diesel fuel backup. Data storage 3 (8 pod data centre) located to south of site served by 1 diesel generator compound to north of building incl 8 flues & 2 bunded fuel tanks, located to north east & north west of Data Storage building & powered by grid. The dev will consist of upgrade of existing 100 kV substation to provide a Substation Compound comprising Gas Insulated Switchgear (GIS) equipment with 4 50 mega Volt Amp bays within a single storey MV building 10 lighting protection masts, 4 oil filled transformers, with c2.4m high palisade fence, provision of 1 single storey security guard house at primary access to data storage facilities, provision of 4 vehicular access points off Shelton Abbey (access rd) on western side (2 to serve Data Storage Facilities, 1 to serve GIS substation & 1 to serve MV building), internal access roads, surface level car parking, site services (foul & surface water drainage & water supply) incl 1 pump house with 3 water tanks to sough west, 1 attenuation pond to south east, waste water treatment plant to the west of Shelton Abbey (access road), landscaping, boundary & site dev works above & below ground. Accompany by EIAR	
Crag Digital Avoca Limited Data Centre new application	Demolition of existing industrial building units totalling (c.2784.4m^2) comprising of a c.7.lm high Overall Main Building (c.2460m^2), a c.4.2m high Substation (c. 107.3m^2), a c.3.6m high Guardhouse (c.106.2m^2), a c.3.6m high East-Building	Given the implementation of best practice standard construction environmental measures for this project and the CEMP for the proposed development, no pathway for in-combination effects with

Project/Plan	Key Policies/Issues/Objectives Directly Related to the Conservation of the Natura 2000 Network	Potential In-combination Effects
	(c.39.1m^2), c.5m high Water Tank (c.56.8m^2) &c.2.6m high Pump House Building (c.15.1m^2), associated works. Development of 3 no. Data Centre Buildings, ancillary offices & plant comprising of: Data Centre Building A, - a single storey Data Centre Building, with mezzanine lst floor level offices (GFA c.10,564m^2, building height c.13,658m & structures c.15,137m), made up of 2 no. Data Halls & loading areas with associated 2 no. Dock Levellers & including 10 no. c.14m high flues, & adjacent 1 no. Standby Power Generation Compounds, consisting of 10 no. IIV Diesel Generators and belly tanks (GFA c.530m^2), I no. storage fuel tank (GFA c.l5m^2). Data Centre Building B - a single storey data centre building with mezzanine lst floor level offices (GFA c.18,508m^2, building height c.13,658m &structures c.15,137m), made up of 4 no. Data Halls and loading areas with associated 2 no. Dock Levellers &including 20 no. c.l4m high flues, and adjacent 2 no. Standby Power Generation Compounds, consisting of 20 no. HV diesel Generators &belly tanks (GFA c.1,060m^2),2 no. storage fuel tanks (GFA c.30m^2). Data Centre Building C - a single storey data centre building with mezzanine 1st floor level offices (GFA c.I8,508m^2, building height c.13,658m & structures c.15,137m), made up of 4 no. Data Halls & loading areas with associated 2 no. Dock Levellers &including 20 no. c.14m high flues, &adjacent 2 no. Standby Power Generation Compounds, consisting of 20 no. Diesel Generators and belly tanks	QIs assessed in this NIS are predicted to occur.

Project/Plan	Key Policies/Issues/Objectives Directly Related to the Conservation of the Natura 2000 Network	Potential In-combination Effects
	(GFA c.1,060 rr.2), 2 no. storage fuel tanks (GFA c.30m^2) Upgrading of existing 110 kV Substation to comprise of Compound (c. 8539m^2) consisting of 110kV GIS Switch Room (GFA c.708m^2), and 4 no. External Transformers (GFA c.550m^2), a grid connection, security fence & all associated works & services. Development of 1 no. Fire Hydrant Pump Hose (GFA c.l29m^2) with Sprinkler Tank (c.49m^2), I no. single storey Security Guard Hose (GFA c.48m^2) and 2 no. vehicular accesses, internal access roads & 224 no. surface car parking spaces. An upgraded attenuation basin, a proposed wastewater treatment plant and polishing filter. All associated site services, with c. 2.7m high palisade fence, landscaping, boundary & all associated site development works above & below ground. An EIAR has been prepared in respect of the proposed dev at Avoca River Park Shelton Abbey & Kilbride Arklow. If the proposed substation development is granted approval and proceeds to construction, one data hall, located on the substation site, will not be built.	
Crag Digital Avoca Ltd 110kV Substation	Provision of a 110kV gas insulated switchgear (GIS) substation, double circuit 110kV underground transmission line and associated site works within the Avoca River Park	Given the implementation of best practice standard construction environmental measures for this project and the CEMP for the proposed development, no pathway for in-combination effects with

Project/Plan	Key Policies/Issues/Objectives Directly Related to the Conservation of the Natura 2000 Network	Potential In-combination Effects
		QIs assessed in this NIS are predicted to occur.
Pre-application Consultation Request Arklow Flood Relief Scheme	Would comprise of flood defence walls along the River Walk and South Quay, widening of the river channel downstream of Arklow Bridge including works to the quays and slipway, dredging of the river channel upstream and downstream, provision of debris trap and gravel trap upstream of Arklow Bridge, lowering of floor of Arklow Bridge, underpinning of bridge piers and abutments and scour protection, provision of flood embankment on the north side of the river channel	Given the implementation of best practice standard construction environmental measures for this project and the CEMP for the proposed development, no pathway for in-combination effects with QIs assessed in this NIS are predicted to occur.
Arklow Wastewater Treatment Plant	Demolition and site clearance of existing structures on a ca. 2.9 hectare site - the ‘Old Wallboard Site’, Mill Road, in the townland of Ferrybank, Arklow, County Wicklow Development of a WwTP at the Old Wallboard Site, to provide for 36,000 Population Equivalent (PE) wastewater treatment capacity, with preliminary and secondary treatment processes, stormwater storage and storm water overflow (SWO), including inter alia the following: An Inlet Works Building (ca. 2448 sq m gross floor area (gfa)); the building will have a maximum height of ca. 16.5 m; A Process Building (ca. 2576 sq m gfa), containing a number of photovoltaic (PV) panels on its roof and located at the southern end of the site. The building will have a maximum height of ca. 14.5m. Treated effluent flows will be discharged to the Irish Sea from the	Given the implementation of best practice standard construction environmental measures for this project and the CEMP for the proposed development, no pathway for in-combination effects with QIs assessed in this NIS are predicted to occur.

Project/Plan	Key Policies/Issues/Objectives Directly Related to the Conservation of the Natura 2000 Network	Potential In-combination Effects
	Process Building via a long sea outfall; A Sludge Tank Enclosure (ca. 867 sq m gfa). The enclosure will have a maximum height of ca. 8.5m. An Odour Control Unit (OCU) will be located within the Sludge Tank Enclosure; An Administration Building (ca. 174 sq m gfa), located at the site entrance on Mill Road. The building will have a maximum height of ca. 10.1m; Provision of a ca. 3,150 m3 stormwater holding tank within the Inlet Works Building of the proposed WwTP; Provision of a storm water overflow (SWO) to discharge excess flows from the stormwater holding tank and to act as an emergency relief for excess storm flows in the sewered catchment, discharging to the Irish Sea (through the toe of the revetment). The overflow will be screened and fitted with appropriate non-return valves; 2 No. vent stacks at the Inlet Works Building and at the Process Building respectively, extending ca. 1m higher than the building structures (the overall height of the vent stacks would be ca. 17.5m (stack at Inlet Works Building) and ca. 15.5 m (stack at Process Building) respectively); Vehicular and pedestrian access to the WwTP via a security gate from the existing entrance on Mill Road; Landscaping and ancillary works including an area of ca. 0.34 hectares at the northern end of the site, between Mill Road and the coastal	

Project/Plan	Key Policies/Issues/Objectives Directly Related to the Conservation of the Natura 2000 Network	Potential In-combination Effects
	revetment which will become part of the public realm. Boundary fence, ca. 2.1m high surrounding the site. Provision of the following infrastructure to serve the WwTP: ca. 20 car parking spaces; Loading bays; Internal circulation roads and associated hard standing; Site lighting; all ancillary connections to electricity, telecommunications and water supply networks and site drainage; Upgrade of a section of the coastal revetment over a distance of approximately 360m along the coastal side of the Old Wallboard site boundary. The revetment crest height will be ca. 7.5mOD and will have a crest width ranging from ca. 9m to 10.1m. The total revetment width (from landward toe to seaward toe) will be approximately 50m. 1 No. temporary construction compound to be located within the Old Wallboard site including associated site works, access to public roads, associated 2.4m high boundary in the form of hoarding or fencing and associated ancillary staff facilities and parking. A wastewater discharge authorisation licence will be required for the proposed development in accordance with the requirements of the Waste Water Discharge (Authorisation) Regulations 2007, as amended.	

6.4 Mitigation Measures

6.4.1 Construction Phase

6.4.1.1 Water Quality

As part of the assessment of the required construction mitigation, best practice construction measures which will be implemented for the proposed development were considered. A summary of the measures relevant to hydrology are provided as follows and are in accordance with Construction Industry Research and Information Association (CIRIA) guidance – *Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors* (Masters-Williams *et al*. 2001). Further detail is provided in the CEMP included in **Appendix B** of this report.

To minimise the potential for elevated silt levels in surface water run-off, the working area used during construction will be clearly outlined prior to the commencement of works and will be kept to the minimum area necessary to effectively complete the works. Vegetation will be retained where possible.

A set of standardised emergency response procedures will govern the management of emergency incidents. These are provided in the CEMP (**Appendix B** of this report), which includes an Environmental Incident and Emergency Response Plan.

A detailed spillage procedure will be put in place and all staff on site will be trained with respect to the relevant procedures to be undertaken in the event of the release of any sediment, hydrocarbons into a watercourse. Spill kits will be maintained on-site and relevant staff will be trained in their effective usage. All site personnel will be trained and aware of the appropriate action in the event of an emergency, such as the spillage of potentially polluting substances. In the event of spillage of any polluting substance and/or pollution of a watercourse, Wicklow County Council, IFI and the NPWS shall be notified.

Specific environmental control measures to minimise the effect on the hydrological regime, water quality and flooding as outlined in the CEMP include:

General

- Good housekeeping (site clean-ups, use of disposal bins, etc.) will be implemented on the site;
- No materials will be stored in flood plains or in areas which would impede flood flow paths;
- Where possible, soil excavation will not be completed during periods of prolonged or heavy rain;
- Earthworks operations shall be carried out such that surfaces shall be designed with adequate falls, profiling and drainage to promote safe run-off and prevent ponding and flooding;

- All construction compounds will be in areas that are at low risk of flooding (outside the 1 in 100-year flood zone);
- Secure oil and chemical storage in over-ground bunded areas, limited to the minimum volume required to serve immediate needs with specified delivery and refuelling areas;
- No refuelling or fuel storage within 50m of watercourse and only on a sealed surface;
- Emergency spill kits retained onsite at sensitive locations;
- Cessation of work and development of measures to contain and/or remove pollutant should an incident be identified;
- Silt traps will be employed and maintained in appropriate locations;
- Temporary interception bunds and drainage ditches will be constructed up slope of excavations to minimise surface runoff ingress and in advance of excavation activities;
- Excavation and earthworks will be suspended during and immediately following periods of heavy rainfall to minimise sediment generation and soil damage;
- Weather warnings will be monitored during construction to ensure that there is no flood risk to construction workers installing the cable. A risk assessment will be carried out in the case of a weather warning to determine what works can proceed, and what works need to be postponed;
- The temporary foul drainage at the construction compounds will comprise self-contained sanitary facilities, with wastewater stored and tankered off-site to appropriately licensed treatment facilities;
- Earthworks haulage will be along predetermined routes along existing national, regional and local routes for importation and exportation of materials, in accordance with the Construction Traffic Management Plan (CTMP) included in the CEMP. Haulage along the cable route will be along internal haul roads/access tracks, where practicable. Where compaction occurs due to truck movements and other construction activities on unfinished surfaces, remediation works will be undertaken to reinstate the ground to its original condition. Where practicable, compaction of any soil or subsoil which is to remain in situ along the sites will be avoided;
- The excavated material storage area will be at least 50m from any watercourse and material side slopes will be commensurate with the type of material, to ensure slope stability and prevent erosion. The stockpile will be surrounded in silt fencing;
- Any existing field drainage present crossing the landfall site will be temporarily diverted or facilities put in place to over-pump to settlement ponds prior to discharge of treated water into the existing surface water drainage system;
- Field drains will be reinstated on completion of the works or new drainage installed to match the drainage characteristics of the ground prior to

development. The landowner will be consulted on the proposed drainage provisions prior to any installation;

- Earthworks operations shall be carried out such that surfaces shall be designed with adequate falls, profiling and drainage to promote safe runoff and prevent ponding and flooding. Runoff will be controlled through erosion and sediment control structures appropriate to minimise the water impacts. Care will be taken to ensure that surfaces are stable to minimise erosion;
- Excavated topsoils will be stockpiled using appropriate methods to minimise the impacts of weathering. Care will be taken in reworking this material to minimise dust generation, groundwater infiltration and generation of runoff. Any surplus suitable material excavated that is not required elsewhere for the proposed development, shall be used for other projects where possible, subject to appropriate approvals/notifications;
- In order to reduce the compaction and erosion of topsoil outside the areas of direct construction, haulage routes will be along predetermined routes within and outside the proposed development. Where compaction occurs due to truck movements and other construction activities on unfinished surfaces, remediation works will be undertaken to reinstate the ground to its original condition. Where practical, compaction of any soil or subsoil which is to remain in-situ within the proposed development will be avoided;
- The *Contractor* will ensure that any topsoil or subsoil is assessed for re-use within the proposed development ensuring the appropriate handling, processing and segregation of the material. Where practical the removal of soil from the proposed development will be avoided. All earthworks will be undertaken in accordance with TII Specification for Road Works (SPW) Series 600 Earthworks and project specific earthworks specifications ensuring that all excavated material and imported material is classified using the same methodology so as to allow maximum opportunity for the reuse of materials on site;
- All excavated material, where possible will be reused as construction fill. The appointed *Contractor* will ensure acceptability of the material for reuse for the proposed development with appropriate handling, processing and segregation of the material;
- All improvement works will be closely monitored and supervised and will be enclosed by silt barriers (e.g. straw or silt fence) to prevent any runoff into surface water bodies and will be carried out in accordance with the CEMP; and
- Horizontal movement monitoring of the sheet piles will be implemented during construction activities to ensure that movement does not exceed the design limitations. Appropriate remedial actions will be implemented should there be any exceedance of design limitations.

Cable Route General Measures

- Any groundwater or rainwater that collects in a trench will be pumped to locations agreed with the landowners and local authorities. Typically, this will be onto adjacent land, not directly into waterways, and through a filter medium, to avoid the build-up of silt, as some granular material will, inevitably, be pumped out with the water. The pump flowrates will match that of the water into the trench, as it must be kept generally free of water. A single pump with a 75mm hose will usually be adequate to deal with rainwater running into a trench. A similar arrangement will apply at joint bays, where a sump will be cast into the concrete base for a pump;
- Any bentonite (or similar HDD drilling head lubrication material) will be handled and removed by the drilling contractor. Typically, bentonite is used, which comprises 95% water and 5% bentonite clay which is a non-toxic, natural substance. HDD will be a closed system, with drilling fluid recirculated, the drill cuttings recovered, and drilling fluid reused;
- In order to eliminate the migration of drilling fluids through the subsurface to waterbodies the following measures will be employed:
  - Drilling pressures will be closely monitored and not exceed those needed to penetrate the formation;
  - Exit and entry points for the HDD will be enclosed by silt barriers (e.g. straw or silt fence) to prevent any runoff into surface water bodies; and
  - If pressure drops during drilling or if there is a lack of returns the drilling will stop immediately to allow an assessment of a potential leakage of drilling fluid into the surrounding formation. A leak stopping compound may be used to prevent the leak from migrating further into the formation. If the leak stopping compound is not successful, the drilling direction may need to change to avoid the area where the leak occurred.
- If damming and over-pumping is adopted for the open cut watercourse crossings the water will be discharged through a filtering medium to limit silt carry over or bed disturbance downstream of the crossing point;
- There will be no tracking of machinery within watercourses other than that related to the temporary works associated with construction of the watercourse crossings for the cable route;
- Silt pollution caused by working in surface water will be minimised or prevented by keeping water out of the works area using appropriate isolation techniques, such as cofferdams, flume pipes and by-pass channels;
- Where short-term over pumping or flume pipes are required, equipment will be sized to accommodate surface water flow that might reasonably be expected over the period in question;
- Dewatering, where required, will incorporate the use of filter media; there will be no direct discharges into the watercourse; and

- The cables will be installed in ducts, so the only section of trench that will be open is that which is being excavated and in which ducts are being installed. Excavated cable trenches will be backfilled as the works progress, as soon as installation is complete and any cement bound surround material has cured sufficiently.

Substation General Measures

- Any excavations within made ground should follow the criteria outlined in the CEMP. The CEMP will be updated by the contractor prior to the commencement of construction;
- Excavations in made ground will be monitored by an appropriately qualified person to ensure that any hotspots of contamination encountered are identified, segregated and disposed of appropriately and to ensure soils are consistent with the descriptions and classifications according to the waste acceptance criteria testing carried out as part of the site investigations. Any identified localised areas of contamination will be segregated and stored in an area where there is no possibility of runoff generation or infiltration to ground or surface water drainage. Care will be taken to ensure that the contaminated material does not cross- contaminate clean soils elsewhere throughout the sites;
- Samples of ground suspected of contamination will be tested for contamination during the detailed investigation and ground excavated from these areas will be disposed of to a suitably licensed or permitted site in accordance with the current Irish waste management legislation;
- Any dewatering in areas of contaminated ground will be designed to minimise the mobilisation of contaminants into the surrounding environment. Where dewatering in such areas is unavoidable the water will be adequately treated prior to discharge;
- Where piling is undertaken, it is recommended that this is completed following the placement of the deeper granular gas drainage layer which will also serve as a piling mat. Following this, the barrier layer and upper drainage layer will be placed around the piles and sealed;
- Piling may also be completed after the GCL barrier and drainage layer has been laid, which will require excavation of material and sealing the GCL around piles; and
- The geotechnical design will ensure that any future settlement on site does not lead to a disruption of the integrity of the GCL barrier layer that could lead to water ingress.

General Monitoring Measures – Water Quality

- Visual monitoring will be undertaken as part of the regular site audits during the construction of the proposed development to ensure existing surface water drainage runoff and natural infiltration to ground is not affected by the proposed development;

- A monitoring regime/programme for water quality will be put in place. Turbidity monitoring will be carried out while works are underway at the Kilbride River and Johnstown North watercourse crossings to ensure that sediment levels are not significantly elevated above baseline levels; and
- The Contractor is required to monitor the weather forecasts to inform the programming of earthworks and stockpiling of materials. Particular regard will be given to trench excavations and other works which may be vulnerable to the generation or conveyance of run-off, and for the protection of site personnel, plant and equipment in flood prone areas.

6.4.2 HDD Works

While the bentonite drilling fluid is non-toxic and can be commonly used in farming practices, if sufficient quantity enters a watercourse it can potentially settle on the bottom, smothering benthic flora and affecting faunal feeding and breeding sites. The drilling contractor will develop a location specific HDD frac-out contingency plan, detailing measures to be taken to reduce the risk of bentonite breakout and measures to be taken for the protection of sensitive ecological receptors, should a breakout occur.

A typical procedure for managing a breakout or frac-out on land would include:

- Stop drilling immediately;
- Contain the bentonite by constructing a bund e.g. using sandbags;
- Recover the bentonite from the bund by pumping to a suitable container or back to the entry pit for recycling;
- If necessary, inert and non-toxic lost circulation material (mica) will be pumped into the bore profile, which will swell and plug any fissures;
- The area will be monitored closely to determine if the breakout has been sealed; and
- Check and monitor mud volumes and pressures as the works recommence.

A typical procedure for managing a breakout or frac-out under water would include:

- Stop drilling immediately;
- Pump lost circulation material (mica), which will swell and plug any fissures;
- Check and monitor mud volumes and pressures as the works recommence; and
- Repeat process as necessary until the breakout has been sealed.

Any bentonite will be managed and removed by the specialist drilling contractor on completion of the operation. Water will be brought to site in tankers (to make up drilling fluid) for lubrication of the bore and to provide the requisite volumes of water to the compound. The water used will be non-saline and non-potable water. For each of the two HDD bores and with an average initial demand of around $10m^3$/hr , the total volume of water required is estimated to be up to $450m^3$ per bore, assuming full drilling fluid returns are maintained.

On completion of the operation the drill fluid will be disposed of to an appropriately licensed facility.

Further details on proposed HDD works and mitigation measures are included in ***Chapter 6*** *Construction Strategy*.

6.4.3 Mitigation Measures during Operations

There will be infrequent visits by personnel to the substation, therefore, foul wastewater generated will be minimal. Foul wastewater will be collected independently from the welfare facilities in both the Transmission 220kV GIS substation building and the Connection 220kV GIS substation building.

Foul wastewater will be stored temporarily in respective, appropriately sized, foul wastewater holding tanks and removed from site periodically, by a licensed service provider, to a licensed wastewater treatment facility.

A new surface water drainage network has been designed to accommodate the proposed development. The surface water drainage network has been designed to ensure that no flooding or surcharging of the system will occur for all storm events up to and including the 1 in 30 year return period storm event. All buildings and equipment within the site boundary will be protected against flooding for all storm events up to and including the 1 in 200 year return period storm event. The proposed surface water drainage network design includes an allowance for climate change. Appropriately sized hydrocarbon interceptors will be installed at strategic locations along the proposed surface water drainage network to prevent any hydrocarbons from leaving the site of the proposed substation.

The existing flood defences will be inspected annually for signs of disrepair, together with additional inspections after significant flood events (Events with a return period greater than a 1 in 2 year flood event). Maintenance of embankments includes removal of vegetation to allow for inspection of the embankment.

The maintenance programme for the drainage system will be set out in the Operation and Maintenance manual which will be prepared during the detailed design. Regular maintenance will consist of regular inspections, silt or oil removal if required more frequently than once per year, vegetation management, sweeping of surfaces, and litter and debris removal.

Emergency procedures detailing the measures to be undertaken should any accidental spill happen during operation will be developed as part of the operations manual.

6.4.4 Mitigation Measures during Decommissioning

Ecology and invasive species surveys will be carried out prior to decommissioning and appropriate mitigation will be provided based on up-to-date data and in line with up-to-date guidelines. The original habitats will be restored and levels of noise, lighting and disturbance will return to levels pre-construction.

Therefore, no significant effect from decommissioning or the decommissioning process will occur.

6.5 Residual Effects

With the employment of the mitigation measures set out in **Section 6.4** above and standard good construction practice, it is considered that overall there will be no significant effects on the integrity of European Sites as a result of the construction, operation and decommissioning of the proposed development. Thus, residual impacts will not arise.

6.6 NIS Conclusion

The AA screening concluded, on the basis of objective information and in view of best scientific knowledge, the possibility of significant effects from the proposed project on European sites could not be ruled out and therefore an Appropriate Assessment was required. The AA screening concluded that there was potential for the proposed development to significantly impact the Buckroney-Brittas Dunes and Fen cSAC, via one QI which may be affected by changes in surface water i.e., Mediterranean salt meadows (*Juncetalia maritimi*) [1410].

The NIS has been prepared to inform and assist An Bord Pleanála to assess, in view of best scientific knowledge, if the proposed development, individually or in combination with another plan or project is likely to have a significant effect on the European site, the Buckroney-Brittas Dunes and Fen cSAC.

This NIS has examined and analysed, in light of the best scientific knowledge, with respect to the Buckroney-Brittas Dunes and Fen cSAC within the potential zone of influence of the proposed development, the potential effect pathways, how these could impact on the QI habitats and species and whether the predicted effects would adversely affect the integrity of the Buckroney-Brittas Dunes and Fen cSAC.

Mitigation measures are set out in **Section 6.4** of the NIS and they ensure that any effects on the conservation objectives of the Buckroney-Brittas Dunes and Fen cSAC will be avoided during the proposed development such that there will be no risk of adverse effects on the integrity of this European site.

It has been objectively concluded following an examination, analysis and evaluation of the relevant information, including in particular the nature of the predicted effects from the proposed development and with the implementation of the mitigation measures proposed, that the construction, operation and decommissioning of the proposed development will not adversely affect (either directly or indirectly) the integrity of any European site, either alone or in combination with other plans or projects. There is no reasonable scientific doubt in relation to this conclusion. The competent authority will make the final determination in this regard.

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Sure Partners Limited

ARKLOW BANK WIND PARK PHASE 2
ONSHORE GRID INFRASTRUCTURE

Natura Impact Statement
APPENDICES

Appendix A. Site Synopsis

Appendix A

Site Synopsis

Buckroney-Brittas Dunes and Fen SAC Site Synopsis Site Code: 000729

Buckroney-Brittas Dunes and Fen is a complex of coastal habitats located about 10 km south of Wicklow town. It comprises two main sand dune systems, Brittas Bay and Buckroney Dunes, connected on the coast by the rocky headland of Mizen Head. The dunes have cut off the outflow of a small river at Mizen Head and a fen, Buckroney Fen, has developed. A further small sand dune system occurs south of Pennycomequick Bridge.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[1210] Annual Vegetation of Drift Lines [1220] Perennial Vegetation of Stony Banks [1410] Mediterranean Salt Meadows
[2110] Embryonic Shifting Dunes
[2120] Marram Dunes (White Dunes) [2130] Fixed Dunes (Grey Dunes)*
[2150] Decalcified Dune Heath*
[2170] Dunes with Creeping Willow
[2190] Humid Dune Slacks
[7230] Alkaline Fens

Along much of the higher parts of the beach at this site, typical annual strandline vegetation occurs. Species such as Sea Rocket (*Cakile maritima*), Prickly Saltwort (*Salsola kali*) and Spear-leaved Orache (*Atriplex prostrata*) are frequent in this zone, with the scarcer Yellow Horned-poppy (*Glaucium flavum*) present in places.

A shingle ridge occurs along the Buckroney dune system. The amount of exposed shingle is low, but it is likely that shingle underlies much of the sandy areas also. The vegetation on the shingle is similar in composition to that which occurs as part of the drift line and embryonic dune habitats. Sea Sandwort (*Honkenya peploides*) is characteristic, and other species include Sand Couch (*Elymus farctus*), Sand Sedge (*Carex arenaria*), Sea Rocket and Yellow Horned-Poppy.

An area of saline vegetation which conforms to ‘Mediterranean salt meadows’ occurs in the Buckroney dune system south of the inlet stream to the fen, and possibly in small areas elsewhere within the site. It is typically dominated by rushes (*Juncus* spp.), and of note is the presence of Sharp Rush (*J. acutus*). Sea Club-rush (*Scirpus maritimus*) also occurs. The area is inundated by the tide only occasionally via the narrow inlet leading to Buckroney Fen.

Embryonic dune development occurs at the southern part of Brittas and more widely at Buckroney and Pennycomequick. Typical species are couch grasses (*Elymus* sp.), Sand Sedge and Sea Sandwort. The main dune ridges are dominated by Marram (*Ammophila arenaria*), with herbaceous species such Sea Spurge (*Euphorbia paralias*), Sea-holly (*Eryngium maritimum*) and Common Restharrow (*Ononis repens*) occurring throughout. The main dune ridges are well developed, reaching heights of 10 m at Brittas. The northern end of the Brittas system has fine examples of parabolic dunes.

Stable fixed dunes are well developed at Brittas and Buckroney. Marram is less frequent in these areas and is replaced by Red Fescue (*Festuca rubra*) as the most common grass species. A rich flora occurs, especially in the more open areas. Common species include Pyramidal Orchid (*Anacamptis pyramidalis*), Common Milkwort (*Polygala vulgaris*), Wild Pansy (*Viola tricolor* subsp. *curtisii*), Carline Thistle (*Carlina vulgaris*), Biting Stonecrop (*Sedum acre*), Wild Thyme (*Thymus praecox*) and Common Bird's-foot-trefoil (*Lotus corniculatus*). The mature areas of fixed dune also contain Burnet Rose (*Rosa pimpinellifolia*), Bracken (*Pteridium aquilinum*), Wood Sage (*Teucrium scordonia*) and Common Sorrel (*Rumex acetosa*). Mosses such as *Tortula ruralis* subsp. *ruraliformis*, *Rhytidiadelphus triquetris*, and *Homalothecium lutescens* are frequent, along with lichens (*Cladonia* spp., *Peltigera canina*).

This is one of the few Irish east coast sites to possess good examples of wet dune slacks and dunes with Creeping Willow (*Salix repens*). These areas of the dunes have a rich and varied flora, including species such as Creeping Willow, Water Mint (*Mentha aquatica*), Silverweed (*Potentilla anserina*), Meadowsweet (*Filipendula ulmaria*) and Meadow Thistle (*Cirsium dissectum*). The slacks are notably rich in rushes and sedges. Of particular interest is the presence of Sharp Rush (*Juncus acutus*), a scarce species in eastern Ireland and one that is indicative of a saline influence.

The site is also notable for the presence, at the back of the dunes, of areas of decalcified dune heath, a rare habitat type, and one which is listed with priority status in the E.U. Habitats Directive. Heath species present include Heather (*Calluna vulgaris*), Bell Heather (*Erica cinerea*) and Gorse (*Ulex europaeus*).

Buckroney Fen lies west of Mizen Head. It is backed to the west by a dense swamp of Common Reed (*Phragmites australis*). The fen is dominated by Tussock Sedge (*Carex paniculata*), with Water Mint, Purple Loosestrife (*Lythrum salicaria*), Marsh Pennywort (*Hydrocotyle vulgaris*), Greater Bird's-foot-trefoil (*Lotus uliginosus*), Water Horsetail (*Equisetum fluviatile*), small sedges (*Carex* spp.) and other flowering plants. An extensive stand of Blunt-flowered Rush (*Juncus subnodulosus*) is of note. Throughout this area the rare Marsh Fern (*Thelypteris palustris*) is frequent. There are also extensive areas of Rusty Willow (*Salix cinerea* subsp. *oleifolia*) scrub.

This site contains two rare plant species protected under the Flora (Protection) Order, 1999: Wild Asparagus (*Asparagus officinalis* subsp. *prostratus*), in its most northerly Irish station, and Meadow Saxifrage (*Saxifraga granulata*). Other rare species which occur within the site include Green-flowered Helleborine (*Epipactis phyllanthes*), Bird's-foot (*Ornithopus perpusillus*) and Spring Vetch (*Vicia lathyroides*). All of these are Red Data Book species. The rare sedge hybrid *Carex riparia* x *C. vesicaria* (*Carex* x *csomadensis*) is only known from Mizen Head.

The invertebrate fauna of Buckroney fen has been investigated and some notable species have been recorded, including the beetle *Eurynebria complanata* and the following flies: *Machimus cowini*, *Anasimyia lunulata*, *Parhelophilus consimilis* and *Lejogaster splendia*.

Little Tern, a species listed on Annex I of the E.U. Birds Directive, has bred or attempted to breed at Buckroney strand in recent years. In 1992 between 7 and 10 pairs were present and in 1993 up to 8 pairs. Teal are regular in winter (119), as are Curlew (46), Lapwing (515) and Snipe (87). All figures are average peaks for 1994/95 - 1995/96.

The dune systems and beaches are subject to high amenity usage from day-trippers and several areas around the site have been developed as caravan parks, car parks and golf courses. The marginal areas of the fen have been reclaimed, especially at the south end, though these areas still flood in winter and attract waterfowl.

This site is important as an extensive sand dune/fen system with well developed plant communities. Several coastal habitats listed on the E.U. Habitats Directive, including two priority habitats - fixed dune and decalcified dune heath - are present. The area contains two legally protected plants, as well as a number of other rare or scarce plant species. The site provides habitat for some rare species of invertebrate and for the vulnerable Little Tern. A rich flora and fauna has persisted on this site despite extensive amenity use and adjacent farming. However, future land use practices will need to be managed to ensure the continued survival of this unique mosaic of coastal habitats.

Sure Partners Limited

ARKLOW BANK WIND PARK PHASE 2 **ONSHORE GRID INFRASTRUCTURE**

Natura Impact Statement APPENDICES

Appendix B. Construction Environmental Management Plan

Appendix B

Construction and Environmental Management Plan

Appendix B

Construction Environmental Management Plan

Sure Partners Limited

Construction Environmental Management Plan (CEMP)

Arklow Bank Wind Park Phase 2

Onshore Grid Infrastructure

(Project Ref.LF100034)

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

Arklow Bank Wind Park Onshore Grid Infrastructure

CONTENTS

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Prepared by:	Clodagh O'Donovan Carmel Brennan	Director (Arup) Environmental Adviser	
Checked by:	Matthew Vesey	Consent Manager	
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GLOSSARY

The following defines some of the terms used throughout this document:

The *Employer* – The Client i.e. the entity commissioning the construction of the onshore grid infrastructure and associated civil infrastructure. That is, Sure Partners Limited (SPL).

The *Contractor* / Principal Contractor (PC) – The *Contractor* responsible for Civil Infrastructure; the Contractor as defined in the Safety, Health and Welfare at Work (Construction) Regulations 2013.

Decommissioning – Decommissioning is a process including the partial removal of the onshore grid infrastructure at the end of its natural operational phase. Decommissioning works will involve similar tasks / impacts as construction works and will be subject to additional detailed proposals to be submitted to the Planning Authority prior to the commencement of the decommissioning works.

Environmental (Ecological) Clerk of Works (ECoW) – The ECoW is an independent specialist appointed by the *Employer*, typically with an ecological background, albeit with practical experience of broad environmental issues associated with construction. In accordance with relevant planning conditions, applicable regulations and good practice, the ECoW monitors environmental compliance and provides advice to the *Employer* and *Contractor* where required. The ECoW role and associated responsibility is outlined in this document.

Geotechnical Engineer – The Geotechnical Engineer is a technical specialist appointed by the *Contractor.* The Geotechnical Engineer monitors the construction works, ensuring that excavations and material stockpiles are managed in an appropriate manner to prevent the occurrence of material instability. The Geotechnical Engineer provides advice to the *Employer* and *Contractor* where required. The Geotechnical Engineer role and associated responsibility is outlined in the Works Information (and this CEMP).

Reinstatement – Reinstatement works are generally undertaken during construction and aim to redress impacts on the landscape as part of the construction process. Reinstatement is undertaken as soon as possible following the construction works in each area, such as the reinstatement of road verges, agricultural grasslands and other areas that may be disturbed as a result of the construction process.

1 INTRODUCTION

1.1 Construction Environmental Management: Aims & Objectives

1.1.1 This document provides information relating to environmental management for the Arklow Bank Wind Park (ABWP) Phase 2 Onshore Grid Infrastructure (OGI), here after referred to as the proposed development. This document has been prepared to inform the Planning Authority and statutory consultees of the proposed management methods to be employed during the construction of the proposed development.

1.1.2 The principal objective of this document is to provide information on the proposed infrastructure and to detail appropriate measures in the avoidance, minimisation and control of adverse environmental impact associated with the proposed development. Furthermore, this document aims to define good practice as well as detailing specific commitments relating to environmental protection as identified in the Environmental Impact Assessment Report (EIAR) (including appendices) and any planning conditions associated with a future planning consent (refer to **Section 2.2**).

1.1.3 The Construction Environmental Management Plan (CEMP) will form part of the *OGI Works Contract* (hereafter, the *Contract*). The methods and principles contained herein, as well as within referenced legislative instruments and published guidance documents, will be adhered to by the *Contractor* in developing construction method statements and other plans relating to environmental management as required by the *Contract*.

1.1.4 This version of the CEMP presents minimum environmental management requirements to be adhered to by the *Contractor*. This CEMP will be updated following receipt of planning consent to incorporate relevant planning conditions and further details on environmental management measures to be applied during the construction period. The CEMP will be a key construction contract document, which will ensure that all mitigation measures, which are considered necessary to protect the environment, are implemented.

1.1.5 The *Contractor* submits all relevant information as detailed in this document to the *Employer* for acceptance in accordance with the contract provisions. No construction works commence prior to the *Employer's* acceptance. Once approved, the *Employer* provides the *Contractor* with an electronic copy of the final CEMP which the *Contractor* maintains for the duration of the works (i.e. CEMP Version 2.0).

1.1.6 This document is read and implemented onsite in conjunction with industry good practice, published guidance documents, and other documents referred to within the CEMP (**Section 13**).

1.1.7 A **Checklist** has been included in **Section 14**, providing the *Contractor* with a summary of the minimum information to be provided to the *Employer* pre-, during and post-construction.

2 PROJECT INFORMATION

2.1 Overview of Arklow Bank Wind Park Phase 2

2.1.1 The Arklow Bank Wind Park (ABWP) is an offshore wind farm, located off the coast of County Wicklow, on the east coast of Ireland. A Foreshore Lease was granted for the development of a wind park on the Arklow Bank in 2002. Arklow Bank Wind Park Phase 1 was constructed in 2003 – 2004 consisting of seven wind turbines. Phase 1 is owned and operated by Arklow Energy Limited under a sublease to the Foreshore Lease. Sure Partners Limited (SPL), a wholly owned subsidiary of SSE plc (SSE), is now proposing to develop the remainder of ABWP, Arklow Bank Wind Park Phase 2, hereafter referenced as the Project.

2.1.2 The proposed development forms part of the overall Arklow Bank Wind Park Phase 2 Project. This Project comprises three distinct elements:

1. Offshore Infrastructure;
2. Onshore Grid Infrastructure - the proposed development to which this CEMP relates; and
3. Operations and Maintenance Facility (OMF)

2.2 Proposed Development

2.2.1 The proposed development, which is the subject of this CEMP, comprises the Arklow Bank Wind Park Phase 2 Onshore Grid Infrastructure (OGI) to be developed as part of the Project. The proposed development will comprise:

- Landfall for two offshore export circuits from the High Water Mark (HWM) to two Transition Joint Bays (TJB) at Johnstown North, located approximately 4.5km northeast of Arklow Harbour,
- Connection by two underground 220kV high voltage alternating current circuits, and fibre optic cables over a distance of c. 6km, from the landfall to the new onshore 220kV substation,
- A new onshore 220kV substation, to be located at Shelton Abbey, north of the Avoca River, approximately 2.1km northwest of Arklow town consisting of two connected compounds:
  1. The transmission compound with the infrastructure to physically connect to the National Electricity Transmission Network (NETN), and
  2. The connection compound with the infrastructure to allow the connection of the wind farm in accordance with EirGrid grid code requirements.
- Flood defence improvement works to the existing Avoca River Business Park flood defences located c. 500m west of the substation site;
- A 220kV overhead power line connection from the new 220kV substation at Shelton Abbey to the existing 220kV transmission network located c. 200m from the substation site.

2.3 Planning Conditions and Commitments Register

Following receipt of planning consent, if granted, this CEMP will be updated following the appointment of the contractor, and prior to commencing the works on site. A draft Commitments Register has been prepared and included in **Appendix A**, detailing the commitments made in the EIAR (based on the Summary of Mitigation and Monitoring Measures in the EIAR); planning conditions will be included in the register post-consent. Therefore, adherence to the measures described in the CEMP will ensure compliance with the planning consent as far as environmental management is concerned (pre-construction and construction phase). The Commitments Register forms part of the *Contractor*'s and *Employer'*s compliance checks throughout the phases of the proposed development.

3 RESPONSIBILITIES, CORRESPONDENCE & GENERAL COMMUNICATION

3.1 Roles & Responsibilities

3.1.1 A project *Contacts Sheet* (**Table 3.1**) provides a list of all *Employer*, *Contractor* and relevant third-party contact details. The *Contractor* updates this sheet and keeps it current for the duration of the *Contract*.

3.1.2 The *Contractor* is responsible for obtaining all necessary consents, licences and permissions for all activities as required by current legislation governing the protection of the environment.

3.1.3 The *Contractor* considers the mitigation measures and good practice construction methods detailed within this document in the Contractor's design and in any detailed environmental plans as required by the *Contract.*

3.1.4 A copy of this CEMP and related files (e.g. Waste Transfer Notes) will be kept in the site offices for the duration of the construction phase and will be made available for review at any time. Upon completion of the construction works, the *Contractor* submits a complete digital copy of the final set of information to the *Employer* for their records. This information will include electronic scans of all relevant hard copy reports, data, field records and correspondence which are generated over the course of the construction phase, including the records highlighted in **Section 3.8** below.

3.1.5 Where the *Contractor* has standard documents within its own Environmental Management System or Environmental Management Plan, that cover a particular requirement of this CEMP, they will either be inserted or cross-referenced within the relevant section of the final CEMP.

3.1.6 The *Contractor* ensures that the Environmental (Ecological) Clerk of Works (ECoW) is timeously informed of all site activities, including all programme changes, to ensure advanced checks and monitoring can be arranged. This extends to any preliminary works.

3.1.7 To ensure compliance of the works with this document and pollution prevention requirements set out in **Section 5**), the *Employer* and the ECoW regularly monitor the *Contractor's* works. **Should the *Employer* or ECoW identify any failure to comply with the requirements of this document or the *Contractor's* own method statements the *Employer* or ECoW may stop the associated works (via instruction to the *Contractor's* Project Manager) until such time as the failure is rectified**. Any associated cost or time delay incurred will be borne by the *Contractor.*

3.2 Contractor's Environmental Manager

3.2.1 The *Contractor* employs an Environmental Manager with appropriate experience and expertise for the duration of the construction phase to ensure that all the environmental design, control and mitigation measures outlined in the CEMP/EIAR and supporting planning documentation in relation to all aspects of the environment are implemented. The Environmental Manager together with an environmental team and in consultation with the ECoW, deals with drainage maintenance, mitigation measures and monitoring. This Environmental Manager will be awarded a level of authority and will be allowed to stop construction activity if there is potential for adverse environmental effects to occur.

3.3 Environmental Clerk of Works (ECoW)

3.3.1 The *Employer* appoints an appropriately qualified and competent environmentalist or ecologist as **Environmental Clerk of Works (ECoW)** to manage and ensure *Contractor* compliance with this CEMP.

3.3.2 The ECoW will have a minimum of 5 years of relevant site experience and will be a full-time role for the duration of site activities. Thereafter the role may be part-time, subject to ongoing compliance of site activities with the CEMP (refer to **Section 3.3.3** below for ECoW responsibilities). For ECoW powers in relation to halting works refer to **Section 3.1** above.

3.3.3 The ECoW undertakes relevant environmental tasks / training prior to and during the construction works. Fundamentally, the ECoW shall be responsible for:

- ***Monitoring and maintaining temporary drainage systems*** in accordance with the CEMP, including the direction of civils works team to implement, bolster and remediate (as necessary) water pollution prevention measures as detailed in **Sections 5 and 6** herein.

- ***Monitoring implementing habitat and species protection measures*** in accordance with the CEMP, including pre-construction verification checks and implementing demarcation measures. Refer to **Section 10** for specific details / tasks.

- ***Developing a positive environmental culture*** via training and engagement with site management and, importantly, site operatives to increase awareness and promote timeous remediation / reporting.

- ***Communicating statutory requirements and good environmental practices*** outlined in the CEMP, principally via a schedule of toolbox talks informed by site activities and recorded non-compliance.

3.4 Geotechnical Engineer

3.4.1 The *Contractor* employs a geotechnical engineer to monitor the construction works, ensuring, for example, that excavations, material stockpiles, and HDD drilling are managed in an appropriate manner as required by the contract (including this CEMP).

3.5 Community Liaison Officer

3.5.1 The Community Liaison Officer will be appointed by the *Contractor* and will be responsible for managing tasks such as the following:

- Alerting neighbouring residents of the works or particular activities commencing in their area

- Briefing neighbours on progress and issues likely to affect them, such as traffic management measures, as necessary;
- Liaison with Wicklow County Council and emergency services as appropriate; and
- Liaison with local Gardaí, particularly in relation to traffic movements and permits where necessary.

3.6 Community Engagement Manager

3.6.1 The Community Engagement Manager is employed by the *Employer*. The dedicated role is in place right through the project phases to facilitate engagement with the community. The Community Engagement Manager will work closely with the Community Liaison Officer.

3.7 Archaeological Consultant

3.7.1 The Archaeological Consultant will be appointed by the *Employer* to undertake a programme of archaeological testing in advance of construction.

3.8 Correspondence, Records & Reporting

3.8.1 The *Contractor* provides a complete record of all relevant communication and reports associated with all aspects of environmental management and implementation of this document. As a guide, the following records will be maintained:

- *Minutes and attendance record* of start-up meeting (onsite meeting prior to commencement of construction works). Attendance required by *Employer*, *Contractor,* ECoW and all other relevant personnel responsible for environmental management during the project.
- Weekly rolling **Environmental Risk Log** – this includes the following components:
  - Environmental Risk Log including look ahead activities with required mitigation (including weather forecasts), discussed and recorded at scheduled weekly construction meetings. This will cover all environmental sensitivities, including ecology, archaeology and water quality/drainage mitigation locations/measures;
- *Employers* and *Contractor Audit Reports* (according to respective corporate procedures).
- *Waste Management Records*, as defined in **Section 7** and **Appendix C** herein.
- *Water Quality Monitoring Records*, documenting the *Contractor's* visual checks of waterbodies and water quality monitoring as outlined in **Section 5**.
- *Licences and Consents* **-** copies of all permissions, consents, licenses and permits, including related correspondence.
- *General Correspondence* - all other relevant internal and external communication records relating to environmental management issues and implementation of the CEMP.

3.9 Site Induction

3.9.1 The *Contractor* ensures that all contractor employees, sub-contractors, suppliers, and other visitors to the site are made aware of the content of this document that is applicable to them. Accordingly, environmental specific induction training will be prepared and presented to all categories of personnel working and visiting the site.

3.9.2 As a minimum, the following information will be provided to all inductees:

- Identification of specific environmental risks associated with the work to be undertaken onsite by the inductee.
- Summary of the main environmental aspects of concern at the site:
  i. species and / or habitat protection requirements, e.g. ecological exclusion zones and contact details for the ECoW;
  ii. archaeological safeguarding measures, e.g. requirements for watching brief and contact details for the project ACoW;
  iii. pollution prevention and protection of the water environment (e.g. silt mitigation measures and refuelling);
  iv. waste management (including littering); and
  v. plant service and repair procedures, specifically service location and the disposal of waste oils and service components.
- Environmental Incident and Emergency Response Plan.

3.9.3 The *Contractor* provides an ***Environmental Risk Map*** illustrating environmentally sensitive areas and potential sources of pollution (e.g. water buffers, refuelling areas, location of spill kits, fuel tanks etc.). The *Environmental Risk Map* will be used during the induction and prominently displayed in the compound areas. In consultation with the ECoW, the *Contractor* updates the map as required. In accordance with **Section 3.10**, any update will trigger a toolbox talk to clearly communicate the change and offer opportunity for any necessary clarifications.

3.10 Training and Toolbox Talks

3.10.1 During construction, in order to provide on-going reinforcement and awareness training, the above topics, along with any other environmental issues which arise onsite, will be discussed at regular toolbox talks.

3.10.2 Toolbox talks and training will be delivered by specialist personnel onsite (e.g. ECoW) as required.

3.10.3 The *Contractor* submits a **schedule for toolbox talks** at least one week prior to commencement of works. The proposed schedule – to be considered as a live document - shall be consistent with the programme of works. Additional toolbox talks shall be added as required based on circumstances such as unforeseen risks, repeated observation of bad practices, perceived lack of awareness, pollution event, etc.

3.10.4 Specifically, the *Contractor* provides, as a minimum, the following environmental training by competent staff/contractors:

- Training on the use of spill kits (on ground and in surface waters), to be provided on a regular basis (to account for staff/subcontractor changes etc);
- Training on silt mitigation e.g. installation of silt fencing etc., silt mitigation measures to relevant construction / site staff; and

3.10.5 Other toolbox talk topics will include but are not necessarily limited to the following:

- Material handling, including: excavation, segregation, storage and reuse/disposal of excavated materials;

- Groundwater and surface water, including: managing surface water ingress into excavations, dewatering excavations, managing pumped water and identifying and treating contaminated groundwater or surface water;
- Waste management, including waste storage, waste segregation and littering;
- Control of fuel and refuelling, and fuel handling procedures;
- Surface water run-off, drainage control and silt mitigation; and
- Ecologically and archaeologically sensitive areas.

3.10.6 The *Contractor* maintains records of all toolbox talks and training and makes these records available to the *Employer* if requested.

3.11 Environmental Audits

3.11.1 The *Contractor* undertakes a programme of environmental audits, including audits of his sub-contractors, on a quarterly basis and provides an audit report to the *Employer* within 2 weeks of the audit being undertaken.

3.11.2 Environmental audits may be completed at any time by the *Employer,* but at least one per quarter. The *Contractor* maintains a record of all completed audit forms, and records of corrective action and close outs.

3.11.3 The *Contractor* undertakes environmental inspections on a daily and weekly basis (refer to individual Sections) and provides relevant records to the *Employer* when and as requested.

3.12 Risk Assessment and Method Statements

3.12.1 The *Contractor* provides risk assessments and method statements (RAMS) for all works and tasks prior to these being undertaken. These documents take into account and address all of the environmental aspects of the planned works and will include proposed mitigation measures, provided to the ECoW at least one week in advance of such works starting.

3.13 Notice Boards

3.13.1 The *Contractor* provides and maintains project environmental notice board(s) which are positioned to ensure that all operatives have the opportunity to review a notice board on a daily basis. As a minimum this will include one notice board in each of the site compounds.

3.13.2 The environmental notice boards are maintained by the *Contractor* and will be updated at least monthly. As a minimum, the notice boards contain:

- Description of the key environmental risks and intended risk mitigation measures, together with accompanying Environmental Risk Map illustrating the location of the key risks and required exclusion zones / buffer zones and location of emergency response equipment, and
- Key contact numbers and responsible personnel identified within the Environmental Incident and Emergency Response Plan (EIERP, refer to **Section 6**).

TABLE 3.1
CONTACTS SHEET
(Table to be completed by *Employer* and *Contractor* prior to commencement. This table will be updated and kept current by the *Contractor* for the duration of the Contract)

COMPANY	POSITION	NAME	TEL / MOBILE NO.	E-ADDRESS
Sure Partners Limited	Project Manager	TBC		
Sure Partners Limited	Construction Manager	TBC		
Sure Partners Limited	Site Supervisor	TBC		
Sure Partners Limited	Community Engagement Manager	TBC		
Sure Partners Limited	SPL Civil Engineer	TBC		
Contractor – tbc	Contractor's Project Manager	TBC		
Contractor – tbc	Site Agent	TBC		
Contractor – tbc	Foreman	TBC		
Contractor – tbc	Environmental Manager	TBC		
Contractor – tbc	Geotechnical Engineer	TBC		
Contractor – tbc	Community Liaison Officer	TBC		
TBC	Environmental Clerk of Works (ECoW)	TBC		
TBC	Archaeological Consultant	TBC		
Wicklow County Council		TBC		
National Parks and Wildlife Service (NPWS)		TBC		
Inland Fisheries Ireland IFI		TBC		
Specialist Emergency Contractor (specify)	TBC	TBC		

TABLE 3.2
MAIN TASKS AND RESPONSIBILITIES – CONSTRUCTION PHASE

Task	*Contractor*							Employer				ECoW	Visitors
	Project Manager	Site Agent	Site Foreman	Environmental Manager	Geotechnical Engineer	Community Liaison Officer	Sub-Contractors	Project Manager	Construction Manager	Community Engagement Manager	Site Supervisor		
Provide information (in accordance with contractual timelines)	☑												
Start Up Meeting	✓	×	×	×	×	×	(×)	☑	✓	×	×	×	
Site Inductions	☑	✓	×	✓	×		×	(×)	×		(×)	✓	×
Obtaining all relevant permissions, consents, licenses and permits	☑			✓								✓	
Weekly progress meetings including *Contractor*, *Employer*, Geotechnical Engineer, Environmental Specialist/Manager/Engineer) updates/issues	☑	×	(×)	✓	(×)	(×)	(×)	(×)	×	(×)	✓	✓	
Monthly or weekly Environmental Log / Report												☑	
Liaison with regulator / statutory consultees	☑			✓					✓			✓	
Liaison with neighbours, Garda and Wicklow County Council						☑				☑			
Environmental checks and monitoring (e.g. dust, oils and chemicals storage, drainage mitigation, waste management, plant etc)	✓	☑	☑	✓	✓		✓		✓		✓	☑	
Environmental monitoring and analysis (Water Quality Monitoring Plan)		✓		✓								✓	
Ecological inspections and monitoring and compliance checks	✓	✓	✓				✓					☑	
Record keeping (e.g. waste documentation, licences, training, incidents, mitigation designs, material, waste and risk registers etc)	☑			✓	✓			☑	✓		✓	☑	
Environmental audits / inspections	✓			☑								☑	
Communicating environmental observations and suggested improvements	☑			✓		☑	☑	☑	☑	☑	☑		☑

KEY:

☑	Lead / Responsible (may apply to several roles)
✓	Provide support (may apply to several roles)
×	Attend / take action (may apply to several roles)
(×)	Optional / as required

Note: This table details the main tasks / responsibilities. Following agreement between the *Employer*, the *Contractor,* tasks/responsibilities may be re-assigned.

4 COMMUNITY LIAISON PLAN

4.1 Community Liaison Plan

4.1.1 SPL recognises the importance of effective community liaison in order to ensure public safety and welfare during the works, to reduce nuisance to residents and the local community, and to help ensure the smooth running of construction activities. To this end, this Community Liaison Plan has been prepared. The purpose of this plan is to ensure good relations with the neighbouring community. Key aims of the Plan are to:

- Provide frequent and timely information to the public during the construction phase, (particularly to nearby residents and building occupants);
- Provide the correct points of contact and be responsive to queries and complaints; and
- Ensure good housekeeping in all aspects of the operations on site to minimise nuisance.

4.1.2 The contractor will take all reasonable steps to engage with stakeholders in the local community, focusing on those who may be affected by the construction works including nearby residents, businesses, community resources and specific vulnerable groups.

4.1.3 Communication with the local community, Wicklow County Council and other relevant stakeholders will be undertaken at an appropriate level and frequency throughout construction. The *Employer* appointed Community Engagement Manager will be involved throughout and will work with the Contractors Community Liaison Officer on all aspects of community engagement. The Community Liaison Plan will be updated by the contractor prior to construction, in consultation with the Community Engagement Manager, and will specify obligations in relation to community and stakeholder engagement that the contractor must adhere to. Where communications are related to environmental issues, the environmental manager will be involved, if appropriate.

4.1.4 A significant part of the plan is the ‘good neighbour’ policy. Key aspects of this policy include:

- Implementation of the policy from the commencement of construction;
- Providing a point of contact for queries and complaints;
- Minimising causes of nuisance;
- Maintaining access to neighbouring premises;
- Clear and concise information, distributed widely and updated frequently; and
- Undertaking timely liaison with stakeholders.

4.1.5 With regard to liaison, the contractor will be required to comply with the Plan and develop it further with additional information, which will include providing the details of how the local community, road users and affected residents will be notified in advance of the scheduling of major works, the temporary traffic diversions and the progress of the construction works.

4.1.6 Details of the available communication channels/points of contact for members of the public to contact the project team during construction will be established in advance of the commencement of construction and displayed around working areas. The contractor’s additional details will include the following:

- Contractor’s community relations policy;
- Personnel nominated to manage community relations;
- A methodology for processing observations, queries and complaints from the general public, relevant authorities, the media and emergency services; and
- The strategy for project-wide liaison with all relevant parties.

4.1.7 The contact details for the Community Liaison Officer will be posted on all construction site notice boards and on any other information or correspondence, which may be distributed from time to time.

4.2 Advance Notice of Works

4.2.1 The contractor will ensure that local residents, businesses, occupiers, general users of the area and stakeholders are informed in advance of construction activities that may affect them. The contractor's detailed procedures and the responsible personnel will be identified in the CEMP, when it is updated by the contractor prior to construction.

4.2.2 All notifications will detail the nature of the works, estimated duration and working hours. All notifications will include a project-specific contact number to which any enquires can be directed. The contractor will be responsible for preparing and issuing the notifications subject to the relevant approval and consents.

4.3 Enquiries and Complaints

4.3.1 The contractor will establish a process for handling all enquires including complaints. All enquires will be recorded and a log will be maintained to include details of the response and action taken. The log will be available for inspection if requested by Wicklow County Council. All observations, queries and complaints will be dealt with in a timely manner.

4.3.2 The *Employer*, including the Community Engagement Manager, Environmental Manager and ECoW will be immediately informed of any environmental-related issues that have been raised. The environmental manager will be responsible for informing Wicklow County Council, relevant stakeholders and statutory bodies, as appropriate, about such issues.

5 GENERAL SITE MANAGEMENT AND POLLUTION PREVENTION & MITIGATION

5.1 Responsibility

5.1.1 The *Contractor* is responsible for pollution prevention for the duration of the contract and until such time as permanent measures, such as permanent drainage and silt mitigation controls, are deemed to be adequate and appropriately constructed.

5.1.2 The *Contractor* ensures that all staff and subcontractors working on site will be familiar with pollution prevention and mitigation measures as detailed in this document. This includes subcontractors, *Employer's* direct contractors and other *Employer's* representatives working on the site.

5.1.3 It is the responsibility of the *Contractor* to contact the relevant statutory and non-statutory bodies e.g. Inland Fisheries Ireland (IFI), and stakeholders in the vicinity of and downstream of the proposed development, so that the requirements and interests of these parties are adhered to and protected throughout the duration of the Contract.

5.1.4 Prior to works commencing on site, the *Contractor* prepares a **Pollution Prevention Plan (PPP)** in line with the **below requirements** (as a minimum) and communicates the contents to all staff (induction / toolbox talks). The PPP covers all potentially polluting activities, taking into account good practice standards[1]. The *Contractor* provides the PPP to the *Employer* prior to start of works on site.

5.1.5 The *Contractor* monitors adherence to the plan throughout the works. The *Contractor* communicates the PPP and any changes/updates of the PPP to all personnel on site.

5.2 Good Housekeeping and General Pollution Prevention Measures

5.2.1 The *Contractor* will ensure "good housekeeping" at all times. The following points (not exhaustive) indicate general pollution prevention measures in accordance with published guidance (**Section 13**) and project commitments. Pollution prevention measures relating to specific tasks are also detailed in the respective sections of this document.

5.2.2 This will include, but not necessarily be limited to, the following measures:

5.2.3 General maintenance of working areas and cleanliness of welfare facilities and storage areas;

5.2.4 Provision of site layout map showing key areas such as first aid posts, spill kits, material and waste storage and welfare facilities;

5.2.5 Maintaining all plant, material and equipment required to complete the construction work in good order, clean, and tidy;

5.2.6 Keeping construction compounds, access routes and designated parking areas free and clear of excess dirt, rubbish piles, scrap wood, etc. at all times;

5.2.7 Provision of signs giving details of site management contact numbers, including out of hours, and public information at the boundaries of the working areas;

5.2.8 Provision of adequate welfare facilities for site personnel;

[1] Refer to Section 13 for relevant documents

5.2.9 Installation of appropriate security, lighting, fencing and hoarding at each working area;

5.2.10 Effective prevention of oil, grease or other objectionable matter being discharged from any working area;

5.2.11 Provision of appropriate waste management at each working area and regular collections to be arranged;

5.2.12 Prevention of infestation from pests or vermin including arrangements for regular disposal of food and material attractive to pests. If infestation occurs the *Contractor* will take appropriate action to eliminate and prevent further occurrence;

5.2.13 Maintenance of wheel washing facilities and other contaminant measures as required in each working area;

5.2.14 No discharge of site runoff or water discharge without agreement of the relevant authorities;

5.2.15 Prohibition of open fires at all times;

5.2.16 Use of less intrusive noise alarms, which meet the safety requirements, such as broadband reversing warnings, or proximity sensors to reduce the requirement for traditional reversing alarms;

5.2.17 Maintenance of public rights of way, diversions and entry/ exit areas around working areas for pedestrians and cyclists where practicable and to achieve inclusive access;

5.2.18 All loading and unloading of vehicles will take place off the public highway wherever this is practicable; and

5.2.19 Material handling and/or stockpiling of materials, where permitted, will be appropriately located to minimise exposure to wind. Water misting or sprays shall be used as required if particularly dusty activities are necessary during dry or windy periods.

5.3 Hours of Work

5.3.1 The core construction working hours for the proposed development will be:

- 7am to 7pm from Monday to Saturday; with the potential for some works taking place outside these hours, including:
    - Equipment lifts over the Arklow to Gorey rail line near the substation site for health and safety and Irish Rail compliance purposes;
    - HDD works will occur 24 hours a day, 7 days a week as required; and
    - Commissioning and pre-commissioning may also take place 24 hours per day, seven days per week

5.3.2 All rock breaking/fracturing activities, pile driving and breaking out of existing concrete will be undertaken during daytime hours. The removal of waste material off site by road and regular deliveries to site will, where appropriate, be generally confined to outside of peak traffic hours.

5.3.3 The *Contractor* may require a period of up to one hour before and one hour after core working hours for start-up and shut down activities in working areas. Activities permitted may include deliveries and unloading of materials, movement of staff to their place of work, maintenance and general preparation works. Excepted as noted in **Section 5.3.4** below, the use of plant or machinery likely to cause disturbance, other than for HDD works, will not be permitted outside of the core working hours.

5.3.4 It may be necessary, for example, due to weather constraints, specialist subcontractor availability or the nature of the activity, to undertake certain activities outside of the construction core working hours. Any construction outside of the construction core working hours will be agreed by the *Contractor* in advance with Wicklow County Council and scheduling of such works will have regard to nearby sensitive receptors, who will be notified in advance.

5.3.5 In the case of work outside of the core working hours required in an emergency or which if not completed would result in an unsafe or harmful situation for workers, the public or local environment, Wicklow County Council will be informed as soon as reasonably practicable of the reasons and likely duration and timing.

5.4 Site Security

5.4.1 The security of the works areas will be the responsibility of the *Contractor* who will provide adequate security to prevent unauthorised entry to or exit from any working areas. The following measures may be used to prevent unauthorised access:

- Installation CCTV and alarm systems where required;
- CCTV and security systems will be sited and directed so that they do not intrude into occupied residential properties;
- Provision of adequate security guards and patrols;
- When there is no activity on site, site gates will be closed and locked and appropriate site security provisions;
- Consultation with neighbouring properties and local crime prevention officers including Wicklow County Council and An Garda Síochána on site security matters as required; and
- Prevention of access to restricted areas and neighbouring properties by securing equipment on site such as scaffolding and ladders.

5.5 Hoarding and Fencing

5.5.1 A site boundary in the form of temporary hoarding will be established around each of the temporary construction compounds with hoarding or fencing used around each of the working areas. These will be established before any significant construction activity commences.

5.5.2 For the temporary construction compounds (HDD, substation and temporary cable construction compounds), the hoarding will be generally be a minimum 2m high in order to provide a secure boundary to prevent unauthorised access and delineate the works.

5.5.3 The hoarding will be typical of that used on most construction sites. Mounting posts will be erected by using a mini-digger and the posts will be set in concrete. Other working areas and site access routes will typically use a mix of fencing and other appropriate safety barriers, as these types can be more readily re-configured and re-used between working areas as the construction activities progress.

5.5.4 The following measures will be applied in relation to hoarding and fencing:

- Adequate fencing and hoardings will be installed to prevent unwanted access to temporary compounds and working areas and provide noise attenuation, screening, and site security where required;

- Appropriate sight lines/visibility splays will be maintained around accesses to temporary compounds and working areas from the public road to ensure safety of both vehicles and pedestrians is preserved;
- Temporary fences may be used in certain areas, such as for short term occupation of working areas;
- Display information boards will be provided with out of hours contact details, a telephone helpline number for comments/complaints and information on the works;
- Notices to warn of hazards on site such as deep excavations, construction access will be installed on site boundaries; and
- Hoarding and fencing will be maintained free of graffiti or posters;

5.5.5 Notwithstanding the fencing and hoarding, existing walls, fences, hedges and earth banks will be retained, where feasible. Additional fencing will be provided for tree protection where required.

5.6 Services and Lighting

5.6.1 Services and Utilities – site services will be installed as part of the enabling works in parallel with the rearrangement and diversion of existing utilities. Working areas will be powered preferably by mains supplies and by diesel generators where an electrical supply is not available.

5.6.2 The *Employer* will require the *Contractor* to put measures in place to ensure that there are no interruptions to existing services unless this has been agreed in advance with the relevant service provider.

5.6.3 Lighting – site lighting will typically be provided by tower mounted temporary portable construction floodlights. The floodlights will be cowled and angled downwards to minimise spillage to surrounding properties. The following measures will be applied in relation to site lighting:

- Lighting will be provided with the minimum luminosity sufficient for safety and security purposes. Where practicable, precautions will be taken to avoid shadows cast by the site hoarding on surrounding footpaths, roads and amenity areas;
- Motion sensor lighting and low energy consumption fittings will be installed to reduce usage and energy consumption; and
- Lighting will be positioned and directed so that it does not to unnecessarily intrude on adjacent buildings and land uses, ecological receptors and structures used by protected species, nor cause distraction or confusion to motorists.
- Refer also to **Section 10.4** below in relation to lighting.

5.6.4 Welfare Facilities - welfare facilities will be provided, as appropriate, for construction staff and site personnel including locker rooms, drying rooms, toilets and showers. The welfare facilities will be located at the temporary construction compounds and works areas.

5.6.5 Drinking Water - potable water will be supplied from Irish Water mains where available. If not, potable water will be either transported via tanker to site or via large bottles. Typically, one delivery each week will be required for the provision of potable water.

5.6.6 Grey Water - grey water for non-drinking purposes (construction and toilets) will be sourced via rainfall collection or transported via tanker to site.

5.6.7 Wastewater - sanitary wastewater will be collected and stored on site in holding tanks, which will be emptied on a regular basis (typically bi-weekly) by licensed contractors and disposed of appropriately.

5.6.8 Wheel Wash - where a wheel wash is installed, this will be located on impermeable surface, and water will be passed through a silt buster or other appropriate surface water management mechanism. Alternatively, a “dry” wheel wash will be used, which relies on mechanical vibration of the vehicle wheels and chassis to loosen and remove mud and debris.

5.6.9 Deliveries to Site - deliveries of materials will be planned and programmed to ensure that the materials are delivered only as they are required at the working areas. Storage of material will be at the supplier premises or at the temporary construction compound, depending on the type of material.

5.6.10 Works requiring multiple vehicle deliveries, such as concrete pours, will be planned so as to ensure queuing on the public roads around the working areas will be avoided as far as is practical.

5.6.1 The removal of waste material off site by road and regular deliveries to site will, where appropriate, be generally confined to outside of peak traffic hours.

5.7 Reinstatement of Working Areas on Completion

5.7.1 The *Contractor* will reinstate all working areas and access routes as work proceeds during construction. All plant, equipment, materials, temporary infrastructure and vehicles will be removed at the earliest opportunity and the surface of the ground restored as near as practicable to its original condition.

5.7.2 Following the excavations required for the cable route along with all other associated works during construction, the temporary cable construction corridor will be reinstated to its original condition as far as practicable with the replacement of excavated materials where appropriate. If the excavated materials are not suitable for re-use, then equivalent materials may be imported for reinstatement. Acceptable materials for import may include materials classified as by products from excavations in natural soils under Regulation 15 of S.I. No. 323/2020 – European Union (Waste Directive) Regulations 2020.

5.8 Fuels and Oils

5.8.1 The *Contractor* prepares and adheres to a **Fuel Management Protocol** in line with the below requirements (as a minimum) and communicates the contents to all staff (induction / toolbox talks).

5.8.2 The *Contractor* will provide secure oil, fuel and chemical storage in over-ground bunded areas, limited to the minimum volume required to serve immediate needs with specified delivery and refuelling areas;

5.8.3 No refuelling or fuel storage within 50m of waterways and only on a sealed surface;

5.8.4 Emergency spill kits will be retained onsite at sensitive locations, with portable kits provided to plant and equipment operators; A detailed spillage procedure, as part of the Environmental Incident and Emergency Response Plan, will be put in place and all staff on site will be trained with respect to the relevant procedures to be undertaken in the event of the release of any sediment, hydrocarbons into a watercourse. In the event of spillage of any polluting substance and/or pollution of a watercourse, Wicklow County Council, Inland Fisheries Ireland and the NPWS shall be notified. A set of standardised emergency response procedures will govern the management of emergency incidents, see Environmental Incident and Emergency Response Plan in **Section 6**.

5.8.5 The *Contractor* ensures that:

- Fuel containers are stored within a secondary containment system e.g. bund to 110% of volume for static tanks or a drip tray for mobile stores;
- Ancillary equipment such as hoses, pipes are contained within the bund;
- Fuel and oil stores including tanks and drums are regularly inspected for leaks and signs of damage;
- Only designated trained operators are authorised to refuel plant on site;
- Procedures and contingency plans are set up to deal with emergency accidents or spills;

5.8.6 All ancillary fuel pipes on plant, outlets at fuel tanks etc. will be regularly checked and maintained to ensure their good state-of-repair and that no drips or leaks to ground occur. The following precautions will also be installed on fuel delivery pipes:

- Any flexible pipe, tap or valve must be fitted with a lock where it leaves the container and be locked when not in use.
- Flexible delivery pipes must be fitted with manually operated pumps or a valve at the delivery end that closes automatically when not in use. Any leaking oil from ancillary pipework must be held within secondary containment.
- The pump or valve must have a lock and be locked when not in use.
- Warning notices including “No smoking” and “Close valves when not in use” shall also be displayed.

5.8.7 Irrespective of the location of refuelling onsite, **interceptor drip trays** (or similar, e.g. plant nappies, – open metal drip trays are not acceptable) shall be available and used during all refuelling operations. Interceptor drip trays will be positioned under any stationary mobile plant to prevent oil contamination of the ground surface or water. Plant and site vehicles are to be well maintained and any vehicles leaking fluids must be repaired or removed from site immediately. Any servicing operations shall take place over drip trays.

5.8.8 Plant, site vehicles and machinery shall be checked daily and are to be well-maintained. Any machinery leaking fluids must be repaired or removed from site immediately. Any servicing operations shall take place at least 50m from watercourses (unless servicing is required at the point of breakdown) and over interceptor drip trays.

5.8.9 The *Contractor* identifies a specialist clean-up contractor (see **Table 3.1**) to engage with in the case of a significant pollution event on site. Details of the specialist contractor will be provided to the *Employer* prior to works commencing on site. Details of the specialist contractor will be included in the Environmental Incident and Emergency Response Plan (**Section 6**).

5.9 Suspended Sediment and Adverse Weather

5.9.1 The *Contractor* shall ensure that all works are in accordance with Construction Industry Research and Information Association (CIRIA) guidance – Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors (Masters-Williams et al, 2001).

5.9.2 To minimise the potential for elevated silt levels in surface water run-off, the working area used during construction will be clearly outlined prior to the commencement of works and will be kept to the minimum area necessary to effectively complete the works. Vegetation will be retained where possible.

5.9.3 Rainfall and associated surface run-off readily mobilise sediment and silt when draining through areas of construction. The *Contractor* ensures that untreated construction run-off is prevented from flowing into watercourses.

5.9.4 The *Contractor* shall ensure that no materials will be stored in flood plains or in areas which would impede flood flow paths;

5.9.5 Earthworks operations shall be carried out such that surfaces shall be designed with adequate falls, profiling and drainage to promote safe run-off and prevent ponding and flooding;

5.9.6 Silt traps will be employed and maintained in appropriate locations;

5.9.7 Temporary interception bunds and drainage ditches will be constructed up slope of excavations to minimise surface runoff ingress and in advance of excavation activities;

5.9.8 Excavation and earthworks will be suspended during and immediately following periods of heavy rainfall to minimise sediment generation and soil damage;

5.9.9 For the cable route, the only section of trench that will be open is that which is being excavated and in which ducts are being installed. Excavated cable trenches will be backfilled as the works progress, as soon as installation is complete, and any cement bound surround material has cured sufficiently;

5.9.10 Any groundwater or rainwater that collects in a cable trench will be pumped to locations agreed with the landowners and local authorities. Typically, this will be onto adjacent land, not directly into waterways, and through a filter medium, to avoid the build-up of silt, as some granular material will, inevitably, be pumped out with the water. The pump flowrates will match that of the water flowing into the trench, as it must be kept generally free of water. A single pump with a 75mm hose will usually be adequate to deal with rainwater running into a trench. A similar arrangement will apply at joint bays, where a sump will be cast into the concrete base for a pump.

5.9.11 At the landfall, if field drains are temporarily diverted, the *Contractor* shall put in place facilities to over pump the water into a settlement pond to limit silt discharge into the field drain downstream;

5.9.12 All works will be closely monitored and will be enclosed by silt barriers (e.g. straw or silt fence) to prevent any runoff into surface water bodies.

5.9.13 Silt pollution caused by working in surface water will be minimised or prevented by keeping water out of the works area using appropriate isolation techniques, such as cofferdams, flume pipes and by-pass channels.

5.9.14 **Adverse weather** (rainfall, snowmelt) may result in increased sediment run-off and pollution of watercourses. Weather warnings will be monitored during construction to ensure that there is no flood risk to construction workers installing the cable ducts. A risk assessment will be carried out in the case of a weather warning to determine what works can proceed, and what works need to be postponed;

5.9.15 The requirement to temporarily suspend aspects of the *works* can be enforced by the *Contractor*, the ECoW or the *Employe*r.

5.10 Concrete

5.10.1 All concrete mixing and batching activities will be located in areas away from watercourses and drains;

5.10.2 Concreting works will be carried out in dry conditions where possible and concrete works will be strictly controlled and monitored; and

5.10.3 No concrete washout will be allowed to discharge to watercourses. Wash out of concrete trucks will only be permitted where the *Contractor* has provided a designated, suitably prepared wash-out area.

5.11 HDD Operations and Frac-Out Contingency Measures

5.11.1 The *Contractor* shall implement a number of specific measures with respect to HDD operations at the landfall and the relevant crossings along the cable route, as detailed below.

5.11.2 Any groundwater or rainwater that collects in the HDD drilling pit will be pumped away. Then it will be discharged onto the adjacent land, not directly into a waterway, and through a filter medium. This will avoid the build-up of silt, as some granular material will, inevitably, be pumped out with the water from the trench.

5.11.3 The *Contractor* and the ECoW will monitor weather conditions as detailed in **Section 5.9.14** and will carry out daily inspections of the mud pit to ensure the volume of the mud pit does not ‘overtop’ to the surrounding land. Where required, measures such as pumping to secure containment will be used where required to prevent overtopping.

5.11.4 Any bentonite (or similar HDD drilling head lubrication material) will be handled and removed by the drilling contractor. The volume of bentonite (or similar material) will be determined by the ground conditions encountered and length of HDD. Typically for a land-based HDD rig, the volume of bentonite would be approximately 10m^3 per HDD bore, and for the landfall and M11 HDD rig, the volume of bentonite would be approximately 22.5m^3 per HDD bore.

5.11.5 Any bentonite (or similar HDD drilling head lubrication material) will be handled and removed by the drilling contractor. Typically, bentonite is used, which comprises 95% water and 5% bentonite clay which is a non-toxic, natural substance. HDD will be a closed system, with drilling fluid recirculated, the drill cuttings recovered, and drilling fluid reused;

5.11.6 In order to eliminate the migration of drilling fluids through the subsurface to waterbodies the following measures will be employed:

- Drilling pressures will be closely monitored and not exceed those needed to penetrate the formation.
- Exit and entry points for the HDD on land (exit point for landfall HDD is on seabed) will be enclosed by silt barriers (e.g. straw or silt fence) to prevent any runoff into surface water bodies.
- If pressure drops during drilling or if there is a lack of returns the drilling will stop immediately to allow an assessment of a potential leakage of drilling fluid into the surrounding formation. A leak stopping compound, such as mica, may be used to prevent the leak from migrating further into the formation. If the leak stopping compound is not successful, the drilling direction may need to change to avoid the area where the leak occurred.

5.11.7 While the bentonite drilling fluid is non-toxic and can be commonly used in farming practices, if sufficient quantity enters a watercourse it can potentially settle on the bottom, smothering benthic flora and affecting faunal feeding and breeding sites. The drilling contractor will develop a location specific HDD frac-out contingency plan, detailing measures to be taken to reduce the risk of bentonite breakout and measures to be taken for the protection of sensitive ecological receptors, should a breakout occur.

5.11.8 A typical procedure for managing a breakout or frac-out on land would include:

- Stop drilling immediately;
- Contain the bentonite by constructing a bund e.g. using sandbags;
- Recover the bentonite from the bund by pumping to a suitable container or back to the entry pit for recycling;
- If necessary, inert and non-toxic lost circulation material (mica) will be pumped into the bore profile, which will swell and plug any fissures;
- The area will be monitored closely to determine if the breakout has been sealed;
- Check and monitor mud volumes and pressures as the works recommence.

5.11.9 A typical procedure for managing a breakout or frac-out under water would include:

- Stop drilling immediately;
- Pump lost circulation material (mica), which will swell and plug any fissures;
- Check and monitor mud volumes and pressures as the works recommence;
- Repeat process as necessary until the breakout has been sealed.

5.11.10 Any bentonite will be managed and removed by the specialist drilling contractor on completion of the operation. Water will be brought to site in tankers (to make up drilling fluid) for lubrication of the bore and to provide the requisite volumes of water to the compound. The water used will be non-saline and non-potable water.

5.11.11 The total volume of water required is estimated to be up to 450m^3 for each HDD bore at the landfall and M11 HDD, and 200m^3 for each HDD bore at the R772 HDD, assuming full drilling fluid returns are maintained. On completion of the operation the drill fluid will be disposed of to an appropriately licensed facility.

5.12 Noise

5.12.1 Noise and vibration will be minimised through the adoption of good industry practice as standard working practices across the site to ensure that noise and vibration are reduced whenever practicable. The following provisions, although not exhaustive, will be adhered to where practicable throughout the construction programme:

5.12.2 Vehicles and mechanical plant used for the purpose of the works will be fitted with effective exhaust silencers, maintained in good and efficient working order, and operated in such a manner as to minimise noise emissions. The *Contractor* will ensure that all plant complies with the relevant statutory requirements;

5.12.3 Machines in intermittent use will be shut down or throttled down to a minimum when not in use;

5.12.4 Compressors will be fitted with properly lined and sealed acoustic covers which will be kept closed whenever in use. Pneumatic percussive tools will be fitted with mufflers or silencers;

5.12.5 Equipment which breaks concrete, brickwork or masonry by bending, bursting or "nibbling" will be used in preference to percussive tools. Where possible, the use of impact tools will be avoided where the site is close to occupied premises;

5.12.6 Rotary drills and bursters activated by hydraulic, chemical, or electrical power will be used for excavating hard or extrusive material;

5.12.7 Wherever possible, equipment powered by mains electricity will be used in preference to equipment powered by internal combustion engine or locally generated electricity;

5.12.8 No part of the works nor any maintenance of plant will be carried out in such a manner as to cause unnecessary noise except in the case of an emergency when the work is absolutely necessary for the saving of life or property or the safety of the works;

5.12.9 Plant will be maintained in good working order so that extraneous noise from mechanical vibration, creaking and squeaking is kept to a minimum; and

5.12.10 Noise emitting machinery which is required to run continuously will be housed in a suitable acoustically lined enclosure.

5.12.11 Monitoring of noise levels at the construction site boundary will be undertaken to identify where work procedures need to be modified. In the event of a valid complaint a noise monitoring protocol will be submitted to Wicklow County Council prior to commencement of any noise monitoring. The protocol will include details of:

- A description of the complaint;
- Construction activities taking place at the time of the complaint;
- Noise monitoring methodology and results; and
- Any actions taken.

5.12.12 Prior to construction works being undertaken, liaison will be undertaken with occupiers of sensitive receptors that may be adversely affected by construction noise and vibration. Providing information on the timing and durations of construction works at night and why they are required to be undertaken at night can reduce adverse effects. All communications will contain contact details to direct any questions or complaints to.

5.13 Dust

5.13.1 The *Contractor* will implement the Community Liaison Plan, that includes community engagement, before work commences on site.

5.13.2 The *Contractor* shall record all dust and air quality incidents, complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.

5.13.3 The *Contractor* shall hold regular liaison meetings with other construction sites within 500m to the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised.

5.13.4 The *Contractor* will undertake on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to Wicklow County Council on request. The frequency of the inspections will be increased during site activities with a high potential to produce dust are being carried out.

5.13.5 The *Contractor* ensures an adequate supply of water for dust suppression. Where applicable, the *Contractor* is responsible for following statutory guidance and/or obtaining necessary permissions for water for use in dust suppression. The water supply for dust suppression will be defined by the *Contractor*. The *Contractor* utilises water spraying for dust suppression on site as required[2]. The *Contractor* obtains all necessary permits and licences as required the supply of water for the purposes of dust suppression on site.

5.13.1 The *Contractor* ensures no mud or debris accumulates on the public road and the *Contractor* cleans the public road of any mud, dust or debris by suitable means. Water-assisted dust sweeper(s) are to be used on the access and local roads, to remove, as necessary, any material tracked out of the site.

5.13.2 The *Contractor* shall ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport and shall implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).

5.13.3 In relation to the substation and the remediation strategy proposed, the *Contractor* shall ensure that dust generation and dermal exposure during site construction works, until the made ground is capped, will be controlled by appropriate dust control measures e.g. water sprays and suitable personal protective equipment. Where the asphalt layer is being removed, this will occur in phases and the asphalt will be replaced with granular fill as soon as possible to prevent the generation of windblown dust.

5.13.4 To minimise the generation of dust emissions to air, the *Contractor* implements the following measures:

- Prepare and maintain the site appropriately, planning site layout so that machinery and dust causing activities are located away from receptors, as far as possible
- Erect a 2m minimum site hoarding around construction compounds
- Keep site fencing, barriers and scaffolding clean using wet methods
- Cover, seed or fence stockpiles to prevent wind whipping.

[2] https://www.hse.gov.uk/copd/casestudies/dustsuppresion.htm

- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation.
- Use enclosed chutes and conveyors and covered skips
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate
- Ensure equipment and spill kits are readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods
- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable
- Only remove the cover in small areas during work and not all at once
- Completes regular equipment checks, including the inspection of relevant plant and vehicle parts to ensure they are maintained in a good state of repair and are fitted with appropriate dust suppressant measures (e.g. water supply for cutting tools etc.).
- Access gates to be located at least 10m from receptors where possible.
- Ensures all material (especially fine-powders, e.g. cement) are appropriately contained and stored.

5.14 Hazardous Materials

5.14.1 At the substation, the *Contractor* will undertake surveys to identify the risk of asbestos on site. Although unlikely, given ground investigations to date, if asbestos is uncovered on site during construction, it will be double-bagged and removed from site by a competent contractor and disposed of in accordance with the relevant procedures and legislation.

5.14.2 The *Contractor* is responsible for ensuring that any hazardous materials (e.g. fuels, oils, paints, chemicals, cement bound granular mixtures etc.) brought to site are accompanied by a Safety Data Sheet (SDS)[3].

5.14.3 The *Contractor* is responsible for carrying out a risk assessment of each substance and ensuring that all appropriate storage, protective equipment and if necessary, emergency procedures are put in place on site as required by the SDS, the risk assessment and relevant regulations (COSHH Regs, Control of Substances Hazardous to Health).

5.14.4 All hazardous materials must be stored in appropriate containers, must be indelibly and legibly labelled to identify the contents, hazards and precautions required.

5.14.5 Hazardous materials on site must be stored in a bunded area and in accordance with the relevant Safety Data Sheet and risk assessment, which must be readily available and up to date.

5.14.6 Any spent (contaminated) spill kits, absorbent granules, sheets or fibres must be disposed of in accordance with relevant regulations and the Construction Waste Management Plan (see Appendix C).

[3] In accordance with REACH Regulation (Regulation (EC) No. 1907/2006)

5.15 Traffic

5.15.1 A Construction Traffic Management Plan (CTMP) has been prepared and is included in Appendix B. This CTMP will be updated by the *Contractor* prior to construction to take account of any specific consent conditions and requirements of the Planning Authority.The *Contractor* will agree the CTMP with Wicklow County Council and An Garda Síochána and will fully implement the CTMP.

5.16 Pollution Monitoring & Controls

5.16.1 The *Contractor* carries out regular (at least monthly) inspections of oil/fuel storage areas, plant and machinery, and the PPP. An inspection sheet together with information on inspection frequency and the relevant responsible *Contractor*'s representative for undertaking these inspections will be recorded by the *Contractor* and communicated to the *Employer* prior to commencement of the works.

5.16.2 Regular onsite meetings will be held to confirm the appropriate use of mitigation measures identified within the *Contractor*'s environmental documents relating to pollution control. These meetings will highlight any further issues / measures which may be relevant either prior to commencement or during the works.

5.16.3 Dust monitoring will be undertaken at the three nearest sensitive receptors (with agreement from the landowner) to the works during the construction phase. The TA Luft dust deposition limit values of 350 mg/m^2/day applied as a 30-day average.

5.16.4 Visual monitoring will be undertaken as part of the regular site audits during the construction of the proposed development to ensure existing surface water drainage runoff and natural infiltration to ground is not affected by the proposed development.

5.16.5 A monitoring regime/programme for water quality will be put in place. Turbidity monitoring will be carried out downstream, within 20m of the crossing, while works are underway at the Templerainy, Kilbride River and Johnstown North watercourse crossings to ensure that sediment levels are not significantly elevated above baseline levels.

5.16.6 The *Contractor* is required to monitor the weather forecasts to inform the programming of earthworks and stockpiling of materials. Particular regard will be given to trench excavations and other works which may be vulnerable to the generation or conveyance of run-off, and for the protection of site personnel, plant and equipment in flood prone areas.

5.16.7 All flood defence improvement works will be appropriately monitored and supervised and will be enclosed by silt barriers (e.g. straw or silt fence) to prevent any runoff into surface water bodies.

5.16.8 Monitoring requirements for noise and vibration are detailed in **Section 5.12** above.

6 ENVIRONMENTAL INCIDENT & EMERGENCY RESPONSE

6.1 General Requirements

6.1.1 The *Contractor* prepares a detailed **Environmental Incident and Emergency Response Plan (EIERP)**. The EIERP contains details of emergency scenarios and relevant procedures and actions that will apply.

6.1.2 The *Contractor* communicates the EIERP as part of the site induction to all staff and visitors.

6.1.3 The *Contractor* ensures the EIERP contains contact details of relevant staff and external authorities, e.g.

- Environmental Protection Agency (EPA) and EPA 24-hour emergency incident line 1890 33 55 99
- Inland Fisheries Ireland (IFI) and IFI 24-hour pollution line 1890 34 74 24
- Specialist clean-up contractor
- Emergency Services
- Local Authority Environmental Officers
- An Garda Síochána
- National Parks and Wildlife Services
- The Coast Guard

6.2 Safety and Environmental Awareness Reports (SEAR) and Environmental Auditing

6.2.1 The *Contractor* completes a SSE Safety and Environmental Awareness Report (SEAR) for all potential (near miss) or actual environmental incident or emergency which occurs on site.

6.3 Pollution/Spill Incident

6.3.1 The *Contractor* provides a 1-page Summary Sheet containing the key information for incidents response to be used as a quick reference for any on-site personnel witnessing an incident. A laminate copy of this Summary Sheet will be located with all plant / machinery / on-site vehicles. Key Information to be provided to the ***Project Manager*** **and the ECoW within 30 minutes** of an incident (irrespective of the scale / severity of the incident):

- E.g. What substance was spilled (Material Data Safety Sheet);
- Approximate volume and time of spillage;
- Accurate location of spill (GPS/grid reference or ID/number referenced on map etc.);
- All measures taken;
- Help required i.e. manpower, machinery, expert advice, disposal, etc. and,
- Whether the spill has reached a watercourse.

6.3.2 The *Contractor* shall, in updating the EIERP, consider the impacts of pollution/spill incidents during construction and shall identify the actions to be taken in the event of a pollution incident, including the following:

- Containment measures;
- Emergency discharge routes;
- List of appropriate equipment and clean-up materials;
- Maintenance schedule for equipment;
- Details of trained staff, location and provision for 24-hour cover;
- Details of staff responsibilities;
- Notification procedures to inform the relevant environmental protection authority;
- Audit and review schedule;
- Telephone numbers of statutory water undertakers and local water company; and
- List of specialist pollution clean-up companies and their telephone numbers.

6.4 Emergency Access

6.4.1 The *Contractor* will be required to maintain access routes for the emergency services in all work areas for the duration of the construction phase and to identify the emergency site access points to each work area.

6.4.2 These will be developed in consultation with the emergency services and documented by the *Contractor*, as part of the updated CEMP prior to construction commencing, as well as being identified in the updated EIERP.

6.5 Extreme Weather Events and Flood Risk

6.5.1 The *Contractor* will consider the impacts of extreme weather events, flood risk and related conditions during construction. The *Contractor* will be required to use the short to medium range weather forecasting service from Met Eireann, or other approved meteorological data and weather forecast provider, to inform short to medium term scheduling of the works, environmental controls and mitigation measures. Refer to **Section 5.9.14** above.

6.5.2 The updated CEMP will include appropriate contingency measures to manage extreme weather events (red weather warnings from Met Éireann), see also **Section 5.9.14**, including the suspension of work, where required. The measures will include training of personnel and prevention and monitoring arrangements for weather events. Where relevant risks have been identified, the detailed construction method statements will consider extreme weather events. For example, while the flood risk is very low at the substation site, appropriate contingency measures for construction works adjacent to the Avoca River will be identified.

6.6 Fire and Explosion Risk

6.6.1 Even though the fire and explosion risk during construction are very low, the updated CEMP will include appropriate contingency measures to manage such risks. The measures will include training of personnel in fire and explosion risk awareness, risk prevention and risk monitoring.

Portable fire extinguishers, suitable for the activities at the working area, checked and maintained in working order, will be available for use at each of the working areas. Potentially flammable or hazardous substances will be stored appropriately and quantities stored will be limited to the minimum volume required to meet the immediate requirements.

6.6.2 Appropriate site personnel will be trained as first aiders and fire marshals. Monitoring of site activities to minimise fire and explosion risk will be a key part of the duties of the site safety officer and fire marshals.

7 WASTE MANAGEMENT

7.1 Construction Waste Management Plan (CWMP)

7.1.1 A Construction Waste Management Plan has been prepared and is included in Appendix C. The *Contractor* will update this plan and implement in full.

8 SOIL MANAGEMENT MEASURES

8.1 Regulatory Compliance and General Measures

8.1.1 The *Contractor* shall ensure that the adopted construction techniques will comply with the requirements of statutory bodies (Wicklow County Council and EPA) and construction will be completed in full accordance with the measures set out in this CEMP.

8.1.2 Good construction management practices will be employed to minimise the risk of transmission of hazardous materials as well as pollution of adjacent watercourses and groundwater.

8.1.3 The construction management of the site will take account of the recommendations of the CIRIA guidance Control of Water Pollution from Construction Sites – Guidance for consultants and contractors (Masters-Williams et al., 2001) to minimise as far as possible the risk of soil, groundwater and surface water contamination.

8.2 Ground Contamination

8.2.1 Good housekeeping (daily site clean-ups, use of disposal bins, etc.) will be carried out on site during construction, and the proper use, storage and disposal of all substances and their containers will help prevent soil contamination, as per the general measures in **Section 5**.

8.2.2 Excavations in made ground will be monitored by an appropriately qualified person to ensure that any localised areas of contamination encountered are identified, segregated and disposed of appropriately. Any identified localised areas of contamination will be segregated and stored in an area where there is no possibility of runoff generation or infiltration to ground or surface water drainage. Care will be taken to ensure that the localised area of contamination does not cross-contaminate clean soils elsewhere throughout the site.

8.2.3 Potential soil and water pollution will be minimised by the implementation of good construction practices. Such practices will include adequate bunding for oil containers, wheel wash and dust suppression on site roads, and regular plant maintenance in accordance with the measures herein, the EIERP and the CIRIA guidance referenced above.

8.3 Loss or damage of topsoil

8.3.1 Excavated topsoils will be stockpiled using appropriate methods to minimise the effects of weathering. Care will be taken in reworking this material to minimise dust generation, groundwater infiltration and generation of runoff. Any surplus suitable material excavated that is not required elsewhere for the proposed development, will be reused for other projects where possible, subject to appropriate approvals/notifications or removed off site to a suitable licensed facility.

8.3.2 In order to reduce the compaction and erosion of topsoil outside the areas of direct construction, haulage routes will be along predetermined routes within and outside the proposed development. Where compaction occurs due to truck movements and other construction activities on unfinished surfaces, remediation works will be undertaken to reinstate the ground to its original condition. Where practical, compaction of any soil or subsoil which is not part of the works or to remain in-situ within the proposed development will be avoided.

8.3.3 The *Contractor* will ensure that any topsoil or subsoil is assessed for re-use within the proposed development ensuring the appropriate handling, processing and segregation of the material. Where practical the removal of soil from the proposed development will be avoided. All earthworks will be undertaken in accordance with TII Specification for Road Works (SRW) Series 600 Earthworks and project specific earthworks specifications ensuring that all excavated material and imported material is classified using the same methodology so as to allow maximum opportunity for the reuse of materials on site.

8.4 Excavation of Made Ground

8.4.1 Excavations in made ground will be monitored by an appropriately qualified person to ensure that any localised areas of contamination encountered are identified, segregated and disposed of appropriately and to ensure soils are consistent with the descriptions and classifications according to the waste acceptance criteria testing carried out as part of the site investigations. Any identified localised areas of contamination will be segregated and stored in an area where there is no possibility of runoff generation or infiltration to ground or surface water drainage. Care will be taken to ensure that the contaminated material does not cross- contaminate clean soils elsewhere throughout the site.

8.4.2 Samples of ground suspected of contamination will be tested for contamination during the detailed investigation and ground excavated from these areas will be disposed of to a suitably licensed or permitted site in accordance with the current Irish waste management legislation.

8.4.3 Any dewatering in areas of contaminated ground will be designed to minimise the mobilisation of contaminants into the surrounding environment. Where dewatering in such areas is unavoidable the water will be adequately treated prior to discharge.

8.4.4 Where piling is undertaken, it will be completed following the placement of the deeper granular gas drainage layer which will also serve as a piling mat. Following this, the barrier layer and upper drainage layer will be placed around the piles and sealed. Piling may also be completed after the geosynthetic clay layer (GCL) barrier and drainage layer has been laid, which will require excavation of material and sealing the GCL around piles.

8.4.5 The geotechnical design will ensure that any future settlement on site does not lead to a disruption of the integrity of the GCL barrier layer that could lead to water ingress.

8.5 Earthworks and Excavations

8.5.1 All excavated material, where possible will be reused within the proposed development. The appointed *Contractor* will ensure acceptability of the material for reuse for the proposed development with appropriate handling, processing and segregation of the material. This material would have to be shown to be suitable for such use and subject to appropriate control and testing according to earthworks specifications.

8.5.2 Care will be taken in reworking this material to minimise dust generation, groundwater infiltration and generation of runoff. Any surplus suitable material excavated that is not required elsewhere for the proposed development, will be used for other projects where possible, subject to appropriate approvals/notifications.

8.5.3 Earthworks haulage will be along predetermined routes within the proposed development and any deliveries to site will be along existing national, regional and local routes for importation and exportation of materials, in accordance with the Construction Traffic Management Plan (CTMP). Haulage along the cable route will be along internal haul roads/access tracks, where practicable. Where compaction occurs due to truck movements and other construction activities on unfinished surfaces, remediation works will be undertaken to reinstate the ground to its original condition. Where practicable, compaction of any soil or subsoil which is to remain in situ along the sites will be avoided.

8.5.4 Earthworks operations shall be carried out such that surfaces will be designed with adequate falls, profiling and drainage to promote safe runoff and prevent ponding and flooding. Runoff will be controlled through erosion and sediment control structures appropriate to minimise the water effects. Care will be taken to ensure that surfaces are stable to minimise erosion.

8.6 Pollution of soil and groundwater

8.6.1 Measures to be implemented to minimise the risk of spills and contamination of soils and waters will include:

- Employing only competent and experienced workforce, and site specific training of site managers, foremen and workforce, including all subcontractors, in pollution risks and preventative measures;
- Ensure that all areas where liquids (including fuel) are stored, or cleaning is carried out, are in designated impermeable areas that are isolated from the surrounding area and within a secondary containment system, e.g. by a roll-over bund, raised kerb, ramps or stepped access;
- The location of any fuel storage facilities will be considered in the design of all construction compounds and will be fully bunded. These are to be designed in accordance with relevant and current guidelines and codes of best practice at the time of construction.
- Good housekeeping will be maintained at the site (daily site clean-ups, use of disposal bins, etc.) during the entire construction phase;
- All concrete mixing and batching activities will be located in designated areas away from watercourses and drains;
- Potential pollutants will be adequately secured against vandalism in containers in a dedicated secured area;
- Provision of proper containment of potential pollutants according to relevant and current codes of practice and legal requirements;
- Thorough control during the entire construction stage to ensure that any spillage is identified at early stage and subsequently effectively contained and managed; and
- Spill kits to be provided and to be kept close to the HDD and temporary construction compounds. Staff to be trained on how to use spill kits correctly.
- Refer also to **Sections 5.9** and **5.10**.

8.7 Monitoring

8.7.1 Excavations in made ground will be monitored by an appropriately qualified person to ensure that any contaminated material is identified, segregated and disposed of appropriately. Any material from identified localised areas of contamination shall be segregated and stored in an area where there is no possibility of runoff generation or infiltration to ground or surface water drainage. Care will be taken to ensure that the localised area of contamination does not cross-contaminate clean soils elsewhere.

8.7.2 Any excavation and stockpiled material shall be monitored during earthworks to ensure the stability of slopes and to ensure that the soils excavated for disposal are consistent with the descriptions and classifications according to the waste acceptance criteria testing carried out as part of the site investigations.

8.7.3 Ground settlement, horizontal movement and vibration monitoring will be implemented during construction activities to ensure that the construction does not exceed the design limitations.

8.7.4 Movement monitoring shall be carried out during any activities which may result in ground movements or movements of any nearby structures.

8.7.5 Visual monitoring will be undertaken as part of the regular site audits during the construction of the proposed development to ensure existing surface water drainage runoff and natural infiltration to ground is not affected by the proposed development.

8.7.6 Horizontal movement monitoring of the sheet piles (if used) will be implemented during construction activities to ensure that movement does not exceed the design limitations. Appropriate remedial actions will be implemented should there be any exceedance of design limitations.

9 WATERCOURSE CROSSINGS

9.1 General Requirements for Watercourse Crossings

9.1.1 The Office of Public Works (OPW) regulate activities in or in the vicinity of rivers, lakes and wetlands, including engineering activities like river crossings and culverting. Depending on the nature of the works, these may require consent from OPW. In addition, consultation with Inland Fisheries Ireland (IFI) will be required. The *Contractor* undertakes all consultation and obtains consents/permits prior to works as necessary.

9.1.2 If damming and over-pumping is adopted for the open cut watercourse crossings the water will be discharged through a filtering medium to limit silt carry over or bed disturbance downstream of the crossing point;

9.1.3 There will be no tracking of machinery within watercourses other than the stream bed excavation for the temporary works associated with construction of the watercourse crossings for the cable route;

9.1.4 Silt pollution caused by working in surface water will be minimised or prevented by keeping water out of the works area using appropriate isolation techniques, such as cofferdams, flume pipes and by-pass channels.

9.1.5 Where short-term over pumping or flume pipes are required, equipment will be sized to accommodate surface water flow that might reasonably be expected over the period in question;

9.1.6 During the construction of the crossing of the Kilbride watercourse Inland Fisheries Ireland (IFI) will be consulted in relation to protecting fish populations. Measures include only undertaking instream works during the period July to September in the Kilbride and Johnstown North watercourses to avoid interference with the spawning migration and spawning process and to protect juvenile fish emerging from the gravels.

9.2 Open Watercourse Crossings – Biodiversity Measures

9.2.1 The Kilbride and Johnstown North watercourse crossings will be constructed using open cut trenched techniques. In addition to the general measures described in other sections herein and in the EIAR, the following specific mitigation measures will be implemented for open cut crossings of watercourses:

- Works will comply with The IFI's Guidelines on protection of fisheries during construction works in and adjacent to waters (IFI, 2016) and IFI will be consulted with regard to any proposed over-pumping at the watercourse crossing.
- The open cut methodology will require dams to be put in place.
- Appropriate silt control measures such silt barriers (e.g. straw or silt fence) will be employed where required. Once reinstatement of the cable trench is complete, the temporary dams will be removed and over pumping ceased. No haul road is proposed at the watercourse crossing. Plant will utilise existing accesses used by landowners to avoid further works within the watercourse.
- Construction activities will be undertaken during daylight hours only. This will ensure that there is potential for undisturbed fish passage at night. The works will be temporary and will not create a significant long-term barrier to fish movement.
- Works on the Kilbride Stream will take place during the summer period from July to September inclusive, which is outside the most sensitive time for these species. Due to dryer conditions in the summer period, this will also minimise the risk of ground damage, minimises the potential for silt generation and thus minimise the risk of inadvertent ecological impacts.
- Sediment from the stream bed will be stockpiled outside of the flood plain and used to re-create the stream bed.
- Dams will be removed gradually, with silt curtains in place and under ecological supervision to minimise the potential for silt generation.
- The banks of the temporary watercourse crossings will be reformed to their original profile in accordance with both the NPWS, IFI and the landowners' requirements. The bed materials which had been removed for construction will be reinstated to the original profile. The temporary flume pipe, packing and sand-bags will be removed once the bed materials and bank profile are reinstated, ensuring the correct sequencing of substrate reinstatement.

  Final bank reinstatement may require further measures to stabilise the banks and prevent erosion. Geotextiles may be used in conjunction with seeding of an appropriate grass mix. Heavier solutions such as the importation of locally sourced large stones or rocks may also be used. Bank stabilisation works will be discussed with the NPWS/IFI to ensure that suitable materials and methodologies are being used. Any bank protection, where it is required, will be adequately keyed into both the bed and banks. The materials and methods employed will be in keeping with the surrounding environment and comply with any conditions attached to the planning approval.

10 BIODIVERSITY MEASURES

10.1 General Measures

10.1.1 Mitigation measures (of relevance in respect of any potential ecological effects) will be implemented throughout the project, including the preparation and implementation of detailed method statements. The works will incorporate the relevant elements of the guidelines outlined below:

- *The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads*. National Roads Authority, Dublin (2010).
- *Control of water pollution from construction sites. Guidance for consultants and contractors* (C532). CIRIA. H. Masters-Williams et al (2001)
- *Control of water pollution from linear construction projects. Technical guidance* (C648). CIRIA. E. Murnane, A. Heap and A. Swain. (2006)

10.1.2 All personnel involved with the proposed development will receive an on-site induction relating to construction and operations and the environmentally sensitive nature of European sites and to re-emphasise the precautions that are required as well as the precautionary measures to be implemented. Site managers, foremen and workforce, including all subcontractors, will be suitably trained in pollution risks and preventative measures.

10.1.3 All staff and subcontractors have the responsibility to:

- Work to agreed plans, methods and procedures to eliminate and minimise environmental impacts,
- Understand the importance of avoiding pollution on-site, including noise and dust, and how to respond in the event of an incident to avoid or limit environmental impact;
- Respond in the event of an incident to avoid or limit environmental impact;
- Report all incidents immediately to the Project Manager and the Environmental (Ecological) Clerk of Works (ECoW);
- Monitor the workplace for potential environmental risks and alert the site manager if any are observed; and
- Co-operate as required, with site inspections.

10.2 Water Quality

10.2.1 To minimise the potential for elevated silt levels in surface water run-off, the working area used during construction will be clearly outlined prior to the commencement of works and will be kept to the minimum area necessary to effectively complete the works. Vegetation will be retained where possible.

10.2.2 A set of standardised emergency response procedures will govern the management of emergency incidents, see the Environmental Incident and Emergency Response Plan.

10.2.3 A detailed spillage procedure will be put in place and all staff on site will be trained with respect to the relevant procedures to be undertaken in the event of the release of any sediment, hydrocarbons into a watercourse. Spill kits will be maintained on-site and relevant staff will be trained in their effective usage. All site personnel will be trained and aware of the appropriate action in the event of an emergency, such as the spillage of potentially polluting substances. In the event of spillage of any polluting substance and/or pollution of a watercourse, Wicklow County Council, IFI and the NPWS shall be notified.

10.2.4 Specific environmental control measures to minimise the effect on the hydrological regime, water quality and flooding as outlined in the CEMP include:

10.2.5 General Measures:

- Good housekeeping (site clean-ups, use of disposal bins, etc.) will be implemented on the site;
- No materials will be stored in flood plains or in areas which would impede flood flow paths;
- Where possible, soil excavation will not be completed during periods of prolonged or heavy rain;
- Earthworks operations shall be carried out such that surfaces shall be designed with adequate falls, profiling and drainage to promote safe run-off and prevent ponding and flooding;
- All construction compounds will be in areas that are at low risk of flooding (outside the 1 in 100-year flood zone);
- Secure oil and chemical storage in over-ground bunded areas, limited to the minimum volume required to serve immediate needs with specified delivery and refuelling areas;
- No refuelling or fuel storage within 50m of watercourse and only on a sealed surface;
- Emergency spill kits retained onsite at sensitive locations;
- Cessation of work and development of measures to contain and/or remove pollutant should an incident be identified;
- Silt traps will be employed and maintained in appropriate locations;
- Temporary interception bunds and drainage ditches will be constructed up slope of excavations to minimise surface runoff ingress and in advance of excavation activities;
- Excavation and earthworks will be suspended during and immediately following periods of heavy rainfall to minimise sediment generation and soil damage;

- Weather warnings will be monitored during construction to ensure that there is no flood risk to construction workers installing the cable. A risk assessment will be carried out in the case of a weather warning to determine what works can proceed, and what works need to be postponed;

- The temporary foul drainage at the construction compounds will comprise self-contained sanitary facilities, with wastewater stored and tankered off-site to appropriately licensed treatment facilities;

- Earthworks haulage will be along predetermined routes along existing national, regional and local routes for importation and exportation of materials, in accordance with the Construction Traffic Management Plan (CTMP) included in the CEMP. Haulage along the cable route will be along internal haul roads/access tracks, where practicable. Where compaction occurs due to truck movements and other construction activities on unfinished surfaces, remediation works will be undertaken to reinstate the ground to its original condition. Where practicable, compaction of any soil or subsoil which is to remain in situ along the sites will be avoided.

- The excavated material storage area will be at least 50m from any watercourse and material side slopes will be commensurate with the type of material, to ensure slope stability and prevent erosion. The stockpile will be surrounded in silt fencing.

- Any existing field drainage present crossing the landfall site will be temporarily diverted or facilities put in place to over-pump to settlement ponds prior to discharge of treated water into the existing surface water drainage system.

- Field drains will be reinstated on completion of the works or new drainage installed to match the drainage characteristics of the ground prior to development. The landowner will be consulted on the proposed drainage provisions prior to any installation.

- Earthworks operations shall be carried out such that surfaces shall be designed with adequate falls, profiling and drainage to promote safe runoff and prevent ponding and flooding. Runoff will be controlled through erosion and sediment control structures appropriate to minimise the water impacts. Care will be taken to ensure that surfaces are stable to minimise erosion.

- Excavated topsoils will be stockpiled using appropriate methods to minimise the impacts of weathering. Care will be taken in reworking this material to minimise dust generation, groundwater infiltration and generation of runoff. Any surplus suitable material excavated that is not required elsewhere for the proposed development, shall be used for other projects where possible, subject to appropriate approvals/notifications.

- In order to reduce the compaction and erosion of topsoil outside the areas of direct construction, haulage routes will be along predetermined routes within and outside the proposed development. Where compaction occurs due to truck movements and other construction activities on unfinished surfaces, remediation works will be undertaken to reinstate the ground to its original condition. Where practical, compaction of any soil or subsoil which is to remain in-situ within the proposed development will be avoided.

- The Contractor will ensure that any topsoil or subsoil is assessed for re-use within the proposed development ensuring the appropriate handling, processing and segregation of the material. Where practical the removal of soil from the proposed development will be avoided. All earthworks will be undertaken in accordance with TII Specification for Road Works (SPW) Series 600 Earthworks and project specific earthworks specifications ensuring that all excavated material and imported material is classified using the same methodology so as to allow maximum opportunity for the reuse of materials on site.

- All excavated material, where possible will be reused as construction fill. The appointed Contractor will ensure acceptability of the material for reuse for the proposed development with appropriate handling, processing and segregation of the material.
- All improvement works will be closely monitored and supervised and will be enclosed by silt barriers (e.g. straw or silt fence) to prevent any runoff into surface water bodies and will be carried out in accordance with the CEMP.
- Horizontal movement monitoring of the sheet piles will be implemented during construction activities to ensure that movement does not exceed the design limitations. Appropriate remedial actions will be implemented should there be any exceedance of design limitations.

10.2.6 Cable Route General Measures

- Any groundwater or rainwater that collects in a trench will be pumped to locations agreed with the landowners and local authorities. Typically, this will be onto adjacent land, not directly into waterways, and through a filter medium, to avoid the build-up of silt, as some granular material will, inevitably, be pumped out with the water. The pump flowrates will match that of the water into the trench, as it must be kept generally free of water. A single pump with a 75mm hose will usually be adequate to deal with rainwater running into a trench. A similar arrangement will apply at joint bays, where a sump will be cast into the concrete base for a pump
- Any bentonite (or similar HDD drilling head lubrication material) will be handled and removed by the drilling contractor. Typically, bentonite is used, which comprises 95% water and 5% bentonite clay which is a non-toxic, natural substance. HDD will be a closed system, with drilling fluid recirculated, the drill cuttings recovered, and drilling fluid reused;
- In order to eliminate the migration of drilling fluids through the subsurface to waterbodies the following measures will be employed:
- Drilling pressures will be closely monitored and not exceed those needed to penetrate the formation.
- Exit and entry points for the HDD will be enclosed by silt barriers (e.g. straw or silt fence) to prevent any runoff into surface water bodies.
- If pressure drops during drilling or if there is a lack of returns the drilling will stop immediately to allow an assessment of a potential leakage of drilling fluid into the surrounding formation. A leak stopping compound may be used to prevent the leak from migrating further into the formation. If the leak stopping compound is not successful, the drilling direction may need to change to avoid the area where the leak occurred.
- If damming and over-pumping is adopted for the open cut watercourse crossings the water will be discharged through a filtering medium to limit silt carry over or bed disturbance downstream of the crossing point;
- There will be no tracking of machinery within watercourses other than that related to the temporary works associated with construction of the watercourse crossings for the cable route;
- Silt pollution caused by working in surface water will be minimised or prevented by keeping water out of the works area using appropriate isolation techniques, such as cofferdams, flume pipes and by-pass channels;

- Where short-term over pumping or flume pipes are required, equipment will be sized to accommodate surface water flow that might reasonably be expected over the period in question.
- Dewatering, where required, will incorporate the use of filter media; there will be no direct discharges into the watercourses
- The cables will be installed in ducts, so the only section of trench that will be open is that which is being excavated and in which ducts are being installed. Excavated cable trenches will be backfilled as the works progress, as soon as installation is complete and any cement bound surround material has cured sufficiently.

10.2.7 Substation General Measures

- Any excavations within made ground should follow the criteria outlined in the CEMP. The CEMP will be updated by the *Contractor* prior to the commencement of construction.
- Excavations in made ground will be monitored by an appropriately qualified person to ensure that any localised areas of contamination encountered are identified, segregated and disposed of appropriately and to ensure soils are consistent with the descriptions and classifications according to the waste acceptance criteria testing carried out as part of the site investigations. Any identified localised areas of contamination will be segregated and stored in an area where there is no possibility of runoff generation or infiltration to ground or surface water drainage. Care will be taken to ensure that the contaminated material does not cross- contaminate clean soils elsewhere throughout the sites.
- Samples of ground suspected of contamination will be tested for contamination during the detailed investigation and ground excavated from these areas will be disposed of to a suitably licensed or permitted site in accordance with the current Irish waste management legislation.
- Any dewatering in areas of contaminated ground will be designed to minimise the mobilisation of contaminants into the surrounding environment. Where dewatering in such areas is unavoidable the water will be adequately treated prior to discharge.
- Where piling is undertaken, it is recommended that this is completed following the placement of the deeper granular gas drainage layer which will also serve as a piling mat. Following this, the barrier layer and upper drainage layer will be placed around the piles and sealed.
- Piling may also be completed after the GCL barrier and drainage layer has been laid, which will require excavation of material and sealing the GCL around piles.
- The geotechnical design will ensure that any future settlement on site does not lead to a disruption of the integrity of the GCL barrier layer that could lead to water ingress.

10.2.8 General Monitoring Measures – Water Quality

- Visual monitoring will be undertaken as part of the regular site audits during the construction of the proposed development to ensure existing surface water drainage runoff and natural infiltration to ground is not affected by the proposed development.
- A monitoring regime/programme for water quality will be put in place. Turbidity monitoring will be carried out downstream, within 20m of the crossing, while works are underway at the Templerainy, Kilbride River and Johnstown North watercourse crossings to ensure that sediment levels are not significantly elevated above baseline levels.
- The *Contractor* is required to monitor the weather forecasts to inform the programming of earthworks and stockpiling of materials. Particular regard will be given to trench excavations and other works which may be vulnerable to the generation or conveyance of run-off, and for the protection of site personnel, plant and equipment in flood prone areas.

10.2.9 HDD Works – Water Quality Measures

10.2.10 The drilling contractor will develop a location specific HDD frac-out contingency plan, detailing measures to be taken to reduce the risk of bentonite breakout and measures to be taken for the protection of sensitive ecological receptors, should a breakout occur.

10.2.11 A typical procedure for managing a breakout or frac-out on land would include:

- Stop drilling immediately;
- Contain the bentonite by constructing a bund e.g. using sandbags;
- Recover the bentonite from the bund by pumping to a suitable container or back to the entry pit for recycling;
- If necessary, inert and non-toxic lost circulation material (mica) will be pumped into the bore profile, which will swell and plug any fissures;
- The area will be monitored closely to determine if the breakout has been sealed; and
- Check and monitor mud volumes and pressures as the works recommence.

10.2.12 A typical procedure for managing a breakout or frac-out under water would include:

- Stop drilling immediately;
- Pump lost circulation material (mica), which will swell and plug any fissures;
- Check and monitor mud volumes and pressures as the works recommence; and
- Repeat process as necessary until the breakout has been sealed.

10.2.13 Any bentonite will be managed and removed by the specialist drilling contractor on completion of the operation. Water will be brought to site in tankers (to make up drilling fluid) for lubrication of the bore and to provide the requisite volumes of water to the compound. The water used will be non-saline and non-potable water. For each of the two HDD bores and with an average initial demand of around $10m^3$/hr, the total volume of water required is estimated to be up to $450m^3$ per bore, assuming full drilling fluid returns are maintained. On completion of the operation the drill fluid will be disposed of to an appropriately licensed facility.

10.3 Noise

10.3.1 The employment of good construction management practice, as described in **Section 5** herein, will minimise the risk of adverse impacts from the noise and vibration during the construction phase.

10.3.2 Mitigation measures will be employed to ensure that potential noise and vibration impacts at nearby sensitive receptors due to construction activities are minimised. The preferred approach for controlling construction noise is to reduce source levels where possible, but with due regard to practicality.

10.3.3 The most effective means of mitigating construction noise are through use of barriers to reduce the levels of noise reaching noise sensitive human receptors. A site hoarding, if suitably impervious, will attenuate noise from construction activities. Where HDD activities will be taking place 24/7 in close proximity, a hoarding will be erected around work sites.

10.3.4 Further noise mitigation and monitoring measures are detailed in **Section 5.12** above.

10.4 Lighting

10.4.1 Site lighting will typically be provided by tower mounted temporary portable construction floodlights. The floodlights will be cowled and angled downwards to minimise spillage to surrounding properties. Lighting mitigation measures will follow *Bats & Lighting Guidance Notes for: Planners, engineers, architects and developers* (Bat Conservation Ireland, 2010). The following measures will be applied in relation to site lighting:

10.4.2 The following measures will be applied in relation to site lighting:

- Lighting will be provided with the minimum luminosity sufficient for safety and security purposes. Where practicable, precautions will be taken to avoid shadows cast by the site hoarding on surrounding footpaths, roads and amenity areas;
- Motion sensor lighting and low energy consumption fittings will be installed to reduce usage and energy consumption; and
- Lighting will be positioned and directed so that it does not to unnecessarily intrude on adjacent ecological receptors and structures used by protected species. The primary area of concern is the potential impact at the Avoca and Templerainy watercourses and its adjacent woodland habitat as well as hedgerows and treelines. There will be no directional lighting focused towards the watercourses or boundary habitats respectively and cowling and focusing lights downwards will minimise light spillage.
- Once commenced, the HDD drilling activities are expected to operate continuously over a 24 hour period until each bore is complete. Consequently, lighting will be provided to provide a safe working area. Directional lighting will be employed to minimise light spill onto adjacent areas and the lighting will be configured to meet health and safety requirements.

10.5 Invasive Species

10.5.1 A number of invasive species control measures have been proposed. Full details on these measures are outlined in the Invasive Species Management Plan provided in Appendix D.

10.5.2 Those involved in the application of herbicides/pesticides will be competent to do so and will have sufficient experience and knowledge in the area of herbicides/pesticides application.

10.5.3 All staff involved in the application of herbicides/pesticides will have received appropriate training, which may include achieving competency certification in the safe use of herbicides/pesticides through a National Proficiency Tests Council registered assessment centre or achieving an appropriate FETAC award in this area.

10.6 Habitats

10.6.1 The Wildlife Act 1976, as amended, provides that it is an offence to cut, grub, burn or destroy any vegetation on uncultivated land or such growing in any hedge or ditch from the 1 March to the 31 August. Exemptions include the clearance of vegetation in the course of road or other construction works or in the development or preparation of sites on which any building or other structure is intended to be provided. Where possible, vegetation will be removed outside of the breeding season and in particular, removal during the peak-breeding season (April-June inclusive) will be avoided. This will also minimise the potential disturbance of breeding birds outside of the proposed development site boundary.

10.6.2 To prevent incidental damage by machinery or by the deposition of spoil during site works, hedgerow, tree and scrub vegetation which are located in close proximity to working areas will be clearly marked and fenced off to avoid accidental damage during excavations and site preparation.

10.6.3 Habitats that are damaged and disturbed will be reinstated and landscaped once construction is complete. Disturbed areas will be seeded or planted using appropriate native grass or species native to the areas where necessary. Natural regeneration of vegetation will also occur.

10.6.4 There will be a defined working area which will be fenced off with designated haul routes to prevent inadvertent damage to adjoining habitats.

10.6.5 Any hedgerows, treelines or woodland habitat removed during construction will be replanted using a suitable mix of shallow rooted, native species such as Hawthorn and Blackthorn.

10.6.6 Tree root systems can be damaged during site clearance and groundworks. Materials, especially soil and stones, can prevent air and water circulating to the roots. No materials will be stored within the root protection area/dripline of mature trees. The ECoW will specify appropriate protective fencing where required. Retention of the existing network of woodland/ treelines/ hedgerows, where possible, will provide natural screening and help to maintain biodiversity. Where tree root systems cannot be avoided the trees will be assessed by an arboriculturist to determine if crown reduction or other measures are required.

10.6.7 It is intended that the land along the cable route will be reinstated and returned to its current use post-construction. As not all habitat can be reinstated, biodiversity enhancement planting will be provided at the landfall to ensure that there is no net-loss of habitat as a result of the proposed development. The total biodiversity enhancement area will be 16,000m^2.

10.7 Otters

10.7.1 A detailed pre-construction survey will be carried out no more than 10-12 months prior to the commencement of construction works to confirm the absence of Otter holts within 150m of the proposed development area.

10.7.2 If Otter holts are recorded at that time, the Environmental (Ecological) Clerk of Works (ECoW) will determine the appropriate means of minimising effects i.e. avoidance, moving works, timing of works etc. If required the ecologist will obtain a derogation licence from the NPWS, to facilitate licenced exclusion from the breeding or resting site in accordance with a plan approved by the NPWS.

10.7.3 Any holts found to be present will be subject to monitoring and mitigation as set out in the NRA Guidelines for the Treatment of Otter prior to the Construction of National Road Schemes (2006b). If found to be inactive, exclusion of holts may be carried out during any season. No wheeled or tracked vehicles (of any kind) will be used within 20m of active, but non-breeding, Otter holts. Light work, such as digging by hand or scrub clearance will also not take place within 15m of such holts, except under licence. The prohibited working area associated with Otter holts will be fenced and appropriate signage erected. Where breeding females and cubs are present no evacuation procedures of any kind will be undertaken until after the Otters have left the holt, as determined by the ECoW. Breeding may take place at any season, so activity at a holt must be adjudged on a case by case basis. On occasion, Otter holts may be directly affected by the scheme. To ensure the welfare of Otters, they must be evacuated from any holts present prior to any construction works commencing. The exclusion process, if required, involves the installation of one-way gates on the entrances to the holt and a monitoring period of 21 days to ensure the Otters have left the holt prior to removal.

10.8 Fish

10.8.1 In addition to the water quality measures outlined in **Section 9.2** above, the following mitigation measures will be implemented:

- Works will comply with the IFI's Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (IFI, 2016) and IFI will be consulted with regard to any proposed over-pumping at the watercourse crossing.
- Construction activities will be undertaken during daylight hours only. This will ensure that there is potential for undisturbed fish passage at night. The works will be temporary and will not create a significant long-term barrier to fish movement.
- During the construction of the crossing of the Kilbride watercourse IFI will be consulted in relation to protecting fish populations. Measures include only undertaking instream works during the period July to September to avoid interference with the spawning migration and spawning process and to protect juvenile fish emerging from the gravels,
- Prior to temporarily damming the Kilbride Stream, a fish salvage operation will be carried out under the provisions of a licence under Section 14 of the Fisheries (Consolidation) Act 1959. Standard biosecurity protocols will be implemented, and fish will be translocated to similar habitat upstream of the works area. This will be carried out following receipt of a Section 14 licence from Inland Fisheries Ireland and in consultation with Inland Fisheries Ireland.

10.9 Badgers

10.9.1 As a precautionary measure, as Badgers could potentially move into the area prior to the commencement of works, the planning boundary will be surveyed for Badgers no more than 10-12 months prior to the commencement of site works, to confirm the absence of Badgers within the zone of influence of the development. If Badgers are discovered at that time, the mitigation measures outlined in the NRA publication, Guidelines for the Treatment of Badgers Prior to the Construction of a National Road Scheme (NRA, 2006a), are to be followed. If necessary, the following measures will be employed for all construction works where badger issues arise:

- Badger sett tunnel systems can extend up to c. 20m from sett entrances. Therefore, no heavy machinery will be used within 30m of badger setts (unless carried out under licence); lighter machinery (generally wheeled vehicles) will not be used within 20m of a sett entrance; light work, such as digging by hand or scrub clearance will not take place within 10m of sett entrances. Based on the results of badger surveys to date the construction works within the planning boundary will not take place within these buffer zones.

- During the breeding season (December to June inclusive), no works will be undertaken within 50m of active setts, and no pile driving within 150m of active setts. Based on the results of badger surveys to date, the construction works within the planning boundary will not take place within these buffer zones.

- Where badger setts are likely to be affected, they will be clearly marked and buffer zones for vehicles clearly marked by fencing and signage;

- Works close to badger setts or removal of badgers from a site will only be carried out under the supervision of a qualified ecologist under license from the NPWS.

- Where affected setts do not require destruction, construction works may commence once recommended mitigation measures to address the badger issues as identified by the ECoW and agreed with NPWS, have been complied with. Such mitigation may include hoarding or visual screens.

- In the unlikely event that destruction of a badger sett is required this can only be carried out under licence from the NPWS. In these circumstances, which are highly unlikely to arise, badgers must have an alternative sett within their territory that can be utilised or an alternative artificial sett will be provided.

10.10 Bats

10.10.1 During the site works, general mitigation measures for bats will follow the National Road Authority's '*Guidelines for the Treatment of Bats during the Construction of National Road Schemes'* NRA (2005c) and *'Bat Mitigation Guidelines for Ireland: Irish Wildlife Manuals, No. 25*' (Kelleher, C. & Marnell, F. (2006)). These documents outline the requirements that will be met in the pre-construction (site clearance) stage to minimise negative effects on roosting bats, or prevent avoidable effects resulting from significant alterations to the immediate landscape.

10.10.2 No bat roosts were recorded within the proposed planning boundary. The *Contractor* will take all required measures to ensure works do not harm individuals by altering working methods or timing to avoid bats, if necessary. The following mitigation measures will be implemented:

- The bat specialist will work with the *Contractor* to ensure that the loss of trees is minimised and that trees earmarked for retention are adequately protected. A preconstruction survey by the bat specialist will be carried out to advise the *Contractor* on minimising tree loss within the cable route corridor.

- Tree-felling will be undertaken in the period September to late October/early November. During this period bats are capable of flight and may avoid the risks of tree-felling if proper measures are undertaken.

- Felled trees will not be mulched immediately. Such trees will be left lying several hours and preferably overnight before any further sawing or mulching. This will allow any bats within the tree to emerge and avoid accidental death. The bat specialist will be on-hand during felling operations to inspect felled trees for bats. If bats are seen or heard in a tree that has been felled, work will cease and the local NPWS Conservation Ranger will be contacted.

- Tree will be retained where possible and no 'tidying up' of dead wood and spilt limbs on tree specimens will be undertaken unless necessary for health and safety.

- Treelines outside the proposed development area but adjacent to it and thus at risk, will be clearly marked by a bat specialist to avoid any inadvertent damage.

- During construction directional lighting will be employed to minimise light spill onto adjacent areas. If night time works are required for HDD works at the Templerainy Stream and at the M11 there will be no directional lighting focused towards woodland habitat and cowling and focusing lights downwards will be utilised to minimise light spillage.

- If bats are recorded by the bat specialist within any vegetation or structure on site i.e. trees, or walls to be removed or impacted on, no works will proceed without a relevant derogation licence from the NPWS.

- Upon completion external lighting will be installed at the substation. The lighting system will provide directional illumination within the substation to allow personnel to move without risk to health and safety and to prevent light spill.

10.11 Birds

10.11.1 Refer to **Section 10.6.1** above.

10.11.2 Retention of the native treelines, hedgerows and woodland where possible will reduce the loss of breeding and nesting habitat for birds. NRA guidelines on the protection of trees and hedges prior to and during construction will be followed (NRA, 2006).

10.12 Landscape

10.12.1 See **Section 11** below.

11 Landscaping

11.1 General Measures

11.1.1 It is intended that the land along the cable route will be reinstated and returned to its current use post-construction.

11.1.2 The substation site, contractors' compounds and temporary work areas will be managed in an orderly manner with security fencing and hoarding kept in good condition, and vehicular access managed to avoid congestion outside the development site. All vehicular traffic leaving work areas will be clean, and the local road network kept clean.

11.1.3 Where trees and hedgerows are to be removed, tree protection fencing in accordance with BS 5837: 2012 will be installed to protect adjacent trees from construction traffic or activity to ensure their integrity and vitality. Excavated topsoil and subsoil will be stockpiled appropriately, for later backfilling and top-soiling.

11.1.4 Following completion of the civil works, all excavations will be backfilled using stockpiled materials, and ground surfaces prepared for seeding. Treelines and hedgerows removed to facilitate construction will be replanted.

11.1.5 It is intended that the land along the cable route will be reinstated and returned to its current use post-construction. Trees and hedgerows removed to facilitate construction corridors will be replaced with similar species where possible.

11.1.6 At field boundaries along the cable route, boundaries will be replanted with shallow rooting hedgerow species above the underground cable circuits.

11.1.7 At the 220kV substation, the space between the main security fence and the outer fence will be planted with shallow rooting hedge and shrub species.

11.2 Biodiversity Enhancement Planting

11.2.1 As not all habitat can be reinstated, biodiversity enhancement planting will be provided to ensure that there is no net-loss of habitat as a result of the proposed development. The total biodiversity enhancement area will be 16,000m^2, comprising an area of coastal woodland planting provided at the landfall site and comprising native woodland species.

11.2.2 The objective of the planting scheme within the biodiversity enhancement area is to create a semi-natural habitat with a diverse woodland structure. The soil type in this area is alkaline and the natural woodland type on relatively dry, fertile and alkaline ground is Oak-ash-hazel woodland WN2 (Fossit, 2000). This is a relatively uncommon woodland type. Pedunculate Oak (Quercus robur) has been included within the planting scheme with a view to creating this woodland type. However, it is noted that the planting site is coastal and exposed and therefore a more diverse planting scheme has been utilised. It is also noted that due to the problems associated with ash die-back disease, ash has not been included in the planting scheme. The objective of the planting scheme therefore is to develop a native woodland which is loosely based on the Oak-ash-hazel woodland WN2, but which is more diverse and better able to survive the prevailing conditions.

11.2.3 This will be achieved by using a mixture of native species to provide a canopy, subcanopy and ground layer as the woodland matures. Native woodlands with this type of structure are generally of higher value for flora and fauna and as it matures it will become a locally important habitat for flora and fauna. Some open areas will be left unplanted to form small glades as the woodland matures. All trees will be of Irish origin. The planting scheme can be broadly categorised as follows:

- Main woodland planting area with Alder, Blackthorn, Hawthorn, Pendunculate Oak *Quercus robur*, Whitebeam, Hazel, Downey Birch *Betula pubescens*, Holly, Rowan *Sorbus* spp. and Scots Pine *Pinus sylvestris*.
- Perimeter Edge Mix with Alder, Blackthorn, Hawthorn, Wild Privet *Ligustrum vulgare*, Holly, Spindle and Guelder Rose *Viburnum opulus*.

11.2.4 A rabbit proof fence will be provided to protect trees during early establishment. Weed control should not be necessary in Years 1 or 2, however in year 3 some hand weeding may be required. A 5-year aftercare programme will be implemented. Any plants which die, are removed or become seriously damaged or diseased within a period of five years from the completion of the development shall be replaced within the next planting season.

11.2.5 The contractor will be required to include a 24-month defects liability clause for replacement landscaping and any planting that fails to establish or dies will be replaced.

11.2.6 The coastal woodland planting at the landfall site will incorporate stock proof fencing and have a 5 year aftercare programme to ensure proper establishment of the woodland.

12 ARCHAEOLOGICAL PROTECTION

12.1 Archaeological Mitigation

12.1.1 A programme of archaeological testing will be carried out in advance of construction within all greenfield areas of the proposed development. This will be undertaken by an archaeologist under licence and will aim to identify the nature, extent and significance of any archaeological remains that may be present within the project extents. If any features of archaeological potential are discovered during the course of the works further archaeological mitigation may be required, such as preservation in-situ or by record and/or archaeological monitoring. Any further mitigation will require approval from the National Monuments Service of the Department of Housing, Local Government and Heritage (DoHLGH).

12.1.2 A programme of underwater archaeological assessment, in the form of wade surveys, will be carried out on each watercourse to be directly impacted by the proposed development. This will be carried out by an archaeologist (or archaeologists) under licence and will aim to identify the nature, extent and significance of any archaeological remains that may be present within the sections of watercourses to be affected. If any features of archaeological potential are discovered during the course of the works further archaeological mitigation may be required, such as preservation in-situ or by record and/or archaeological monitoring. Any further mitigation will require approval from the National Monuments Service of the DoHLGH.

13 REFERENCE DOCUMENTATION

CIRIA SP156 Control of water pollution from construction sites – guide to good practice (2002)

CIRIA C532 Control of Water Pollution from Construction Sites. Guidance for consultants and Contractors (2001)

CIRIA C584: Coastal and Marine Environmental Site Guide (2003)

CIRIA C624 Development and Flood Risk – guidance for the construction industry (2004);

CIRIA C648 Control of Water Pollution from Linear Construction Projects - Site Guide (2006)

CIRIA C649 Control of water pollution from linear construction projects - Technical guidance (2006)

CIRIA C741 Environmental good practice on site guide (4th edition) (2015)

CIRIA C744 Coastal and marine environmental site guide (2nd edition) (2015)

CIRIA C750 Groundwater control – design and practice (2016)

CIRIA C762 Environmental Good Practice on Site pocket book (fourth edition) (2015)

CIRIA X263 Brownfield development sites: ground-related risks for buildings (2002) Department of the Environment Heritage and Local Government Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects (2006)

Department of the Marine and Natural Resources (1998), Fisheries Guidelines for Local Authority Works. Department of the Marine and Natural Resources, Dublin

Department of Transport, Tourism and Sport Guidelines for Managing Openings in Public Roads (April 2017).

Department of Transport, Tourism and Sport Traffic Signs Manual – Chapter 8 Temporary Traffic Measures and Signs for Roadworks (August 2019)

Department of Marine and Natural Resources (DMNR) (1998), Fisheries Guidelines for Local Authority Works. Department of Marine and Natural Resources, Dublin

Eastern Regional Fisheries Board. (Year Unknown). Fisheries Protection Guidelines. Eastern Regional Fisheries Board, Dublin

Enterprise Ireland, Best Practice Guide BPGCS005 Oil Storage Guidelines

Environment Protection Agency (EPA), http://www.epa.ie/pubs/advice/

EPA Guidance on Soil and Stone By-products in the context of article 27 of the European Communities (Waste Directive) Regulations 2011 (Version 3; June 2019).

Inland Fisheries Ireland (2016) Guidance on Protection of Fisheries during Construction in and adjacent to Water

Kelleher, C. & Marnell, F Bat Mitigation Guidelines for Ireland: Irish Wildlife Manuals, No. 2' (2006).

Local Government Management Services Board and Department of Transport Guidance for the Control and Management of Traffic at Roadworks – Second Edition (2010)

National Roads Authority Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes (2008)

National Roads Authority Guidelines on the Management of Noxious Weeds and Non-Native Invasive Plant Species on National Road Schemes, Revision 1 (2010)

National Roads Authority Guidelines on the Management of Waste from National Road Construction Projects, Revision 1 (2014)

National Roads Authority Guidelines for the Protection and Preservation of Trees, Hedgerows and Scrub Prior to, During and Post Construction of National Road Schemes (2005)

National Roads Authority Guidelines for the Treatment of Badgers Prior to the Construction of a National Road Schemes (2006a)

National Roads Authority Guidelines for the Treatment of Bats during to the Construction of National Road Schemes (2008)

National Roads Authority Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes (2006b)

Transport Infrastructure Ireland CC-SPW-00600 Specification for Road Works Series 600 - Earthworks (including Erratum No 1, dated June 2013) (2013)

Transport Infrastructure Ireland GE-ENV-01104 The Management of Invasive Alien Plant Species on National Roads - Standard (2020)

Transport Infrastructure Ireland GE-ENV-01105 The Management of Invasive Alien Plant Species on National Roads - Technical Guidance (2020)

Office of Public Works "Construction, Replacement or Alteration of Bridges and Culverts, 2013".

UK Pollution Prevention Guidelines (PPG):

- GPP 2 (2018): Above ground oil storage tanks
- GPP 4 (2017): Treatment and disposal of wastewater where there is no connection to the public foul sewer
- GPP 5 (2017): Works and maintenance in or near water
- PPG6 (2012): Working at construction and demolition sites
- *GPP08 (2017): Safe Storage and Disposal of Used Oils;*
- GPP 21 (2017): Pollution incident response planning
- PPG 22 (2011): Incident response - dealing with spills
- PPG 26 (2011) Safe storage - drums and intermediate bulk containers

14 CHECKLIST – Required *Contractor's* Information

The information listed in the table below will be provided by the *Contractor* to the *Employer* according to the provisions of the contract, as indicated.

To be updated post-consent in accordance with planning permission

Documents / Information (and updates thereof) required	pre-start of works	during and post construction
Consents, licences and permissions for activities as required by current legislation governing the protection of the environment	Yes	Yes
Completed / Updated **Contacts Sheet**	Yes	Updates
Pollution Prevention Plan	Yes	Updates
Fuel Management Plan	Yes	Updates
Rock Blasting Plan	Yes	Updates
Drainage Maintenance Register		Yes
Weekly Environmental Risk Log		Yes
Geotechnical Risk Register		Yes
Environmental Risk Map	Yes	Updates
Toolbox Talk Schedule	Yes	Updates
Environmental Inspection Schedule	Yes	Updates
SHE risk register, **Risk Assessment** & **Method Statements**	Yes	Yes
Construction **Waste Management Plan** and related information	Yes	Yes
Excavation / Reinstatement records and plans		Yes
Inspection and Audit Reports		Yes
Water monitoring records		Yes
Watercourse Crossing Plan	Yes	Updates
Invasive Species Management Plan	Yes	Updates
Environmental Incident and Emergency Response Plan	Yes	Updates

Note: The above list only relates to requirements of this CEMP and is not exhaustive. As part of the Contract, other information provisions will also be required from the *Contractor*.

Appendix A – Draft Commitments Register

Appendix B-A

Commitments Register

Planning Condition No.; EIAR Chapter/EIAR Appendix Commitment	Topic	Commitment	Related Planning Condition (PC)	Related Existing (Draft Document)	To be covered in Construction Document	Project Phase	Responsible Party
Chapter 6, Construction Strategy	General environmental management	The Developer, Sure Partners Limited (SPL), will ensure that the contractor complies with the measures that have been outlined in the EIAR to avoid and/or reduce significant adverse effects that have been identified.		EIAR	CEMP	Pre-Construction; Construction	Employer
Chapter 6 Construction Strategy; Chapter 23 Schedule of Mitigation; EIAR Appendix 6.1 CEMP	General environmental management	A Construction Environmental Management Plan (CEMP) has been prepared for the proposed development. The CEMP sets out the principles and control procedures to manage any likely significant effects on the environment from the construction phase. The contractor(s) will establish detailed construction methodologies upon appointment, and will further develop the CEMP, while ensuring that all proposals comply with the requirements detailed in the CEMP. The implementation of proposed mitigation measures, environmental commitments of the proposed development and the monitoring and supervision of these measures will be managed through the CEMP. It includes measures to control/manage the following: Noise and Dust Emissions; Surface Water and Water Quality Management Measures; Fuel and Oils Management; Traffic Management; Management of Concrete; Ecological Management; Invasive Species Management; Management of Archaeology; Waste Management; Environmental Incident and Emergency Response; Site Environmental Training and Awareness; Monitoring and Auditing; Managing Environmental Incidents and Complaints.		CEMP	CEMP	Pre-Construction; Construction	Employer/ Contractor
Chapter 6 Construction Strategy; EIAR Appendix 6.1 CEMP	General environmental management	A final CEMP will be prepared by the contractor in advance of works commencing and will be submitted to the local authority(s) for approval. Construction method statements will be prepared prior to commencement of construction and incorporated into the CEMP.		CEMP	CEMP	Pre-Construction; Construction	Employer/ Contractor
Chapter 6 Construction Strategy; EIAR Appendix 6.1 CEMP	General environmental management/ Stakeholder Engagement	A Community Liaison Plan has been prepared for the proposed development and will be fully implemented as detailed in the CEMP.		CEMP	CEMP	Pre-Construction; Construction	Employer/ Contractor
Chapter 6, Construction Strategy	General environmental management	The CEMP sets out the principles and control procedures to manage any likely significant effects on the environment from the construction phase. The contractor(s) will establish detailed construction methodologies upon appointment, and will further develop the CEMP, while ensuring that all proposals comply with the requirements detailed in the CEMP.		CEMP	CEMP	Pre-Construction; Construction	Contractor
Chapter 7 Air Quality; Appendix 6.1 CEMP	Dust Management	<u>Mitigation for all sites</u> • A Community Liaison Plan that includes community engagement before work commences on site is included in the Construction Environmental Management Plan (CEMP) (**Appendix 6.1** of **Volume 3**). • Dust mitigation measures are included in the CEMP (**Appendix 6.1** of **Volume 3**). All measures therein will be implemented.		CEMP	CEMP	Pre-Construction; Construction	Employer/ Contractor
Chapter 7 Air Quality; Appendix 6.1 CEMP	Dust Management	<u>Site Management</u> • Record all dust and air quality incidents, complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken. • Hold regular liaison meetings with other construction sites within 500m to the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised, refer to **Chapter 21** *Summary of Cumulative Effects*.		CEMP	CEMP	Construction	Contractor
Chapter 7 Air Quality; Appendix 6.1 CEMP	Dust Management	<u>Preparing and maintaining the site</u> • Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible. • Erect a 2m minimum site hoarding around construction compounds. • Keep site fencing, barriers and scaffolding clean using wet methods. • Cover, seed or fence stockpiles to prevent wind whipping.		CEMP	CEMP	Pre-Construction; Construction	Contractor
Chapter 7 Air Quality; Appendix 6.1 CEMP	Dust Management	<u>Construction Operations</u> • Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation. • Use enclosed chutes and conveyors and covered skips		CEMP	CEMP	Construction	Contractor

Planning Condition No.; EIAR Chapter/EIAR Appendix Commitment	Topic	Commitment	Related Planning Condition (PC)	Related Existing (Draft Document)	To be covered in Construction Document	Project Phase	Responsible Party
		• Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate • Ensure equipment and spill kits are readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods					
Chapter 7 Air Quality; Appendix 6.1 CEMP	Dust Management	Measures specific to Earthworks • Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable • Only remove the cover in small areas during work and not all at once		CEMP	CEMP	Construction	Contractor
Chapter 7 Air Quality; Appendix 6.1 CEMP	Dust Management	Measures specific to Trackout • Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. • Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport. • Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable). • Access gates to be located at least 10m from receptors where possible.		CEMP	CEMP	Construction	Contractor
Chapter 7 Air Quality; Chapter 9 Land and Soils; Appendix 6.1 CEMP	Dust & Air Quality Management	Measures specific to Substation Site Remediation • Dust generation and dermal exposure during site construction works will be controlled by appropriate dust control measures e.g. water sprays and appropriate personal protective equipment (PPE). • Where the asphalt layer is removed at the substation site this will occur in a phased basis and will be replaced with granular hardcore as soon as possible to prevent the generation of windblown dust. • There will be a gas drainage layer and ventilation system, incorporated into the substation site remediation works, which will ensure there is no build-up of ground gas (as described in Chapter 9 Land and Soils).		CEMP	CEMP	Construction	Contractor
Chapter 7 Air Quality; Chapter 9 Land and Soils; Appendix 6.1 CEMP Dust Management	Asbestos	Substation Surveys will be undertaken to identify the risk of asbestos on site. Although unlikely, given ground investigations to date, if asbestos is uncovered on site during construction, it will be double-bagged and removed from site by a competent contractor and disposed of in accordance with the relevant procedures and legislation.		CEMP	CEMP	Pre-Construction; Construction	Contractor
Chapter 7 Air Quality; Appendix 6.1 CEMP Dust Management	Dust Monitoring	The following monitoring measures, will be implemented for the construction phase of the proposed development: • The contractor will undertake on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to Wicklow County Council on request. The frequency of the inspections will be increased during site activities with a high potential to produce dust are being carried out. • Dust monitoring will be undertaken at the three nearest sensitive receptors (with agreement from the landowner) to the works during the construction phase. The TA Luft dust deposition limit values of 350 $mg/m^2/day$ applied as a 30-day average.		CEMP	CEMP	Construction	Contractor
Chapter 8 Climate	Carbon	There will be mitigation embedded through the design of the proposed development including the use of low carbon construction materials. This includes the use of less carbon intensive concrete blends (weak-mix concrete) for the cable route. This low carbon approach has been incorporated as a design measure to reduce carbon.		EIAR	Tender Documents	Pre-Contract award	Employer
Chapter 9 Land and Soils; Appendix 6.1 CEMP	Regulatory Compliance	Construction techniques that comply with the requirements of statutory bodies (Wicklow County Council and EPA) in terms of noise, vibration, soil and groundwater contamination and disposal of contaminated material for both soil and rock cuttings will be adopted.		CEMP	CEMP	Pre-construction; Construction	Employer/ Contractor
Chapter 9 Land and Soils; Chapter 10 Water; Appendix 6.1 CEMP	Ground Contamination	Good housekeeping (daily site clean-ups, use of disposal bins, etc.) will be carried out on site during construction, and the proper use, storage and disposal of all substances and their containers will help prevent soil contamination. For all activities involving the use of potential pollutants or hazardous materials, there will be a requirement to ensure that the material such as concrete, fuels, lubricants and hydraulic fluids will be carefully handled and stored to avoid spillages. Potential pollutants will also be adequately secured against vandalism and will be provided with proper containment according to codes of best practice. Any spillages will		CEMP	CEMP	Construction	Contractor

Planning Condition No.; EIAR Chapter/EIAR Appendix Commitment	Topic	Commitment	Related Planning Condition (PC)	Related Existing (Draft Document)	To be covered in Construction Document	Project Phase	Responsible Party
		be immediately contained, and contaminated soil removed from site and disposed of in a licensed waste facility.					
Chapter 9 Land and Soils; Appendix 6.1 CEMP	Ground Contamination	Excavations in made ground will be monitored by an appropriately qualified person to ensure that any hotspots of contamination encountered are identified, segregated and disposed of appropriately. Any identified hotspots will be segregated and stored in an area where there is no possibility of runoff generation or infiltration to ground or surface water drainage. Care will be taken to ensure that the hotspot does not cross- contaminate clean soils elsewhere throughout the site.		CEMP	CEMP	Construction	Employer/ Contractor
Chapter 9 Land and Soils; Chapter 12 Biodiversity, Appendix 6.1 CEMP	Ground Contamination	Potential soil and water pollution will be minimised by the implementation of good construction practices. Such practices will include adequate bunding for oil containers, wheel wash and dust suppression on site roads, and regular plant maintenance. The Construction Industry Research and Information Association (CIRIA) provides guidance on the control and management of water pollution from construction sites in their publication *Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors* (Masters-Williams et al, 2001). An Environmental Incident and Emergency Response Plan has been prepared and will be further developed by the appointed contractor prior to the commencement of works and regularly updated, identifying the actions to be taken in the event of a pollution incident. The Environmental Incident and Emergency Response Plan will address the following: • Containment measures; • Emergency discharge routes; • List of appropriate equipment and clean-up materials; • Maintenance schedule for equipment; • Details of trained staff, location and provision for 24-hour cover; • Details of staff responsibilities; • Notification procedures to inform the relevant environmental protection authority; • Audit and review schedule; • Telephone numbers of statutory water undertakers and local water company; and • List of specialist pollution clean-up companies and their telephone numbers.		CEMP	CEMP	Construction	Contractor
Chapter 9 Land and Soils; Chapter 12 Biodiversity, Appendix 6.1 CEMP	Loss or damage of topsoil	Excavated topsoils will be stockpiled using appropriate methods to minimise the effects of weathering. Care will be taken in reworking this material to minimise dust generation, groundwater infiltration and generation of runoff. Any surplus suitable material excavated that is not required elsewhere for the proposed development, will be reused for other projects where possible, subject to appropriate approvals/notifications or removed off site to a suitable licensed facility. In order to reduce the compaction and erosion of topsoil outside the areas of direct construction, haul routes will be along predetermined routes within the proposed development and deliveries will be along predetermined routes outside the proposed development. Where compaction occurs due to truck movements and other construction activities on unfinished surfaces, remediation works will be undertaken to reinstate the ground to its original condition. Where practical, compaction of any soil or subsoil which is not part of the works or to remain in-situ within the proposed development will be avoided. The Contractor will ensure that any topsoil or subsoil is assessed for re-use within the proposed development ensuring the appropriate handling, processing and segregation of the material. Where practical the removal of soil from the proposed development will be avoided. All earthworks will be undertaken in accordance with TII Specification for Road Works (SPW) Series 600 Earthworks and project specific earthworks specifications ensuring that all excavated material and imported material is classified using the same methodology so as to allow maximum opportunity for the reuse of materials on site.		CEMP	CEMP	Construction	Contractor
Chapter 9 Land and Soils; Chapter 12 Biodiversity; Appendix 6.1 CEMP	Excavations in made ground	Any excavations within made ground should follow the criteria outlined in the CEMP. The CEMP will be updated by the contractor prior to the commencement of construction. Excavations in made ground will be monitored by an appropriately qualified person to ensure that any localised areas of contamination encountered are identified, segregated and disposed of appropriately and to ensure soils are consistent with the descriptions and classifications according to the waste acceptance criteria testing carried out as part of the site investigations. Any identified localised areas of contamination will be segregated and		CEMP	CEMP	Construction	Contractor

Planning Condition No.; EIAR Chapter/EIAR Appendix Commitment	Topic	Commitment	Related Planning Condition (PC)	Related Existing (Draft Document)	To be covered in Construction Document	Project Phase	Responsible Party
		stored in an area where there is no possibility of runoff generation or infiltration to ground or surface water drainage. Care will be taken to ensure that the contaminated material does not cross- contaminate clean soils elsewhere throughout the site. Samples of ground suspected of contamination will be tested for contamination during the detailed investigation and ground excavated from these areas will be disposed of to a suitably licensed or permitted site in accordance with the current Irish waste management legislation. Any dewatering in areas of contaminated ground will be designed to minimise the mobilisation of contaminants into the surrounding environment. Where dewatering in such areas is unavoidable the water will be adequately treated prior to discharge. Where piling is undertaken, it will be completed following the placement of the deeper granular gas drainage layer which will also serve as a piling mat. Following this, the barrier layer and upper drainage layer will be placed around the piles and sealed. Piling may also be completed after the GCL barrier and drainage layer has been laid, which will require excavation of material and sealing the GCL around piles. The geotechnical design will ensure that any future settlement on site does not lead to a disruption of the integrity of the GCL barrier layer that could lead to water ingress.					
Chapter 9 Land and Soils; Chapter 12 Biodiversity; Appendix 6.1 CEMP	Loss of Solid Geology	All excavated material, where possible will be reused within the proposed development. The appointed contractor will ensure acceptability of the material for reuse for the proposed development with appropriate handling, processing and segregation of the material in accordance with the CEMP. This material would have to be shown to be suitable for such use and subject to appropriate control and testing according to earthworks specifications. Care will be taken in reworking this material to minimise dust generation, groundwater infiltration and generation of runoff. Any surplus suitable material excavated that is not required elsewhere for the proposed development, will be used for other projects where possible, subject to appropriate approvals/notifications.		CEMP	CEMP	Construction	Contractor
Chapter 9 Land and Soils; Chapter 12 Biodiversity; Appendix 6.1 CEMP	Earthworks haulage	Earthworks haulage will be along predetermined routes within the proposed development and any deliveries to site will be along existing national, regional and local routes for importation and exportation of materials, in accordance with the Construction Traffic Management Plan (CTMP) included in the CEMP. Haulage along the cable route will be along internal haul roads/access tracks, where practicable. Where compaction occurs due to truck movements and other construction activities on unfinished surfaces, remediation works will be undertaken to reinstate the ground to its original condition. Where practicable, compaction of any soil or subsoil which is to remain in situ along the sites will be avoided. Earthworks operations shall be carried out such that surfaces will be designed with adequate falls, profiling and drainage to promote safe runoff and prevent ponding and flooding. Runoff will be controlled through erosion and sediment control structures appropriate to minimise the water effects. Care will be taken to ensure that surfaces are stable to minimise erosion.		CEMP	CEMP	Construction	Contractor
Chapter 9 Land and Soils; Appendix 6.1 CEMP	Effects on the surrounding ground	Monitoring of ground settlement, horizontal movement will be implemented during construction activities where required to ensure that the construction does not exceed the design limitations. Foundation type and method of construction have been selected to control ground settlement. The foundation types are described in Sections 6.5.4 and 6.5.5 within Chapter 6 Construction Strategy of the EIAR.		CEMP	CEMP	Construction	Contractor
Chapter 9 Land and Soils; Chapter 12, Biodiversity; Appendix 6.1 CEMP	Improvement works for flood defences	All improvement works will be appropriately monitored and supervised and will be enclosed by silt barriers (e.g. straw or silt fence) to prevent any runoff into surface water bodies and will be carried out in accordance with the CEMP. Horizontal movement monitoring of the sheet piles (if used) will be implemented during construction activities to ensure that movement does not exceed the design limitations. Appropriate remedial actions will be implemented should there be any exceedance of design limitations.		CEMP	CEMP	Construction	Contractor

Planning Condition No.; EIAR Chapter/EIAR Appendix Commitment	Topic	Commitment	Related Planning Condition (PC)	Related Existing (Draft Document)	To be covered in Construction Document	Project Phase	Responsible Party
Chapter 9 Land and Soils; Appendix 6.1 CEMP	Pollution of soil and groundwater	The CEMP will be updated by the contractor prior to the commencement of construction. Good construction management practices will be employed to minimise the risk of transmission of hazardous materials as well as pollution of adjacent watercourses and groundwater. The construction management of the site will take account of the recommendations of the CIRIA guidance Control of Water Pollution from Construction Sites – Guidance for consultants and contractors (Masters-Williams et al., 2001) to minimise as far as possible the risk of soil, groundwater and surface water contamination. Measures to be implemented to minimise the risk of spills and contamination of soils and waters will include: • Employing only competent and experienced workforce, and site specific training of site managers, foremen and workforce, including all subcontractors, in pollution risks and preventative measures; • Ensure that all areas where liquids (including fuel) are stored, or cleaning is carried out, are in designated impermeable areas that are isolated from the surrounding area and within a secondary containment system, e.g. by a roll-over bund, raised kerb, ramps or stepped access; • The location of any fuel storage facilities will be considered in the design of all construction compounds and will be fully bunded. These are to be designed in accordance with relevant and current guidelines and codes of best practice at the time of construction. • Good housekeeping will be maintained at the site (daily site clean-ups, use of disposal bins, etc.) during the entire construction phase; • All concrete mixing and batching activities will be located in designated areas away from watercourses and drains; • Potential pollutants will be adequately secured against vandalism in containers in a dedicated secured area; • Provision of proper containment of potential pollutants according to relevant and current codes of practice and legal requirements; • Thorough control during the entire construction stage to ensure that any spillage is identified at early stage and subsequently effectively contained and managed; and • Spill kits to be provided and to be kept close to the HDD and temporary construction compounds. Staff to be trained on how to use spill kits correctly.		CEMP	CEMP	Pre-construction; Construction	Contractor

Chapter 9 Land and Soils; Appendix 6.1 CEMP	Landfall and Cable Route – specific measures	• Any groundwater or rainwater that collects in the HDD drilling pit or in a trench will be pumped away onto adjacent land, not directly into waterways, and through a filter medium in the mud recycling plant;
		• Any bentonite (or similar HDD drilling head lubrication material) will be handled and removed by the drilling contractor. Typically, bentonite is used, which comprises 95% water and 5% bentonite clay which is a non-toxic, natural substance. HDD will be a closed system, with drilling fluid recirculated, the drill cuttings recovered, and drilling fluid reused;
		• In order to minmise the likely migration of drilling fluids through the subsurface to waterbodies the following measures will be employed:
		  ◦ Exit and entry points for the HDD will be enclosed by silt barriers (e.g. straw or silt fence) to prevent any runoff into surface water bodies.
		  ◦ If pressure drops during drilling or if there is a lack of returns the drilling will stop immediately to allow an assessment of a potential leakage of drilling fluid into the surrounding formation. A leak stopping compound may be used to prevent the leak from migrating further into the formation. If the leak stopping compound is not successful, the drilling direction may need to change to avoid the area where the leak occurred.
		• If damming and over-pumping is adopted for the open cut watercourse crossings the water will be discharged through a filtering medium to limit silt carry over or bed disturbance downstream of the crossing point;
				CEMP	CEMP	Construction	Contractor

Planning Condition No.; EIAR Chapter/EIAR Appendix Commitment	Topic	Commitment	Related Planning Condition (PC)	Related Existing (Draft Document)	To be covered in Construction Document	Project Phase	Responsible Party
		• There will be no tracking of machinery within watercourses other than that related to the temporary works associated with construction of the watercourse crossings for the cable route; • Where short-term over pumping or flume pipes are required, equipment will be sized to accommodate surface water flow that might reasonably be expected over the period in question; An Environmental Incident & Emergency Response Plan has been developed and is included in the CEMP, which will be further developed by the appointed contractor prior to the commencement of works and regularly updated. This identifies the actions to be taken in the event of a pollution incident. The CEMP addresses, among other aspects, spoil management, containment measures, emergency discharge routes, a list of appropriate equipment and clean-up materials and notification procedures to inform the relevant environmental protection authority.					
Chapter 9 Land and Soils; Chapter 12, Biodiversity; Appendix 6.1 CEMP	Monitoring during construction	Excavations in made ground will be monitored by an appropriately qualified person to ensure that any contaminated material is identified, segregated and disposed of appropriately. Any material from identified hotspot locations shall be segregated and stored in an area where there is no possibility of runoff generation or infiltration to ground or surface water drainage. Care will be taken to ensure that the hotspot does not cross-contaminate clean soils elsewhere. All excavations will be monitored in accordance with good practice and guidelines at the time of the works. Any excavation and stockpiled material shall be monitored during earthworks to ensure the stability of slopes and to ensure that the soils excavated for disposal are consistent with the descriptions and classifications according to the waste acceptance criteria testing carried out as part of the site investigations. Ground settlement, horizontal movement and vibration monitoring will be implemented during construction activities to ensure that the construction does not exceed the design limitations. Movement monitoring shall be carried out during any activities which may result in ground movements or movements of any nearby structures. Visual monitoring will be undertaken as part of the regular site audits during the construction of the proposed development to ensure existing surface water drainage runoff and natural infiltration to ground is not affected by the proposed development. Implementation of the CEMP will be monitored on an ongoing basis.		CEMP	CEMP	Construction	Employer/ Contractor
Chapter 9 Land and Soils; Appendix 6.1 CEMP	Monitoring during operation	Emergency procedures detailing the measures to be undertaken should any accidental spill happen during operation will be developed as part of the operations manual for the proposed development.		EIAR	Operational Procedures	Operation	Employer
Chapter 10 Water; Appendix 6.1 CEMP	Good Practice	The employment of good construction management practices will minimise the risk of adverse impacts on the hydrological regime, water quality and flood risk. As part of the assessment of the required construction mitigation, good practice construction measures which will be implemented for the proposed development were considered.		CEMP	CEMP	Construction	Contractor
Chapter 10, Water; Chapter 12 Biodiversity, Appendix 6.1 CEMP	General Measures	The following general measures are proposed: • No materials will be stored in flood plains or in areas which would impede flood flow paths; • Where possible, soil excavation will not be completed during periods of prolonged or heavy rain; • Earthworks operations shall be carried out such that surfaces shall be designed with adequate falls, profiling and drainage to promote safe run-off and prevent ponding and flooding; All construction compounds will be in areas that are at low risk of flooding (outside the 1 in 100-year flood zone); • Secure oil and chemical storage in over-ground bunded areas, limited to the minimum volume required to serve immediate needs with specified delivery and refuelling areas; • Emergency spill kits retained onsite at sensitive locations; • Cessation of work and development of measures to contain and/or remove pollutant should an incident be identified; • Silt traps will be employed and maintained in appropriate locations;		CEMP	CEMP	Construction	Contractor

Planning Condition No.; EIAR Chapter/EIAR Appendix Commitment	Topic	Commitment	Related Planning Condition (PC)	Related Existing (Draft Document)	To be covered in Construction Document	Project Phase	Responsible Party
		• Temporary interception bunds and drainage ditches will be constructed up slope of excavations to minimise surface runoff ingress and in advance of excavation activities; • Weather warnings will be monitored during construction to ensure that there is no flood risk to construction workers installing the cable ducts. A risk assessment will be carried out in the case of a weather warning to determine what works can proceed, and what works need to be postponed; and • The temporary foul drainage at the construction compounds will comprise self-contained sanitary facilities, with wastewater stored and tankered off-site to appropriately licensed treatment facilities.					
Chapter 10, Water; Appendix 6.1 CEMP	Landfall	If field drains at the landfall are temporarily diverted, facilities will be put in place to over pump the water into a settlement pond to limit silt discharge into the field drain downstream.		CEMP	CEMP	Construction	Contractor

Chapter 10, Water; Chapter 12, Biodiversity; Appendix 6.1 CEMP	Cable Route - HDD	The following measures are proposed:
		• Any groundwater or rainwater that collects in the HDD drilling pit or in a trench will be pumped away onto adjacent land, not directly into waterways;
		• Any bentonite (or similar HDD drilling head lubrication material) will be handled and removed by the drilling contractor. Typically, bentonite is used, which comprises 95% water and 5% bentonite clay which is a non-toxic, natural substance. HDD will be a closed system, with drilling fluid recirculated, the drill cuttings recovered, and drilling fluid reused;
		• In order to eliminate the migration of drilling fluids through the subsurface to waterbodies the following measures will be employed:
		  • Drilling pressures will be closely monitored and not exceed those needed to penetrate the formation.
		  • Exit and entry points for the HDD will be enclosed by silt barriers (e.g. straw or silt fence) to prevent any runoff into surface water bodies.
		  • If pressure drops during drilling or if there is a lack of returns the drilling will stop immediately to allow an assessment of a potential leakage of drilling fluid into the surrounding formation. A leak stopping compound, such as mica, may be used to prevent the leak from migrating further into the formation. If the leak stopping compound is not successful, the drilling direction may need to change to avoid the area where the leak occurred.
				CEMP	CEMP	Construction	Contractor

Chapter 10, Water; Chapter 12 Biodiversity; Appendix 6.1 CEMP	Cable Route - General	The following measures are proposed: • If damming and over-pumping is adopted for the open cut watercourse crossings the water will be discharged through a filtering medium to limit silt carry over or bed disturbance downstream of the crossing point; • There will be no tracking of machinery within watercourses other than the stream bed excavation for the temporary works associated with construction of the watercourse crossings for the cable route; • Silt pollution caused by working in surface water will be minimised or prevented by keeping water out of the works area using appropriate isolation techniques, such as cofferdams, flume pipes and by-pass channels; • Where short-term over pumping, culverts or flume pipes are required, equipment will be sized to accommodate surface water flow that might reasonably be expected over the period in question; • During the construction of the crossing of the Kilbride watercourse Inland Fisheries Ireland (IFI) will be consulted in relation to protecting fish populations. Measures include only undertaking instream works during the period July to September in the Kilbride watercourse to avoid interference with the spawning migration and spawning process and to protect juvenile fish emerging from the gravels.		CEMP	CEMP	Construction	Contractor
Chapter 10, Water; Chapter 12, Biodiversity; Appendix 6.1 CEMP	Monitoring	Visual monitoring will be undertaken as part of the regular site audits during the construction of the proposed development to ensure existing surface water drainage runoff and natural infiltration to ground is not affected by the proposed development. A monitoring regime/programme for water quality will be put in place. Turbidity monitoring will be carried out downstream, within 20m of the crossing, while works are underway at the Templerainy, Kilbride River and		CEMP	CEMP	Construction	Contractor

Planning Condition No.; EIAR Chapter/EIAR Appendix Commitment	Topic	Commitment	Related Planning Condition (PC)	Related Existing (Draft Document)	To be covered in Construction Document	Project Phase	Responsible Party
		Johnstown North watercourse crossings to ensure that sediment levels are not significantly elevated above baseline levels. The contractor is required to monitor the weather forecasts to inform the programming of earthworks and stockpiling of materials. Particular regard will be given to trench excavations and other works which may be vulnerable to the generation or conveyance of run-off, and for the protection of site personnel, plant and equipment in flood prone areas.					
Chapter 10, Water; Appendix 6.1 CEMP	Operation - Drainage	The following mitigation measures will be implemented during the operational phase: • Appropriately sized hydrocarbon interceptors will be installed at strategic locations along the proposed surface water drainage network to prevent any hydrocarbons from leaving the site of the proposed substation. • Emergency procedures detailing the measures to be undertaken should any accidental spill happen during operation will be developed as part of the operations manual. • An automated remote monitoring system will be put in place on the proposed attenuation pumping system to monitor on-site infrastructure in an extreme rainfall event. Where this monitoring system notifies an issue appropriate measures will be adopted based on the circumstances.		EIAR	Operations Manual	Operation	Employer
Chapter 10, Water; Appendix 6.1 CEMP	Operation – Flood Defences	The existing flood defences will be inspected annually for signs of disrepair, together with additional inspections after significant flood events (Events with a return period greater than a 1 in 2 year flood event). Maintenance of embankments includes removal of vegetation to allow for inspection of the embankment. The maintenance programme for the drainage system will be set out in the Operation and Maintenance manual which will be prepared during the detailed design. Regular maintenance will consist of regular inspections, silt or oil removal if required more frequently than once per year, vegetation management, sweeping of surfaces, and litter and debris removal.		EIAR	Operations Manual	Operation	Employer
Chapter 11, Noise & Vibration, Appendix 6.1 CEMP	General	Good industry standards, guidance and practice procedures will be followed in order to minimise noise and vibration effects during construction.		CEMP	CEMP	Construction	Contractor
Chapter 11, Noise & Vibration, Appendix 6.1 CEMP	General, Community Liaison	Prior to construction works being undertaken, liaison will be undertaken with occupiers of properties that may be adversely affected by construction noise and vibration. Providing information on the timing and durations of construction works at night and why they are required to be undertaken at night can reduce adverse effects. All communications will contain contact details to direct any questions or complaints to.		CEMP	CEMP	Pre-Construction, Construction	Employer/ Contractor
Chapter 11, Noise & Vibration, Appendix 6.1 CEMP	Noise & Vibration Mitigation Measures - Construction	The following provisions, although not exhaustive, will be adhered to where practicable throughout the construction programme: • Vehicles and mechanical plant used for the purpose of the works will be fitted with effective exhaust silencers, maintained in good and efficient working order, and operated in such a manner as to minimise noise emissions. The contractor will ensure that all plant complies with the relevant statutory requirements; • Machines in intermittent use will be shut down or throttled down to a minimum when not in use; • Compressors will be fitted with properly lined and sealed acoustic covers which will be kept closed whenever in use. Pneumatic percussive tools will be fitted with mufflers or silencers; • Equipment which breaks concrete, brickwork or masonry by bending, bursting or "nibbling" will be used in preference to percussive tools. Where possible, the use of impact tools will be avoided where the site is close to occupied premises; • Rotary drills and bursters activated by hydraulic, chemical, or electrical power will be used for excavating hard or extrusive material; • Wherever possible, equipment powered by mains electricity will be used in preference to equipment powered by internal combustion engine or locally generated electricity; • No part of the works nor any maintenance of plant will be carried out in such a manner as to cause unnecessary noise except in the case of an emergency when the work is absolutely necessary for the saving of life or property or the safety of the works;		CEMP	CEMP	Construction	Contractor

Planning Condition No.; EIAR Chapter/EIAR Appendix Commitment	Topic	Commitment	Related Planning Condition (PC)	Related Existing (Draft Document)	To be covered in Construction Document	Project Phase	Responsible Party
		• Plant will be maintained in good working order so that extraneous noise from mechanical vibration, creaking and squeaking is kept to a minimum; and • Noise emitting machinery which is required to run continuously will be housed in a suitable acoustically lined enclosure.					
Chapter 11, Noise & Vibration, Appendix 6.1 CEMP	Noise & Vibration Monitoring Measures - Construction	Monitoring of noise and vibration levels at the construction site boundary will be undertaken to identify where work procedures need to be modified. In the event of a valid complaint a noise monitoring protocol will be submitted to Wicklow County Council prior to commencement of any noise monitoring. The protocol will include details of: • A description of the complaint; • Construction activities taking place at the time of the complaint; • Noise monitoring methodology and results; and • Any actions taken.		CEMP	CEMP	Construction	Contractor
Chapter 11, Noise & Vibration, Appendix 6.1 CEMP	Noise & Vibration Mitigation - Operation	To address cumulative noise effects with the Crag Digital Avoca Ltd Data Centre permitted application (ref. 18940), noise mitigation is required as part of the onshore 220kV substation. A proposed reduction of sound power levels for the harmonic filters and the 33kV STATCOM reactors (e.g. selection of quieter plant; enclosures; louvres; sound shields, reactor top hats; dynamic vibration absorbers; or active noise cancelling) will be employed by the manufacturer as part of the onshore 220kV substation detailed design so as to avoid cumulative noise levels exceeding the NG4 criteria at surrounding receptors.		EIAR	Tender Documentation	Pre-contract award	Employer
Chapter 11, Noise & Vibration, Appendix 6.1 CEMP	Noise & Vibration Mitigation - Operation	Noise generated from the operational substation site will be periodically reviewed. This will include the following: • Examination of noise sources on site; • Examination of noise propagation factors; • Operational noise monitoring; and • Review of any complaints.		EIAR	Operational Procedures	Operation	Employer
Chapter 11, Noise & Vibration, Appendix 6.1 CEMP	Noise & Vibration Mitigation - Operation	It is proposed that operational noise emissions due to the proposed development are subject to a planning condition that covers the most onerous cumulative assessment. As the predicted noise levels in Table 11.20 of the EIAR do not exceed 38 dB LAr,Tr at surrounding residential properties, suggested wording for the planning condition is provided as follows: • *"The rated noise level due to the Proposed Development, shall not exceed 38 dB LAr,Tr at any existing residential Noise Sensitive Locations (NSL)."*		EIAR	Planning Conditions/ Tender Documentation	Pre-contract award	Employer
Chapter 12, Biodiversity; Appendix 6.1 CEMP	General	Mitigation measures (of relevance in respect of any potential ecological effects) will be implemented throughout the project, including the preparation and implementation of detailed method statements. The works will incorporate the relevant elements of the guidelines outlined below: • *The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads*. National Roads Authority, Dublin (2010). • *Control of water pollution from construction sites. Guidance for consultants and* contractors (C532). CIRIA. H. Masters-Williams et al (2001) • *Control of water pollution from linear construction projects. Technical guidance (C648).* CIRIA. E. Murnane, A. Heap and A. Swain. (2006)		CEMP	CEMP	Construction	Contractor
Chapter 12, Biodiversity; Appendix 6.1 CEMP	General – training an induction	All personnel involved with the proposed development will receive an on-site induction relating to construction and operations and the environmentally sensitive nature of European sites and to re-emphasise the precautions that are required as well as the precautionary measures to be implemented. Site managers, foremen and workforce, including all subcontractors, will be suitably trained in pollution risks and preventative measures. All staff and subcontractors have the responsibility to: • Work to agreed plans, methods and procedures to eliminate and minimise environmental impacts, • Understand the importance of avoiding pollution on-site, including noise and dust, and how to respond in the event of an incident to avoid or limit environmental impact; • Respond in the event of an incident to avoid or limit environmental impact;		CEMP	CEMP	Construction	Contractor

Planning Condition No.; EIAR Chapter/EIAR Appendix Commitment	Topic	Commitment	Related Planning Condition (PC)	Related Existing (Draft Document)	To be covered in Construction Document	Project Phase	Responsible Party
		• Report all incidents immediately to the project manager and the ecological clerk of works (ECOW); • Monitor the workplace for potential environmental risks and alert the site manager if any are observed; and • Co-operate as required, with site inspections.					
Chapter 12, Biodiversity; Appendix 6.1 CEMP	Water Quality	To minimise the potential for elevated silt levels in surface water run-off, the working area used during construction will be clearly outlined prior to the commencement of works and will be kept to the minimum area necessary to effectively complete the works. Vegetation will be retained where possible.		CEMP	CEMP	Construction	Contractor
Chapter 12, Biodiversity; Appendix 6.1 CEMP	Water Quality	A detailed spillage procedure will be put in place and all staff on site will be trained with respect to the relevant procedures to be undertaken in the event of the release of any sediment, hydrocarbons into a watercourse. Spill kits will be maintained on-site and relevant staff will be trained in their effective usage. All site personnel will be trained and aware of the appropriate action in the event of an emergency, such as the spillage of potentially polluting substances. In the event of spillage of any polluting substance and/or pollution of a watercourse, Wicklow County Council, IFI and the NPWS shall be notified.		CEMP	CEMP	Construction	Contractor
Chapter 12, Biodiversity; Chapter 6 Construction Strategy; Appendix 6.1 CEMP	Water Quality – Cable Route	Any groundwater or rainwater that collects in a trench will be pumped to locations agreed with the landowners and local authorities. Typically, this will be onto adjacent land, not directly into waterways, and through a filter medium, to avoid the build-up of silt, as some granular material will, inevitably, be pumped out with the water. The pump flowrates will match that of the water into the trench, as it must be kept generally free of water. A single pump with a 75mm hose will usually be adequate to deal with rainwater running into a trench. A similar arrangement will apply at joint bays, where a sump will be cast into the concrete base for a pump. Dewatering, where required, will incorporate the use of filter media; there will be no direct discharges into the watercourses. The cables will be installed in ducts, so the only section of trench that will be open is that which is being excavated and in which ducts are being installed. Excavated cable trenches will be backfilled as the works progress, as soon as installation is complete and any cement bound surround material has cured sufficiently.		CEMP	CEMP	Construction	Contractor
Chapter 12, Biodiversity; Appendix 6.1 CEMP	Watercourse Crossings	The Kilbride and Johnstown North watercourse crossings will be constructed using open cut trenched techniques. In addition to the general measures described above, the following specific mitigation measures will be implemented for open cut crossings of watercourses: • Works will comply with The IFI's *Guidelines on protection of fisheries during construction works in and adjacent to waters* (IFI, 2016) and IFI will be consulted with regard to any proposed over-pumping at the watercourse crossing. • The open cut methodology will require dams to be put in place. • Appropriate silt control measures such silt barriers (e.g. straw or silt fence) will be employed where required. Once reinstatement of the cable trench is complete, the temporary dams will be removed and over pumping ceased. No haul road is proposed at the watercourse crossing. Plant will utilise existing accesses used by landowners to avoid further works within the watercourse. • Construction activities will be undertaken during daylight hours only. This will ensure that there is potential for undisturbed fish passage at night. The works will be temporary and will not create a significant long-term barrier to fish movement. • Works on the Kilbride Stream will take place during the summer period from July to September inclusive, which is outside the most sensitive time for these species. Due to dryer conditions in the summer period, this will also minimise the risk of ground damage, minimises the potential for silt generation and thus minimise the risk of inadvertent ecological impacts. • Sediment from the stream bed will be stockpiled outside of the flood plain and used to re-create the stream bed.		CEMP	CEMP	Pre-construction; Construction	Contractor

Planning Condition No.; EIAR Chapter/EIAR Appendix Commitment	Topic	Commitment	Related Planning Condition (PC)	Related Existing (Draft Document)	To be covered in Construction Document	Project Phase	Responsible Party
		• Dams will be removed gradually, with silt curtains in place and under ecological supervision to minimise the potential for silt generation. • The banks of the temporary watercourse crossings will be reformed to their original profile in accordance with both the NPWS, IFI and the landowners' requirements. The bed materials which had been removed for construction will be reinstated to the original profile. The temporary flume pipe, packing and sand-bags will be removed once the bed materials and bank profile are reinstated, ensuring the correct sequencing of substrate reinstatement. • Final bank reinstatement may require further measures to stabilise the banks and prevent erosion. Geotextiles may be used in conjunction with seeding of an appropriate grass mix. Heavier solutions such as the importation of locally sourced large stones or rocks may also be used. Bank stabilisation works will be discussed with the NPWS/IFI to ensure that suitable materials and methodologies are being used. Any bank protection, where it is required, will be adequately keyed into both the bed and banks. The materials and methods employed will be in keeping with the surrounding environment and comply with any conditions attached to the planning approval.					
Chapter 12, Biodiversity; Appendix 6.1 CEMP	HDD Works	While the bentonite drilling fluid is non-toxic and can be commonly used in farming practices, if sufficient quantity enters a watercourse it can potentially settle on the bottom, smothering benthic flora and affecting faunal feeding and breeding sites. The drilling contractor will develop a location specific HDD frac-out contingency plan, detailing measures to be taken to reduce the risk of bentonite breakout and measures to be taken for the protection of sensitive ecological receptors, should a breakout occur. A typical procedure for managing a breakout or frac-out on land would include: • Stop drilling immediately; • Contain the bentonite by constructing a bund e.g. using sandbags; • Recover the bentonite from the bund by pumping to a suitable container or back to the entry pit for recycling; • If necessary, inert and non-toxic lost circulation material (mica) will be pumped into the bore profile, which will swell and plug any fissures; • The area will be monitored closely to determine if the breakout has been sealed; and • Check and monitor mud volumes and pressures as the works recommence. A typical procedure for managing a breakout or frac-out under water would include: • Stop drilling immediately; • Pump lost circulation material (mica), which will swell and plug any fissures; • Check and monitor mud volumes and pressures as the works recommence; and • Repeat process as necessary until the breakout has been sealed. Any bentonite will be managed and removed by the specialist drilling contractor on completion of the operation. Water will be brought to site in tankers. (to make up drilling fluid) for lubrication of the bore and to provide the requisite volumes of water to the compound. The water used will be non-saline and non-potable water. For each of the two HDD bores and with an average initial demand of around $10m^3$/hr , the total volume of water required is estimated to be up to $450m^3$ per bore, assuming full drilling fluid returns are maintained. On completion of the operation the drill fluid will be disposed of to an appropriately licensed facility.		CEMP	CEMP	Pre-construction; Construction	Contractor
Chapter 12, Biodiversity; Chapter 11 Noise; Appendix 6.1 CEMP	Biodiversity & Noise	The employment of good construction management practice, as described in Section 5 of the CEMP and in Chapter 11 Noise and Vibration of the EIAR, will minimise the risk of adverse impacts from the noise and vibration during the construction phase.					

Planning Condition No.; EIAR Chapter/EIAR Appendix Commitment	Topic	Commitment	Related Planning Condition (PC)	Related Existing (Draft Document)	To be covered in Construction Document	Project Phase	Responsible Party
		This section of the CEMP will be updated by the contractor, prior to construction, to include any specific conditions attached to the approval and other specific construction information, but will at a minimum, include the measures described below. Mitigation measures will be employed to ensure that potential noise and vibration impacts at nearby sensitive receptors due to construction activities are minimised. The preferred approach for controlling construction noise is to reduce source levels where possible, but with due regard to practicality. The most effective means of mitigating construction noise are through use of barriers to reduce the levels of noise reaching noise sensitive human receptors. A site hoarding, if suitably impervious, will attenuate noise from construction activities. Where HDD activities will be taking place 24/7 in close proximity, a hoarding will be erected around work sites.					
Chapter 12, Biodiversity; Appendix 6.1 CEMP	Invasive Species	In addition to the possible advance treatment works and pre-construction survey, when the works areas become available to the contractor for fencing and commencement of site clearance, areas identified as requiring specific invasive species treatment will be demarcated and the designated control measures implemented at the earliest possible stage to reduce the risk of spread along the proposed scheme or beyond the land take. There are a number of management options that may be implemented to control and prevent the spread of invasive species. Detail on these measures are outlined in the ISMP (Appendix D of CEMP). It may not be possible to completely eradicate the invasive species before or during the construction phase. For example, if Japanese Knotweed is found at locations where structures are proposed, root barrier membranes may be required to be installed to protect the structures from the plant. The design of these membranes will form part of the detailed design stage. Those involved in the application of herbicides/pesticides will be competent to do so and will have sufficient experience and knowledge in the area of herbicides/pesticides application. All staff involved in the application of herbicides/pesticides will have received appropriate training, which may include achieving competency certification in the safe use of herbicides/pesticides through a National Proficiency Tests Council registered assessment centre or achieving an appropriate FETAC award in this area. A number of possible invasive species control measures have been proposed. Full details on these measures are outlined in the Invasive Species Management Plan.		CEMP	CEMP (Appendix D ISMP)	Pre-construction; Construction	Contractor
Chapter 12, Biodiversity; Appendix 6.1 CEMP	Habitats	The following biodiversity measures are to be implemented with respect to habitats: • The Wildlife Act 1976, as amended, provides that it is an offence to cut, grub, burn or destroy any vegetation on uncultivated land or such growing in any hedge or ditch from the 1 March to the 31 August. Exemptions include the clearance of vegetation in the course of road or other construction works or in the development or preparation of sites on which any building or other structure is intended to be provided. Where possible, vegetation will be removed outside of the breeding season and in particular, removal during the peak-breeding season (April-June inclusive) will be avoided. This will also minimise the potential disturbance of breeding birds outside of the proposed development site boundary. • To prevent incidental damage by machinery or by the deposition of spoil during site works, hedgerow, tree and scrub vegetation which are located in close proximity to working areas will be clearly marked and fenced off to avoid accidental damage during excavations and site preparation. • Habitats that are damaged and disturbed will be reinstated and landscaped once construction is complete. Disturbed areas will be seeded or planted using appropriate native grass or species native to the areas where necessary. Natural regeneration of vegetation will also occur. • There will be a defined working area which will be fenced off with designated haul routes to prevent inadvertent damage to adjoining habitats. • Any hedgerows, treelines or woodland habitat removed during construction will be replanted using a suitable mix of shallow rooted, native species such as Hawthorn and Blackthorn. • Tree root systems can be damaged during site clearance and groundworks. Materials, especially soil and stones, can prevent air and water circulating to the roots. No materials will be stored within the root protection area/dripline of mature trees. The ECoW will specify appropriate protective fencing		CEMP	CEMP	Construction	Contractor

Planning Condition No.; EIAR Chapter/EIAR Appendix Commitment	Topic	Commitment	Related Planning Condition (PC)	Related Existing (Draft Document)	To be covered in Construction Document	Project Phase	Responsible Party
		where required. Retention of the existing network of woodland/ treelines/ hedgerows, where possible, will provide natural screening and help to maintain biodiversity. Where tree root systems cannot be avoided the trees will be assessed by an arboriculturist to determine if crown reduction or other measures are required. • It is intended that the land along the cable route will be reinstated and returned to its current use post-construction. As not all habitat can be reinstated, biodiversity enhancement planting will be provided at the landfall to ensure that there is no net-loss of habitat as a result of the proposed development. The total biodiversity enhancement area will be 16,000m^2					
Chapter 12, Biodiversity; Appendix 6.1 CEMP	Otters	No signs of Otter or Otter holts were noted within 150m of the planning boundary, although Otter are known to occur along the Avoca River. This species is also likely to occur along the Templerainy Stream and potentially the Kilbride Stream. A detailed pre-construction survey will be carried out no more than 10-12 months prior to the commencement of construction works to confirm the absence of Otter holts within 150m of the proposed development area. If Otter holts are recorded at that time, the Environmental Clerk of Works (ECoW) will determine the appropriate means of minimising effects i.e. avoidance, moving works, timing of works etc. If required the ecologist will obtain a derogation licence from the NPWS, to facilitate licenced exclusion from the breeding or resting site in accordance with a plan approved by the NPWS. Any holts found to be present will be subject to monitoring and mitigation as set out in the NRA Guidelines for the *Treatment of Otter prior to the Construction of National Road Schemes* (2006b). If found to be inactive, exclusion of holts may be carried out during any season. No wheeled or tracked vehicles (of any kind) will be used within 20m of active, but non-breeding, Otter holts. Light work, such as digging by hand or scrub clearance will also not take place within 15m of such holts, except under licence. The prohibited working area associated with Otter holts will be fenced and appropriate signage erected. Where breeding females and cubs are present no evacuation procedures of any kind will be undertaken until after the Otters have left the holt, as determined by the ECoW. Breeding may take place at any season, so activity at a holt must be adjudged on a case by case basis. On occasion, Otter holts may be directly affected by the scheme. To ensure the welfare of Otters, they must be evacuated from any holts present prior to any construction works commencing. The exclusion process, if required, involves the installation of one-way gates on the entrances to the holt and a monitoring period of 21 days to ensure the Otters have left the holt prior to removal.		CEMP	CEMP	Construction	Contractor
Chapter 12 Biodiversity; Appendix 6.1 CEMP	Fish – Crossing of Kilbride and Johnstown North	The Kilbride and Johnstown North watercourse crossings will be constructed using open cut trenched techniques. The following mitigation measures will be implemented: • Works will comply with the IFI's Guidelines on *Protection of Fisheries During Construction Works in and Adjacent to Waters* (IFI, 2016) and IFI will be consulted with regard to any proposed over-pumping at the watercourse crossing. • Construction activities will be undertaken during daylight hours only. This will ensure that there is potential for undisturbed fish passage at night. The works will be temporary and will not create a significant long-term barrier to fish movement. • During the construction of the crossing of the Kilbride watercourse IFI will be consulted in relation to protecting fish populations. Measures include only undertaking instream works during the period July to September to avoid interference with the spawning migration and spawning process and to protect juvenile fish emerging from the gravels, • Prior to temporarily damming the Kilbride Stream a fish salvage operation will be carried out under the provisions of a Section 14 licence. Standard biosecurity protocols will be implemented, and fish will be translocated to similar habitat upstream of the works area. This will be carried out following receipt of a Section 14 licence from IFI and in consultation with IFI.		CEMP	CEMP	Construction	Contractor
Chapter 12 Biodiversity; Appendix 6.1 CEMP	Badgers	As a precautionary measure, as Badgers could potentially move into the area prior to the commencement of works, the planning boundary will be surveyed for Badgers no more than 10-12 months prior to the commencement of site works, to confirm the absence of Badgers within the zone of influence of the development. If Badgers are discovered at that time, the mitigation measures outlined in the NRA publication,		CEMP	CEMP	Pre-construction; Construction	Employer/ Contractor

Planning Condition No.; EIAR Chapter/EIAR Appendix Commitment	Topic	Commitment	Related Planning Condition (PC)	Related Existing (Draft Document)	To be covered in Construction Document	Project Phase	Responsible Party
		Guidelines for the Treatment of Badgers Prior to the Construction of a National Road Scheme (NRA, 2006a), are to be followed. If necessary, the following measures will be employed for all construction works where badger issues arise: • Badger sett tunnel systems can extend up to c. 20m from sett entrances. Therefore, no heavy machinery will be used within 30m of badger setts (unless carried out under licence); lighter machinery (generally wheeled vehicles) will not be used within 20m of a sett entrance; light work, such as digging by hand or scrub clearance will not take place within 10m of sett entrances. Based on the results of badger surveys to date the construction works within the planning boundary will not take place within these buffer zones. • During the breeding season (December to June inclusive), no works will be undertaken within 50m of active setts, and no pile driving within 150m of active setts. Based on the results of badger surveys to date, the construction works within the planning boundary will not take place within these buffer zones. • Where badger setts are likely to be affected, they will be clearly marked and buffer zones for vehicles clearly marked by fencing and signage; • Works close to badger setts or removal of badgers from a site will only be carried out under the supervision of a qualified ecologist under license from the NPWS. • Where affected setts do not require destruction, construction works may commence once recommended mitigation measures to address the badger issues as identified by the ECoW and agreed with NPWS, have been complied with. Such mitigation may include hoarding or visual screens. • In the unlikely event that destruction of a badger sett is required this can only be carried out under licence from the NPWS. In these circumstances, which are highly unlikely to arise, badgers must have an alternative sett within their territory that can be utilised or an alternative artificial sett will be provided.					
Chapter 12 Biodiversity; Appendix 6.1 CEMP	Bats	During the site works, general mitigation measures for bats will follow the National Road Authority's '*Guidelines for the Treatment of Bats during the Construction of National Road Schemes'* NRA (2005c) and *'Bat Mitigation Guidelines for Ireland: Irish Wildlife Manuals, No. 25*' (Kelleher, C. & Marnell, F. (2006)). These documents outline the requirements that will be met in the pre-construction (site clearance) stage to minimise negative effects on roosting bats, or prevent avoidable effects resulting from significant alterations to the immediate landscape. No bat roosts were recorded within the proposed planning boundary. The contractor will take all required measures to ensure works do not harm individuals by altering working methods or timing to avoid bats, if necessary. The following mitigation measures will be implemented: • The bat specialist will work with the contractor to ensure that the loss of trees is minimised and that trees earmarked for retention are adequately protected. A preconstruction survey by the bat specialist will be carried out to advise the contractor on minimising tree loss within the cable route corridor. • Tree-felling will be undertaken in the period Septembe to late October/early November. During this period bats are capable of flight and may avoid the risks of tree-felling if proper measures are undertaken. • Felled trees will not be mulched immediately. Such trees will be left lying several hours and preferably overnight before any further sawing or mulching. This will allow any bats within the tree to emerge and avoid accidental death. The bat specialist will be on-hand during felling operations to inspect felled trees for bats. If bats are seen or heard in a tree that has been felled, work will cease and the local NPWS Conservation Ranger will be contacted. • Tree will be retained where possible and no 'tidying up' of dead wood and spilt limbs on tree specimens will be undertaken unless necessary for health and safety. • Treelines outside the proposed development area but adjacent to it and thus at risk, will be clearly marked by a bat specialist to avoid any inadvertent damage. • During construction directional lighting will be employed to minimise light spill onto adjacent areas. If night time works are required for HDD works at the Templerainy Stream and at the M11 there will		CEMP	CEMP	Pre-construction; Construction	Employer/ Contractor

Planning Condition No.; EIAR Chapter/EIAR Appendix Commitment	Topic	Commitment	Related Planning Condition (PC)	Related Existing (Draft Document)	To be covered in Construction Document	Project Phase	Responsible Party
		be no directional lighting focused towards woodland habitat and cowling and focusing lights downwards will be utilised to minimise light spillage. • If bats are recorded by the bat specialist within any vegetation or structure on site i.e. trees, or walls to be removed or impacted on, no works will proceed without a relevant derogation licence from the NPWS. • Upon completion external lighting will be installed at the substation. The lighting system will provide directional illumination within the substation to allow personnel to move without risk to health and safety and to prevent light spill.					
Chapter 12, Biodiversity; Appendix 6.1 CEMP	Birds	The Wildlife Act 1976, as amended, provides that it is an offence to cut, grub, burn or destroy any vegetation on uncultivated land, or any such growing in any hedge or ditch from the 1st of March to the 31st of August. Exemptions include the clearance of vegetation in the course of road or other construction works or in the development or preparation of sites on which any building or other structure is intended to be provided. Vegetation will only be removed outside of the breeding season. Retention of the native treelines, hedgerows and woodland where possible will reduce the loss of breeding and nesting habitat for birds. NRA guidelines on the protection of trees and hedges prior to and during construction will be followed (NRA, 2006).		CEMP	CEMP	Pre-construction; Construction	Employer/ Contractor
Chapter 12, Biodiversity; Appendix 6.1 CEMP	Biodiversity and Landscape	Where possible the working width will be managed to minimise the removal of trees and hedgerows. The substation site, contractors' compounds and temporary work areas will be managed in an orderly manner with security fencing and hoarding kept in good condition, and vehicular access managed to avoid congestion outside the development site. All vehicular traffic leaving work areas will be clean, and the local road network kept clean. Where trees and hedgerows are to be removed, tree protection fencing in accordance with BS 5837: 2012 will be installed to protect adjacent trees from construction traffic or activity to ensure their integrity and vitality. Excavated topsoil and subsoil will be stockpiled appropriately, for later backfilling and top-soiling. Following completion of the civil works, all excavations will be backfilled using stockpiled materials, and ground surfaces prepared for seeding. Treelines and hedgerows removed to facilitate construction will be replanted. It is intended that the land along the cable route will be reinstated and returned to its current use post-construction. As not all habitat can be reinstated, biodiversity enhancement planting will be provided to ensure that there is no net-loss of habitat as a result of the proposed development. The total biodiversity enhancement area will be 16,000m^2. The objective of the planting scheme within the biodiversity enhancement area is to create a semi-natural habitat with a diverse woodland structure. The soil type in this area is alkaline and the natural woodland type on relatively dry, fertile and alkaline ground is Oak-ash-hazel woodland WN2 (Fossit, 2000). This is a relatively uncommon woodland type. Pedunculate Oak (*Quercus robur*) has been included within the planting scheme with a view to creating this woodland type. However, it is noted that the planting site is coastal and exposed and therefore a more diverse planting scheme has been utilised. It is also noted that due to the problems associated with ash die-back disease, ash has not been included in the planting scheme. The objective of the planting scheme therefore is to develop a native woodland which is loosely based on the Oak-ash-hazel woodland WN2, but which is more diverse and better able to survive the prevailing conditions. This will be achieved by using a mixture of native species to provide a canopy, subcanopy and ground layer as the woodland matures. Native woodlands with this type of structure are generally of higher value for flora and fauna and as it matures it will become a locally important habitat for flora and fauna. Some open areas will be left unplanted to form small glades as the woodland matures. All trees will be of Irish origin. The planting scheme can be broadly categorised as follows:					

Planning Condition No.; EIAR Chapter/EIAR Appendix Commitment	Topic	Commitment	Related Planning Condition (PC)	Related Existing (Draft Document)	To be covered in Construction Document	Project Phase	Responsible Party
		• Main woodland planting area with Alder, Blackthorn, Hawthorn, Pendunculate Oak Quercus robur, Whitebeam, Hazel, Downey Birch Betula pubescens, Holly, Rowan Sorbus spp. and Scots Pine Pinus sylvestris. • Perimeter Edge Mix with Alder, Blackthorn, Hawthorn, Wild Privet Ligustrum vulgare, Holly, Spindle and Guelder Rose Viburnum opulus. A rabbit proof fence will be provided to protect trees during early establishment. Weed control should not be necessary in Years 1 or 2, however in year 3 some hand weeding may be required. A 5-year aftercare programme will be implemented. Any plant which die, are removed or become seriously damaged or diseased within a period of five years from the completion of the development shall be replaced within the next planting season.					
Chapter 12, Biodiversity; Appendix 6.1 CEMP	Operation	There will be infrequent visits by personnel to the substation, therefore, foul wastewater generated will be minimal. Foul wastewater will be collected independently from the welfare facilities in both the Transmission 220kV GIS substation building and the Connection 220kV GIS substation building. Foul wastewater will be stored temporarily in respective, appropriately sized, foul wastewater holding tanks and removed from site periodically, by a licensed service provider, to a licensed wastewater treatment facility. A new surface water drainage network has been designed to accommodate the proposed development. The surface water drainage network has been designed to ensure that no flooding or surcharging of the system will occur for all storm events up to and including the 1 in 30 year return period storm event. All buildings and equipment within the site boundary will be protected against flooding for all storm events up to and including the 1 in 200 year return period storm event. The proposed surface water drainage network design includes an allowance for climate change. Appropriately sized hydrocarbon interceptors will be installed at strategic locations along the proposed surface water drainage network to prevent any hydrocarbons from leaving the site of the proposed substation. Should a flood event be forecast to occur it will be required that the substation operator would deploy personnel to the substation to manage on-site infrastructure in the event of a local flood. Emergency procedures detailing the measures to be undertaken should any accidental spill happen during operation will be developed as part of the operations manual. The lighting system will provide directional illumination within the substation to allow personnel to move without risk to health and safety and to prevent light spill. Security lighting will be installed against the building and Glass Reinforced Polymer lighting poles of maximum 6m height will be installed for illuminating the external area within the perimeter fencing. 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. Motion sensor technology will be used to control lighting at access doors and security gates. Lighting design/locations will be designed to provide minimum lux levels, for security and for safety reasons. The lighting will comply with EirGrid requirements which include for outdoors at ground level horizontal illuminance of not less than 2 lux. Lights will be controlled to automatically switch on at 55 lux and off at 110 lux, with manual override. For emergency lighting a minimum illumination of not less than 30 lux will be provided in all areas to ensure safe movement of personnel, safe access to, and egress from, any part of the substation building.		EIAR	Operational Procedures	Operation	Employer

Planning Condition No.; EIAR Chapter/EIAR Appendix Commitment	Topic	Commitment	Related Planning Condition (PC)	Related Existing (Draft Document)	To be covered in Construction Document	Project Phase	Responsible Party
Chapter 12 Biodiversity; Appendix 6.1 CEMP		Ecology and invasive species surveys will be carried out prior to decommissioning and appropriate mitigation will be provided based on up-to-date data and in line with up to date guidelines. The original habitats will be restored and levels of noise, lighting and disturbance will return to levels pre-construction.		EIAR	Decommissioning Plan	Decommissioning	Employer
Chapter 13, Traffic & Transport; Appendix 6.1 CEMP	Construction Traffic Management Plan	A Construction Traffic Management Plan (CTMP) has been prepared and is included in the CEMP. The contractor will update the CTMP prior to commencement of construction, will keep the CTMP updated throughout, will agree the CTMP with Wicklow County Council and An Garda Síochána and will fully implement the CTMP. The CTMP includes the details of the required traffic management measures. It demonstrates how pedestrians, cyclists and motorised vehicles can pass through the area safely where appropriate and that measures are in place which ensure traffic operates in as efficient a manner as possible. The CTMP includes a detailed consultation plan to deal with third party queries from local resident and community groups along the cable route in particular but also in the vicinity of the proposed site compounds. The contractor will appoint a single point of contact to facilitate the communication of the various traffic management plans. The implementation of the CTMP and the co-ordination of works in consultation with Wicklow County Council and local residents, will minimise these impacts.		CEMP	CEMP	Pre-Construction; Construction	Employer/ Contractor
Chapter 13, Traffic & Transport; Appendix 6.1 CEMP	Deliveries to Site	The following measures apply: • Deliveries of materials will be planned and programmed to ensure that the materials are delivered only as they are required at the working areas along the cable route and will avoid peak hours for set-up and removal of equipment; • Works requiring multiple vehicle deliveries, such as concrete pours, will be planned so as to ensure there will be no queuing on the public roadways around the working areas.		CEMP	CEMP	Construction	Contractor
Chapter 13, Traffic & Transport; Appendix 6.1 CEMP	Road/Lane Closures	The following measures apply: • Road closures will be kept to a minimum to avoid disruption to traffic. Each of the road closures will be short in duration and temporary (unlikely to exceed a week with access allowed between working shifts). Where possible, traffic flow will be maintained by use of temporary traffic signals. • For any works related to the cable route that require lane closures the length of lane closure and the required working area will be kept as small as possible.		CEMP	CEMP	Construction	Contractor
Chapter 13, Traffic & Transport; Appendix 6.1 CEMP	Working Areas, Cable Construction Corridor and Construction Compounds	The following measures apply: • All trucks entering and exiting the working areas which are carrying materials which could become windborne will be covered with tarpaulin; • Trucks will not be allowed to park on public roads either outside the working areas or on any of the approach roads leading to the working areas; • All trucks entering the working areas will be restricted to suitable speed limits and will be directed to the relevant area by the site manager, avoiding school areas at drop off and collection times. St Josephs National School is located on the R772 Dublin Road. Bus services and infrastructure along the R772 Dublin Road and the R774 Vale Road in the study area will not be impacted by the proposed development, as no lane closures or traffic diversion will be required along these roads; • Trucks required to wait at the working areas will switch off engines to avoid unnecessary fuel usage and noise; • All trucks exiting the construction compounds will be required to pass through a dry or wet wheel wash. All water from the wheel wash will be collected, treated to remove silt or other contaminants, and removed from site. This will ensure no spread of invasive species from vehicle movements;		CEMP	CEMP	Construction	Contractor

Planning Condition No.; EIAR Chapter/EIAR Appendix Commitment	Topic	Commitment	Related Planning Condition (PC)	Related Existing (Draft Document)	To be covered in Construction Document	Project Phase	Responsible Party
		• Roads immediately adjacent to the construction compounds will be visually inspected on a daily basis and power swept and washed as and when required; and • Adequate parking will be provided at the substation site, landfall compounds (HDD and temporary construction compounds), the cable route HDD compounds and the substation compound to avoid queuing at the site entrances and prevent disruption to neighbouring businesses and residences. Site entrance gates will be set back from the main road to allow a vehicle to pull in off the road before the gate is opened.					
Chapter 13, Traffic & Transport; Appendix 6.1 CEMP	Monitoring	The effectiveness of the Construction Traffic Management Plan will be continually monitored by the contractor to ensure the effects on traffic flows on the surrounding road network are minimised. The monitoring regime will consider all modes of traffic including pedestrians, cyclists and car parking provision.		CEMP	CEMP	Construction	Contractor
Chapter 14 – Landscape and Visual	Substation	Building elements within the substation are designed as simple forms with metal panel cladding panels that will be finished in a matt dark green/grey colour that will be visually absorbed by the mixed woodland backdrop on the northern valley face. Perimeter security fencing will also be a dark grey/green finish.		EIAR	Substation Contract	Pre-construction	Employer
Chapter 14 – Landscape and Visual (LVIA)	Substation lighting design	Site lighting will be provided using lamp standards up to 6.0m in height and fitted with high cut-off LED luminaires so as to minimise light spill.		EIAR	Substation Contract	Pre-construction	Employer
Chapter 14 – Landscape and Visual (LVIA)	Substation operation	Lighting will typically be switched off during the hours of darkness and will be operated by motion sensors.		EIAR	Substation Contract	Pre-construction; Construction	Employer/ Contractor
Chapter 14 – Landscape and Visual (LVIA)	LVIA	The substation site, temporary construction compounds and temporary work areas will be managed in an orderly manner, with security fencing or hoarding as appropriate kept in good condition, and vehicular access managed to avoid congestion outside the development site. All vehicular traffic leaving work areas will be clean, and the local road network kept clean in accordance with the Construction Environmental Management Plan (CEMP).		EIAR	CEMP	Pre-construction; Construction	Employer/ Contractor
Chapter 14 – Landscape and Visual (LVIA)	LVIA	Where trees and hedgerows are to be removed, tree protection fencing in accordance with BS 5837: 2012 will be installed to protect adjacent trees from construction traffic or activity to ensure their integrity and vitality. Excavated topsoil and subsoil will be stockpiled appropriately for later backfilling and top-soiling.		EIAR	CEMP	Construction	Contractor
Chapter 14 – Landscape and Visual (LVIA)	LVIA	Following completion of the civil works, all excavations will be backfilled using stockpiled materials, and ground surfaces prepared for seeding. Trees and hedgerows removed to facilitate construction corridors will be replaced with similar species where possible. An area of coastal woodland planting will be provided at the landfall site extending to 16,000m^2 and comprising native woodland species of Alder, Blackthorn, Hawthorn, Sessile Oak *Quercus petraea*, Whitebeam, Hazel, Downey Birch *Betula pubescens*, Holly, Rowan *Sorbus spp*. and Scots Pine *Pinus sylvestris*, together with perimeter edge mix of Alder, Blackthorn, Hawthorn, Wild Privet *Ligustrum vulgare*, Holly, Spindle and Guelder Rose *Viburnum opulus*. At field boundaries along the cable route, boundaries will be replanted with shallow rooting hedgerow species above the underground cable circuits. At the 220kV substation, the space between the main security fence and the outer fence will be planted with shallow rooting hedge and shrub species.		EIAR	CEMP	Construction	Contractor
Chapter 14 – Landscape and Visual	LVIA	The contractor will be required to include a 24-month defects liability clause for replacement landscaping and any planting that fails to establish or dies will be replaced.		EIAR	Contract	Pre-construction; Construction	Employer/ Contractor
Chapter 14 – Landscape and Visual	LVIA	Orderly operation and maintenance of the substation site area will ensure the facility remains as built, any defects repaired promptly, and lighting fixtures maintained to ensure minimal light spill.		EIAR		Operation	Employer
Chapter 15 – Archaeology, Architectural and Cultural Heritage; Appendix 6.1 - CEMP	Archaeology	A programme of archaeological testing will be carried out in advance of construction within all greenfield areas of the proposed development. This will be undertaken by an archaeologist under licence and will aim to identify the nature, extent and significance of any archaeological remains that may be present within the project extents. If any features of archaeological potential are discovered during the course of the works further archaeological mitigation may be required, such as preservation in-situ or by record and/or archaeological		EIAR	CEMP	Pre- Construction	Employer

Planning Condition No.; EIAR Chapter/EIAR Appendix Commitment	Topic	Commitment	Related Planning Condition (PC)	Related Existing (Draft Document)	To be covered in Construction Document	Project Phase	Responsible Party
		monitoring. Any further mitigation will require approval from the National Monuments Service of the DoHLGH.					
Chapter 15 – Archaeology, Architectural and Cultural Heritage; Appendix 6.1 CEMP	Archaeology	A programme of underwater archaeological assessment, in the form of wade surveys, will be carried out on each watercourse to be directly impacted by the proposed development. This will be carried out by an archaeologist (or archaeologists) under licence and will aim to identify the nature, extent and significance of any archaeological remains that may be present within the sections of watercourses to be affected. If any features of archaeological potential are discovered during the course of the works further archaeological mitigation may be required, such as preservation in-situ or by record and/or archaeological monitoring. Any further mitigation will require approval from the National Monuments Service of the DoHLGH.		EIAR	CEMP	Pre-Construction	Employer
Chapter 16 – Resource & Waste Management; Appendix 6.1 CEMP	Construction Waste Plan	Every effort will be made to ensure that significant environmental effects will be prevented or reduced during the construction phase of the proposed development. A Construction Waste Management Plan (CWMP) is included in the CEMP. This plan meets the requirements of the Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects (Department of Environment, Heritage & Local Government, 2006). The contractor will be obliged to further develop, implement and maintain the CWMP during the construction phase. The key principles underlying the plan will be to minimise waste generation and to segregate waste at source. The measures to achieve these aims include: • Where possible recyclable material will be segregated and removed off site to a permitted/licensed facility for recycling. Waste stream colour coding and photographs will be used to facilitate segregation. • Office and food waste arising on the construction compounds will be source separated at least into dry mixed recyclables, biodegradable and residual wastes. • Waste bins, containers, skip containers and storage areas will be clearly labelled with waste types which they contain, including photographs as appropriate. • The site will be maintained to prevent litter and regular litter picking will take place throughout the site. • Material Management: ‘Just in time’ delivery will be used so far as is reasonably practicable to minimise material wastage. • The Contractor will ensure that the material transported off site will go to an appropriately licensed/permitted facility. • The Contractor will record the quantity in tonnes and types of waste and materials leaving the site. The name, address and authorisation details of all facilities and locations to which waste and materials are delivered will be recorded along with the quantity of waste in tonnes delivered to each facility. Records will show material which is recovered and disposed of. • Paints, sealants and hazardous chemicals etc. will be stored in secure, bunded locations. • All hazardous waste will be separately stored and labelled, in appropriate lockable containers, prior to removal from site by an appropriate waste collection holder. • Waste generated on site will be removed as soon as practicable following generation for delivery to an authorised waste facility.		CEMP	CEMP	Pre-Construction; Construction	Employer/ Contractor
Chapter 16 – Resource & Waste Management; Appendix 6.1 CEMP	Waste Management Measures	The following measures apply: • The contractor will minimise waste disposal so far as is reasonably practicable; • Source segregation: Where possible, metal, timber, glass and other recyclable material will be segregated during construction works and removed off site to a permitted/licensed facility for recycling. Waste stream colour coding, and photographs of wastes to be placed in each container as required, will be used to facilitate segregation. Where waste generation cannot be avoided this will maximise the quantity and quality of waste delivered for recycling and facilitate its movement up the waste hierarchy away from landfill disposal and reduce its environmental effect; • Supply chain partners: The Contractor will engage with the supply chain to supply products and materials that use minimal packaging, and segregate packaging for reuse;		CEMP	CEMP	Construction	Contractor

Planning Condition No.; EIAR Chapter/EIAR Appendix Commitment	Topic	Commitment	Related Planning Condition (PC)	Related Existing (Draft Document)	To be covered in Construction Document	Project Phase	Responsible Party
		• Waste Auditing: The Contractor will record the quantity in tonnes and types of waste and materials leaving site during the construction phase; • Waste fuels/oils will be generated from equipment used on-site during construction and will be classified as hazardous waste. Such wastes will be stored in a secure, bunded area on-site prior to collection by a Contractor who holds the appropriate waste collection permit; • Possibilities for re-use of clean non-hazardous excavation material as fill on the site or in landscaping works will be considered following appropriate testing to ensure material is suitable for its proposed end use. Where excavation material cannot be re-used within the proposed works the Contractor will endeavour to send material for re-use as a by-product, recovery or recycling so far as is reasonably practicable. Re-use as a by-product can be done under an Article 27 notification once the established EPA criteria for such re-use are met; • Excavated material will be stored onsite within the planning (red line) boundary prior to re-use; • The name, address and authorisation details of all facilities and locations to which waste and materials are delivered will be recorded along with the quantity of waste in tonnes delivered to each facility. Records will show material, which is recovered, and which is disposed of; and • The Contractor will ensure that any off-site interim storage or waste management facilities for excavated material have the appropriate waste licences or waste facility permits in place.					
Chapter 16 – Resource & Waste Management; Appendix 6.1 CEMP	Hazardous Waste	Export of hazardous waste from the proposed development outside of the State is subject to a Europe-wide control system founded on EU Regulation 1013/2006 on the Shipments of Waste (known as the Transfrontier Shipment Regulations), as amended. This legislation is supplemented by the Waste Management (Shipments of Waste) Regulations 2007, as amended, which makes Dublin City Council responsible for the enforcement of this regulatory system throughout Ireland. In 2019 in Ireland, 580,977 tonnes of hazardous waste was generated and of this 333,195 tonnes was exported for treatment. The above procedures will be applied to any hazardous waste generated during the construction phase. Export of hazardous waste from site outside the state will comply with the procedures set out in this legislation. An estimated 2,000 tonnes of hazardous excavation waste will be generated as part of the proposed development.		CEMP	CEMP	Construction	Contractor
Chapter 16 – Resource & Waste Management; Appendix 6.1 CEMP	Monitoring	Monitoring required as part of the detailed CWMP will be undertaken and recorded by the contractor.		CEMP	CEMP	Construction	Contractor
Chapter 16 – Resource & Waste Management; Appendix 6.1 CEMP	Decommissioning	For the decommissioning phase, a materials management plan will be prepared, which will cover the same topics and be based on the same general principles as the construction phase CWMP, included in the CEMP (Appendix 6.1 of Volume 3), updated to reflect best practice at the time. During the decommissioning phase the contractor will segregate materials at source and ensure that all waste and recoverable materials leaving site will be collected by authorised collectors and delivered to permitted facilities in accordance with the relevant Irish legislation, pertaining at the time.		EIAR	Decommissioning Plan	Decommissioning	Employer
Chapter 17 – Material Assets	Utilities - wastewater	Wastewater will be collected independently from the welfare facilities in each of the transmission and connection compounds within the proposed substation. The wastewater will be stored temporarily in holding tanks and removed from site periodically, by a licensed service provider, to a licensed wastewater treatment facility.		EIAR		Operation	Employer
Chapter 17 – Material Assets	Utilities - wastewater	The temporary construction compounds will store wastewater in holding tanks, which will be emptied on a regular basis (typically bi-weekly) by licensed contractors and disposed of appropriately.		EIAR	CEMP	Construction	Employer/ Contractor
Chapter 6 – Construction Strategy, Chapter 17 – Material Assets	Utilities – surface water	To control surface water runoff from the site during construction, temporary drainage will be installed.		EIAR	CEMP	Construction	Employer/ Contractor
Chapter 17 – Material Assets	Utilities – surface water	Maintenance work on the existing drainage network and attenuation pond may be required. This is expected to include de-siltation of existing channels and the attenuation pond to be used as part of the work and will either		EIAR		Operation	Employer

Planning Condition No.; EIAR Chapter/EIAR Appendix Commitment	Topic	Commitment	Related Planning Condition (PC)	Related Existing (Draft Document)	To be covered in Construction Document	Project Phase	Responsible Party
		be completed by an excavator or hydro-vac. The silt will be removed from site as required, to an appropriately licensed disposal facility.					
Chapter 17 – Material Assets	Utilities – surface water	Other maintenance work such as water jet cleaning of existing drainage culvert pipes to remove any blockages or debris, replacement of damaged culvert pipes using equivalent size twin walled HDPE or precast concrete pipes and the shoring up of culvert pipe headwalls may also be required.		EIAR		Operation	Employer
Chapter 17 – Material Assets	Utilities – surface water	Any existing field drainage crossing the landfall site will be temporarily diverted or facilities put in place to over-pump to settlement ponds prior to discharge of treated water into the existing surface water drainage system.		EIAR	CEMP	Construction	Contractor
Chapter 17 – Material Assets	Utilities – surface water	Where existing drainage is present along the cable route, whether in open ditch or buried field drains, these will be temporarily diverted, or facilities put in place to over-pump to the temporary surface water drainage system.		EIAR	CEMP	Construction	Contractor
Chapter 17 – Material Assets	Utilities – surface water	Field drains will be reinstated on completion of the works or new drainage installed to match the drainage characteristics of the ground prior to development, to ensure agriculture is not affected. Landowners will be consulted on the proposed drainage provisions prior to any installation.		EIAR	CEMP	Construction	Employer/ Contractor
Chapter 17 – Material Assets	Land Use	For the installation of the cables, the temporary cable construction corridor along the cable route will be fenced-off on a phased basis and this land will not be available for its current use for the duration of the construction phase. Similarly, the construction compounds will be fenced off and the area of the compounds will not be available for their current use for the duration of the construction phase. Apart from the access tracks to the jointing bays, which will be retained as permanent access tracks, the land will be returned to its original condition and use after the works are complete.		EIAR	CEMP	Construction	Employer/ Contractor
Chapter 17 – Material Assets	Utilities – Power supply	Where possible, the working areas will be powered by existing mains supplies, but if not available, via a diesel generator. The mains supply in the area is expected to have adequate capacity for any proposed requirements.		EIAR	Construction Contracts	Construction	Employer/ Contractor
Chapter 17 – Material Assets	Utilities – Potable Water	Potable water will be supplied to the construction compounds from Irish Water mains where available. If a connection is not feasible, the water required in the works areas during the construction period will be transported to site. Water will also be required in these areas for wheel washes and/or for dust control in dry windy weather. Grey water for construction and toilets will be sourced via rainfall collection or transported via tanker to site. Any potable water supplies, affected by the works, will be reinstated as soon as is feasible, or an alternative supply provided on a temporary basis until the permanent supply can be reinstated.		EIAR	Construction Contracts	Construction	Employer/ Contractor
Chapter 17 – Material Assets	Utilities – General	The proposed cable route will cross underground services and utilities. These have been identified through consultation with the utility providers. There is the potential for disruption to these utilities when the cable trench is being excavated. Some utilities may need to be disconnected for a brief period, with the agreement of the utility owner.		EIAR	Construction Contracts	Construction	Employer/ Contractor
Chapter 17 – Material Assets	Utilities – Potable Water Supply	The water demand at the substation will be minimal and will be less than a domestic requirement. Water will be supplied to welfare facilities in the substation via an upgraded Irish Water watermain.		EIAR	IW Connection Agreement	Operation	Employer
Chapter 17 – Material Assets	Utilities - general	The developer will require the contractor to put measures in place to ensure that there are no interruptions to existing services unless this has been agreed in advance with the relevant service provider. Adequate separation distances will be established between the cables and the existing services. Further methods that will be used to mitigate the risk of damage to existing services will be as follows: • Assessing route records for existing assets to understand their depth, location and proximity to the planned cable trenches; • The use of Ground Penetration Radar (GPR), to provide greater confirmation of the locations of existing assets; • The use of trial holes, again to provide greater knowledge on the exact location of existing assets; and • Full liaison with asset owners to discuss and agree clearances and where necessary designs. All works near existing services and utilities will be carried out in ongoing consultation with the relevant utility company or local authority and will follow any requirements or guidelines they may have.		EIAR	Construction Contracts	Pre-construction; Construction	Employer/ Contractor
Chapter 18 Population and	General Measures covered elsewhere	Mitigation for emissions during construction is proposed throughout under measures in Chapter 7 Air Quality, Chapter 8 Climate, Chapter 9 Land and Soils, Chapter 11 Noise and Vibration, Chapter 13 Traffic and		EIAR	CEMP	Pre-construction; Construction	Employer/ Contractor

Planning Condition No.; EIAR Chapter/EIAR Appendix Commitment	Topic	Commitment	Related Planning Condition (PC)	Related Existing (Draft Document)	To be covered in Construction Document	Project Phase	Responsible Party
Human Health; CEMP		Transport, Chapter 16 Resource and Waste Management, Chapter 17 Material Assets and Chapter 19 Major Accidents and Disasters. The use of hoarding at the temporary construction compounds and management of the timing and duration of works will, in most cases have the effect of reducing the significance of effects on the population.					

Chapter 18 Population and Human Health; CEMP	Community Liaison/Good Neighbour Policy	The developer recognises the importance of effective community liaison in order to reduce nuisance to residents during the works, to ensure public safety and welfare, and to help ensure the smooth running of construction activities. Important issues in ensuring good relations are:
		• Providing information for the public during the construction phase, (particularly nearby sensitive receptors);
		• Providing the correct points of contact and being responsive; and
		• Ensuring good housekeeping in all aspects of the operations.
		• A 'good neighbour' policy will also be implemented.
		• Key aspects of this policy include:
		  • Early implementation of the policy i.e. from the commencement of construction;
		  • Reduction of nuisance factors;
		  • Maintaining access to neighbouring premises;
		  • Clear and concise information; and
		  • Undertaking timely liaison with stakeholders.
				EIAR	CEMP	Pre-construction; Construction	Employer/ Contractor

Chapter 18 Population and Human Health; CEMP	Community Liaison Plan	With regard to liaison, the contractor will be required to implement the Community Liaison Plan (included in the Construction Environmental Management Plan (CEMP), which includes details of how the local community, road users and affected residents will be notified in advance of the scheduling of major works, any temporary traffic diversions and the progress of the construction works. This plan includes details of the following: • The Developer's 'good neighbour' policy; • Personnel nominated to manage public relations; • A methodology for processing observations, queries and complaints from the general public, relevant authorities, the media and emergency services; and • The strategy for project-wide liaison with all relevant parties. A Community Liaison Officer will be responsible for managing such tasks as the following: • Briefing neighbours on progress and issues as necessary; • Liaison with Wicklow County Council and emergency services as appropriate; • Liaison with local Gardaí, particularly in relation to traffic movements and permits where necessary; and • Contact details for the Community Liaison Officer will be posted on all construction site notice boards and on any other information or correspondence, which may be distributed from time to time.		EIAR	CEMP	Pre-construction; Construction	Contractor
Chapter 18 Population and Human Health; CEMP	General Measures for Population	The selected construction methodologies will help to avoid/minimise negative effects to the surrounding population during the construction phase of the proposed development: • The implementation of a CEMP to minimise effects of construction works on local amenity and on traffic flow • The implementation of the Environmental Incident & Emergency Response Plan to cover foreseeable risks; • Industry-standard traffic management measures will be put in place to alleviate construction-related traffic disruptions as outlined in **Chapter 13** *Traffic and Transport* and herein; • Dust emissions will be controlled throughout the construction phase. Further details of dust mitigation measures are outlined in **Chapter 7** *Air Quality* and herein;					

Planning Condition No.; EIAR Chapter/EIAR Appendix Commitment	Topic	Commitment	Related Planning Condition (PC)	Related Existing (Draft Document)	To be covered in Construction Document	Project Phase	Responsible Party
		• Best practice measures for noise control on construction sites will be adhered to during construction. Further details of noise and vibration mitigation measures are outlined in **Chapter 8** *Noise and Vibration* and herein; • As required by regulation and legislation, a Health and Safety Plan will be prepared to address health and safety issues during the construction phase. Further details are provided in **Chapter 6** *Construction Strategy;* • A Construction Traffic Management Plan (CTMP) has been prepared and is included in the CEMP; • Temporary traffic management signage Chapter 8 of the Traffic Signs Manual and Temporary Traffic Management Document Guidelines (Department of Transport, Tourism and Sport, 2019) will be erected which will provide advance warning of site entrances as described in **Chapter 13** *Traffic and Transport*; • Deliveries of materials will be planned and programmed to ensure that the materials are delivered only as they are required at the working areas. • Storage of material will be at the supplier or at the temporary construction compounds, depending on the type of material; • Works requiring multiple vehicle deliveries, such as concrete pours, will be planned so as to ensure there will no queuing on the public roadways around the working areas. Deliveries will, where appropriate, be limited to outside of peak traffic hours					
Chapter 19 – Major Accidents and Disasters, Appendix 6.1 - CEMP	Fire/Explosion Risk	As outlined in the EIAR**,** the scenario with the highest risk score in terms of a major accident and/or disaster during the construction phase was identified as 'fire and/or explosion', with a secondary effect of 'fire water/foam/powder reaching nearby receptors'. The mitigation measures, which will limit the likelihood and consequence of a fire or explosion, will include: • The storage of fuels and oils in contained and bunded areas, with quantities stored being limited to the minimum volume required to meet the immediate requirements. This will mitigate, by prevention, the risk of fire/explosion resulting from the potential spillage of fuels or oils. • Portable fire extinguishers will be available for use at each of the onshore working areas. • Appropriate site personnel will be trained as first aiders and fire marshals. • Monitoring of site activities to minimise fire and explosion risk will be a key part of the duties of the site safety officer and fire marshals.		EIAR	CEMP	Pre-construction; Construction	Employer/ Contractor
Chapter 5 Description of Development, Chapter 6 Construction Strategy, Chapter 19 – Major Accidents and Disasters	Operations	The proposed development will be operated in line with industry good practice as described in **Chapter 5** *Description of Development* and **Chapter 6** *Construction Strategy* including operational management procedures implemented so as to minimise the risk of major accidents occurring.		EIAR		Operations	Employer
Chapter 19 – Major Accidents and Disasters, Appendix 6.1 - CEMP	Fire/Explosion Risk	The scenarios with the highest risk score during the operational phase were a 'fire and/or explosion', with a secondary effect of 'fire suppressant powder reaching nearby receptors.' The mitigation measures, which will limit the likelihood and consequence of a fire or explosion, will include: • The proposed development will comply with BS 9999 Fire safety in the design, management and use of buildings. • A Fire Plan specific to the substation site will detail the pre-planned procedures in place for use in the event of a fire. • Fire detection and alarm will be designed to BS 5839 Fire Detection and Alarm Systems for Buildings • The buildings will be equipped with firefighting equipment that may aide safe evacuation in the event of a fire. • Fire suppression systems will be fitted to all enclosed areas with equipment/plant containing oil unless it can be demonstrated at detailed design stage that it is safe not to do so.		EIAR		Operations	Employer

Planning Condition No.; EIAR Chapter/EIAR Appendix Commitment	Topic	Commitment	Related Planning Condition (PC)	Related Existing (Draft Document)	To be covered in Construction Document	Project Phase	Responsible Party
		• Cable routes and other holes through walls and floors will be designed to be capable of being fire sealed after installation of all equipment/plant and cables. • Smoke detection will be provided throughout the substation building.					

Appendix B – Construction Traffic Management Plan

Appendix B-B

Construction Traffic Management Plan

Contents

1 Introduction

1.1 General

This Construction Traffic Management Plan (CTMP) has been prepared for the Arklow Bank Wind Park Phase 2 Onshore Grid Infrastructure (the proposed development) to ensure that construction traffic will be managed and monitored safely and efficiently throughout the construction phase. The Contractor will update the CTMP prior to commencement of construction, will keep the CTMP updated throughout, will agree the CTMP with Wicklow County Council and An Garda Síochána and will fully implement the CTMP.

1.2 Purpose and Scope

This CTMP will be a key construction contract document, the implementation of which will reduce possible impacts which may occur during the construction of the proposed scheme.

The objectives of this CTMP are to:

- Outline minimum traffic management measures to be implemented at the site access/egress locations and at the approaches to such access/egress locations, during the works;
- Demonstrate to the Developer, Contractor and suppliers the need to adhere to the relevant guidance documentation for such works; and
- Provide the basis for the Contractor to further develop the details of this CTMP.

The Developer or the Employer’s Representative will be responsible for ensuring that the Contractor manages the construction activities in accordance with this CTMP.

Objectives and measures are also included for the management, design and construction of the project to control the traffic impacts of construction insofar as it may affect the environment, local residents and the public in the vicinity of the construction works.

In the event that approval is granted for the proposed development, the CTMP will address the requirements of any relevant conditions, including any additional mitigation measures which are conditioned. The CTMP (updated by the Contractor prior to construction to incorporate these conditions) will require approval from Wicklow County Council and An Garda Síochána.

The objective of this CTMP is to ensure that the residual impacts to the public road network during the construction phase of the proposed development are minimised and that transport related activities are carried out as safely as possible and with the minimum disruption to other road users.

The CTMP has also been prepared for the purpose of identifying appropriate and safe methods of access for construction traffic to the proposed development.

This CTMP describes the traffic management for the transportation of construction materials, equipment and personnel along the public road network to facilitate the construction of the proposed development. Light vehicles, such as cars and vans, will be used by site operatives travelling to and from the site. Heavy Goods Vehicles (HGV) will be required to deliver general construction materials, such as concrete, to the site and for the removal of excavated material that is to be disposed of off-site.

1.3 Implementation

Key to the implementation of the CTMP is the is the appointment of a suitably experienced and qualified person on-site (nominated by the Contractor) who will supervise the implementation of the plan and regularly liaise with and update the supervising Employer’s Representative team on the operation of the CTMP and any proposed improvements. All site personnel will be charged with following good practice and will be encouraged to provide feedback and suggestions for improvements. Site personnel will also be required to comply with the requirements of the site’s CTMP.

1.4 Document Revision

The CTMP will be subject to on-going review throughout the construction phase of the proposed scheme, and regular auditing and site inspections.

All of the information required to further develop the CTMP will be highlighted in the specification for the construction contract. The Contractor will be required to include further details and/or confirmation, as described below.

2 Proposed Construction Traffic Generation

2.1 Overview

The potential temporary impacts of the scheme on the road network are as follows:

- Temporary impacts during construction due to the excavation of materials in order to facilitate construction, and the associated movements of excavation vehicles;
- Temporary impacts associated with the importing of construction materials, equipment, etc to the works areas, and the relevant movements of delivery and construction vehicles and construction workforce;
- Temporary impacts during construction due to road closures, lane closures and diversions;

- Construction staff commuting to and from the construction compounds, cable route corridor and working areas; and
- General service traffic associated with construction activities (i.e. plant deliveries, visitors, traffic between compounds and working areas, etc.)

2.2 Traffic Generation from Proposed Scheme

In the traffic impact assessment, the volumes of traffic associated with the construction activities have been estimated on the basis of the requirements of each individual area of works. All the assumptions made for the purpose of the assessment were conservative and therefore the conclusions are robust.

The time periods assessed as part of this transportation assessment included the busiest periods namely the morning peak period, the evening peak period and also daily flows (i.e. 24-hour period).

The crossing of the M11 will be either via HDD or via an existing underpass. In respect of the M11 crossing, it is considered that, in terms of this transport assessment, the HDD crossing would generate the highest number of vehicle trips due to the amount of excavated material to be removed. The HDD crossing therefore has been used in the traffic impact assessment. Should the option to use the existing underpass materialise then the volume of generated traffic will be less, resulting in a reduced impact.

The duration of construction works at the landfall area will be c. 10 months between September 2023 and June 2024. For the purpose of the assessment it was assumed that the export and import of earthworks will take place over a period of 2 months.

The duration of construction works along the cable route will be c. 24 months commencing in 2023. It was assumed that the export and import of earthworks/fill along the cable route to/from the temporary cable construction compound at the landfall and to/from the substation temporary construction compound will take place over a period of 6 months. It was also assumed that the export and import of earthworks along the cable route to/from the four HDD temporary construction compounds at the R772 and M11 will take place over a period of 1 month.

The duration of construction works at the substation area will be c. 24 months commencing in 2023. For the purpose of the assessment it was assumed that the export and import of earthworks at the substation area will take place over a period of 3 months.

The assessment assumes that the construction of all aspects of the proposed development will take place in parallel, at the same time. It is also assumed that peak construction takes place during summertime where the traffic on the roadways in the study area will be at their busiest.

The maximum projected increase in traffic associated with this likely construction sequence will result in the following increase in traffic flows.

	Daily (Light Vehs)	Daily (HGVs)	Peak Hour (Light Vehs)	Peak Hour (HGVs)
Landfall Area	41	65	9	7
Cable Route (including R772 and M11 HHD construction)	196	221	52	22
Substation Area	103	259	29	26
TOTAL	**340**	**545**	**90**	**54**

Table 7: Construction Traffic Volumes

The construction trip generation takes into account trips generated by the following:

- Earthworks and materials - excavated waste exported, fill materials imported and construction materials delivered, using the public road network, via the construction area;
- Construction equipment being delivered to the construction area;
- Staff commuting to and from the construction area; and
- Service trips associated with the construction area (i.e. compound set up, maintenance, external third party visitors, etc.).

For the purposes of the traffic impact assessment, it is assumed that all externally generated traffic will arrive to and from Junction 20 on the M11 and this is the designated access point from the Motorway to the construction site(s).

For the cable route construction, it is assumed that during construction 100% of the traffic could travel along the R772 Dublin Road and R750 Sea / Coast Road. Alternatively, 100% of the traffic could travel along the R772 Dublin Road, L2180 Beech Road and L6179 Kilbride Road.

Most of the construction site staff will be on site for standard working hours between 07.00-19.00 and will arrive before and depart after these times, although the traffic impact assessment undertaken in respect of the proposed development has assumed that the peak traffic generation associated with the construction activities will coincide with the peak periods on the receiving road network.

2.3 Envisaged Construction Equipment

Construction equipment and vehicles required for each construction element/operation will be delivered to site by appropriate vehicles.

Specific equipment and vehicles which are deemed to be required for the proposed development by the contactor, suppliers and staff are to be confirmed and included in the updated CTMP, prior to the commencement of construction.

3 Matters to be Addressed in More Detail

The Contractor will be required to ensure that the contents of this CTMP are further developed prior to the commencement of works and in accordance with the EIAR. The Contractor will implement monitoring measures to confirm the effectiveness of the mitigation measures outlined in the CTMP.

This following aspects of traffic management during the construction stage are considered in further detail hereunder:

- Site/works area access and egress;
- Traffic management signage;
- Timings of material, plant and equipment deliveries to site;
- Traffic management speed limits;
- Road cleaning;
- Vehicle cleaning;
- Road condition;
- Road closures;
- Enforcement of traffic management plan;
- Emergency procedures during construction; and
- Communication.

These details (see below) will be further developed by the Contractor prior to commencement of construction.

3.1 Site Access and Egress

The proposed site access locations have been identified and the Contractor will provide advanced warning signs, in accordance with the latest current Department of Transport's 'Traffic Signs Manual, Chapter 8: *Temporary Traffic Measures and Signs for Roadworks* , on the approaches to proposed site access locations, a minimum of one week prior to construction works commencing at that location.

Appropriate lines of sight have been identified at each access location, with the exception of R747 Vale Road which has restricted visibility in one direction. This will be managed by the use of banksman and / or temporary traffic management for all vehicles entering / egressing from the working area.

3.1.1 National Road Network

Junction 20 on the M11 national primary route is anticipated to be utilised as the access route for all construction activity during the construction period.

3.1.2 Regional and Local Road Network

The following regional roads will be utilised as delivery routes during the construction period:

Regional Road Network

- R750 Sea / Coast road
- R772 Dublin Road

Local Road Network

- L6197 Kilbride Road
- L2180 Beech Road

No construction traffic will be permitted to use the L95115 during the course of the construction works, however some short-term activity will occur during the construction of the cable crossing this road.

No construction traffic will be permitted to use Love Lane during the course of the construction works.

3.1.3 Construction Compounds and Working Areas

Seven temporary construction compounds have been identified: There will be both a HDD compound and a temporary cable construction compound at the landfall site, at Johnstown North. There will also be a temporary construction compound at the substation site at Shelton Abbey. There will also be four compounds along the cable route, at the HDD crossing locations (M11 and R772 Dublin Road) to accommodate the HDD equipment and accommodate construction staff for the HDD crossing.

In addition, four working areas have been identified to serve specific activities related to the decommissioning of old overhead line towers, the construction of new towers and the flood defence works at the substation area.

3.2 Traffic Management Signage

The Contractor will undertake consultation with the relevant authorities for the purpose of identifying and agreeing signage requirements. Such signage will be installed prior to works commencing on site.

Proposed signage will include warning signs to provide warning to road users of the works access/egress locations and the presence of construction traffic.

All signage will be provided in accordance with the latest current Department of Transport’s ‘Traffic Signs Manual, Chapter 8: *Temporary Traffic Measures and Signs for Roadworks* .

In summary, the Contractor will ensure that the following elements are implemented:

- Consultation with the relevant authorities for the purpose of identifying and agreeing signage requirements;
- Provision of temporary signage indicating site access route and locations for contractors and associated suppliers; and
- Provision of general information signage to inform road users and local communities of the nature and locations of the works, including project contact details.

3.3 Timings of Material Deliveries to Site

In order to reduce impacts on local communities and residents adjacent to the proposed sites:

- The Contractor will liaise with the management of other construction projects in the area and the local authorities to co-ordinate deliveries;
- The Contractor will schedule deliveries in such a way that construction activities and deliveries activities do not run concurrently, where practicable, e.g. avoiding pouring of concrete on the same day as material deliveries in order to reduce the possibility of numbers of construction delivery vehicles arriving at each site/works area location simultaneously, resulting in build-up of traffic on road network;
- The Contractor will schedule deliveries to and from any proposed temporary construction materials storage yards or compounds such that traffic volumes on the surrounding road network are kept to a minimum;
- A construction phase programme of works will be developed by the Contractor in liaison with Wicklow County Council, specifically taking into account potential road repair works that are included in the agreed local authority’s road works schedule;
- HGV deliveries to specific areas of the site will be suspended on the days of any major local events, etc. that have the potential to cause larger than normal traffic volumes in the overlap areas;
- The Contractor will liaise with members of the local community to ensure that construction-related traffic will not conflict with sensitive events such as funerals and to notify of potential delays, e.g. road closures and diversions;
- Specific construction moratoria (for example, certain busy periods) as indicated by Wicklow County Council will be respected and incorporated into the construction phasing programme;
- HGV deliveries will avoid passing schools at opening and closing times where it is reasonably practicable; and

- Construction activities will normally be undertaken during daylight hours for all construction stages. It is expected that the HDD works will operate 24 hours per day, seven days per week. Commissioning and pre-commissioning may also take place 24 hours per day, seven days per week. Any works on public roads outside normal working hours will be subject to consultation with Wicklow County Council and An Garda Síochána.

3.4 Traffic Management Speed Limits

Adherence to posted / legal speed limits will be emphasised to all staff and suppliers and contractors during induction training. Drivers of construction vehicles and HGVs will be advised that vehicular speeds in sensitive locations, such as local community areas, will be restricted to appropriate levels.

Special speed limits will be implemented for construction traffic in sensitive areas such as school locations. Such recommended speed limits will only apply to construction traffic and not to general traffic.

3.5 Road Cleaning

It will be a requirement of the works contract that the Contractor carry out periodic road sweeping/cleaning operations to remove any scheme related dirt and material deposited on the road network by construction / delivery vehicles. Road sweepers will dispose of material following sweeping of road network, to a licensed waste facility.

3.6 Vehicle Cleaning

It will be a requirement of the works contract that the Contractor will provide dry or wet wheel washing facilities where appropriate, and any other necessary measures to remove mud and organic material from vehicles exiting sites or works areas.

3.7 Road Condition

The Contractor will ensure that:

- Prior to mobilisation, a pre-commencement pavement condition survey is carried out along each of the local and regional roads forming part of the access/delivery routes, and a copy of the condition survey report is submitted to Wicklow County Council as a record of the baseline condition of each road.
- Throughout the course of the construction of the proposed scheme, on-going visual inspections and monitoring of the access/delivery routes will be undertaken - to ensure any damage caused by construction traffic is minimised and repaired in a timely manner to minimise disruption to other road users.
- Loads of materials leaving each site will be evaluated, covered and appropriately secured if considered necessary to minimise potential dust impacts during transportation.

- The hauliers will take all reasonable measures while transporting waste or any other materials likely to cause fugitive losses from a vehicle during transportation to and from site, including but not limited to:
  - Covering of all waste or material with suitably secured tarpaulin/ covers to prevent loss; and
  - Utilisation of enclosed units to prevent loss.
- The roads forming part of the delivery routes will be monitored visually throughout the construction period and a truck mounted vacuum mechanical sweeper will be assigned to roads along the delivery routes as required.
- In addition, the Contractor will, in conjunction and through agreement with Wicklow County Council:
  - Undertake additional inspections and reviews of the roads forming the delivery routes prior to the construction phase to record the condition of these roads at that particular time; and
  - Such surveys will comprise, any recording or documentation processes as determined necessary by Wicklow County Council.
- Upon completion of the construction of the proposed scheme, the surveys carried out at pre-construction phase will be repeated and a comparison of the pre and post construction surveys carried out, with the Developer undertaking to make good any damage incurred as a result of the construction works.
- The necessary permit(s) and/or licence(s) will be obtained and in consultation with Wicklow County Council, road damage attributable to works will be rectified, to an appropriate standard.

3.8 Road Closures

3.8.1 During Road Crossings

The construction of the cable route requires the construction of a number of road crossings.

The crossings of the M11, R772 Dublin Road and the R750 Sea / Coast Road will be via HDD methods (although there is an open cut option through an existing underpass for the M11 crossing). As a result, these crossings will not impact on the traffic flows.

However, for the minor roads some road / lane closures will be required. Traffic will be managed at these locations using either stop/ go control (single lane closure) or temporary parallel lanes or localised diversion (full closure). Each of the lane closures will be short in duration. The open cut road crossings will take place at:

- L95115,
- L6179 Kilbride Road, and
- L2180 Beach Road.

To undertake the crossing of a public road, a local temporary traffic management plan will be produced, agreed with the road authority and implemented by the Contractor.

3.8.2 During cable construction along the road

The cable will also run within the following roads for short stretches:

1. Forest Road (if the M11 is crossed via the existing underpass instead of HDD)
2. L6179 Kilbride Road
3. Avoca River Business Park access road

Traffic will be managed at these locations using either stop / go (single lane closure). Localised diversion (full closure) is not recommended in these cases.

3.9 Enforcement of Traffic Management Plan

All project staff and material suppliers will be required to adhere to the CTMP. The Contractor will agree and implement monitoring measures to confirm the effectiveness of the CTMP and compliance will be monitored by the supervising Employer's Representative. Regular inspections / spot checks will also be carried out to ensure that all project staff, material suppliers and hauliers follow the measures specified in the CTMP.

3.10 Emergency Procedures During Construction

The Contractor will ensure that unobstructed access is provided for all emergency vehicles along all routes and site accesses.

The Contractor will provide to Wicklow County Council and the emergency services, the contact details of the Contractor's personnel responsible for construction traffic management.

In the case of an emergency which occurs off site all construction traffic will be notified of the incident and location.

3.11 Communication

The Contractor will ensure that close communication with Wicklow County Council and the emergency services is maintained throughout the construction phase. Such communications will include:

- Submissions of proposed detailed traffic management measures for comment and approval,
- Ongoing reporting relating to the condition of the road network and updates to construction programming,
- Information relating to local and community events that could conflict with proposed traffic management measures and construction traffic in order to implement alternative measures to avoid such conflicts.

The Contractor will also ensure that the local community is informed of proposed traffic management measures in advance of their implementation and in accordance with the Community Liaison Plan (included in the CEMP). Such information will be disseminated by posting advertisements in local newspapers and delivering leaflets to houses in the affected areas. Such information will contain the Contractor's contact information for members of the public to obtain additional information and to provide additional knowledge such as local events, sports fixtures etc. which may conflict with proposed traffic management measures.

4 Conclusions

This CTMP will form part of the construction contract and is designed to reduce possible impacts which may occur during the construction of the proposed development.

The Contractor will update the CTMP prior to commencement of construction, will keep the CTMP updated throughout, will agree the CTMP with Wicklow County Council and An Garda Síochána and will fully implement the CTMP.

The Employer's Representative will be responsible for ensuring that the Contractor manages the construction activities in accordance with this CTMP and will ensure that any conditions of planning are incorporated into the site specific CTMP.

4.1 Monitoring

The implementation of the CTMP will be monitored by the Contractor and Employer's Representative. Regular inspections / spot checks will be carried out to ensure that all project staff, material suppliers and hauliers follow the measures specified in the CTMP.

Appendix C – Construction Waste Management Plan

Appendix B-C

Construction Waste

Management Plan

Contents

1 Introduction

This Construction Waste Management Plan (CWMP) has been prepared having regard to the Department of Environment, Heritage & Local Government *Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects* (2006) and National Roads Authority *Guidelines on the Management of Waste from National Road Construction Projects, Revision 1* (2014).

The Contractor will further develop, implement and maintain the CWMP during the construction phase. The CWMP addresses:

- Waste management
- Waste minimisation
- Tracking and documentation procedures for off-site waste.

1.1 Construction Phase

The key principles underlying the plan are to minimise waste generation and to segregate waste at source, in accordance with the waste hierarchy. Prevention and minimisation are inherent in the design of the proposed development.

1.1.1 Site Clearance and Earthworks

During site clearance, organic waste (such as trees and vegetation) will be removed from site by a waste collection permit holder and delivered to an authorised composting or organic waste facility. The extent of vegetation clearance will not be significant based on site and route selection.

Excavation will be required at the landfall, cable route, substation site and connection to the NETN. The most environmentally sustainable means of managing excavated material is its prevention and minimisation. Excavated material as part of the construction works will generally consist of:

- Rock, at the landfall compound;
- Topsoil and subsoil; and
- Made ground.

A significant proportion of the surplus excavation material from the landfall site and cable route will consist of uncontaminated soil, stone and naturally occurring material which may be reused in its natural state within the site.

Natural ground, where it can be shown to fulfil the requirements of the project Earthworks Specification, will be reused within the site. The excavated material will be tested to ensure compliance with the requirements of Class 1 or Class 2 general fill as defined in Transport Infrastructure Ireland (TII) publication titled ‘Specification for Road Works Series 600 - Earthworks (including Erratum No. 1, dated June 2013)’.

Off-site re-use options for surplus clean and inert excavated material include reuse as a by-product on other construction sites subject to Article 27 notification to the EPA, or recovery at suitable authorised waste facilities i.e. facilities which have been granted a Certificate of Registration, Waste Facility Permit or EPA licensed soil recovery facilities in accordance with the *Waste Management Acts 1996-2016.*

Potential recycling/recovery activities include processing of stone to produce construction aggregate, infilling of quarries, raising land for site improvement or development.

A small volume of soil and bentonite will be generated during HDD activities but this will be minimal (i.e. a few cubic metres of soil plus a small volume of bentonite). Bentonite containing wastes will be removed from site by a waste collector authorised to transport this waste and delivered it to a waste facility authorised to accept it.

Any excavated contaminated material will be removed and disposed of or recovered at a suitably licensed or permitted site in accordance with the current Irish waste management legislation.

The following is a summary of material likely to require removal from site.

Table 1 Summary of Material Likely to Require Removal from Site

Material	Estimate Quantity (tonnes)	Classification
HDD Bore Material	3,600	Non-hazardous waste LoW Code – 01 05 04
Crushed stone	49,000	TII Series 600 Class 1
Asphalt/pavements build up	1,530	Where feasible this will be reused as a by-product. Where this is not possible it will be delivered as a waste to an authorised waste facility.
Haul Roads build up*	22,000	TII Series 600 Class 1
Flood defence embankment material	600	The flood defence embankment contains Japanese Knotweed and will be delivered to a waste facility authorised to accept these invasive species.

Material	Estimate Quantity (tonnes)	Classification
Tower foundation excavation	400	TII Series 600 Class 1 or Class 2
Substation site excavation material	23,000	Disposed of or recovered at an authorised waste facility
Hazardous material from substation site	2,000	Delivered to an authorised hazardous waste facility

* Reuse of haul road material subject to the routes being adequately maintained and not suspected to contain any suspected contamination.

It is considered that the predicted quantities of waste streams generated by the proposed development are small in the wider context of the national generation of waste materials.

1.1.2 Construction Waste

In the case of the proposed development, the most likely type of construction waste will be bituminous material from excavation, surplus concrete and unusable or damaged ducting segments which will arise on site.

Other than the waste generated from the earthworks, it is not expected there would be significant volumes of wastes sent for recovery or disposal at authorised waste facilities. There are a number of authorised waste facilities in the region suitable for recovery or disposal of wastes from the proposed development.

Liquid wastes (such as contained wheel-wash runoff, and sanitary waste) will be contained and dispatched off-site for disposal at appropriately licensed or permitted facilities.

Transport of material to and from the works areas will be managed in accordance with the Construction Traffic Management Plan in this CEMP, to ensure that there will be no queuing of trucks on public roadways around the works areas.

1.1.3 Measures to Achieve CWMP Aims

The measures to achieve the aims of waste prevention and minimisation include:

- Where possible recyclable material will be segregated and removed off site to a permitted/licensed facility for recycling. Waste stream colour coding and photographs will be used to facilitate segregation.
- Office and food waste arising on the construction compounds will be source-separated at least into dry mixed recyclables, biodegradable and residual wastes.

- Waste bins, containers, skip containers and storage areas will be clearly labelled with the waste types which they should contain, including photographs as appropriate.
- The site will be maintained to prevent litter and regular litter picking will take place throughout the site.
- Material management ‘just in time’ delivery will be used so far as is reasonably practicable to minimise material wastage.
- The Contractor will ensure that the material transported off site will go to an appropriately licensed/permitted facility.
- The Contractor will record the quantity in tonnes and types of waste and materials leaving the site. The name, address and authorisation details of all facilities and locations to which waste and materials are delivered will be recorded along with the quantity of waste in tonnes delivered to each facility. Records will show material which is recovered and disposed of.
- Paints, sealants and hazardous chemicals etc. will be stored in secure, bunded locations.
- All hazardous waste will be separately stored and labelled, in appropriate lockable containers, prior to removal from site by an appropriate waste collection holder.
- Waste generated on site will be removed as soon as practicable following generation for delivery to an authorised waste facility. In the unlikely event that asbestos is uncovered, the asbestos containing material will be double-bagged, stored, collected and removed from site by a competent Contractor and disposed of in accordance with the relevant procedures and legislation.

In addition to the measures inherent in the design of the proposed development, which will be implemented during the construction phase, the following mitigation measures will be implemented:

- The Contractor will minimise waste disposal so far as is reasonably practicable;
- Source segregation: Where possible, metal, timber, glass and other recyclable material will be segregated during construction works and removed off site to a permitted/licensed facility for recycling. Waste stream colour coding, and photographs of wastes to be placed in each container as required, will be used to facilitate segregation. Where waste generation cannot be avoided, segregation will maximise the quantity and quality of waste delivered for recycling and facilitate its movement up the waste hierarchy away from landfill disposal and reduce its environmental effect;
- Supply chain partners: The Contractor will engage with the supply chain to supply products and materials that use minimal packaging, and segregate packaging for reuse;
- Waste Auditing: The Contractor will record the quantity in tonnes and types of waste and materials leaving site during the construction phase;

- Waste fuels/oils will be generated from equipment used on-site during construction and will be classified as hazardous waste. Such wastes will be stored in a secure, bunded area on-site prior to collection by a haulier who holds the appropriate waste collection permit;
- Possibilities for re-use of clean non-hazardous excavation material as fill on the site or in landscaping works will be considered following appropriate testing to ensure material is suitable for its proposed end use. Where excavation material cannot be re-used within the proposed works the Contractor will endeavour to send material for re-use as a by-product, recovery or recycling so far as is reasonably practicable. Re-use as a by-product can be done under an Article 27 notification once the established EPA criteria for such re-use are met;
- Excavated material will be stored onsite within the planning (red line) boundary prior to re-use;
- The name, address and authorisation details of all facilities and locations to which waste and materials are delivered will be recorded along with the quantity of waste in tonnes delivered to each facility. Records will show material, which is recovered, and which is disposed of; and
- The Contractor will ensure that any off-site interim storage or waste management facility for excavated material will have the appropriate waste licences or waste facility permits in place.

Export of hazardous waste from the proposed development outside of the State is subject to a Europe-wide control system founded on EU Regulation 1013/2006 on the Shipments of Waste (known as the Transfrontier Shipment Regulations), as amended (including Commission Delegated Regulation (EU) 2020/2174 of 19 October 2020). This legislation is supplemented by the Waste Management (Shipments of Waste) Regulations 2007, as amended, which makes Dublin City Council responsible for the enforcement of this regulatory system throughout Ireland. Export of hazardous waste from site outside the state will comply with the procedures set out in this legislation.

The quantities of hazardous waste generated during the construction phase are expected to be small and not of significance.

1.2 Monitoring

The Contractor’s waste manager will monitor the implementation of this CWMP. The employer’s representative will audit the waste segregation arrangements and the records of waste removed from site, haulier permits and the licences or permits of the waste management facilities to which the waste was sent.

1.3 References

Department of Environment Community and Local Government (2006) *Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects. DoECLG, Dublin, Ireland.*

EU Regulation 1013/2006 of the *Shipments of Waste*

Commission Delegated Regulation (EU) 2020/2174 of 19 October 2020 *amending Annexes IC, III, IIIA, IV, V, VII and VIII to Regulation (EC) No 1013/2006 of the European Parliament and of the Council on shipments of waste*

Appendix D – Invasive Species Management Plan

Appendix B-D

Invasive Species

Management Plan

Contents

1 Introduction

Invasive plant species have been identified within and close to the construction works areas for the proposed Arklow Bank Wind Park Phase 2 Onshore Grid Infrastructure.

Two high-risk, non-native and invasive species Japanese Knotweed (*Fallopia japonica*) and Himalayan Knotweed (*Persicaria wallichii*) were recorded within the planning boundary. Hottentot Fig (*Carpobrotus edulis*) and Buddleia (*Buddleia davidii*) were also recorded within the planning boundary.

This Invasive Species Management Plan (ISMP) describes the strategy that will be adopted during the construction and operation of the proposed development to manage the knotweed and other invasive species. This ISMP is a working document. Following the appointment of the contractor, and prior to commencing works on site, the ISMP will be further developed by the contractor.

The main objective of the ISMP is to control and prevent the spread of invasive species during the construction phase.

2 Methodology

This plan applies the most relevant and current guidance in relation to the treatment and management of invasive plant species in construction projects. The following guidance was referred to in preparation of this plan.

- NRA *Guidelines on The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads* (2010)
- Invasive Species Ireland *Best Practice Management Guidelines Japanese Knotweed Fallopia japonica*, (2015).

3 Legislation

The control of invasive species in Ireland comes under the Wildlife (Amendment) Act 2000, where it states that

'*Any person who— [...] plants or otherwise causes to grow in a wild state in any place in the State any species of flora, or the flowers, roots, seeds or spores of flora, ['refers only to exotic species thereof'][...] otherwise than under and in accordance with a licence granted in that behalf by the Minister shall be guilty of an offence*.'

The Birds and Natural Habitats Regulations 2011 (SI 477 of 2011), Section 49(2) prohibits the introduction and dispersal of species listed in the Third Schedule, which includes Japanese Knotweed, as follows: "*any person who plants, disperses, allows or causes to disperse, spreads or otherwise causes to grow [….] shall be guilty of an offence."*

Buddleia and Hottentot Fig are not included in the Third Schedule. Therefore, their presence at the site does not have the potential to lead to an offence under the Birds and Natural Habitats Regulations 2011 (SI 477 of 2011). However, the National Biodiversity Centre (NBDC) notes that under the right ecological conditions these species may have an impact on the conservation goals of a European site or impact on a water body achieving good/high ecological status under the Water Framework Directive (Directive 2000/60/EC). Buddleia is also included in the NRA *Guidelines on the Management of Noxious Weeds and Non-native Species on National Roads* (NRA 2010) as this species has been shown to have an adverse impact on landscape quality, native biodiversity or infrastructure; and is likely to be encountered during road schemes.

4 Invasive Species in the Study Area

During the ecological site surveys undertaken by DixonBrosnan for the proposed development, the high-risk invasive species Japanese Knotweed and Himalayan Knotweed were recorded west of the substation site on the banks of the Avoca River.

Hottentot Fig was recorded on sea-cliffs close to the landfall location. This is listed as a high impact invasive species by the National Biodiversity Data Centre (NBDC). Although Hottenot Fig was recorded within the planning boundary, no construction works will take place on or in the vicinity of this location. Therefore, no disturbance or risk of the spread of this invasive species will occur as a result of the proposed development. Measures to prevent the spread of Hottenot Fig are therefore not required.

Buddleia is listed as a medium impact species by the NBDC and was recorded adjacent to the substation site and the access roads to the substation.

Refer to **Chapter 12** *Biodiversity* of the EIAR, for further information on the ecological surveys. The location of invasive species recorded within the study area are included in **Appendix 12.4 of Volume 3**.

5 Japanese and Himalayan Knotweed Management During Construction Phase

This purpose of this plan is to:

- Identify the extent of the infestation on the site
- Ensure further growth and spread of the plant on the site does not occur
- Ensure the plant is not spread to other sites either adjacent to the infested site or through transportation of contaminated soil to another site
- Identify the best method for managing and controlling Japanese Knotweed, Himalayan Knotweed and other invasive species on the site with regard to the proposed site works and construction methods
- Communicate the plan to all site operatives to ensure success of the plan
- Document and record the treatment and management methods carried out on site for future reference, for future site owners and site users and to avoid litigation.

The contractor will employ a suitably qualified ecologist to update the plan prior to the commencement of construction. The updated plan will contain the following:

- Site background including proposed works
- Extent of the Japanese Knotweed and Himalayan Knotweed infestation
- Specific control plan to be put in place
- Site hygiene protocols
- Responsible individuals
- Follow up requirements
- Any other relevant information

5.1 Management Options for Knotweed Species

There are a number of suitable management options to control and prevent the spread of Japanese Knotweed and Himalayan KnotweedThe methodology outlined in this document will be updated, if required, based on an uptodate survey of the contaminated area. The proposed management plan will be agreed with Wicklow County Council prior to the works being carried out. It should be noted that:

- Where any infested material (soil containing Japanese Knotweed or Himalayan Knotweed) is to be taken off site, a licence to transport the material will be required from National Parks and Wildlife Service (NPWS).
- A landfill, which is licensed to accept such material, will be identified to dispose of the excavated material. The landfill site operator will be informed of what the material contains.

- Where herbicide treatment will be used, consideration will be given to the proximity of the herbicide treatment to watercourses and other vegetation.
- For all management plans, site hygiene protocols will be implemented. These protocols will apply to sites which are infested with Knotweed and those where Knotweed is not growing to prevent contaminated material being brought to site. Site hygiene protocols are outlined in **Section 5.3** below.

5.2 Pre-Construction Survey

Since invasive species spread quickly, prior to the commencement of treatment, a pre-construction survey will be undertaken to identify the extent of invasive species at that time. The survey will be undertaken by a suitably qualified ecologist. This information will be utilised to update the ISMP.

5.3 Site Hygiene at Contaminated Areas

Construction equipment, vehicles and footwear may provide a vector for the spread of invasive species. Maintaining site hygiene at all times in an area affected by invasive species is essential to prevent further spread.

The following site hygiene measures will be implemented for the contaminated area:

- Understand the potential extent of the rhizome (root) system underground – up to seven metres horizontally and three metres vertically.
- Where possible, the contaminated area will be avoided and fenced off, or the extent of the rhizomes clearly marked.
- If possible, the use of machinery with tracks will be avoid contaminated areas. Movement of machinery between contaminated and non-contaminated areas must be controlled and adequate power washing measures implemented.
- Areas where contaminated soil is to be stockpiled on site will be clearly identified and marked out.
- Designated entry and exit points will be identified for personnel on foot and for small mobile equipment. A delineated access track, to be maintained free of Japanese Knotweed and Himalayan Knotweed, will be established through the site to minimise the spread of Knotweed species by permitted vehicles accessing the site.
- Vehicles, including footwear and tools, leaving the site will be inspected for any plant material and washed down (using a pressure washer) in a dedicated vehicular wheel wash down facility, which will drain into a contained area within the site. Particular care is required with tracked machines.
- Vehicles used in the transport of contaminated material will be visually checked and washed down into a contained area before being used for any other work, either in the same area or on a different site.

- Only vehicles required for essential works including site investigation works will be brought on site and the number of visits minimised as much as practicable.
- Material gathered in the dedicated wash down contained areas will be appropriately disposed of off-site.
- For any subsoil or topsoil entering the site, the supplier will be required to provide an assurance that it is free of Japanese Knotweed and Himalayan Knotweed.
- All site personnel will be made aware of measures to be taken and will be informed of the requirements of the ISMP.
- Site hygiene signage, in relation to the management of invasive species, will be erected.

5.4 Management Options

In addition to the possible advance treatment works and pre-construction survey, when the works areas become available to the contractor for enabling works, areas identified as requiring specific invasive species treatment will be demarcated and the designated control measures implemented at the earliest possible stage to reduce the risk of spread along the proposed scheme or beyond the land take.

There are a number of management options that may be implemented to control and prevent the spread of invasive species. These are presented in the sections below.

Those involved in the application of herbicides/pesticides will be competent to do so and, consequently, will have sufficient training, experience and knowledge in the area of herbicides/pesticides application.

All staff involved in the application of herbicides/pesticides will have received appropriate training, which may include achieving competency certification in the safe use of herbicides/pesticides through a National Proficiency Tests Council registered assessment centre or achieving an appropriate FETAC award in this area.

It is likely that chemical treatment, as described in **Section 5.4.1**, will be the most suitable method for the identified invasive species.

5.4.1 Chemical Treatment

The control of Japanese Knotweed and Himalayan Knotweed will require the use of herbicides, which can pose a risk to human health, to non-target plants or to wildlife. In order to ensure the safety of herbicide applicators and of other public users of the site, it is essential that a competent and qualified person carries out the herbicide treatment. A qualified and experienced contractor will be employed to carry out all treatment work.

The contractor will follow the detailed recommendations of the following documents for the control of invasive species and noxious weeds:

- Chapter 7 and Appendix 3 of the TII Publication: *The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads* (NRA, 2010)
- *Best Practice Management Guidelines for Japanese Knotweed* (Invasive Species Ireland, 2015)
- Circular Letter NPWS 2/08 *Use of Herbicide Spray on Vegetated Road Verges* (National Parks and Wildlife Service 2008)

These documents include measures to aid the identification of relevant species, with details for the timing, chemicals and methodology for chemical control, and for measures to avoid environmental damage during the use of herbicides.

Chemical treatment involves the application of an herbicide to invasive species plant such as Japanese Knotweed stands without any excavation or removal of the plant material. The preferred types of herbicides to be used in the treatment of Knotweed are Glyphosate and 2,4-D Amine.

If herbicide is applied as the treatment option, it may need to be reapplied for up to five years after the first application to ensure the plant control measures have been effective.

Glyphosate is non-persistent and can be used near water but it is not selective (i.e. it is a broad spectrum chemical and will impact all plant species) whereas 2,4-D Amine can be persistent for up to one month, and can also be used near water but is more selective on certain plants. The selection of chemical by the contractor and supervising ecologist will depend on seasonal factors, site conditions, proximity to water, surrounding habitats etc.

The most effective time to apply Glyphosate is from July to September (or before cold weather causes leaves to discolour and fall). The majority of herbicides are not effective during the winter dormant stage because they require living foliage to take up the active ingredient.

Reapplication rates will depend on site specific considerations including the extent of the infestation, its location, and the time of year treatment commences. Details of the proposed chemical treatment plan will be included in the updated ISMP.

Foliar treatment (spraying) is usually applied with a sprayer such as a knapsack sprayer or a larger spray system. It is important to use a treatment dye to identify clearly all areas treated. Foliar treatment is an efficient way to treat large monocultures of invasive plants, or to spot-treat individual plants that are difficult to remove mechanically such as Japanese Knotweed.

In the case of Knotweed, depending on weather and temperatures in the days following the initial treatment, and to ensure optimal uptake of herbicide into the rhizome system, a second similar treatment will be required usually within ten days, before the internal vascular system is no longer capable of translocating the herbicide to the root system.

While the upper surface of the leaves will be easier to treat, it is also important to treat the leaf under surface as Knotweed possesses many stomata openings on the leaf under surface. Dead stems can be cut, removed and burned on/off site in accordance with the relevant legislation.

The stem injection method is sometimes used for Japanese Knotweed control. This treatment requires a higher concentration of the active ingredient than is used in foliar applications. It involves the use of a specialist herbicide injection tool whereby the injection tool injects the herbicide directly into each of the canes approximately 20-30cms from the base of each cane (between the 1^{st} and 2^{nd} nodule).

Subsequently approximately 10 mL of herbicide mix is injected into each cane at a ratio of 5:1 through the use of a specialist stem injection tool. The application of glyphosate-based products by injection is most effective when applied in the early Autumn (mid to late Sept). Regrowth will occur in subsequent years, albeit much less vigorously, which will require follow up treatment at the appropriate time of year. Spot treatment will be required each year until no regrowth is observed.

In order to ensure that the use of herbicides does not contravene legislation, the contractor must comply with Circular Letter NPWS 2/08 *Use of Herbicide Spray on Vegetated Road Verges* from the National Parks and Wildlife Service dealing with the application on to non-target areas.

5.4.2 Excavation and Chemical Treatment On-Site

This option employs both physical and chemical methods of treatment. This method is employed in situations where treatment of invasive species, in particular Knotweed, is required to be completed in a relatively short timeframe. Generally, digging up the rhizomes and re-cultivating it stimulates plant growth and will result in more successful herbicide application and management.

In summary, this management method requires cutting and killing of the surface plant. The cut material must be left on top of plastic sheeting until dried out and subsequently monitored for any sign of regrowth. Storage of cut material should not take place within flood risk zone of a river. The cut material should not be placed in a green waste recycling bin. Once dried out, the material should be burned on site in accordance with the relevant legislation. The surface of the affected area should be raked with tines to remove crowns and surface material, and in order to break up the rhizomes, bringing them to the surface, which will stimulate leaf production. This will make the plant more vulnerable to herbicide treatment. The more rhizomes that are brought to the surface, the more growth will occur, allowing for a more successful treatment. An excavator can be used to scrape the surface crowns and rhizomes into a pile and then to cultivate the ground to stimulate rhizomes to produce a higher density of stems for treatment. Reapplication of herbicide may be required for up to five years after initially application, subject to the site-specific management plan.

5.4.3 Excavation and burial

Excavated material containing Knotweed can also be buried on site. This will require burying the material at a depth of at least five metres. The contaminated material must be covered with a root barrier membrane before being backfilled with topsoil, or other, suitable fill material. The manufacturer's guarantee is required that the membrane will stay intact for at least 50 years. An accurate map and record of the location of the burial site, to prevent any future accidental disturbance, is required, and future owners must be informed of its position. If soil containing Japanese Knotweed is stockpiled, the material must be stored in a manner that will not harm health or the environment. The stockpile should be on an area of the site that will remain undisturbed. The area should be clearly fenced and marked with warning signs, and the stockpile should be regularly treated with herbicide to prevent any regrowth or re-infestation.

As a precaution, the stockpiled material should be laid on a root barrier membrane and covered to avoid contaminating the site further. The contractor must also comply with all waste legislation.

5.4.4 Excavation and root barrier cell method

Excavated material containing Knotweed can also be buried on site within a root barrier membrane cell. The procedure is similar to that described in **Section 5.4.3** above.

This method will require burying the material at a depth of at least two metres. The contaminated material must be placed in a contained cell formed by a root barrier membrane before being backfilled with topsoil, or other, suitable fill material. The manufacturer's guarantee is required that the membrane will stay intact for at least 50 years. The method for stockpiling prior to burial would be as described as above. The contractor must also comply with all waste legislation.

5.4.5 Excavation and bund method

Where there is not sufficient depth on a site excavated material can be placed in a structured bund. The bund will comprise a raised area above ground level or a shallow excavation, no more than 0.5m deep, and lined with a root barrier membrane. The manufacturer's guarantee is required that the membrane will stay intact for at least 50 years. This method of treatment can also be used where Knotweed material needs to be moved from a location and there is another area of the site available to contain it.

The aim of this method is to concentrate the rhizome material into the upper surface of the bund, where it will grow and be controlled by herbicide. If the rhizome is buried deep, it will become dormant when inside the bund and regrow when the apparently clean soil is used for landscaping on the site. The bund location needs to be clearly marked by warning signs and protected from potential accidental damage. Reapplication of herbicide may be required for up to five years after the initial application, subject to the site-specific management plan.

The appointed contractor must comply with waste legislation if this method is to be considered.

5.4.6 Excavation and removal from site

Where the above treatment options are not possible because the site is too small to contain excavated material, or too shallow for burial, or where there is a lack of space or where the infestation simply cannot be avoided by the construction works, removal of excavated material may be the only option. If any invasive species plant material is collected (e.g. by hand-pulling or mowing), it is important that its disposal will not lead to a risk of further spread. Where there are small amounts of Knotweed material to be removed it is possible to double bag the material and send to a licenced waste facility for disposal. Where the amount of material is larger in volume, it will be necessary to haul it from site to a suitably licenced waste facility.

Invasive species material, particularly roots, flower heads or seeds, must be disposed of at licensed waste facilities appropriately buried, or incinerated in compliance with the relevant legislation. Disposal must be carried out in accordance with the relevant waste management legislation. Invasive species plant material or soil containing residual herbicides may be classified as either ‘hazardous waste’ or ‘non-hazardous waste’ under the terms of the Waste Management Acts, and both categories may require special disposal procedures or permissions. If the material has been treated with a persistent herbicide, the excavated material must be classified as hazardous waste and must be disposed of to a hazardous waste facility. Advice would need to be sought from a suitably qualified waste expert regarding the classification of the waste and the suitability of different disposal measures.

The movement of invasive plant material requires a licence from the NPWS under Section 49 of the European Communities (Birds and Natural Habitats) Regulations, 2011 (as amended).

5.5 Preferred Treatment Option – Advance Chemical Treatment and Continued Chemical Treatment of Regrowth

The Knotweed within the proposed development boundary is located on existing flood defence structures. As there is the potential for flooding to impact on the area currently contaminated with Knotweed species, there is the potential for fragments of Knotweed to be spread from the works area and inadvertently distributed off-site.

Within this area, improvement works to a section of the flood embankment at the Avoca River Business Park is proposed as detailed in **Chapter 6** *Construction Strategy*. The substation site flood defence improvement works will comprise localised raising of the existing flood defence embankment level for a length of up to 75m.

Up to approximately 160m of temporary drainage and an access track will be constructed from the Avoca River Business Park along the northern side of the existing embankment.

Having assessed the available management options and constraints associated with this particular site, it has been concluded that in-situ chemical treatment prior to construction, careful management of the works and continued in-situ chemical treatment post construction is the preferred option. This is primarily due to the following significant constraints;

- The Knotweed contamination to the west of the substation is located on an existing flood defence structure and although limited excavation within this area will occur, it is preferable to avoid large scale excavation and removal of Knotweed contaminated material which could damage the existing flood defence structure and increase the risk of flooding to the site.
- The risk of fragments of Knotweed being spread outside of its current distribution is high as high flood levels could result in fragments of Knotweed, which are dislodged during site works, being carried downstream along the Avoca River and thus impacts on off-site receptors could occur.
- Given that flooding could impact on existing stands of Knotweed, large scale foliar spraying is not recommended and therefore only stem injection and spot treatment is practical as a first treatment method. For the re-growth material within the site or juvenile plants, a foliar spray application using a cowled knapsack sprayer will allow for efficient treatment when stems are too small and fragile to use stem injection.

Therefore, the following methodology is proposed:

1. Landowners will commence chemical treatment of the Knotweed species in this area, in order to avoid the continued spread of the species, under the ongoing maintenance of the Avoca River Business Park. The preferred method for initial treatment is stem injection and spot treatment. This will be carried out under the supervision of a qualified ecologist who will ensure that the correct methodology and appropriate site hygiene methods are utilised. This ISMP will be updated by the supervising ecologist if required. Early treatment will effectively reduce the length of time that chemical treatment will be required. It is noted that Knotweed can persist for long periods and the sooner treatment commences, the more rapidly this species will be eradicated from the works area.
2. Prior to the commencement of site works, the extent of contamination will be determined by site investigations including trial pits. This information will be used to determine the area of contamination taking into account that the roots of Knotweed can extend 7m from the parent plant. If it is determined by visual inspections/trial hole investigation that viable plants remain within the work area the spreading of this viable Knotweed plant material outside the current area of contamination is not permitted.
3. Following the above, the identified area of contamination will be clearly fenced and all works in relation to Knotweed will be carried out only within this fenced area.

4. Where possible, contaminated soil will remain on-site and be treated. The transport of any material that must be removed off site for disposal, as part of the construction works, will require a licence from the NPWS.
5. Any excavations that are carried out as part of the project, must be contained within this area and the spread of any fragments of viable plant material or contaminated soil outside of this area must be effectively prevented. All hygiene protocols as listed in this ISMP must be effectively implemented.
6. Any contaminated material including material from the wash down area must be contained within the identified and fenced contaminated area or removed to a suitably licenced facility offsite in line with standard hygiene measures.
7. Once works within the contaminated area is complete a follow-up programme of works will commence to treat any regrowth of Knotweed. This will consist of stem injection and spot treatment and it will continue until the supervising ecologist can certify that Knotweed has been effectively eradicated.
8. The application of herbicide (injection/spot treatment) must take into account the risk of flooding which must be assessed immediately prior to the use of herbicides. Treatment will not be carried out when heavy rain is forecast or in the winter period when there is a higher risk of flooding and adverse weather. It is noted that site hygiene is of particular importance in areas prone to flooding.

6 Buddleia Management During Construction Phase

As noted in **Section 3** of this report, there is no statutory obligation to remove Buddleia. However, should it be concluded that Buddleia at the proposed development site should be removed, the following treatment methods are recommended.

Buddleia is straightforward to control using a mixture of mechanical removal and herbicide treatment.

Buddleia is a plant that favours disturbed sites, physical grubbing of plants can provide ideal conditions for the germination of seeds. Therefore, care needs to be taken to ensure re-vegetation of controlled areas is undertaken swiftly. The branches of Buddleia are capable of rooting as cuttings, so care should also be taken to ensure material is disposed of in a manner to avoid this risk. Site hygiene measures outlined is **Section 5.3** should be implemented where relevant.

As mature plants occur within the proposed works area, the preferred method of treatment is cutting back to a basal stump or grubbing out followed by chemical treatment. Herbicide applications will take into account sensitive receptors such as watercourses and locally important habitats such as woodland and must only be applied in line with manufacturers recommendations.

Recommended practice for the application of herbicides requires cutting back of plants to a basal stump during active growth (late spring to early summer) which is then treated (brushed on) immediately with a systemic weed killer mix (Starr *et al*, 2003). Foliar application of triclopyr or glyphosate may be adequate for limited infestations of younger plants, but should be followed up at 6 monthly interval until the supervising ecologist can certify that the plant is no longer extant within the works area.

7 Invasive Species Management – Operational Phase

7.1 Protecting Flood Defence Structures

As part of the operation phase, there will need to be on-going management of any invasive species found on the flood defence embankment, where it could potentially compromise the structural integrity of the embankment. A management plan for the operational phase will be implemented. This will comprise monitoring to detect any new or re-occurrence of infestation and chemical treatment as described in **Section 5.4.1** above.

8 Conclusion

Japanese and Himalayan Knotweed are high risk invasive plant species and will be treated in accordance with this ISMP.

The primary concern is the presence of Knotweed species within the flood embankment area to the west of the substation site where some improvement works are proposed.

Herbicide treatment of Knotweed via stem injection and spot treatment will commence as soon as practically possible under the supervision of a qualified ecologist. Site investigations will be carried out prior to the commencement of works to determine if Knotweed species are still present and the degree of contamination.

This information will be utilised to determine the extent of the contaminated area and will be utilised to update this ISMP. Detailed fencing and hygiene protocols will ensure that viable plant material will not be spread outside of its current distribution area. Following completion of works, monitoring and treatment protocols will be implemented to ensure any regrowth is effectively treated.

Buddleia is considered a lower risk species and will be treated via cutting back to a basal stump or grubbing out followed by chemical treatment. Treatment will continue until the supervising ecologist certifies that this species has been effectively removed from the works area.

9 References

- National Roads Authority (2010) *The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads*
- Invasive Species Ireland (2015) *Best Practice Management Guidelines for Japanese Knotweed*
- National Parks and Wildlife Service (2008) Circular Letter NPWS 2/08 *Use of Herbicide Spray on Vegetated Road Verges*
- US Geological Survey ‑ Biological Resources Division. Starr, F., Starr, K. & Loope, L. (2003). *Buddleia davidii*. Maui, Hawaii

Sure Partners Limited

ARKLOW BANK WIND PARK PHASE 2 **ONSHORE GRID INFRASTRUCTURE**

Natura Impact Statement APPENDICES

Appendix C. EIAR Chapter 6 Construction Strategy

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Appendix C

EIAR Chapter 6 Construction Strategy

Contents

6 Construction Strategy

6.1 Introduction

This chapter describes the strategy to construct the Arklow Bank Wind Park Phase 2 Onshore Grid Infrastructure (hereafter the 'proposed development'). The detailed description of the proposed development is provided in **Chapter 5** *Description of Development.*

This chapter has been prepared in accordance with Part 1 of Annex IV of the EIA Directive. This chapter has therefore been structured to describe the following:

- Indicative duration and phasing during the construction period;
- Land use requirements to support the construction of the proposed development;
- Likely activities required to prepare the site and undertake the enabling works to support the construction of the proposed development;
- Methodologies to undertake construction activities;
- An overview of employment and site management measures associated with the construction of the proposed development; and
- An overview of the Construction Environmental Management Plan (CEMP), which has been prepared to provide minimum requirements that the Contractor(s) will be required to implement during the construction of the proposed development (Refer to **Appendix 6.1** for the CEMP).

6.2 Approach

The approach to construction which has been adopted for the purpose of this EIAR is illustrated in **Sections 6.3 - 6.12** herein. This information describes the main construction activities that are relevant for the assessment of likely significant environmental effects.

The approach to construction outlined in **Sections 6.3 - 6.12** herein is considered to be the reasonable worst-case scenario, given the existing site constraints, the adjacent land uses and the various construction methodologies which could be considered by the Contractor(s). The construction of the proposed development will require mostly land-based works with some riverine works (at watercourse crossings).

The Developer, Sure Partners Limited (SPL), will ensure that the Contractor complies with the measures that have been outlined in this EIAR to avoid and/or reduce significant adverse effects that have been identified.

A Construction Environmental Management Plan (CEMP) has been prepared and accompanies this EIAR (**Appendix 6.1**).

The CEMP sets out the principles and control procedures to manage any likely significant effects on the environment from the construction phase. The Contractor(s) will establish detailed construction methodologies upon appointment, and will further develop the CEMP, while ensuring that all proposals comply with the requirements detailed in the CEMP.

The defined planning (red line) boundary for the proposed development includes all project elements, including ancillary infrastructure such as site access tracks, drainage and temporary working areas for site facilities.

Along the cable route, assessments to date have covered a 100m wide corridor to ensure that all relevant information was captured. The cable route corridor for the purpose of the planning consent application (red line boundary) will generally be 50m, while the working corridor width for construction purposes will generally be 30m. The 50m planning (red line) corridor, provides flexibility at construction stage, if minor re-routing is required within the planning corridor.

The planning corridor along the cable route, will be locally widened beyond the 50m corridor in a limited number of locations, to accommodate specific construction methodologies, such as at road and watercourse crossings.

At other areas (substation, landfall, temporary construction compounds and working areas) the planning (red line) boundary is shown on the planning drawings and encompasses both the permanent and temporary works requirements as described in **Sections 6.4** and **6.5**.

Most of the potential negative environmental effects of the proposed development will be associated with construction and installation activities. This EIAR identifies the measures required to avoid or minimise such potential impacts.

6.3 Indicative Construction Programme and Phasing

Subject to obtaining planning approval and the relevant permits and licences, on-site construction of the proposed development will commence in 2023 and is expected to be completed in 2024.

The construction of the other components of the Arklow Bank Wind Park Phase 2 (the Project) will overlap with the construction works for the proposed development, with the proposed development expected to be operational in 2025, with full build out of the Project expected post 2025.

The approach outlined below is considered to represent a reasonable worst-case scenario as to how the proposed development may be constructed. Whilst the general requirements detailed in this section will be followed, the Contractor(s), when appointed, will be responsible for the sequencing and implementation of the works in a safe and secure manner and in accordance with all statutory requirements. Notwithstanding this flexibility, as stated above, the Developer will ensure that the construction activities, and all associated environmental controls are carried out in compliance with the mitigation measures and good construction practice described in this EIAR.

6.3.1 Landfall

The landfall horizontal directional drilling (HDD) works at Johnstown North are currently scheduled to take approximately ten months and to be undertaken between September 2023 and June 2024. The actual HDD drilling and duct pull-back will take up to 14 days working 24 hours a day for each cable circuit.

The timeline in **Table 6.1** sets out the anticipated programme for the construction of the proposed landfall.

Table 6.1: Outline Construction Program – Landfall

Activity	Approximate Timing
HDD compound establishment at Johnstown North	1 month
Trenchless construction (HDD set up, bore and duct installation)	5 months
Transition Joint Bay (TJB) construction	2 months
Cable pull and jointing with onshore cable	2 months

6.3.2 Onshore Cable from Landfall to 220kV Substation (Including Road Crossings)

The timeline in **Table 6.2** sets out the anticipated programme for the construction of the proposed cable route. Construction will commence in 2023 and complete in 2024.

Table 6.2: Outline Construction Program – Onshore Cable Route

Activity	Approximate Timing
Cable compound establishment at Johnstown North	1 month
Cable trenching, joint bays and access track construction (including vegetation clearance)	6 months
HDD set-up, bore and duct installation - R772	4 months
HDD set-up, bore and duct installation - M11 Crossing Option	4 months
Cable installation	4 months
Cable jointing	4 months
Reinstatement	1 month
Cable testing	3 months

Activity	Approximate Timing
Full cable energised	1 month

For the onshore cable route, the works will be progressed on a rolling basis and in phases. Where no obstacles or constraints exist within or near the cable route, it is expected that progress rates for the trench excavation and installation of ducts will be up to:

- 80m/day in agricultural land
- 60m/day on sections with road crossings with full or single lane closure
- 30m/day on sections with road crossings maintaining two-way traffic
- 5m/day on sections with watercourse crossings (depending on span, flow, access, seasonal restrictions)

These rates will reduce where any obstructions or utility services are encountered.

The current schedule envisages that trench excavation and installation of duct sections will be undertaken between May and October 2023.

Cable pulling and jointing is currently programmed to be undertaken between December 2023 and March 2024.

The expected construction steps for each cable section (of up to 700m) is presented in **Table 6.3**.

Table 6.3: Outline Construction Phases & Activity Durations – Onshore Cable Route (per cable section of up to 700m)

Phase	Activity & Approximate Duration
Excavation / Ducting	A minimum of 2 weeks depending on terrain/crossings for cable route Excavate and prepare joint-bay: 5-7 days (precast) or 10-12 days (cast in-situ)
Cable and Fibre Optic Pulling and Jointing	Pull cables into joint-bays and jointing activities: 3 weeks per joint bay Back fill joint bay: 2-3 days
Total Duration	A minimum of 7 weeks per 700m cable section

The HDD option (if used) across the M11 is currently scheduled to take c. four months in total, of which the actual HDD drilling and duct pull-back will take up to 7 days working 24 hours a day for each cable circuit. This work is planned to be undertaken between June and November 2023, dependent on any seasonal restrictions.

The HDD across the R772 is currently scheduled to take c. four months in total, of which the actual HDD drilling and duct pull-back will take up to 7 days working 24 hours a day for each cable circuit. This work is planned to be undertaken between December 2023 and March 2024, dependent on any seasonal restrictions.

6.3.3 Onshore 220kV Substation

The timeline in **Table 6.4** sets out the anticipated programme for the construction of the proposed onshore 220kV substation. Construction is planned to be undertaken between January 2023 and December 2024.

Table 6.4: Outline Construction Program - Substation

Activity	Approximate Timing
Site set-up	1 month
Site prep, civil construction and GIS building construction	11 months
Electrical installation and pre-commissioning	8 months
Commissioning and energisation	4 months

6.3.4 Connection from Substation to Transmission Network

The overhead line (OHL) connection from the substation to the transmission network is scheduled to take a total of four months and is planned to be undertaken within the timeframe of August to November 2024.

An outage of the existing OHL between the Arklow substation and the Lodgewood substation will be scheduled by EirGrid to maintain grid stability while these works are undertaken. The outage will be agreed with EirGrid as part of their work to securely coordinate outages on the National Electricity Transmission Network (NETN).

6.4 Temporary Construction Compounds, Working Areas and Access Points

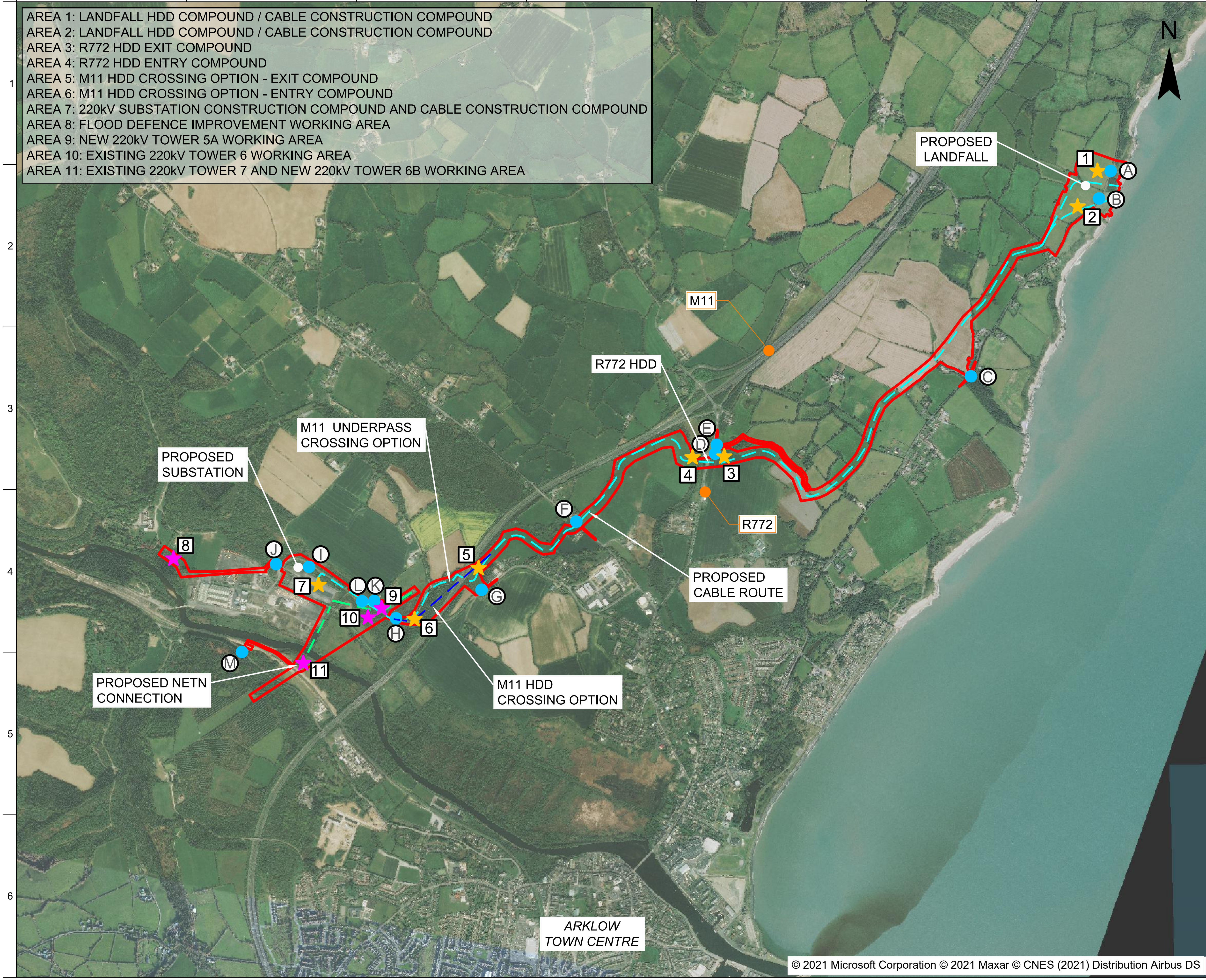
Several temporary construction compounds and working areas are required to allow construction of the proposed development.

The locations of the compounds and working areas, including associated access, are listed in **Table 6.5** and shown in **Figure 6.1**. The cable construction corridor is considered to be the route from the Transition Joint Bay at the landfall to the onshore 220kV substation site, more detail can be found in **Section 6.5.3.3**.

Table 6.5: Temporary Construction Compounds, Working Areas and Access Points

Compound or Working Area	Construction Access Point	Location	Activity
1	A	Johnstown North	Landfall HDD Compound / Cable Construction Compound Access to Cable Construction Corridor
2	B	Johnstown North	Landfall HDD Compound / Cable Construction Compound Access to Cable Construction Corridor
-	C	Johnstown South	Access to Cable Construction Corridor
3	D	R772 (East)	Access to Cable Construction Corridor HDD Exit Compound
-	E	R772 (East)	Access to Cable Construction Corridor
4	F	R772 (West)	Access to Cable Construction Corridor HDD Entry Compound
5	G	M11 (East)	HDD Crossing Option - Exit Compound Access to Cable Construction Corridor
6	H	M11 (West)	HDD Crossing Option – Entry Compound
7	I	Avoca River Business Park	220kV Substation and Cable Construction Compound
8	J	Shelton Abbey	Working Area: Flood Defence Improvement Works
9	K	Kilbride	Working Area: Installation of new OHL Tower 5A
10	L	Kilbride	Working Area: Decommissioning of existing OHL Tower 6
11	M	Ballyraine Lower	Working Area: Decommissioning of existing OHL Tower 7 and installation of new OHL Tower 6B

A3



LEGEND:

- RED LINE BOUNDARY
- PROPOSED CABLE ROUTE
- PROPOSED M11 CROSSING HDD OPTION
- PROPOSED NETN CONNECTION
- 1 PROPOSED TEMPORARY CONSTRUCTION COMPOUND
- 8 PROPOSED TEMPORARY WORKING AREA
- A PROPOSED CONSTRUCTION ACCESS

D1	18.02.21	SB	EO'G	MW
Rev	Date	By	Chkd	Appd

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Client
Sure Partners Limited

Project Title
Arklow Bank Wind Park
Phase 2
Onshore Grid Infrastructure

Drawing Title
Temporary Construction Compounds and Working Areas

Scale at A3: 1:20,000
Role: Civil
Suitability: Draft
Arup Job No: 271715-00
Rev: D1
Name: **Figure 6.1**

Do not scale

6.4.1 Landfall Temporary Compounds

The planning application includes two temporary construction compounds at Johnstown North.

One temporary construction compound will support HDD operations (HDD Compound). This compound will be up to 4,900m^2 in area. The other temporary construction compound (Cable Construction Compound) will support the construction of the eastern end of the onshore export cable. This compound will be up to 15,000m^2 in area.

There are two options for the location of these compounds, one in each of the two adjacent fields, which are located on the western side of the R750 road. The HDD Compound may be in the northern field and the Cable Construction Compound in the southern field, or vice versa as shown on **Figure 6.2** and **Figure 6.3**.

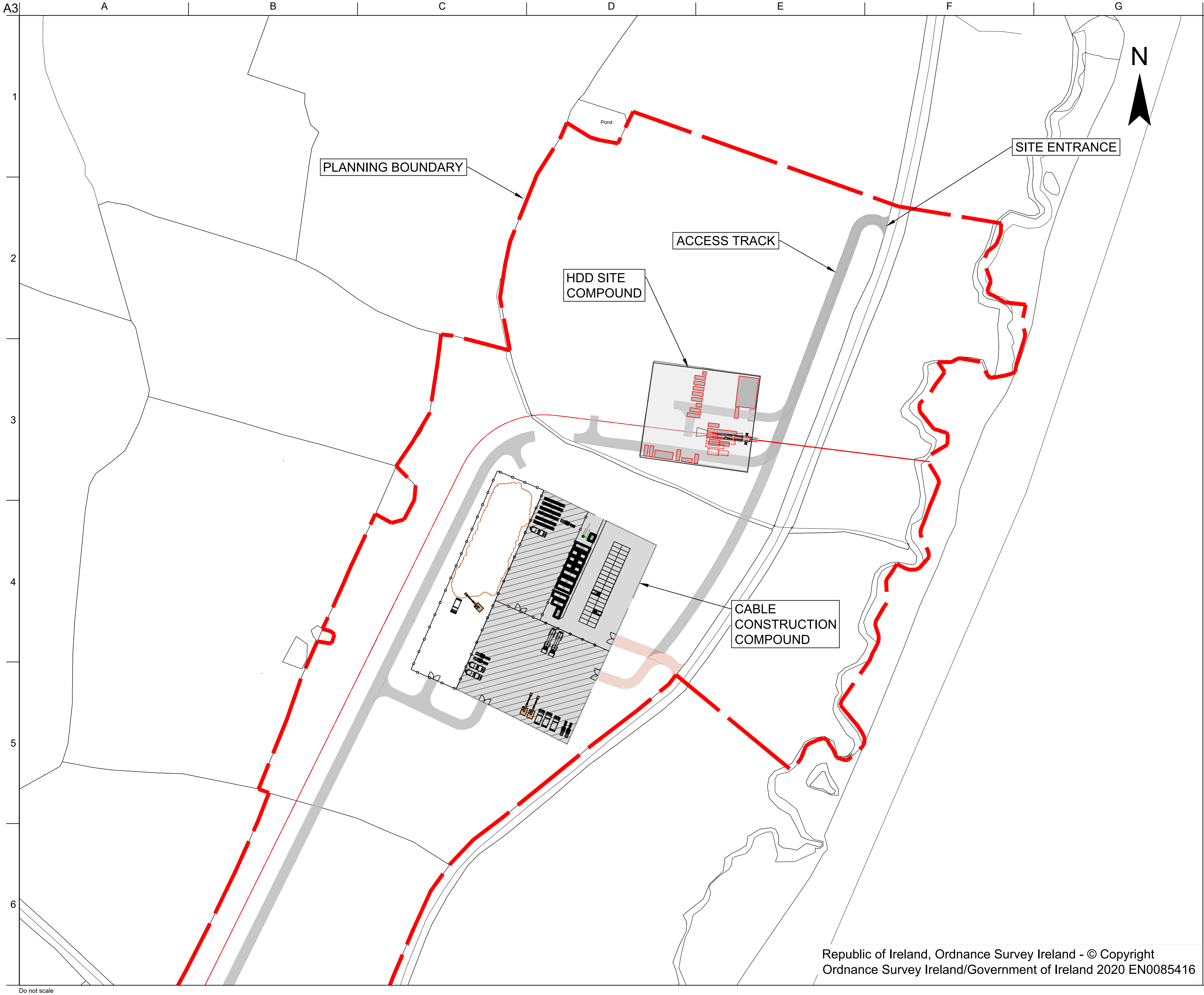
To ensure that a reasonable worst-case scenario is assessed, both options have been considered in this EIAR. The Developer, in consultation with the HDD construction Contractor, will decide which compound location is to be used, with the other location then being used as the Cable Construction Compound for the onshore cable.

Each compound will be accessed via existing entrances between the fields and the R750 road. Temporary traffic management signage will be erected on the R750 on the approach to the access gates, which will provide advance warning of the presence of the site entrance.

A temporary access track, approximately 4.5m wide, suitable for the delivery of plant, equipment and materials, will be formed from the existing field access gate, on the western side of the R750 public road to each compound location. In the interests of health and safety, localised widening, in the form of passing places, may be required along the compound access track. Where required, passing places will generally be up to 30m long and 5m wide, inclusive of a non-load bearing shoulder.

The Cable Construction Compound will necessitate minor earthworks involving topsoil stripping. Additional earthworks will be required for the HDD Compound at the landfall site as described in **Section 6.9.1**.

Figure 6.4 below provides a typical layout for a HDD Compound with a ‘mud pit’ arrangement. Alternatively, the ‘mud pit’ may be replaced with a containerised ‘mud lab’. The two options (both of which are assessed in the EIAR) are described in **Section 6.5.2.3**.



Rev	Date	By	Chkd	Appd
D1	18.02.21	SB	EO'G	MW

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Client
Sure Partners Limited

Project Title
Arklow Bank Wind Park
Phase 2
Onshore Grid Infrastructure

Drawing Title
Typical Landfall Temporary
Compound Arrangement Option 1

Scale at A3: 1:2,000

Role: Civil

Suitability: For Information

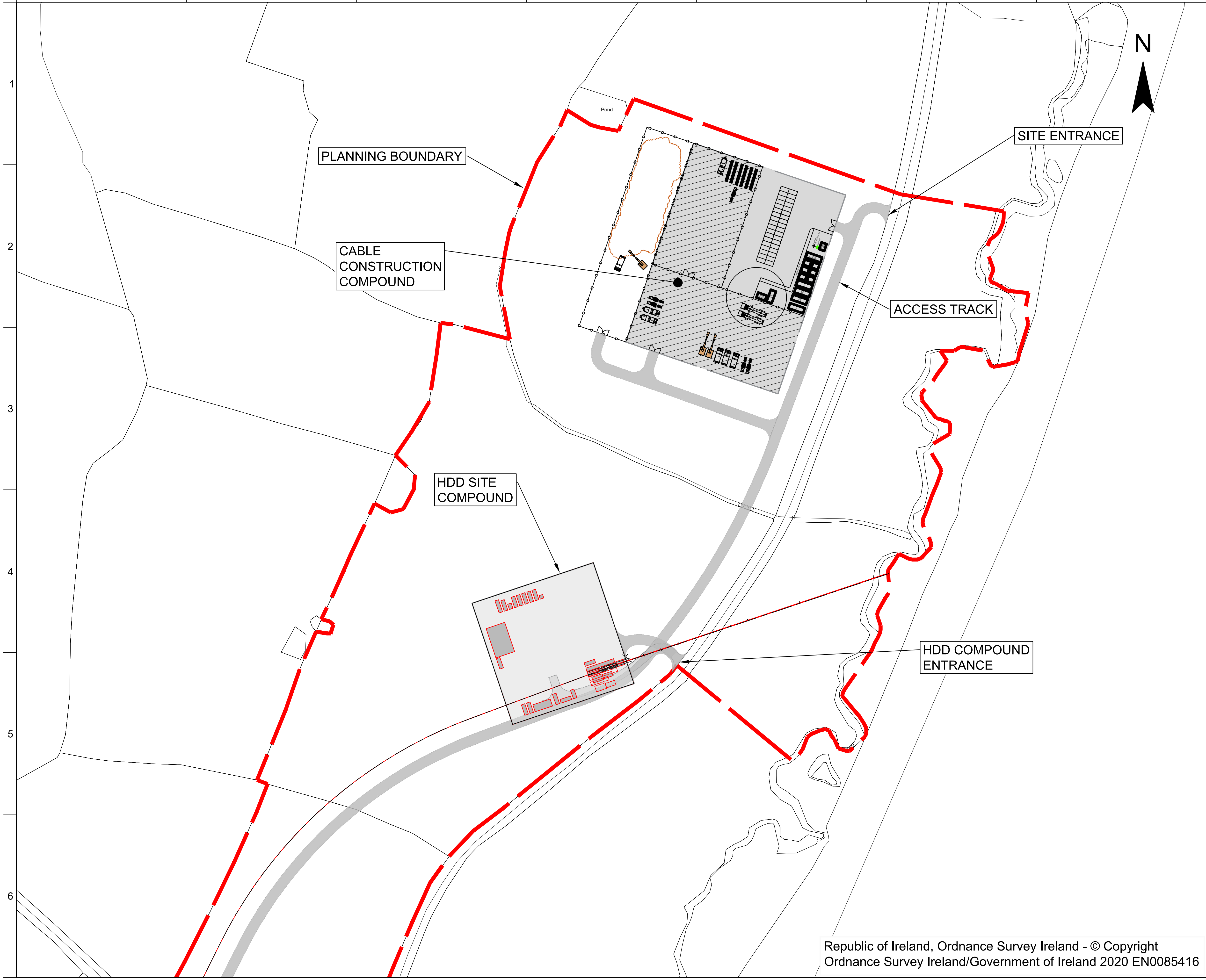
Arup Job No: 271715-00

Rev: D1

Name

Figure 6.2

A3



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Project Title
Arklow Bank Wind Park
Phase 2
Onshore Grid Infrastructure

Drawing Title
Typical Landfall Temporary
Compound Arrangement Option 2

Scale at A3: 1:2,000

Role: Civil

Suitability: For Information

Arup Job No: **271715-00**

Rev: **D1**

Name

Figure 6.3

Do not scale

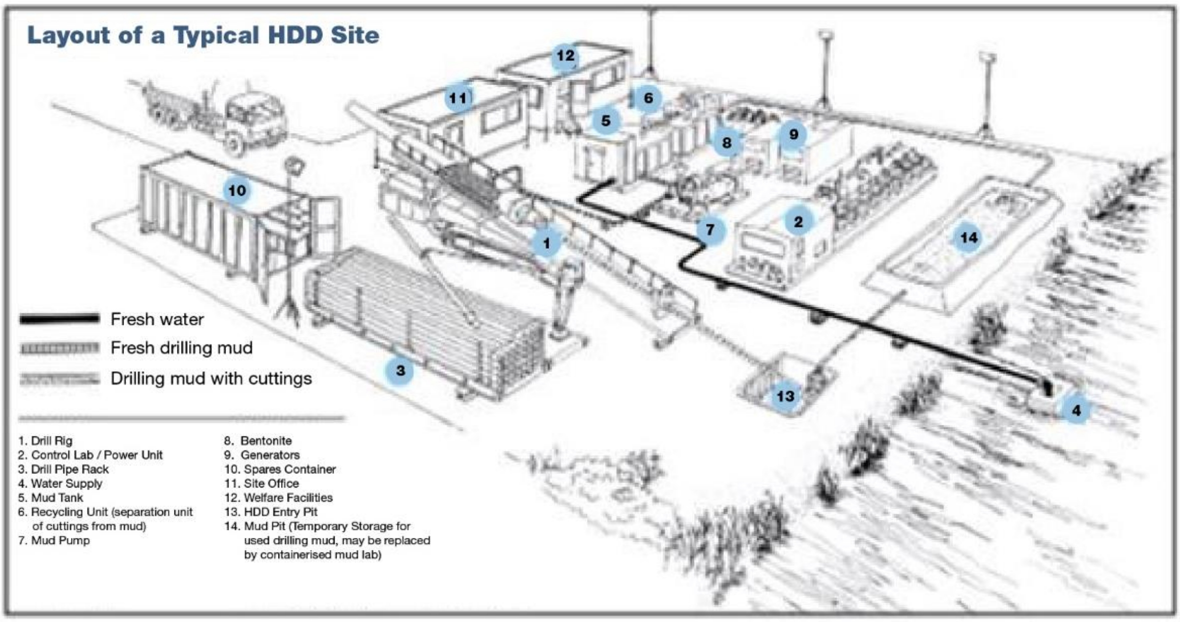


Figure 6.4: Typical HDD Compound with a mud pit

Double height stacked welfare and offices may be used to maximise the available footprint and minimise the interface with adjacent works.

The HDD Compound will likely accommodate the following:

- Drilling unit;
- Drill strings;
- Drilling mud (naturally occurring non-toxic lubricant for the drill operation) equipment;
- Workshops;
- Welfare facilities;
- Offices;
- Stores;
- Material & equipment storage;
- Construction waste storage;
- Road access;
- Vehicle parking;
- Gate facility to control access and egress, as well as providing security;
- Wheel wash prior to exiting;
- Temporary power, either via connection to existing electricity supply or from diesel generator;
- IT/telecommunication connection;
- Secure bunded area for fuel storage and chemicals, and generators;

- Signage and lighting;
- Topsoil stockpile; and
- Surface water runoff management.

The Cable Construction Compound will predominantly serve the onshore cable laying Contractor on the eastern section of the onshore cable from the landfall to the onshore 220kV Substation. This Cable Construction Compound, the proposed layout for which is shown in **Figure 6.5**, will likely comprise the following:

- Workshops;
- Welfare facilities;
- Offices;
- Stores;
- Material & equipment storage;
- Construction waste storage;
- Road access;
- Vehicle parking;
- Gate facility to control access and egress, as well as providing security;
- Wheel wash prior to exiting;
- Temporary power, either via connection to existing electricity supply or from diesel generator;
- IT/telecommunication connection;
- Secure bunded area for fuel storage and chemicals, and generators;
- Signage and lighting; and
- Surface water runoff management.

The material storage area will also allow for storage of:

- Topsoil;
- Cable drums;
- Fibre optic cable drums;
- Ducts (if required); and
- Cable installation equipment.

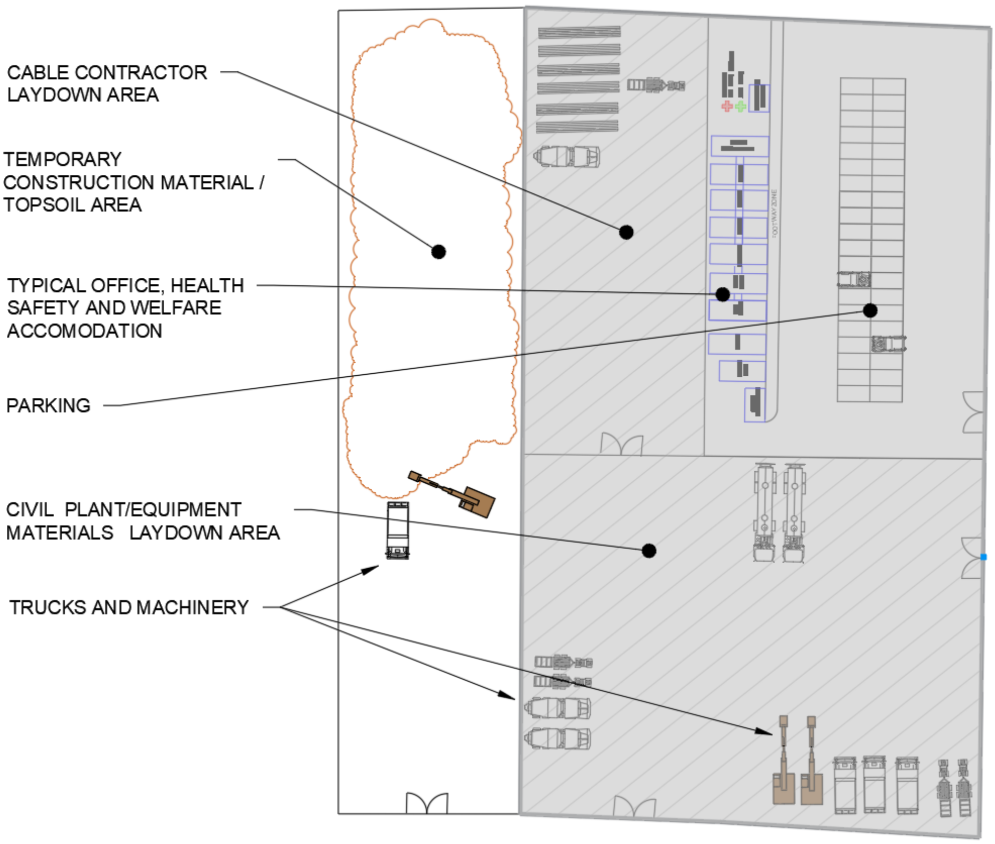


Figure 6.5: Typical Temporary Cable Construction Compound

6.4.2 Onshore Cable HDD Temporary Compounds

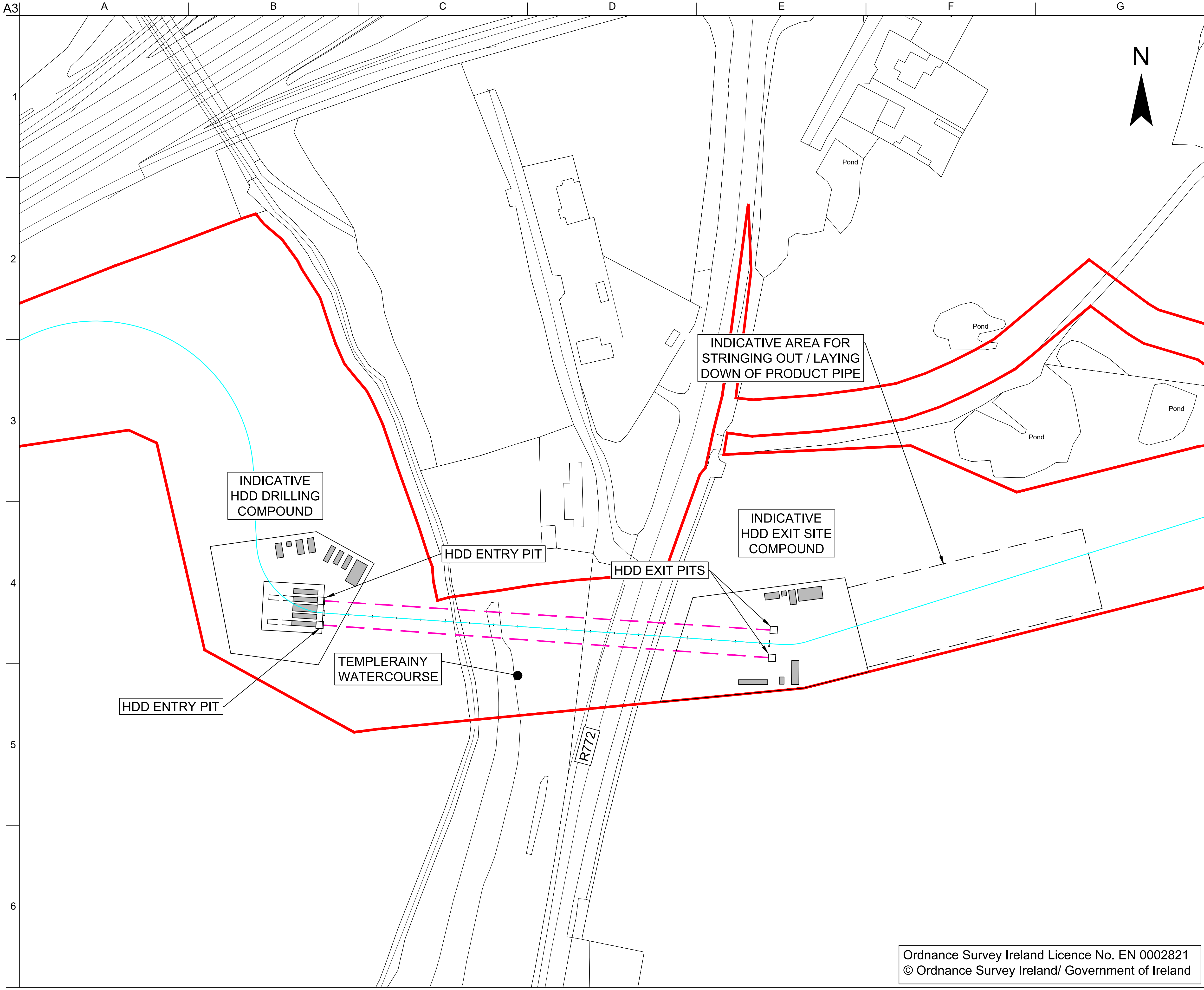
Temporary construction compounds will be required for the HDD operations at the crossings of the M11 and R772 roads. Each entry and exit compound is up to 3,000m^2 in area, excluding the HDD compound on the west of the M11, which is located in an area of immature woodland, which will be up to 4,000m^2 in area, including an access route.

An additional area, clear of obstructions, of typically around 50m wide x 100m long will be required, within the planning (red line) boundary, to string out the ducts before being pulled into the bore profile. The area for duct stringing may vary slightly subject to any spatial constraints, topography etc., however no modification to the existing land, such as clearance of vegetation and topsoil stripping, will be undertaken.

The location of the HDD temporary compounds is specific to the orientation of the route crossing of the roads.

A preliminary design of the HDD profile for each crossing has identified the entry and exit points, which require the compound to be located around that point to facilitate safe and correct execution of the HDD operation.

Refer to **Figure 6.6** and **Figure 6.7** for a proposed layout of the compounds associated with each HDD.



LEGEND

- PROPOSED HDD PIPES
- RED LINE BOUNDARY
- CABLE ROUTE

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Project Title
Arklow Bank Wind Park
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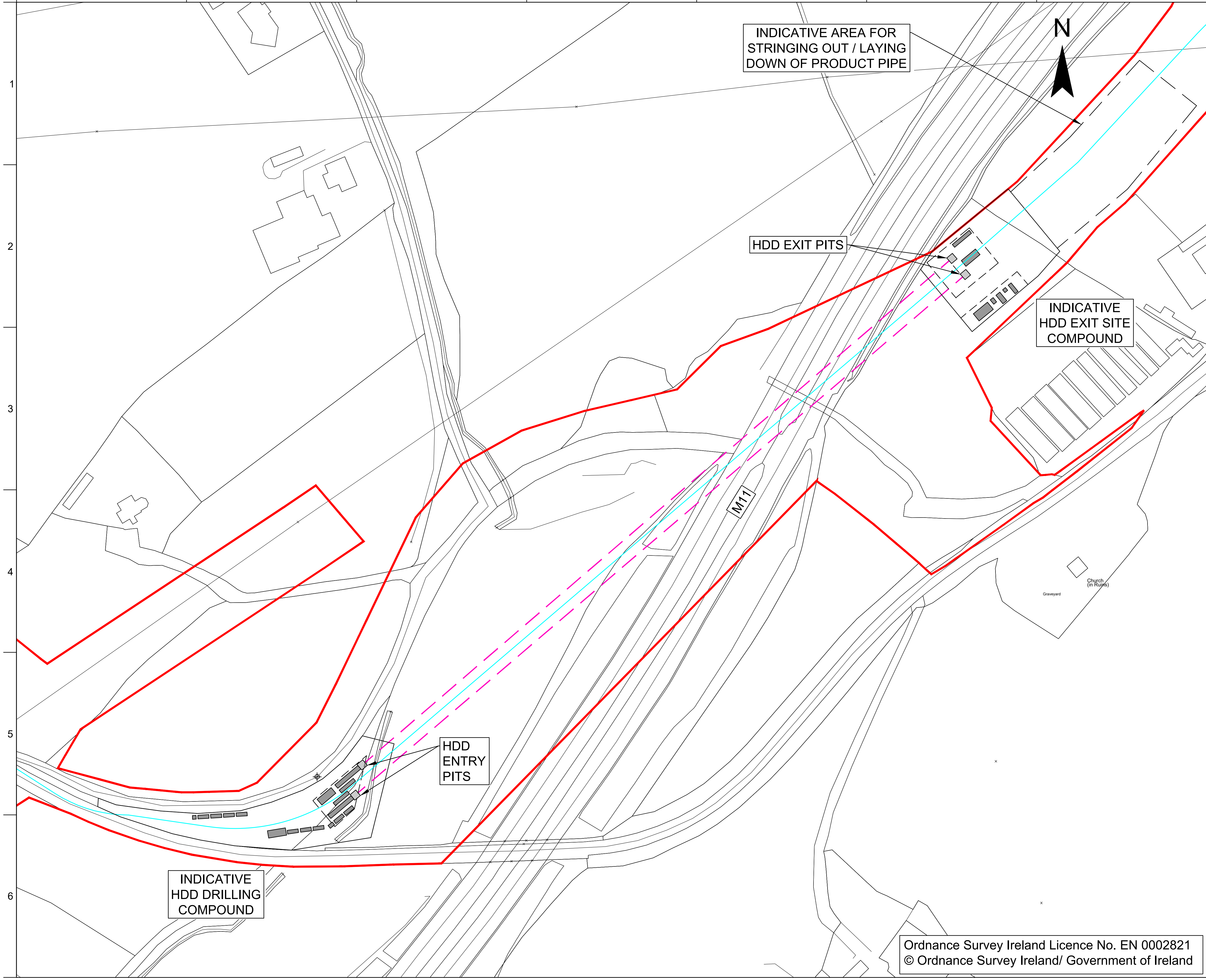
Onshore Grid Infrastructure

Drawing Title
Indicative HDD Compounds for R772 Crossing

Scale at A3: 1:1,500
Role: Civil
Suitability: Draft
Arup Job No: 271715-00
Rev: D1
Name: **Figure 6.6**

Do not scale

A3



LEGEND

- PROPOSED HDD PIPES
- RED LINE BOUNDARY
- CABLE ROUTE

Rev	Date	By	Chkd	Appd
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Client
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Project Title
Arklow Bank Wind Park
Phase 2
Onshore Grid Infrastructure

Drawing Title
Indicative HDD Compounds for
M11 Crossing

Scale at A3 1:2,000
Role Civil
Suitability Draft
Arup Job No 271715-00
Rev D1
Name
Figure 6.7

Do not scale

The temporary R772 & M11 HDD compounds will likely accommodate the following:

- Drilling unit;
- Drill strings;
- Drilling mud (naturally occurring non-toxic lubricant for the drill operation) equipment;
- Workshops;
- Self-contained welfare facilities;
- Offices;
- Stores;
- Material storage;
- Construction waste storage;
- Road access;
- Vehicle parking;
- Gate facility to control access and egress, as well as providing security;
- Wheel wash prior to exiting;
- Temporary power, either via connection to existing electricity supply or from diesel generator;
- Secure bunded area for fuel storage and chemicals, and generators;
- Signage and lighting;
- Water bowser parking; and
- Surface water runoff management.

6.4.3 Onshore 220kV Substation Temporary Compound

A temporary construction compound, up to 10,000m^2 in area will be required for the substation site, as well as to support the construction of the western end of the onshore export cable from the landfall to the new 220kV substation and the connection from the substation to the NETN.

Double height, stacked welfare and offices may be used to maximise the available footprint and minimise the interface with adjacent works.

The substation Contractor's compound will be established within the footprint of the permanent works at the Shelton Abbey substation site.

The connection substation works and the transmission substation work will be programmed accordingly, to accommodate the presence of the substation temporary construction compound. This will require the movement of the contactor's compound around the site depending on the phase of construction.

Refer to **Figure 6.8 - Figure 6.10** for indicative layouts of the compound for different stages of construction.

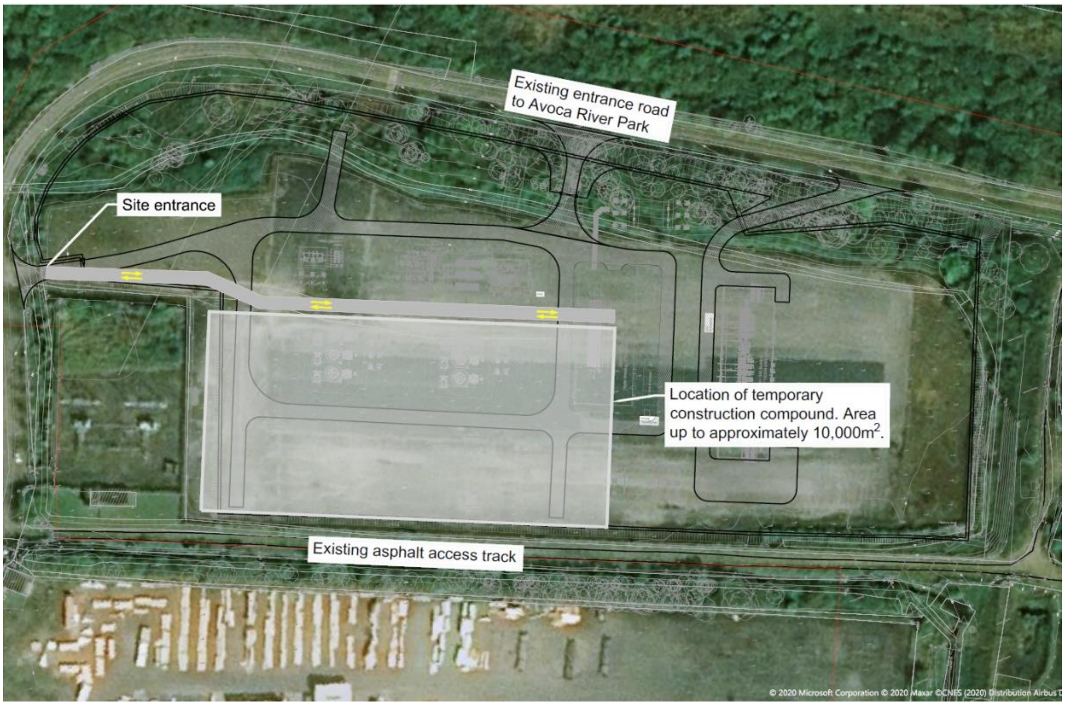


Figure 6.8: Indicative Substation Construction Compound Stage 1

Figure 6.9: Indicative Substation Construction Compound Stage 2

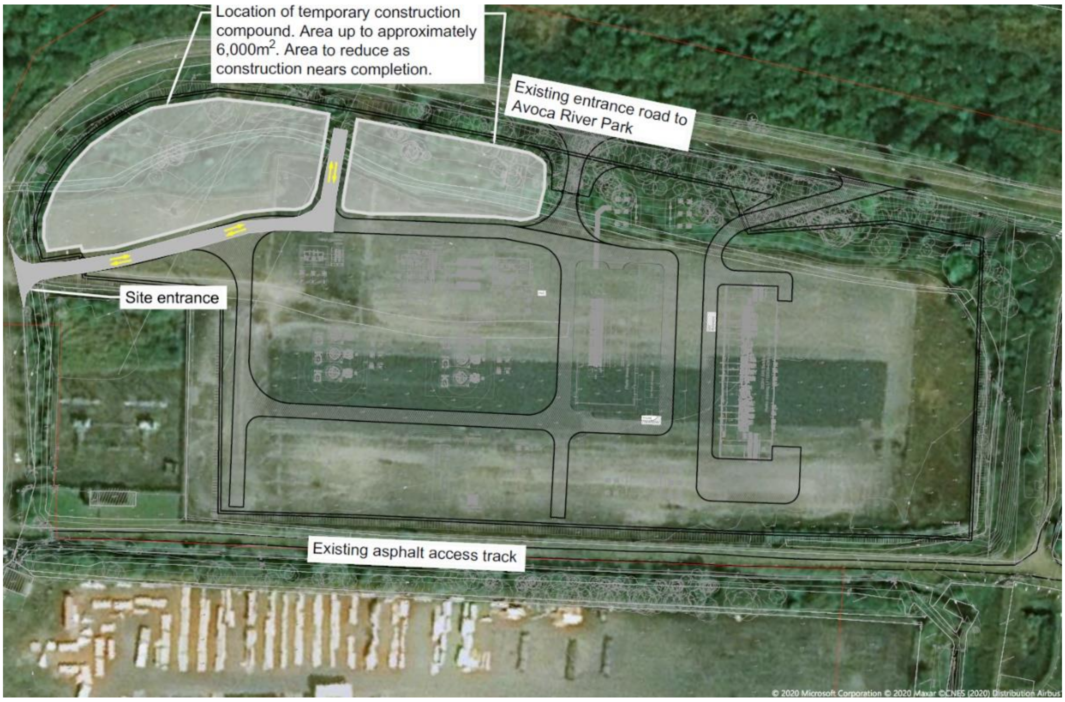


Figure 6.10: Indicative Substation Construction Compound Stage 3

The temporary construction compound will likely accommodate the following:

- Workshops;
- Welfare facilities;
- Offices;
- Stores;
- Material storage;
- Construction waste storage;
- Road access;
- Vehicle parking;
- Gate facility to control access and egress, as well as providing security;
- Wheel wash prior to exiting;
- Temporary power, either via connection to existing electricity supply or from diesel generator;
- Temporary surface water management;
- IT/telecommunication connection;
- Secure bunded area for fuel storage and chemicals, and generators; and
- Signage and lighting.

6.4.4 Temporary Working Areas

In addition to the landfall, cable route and substation construction compounds, temporary working areas will be established, as shown in **Figure 6.1**, for the construction of the new 220kV towers and decommissioning of existing 220kV towers, as well as the flood embankment improvement works.

The temporary working areas will accommodate some or all of the following, depending on the working area in question:

- Welfare facilities;
- Stores;
- Material storage;
- Construction waste storage;
- Road access;
- Vehicle parking;
- Wheel wash prior to exiting;
- Designated wash-down areas when working in areas of invasive species;
- Temporary power, either via connection to existing electricity supply or from diesel generator;
- Secure bunded area for fuel storage and chemicals, and generators; and
- Signage and lighting.

6.5 Construction Methods

6.5.1 Pre-Construction Activity

Pre-Construction Survey

The following pre-construction confirmatory surveys will be completed at all temporary construction compounds and working areas, as required:

- Pre-construction confirmatory habitat or species surveys specified as part of the biodiversity mitigation measures;
- Confirmatory ground investigations;
- Up to date utility survey check (desktop and site based);
- Topographic survey;
- Access route condition survey; and
- Pre-construction, photographic site condition survey.

Landowner and Neighbour Notifications

Prior to commencing any works, the Developer will inform the appointed landowner agents and the landowners about the activities, specific works, and the construction schedule. The neighbours, in the vicinity of the works, will be contacted and advised of the type of work being undertaken and the expected dates and durations.

All landowners will be contacted prior to access being required on their lands and a date of commencement for the works will be provided to the landowner before any work begins.

Pre-Construction Documentation

Prior to commencement of site work, the appointed Contractor(s) will produce detailed construction method statements, work programmes and risk assessments. These documents will provide details on:

- Pre-construction surveys;
- Site enabling works for temporary compounds and working areas, cable route and substation sites;
- Landfall and Transition Joint Bay construction;
- Cable corridor construction;
- Joint bay construction;
- Cable installation;
- Cable route crossings;
- Joint bay and substation permanent access roads;
- Substation platform construction;
- Substation perimeter fencing erection;
- Substation drainage installation;
- Substation earthing and ducting installation;
- Substation foundation construction;
- Substation building construction and fit-out;
- Substation electrical fit-out;
- Substation site finishes and surfacing;
- Access route works for connection to transmission network;
- Tower foundation construction for connection to transmission network;
- Tower structure construction for connection to transmission network;
- OHL stringing for connection to transmission network;
- Existing tower and string decommissioning; and
- Reinstatement.

These method statements will detail how the Contractor plans to implement the design. They will also take into account site investigations, third party requirements, and the mitigation measures outlined in the various sections of the EIAR and CEMP (**Appendix 6.1**).

The method statements produced by the Contractor(s) will be agreed with the Developer, who will ensure the method statement has taken account of any mitigations or actions identified within this EIAR, including compliance with the CEMP (**Appendix 6.1**).

6.5.2 HDD at Landfall

Owing to the steep coastal cliffs in the vicinity of the landfall, HDD will be used to bring the offshore export cables ashore, under the R750, before connecting to the onshore cables.

HDD is a trenchless cable installation technique whereby a hole is drilled under a feature so that the cable installation avoids disturbance of the cliffs and any sensitive habitats in the area.

There will be two HDD bores at the landfall and each HDD bore and duct will contain one cable circuit.

6.5.2.1 Pre-Construction Activity

The pre-construction activities are described in **Section 6.5.1** above.

6.5.2.2 Site Enabling Works

In preparation of commencing construction of the landfall, site enabling works, such as that listed below, will be undertaken.

Site Entrances and Access Tracks

Existing field entrance gates may be replaced with new lockable galvanised double width field gates and posts. To facilitate safe vehicular access and egress, and where required, gates will be set back from the existing entrance.

The existing field entrance will either be temporarily finished with an unbound crushed stone surface, or where required to facilitate safe vehicular access and egress, a bituminous bound bellmouth will be provided up to the edge of the public road. The public road will be kept free of debris by use of a road sweeper and/or on-site wheel wash, as required.

The access track to the compounds will require stripping of topsoil, typically 300mm deep, and then placing of up to a maximum of 600mm of imported clean natural stone, such as SRW Type A to Clause 801 (Transport Infrastructure Ireland, Specification for Roads Works Series 800, Road Pavements) on top of a geotextile separation membrane. Alternatively, a temporary plastic or metal roadway could be used.

There are various plastic or metal access track products available, these generally comprise panels, 3m x 3m, laid directly on top of existing level or levelled ground. A hiab type delivery vehicle can be used to lay the panels, overlapping and linking to form a contiguous access track.

Temporary construction signage will be erected on the R750 public road, in accordance with the Traffic Signs Manual (DTTS, 2019).

Setting Out

The site boundaries will be set out using Global Positioning System (GPS) or total station equipment and temporary hoarding, fencing, signage etc. will be erected, as required, to delineate the extent of the site, prevent unauthorised access and protect the surrounding environment.

If the up-to-date pre-construction utility survey check work identifies existing utilities crossing the site, these will be detected on site using an appropriate technique and equipment, such as Cable Avoidance Tool (CAT) / Ground Penetrating Radar (GPR) equipment, and the location clearly set out prior to any site clearance and excavations, so they can be safely exposed, worked around or diverted.

Clearing the Works Area

The topsoil will be stripped and temporarily stored separately at a designated excavated material storage area for re-use in the reinstatement works.

The excavated material storage area will be at least 50m from any watercourse and material side slopes will be commensurate with the type of material, to ensure slope stability and prevent erosion. The stockpile will be surrounded in silt fencing to protect the surrounding environment.

Existing field entrances to be used for the landfall site will be cleared of vegetation, where required to achieve sight lines as shown in the planning drawings. Vegetation clearance at the site entrances will also help improve turning radii for larger vehicles. All vegetation clearance, where appropriate, will be done outside the bird breeding season (March to August).

Diversion of Field Drains

Any existing field drainage present crossing the landfall site will be temporarily diverted or facilities put in place to over-pump to settlement ponds prior to discharge of treated water into the existing surface water drainage system.

Field drains will be reinstated on completion of the works or new drainage installed to match the drainage characteristics of the ground prior to development. The landowner will be consulted on the proposed drainage provisions prior to any installation.

Existing Utilities

Any area to be excavated will be subject to utilities searches and CAT scanning.

Services, if any, subject to utilities searches and investigation during design, will be exposed using intrinsically safe excavation methods i.e. vacuum or hand excavation. Subject to design requirements and in agreement with the relevant service owner/operator, appropriate protection methods (such as steel plating, concrete slab etc.) will be installed.

Compound Construction

The construction method for each temporary construction compound will be as described below:

A. The temporary site access will be constructed;

B. The compound areas will be fenced and secured;

C. If required, the underlying soil material will be excavated and stockpiled separately, then profiled and surrounded in silt fencing. The underlying soil material will only be excavated to create a level platform area. In the case of the landfall, rock breaking may be required;

D. If the underlying soil material is suitable, it will be used to create a level platform and so reduce the need for stockpiling and import of granular stone material;

E. Geotextile and/or geogrid material will be placed on the platform area to improve the ground and to facilitate the subsequent removal of any imported granular material after construction;

F. Imported granular stone material will be placed and compacted in layers to create a level platform area, typically up to 600mm thick; and

G. Stores and offices will be set-up, parking areas, laydown areas and pedestrian walkways etc. will be created.

On completion of the works, the area of the temporary construction compounds will be decommissioned in reverse order. The temporary cable construction compound will be reinstated to its original use. The HDD compound form part of the biodiversity enhancement planting scheme post construction.

6.5.2.3 HDD Set-up

The Contractor will excavate an entry pit to allow the HDD drilling rig to commence drilling at an appropriate cable burial depth. The entry pit will be used to bring the offshore export cable from the HDD duct to the Transition Joint Bay. This may require introduction of sheet piling.

The Contractor will either mobilise to site a containerised ‘mud lab/recycling plant’ or construct a temporary ‘mud pit/lagoon’. The mud recycling plant or mud pit/lagoon will facilitate the recycling of drilling fluid by removing drill cuttings thus reducing the total water demand.

There are different arrangements for mud recycling plant, which depends on several factors including ground conditions, detailed design of the HDD and the Contractor’s drilling equipment.

A mud recycling plant is typically 2m wide x 6m long x 4m high and will typically comprise pumps with desander and desilter modules.

The desander is used as a primary mud cleaner for drilling applications by separating coarse and medium mixed sands from the mud via a pump tank and a shaker module. The mud then passes through a riser pipe to the lower deck of the shaker for screening. After primary screening, the mud falls into a pump tank below, from there the mud is pumped by a centrifugal pump to a hydrocyclone. The underflow from the hydrocyclones is discharged on to the top deck of the shaker for dewatering, the overflow flows into the pump tank where some is recycled, and some is passed to clean the mud discharge pump for transfer to the next stage of mud treatment or reuse.

The desilter module works in a similar way to the desander module, however, it is fitted with different screens to capture the finer material.

The screened material will be contained in-situ and removed by dump truck or tank, to an appropriately permitted/licenced disposal site.

A temporary ‘mud pit’ area may also be used to settle the returning cuttings from drilling mud. Settling of the cuttings from the mud may take one to two days before it is removed off site by a dump truck or tanker, to an appropriately licenced disposal site.

The mud pit will be appropriately sized and lined to prevent leakage or overtopping due to rain. Typical dimensions of a mud pit are 12m long x 15m wide x 2m deep. The mud pit, if required, will either be formed at existing ground level using an impermeable geomembrane ‘liner’ material and earth bunds or will be an excavation, lined with an impermeable geomembrane below existing ground level.

Spoil management has been included in the CEMP (See **Appendix 6.1**) and will be further developed by the Contractor. This spoil management sets out how volumes of material in and out of the area are managed. The CEMP also sets out how site rainfall volumes are managed, to ensure the volume of the mud pit does not ‘overtop’ to the surrounding land. This will be achieved by monitoring weather conditions, the daily monitoring of the mud pit by the Contractor to prevent overtopping, and measures such as pumping to secure containment will be used where required to prevent overtopping.

Anchoring of HDD Rigs

During the drilling of a pilot hole, reaming out and installation of HDD duct pipe, a HDD rig can exert a considerable pushing and pullback force. This force is generally 30 tonnes but can potentially be up to 300 tonnes. The rig will therefore need to be anchored to the ground and this is usually achieved by either anchoring directly to rock by drilling or, where this is not possible, driving a line of sheet piles to provide an anchoring point.

If superficial deposits still do not provide adequate anchoring support from sheet piles, one anchor block of reinforced concrete will be required to secure each rig during the works.

An anchor block typically consists of a mesh reinforced concrete block of approximate plan dimensions 4.5m x 4m and thickness of c. 1.50m, which will be constructed onsite.

Final details are dependent on specific HDD plant and ground conditions, which will be determined at detailed design stage, by the Contractor. However, the scale and characteristics of the construction works are considered to be the expected worst case for the purposes of assessment.

6.5.2.4 Landfall HDD Works

In the case of a landfall constructed by HDD, considering geological features, water depths, mechanical properties of cables and ducts, the bore would extend to a point at a suitable distance offshore, usually several hundred metres. A pipe is inserted into the drilled hole which is then used as a duct into which the cables are installed. Sufficient space is required behind the HDD bore to string out the HDD pipe to enable a direct feed into the boreholes.

Installation of lengths of cables in HDD ducts can be limited by the maximum pulling tension of the cable and this will vary depending upon the cable mass, conductor cross-section, conductor material and, for the submarine cables, the design of the cable armouring. Also, the length of cable that can be delivered to the HDD location is another limiting factor. Initial consideration of feasible construction methods has indicated the cable will be pulled onshore from a vessel as described below.

A HDD rig will be required for the landfall HDD works. Within the landfall HDD compound, the typical space required for a HDD rig entry set-up is up to 50m x 50m (within the wider HDD compound), providing room for the drilling rig, bentonite pumping plant and drill sections. **Figure 6.11** shows a typical HDD drill rig and **Figure 6.20** illustrates the stages in a typical HDD duct installation at a road and water crossing, similar to the landfall HDD.

Figure 6.11: Photo of Typical HDD Drill Rig at Landfall

The HDD works comprise the following main stages:

A. A pilot hole of approximately 311mm diameter will be drilled from onshore to offshore;

B. Once the pilot hole has been completed, the reaming process will commence, increasing the diameter of the pilot hole to accommodate the safe installation of HDD duct. The reaming process will continue back and forth for a number of passes to achieve a bore diameter of approximately 1118mm. During the drilling procedure, drilling mud is continuously pumped to the drill head to act as a lubricant. Solids are removed from the returning mud via the mud recycling plant, and the spoil is transported off site or via the mud pit to settle before being removed;

C. A Jack-up vessel or dredger will be used at the reception pit, ‘punch out’ location in the seabed;

D. An approximate 30m x 8m wide reception pit will be created at the reception point in the seabed. This is achieved using a combination of air lift and long reach excavators;

E. The last forward HDD reamer will punch through the seabed at the reception pit;

F. The HDD reamer will then be disconnected from the drill pipe and recovered by divers;

G. The high-density Polyethylene (HDPE) liner pipe (duct) will be pre-assembled offsite and then floated in, connected to the drill pipe, and pulled onshore from the offshore end through the pre-drilled bore into position;

H. Steps A – G are then repeated for the other 220kV offshore export cable;

I. Trenches are then excavated from the HDD entry points to the Transition Joint Bay and ducts installed and backfilled;

J. HDD construction equipment and plant will then be demobilised from site;

K. The ducts will then be checked to make sure they are clear for cable pull-in and messenger wires will be installed; and

L. Cables will then be installed in the ducts by pulling onshore through the ducts from the offshore delivery vessel to the Transition Joint Bays.

The maximum duct and associated bore diameter are based on an offshore export cable with outside diameter (OD) of up to 266mm.

Using the current industry standard for the HDD duct diameter of 2.5 times the cable OD, a minimum 665mm internal diameter duct will be required, meaning a standard HDPE Standard Dimension Ratio 11 duct of nominal 800mm diameter will be provided.

This is the envisaged maximum duct diameter, however, this may be subject to change in accordance with industry standards and good practice for duct sizing.

The duct installation mitigates the risk of any gravel or sediments being pulled into the duct during the cable installation phase damaging the cable. Other appropriate controls will be employed to mitigate risk of damage to cables during installation such as positive water pressure with outflow of water from the HDD duct during cable pulling, coupled with a series of roller brushes at the duct entry point.

The drilling of the pilot bore may be performed by a specialist subcontractor, working for the HDD Contractor, using wireline gyroscopic sensor-guiding techniques to set the profile of the drill, providing ‘real time’ three-dimensional location tracking with an accuracy of typically plus or minus one to two metres, horizontally.

Once commenced, the HDD drilling activities are expected to operate continuously over a 24-hour period until each bore is complete. Consequently, lighting will be provided to provide a safe working area. Directional lighting will be employed to minimise light spill onto adjacent areas and the lighting will be configured to meet health and safety requirements.

Drilling may be carried out simultaneously (for both circuits) to accelerate the works programme.

The HDD will require a drilling fluid to cool and lubricate the drill head. Typically, bentonite is used, which comprises 95% water and 5% bentonite clay which is a non-toxic, natural substance. The bentonite effectively seals the bore maintaining a closed system throughout the drill. The bentonite drilling fluid is circulated down through the drill rods and back up the outside the rods in the annulus of the borehole.

While the bentonite drilling fluid is non-toxic and can be commonly used in farming practices, if sufficient quantity enters a watercourse it can potentially settle on the bottom, smothering benthic flora and affecting faunal feeding and breeding sites. In saltwater environments, the smothering effect is less problematic because seawater degrades the bentonite fluid, causing it to flocculate and allowing faster dispersal. Every endeavour will be made to avoid a breakout or frac-out (loss of drilling fluid to the surface) and it will be managed quickly if one occurs.

The drilling Contractor will develop a location specific HDD frac-out contingency plan, detailing measures to be taken to reduce the risk of bentonite breakout and measures to be taken for the protection of sensitive ecological receptors, should a breakout occur.

A typical procedure for managing a breakout or frac-out on land would include:

- Stop drilling immediately;
- Contain the bentonite by constructing a bund e.g. using sandbags;
- Recover the bentonite from the bund by pumping to a suitable container or back to the entry pit for recycling;
- If necessary, inert and non-toxic lost circulation material (mica) will be pumped into the bore profile, which will swell and plug any fissures;
- The area will be monitored closely to determine if the breakout has been sealed; and
- Check and monitor mud volumes and pressures as the works recommence.

A typical procedure for managing a breakout or frac-out under water would include:

- Stop drilling immediately;
- Pump lost circulation material (mica), which will swell and plug any fissures;
- Check and monitor mud volumes and pressures as the works recommence; and
- Repeat process as necessary until the breakout has been sealed.

Any bentonite will be managed and removed by the specialist drilling Contractor on completion of the operation. Water will be brought to site in tankers (to make up drilling fluid) for lubrication of the bore and to provide the requisite volumes of water to the compound. The water used will be non-saline and non-potable water. For each of the two HDD bores and with an average initial demand of around $10m^3$/hr, the total volume of water required is estimated to be up to $450m^3$, assuming full drilling fluid returns are maintained.

On completion of the operation the drill fluid will be disposed of or recovered at an appropriately licensed facility.

6.5.2.5 Transition Joint Bay

The onshore cables, which will be to a different specification to the offshore export cables, will be joined at the Transition Joint Bays which will be located below ground level in the HDD compound, at Johnstown North. The location will depend on the Contractor’s selection of HDD location, based on the options outlined in **Figure 6.2** and **Figure 6.3.**

The Transition Joint Bays will comprise a buried concrete chamber, typically 20m long x 5m wide. One chamber will be required for each circuit. The chambers will be constructed within an excavated pit, approximately 2.5m deep. The sides of the excavations for the Transition Joint Bays will be profiled to a safe angle of repose or safely shored using trench support or sheet piling. The transition bay walls will be constructed using reinforced concrete and the floor of each will be concrete lined to provide a flat, clean working environment. The Transition Joint Bays may be constructed prior to the HDD works in order to minimise construction delays and reduce the length of time for the offshore export cable pull in works.

The offshore and onshore cables must be joined together in a controlled environment, requiring a purpose designed shed or tent to be placed temporarily on top of each Transition Joint Bay chamber. These will be removed once the onshore cables have been joined with the offshore cables.

The chambers will have removable lids and following construction and commissioning, the lids will be installed, and the void below the lids backfilled and ground reinstated above. Surplus excavated material will be reused in the general reinstatement of the site.

Adjacent to each Transition Joint Bay there will be an earth link box. Earth link boxes are used at cable joints and terminations to provide easy access for cable testing and fault location purposes. Earth link boxes will require a number of surface level access covers placed in the vicinity of its associated Transition Joint Bay.

The area around the Transition Joint Bays will be backfilled with the excavated material upon completion of the jointing works, but permanent access will be required to the earth link boxes during the operational lifetime of the proposed development for maintenance purposes. In addition to the earth link boxes, there will be a requirement for a separate small communications chamber that will house jointing of the fibre optic cables.

After installation and reinstatement of the onshore Transition Joint Bays, the only visible above ground equipment will be manhole covers to allow access to the earth link boxes and communication chambers. There will be four manhole covers which, where possible, will be positioned close to field boundaries.

The access track to the Transition Joint Bays for construction will be maintained for permanent access during the operation phase.

6.5.2.6 Landfall Cable Installation

Following the completion of the duct installation, the cable for each circuit will be pulled through the ducts to join with the onshore cable at the Transition Joint Bays.

A ground level platform will be constructed at each Transition Joint Bay for the cable pull-in winch. The winch will be anchored using kentledge blocks, sheet piles or rock anchors. **Figure 6.12** is a photograph of a typical cable pull-in winch.

Figure 6.12: Photograph of typical onshore cable pull-in winch

Prior to pulling, the cable ducts will be tested to ensure the cable can be pulled through without any obstructions.

The cable laying vessel will be positioned offshore in sufficiently deep water. The cable end will be lowered from the vessel and floated (see **Figure 6.13** below which shows a typical cable float in progress) to the location of the HDD reception pit 'punch out' location. Divers will then connect the winch line to the cable and the shore winch will then begin pulling the cable through the duct. Pull-in will cease when the cable end reaches the onshore Transition Joint Bays. The offshore export cable beyond the HDD exit will then be lowered to the seabed for burial later, e.g. using a mechanical trenching, ploughing or jetting machine.

Figure 6.13: Typical cable float in progress

6.5.2.7 Reinstatement

Following completion of the HDD and jointing activities, all cabling and jointing infrastructure will be below ground.

The only visible structures at the landfall will be two small manhole covers for each circuit and small cable marker posts, which will indicate the location of the underground circuits. There will also be a permanent access track of approximately 4.5m to allow access to the Transition Joint Bays.

6.5.2.8 Biodiversity Enhancement Planting

In additional to the access track and four manhole covers at the HDD compound at Johnstown North, a biodiversity enhancement planting scheme is proposed, to ensure that there is no net-loss of habitat as a result of the proposed development.

The total biodiversity enhancement area will be 16,000m^2 and include a mixture of native woodland species in a main woodland planting area and perimeter edge mix. Some open areas will be left unplanted to form small glades as the woodland matures. Further information can be found in **Chapter 12** *Biodiversity*.

A rabbit proof fence will be provided to protect trees during early establishment. Weed control should not be necessary in Years 1 or 2, however in Year 3, some hand weeding may be required. A 5-year aftercare programme will be implemented. Any plants which die, are removed or become seriously damaged or diseased within a period of five years from the completion of the development shall be replaced within the next planting season.

6.5.3 Onshore Cable from Landfall to 220kV Substation

Connection to the proposed onshore 220kV substation at Shelton Abbey will be made by two 220kV high voltage alternating current (HVAC) circuits with associated fibre optic communication and earth cables, laid underground from the landfall location at Johnstown North.

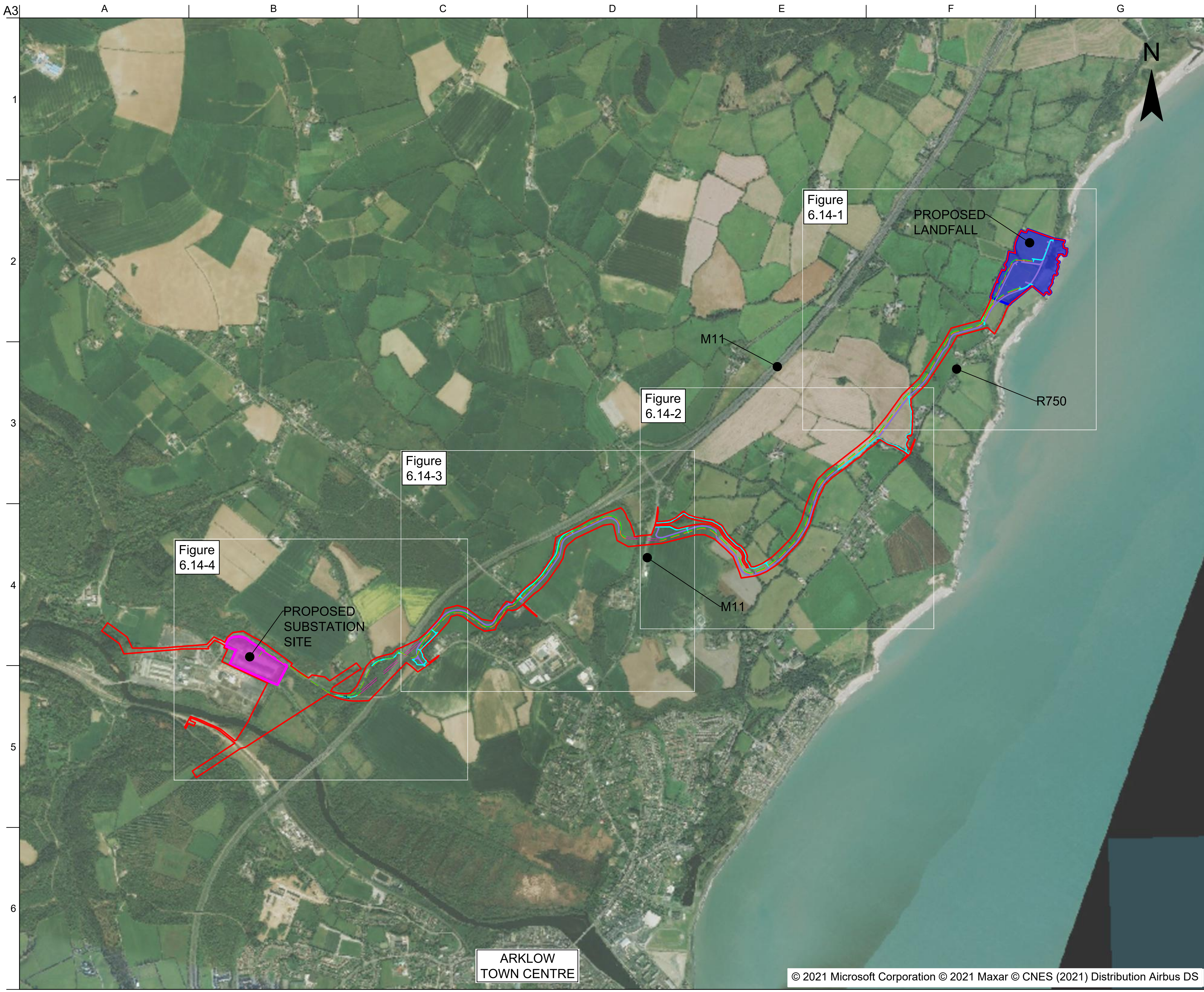
Each of the two circuits comprise of three power cables plus two fibre optic cables. In total there are six power cables plus four fibre optic cables and two earth cables.

The proposed cable route is shown in **Figure 6.14**.

Sequence of Works

Due to the linear nature of the cable route, the stage of work may differ at different locations, however they will all follow the sequence of works outlined below.

A3



LEGEND:

- PROPOSED LANDFALL
- PROPOSED SUBSTATION SITE
- RED LINE BOUNDARY
- PROPOSED CIRCUIT 1
- PROPOSED CIRCUIT 2
- M11 / R772 HDD CROSSING
- RED LINE BOUNDARY
- PROPOSED PERMANENT JOINT BAY ACCESS TRACK
- PROPOSED TEMPORARY HAUL ROAD

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Project Title
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Phase 2
Onshore Grid Infrastructure

Drawing Title
Proposed Cable Route
Keyplan

Scale at A3 1:20,000

Role Civil

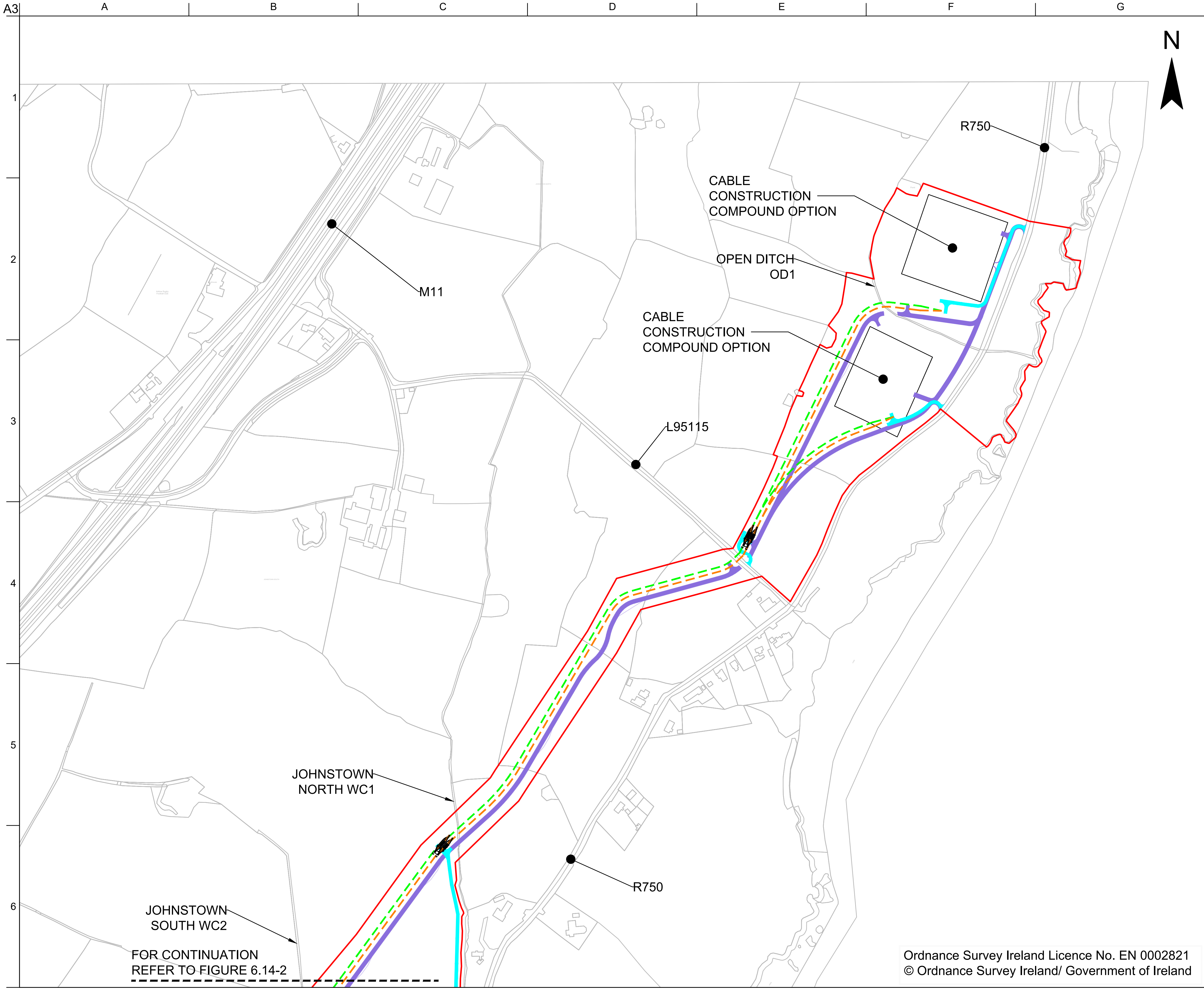
Suitability For Information

Arup Job No **271715-00**

Rev **D1**

Name
Figure 6.14

Do not scale



LEGEND:

- PROPOSED CIRCUIT 1
- PROPOSED CIRCUIT 2
- M11 HDD CROSSING OPTION
- RED LINE BOUNDARY
- PROPOSED PERMANENT JOINT BAY ACCESS TRACK
- PROPOSED TEMPORARY HAUL ROAD
- INDICATIVE PROPOSED STAGGERED JOINT BAY (TREFOIL)
- INDICATIVE PROPOSED PARALLEL JOINT BAY (FLAT FORMATION)

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Drawing Title
Proposed Cable Route
Sheet 1 of 4

Scale at A3 1:5,000

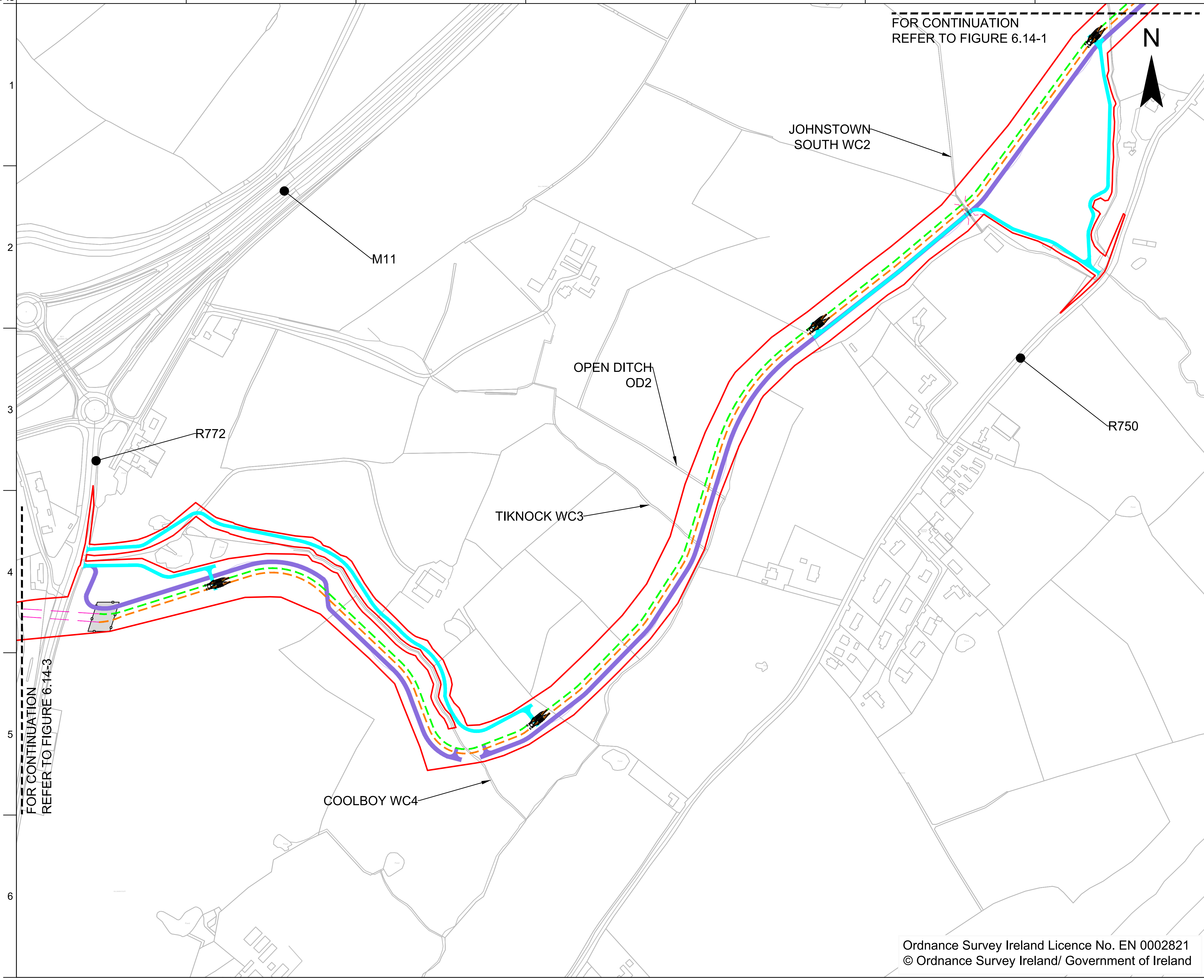
Role Civil

Suitability For Information

Arup Job No **271715-00** Rev **D1**

Name
Figure 6.14-1

Do not scale



LEGEND:

- PROPOSED CIRCUIT 1
- PROPOSED CIRCUIT 2
- M11 & R772 HDD CROSSING OPTION
- RED LINE BOUNDARY
- PROPOSED PERMANENT JOINT BAY ACCESS TRACK
- PROPOSED TEMPORARY HAUL ROAD
- INDICATIVE PROPOSED STAGGERED JOINT BAY (TREFOIL)
- INDICATIVE PROPOSED PARALLEL JOINT BAY (FLAT FORMATION)
- PROPOSED PERMANENT CULVERT

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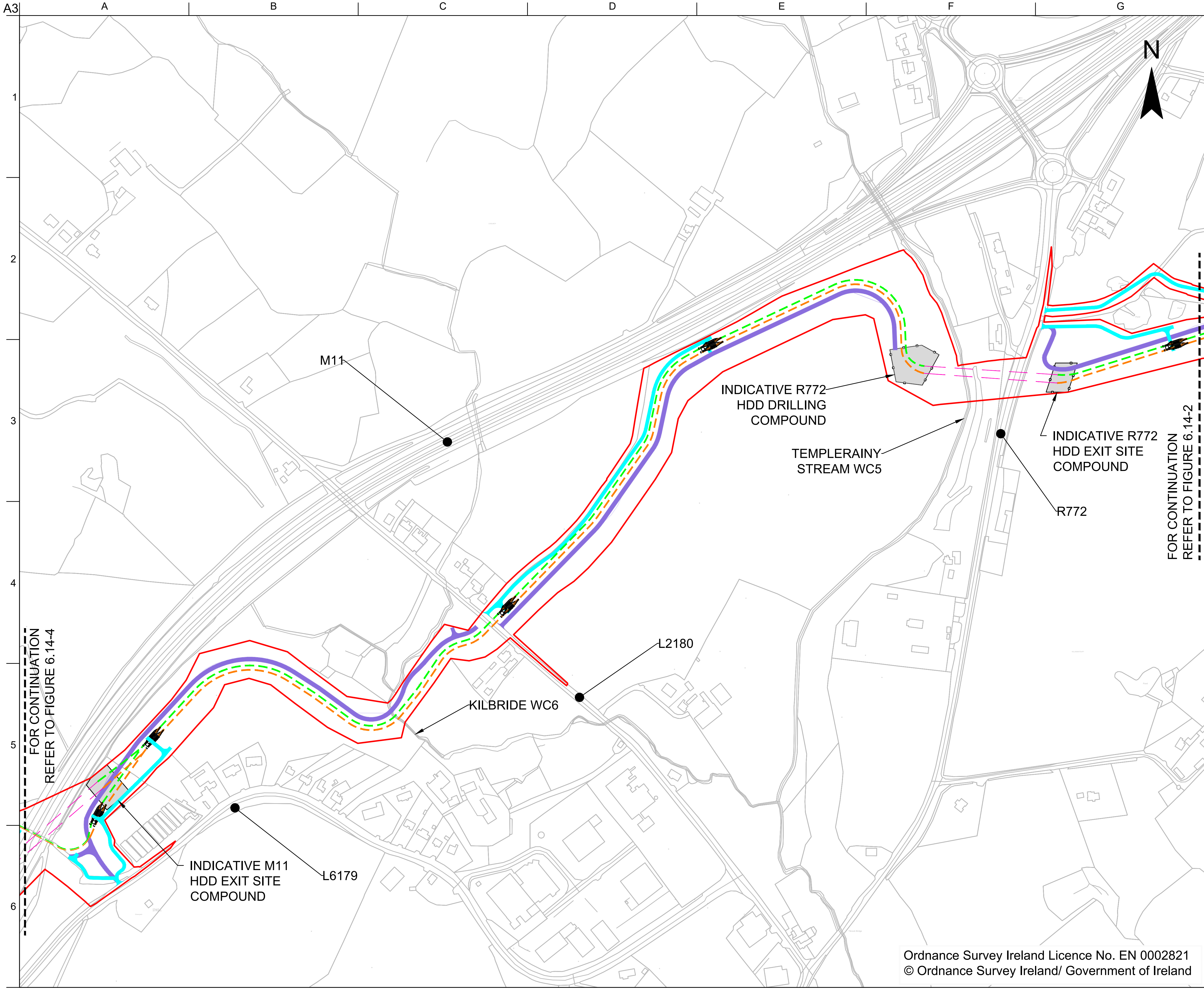
Drawing Title
Proposed Cable Route
Sheet 2 of 4

Scale at A3	1:5,000
Role	Civil
Suitability	For Information
Arup Job No	271715-00
Rev	D1
Name	**Figure 6.14-2**

Do not scale



LEGEND:

- PROPOSED CIRCUIT 1
- PROPOSED CIRCUIT 2
- M11 & R772 HDD CROSSING OPTION
- RED LINE BOUNDARY
- PROPOSED PERMANENT JOINT BAY ACCESS TRACK
- PROPOSED TEMPORARY HAUL ROAD
- INDICATIVE PROPOSED STAGGERED JOINT BAY (TREFOIL)
- INDICATIVE PROPOSED PARALLEL JOINT BAY (FLAT FORMATION)

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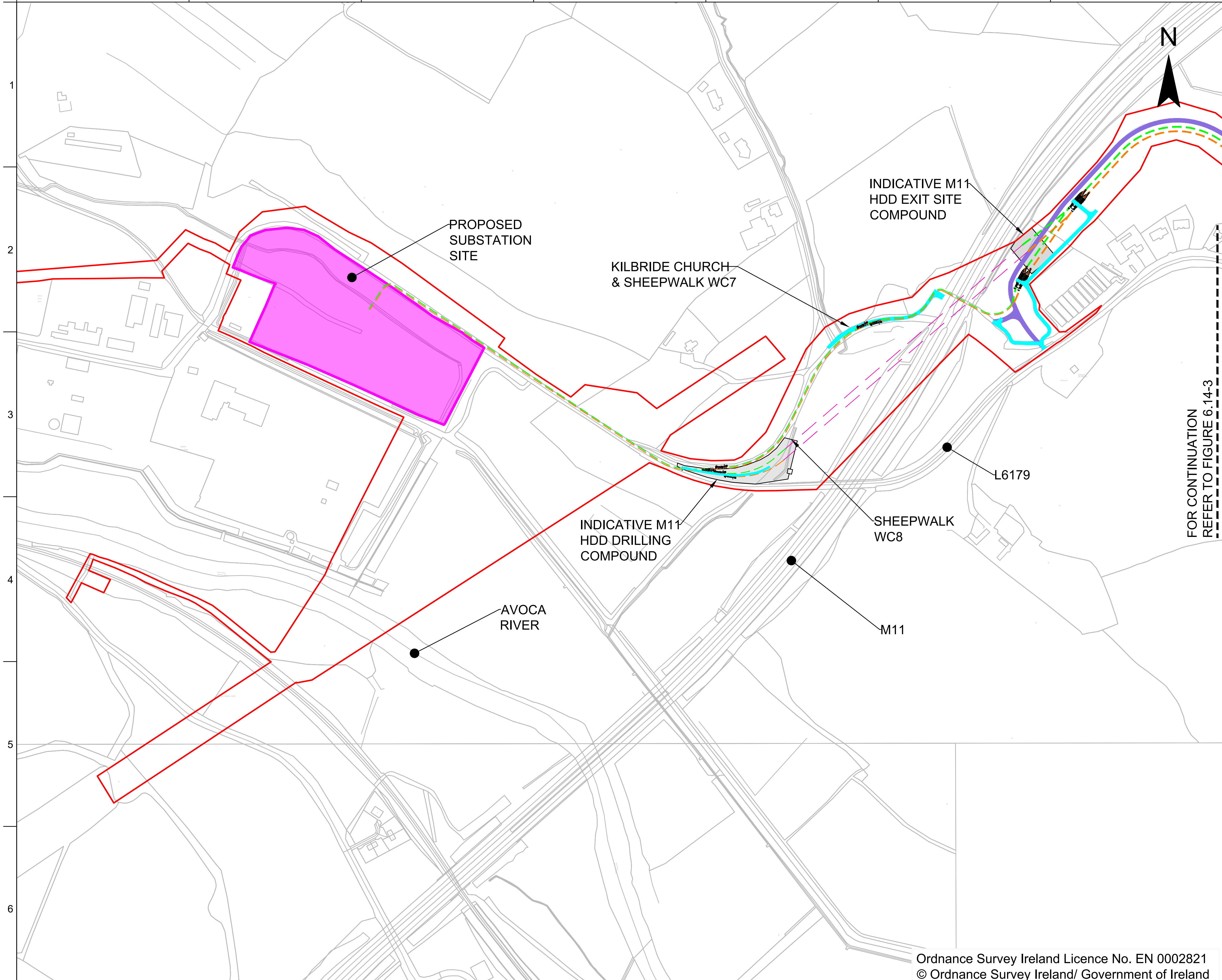
Scale at A3 1:5,000
Role Civil
Suitability For Information

Arup Job No **271715-00**
Rev **D1**

Name
Figure 6.14-3

Do not scale



LEGEND:

- PROPOSED SUBSTATION SITE
- PROPOSED CIRCUIT 1
- PROPOSED CIRCUIT 2
- M11 HDD CROSSING OPTION
- RED LINE BOUNDARY
- PROPOSED PERMANENT JOINT BAY ACCESS TRACK
- PROPOSED TEMPORARY HAUL ROAD
- INDICATIVE PROPOSED STAGGERED JOINT BAY (TREFOIL)
- INDICATIVE PROPOSED PARALLEL JOINT BAY (FLAT FORMATION)

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Proposed Cable Route
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Scale at A3 1:5,000
Role Civil
Suitability For Information
Arup Job No 271715-00
Rev D1
Name
Figure 6.14-4

Do not scale

6.5.3.1 Pre-Construction Activity

The pre-construction activities are as described in **Section 6.5.1** above.

6.5.3.2 Site Enabling Works

Prior to commencement of construction of the cable route, site enabling works, listed below, will be undertaken.

Setting Out

The cable route works will be set out using GPS or total station equipment and temporary hoarding, fencing, signage etc. will be erected, as required, to delineate the extent of the works area to provide a safe working area, prevent unauthorised access and protect the surrounding environment.

If the up-to-date pre-construction utility survey check work identifies existing utilities crossing the site, these will be detected on site using an appropriate technique and equipment (such as CAT/GPR equipment) and the location clearly set out prior to any site clearance and excavations, so they can be safely exposed, worked around or diverted.

Clearing the Works Area

Once the cable route and associated works area has been set out, clearing of the works area will begin. This will include removal of fences and cutting back of trees and vegetation, outside of the bird breeding season. To maintain field and other boundaries, throughout the works and prior to full reinstatement, the line of the hedge/fencing will be marked and temporarily fenced as appropriate.

Temporary access routes to the cable route may also result in loss of localised vegetation. Again, this vegetation will be reinstated, on completion.

Any non-native and invasive species recorded near works areas will be managed in accordance with the Invasive Species Management Plan in the CEMP, which is included in **Appendix 6.1**.

Diversion of Field Drains

Where existing drainage is present along the cable route, whether in open ditch or buried field drains, these will be temporarily diverted, or facilities put in place to over-pump to the temporary surface water drainage system.

Field drains will be fully reinstated on completion of the works or new drainage installed to match the drainage characteristics of the ground prior to development. The landowner will be consulted on the proposed drainage provisions prior to any installation.

Diversion of Any Existing Utilities

If existing utilities need to be diverted, this will be undertaken, either by the Contractor or by the utility owner in accordance with the relevant codes and standards and following agreement with the relevant authorities.

Any potable water supplies affected by the works, will be reinstated as soon as is feasible, or an alternative supply provided on a temporary basis until the permanent supply can be reinstated. Where access to drinking troughs for animals is severed by the works, an alternative supply will be provided for the duration of the works.

Erection of Temporary Guarding Positions

Where the cable route passes beneath existing overhead services, suitable fencing and guarding will be installed in accordance with good practice.

Temporary Access Points

Access points to the temporary cable construction corridor are presented in **Figure 6.1**.

Where temporary access is required to a point on the cable route other than provided directly from a public road, this will be defined, signed, and if necessary upgraded. These access track locations will be contained within the red line boundary and will comprise crushed stone and be approximately 4.5m wide. Crushed stone will be delivered to site by 20t tipping truck, then spread and profiled using an appropriately-sized tracked excavator or grader and then rolled and compacted using an appropriately sized vibrating roller.

Sections of temporary access tracks will be maintained for permanent access to joint bay locations. Appropriate drainage measures will be designed and constructed along these access tracks to maintain existing drainage regime.

Where required and to facilitate safe vehicular access and egress, a bituminous bound bell-mouth will be provided up to the edge of the public road.

6.5.3.3 Standard Cable Corridor

For the majority of the length of the cable corridor, an open cut trench method will be used to construct the two 220kV cable circuits.

Corridor Principle

A temporary cable construction corridor, typically 30m wide, will be established. As shown in **Figure 6.15**, the temporary construction corridor will provide space as follows:

- c. 1.25m temporary fencing and drainage
- c. 4.75m for stockpiling of segregated excavated material (topsoil and subsoil)
- c. 1.5m safe buffer zone
- c. 1.825m trench for circuit one
- c. 4.0m median
- c. 1.825m trench for circuit two
- c. 2m safe working zone
- c. 3m working zone / duct laydown area

- c. 5.5m haul road
- c. 2.5m excavated material stockpiling between 20m long passing bays typically @ 100m centres
- c. 1.25m temporary fencing and drainage

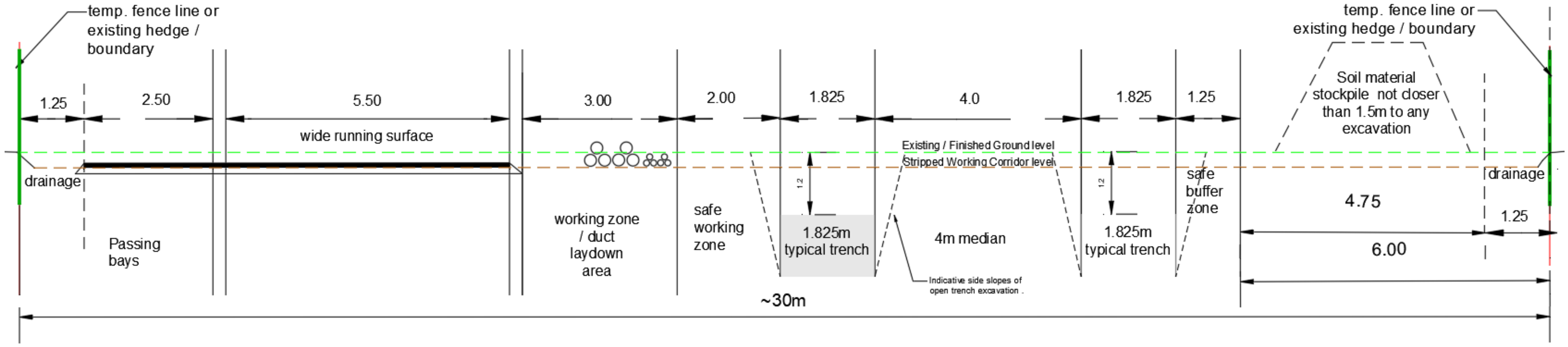


Figure 6.15: Temporary Cable Construction Corridor

Methodology

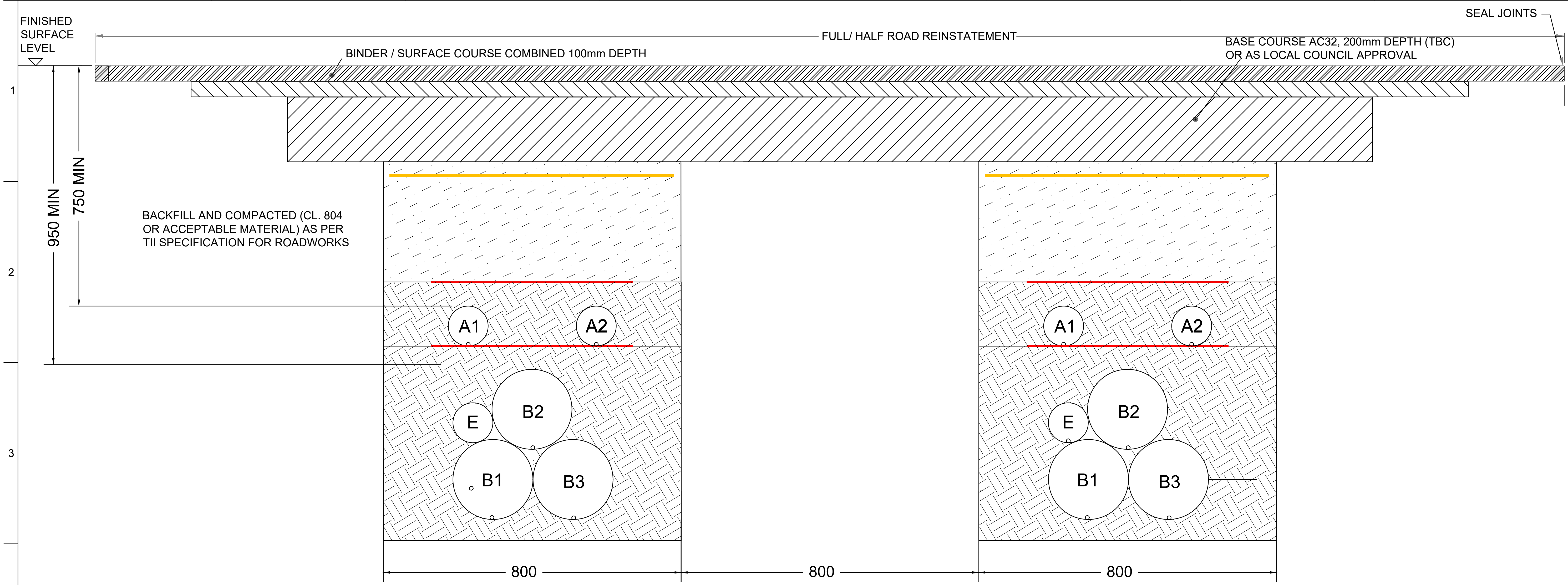
The following methodology will be used to construct the temporary cable construction corridor, with enabling works having been undertaken as outlined previously in **Section 6.5.3.2.**

The methodology will depend on the nature of the existing ground use. Where the existing ground is private land, such as agricultural:

- The proposed surface water management measures will be employed as required, in accordance with the measures set out in the CEMP, see **Appendix 6.1**;
- The haul road will be constructed by placing geotextile (and geogrid if required) material on to the existing ground;
- Imported granular stone will then be placed and compacted in layers as per the detailed design to create a typical make-up of 300-600mm thickness (depending on underlying ground conditions);
- The cable circuit 1 trench and cable circuit 2 trench will be excavated to the required depth, or further if required to reach a suitable bearing stratum;
- Excavated material will be side cast from the point of excavation and profiled. Topsoil and subsoil will be in separate stockpiles. The material will be kept a sufficient distance from the edge of the excavation for stability of the trench wall. Silt fences will be installed on the downslope side;
- The bedding material will be placed along with the cable ducts in trefoil or flat formation as required by the design;
- The remainder of the trench will be backfilled, with warning tapes or boards installed as per the detailed design; and
- The ducts will be cleaned of any debris and water by a series of brushes and rubber discs, usually pulled through as a ‘train’.

Circuit Trench

The circuit trench detail (trefoil and flat) is described in **Chapter 5** *Description of Development* and illustrated in **Figure 6.16** and **Figure 6.17** below.



TYPICAL ON ROAD CROSS SECTION INDICATING TRENCH FOR 220KV CIRCUIT TREFOIL

SCALE NTS

A= 125mm O.D. HDPE DUCT FOR COMMUNICATIONS, SDR=17.6
B= 250mm O.D. HDPE DUCT FOR HV CABLE, SDR=21
E= 125mm O.D. HDPE DUCT FOR EARTH CONTINUITY CONDUCTOR, SDR=17.6

- RED MARKER STRIP
- YELLOW MARKER WARNING TAPE
- EXISTING SERVICE MARKER STRIP
- 6mm GALVANISED STEEL PLATE

- RAPID HARDENING WET CONCRETE C25/30
- CBGM B (CL. 822). COMPACTED TO CL 813.10
- BACKFILL COMPACTED (CL. 802 OR ACCEPTABLE MATERIAL)
- TOP SPOIL
- ACCEPTABLE REINSTATEMENT MATERIAL

NOTES
1. ALL DIMENSIONS ARE IN MILLIMETRES.

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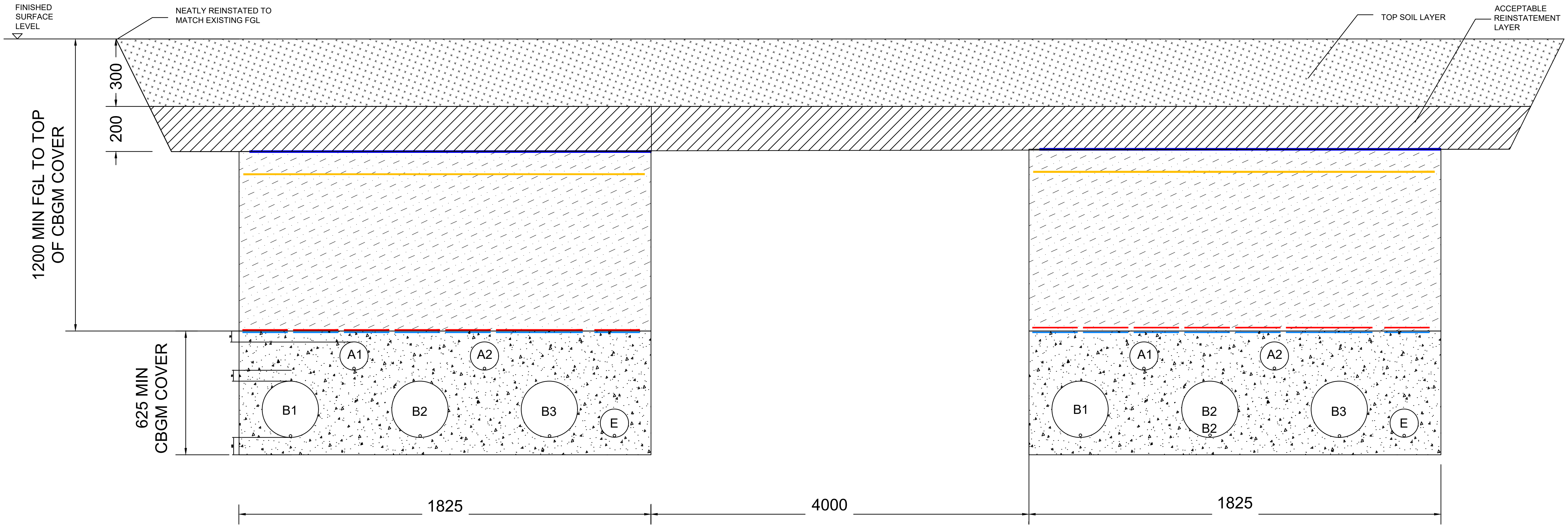
Project Title: Arklow Bank Wind Park Phase 2 Onshore Grid Infrastructure

Client: Sure Partners Limited

Drawing Title: Trench Cross Section Trefoil Arrangement

Scale at A3: NTS
Role: Civil
Suitability: Preliminary
Arup Job No: 271715-00
Rev: P1
Name: Figure 6.16

Do not scale



SECTION B-B DETAIL 1

TYPICAL OFF ROAD CROSS SECTION INDICATING TRENCH FOR 220KV CIRCUIT FLAT FORMATION

SCALE NTS

A= 125mm O.D. HDPE DUCT FOR COMMUNICATIONS, SDR=17.6
B= 250mm O.D. HDPE DUCT FOR HV CABLE, SDR=21
E= 125mm O.D. HDPE DUCT FOR EARTH CONTINUITY CONDUCTOR, SDR=17.6

RED MARKER STRIP
YELLOW MARKER WARNING TAPE
EXISTING SERVICE MARKER STRIP
6mm GALVANISED STEEL PLATE

RAPID HARDENING WET CONCRETE C25/30
CBGM B (CL. 822). COMPACTED TO CL 813.10
BACKFILL COMPACTED (CL. 802 OR ACCEPTABLE MATERIAL)
TOP SPOIL
ACCEPTABLE REINSTATEMENT MATERIAL

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES.

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Client: Sure Partners Limited

Drawing Title: Trench Cross Section Flat Arrangement

Scale at A3: NTS
Role: Civil
Suitability: Preliminary
Arup Job No: 271715-00
Rev: P1
Name: **Figure 6.17**

Do not scale

Duct Installation

Ducts will typically be delivered to site in c. 6m sections. Where the route changes direction, care will be taken to ensure that local over-bending of the ducts will not occur at the connections.

Alternatively, pre-formed bends will be used at tighter changes in direction. Pre-formed bends will be avoided, if possible, as they increase the pulling force on cables during installation and so reduce the length of a cable that can be installed.

Due to the way push-fit ducts are connected, with a considerable length of interference (i.e. the ‘male’ part is inserted at approximately 300mm to ensure adequate sealing of the duct joints), the ducts will be installed in a continuous process. Trying to insert ducts in gaps in the route e.g. at road crossings, requires a considerable length of duct to be lifted in order to provide the spare length to accommodate the interference, and there is a risk of disturbing good duct connections at either side of the gap.

For this reason, it is essential that the whole of each cable section will be available and accessible before duct installation commences, and that one crew works from one end to the other. Multiple crews working on the same section is not practicable and will not be carried out.

The push-fit joints are designed to present minimum interference to the cable when pulled in one direction through the joint, from the ‘male’ end of one duct into the ‘female’ part of the next duct. Therefore, the installation of the cables will be planned before the ducts are installed, to ensure that the orientation suits the proposed pulls.

Cables can be pulled in the opposite direction, but additional scuffing of the cable over-sheath, and increased pulling tensions, could occur.

A nylon rope will be left in each section of duct to enable cleaning equipment to be pulled into the duct. The ducts will then be sealed.

Duct Quality Check

The cable ducts will be installed in such a manner to ensure the cables can be pulled into them without damage. Some scuffing of the cable over-sheath is to be expected during any cable installation. The purpose of this over-sheath is to provide mechanical protection to the metallic sheath and the cable core.

The pulling tension will be recorded to allow:

- Validation of the assumptions regarding coefficients of friction between the bond wire and the unlubricated duct; and
- Validation of increases in pulling tension, compared with calculated values, can indicate local obstructions, ovality (caused by ducts being crushed during installation) or deviations from the designed route.

6.5.3.4 Joint Bays

The joints between two circuits will be made at a joint bay after two lengths of circuit have been winched into position in the duct.

The locations of joint bays along the cable route are indicated in **Chapter 5** *Description of Development*.

Methodology

The following methodology will be used in installing a joint bay on a cable route (30m corridor):

- The area of the joint bay will be excavated down to a suitable bearing stratum, with the sides of the excavation either battered or shored.
- If necessary, ground water will be pumped out and discharged downslope via suitable surface water management means.
- The reinforced concrete base slab will be constructed, followed by the reinforced concrete walls. Alternatively, precast U-channel sections may be used and lifted into place using appropriately sized excavator or crane.
- The required number and orientation of duct penetrations will be formed in the walls.
- The perimeter of the excavation will be backfilled as much as possible once duct penetrations are sealed with a non-shrinking material, or fully if the cable trench is already installed on either side.
- Ancillary items including the link box and communications chamber will be installed adjacent to the joint bay.
- The pull-in locations on either side of the joint bay will be prepared to support the cable pulling equipment and the cable drum.

The joint bay may be constructed in advance of the cable trench on either side.

6.5.3.5 Cable Installation

Methodology

The following methodology will be used in installing a cable, or pulling into a duct:

- Cable drums will be located on low loader vehicles unless the installation dictates that it needs to be transferred to drum stands due to limited space.
- The cable pulling will be undertaken using the pulling equipment located on a hardstand area adjacent to the joint bay.
- A suitable length of spare cable will be coiled at either end to undertake the joining process.
- A temporary shelter will be placed over the joint bay to provide a safe and clean environment for an engineer to work in while connecting the two cable ends. This shelter could be a modified shipping container.

Figure 6.18 is a photograph of a typical shelter.

- The joint will be made as per the cable manufacturer's instructions (See **Figure 6.19**).
- The temporary shelter will be removed.
- The joint box will be backfilled with clean sand, with red cable marker tape above the cables.
- A reinforced concrete slab will be placed over the top of the joint box before yellow cable markers are installed as part of the remaining backfilling and final reinstatement
- The cable will be tested and commissioned.

The cable will be energised on completion of the full length between the onshore 220kV substation and the offshore substation, and connection of the onshore 220kV substation to the National Electricity Transmission Network (NETN).

Figure 6.18: Typical Joint Bay Shelter

Figure 6.19: Typical Jointing Process

6.5.3.6 Reinstatement

The cable corridor will be fully reinstated following the completion of works along the cable route.

Farmland will be reinstated to its original condition. Prior to the replacement of the topsoil, the subsoil will be ripped to below the depth of compaction, if possible, and levelled, and any roots, stones, shale and rock will be removed. Topsoil will be replaced, and additional topsoil provided, if required. Grassland will be reseeded, in consultation with the landowner.

On completion of the works all temporary buildings, fences, roadways, surplus materials debris, and materials not naturally belonging on the land will be removed. The access tracks to the joint bays will be retained.

Where loss of hedgerows occurs due to the cable route crossing them, the hedgerow will be replanted with shallow-rooted, native species to provide new growth, with stock-proof fencing installed to maintain the boundary until the growth matures. To protect the cable, there will be restrictions on the reinstatement of treelines over the cable trenches. Suitable alternative planting will be provided instead, at these locations.

Where habitat cannot be reinstated, biodiversity enhancement planting will be provided at the landfall to ensure that there is no net-loss of habitat as a result of the proposed development. Further detail on this is provided in **Chapter 12** *Biodiversity*.

On completion of the construction works and energisation of the project, the permanent wayleave will be 15m. Future access to the joint bays for annual inspection will be maintained via the construction of approximately 4.5m wide permanent access tracks to each joint bay location (See **Chapter 5** *Description of Development*).

6.5.3.7 Road and Utility Crossings

Where the cable crosses another utility or feature, the crossing will be undertaken based on the following methodologies.

Road Crossings – Open Cut Trench

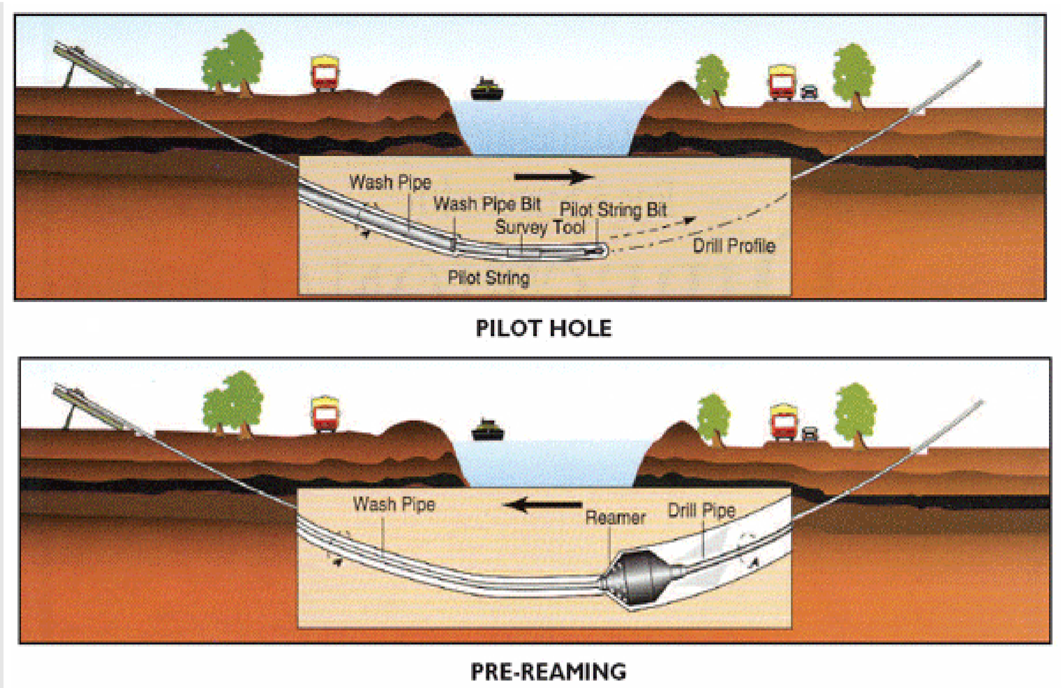
The cable route crosses a number of public roads as shown in **Figure 6.14**, as well as some private access roads.

Where the works cross existing farm tracks or farm roadways, obstruction will be minimised while the work is underway, and arrangements will be made for the safe passage of persons, farm machinery and livestock across the working width, as required by the landowner.

The circuit trench detail will remain as per the standard cable corridor circuit trench, however the backfill material may be changed to mass concrete. To undertake the crossing of a public road, a temporary traffic management plan will be produced, agreed with the road authority and be implemented. If possible, traffic flow will be maintained by use of temporary traffic signals, however if the road width is insufficient, or on private lanes, the road will be closed and an appropriate diversion put in place.

R772 Road Crossing - Horizontal Directional Drill

HDD will be used to cross the R772, the adjoining Templerainy watercourse and a gas pipeline beside the R772, as shown in the typical HDD schematic in **Figure 6.20.**



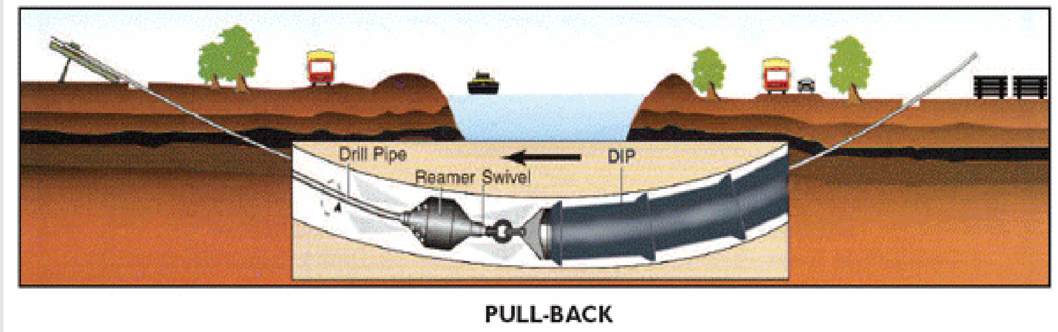


Figure 6.20: Typical HDD Schematic

A smaller HDD-rig (**Figure 6.21**) than that proposed for the landfall HDD is likely to be used for the R772 road and Templerainy watercourse crossing.

The exact equipment to be used will be subject to the Contractor's available equipment and the detailed design. However, the scale and characteristics of the construction works described below are considered to be the worst case for the purposes of assessment.

The HDD for the R772 and Templerainy watercourse crossing will be approximately 200m long with an anticipated maximum depth of approximately 20m.

The typical space required for the smaller HDD rig entry set up is up to 20m x 25m, providing room for the drilling rig, bentonite pumping plant and drill sections, as shown in **Figure 6.6**.

The typical space requirement for the exit compound is similar to the entry compound and provides space for the construction of the HDD drill reception pit, storage of the HDD pipe and welding equipment during the pipe fabrication process including the plant and welfare facilities.

Figure 6.21: Indicative HDD Rig for Road and Watercourse Crossings

For the R772 road and Templerainy watercourse crossing, the maximum expected outer diameter of each HDD bore will be c. 900mm.

The operation of the smaller HDD rigs will be similar to that described above for the landfall (**Section 6.5.2.4**). The smaller HDD rig will utilise a comparatively smaller volume of drilling fluid which will be in a self-contained small mobile vessel. The smaller HDD rig will also have smaller ancillary equipment on a small footprint with setup significantly quicker than the static equipment used by a larger HDD rig.

Drilling mud and water management in relation to the R772 road and Templerainy watercourse crossing will be similar to that described for the landfall HDD. For each of the two R772 HDD bores and with an average initial demand of around $10m^3/hr$, the total volume of water required is estimated to be up to $200m^3$, assuming full drilling fluid returns are maintained. On completion of the operation the drill fluid will be disposed of or recovered at an appropriately licensed facility.

M11 Road Crossing - Horizontal Directional Drill or Existing Underpass

Two options are being considered to cross the M11 motorway as shown in **Figure 6.14**. One option is a HDD, as described above for the landfall HDD except, the HDD length to cross the M11 (including Sheepwalk watercourse) will be approximately 500m, with an approximate depth of 25m (See **Figure 6.7**).

This option will require felling up to approximately $4000m^2$ of immature woodland on the west side of the M11 to facilitate the HDD work, follow-on cable route and safe access.

Once tree felling and site clearance works are complete and subject to the ground conditions encountered, the M11 HDD crossing option will require an over-pumping arrangement similar to that described for open cut cable trench watercourse crossings in **Section 6.5.3.8**. which will be over a length of approximately 50m of the Sheepwalk watercourse.

The temporary HDD working area (c. $550m^2$) will be excavated west of the Sheepwalk watercourse up to approximately 8m below existing ground level to achieve the minimum vertical HDD bend radius of 500m and a provide approximate 2m cover, to the HDD bore profile below the Sheepwalk watercourse.

An adjoining c. $1500m^2$ area for temporary access track and hardstand construction will be excavated and graded from ground level to the HDD working area level.

The sides of the M11 HDD working, access and hardstand area excavations may be temporarily shored up using sheet piling or other appropriate supports (timber; sandbags, gabion baskets etc.) to minimise the extent of the excavation and earthworks.

Excavated material will be temporarily stored locally at temporary HDD exit compound for re-use in the works, and topsoil will be stored separate from subsoil.

Imported crushed stone typically 300mm – 600mm thick will be placed to form a stable platform for the temporary HDD working area and access track.

Appropriate temporary drainage will be installed in and around the working area and the perimeter of the excavations, as required.

For each of the two M11 HDD bores and with an average initial demand of around $10m^3$/hr, the total volume of water required is estimated to be up to $450m^3$, assuming full drilling fluid returns are maintained. On completion of the operation the drill fluid will be disposed of or recovered at an appropriately licensed facility. The other option for the onshore cables to cross the M11 is via an existing underpass, comprising a concrete box-culvert.

The underpass was installed when the M11 was originally constructed to allow the landowner to move cattle between fields severed by the motorway construction. The concrete box-culvert aperture is approximately 40m long, 3m wide and 3m high.

The two 220kV circuits will either be in flat or in trefoil formation in the underpass. In both instances, the cables will be ducted and concrete encased for both security and cable protection reasons. **Figure 6.22** illustrates the flat formation option for installing the cable in the box culvert under the M11.

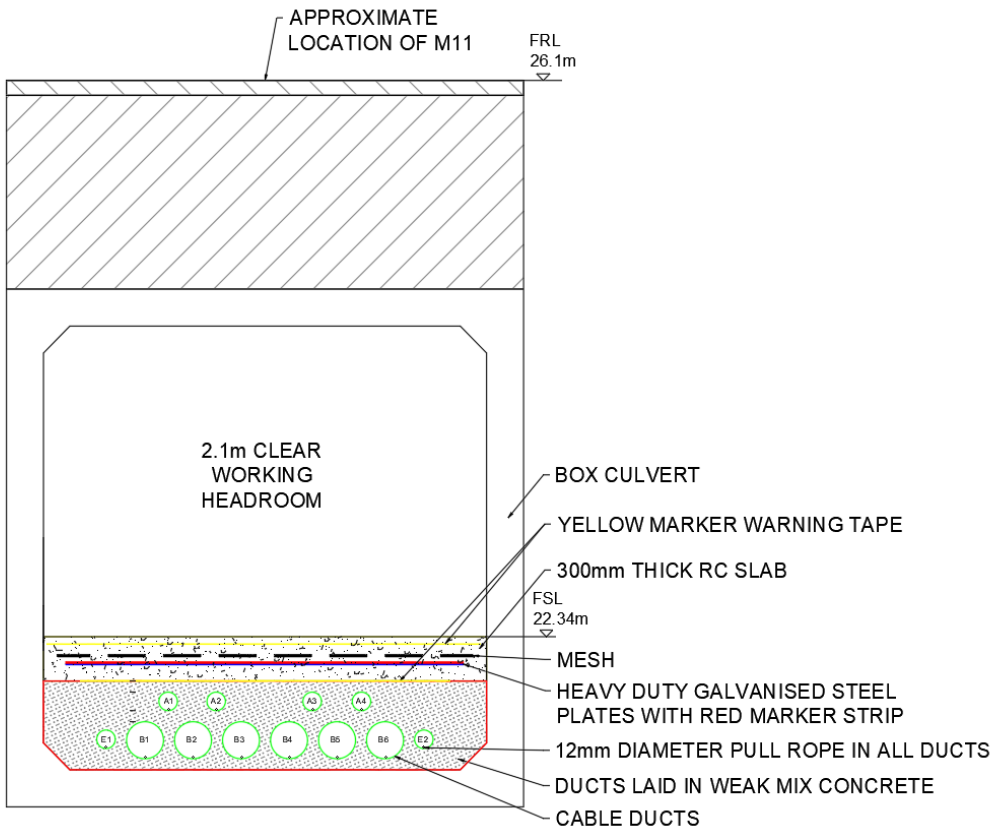


Figure 6.22: Typical Option (flat formation) for Installing cable in Box Culvert in M11 Underpass

The underpass, if used for the cable installation, will no longer be suitable for pedestrian and vehicular access and will therefore be used for the sole purpose of the proposed development.

Ongoing consultation with the asset owner, Transport Infrastructure Ireland (TII) is underway to finalise design details prior to works commencing.

Gas Pipeline Crossing

The cable corridor crosses a 4bar 180mm HDPE Gas Networks Ireland pipeline along Forest Road. This pipeline is generally approximately 1m below ground level. It is 2.5m below ground level where it crosses the M11.

This pipeline will be crossed by either open cut trench or as part of the M11 HDD crossing. Where the crossing of the gas pipeline is achieved by use of an open cut trench, this will be undertaken by hand digging. Protective timbers will be strapped around the gas pipeline as it is exposed, such that the timber will provide support and protection to the short length of exposed gas pipeline. The cable trench will be deeper than a standard cable trench to allow the ducts to be installed under the gas pipeline. The protective/supporting timbers will be removed as the cable trench is backfilled carefully by hand.

If crossed by the M11 HDD crossing, the methodology will be similar to the crossing of gas pipeline at the R772 and Templerainy watercourse as described above.

The crossing methodologies will be in accordance with the GNI Safety Advice for Working in the Vicinity of Gas Pipelines (2016).

6.5.3.8 Watercourse Crossings

Along the cable route, a number of watercourses will be crossed by open cut to facilitate cable trench installation. Watercourse crossings are also required for temporary vehicular access along the cable route during the construction phase to minimise traffic on public roads.

The location of all watercourse crossings is shown in **Figure 6.14** and typical crossing types shown in **Figure 6.23** and **Figure 6.24**.

A schedule of both HDD and open cut watercourse crossings is provided in **Table 6.6** below:

Table 6.6: Watercourse Crossings

Ref	Watercourse Name	Crossing Type	Crossing Method
OD1	Unnamed – Open Ditch	Cable Trench + Haul Road	Potential temporary over-pumping Potential bottomless culvert due to topography
WC1	Johnstown North	Cable Trench + Haul Road	Potential temporary over-pumping Potential bottomless culvert due to topography.
WC2	Johnstown South	Cable Trench + Permanent access to joint bay /Haul Road	Potential temporary over-pumping Existing vehicular crossing to be upgraded using

Ref	Watercourse Name	Crossing Type	Crossing Method
			minimum 900mm diameter culvert pipe
OD2	Unnamed - Open Ditch	Cable Trench + Haul Road	Potential temporary over-pumping Potential bottomless culvert due to topography
WC3	Ticknock	Cable Trench + Haul Road	Potential temporary over-pumping Potential bottomless culvert due to topography
WC4	Coolboy	Cable Trench	Potential temporary over-pumping
WC5	Templerainy	HDD	Trenchless technique. Refer to Section 6.5.3.7
WC6	Kilbride	Cable Trench + Haul Road	Potential temporary over-pumping Potential bottomless culvert due to topography Seasonal working required due to fish stock value
WC7	Sheepwalk + Kilbride Church	Cable Trench	Potential temporary over-pumping
WC8	Alternative crossing method for Sheepwalk	HDD	Trenchless technique with temporary over-pumping. Refer to Section 6.5.3.7

All applicable watercourse crossings will be designed and agreed in consultation with the Office for Public Works (OPW) prior to commencement of watercourse crossings, and in accordance with Section 50 of the Arterial Drainage Act 1945, as amended.

The following general principles for each of the different *Type* and *Method* of crossing will be adhered to, as described in **Section 6.5.3.8.1** and **Section 6.5.3.8.2**.

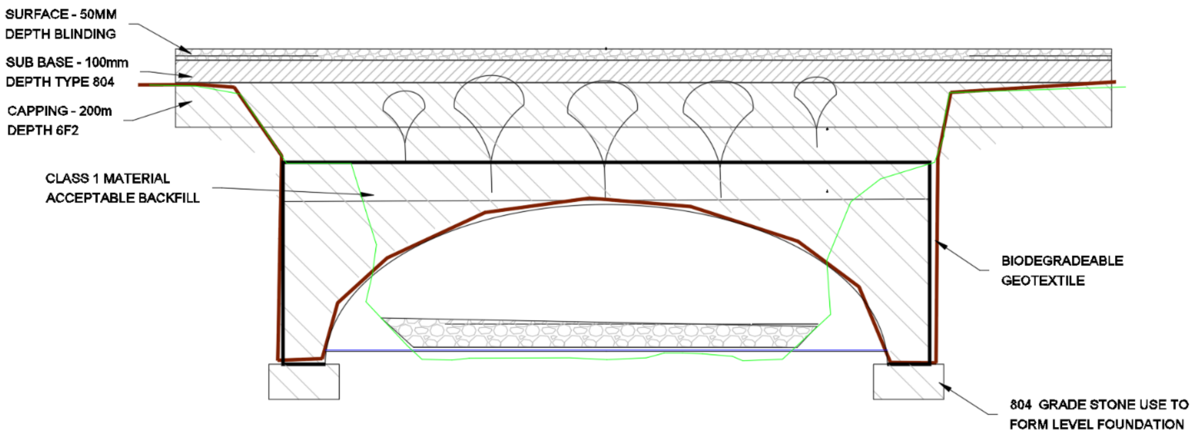


Figure 6.23: Typical Temporary Watercourse Crossing Detail

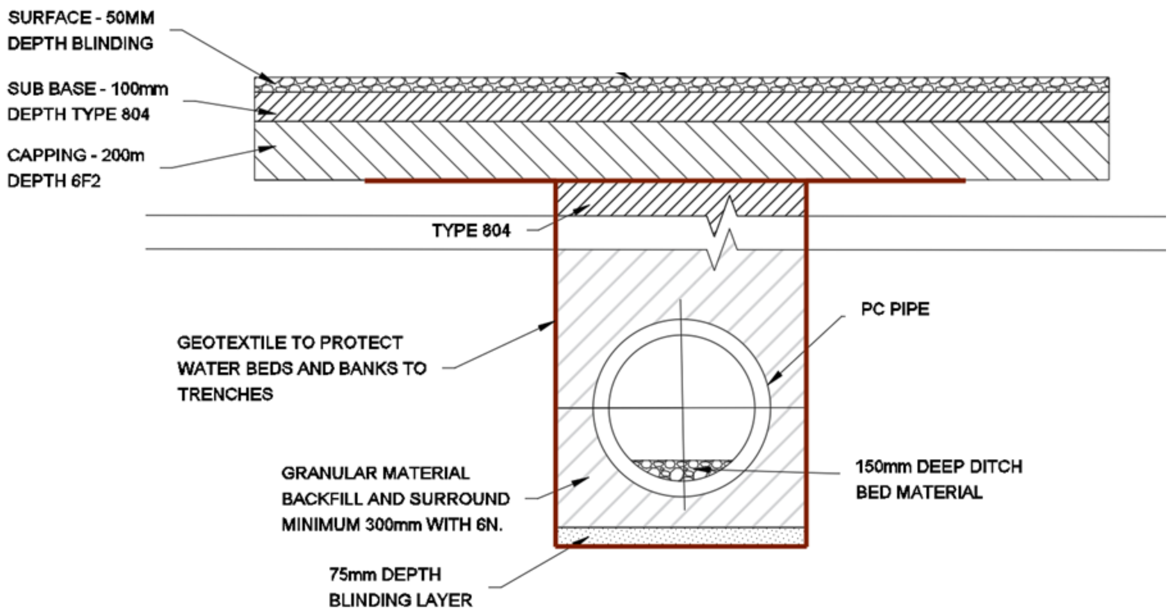


Figure 6.24: Typical Permanent Watercourse Crossing Detail

6.5.3.8.1 Watercourse Crossing Types

Cable Trench Watercourse Crossing Type

Before any watercourse cable installation work commences and to allow these works to take place, water flows will first be controlled to maintain free flow, this will either be achieved using temporary damming and an over-pumping method or alternatively, using a flume pipe method, with the invert of the pipe typically 100mm below the invert of the existing stream bed, to replicate the natural flow.

Haul Road and Joint Bay Access Track Watercourse Crossing Type

Before the construction of any haul road or permanent joint bay access track over a watercourse and to allow these works to take place, water flow will first be controlled and maintained using a culvert/flume pipe method, with the invert of the pipes installed typically 100mm below the invert of the existing stream bed, to replicate natural free flow.

Temporary bridge structure or bottomless culverts are methods that may be used in instances of steep topography or if required to minimise impact to a watercourse and allow safe passage of plant, equipment and materials.

HDD Crossing Type

Further details of these crossings can be found in **Section 6.5.3.7** Road and Utility Crossings.

6.5.3.8.2 Typical Watercourse Crossing Methodologies

Over-pump Watercourse Crossing Methodology

If temporary damming and over-pumping methodology is adopted, soil filled sandbags will be used to create a seal and dam both the upstream and downstream sides of the watercourse crossing. Then appropriately sized pumps will be located adjacent to the watercourse crossing and an intake pipe will be lowered into the dammed upstream side of the crossing and a discharge pipe to the downstream side of the crossing.

The pump will take all the flow from upstream side of the crossing point. The discharge hose will be directed through a filtering medium to limit siltation or bed disturbance, before being released to the downstream side.

Culvert/Flume Pipe Watercourse Crossing Methodology

In this method, the water flow will be diverted into a culvert or flume pipe to the side of the watercourse. The culvert/flume pipe watercourse crossing will be prepared by stripping the topsoil from the banks and areas adjacent to the river at the crossing point and storing it separately within the working area, at a safe distance away from the watercourse. The bank material and a selection of vegetation will be stored for replacement, after the cable ducts have been laid. A flume pipe bridge will be installed to one side of the watercourse channel. The culvert/flume pipe will be long enough to extend below the haul road to allow safe passage of plant and materials along the cable route.

Suitably sized culvert/flume pipe will be installed at the crossing point. The invert of the culvert/flume pipe will be typically 100mm below the existing watercourse invert, to replicate natural free flow through the channel. The culvert/flume pipe will extend on the upstream and downstream sides of the crossing point for a suitable distance. The culvert/flume pipe will then be bedded and packed or surrounded with soil filled sandbags to create a seal or dam across the watercourse, to prevent scouring and to divert the water flow into the flume pipe. The flume pipe will take all the flow to the downstream side of the crossing point and the ducts will be installed beneath the dry watercourse channel.

Cable Trench Watercourse Installation Method

Once the flume pipe or dam and over-pump method has been installed and sandbags are securely in place, the construction of the cable trench can proceed by excavating through the bed of the watercourse. In the case of the Johnstown North and Johnstown South watercourse crossings, ground investigations indicate a small amount of rock excavation may be required to achieve the required trench depth. The excavated stream bed material will be stored within the working width separately from the bank material. Trench supports may be used to facilitate safe excavation and dewatering of the excavation area will be carried out if required.

Prefabricated cable duct sections will then be installed in the trench and checked to ensure that a minimum cover, typically 1.6m below the top of watercourse bed and the top of the cable ducts. Thicker walled ducts may be used. In some circumstances the ducts may be further protected by installing at a greater depth.

The ducts will be surrounded with concrete and galvanised steel plates with red marker strip fixed to the top of the concrete. Final reinstatement will use the stored river-bed materials with reinforcement mesh included along with yellow marker warning tape.

Bridge or Bottomless Culvert Watercourse Crossing Methodology

Where a temporary bridge structure or bottomless culvert crossing is used for vehicular access along the temporary haul road or permanent Joint Bay access track, the ground adjacent to the watercourse will be stripped of topsoil and stored away from the watercourse for re-use in the reinstatement works. The exposed ground will be levelled before installing the crossing and constructing the haul road over.

An excavator or mobile crane will be used to place the temporary bridge or bottomless culvert.

Kilbride Watercourse Crossing Methodology

To minimise impact to the Kilbride Watercourse crossing and maintain water quality for the aquatic environment, all works within the watercourse, including any bank stabilisation work, will be completed between July and September.

Good practice pollution prevention measures, described in **Chapter 10** *Water*, will be installed to avoid any downstream siltation impacts.

Typical Watercourse Crossing Reinstatement Method

The banks of the temporary watercourse crossings will be reformed to their original profile in accordance with both the National Parks and Wildlife Service (NPWS), Inland Fisheries Ireland (IFI) and the landowners' requirements. The bed materials which had been removed for construction will be reinstated to the original profile. The temporary flume pipe, packing and sand-bags will be removed once the bed materials and bank profile are reinstated, ensuring the correct sequencing of substrate reinstatement.

Final bank reinstatement may require further measures to stabilise the banks and prevent erosion. Geotextiles may be used in conjunction with seeding of an appropriate grass mix. Heavier solutions such as the importation of locally sourced large stones or rocks may also be used. Bank stabilisation works will be discussed with the NPWS/IFI to ensure that suitable materials and methodologies are being used. Any bank protection, where it is required, will be adequately keyed into both the bed and banks. The materials and methods employed will be in keeping with the surrounding environment and will comply with any conditions attached to the planning approval.

The management of stockpiles of material in the vicinity of a watercourse will comply with the requirements specified in the CEMP (**Appendix 6.1**).

6.5.4 Onshore 220kV Substation

6.5.4.1 Pre-Construction Activity

The pre-construction activities are described in **Section 6.5.1** above.

6.5.4.2 Site Enabling Works

In preparation for commencing construction of the substation, access routes, towers and stringing, site enabling works, such as that listed below, will be undertaken.

Setting Out

The substation works will be set out using GPS or total station equipment and site perimeter temporary hoarding, fencing, signage etc. will be erected, as required, to delineate the extent of the works area to provide a safe working area, prevent unauthorised access and protect the surrounding environment.

If the up-to-date pre-construction utility survey check work identifies existing utilities crossing the site, these will be detected on site using an appropriate technique and equipment (such as CAT/GPR equipment) and the location clearly set out prior to any site clearance and excavations, so they can be safely exposed, worked around or diverted.

Site Perimeter

The perimeter of the substation site will be secured by temporary hoarding prior to construction works commencing.

The temporary fence will be located outside the perimeter of all permanent works to ensure the site remains secure during construction.

Clearing the Works Area

The works area will be cleared of any material or items not required for the works. This will include removal of fences and clearance of trees and vegetation outside of the bird breeding season.

Diversion of Any Existing Utilities

At present no utility diversions are required.

If following pre-construction surveys any existing utilities are identified as needing to be diverted, these works will be undertaken either by the Contractor or by the utility owner in accordance with the relevant codes and standards and following agreement with the relevant authorities.

Existing 110kV poles are located within the site, these will remain in-situ and appropriate guarding for working around electrical overhead lines and poles will be erected for both health and safety of personnel but also to protect the electrical infrastructure from damage and disruption.

6.5.4.3 Site Access

Initial access to the substation site will be via the existing access road to the Avoca River Business Park. For that purpose:

- All plant movements will be controlled by a qualified supervisor; works will be zoned by barriers ensuring segregation.
- Temporary signage will be installed at intervals (speed limits, passing places, overhead services, etc). Warning "goal posts" will be provided where overhead services cross the route.
- An additional entrance junction will be constructed for the transmission compound.
- An additional entrance junction will be constructed for the connection compound. The existing entrance will also be maintained to provide access to the connection compound during operation.

To avoid re-work, construction of the new site entrances, including the associated existing Avoca River Business Park access road tie-in works, will be undertaken once the platform and permanent drainage works in the vicinity are complete.

6.5.4.4 Permanent Site Entrance Works

Permanent entrance construction works includes:

- Each of the new proposed connection and transmission compound entrance junctions will be constructed using an appropriate material, typically placed using an excavator and suitably compacted using a vibrating roller.
- All entrances junction will tie-in to the existing Avoca River Business Park access road levels and provide safe sightlines.
- Where required, entrance junction works will be carried out under temporary traffic management (lane closure under traffic signal control), located along the Avoca River Business Park access road.
- Road embankments required for the site entrance junctions will be profiled using an excavator, to provide an appropriate safe angle of repose.
- Drainage will be installed to maintain the existing drainage regime along the Avoca River Park Business Park access road and prevent surface water runoff from the Avoca River Business Park road flowing into the substation site.
- A kerb raft will be constructed with in-situ concrete, and precast concrete kerbs and backing will be installed. Mechanical lifting will be used to lift and place the kerbs.
- Surfacing to roads will be bituminous e.g. asphalt. The equipment used will include an asphalt paving machine, ride-on rollers, floor saw, and planers.
- The surface course will be placed prior to handover to the client on completion of construction, when use of the road for site construction traffic has finished.
- On completion of the final road surface, road markings will be applied to the road surface by a competent Contractor.

- Permanent signage will be installed in and around the site entrances to safely direct drivers to their destination, using weather resistant metal poles, embedded within an in-situ concrete foundation for stability.
- Permanent signage will be installed, prior to the removal of temporary traffic management.
- Permanent entrance gates will be installed to ensure access control.
- Entrance gates will be set back an appropriate distance from the edge of the existing road to allow vehicles to safely access and egress the site.

6.5.4.5 Platform

A level platform of c. 4 hectares in area, on which the substation will be constructed, will be created by bulk filling to bring site levels up to a maximum level of 3.8mOD to provide flood protection in accordance with the Flood Risk Assessment, provide suitable capping to the made ground and facilitate the buried services for the proposed development.

The earthworks to create the substation platform, including those works required for the remediation strategy (capping) will be as follows:

- Most of the substation site is paved with asphalt. This existing asphalt paving will be removed in phases and will be replaced with granular fill as soon as possible to protect the material below and prevent the generation of any windblown dust;
- An area along the northern boundary of the substation site will be excavated to achieve the final platform level;
- Where required, the made ground will be locally excavated for the shallow cable basements and footings of the external electrical infrastructure;
- The made ground will be compacted and levelled to form an even working platform;
- A geotextile will be placed over the entire area;
- Suitably graded imported material will be delivered to site by lorry and stockpiled for use in the substation works. All stockpiles will be adequately protected from erosion as outlined in the CEMP;
- As and when required, delivery lorries, prior to exiting the site and joining the surfaced road, will pass through a wheel wash to remove loose mud and debris from the vehicle;
- A gas drainage layer of appropriately graded granular material will be laid initially with a minimum thickness of 0.3m. The gas collection layer will terminate at a gas venting trench along the site perimeter;
- A geosynthetic clay liner (GCL) which will form a suitable hydraulic barrier, will then be laid by a specialist Contractor. The thickness of this layer is negligible. It is not necessary for the GCL to extend beneath buildings and larger impermeable foundations such as for the transformers. The GCL will be suitable for the proposed use of the site including for traffic movements;

- A granular material drainage layer of 0.3 - 0.5m thickness or a geosynthetic drainage medium having a minimum hydraulic conductivity of $1x10^{-4}$m/s will then be placed on top of the GCL;
- This drainage layer will have perforated filtration pipes which collect the percolated rainfall and route this to the storm water collection system;
- Finally, a finishing layer of varying thickness, comprising appropriately graded fill material, will be placed to raise the site to the maximum platform level of 3.8mOD;
- The composition of the finishing layer will vary across the site based on the requirements at each particular location. It will comprise a granular material to form the piling platform and sub-base layer to any structures. Outside of the building and road footprints, this layer will be topped off with a minimum compacted thickness of 200mm of crushed stone fill material to finished site levels;
- To mitigate the environmental exposure risk to construction workers, dust generation and dermal exposure during site construction works will be controlled by appropriate dust control measures e.g. water sprays and appropriate personal protective equipment (PPE);
- Where required by the detailed design, geotextile or geogrid materials will be used to increase strength of the platform
- The imported material will be placed using excavator and dump trucks, then levelled using a dozer or grader to the required thickness.
- The material will then be compacted by roller in layer thickness defined by the detailed design.
- The surface of the final layer will be graded to avoid ponding of water and to direct surface flow to the site drainage.
- Any made ground, excavated in the course of installing underground services and footings, which is not suitable for reuse on site, or surplus to requirements, will be stockpiled, tested and classified for recovery or disposal. Refer to **Chapter 16** *Resource and Waste Management* for further information.

Figure 6.25 provides a graphic representation of the capping design.

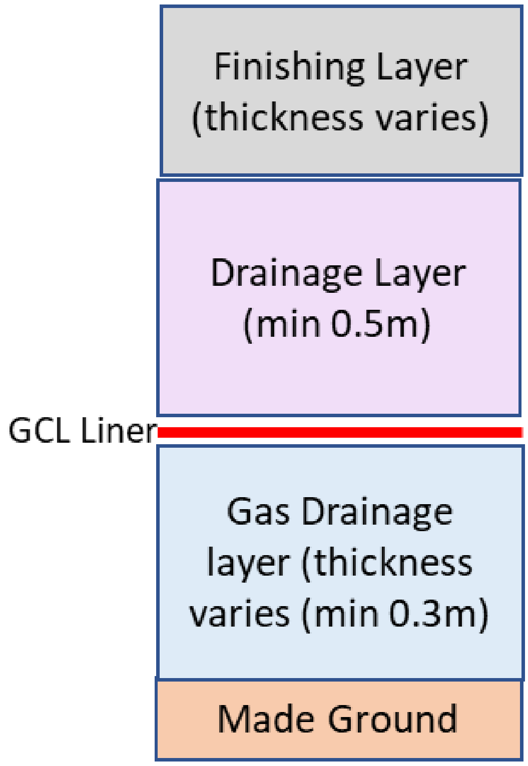


Figure 6.25: Substation Site Remediation Strategy (not to scale)

6.5.4.6 Site Perimeter Fencing

The permanent fencing will be installed following completion of earthworks.

Methodology

The fence will be erected using the following method:

- Marking the line of the fence and then positions of the fence posts.
- Drilling or excavating holes using an excavator with suitable attachment of the fence holes to a depth required to ensure stability of the fence.
- Placing the fence posts and infilling the hole with concrete from a concrete skip attached to an excavator or direct from the concrete delivery lorry if access is available.
- Placing or pouring a concrete cill below the line of the fence.
- Placing fence rails and support members between the fence posts.
- Installing and connecting appropriate earthing.

6.5.4.7 Substation Site Drainage

To control surface water runoff from the site during construction, temporary drainage will be installed in accordance with the CEMP.

The permanent drainage will then be installed after the GCL has been installed during platform construction as described in **Section 6.5.4.5**.

Temporary Drainage

- Measures will be provided to ensure only appropriately treated/clean surface water run-off is discharged from site during construction, which may include settlement ponds/silt interceptors. These will be subject to daily inspection to ensure they remain adequate and effective. The treated discharge will be to the same outfall location as the existing permanent drainage.

Maintenance of Existing Drainage

Carrier Drains, Filter Drains, Manholes

- Maintenance work on the existing drainage network and attenuation pond may be required. This is expected to include de-siltation of existing channels and the attenuation pond and will either be completed by an excavator or hydro-vac. The silt will be removed from site as required, to an appropriately licenced disposal facility.
- Other maintenance work such as water jet cleaning of existing drainage culvert pipes to remove any blockages or debris, replacement of damaged culvert pipes using equivalent size twin walled HDPE or precast concrete pipes and the shoring up of culvert pipe headwalls may also be required.
- Excavation will typically be by an appropriately sized 360° tracked excavator, typically 13 to 25 tonnes. The excavator or a mobile crane may be used to lower and install drainage pipes into trenches and the excavator will be used to backfill material over pipes, as necessary to provide sufficient cover protection.
- Safe access and egress into excavations will be maintained with appropriate edge protection.

Permanent Site Drainage

Storm Water Drainage, Road Gullies

- Below ground drainage will be installed prior to construction of the building superstructure/roof drainage. Final connection will be made when down pipes are installed to ensure accurate positioning.
- Road gullies, filter drains and associated connections will be installed during road construction, prior to trimming sub-base, and surfacing. Gullies will be finished once the binder course has been installed.
- Appropriately sized hydrocarbon interceptors will be installed at strategic locations along the proposed surface water drainage network to prevent any hydrocarbons from leaving the site of the proposed substation.
- The efficiency of the existing pumping arrangement used to control the discharge of surface water to the Avoca River will be confirmed. If found not to meet the minimum requirements of the Flood Risk Assessment, then it will be replaced. The pump will first be safely disconnected from existing infrastructure before an excavator or crane is used to lift out and remove the existing pump, and an appropriate replacement is installed in reverse sequence to the removal.

The old pump will be recycled or disposed of at an appropriately licensed facility.

- On the northern side of the flood defence embankment, a hydrobrake will be installed to the existing attenuation pond outfall, limiting the existing gravity fed outfall to a maximum greenfield discharge rate of the existing facilities and planned developments within Avoca River Business Park. A mix of hand and machine excavating will be used to locate the existing outfall pipe before installation of the hydrobrake to control the gravity fed outflow. In accordance with the manufacturer's instructions, the hydrobrake (and exposed pipe) will then be backfilled, using the excavated material.

6.5.4.8 Substation Flood Defences

In addition to determining a minimum substation platform level, the Flood Risk Assessment confirmed the existing Avoca River Business Park flood defences require improvement works to protect the substation buildings and associated ancillary external equipment, from a mid-range future scenario 1 in 1000 return period event.

The substation site flood defence improvement works will comprise localised raising of the existing flood defence embankment level for a length of up to 75m (See **Figure 6.26**).

In accordance with the Flood Risk Assessment Report, the level of flood defence embankment needs to be at least 6.5mOD. Whilst most of the existing embankment is 6.5mOD or above, one section of approximately 75m in length, to the west of the substation site, will be raised by up to 0.7m, where at its lowest point the embankment was found to be approximately 5.8mOD.

This may be achieved by driving a sheet pile through the centre of the embankment and shoring either side with appropriate earth material, placed and compacted to a stable angle of repose and subsequently finished with rock armour, as protection to prevent scouring and erosion.

Alternatively, the embankment could be raised with an appropriate impermeable or cohesive material, placed and compacted by excavator at a stable angle of repose and, if required, finished with rock armour, to prevent scouring and erosion.

Up to approximately 160m of temporary drainage and an access track will be constructed from the Avoca River Business Park along the northern side of the existing embankment.

The access track will be typically 5m wide, comprising crushed stone over laid onto geotextile membrane to assist with removal.

If required, the access track will be used as a piling platform and may necessitate an additional 3m to be added to the width over the length of embankment to be piled, to facilitate safe access and egress around the piling rig.

A temporary materials storage area, within 20m of the embankment, will be used to facilitate the embankment improvement works.

The Contractor will take all steps reasonably practical to avoid damage to the vegetation and ground that is not part of the permanent work through use separation layers such as geotextile material and load spreaders such as bog mats.

Stands of the non-native invasive species Japanese knotweed and Himalayan Knotweed were recorded growing along the flood defence embankment, in the vicinity of the improvement works. The preferred management option is chemical treatment and further information is provided in **Chapter 12** *Biodiversity*. An Invasive Species Management Plan is included in the CEMP (**Appendix 6.1**). Any works in the area of the embankment will be undertaken in compliance with the Invasive Species Management Plan.

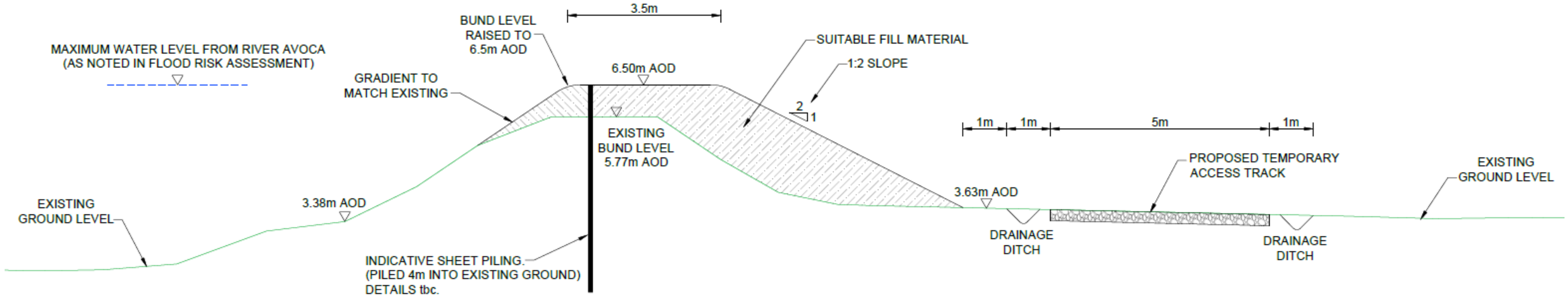


Figure 6.26: Proposed Flood Defence Embankment Improvement Works – Indicative Cross Section

6.5.4.9 Ducts, Troughs and Earthing Grid

Earthing Grid

The substation will have an earthing grid installed typically 600mm below platform level. The methodology for the earthing grid installation is as follows:

- The earthing grid will be progressed in conjunction with drainage/ducts/ troughs and foundations to ensure it is progressed safely and efficiently. As far as possible open excavations will be avoided, and the excavations will be backfilled the same day.
- Open excavations will be suitably protected, if required.
- An excavator will be used to place the earthing grid. If required, imported selected backfill material may also be used to achieve necessary equipment specific earthing ratings..

Ducts and Troughs

Electric and fibre optic cables will be installed in ducts and troughs to provide linkage between different elements of the electrical equipment. The ducts and troughs will be installed as follows:

- A tracked excavator will be used.
- The sequence of installation will be carefully planned with the drainage and foundations installation to ensure that it can be carried out safely and efficiently.
- Ducts and chambers will be installed in shallow excavations. As far as possible, open excavations will be avoided and the excavations will be backfilled the same day. Any open excavations will be protected by barriers.
- Excavations for cable troughs will be benched to avoid the need for additional ground support. The base of the excavation will be prepared typically with mass concrete. Precast concrete trough units will be placed using mechanical lifting, using a tracked excavator. The excavations will be backfilled as soon as possible. Precast covers will be placed progressively to avoid a fall hazard of open troughs. Whenever covers are removed or omitted, edge protection/barriers will be provided.

6.5.4.10 Substation Site Foundations and Slabs

The proposed substation layout consists of various buildings, equipment, towers, roads and hardstanding areas which each require appropriate foundations to support the structural loads and ensure the functionality of the substation site.

The substation will have various reinforced concrete foundations to provide support to buildings and external electrical equipment. The foundations for the buildings and heavier equipment will be supported on displacement piles such as precast driven piles, to transfer loads to a suitable bearing stratum below.

In addition, due to the presence of soft silt / peat layers below the made ground as described in **Chapter 9** *Land and Soils*, the site requires soil improvement piling such as vibro concrete columns.

Driven precast piles, typically 275mm x 275mm or 325mm x 325mm, with a pile length in the order of 12m to 14m are expected to be suitable to support buildings and external electrical equipment.

For soil improvement, approximately 12m long vibro concrete columns will be installed in a triangular or square grid pattern with 2m to 3m spacing.

All piling will be carried out following the placement of the deeper granular gas drainage layer which will serve as a piling mat.

The equipment to be used will include a tracked excavator, mobile crane/crawler crane/tower crane/pedestrian tower crane, piling rigs and concrete pumps. The different concrete works will be undertaken as described below.

Piling

- The displacement piles (such as precast concrete type) will be transported to site, close to the installation position.
- Specialist piling rigs will undertake the installation of the piles to the design depth, which will vary by location and items being supported.
- Hydraulic crushers/mounted excavators will be used to trim the top of the piles and the final trim will be completed using hand-held breakers. This is to allow the top of the pile to be embedded within the reinforced concrete base of the foundation.
- Ground improvement piling (i.e. Vibro concrete columns) will be implemented using a vibrating poker which penetrates the soil by a combination of self-weight, vibrations and air/water jetting and is a relatively quiet installation process. During this process concrete is pumped to create the concrete column.

Excavation and Blinding

- All excavations will be barriered and fenced.
- Excavations will be undertaken by appropriately sized excavator – typically 20 or 25 tonnes for larger structures, and 13 tonnes for smaller structures. Excavations will be benched or battered, and if required temporary stairs will be provided for safe access into excavations. To prevent degradation, formation levels will not be left exposed in poor weather. Blinding concrete will be placed as the excavation progresses over several days, or a protective surcharge will be left for final trim.
- Blinding will be placed using a machine bucket, or crane and skip, or by concrete pump.
- If required, a sheet piled ground support system or other similar trench support system will be used to reduce the extent of excavation or provide support to provide safe space to work for operatives.

The excavation support will be lifted into position by a suitable sized excavator or crane, with installation by a suitable attachment for an excavator or from specialist installation equipment.

Steel Fixing

- Where possible steel reinforcement cages will be prefabricated at ground level and lifted into position by a suitably sized excavator or crane.
- Where fixed in situ, reinforcement will be lifted onto the blinding in bundles and then distributed by operatives tying the reinforcement cage together.
- Reinforcement will be fixed progressively across the blinding, using tying wire and hand tools. Strips of rubber matting will be placed to provide safe access to reduce trip hazard on reinforcement mats. Protection will be provided to starter bars and any projecting steel.

Shuttering and Preparation for Pour

- Prior to erection, shuttering panels (which will be assembled into the formwork, into which the concrete will be placed) will be inspected to ensure they are clean and free from damage. Shutter oil, used to prevent the concrete sticking to the shuttering, will be applied by brush, roller or spraying.
- The panels will be placed using mechanical lift assistance. Kickers and bolt hanging jigs etc. will be completed in timber and plywood.
- Cast-in bolts and ducts will be installed during shutter erection.
- Prior to placement of concrete, the shuttering will be checked, and debris will be blown out or removed by hand.

Placement, Compaction, Finishing and Curing of Concrete

- Concrete will be placed by crane and skip, or by concrete pump, working progressively across the pour in layers, to ensure the working front is kept “live”.
- Concrete will be compacted using portable vibrating poker units.
- Unformed surfaces will be tamped off to the required level, before being floated to the required finish. Some slabs may require a power float finish.
- The finished concrete will be covered to aid curing, typically with polythene covers or sprayed with curing membranes. Protection from rain or cold may be required in adverse weather.
- The covers and protection will remain in place until the concrete has “set” and the temperature of the concrete has reduced to a suitable level. This could be up to 72 hours depending on the dimensions of the volume poured.

Striking Formwork, Finishing Works

- The sequence for striking (removing) formwork will be planned, and temporary propping for stability will be provided.

- Formwork will be stuck when the concrete is sufficiently cured and has gained sufficient strength.
- On striking formwork, defects and tie holes will be made good, and any rubbing up/finishing will be carried out.
- Surface treatments (if any) to surfaces will be applied
- The space between the excavation and the cured concrete will be backfilled as soon as possible.

6.5.4.11 Substation Steel Superstructure Erection, Wall Cladding, Roof Installation, Gutters and Rainwater Pipes

The superstructure of the substation buildings will be structural steel. The structural steel will be erected, once the foundations have been completed. The wall and roof metal cladding will be fixed, making the buildings weather-tight, when the structural steel frames are in place.

Structural Steel Erection

- Equipment to be used will include: 200 or 250 tonne crawler cranes, 120 or 160 tonne mobile cranes and mobile elevated work platforms for access.
- The sequence of operations will be carefully planned, ensuring that the structures are built progressively to maintain access, and ensuring temporary stability. Temporary bracing may be required to ensure stability.
- Large span roof trusses will be assembled at ground level in two parts, which will be connected by an “air splice” to avoid tandem lifts.

Wall Cladding and Roof installation

- Equipment to be used will include mobile cranes, mobile elevated work platform access, scissor lifts, scaffold and tower access, fall arrest netting.
- The sequence of operations will be carefully planned to ensure the installation is progressed safely and efficiently.

Floor Screeds and Finishes

- Floor Screeds and finishes will comprise a pumped floor screed and specialist concrete floor paints.

Internal Walls and Partitions

- Once the building envelope is water-tight, internal walls will be constructed using a metal stud partition system.
- Plywood pattresses will be installed where items are to be fixed to the walls.
- Appropriate fire rating for walls and ceilings will be achieved by use of cement board, cement blocks and/or concrete. Structural steelwork will be treated with an appropriate coating such as intumescent paint, to achieve the require fire rating.

- All walls will be painted.
- First and second fix joinery will be installed.
- Electrical equipment and instrumentation will be installed.
- A specialist subcontractor will install fire stopping which will undergo a very stringent monitoring system.
- Rooms will be fitted with required fixtures and fittings.

6.5.4.12 Substation Electrical Fit Out

Once external foundations are constructed or buildings are weather-tight, the electrical fit out will be undertaken.

The electrical fit out includes the following:

- Delivery and installation of all high voltage equipment, communication mast and lightning arrestor masts.
- Wiring and cabling of all high voltage equipment and protection and control cabinets.
- Commissioning of all newly installed equipment

6.5.4.13 Substation Site Finishes and Surfacing

When site construction traffic is no longer a risk to finished surfaces and prior to the completion of the development, road surfacing (access roads to substation platforms) will be completed, permanent site signage will be erected, unpaved areas within the substation will be surfaced with stone chippings.

Road Surfacing

- Top surface of the bituminous binder layer will be thoroughly cleaned, and tack coat will be applied to the binder layer, prior to placing the surface course by the surfacing Contractor.
- Surface course material will be delivered by lorry, placed using asphalt paving plant and then be compacted by roller.

Lining and Signage

- Road markings will be applied as soon as possible after the surface course has been placed.
- Permanent Road Signage will be installed, fixed either to fences or buildings, or mounted on galvanised steel poles, which are embedded in a concrete mass footing in the ground.

Substation Surfacing "chippings"

- The sub-base will be placed as structures are completed and backfilled.
- When areas are no longer subject to site traffic, the sub-base will be trimmed and sub-station surfacing – chippings – will be placed and compacted.

6.5.5 Connection to the National Electricity Transmission Network (NETN)

The proposed double circuit angle towers required for the connection to the NETN will be constructed as galvanised steel lattice towers, which are the standard type used for the construction of double circuit 220kV overhead lines in Ireland.

Figure 6.27 shows the working areas relating to the construction of the NETN connection.

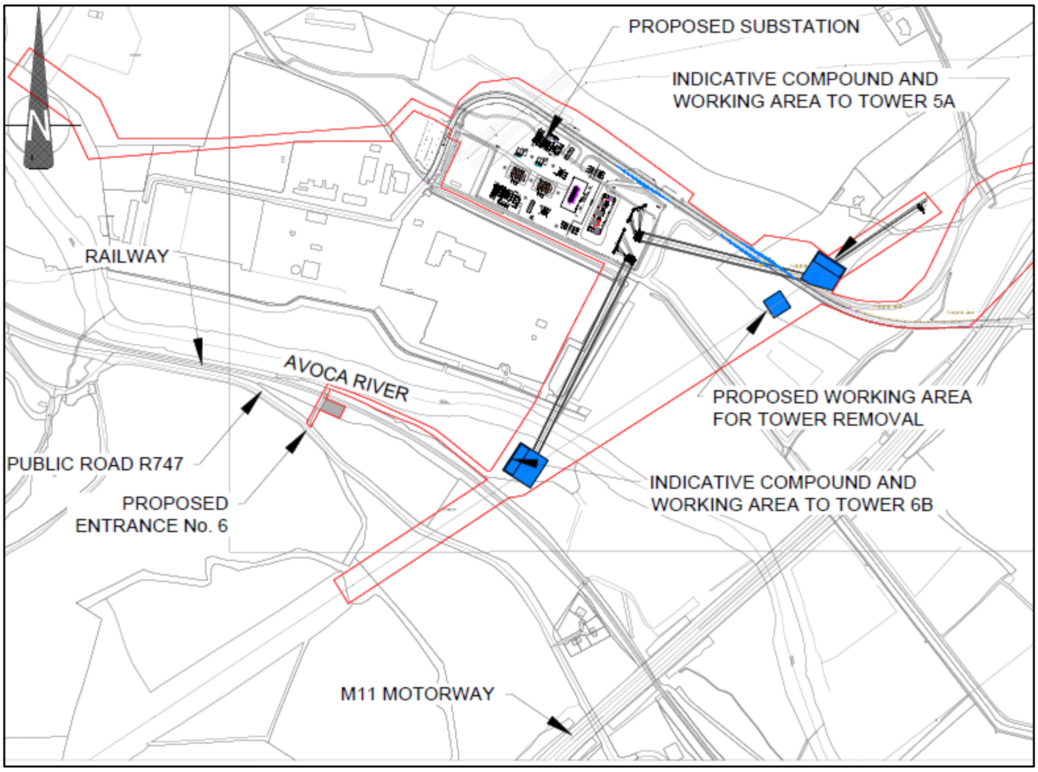


Figure 6.27: NETN Connection Working Areas

6.5.5.1 Pre-Construction Activity

The pre-construction activities are described in **Section 6.5.1** above.

<u>Outage Scheduling</u>

The works involve the permanent diversion of a short length of the existing 220kV overhead line between Arklow substation and Lodgewood substation. To facilitate this diversion, EirGrid will grant a pre-scheduled, defined duration, outage of the overhead line. This outage will be planned by EirGrid to ensure grid stability is maintained. The bases of the two new towers will likely be constructed while the overhead line is live.

6.5.5.2 Site Enabling Works

In preparation for commencing construction of access routes, towers and stringing, site enabling works, such as that listed below, will be undertaken.

Clearing the Works Area

This will include removal of fences, cutting back of trees and vegetation. These works will be undertaken outside of the March to August bird breeding season.

All vegetation adjacent to the overhead line, which has the potential to fall onto the overhead line, will be cut or trimmed to ensure safety clearances. The extent of trimming will depend on distance from the proposed overhead line and will involve a scalloping or profiling effect which will minimise the effect on vegetation.

For the purposes of assessment (reasonable worst case), a corridor (twice the height of the maximum trees/vegetation plus the width of the line – which for a standard 220kV line is twice the tree height + 16m) will be cleared. This is to ensure that trees cannot fall onto the overhead conductors or towers.

As a minimum, tree clearances will be in accordance with the requirements of Table 5.4.4 of Irish NNA EN 50341-3-11:2001. The extent of vegetation clearance will be location specific and subject to survey in advance of construction together with a final check immediately prior to works commencing.

There will be a loss of localised vegetation to the tower sites including tree, shrub and hedge removal to allow for the construction of towers for supporting the overhead lines.

Provision of temporary access routes to the towers may also result in loss of localised vegetation.

A corridor of 4m width directly under the overhead lines and support structures must be kept totally clear for maintenance access. Directly outside the permanent 4m corridor, trees/vegetation will be reinstated once the works have been completed. However the trees/vegetation will be kept to a maximum height of 3m above ground level. This 3m maximum height requirement applies along the full corridor.

A competent Contractor will undertake the cutting of trees to ensure required safety clearances are maintained.

Levelling of the Tower Foundation Area

The towers are designed such that a difference in ground level can be accommodated from one side of the tower to the other, hence minimising the extent of local disturbance.

For a difference in ground level across the foundation of less than 1m, this will be dealt with by locally re-grading of the ground profile.

For a difference in level of greater than 1m, leg extenders will be used between the tower foundation stub and the tower body on the lower side. The elevation of the top of the tower will not increase.

On completion of the tower and OHL work, the ground level around the excavated area will be assimilated into existing landscape contours as much as is feasible, avoiding sharp changes of gradients within the constraints of the working area and achieving the objective of minimising land use impacts.

Diversion of Field Drains

Where existing drainage is present at the location of a tower foundation, typically this drainage will be removed from the tower foundation construction area. New drainage trenches will be dug to bypass the tower foundations on one or as many sides of the foundations as required, or alternatively a number of drains will be replaced by a larger single drain, which bisects the tower foundation.

Delineation of Any On-site Working Area

Temporary fencing, goal post/restricted height barrier arrangements and warning signs will be erected as required to provide a safe working area for operatives, landowners and third parties.

Diversion of Any Existing Utilities

No diversion of utilities is anticipated. However, if existing utilities need to be diverted, this will be undertaken in accordance with the utility standards, either by the Contractor or by the utility owner.

Erection of Temporary Guarding Positions

Where the overhead line is to be strung over roads and railway tracks, temporary protective structures will be erected prior to the commencement of stringing. These temporary structures will be in the form of suitable guard poles.

The protective structures will be positioned on both sides of a crossing and will be temporary in nature, for the duration of the stringing operation. They will help to minimise disruption to road and rail users.

6.5.5.3 Temporary Access Routes to Working Areas

Temporary access routes, capable of accommodating construction plant, construction materials and personnel, are required for the construction of each tower, the installation of the overhead line and the setting up of temporary guarding positions.

Temporary access routes for the proposed development are indicated in **Figure 6.1** and are described below.

Access routes for these activities will minimise disruption and use existing access routes and points as far as possible:

Tower 5A Access

- Access to the Tower 5A working area will be from the existing Avoca River Business Park access road using an existing field entrance and via a new access track, approximately 100m long and 4.5m wide.
- Overhead line installation (stringing) equipment will be accessed from the working area, the Avoca River Business Park access road and adjacent lands using a 4 x 4 and/or a low ground pressure excavator to minimise any disruption. Consideration will be given to the manual pulling out of the new conductor as this may speed up the operation and reduce the requirement of stringing equipment.
- Access to guarding activities: The guarding positions will be accessed from the working area, the Avoca River Business Park access road and adjacent lands. This will be by 4 x 4 vehicle and/or a low ground pressure excavator to minimise any disruption. Two trips will be required from the working area, one for erection, and one for disassembly.

Tower 6B Access

- Access to the Tower 6B working area will be from the R747 (Vale Road) on the west side of the M11 motorway:
    - An access route is available via an existing gated access track to the north west of the existing Arklow to Lodgewood 220kV OHL. The track continues for approximately 350m before reaching the Working Area. This route requires traversing beneath a rail bridge for Arklow to Gorey railway line and is suitable for 4 x 4s and other low sided vehicles, plant and pedestrians.
    - A mobile crane may be used to lift other equipment and materials, which would be unsuitable for the proposed Tower 6B access route, over the Arklow to Gorey railway line (in consultation with Irish Rail) to the existing access track. To minimise disruption to rail services, any such lifting over the Arklow to Gorey railway will likely occur at night.
- The working area is adjacent to the new proposed tower location and existing access track, and to the existing adjacent tower, which is to be decommissioned and removed.
- Overhead line (stringing) equipment will be accessed from the working area and adjacent lands using 4 x 4 and/or a low ground pressure excavator to minimise any disruption.
- The guarding positions will be accessed from the working area and adjacent lands. This will be by 4 x 4 vehicle and/or a low ground pressure excavator to minimise any disruption. Two trips will be required from the working area, one for erection, and one for disassembly.

Where a crane is required to lift other plant, equipment or materials over railway infrastructure, temporary laydown areas will be required to be cleared of vegetation and crushed stone will be laid onto geosynthetic reinforcing material to form a temporary crane hardstand if required.

The maximum hardstand dimensions for the mobile crane hard stand are expected to be c. 30m x 20m. The hardstand will be formed by removing the topsoil and subsoil to create a level sub-base for the platform. Separate stockpiles of vegetated topsoil and subsoil materials will be created adjacent to the cleared area. The crushed stone will be placed, using a tracked excavator. The crushed stone will then be compacted using a roller.

Alternatively (if the weather and the Contractor's equipment allow) and if the task specific lifting plan and ground conditions permit, crane outrigger plates will be sufficient to disperse loads, and a crushed stone hardstand will not be required.

Vehicular Access Route

A range of construction types for access routes are available, which include:

- Use of existing surfaced roads or farm tracks
- Use of existing farm tracks, with improvements if required by track condition
- Installation of temporary metal or plastic roadway panels (such as Trakway)
- Installation of temporary stone track, with geotextile and geogrid as required
- Use of low ground bearing pressure vehicles across original ground

While all of these potential access route options have been assessed in the EIAR, the method used for each route will be selected at construction stage, in consultation with the Contractor. Weather conditions during the period of works may also influence the decision.

Tower 6 Access

Access to the Tower 6 working area will be via the existing Avoca River Business Park access road using an existing field entrance. Access to the tower will be via an existing track (see **Figure 6.1**) with some vegetation clearance required directly adjacent to the tower.

As the tower is located on EPA licensed land, to minimise disruption, the access route will be used in its current state with the addition of temporary metal or plastic roadway panels if required. Temporary traffic management may be required on the L6179 Kilbride Road to accommodate crane access to the tower from the road.

6.5.5.4 Foundations for New 220kV Towers

Methodology

The following methodology will be used by the Contractor to install each new 220kV tower foundation:

- Location of the foundations will be checked for underground services such as cables, water pipes etc.;
- A working area of approximately 50m x 50m will prepared and secured following the same methodology as for the landfall temporary compounds, described in **Section 6.5.2.2** above;

- The foundation excavation will be set out and pegged;
- This may require excavation of existing ditches or field drains to allow clear pegging of each individual leg footing for excavation;
- Foundations will be constructed;
- The foundations will consist of a reinforced concrete block at each tower leg, which will be founded on a suitable bearing stratum and of sufficient size to anchor the tower in position. Depth can range from 2m to 3.5m, with plan size ranging from 2m x 2m to 9m x 9m;
- Where a standard foundation is not suitable, the foundation could be:
    - Larger foundation in the case of weak soils;
    - Pile foundations in the case of large depth to suitable bearing stratum; or
    - Reduced foundation in the case of shallow rock.
- Each of the tower stubs (lower part of tower leg, of which there will be four in total) will be embedded into or connected to the foundation;
- A template frame will be used to correctly position and orientate the tower stubs relative to each other;
- For a standard foundation, for each of the four tower stubs an excavation will be undertaken using a tracked excavator to reach a suitable bearing stratum at the required formation level;
- The depth of excavation will be checked by the on-site foreman;
- If groundwater is present in the excavation, it will be pumped out prior to any concrete being poured into the foundation. The water will be discharged at the surface a suitable distance downhill from the excavation. If suspended solids are present in the groundwater, a system such as a settlement pond, proprietary Siltbuster or other technique will be used to filter the groundwater before discharge;
- Concrete trucks will bring the required volume of concrete to site, and, depending on site topography and ground condition, the concrete will be transferred to the excavation by:
    - Lorry;
    - Wheeled dumper;
    - Tracked excavator with concrete skip; and / or
    - Concrete pump.
- In areas of poor ground or high water table, it may be necessary to use temporary works such as sheet piles to support the excavation walls;
- After this, the remaining part of the foundation, the concrete shear block or neck will be formed using shuttering;
- During each pour, the concrete will be vibrated thoroughly using a vibrating poker. In the event that sheet piles are used, these will be removed (pulled) at this stage. Care will be taken not to damage the base members of the tower. The shear block shuttering will be removed at this stage;

- The tower foundations will be backfilled one leg at a time with the excavated material. The backfill will be placed and compacted in layers. All dimensions will be checked following the backfilling process. If the excavated material is deemed unsuitable for backfilling, imported fill material will be used and also compacted in layers. When the base construction crew leave site, they will remove all surplus materials from the site including all unused excavated fill;
- Once the concrete in the tower base is completed and fully set (usually after at least seven days) it will be ready to receive the tower body sections, which will be assembled in an area near the foundation site ready to be lifted and bolted into place;

Construction Equipment Required

The following construction equipment will be required to construct the tower foundations.

- 4 x 4 vehicle;
- Concrete placing and finishing equipment;
- Tractor and trailer;
- Water pump;
- Wheeled dumper or track dumper (typically 6 to 8 tonnes);
- Timber/steel or other shuttering boxes;
- 360˚ tracked excavator (typically 13 tonne and 22 tonne for rock breaking);
- Transit van;
- Chains, vibrating pokers and other small tools;
- Survey equipment; and
- Concrete delivery lorry travelling from suitable nearby concrete production facility.

Duration of Works and Crew Size

The duration of the foundation works is expected to be 10 days. However, if the foundation is non-standard the duration will be up to 15 days. The crew size will be four to six workers.

6.5.5.5 Erection of Tower Body

Methodology

To erect the tower body, which is the above ground element of the tower, the following methodology will be used:

- The pre-cut, drilled and protected steel sections and bolts will be delivered to the tower location by flat-bed lorry or, if necessary, by helicopter;

- Portions of the tower body will be preassembled from the steel sections and bolted together at a location beside the foundation. Portion sizes will be dictated by weight and method of lifting;
- Assembled tower portions will be lifted into position and bolted together; and
- The assembled tower portions would normally be lifted into place using a suitably sized crane if the ground is suitable. Alternatively, a derrick/gin pole and winch/tractor will be used to lift the semi-assembled portions of tower into place, or if necessary, a helicopter where access is particularly constrained.

Construction Equipment Required

The following construction equipment will be used to construct a tower body.

- 4 x 4 vehicle;
- Winch/hoist;
- Tractor and trailer;
- Mobile crane (size depends on weight of lift, along with vertical and horizontal distance of the lift);
- Derrick/gin pole and winch/tractor or possibly a helicopter;
- Teleporter;
- Transit van; and
- Chains and other small tools.

Duration of Works and Crew Size

The expected duration of the tower body erection works will be five days. However, adverse wind condition or electric storms may cause delay. The crew size will be seven workers.

6.5.5.6 Overhead Line Stringing

Methodology

Stringing of overhead lines refers to the installation of phase conductors and earth wires on the supporting tower structures.

The conductor installation will follow a staged process of:

- Erecting temporary guards such as guard poles at obstacles including roads and railways;
- Pulling of a pilot line (nylon rope), which is normally carried by hand into the stringing wheels, across the gap between the towers to be connected. A drone or boat will be used to carry the pilot line across the Avoca River (no works are required for landing/berthing of drone or boat);
- Using the pilot line to pull a heavier pilot line (steel rope) across the gap;

- Using the heavier pilot line and specifically designed “puller – tensioner” machines to pull the conductors from the drum stands into position;
- One end of the conductor, which has just been pulled into position, is terminated on the appropriate tension fittings and insulator assemblies;
- The other end of the conductor is then placed in temporary clamps called “come-alongs” which take the conductor tension; and
- The conductor is then cut from the puller-tensioner and the conductor is sagged using a chain hoist.

Consideration will be given to pulling out the conductor manually, however the main advantages with this method are:

- The conductor is protected from surface damage; and
- Major obstacles such as road and rail crossings can be completed without the need for major disruption.

Where a string crosses a main road, and the extent of guarding structure required becomes excessive, catenary stringing can be used as an alternative protection method. Catenary stringing is a secondary safety support system, such that if the conductor or pilot line breaks it can only fall a short distance determined by the catenary design.

The catenary support system consists of a high strength, low elasticity rope, which once installed hangs above the profile of the wire being strung and provides support via a series of roller wheels. The method to deploy the catenary system is:

- The catenary rope is anchored to a tower or ground anchor at one side;
- A series of rollers are placed on the previously installed pilot line, with the catenary rope attached to these rollers at defined spacings. As the catenary rope has less tension than the pilot line, it hangs below it;
- The spacing of the rollers is calculated so that the sag in the un-tensioned catenary rope does not enter the exclusion zone of the obstruction or feature below;
- The free end of the catenary rope is attached to a robot, which is hanging on the pilot line;
- The robot travels across the pilot line to the next stringing support point, pulling the catenary rope behind it, with the roller units supporting the catenary rope;
- The free end of the catenary rope is removed from the robot and fixed to the next tower or ground anchor;
- The catenary rope is tensioned. In doing so, the catenary rope is pulled into a profile that now positions it above the pilot line. As the roller wheels are double wheels, the 180^0 reversal of orientation means the bottom wheel becomes the top wheel;
- The tensioned and anchored catenary rope is now supporting the pilot line via the series of rollers hanging from the catenary rope;

- The previously calculated spacing of the rollers is also checked so that if the pilot line or conductor wire were to fail during deployment, the sag would be minimal and so avoid conflict with the obstruction or feature below;
- The heavier pilot line and then conductor wire are pulled across as previously described, with catenary system providing temporary support and maintaining the exclusion area; and
- Once the conductor wire is installed and fixed in position, the catenary system is removed in reverse order to the previous steps.

In accordance with standard installation practice, for stringing of the overhead line between the existing Tower 5 and the new Tower 5A and also between the existing Tower 8 and the new Tower 6B, the following will be the sequence of works:

- The new double circuit angle towers, except for the bases which will have been constructed earlier, will be erected while the Arklow to Lodgewood 220kV OHL is switched out. Each of the existing OHL conductors will still be in place between the existing towers. Care will be taken when assembling the new towers not to damage the OHL conductors or shield wire;
- Come-along clamps/slings and chain hoists will be used to transfer each OHL conductor across to the correct tower arm on the new tower while the conductor is slipped from its fixing on the old towers. Once in place and the correct sag has been obtained, the conductor will be fixed to its respective fixing point on the tower arm via insulators. This will be repeated for each of the OHL conductors and the shield wire.

Construction Equipment Required

The following equipment will be during line stringing.

- 4 x 4 vehicles;
- Puller – tensioners;
- Mobile aerial platform;
- Teleporters;
- Drum stands;
- Drum carriers;
- Stringing wheels;
- Conductor drums;
- Compressor & head;
- Transit vans;
- Chains, hoists/winch, slings and other small tools; and
- Conflict guarding.

Duration of Works and Crew Size

The average duration of stringing works is typically one week per straight. This figure is approximately the same for all straights, regardless of length, as the most time-consuming aspect is the movement and setup of the stringing equipment. Stringing crews are typically quite large and could have as many as 15 workers.

The process is shown in **Figure 6.28.**

Figure 6.28: Typical Setup for Overhead Line Stringing (Source: SPL)

6.5.5.7 Decommissioning of Existing Structures

The decommissioning of the existing Towers 6 and 7 will be completed by ESB Networks in line with the ESB's standard policy and procedures.

For the OHL conductors and towers that are to be decommissioned, the following stages will occur:

- De-stringing will be carried out as the reverse process of overhead line stringing operations. Winch and tensioner positions will be established to reel in the conductors.
- Decommissioned conductors will be taken to an appropriately licensed facility for recycling or reuse.
- Towers will generally be dismantled in sections.
- The tower steel will be bundled on site and removed by tractor and trailer and sent for recycling.

- Insulator strings will be taken for disposal at an appropriately licensed waste facility.
- The foundations of the existing Tower 6 within the licensed landfill will be left in situ to avoid any disturbance of lands within this area.
- The existing Tower 7 foundations (which is outside the existing licensed area) will be broken down to a depth of approximately 1m below ground level and the stubs cut off. Waste material will be segregated on site and will be removed from site using a permitted waste carrier for recycling or disposal at a licensed site. The ground will then be reinstated and landscaped to match the surrounding ground.

6.5.5.8 Reinstatement

Once all works are complete, the access route and the working areas around the towers and overhead line stringing areas will be reinstated as close as possible to their original condition.

This work will be carried out by a specialised agricultural Contractor and will be carried out in accordance with the relevant good practice and in consultation with the individual landowner.

6.6 Commissioning Activities

Commissioning of all electrical equipment will be required to confirm the operational readiness of the equipment and to demonstrate the equipment meets the functional and operational specifications.

The overall commissioning duration for all elements of the proposed development will be approximately 6 months.

6.6.1 Landfall

The landfall circuits will be commissioned in accordance with the relevant industry standards and specifications. Equipment for this may be required to be transported via a low loader vehicle due to the size of the testing equipment. The test equipment will be placed in the landfall HDD compound.

6.6.2 Connection from Landfall to the Onshore 220kV Substation

The onshore export circuits will be commissioned in accordance with the relevant industry standards and specifications.

Testing will be completed at each joint bay.

High voltage and partial discharge testing will be required at the substation and the landfall. Equipment for this may be required to be transported via a low loader vehicle due to the size of the testing equipment. The test equipment will be placed within the substation construction compound.

6.6.3 Onshore 220kV Substation

The onshore 220kV substation will be commissioned in accordance with the relevant industry standards and specifications.

Commissioning of the substation will involve the following activities:

- Pre-commissioning;
- Sub-system testing;
- HV energisation; and
- Performance testing.

Each piece of auxiliary equipment, STATCOMs, including 33kV switchgear and transformer, harmonic filters, voltage regulation devices, house transformer, and diesel generators will be commissioned separately and in accordance with the respective industry standard and specification.

The connection compound and transmission compound will include 220kV GIS switchgear, control and protection panels, LV distribution equipment, batteries and UPS supplies. Again, all elements will be commissioned separately and in accordance with the respective industry standard and specification.

The onshore 220kV substation will be pre-commissioned by the Developer. The final steps of commissioning including HV energisation will be undertaken between the Developer and ESB Networks, in their role as Transmission Asset Owner, and in coordination with EirGrid as Transmission System Operator.

6.6.4 Connection from Substation to Transmission Network

The Developer will pre-commission the overhead line loop-in connection from the existing overhead line to the transmission compound.

The pre-commissioning will involve impedance testing of the overhead line. Test equipment required for this is lightweight and portable in nature.

Once pre-commissioned, ESB Networks will fully commission the new overhead line loop-in connection in accordance with standard ESB Networks’ policies and procedures.

6.7 Delivery Routes

Access to the construction compounds and working areas will be from the local and regional road network (See **Figure 6.1**).

Delivery routes for equipment and materials including cable drums will be determined upon selection of supplier, which will determine their manufacturing location. With the M11 in close proximity to the site, equipment and materials will be easily transported to site via the public road network by standard road vehicles.

Transport and delivery routes are addressed further in **Chapter 13** *Traffic and Transportation*.

6.8 Site Management

6.8.1 Employment

The project is anticipated to provided employment to approximately 165 people during the construction phase.

A breakdown of the number of workers on site for the landfall, cable route, substation and NETN connection during the construction phase is presented in **Table 6.7**.

Table 6.7: Estimate of workforce required for the various stage of installation

Project Stage	Estimated No. of People
Landfall Construction	10
Landfall Decommissioning	4
Cable route civil works	50
Cable installation and jointing	40
Cable testing and commissioning	15
Reinstatement	5
Substation earthworks, services installation, and erection of buildings and equipment, fit out and finishes	Up to 30
Substation Electrical Fit-Out	30
NETN Connection – Foundation Works	6
NETN Connection – Tower Installation	7
NETN Connection – Stringing of OHL	15
HDD M11 Crossing	10
HDD R772 Crossing	10

There is some overlap in terms of workforce numbers in the table above, as some personnel will (programme dependent) be involved in more than one of the stages.

Decommissioning of the landfall, cable and substation, at the end of the operational life of the proposed development, would take place over a c. 6 month duration.

Table 6.8: Estimate of workforce required for decommissioning

Project Stage	Estimated No. of People
Landfall	4
Cable route	4
Substation	Up to 25

6.8.2 Working Hours

The timing of construction activities, core working hours and the rate of progress of construction works are a balance between efficiency of construction and minimising nuisance and significant effects.

The normal construction working hours for the proposed development will be 7am – 7pm: Monday to Saturday. These hours correspond to the current construction programme.

The permissible noise levels are detailed in **Chapter 11** *Noise and Vibration* where ‘daytime’ noise limits are defined as 7am to 7pm, and lower permissible noise levels are stipulated outside these hours.

All rock breaking/fracturing activities, pile driving and breaking out of existing concrete will be undertaken during normal working hours. The removal of waste material off site by road and regular deliveries to site will, where appropriate, be generally confined to outside of peak traffic hours.

Subject to further construction planning and resourcing, certain activities may occur 24-hours a day, 7-days a week for the duration and this has been taken as a worst case for the purpose of the assessment of impacts in this EIAR.

Deliveries to site will, where appropriate, be generally confined to outside of peak traffic hours to minimise the disruption to other road users, with all such traffic movements carried out under the conditions of the relevant permits from An Garda Síochána.

It is expected that the HDD works will operate 24 hours per day, seven days per week. Commissioning and pre-commissioning may also take place 24 hours per day, seven days per week.

In order to undertake the works on Tower 6B as described in **Section 6.5.5.3**, equipment will need to be lifted across the Arklow to Gorey railway line. Night-time working will take place for this activity for Health and Safety and Irish Rail compliance purposes.

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

6.8.3 Hoarding and Fencing

A site boundary in the form of temporary hoarding will be established around each of the temporary construction compounds with hoarding or fencing used around each of the working areas. These will be established before any significant construction activity commences, as these construction sites can be a unsafe environment for those that have not received the proper training and are unfamiliar with construction operations.

For the temporary construction compounds (HDD, substation and temporary cable construction compounds), the hoarding will be generally be a minimum 2m high in order to provide a secure boundary to prevent unauthorised access and delineate the works. The site hoarding will also perform an important function in relation to minimising nuisance and effects including:

- Noise emissions (by providing a buffer);
- Visual impact (by screening the working areas, plant and equipment); and
- Dust minimisation (by providing a buffer).

The hoarding/fencing will be typical of that used at most construction sites. Mounting posts will be erected by using a mini-digger and the posts will be set in concrete.

Other working areas and site access routes will typically use a mix of fencing and other appropriate safety barriers, as these types can be more readily re-configured and re-used between working areas as the construction activities progress.

6.8.4 Services and Site Lighting

Temporary site services will be installed in parallel with the rearrangement and diversion of existing utilities, where relevant. Ecocabins will be used to promote the most efficient use of resources for the temporary construction facilities for the proposed development.

Electricity

Where possible, the working areas will be powered by existing mains supplies, but if not available, via a diesel generator, where power is required. Typically, one 20,000 litre tanker for the delivery of diesel to the site compounds will be required each week.

Drinking Water

Potable water will be supplied from Irish Water mains where available. If not, potable water will be either transported via tanker to site or via large, recyclable bottles. Typically, one delivery each week will be required for the provision of potable water.

Grey Water

Grey water for non-drinking purposes (construction and toilets) will be sourced via rainfall collection or transported via tanker to site.

Wastewater

Wastewater will be collected and stored on site in holding tanks, which will be emptied on a regular basis (typically bi-weekly) by licensed Contractors and disposed of appropriately.

Internet and Telephone

Connection to the internet (which will also provide telephone services) will be via satellite or microwave dish by a specialist third party Contractor.

Lighting

Site lighting will typically be provided by tower mounted temporary portable construction floodlights that will be cowled and angled downwards to minimise spillage to surrounding properties.

Wheel wash

Where a wheel wash is installed, this will be located on impermeable surface, and water will be passed through a silt buster or other appropriate surface water management mechanism.

Alternatively, a “dry” wheel wash will be used, which relies on mechanical vibration of the vehicle wheels and chassis to loosen and remove mud and debris.

6.8.5 Deliveries to Site

Deliveries of materials will be planned and programmed to ensure that the materials are delivered only as they are required at the working areas. Storage of material will primarily be at the substation compound or at the temporary cable construction compound, depending on the type of material.

Works requiring multiple vehicle deliveries, such as concrete pours, will be planned so as to ensure there will be no queuing on the public roadways around the working areas.

Deliveries will, where appropriate, be limited to outside of peak traffic hours.

6.8.6 Security

Security for the works will be provided by a combination of:

- Secured work areas with fencing, with gate man and barrier controlling access to the fenced areas, at the substation site.
- Roving security patrol outside normal working hours
- CCTV

6.8.7 Community Liaison During Construction

The Developer recognises the importance of effective community liaison in order to reduce nuisance to residents and the general public during the works, to ensure public safety and welfare, and to help ensure the smooth running of construction activities. The Developer has prepared a Community Liaison Plan, which is included in the CEMP (See **Appendix 6.1**). The purpose of the plan is to ensure good relations with the community, which will be done by:

- Providing information for the public during the construction phase, (particularly nearby sensitive receptors);
- Providing the correct points of contact and being responsive; and
- Ensuring good housekeeping in all aspects of the operations.

A significant part of the plan is the 'good neighbour' policy. Key aspects of this policy include:

- Early implementation of the policy i.e. from the commencement of construction;
- Reduction of nuisance factors;
- Maintaining access to neighbouring premises;
- Clear and concise information; and
- Undertaking timely liaison with stakeholders.

With regard to liaison, the Contractor will be required to comply with the plan and develop it further with additional information, which will include providing the details of how the local community, road users and affected residents will be notified in advance of the scheduling of major works, the temporary traffic diversions and the progress of the construction works.

The Contractor's additional details will include the following:

- Contractor's community relations policy;
- Personnel nominated to manage public relations;
- A methodology for processing observations, queries and complaints from the general public, relevant authorities, the media and emergency services; and
- The strategy for project-wide liaison with all relevant parties.

A liaison manager will be responsible for managing such tasks as the following:

- Briefing neighbours on progress and issues as necessary;
- Liaison with Wicklow County Council and emergency services as appropriate;
- Liaison with local Gardaí, particularly in relation to traffic movements and abnormal load permits where necessary; and
- Contact details for the liaison manager will be posted on all construction site notice boards and on any other information or correspondence, which may be distributed from time to time.

6.8.8 Waste Management

A Construction Waste Management Plan (CWMP) has been prepared and is included in the CEMP (See **Appendix 6.1**). The Contractor will further develop this CWMP, prior to construction.

The CWMP addresses:

- Waste Manager
- Waste Types
- Tracking and documentation procedures for waste sent off site.

A significant proportion of the surplus excavated material from the landfall site and cable route will consist of uncontaminated soil, stone and naturally occurring material which may be reused in its natural state within the site. This reuse is certain and as such the material is not deemed to be a waste in accordance with Article 2 of the Waste Framework Directive (2008/98/EC) (EC, 2008) and Section 3 (c) of the Waste Management Act 1996 (as amended). **Chapter 16** *Resource and Waste Management* provides further information.

Off-site re-use options for surplus clean and inert excavated material include reuse as a by-product on other construction sites subject to Article 27 of the European Communities (Waste Directive) Regulations 2011, S.I. No. 126 of 2011 (as substituted by Article 15 of S.I. No. 323/2020 - European Union (Waste Directive) Regulations 2020) notification to the EPA, or recovery at suitable authorised waste facilities i.e. facilities which have been granted a Certificate of Registration, Waste Facility Permit or EPA licensed soil recovery facilities in accordance with the Waste Management Acts 1996-2016.

On the substation site, made ground, excavated in the course of installing footings and underground services, which is not suitable for reuse on site, or surplus to requirements, will be stockpiled, tested and classified for recovery or disposal. Refer to **Chapter 16** *Resource and Waste Management* for further information.

In the unlikely event that asbestos is uncovered, the asbestos containing material will be double-bagged, stored, collected and removed from site by a competent Contractor and disposed of in accordance with the relevant procedures and legislation.

6.9 Materials Management

6.9.1 Excavated Materials

Excavated material as part of the construction works will generally consist of:

- Rock, at the landfall compound;
- Topsoil and subsoil; and
- Made ground.

Natural ground, where it can be shown to fulfil the requirements of the project Earthworks Specification, will be reused within the site. The excavated material will be shown to comply with the requirements of Class 1 or Class 2 general fill as defined in Transport Infrastructure Ireland (TII) publication titled ‘Specification for Road Works Series 600 - Earthworks (including Erratum No. 1, dated June 2013)’.

Any excavated contaminated material will be removed and disposed of or recovered at a suitably licensed or permitted site in accordance with the current Irish waste management legislation as described in **Section 6.8.8**.

Table 6.9: Earthworks Balance Table

Earthworks Description	**Volume (m^3)**
Landfall Option 1 (Worst Case – HDD Compound in Southern Field, Cable Construction Compound in Northern Field)	
Volume of material to be reused:	
Topsoil	6,700
Subsurface material (from platform earthworks)	19,000
Volume of material to be disposed of or recovered:	
Topsoil and Subsurface material (from platform earthworks)	0
HDD Bore Material	1,100
Imported crushed stone (for compound bases and 1no. access tracks)	13,500
Cable Route Construction Corridor	
Volume of material to be reused:	
Topsoil	42,000
Subsoil (trench backfill as per typical detail) & joint bay excavation	17,200
Volume of material to be disposed of or recovered:	
Topsoil and Subsurface material (excavation for CL1039 part of trench) & joint bay excavation	0

Earthworks Description	**Volume (m^3)**
Asphalt/pavement build up (remove pavement where cable is laid in road)	900
Haul roads build up along corridor	11,000
Cable Route Access Tracks	
Volume of material to be reused:	
Topsoil	4,500
Volume of material to be disposed of or recovered:	
Imported crushed stone (for access tracks)	0
R772 HDD Platforms	
Volume of material to be reused:	
Topsoil	2,000
Volume of material to be disposed of or recovered:	
Imported crushed stone (for HDD temp. base)	4,000
HDD Bore Material	200
M11 HDD Platforms	
Volume of material to be reused:	
Topsoil	2,400
Subsoil (M11 HDD entry pit and cable trench)*	11,000*
Volume of material to be disposed of or recovered:	
Imported crushed stone (for HDD temp. base)	4,600
HDD Bore Material	500
Substation	
Volume of material to be reused:	

Earthworks Description	**Volume (m^3)**
Subsurface material (from embankment cut excavation)	0
Volume of material to be disposed of or recovered:	
Asphalt/pavement build up (existing pavement on site), embankment cut excavation and local excavation of made ground	12,500
Flood Defence Improvement Works	
Volume of material to be reused:	
Existing embankment material	0
Volume of material to be disposed of or recovered:	
Existing embankment material	300
Imported crushed stone (for working area and access track)	700
Connection to NETN	
Volume of material to be reused:	
Topsoil (tower working areas)	2000
Volume of material to be disposed of or recovered:	
Tower 7B foundation	200
Imported crushed stone (for working areas and access tracks)	1,700

*Material to be transported by Public Road to the HDD Exit Compound for stockpiling.

Transport of material to and from the works areas will be managed in accordance with the construction traffic management measures outlined **Chapter 13** *Traffic and Transportation* and included in the Construction Traffic Management Plan in the CEMP (**Appendix 6.1**), to ensure that there will be no queuing of trucks on public roadways around the works areas.

6.9.2 Construction Materials Requirements

The proposed development will have a requirement for materials imported to the works areas, primarily concrete, crushed stone, road paving materials and steel, for the construction of the substation and crushed stone and PVC ducting for the installation of the cables.

Concrete, sand, crushed stone and steel will be imported to works areas during the construction works, when required. Breakdowns of the volumes of these materials required are presented below:

6.9.2.1 Landfall

Water for HDD

Approximately 450m^3 of water will be utilised for the landfall HDD per bore, brought to site in tankers.

Bentonite for HDD

Approximately 22.5m^3 of bentonite will be utilised for the landfall HDD per bore.

Landfall HDD Materials

High Density Polyethylene (HDPE) HDD duct will require up to 1km of ducting for the two circuits.

Concrete at Transition Joint Bay

Approximately 100m^3 of concrete will be required for the Transition Joint Bay chambers (two in total).

Concrete for Anchor Blocks

Approximately 54m^3 of concrete for anchor blocks, if kentledge is used for the HDD rig.

Steel for Anchor Blocks

Approximately 20 tonnes of steel for anchoring, if sheet piling is used for the HDD rig.

Temporary Construction Compounds (HDD and Cable Construction Compound) and Access Tracks

Approximately 13,500m^3 of crushed stone will be imported for the HDD, cable construction compound and associated access tracks at the landfall.

6.9.2.2 Connection from Landfall to the Onshore 220kV Substation

Concrete Requirements along Cable Route

There will be weak mix concrete (i.e. cement-bound sand (CBS), typically 14:1 sand/cement mix) required for most of the cable route in the cable trench.

A standard concrete pad will be required at the base of each joint-bay. Estimated volumes of concrete required for the cable route are provided below.

- Estimated volume of weak mix concrete for the cable route (two circuits) = 5,000m^3
- Estimated volume of standard concrete per joint-bay = 20m^3
- Assuming 20 joint-bays, estimate volume of standard concrete = 400m^3

Cable Materials

The length of the cable route from the Transition Joint Bays at the landfall to the substation is approximately 6,000m.

This comprises (per circuit) three power cables coming to 18,000m, two fibre optic cables coming to 12,000m and one earthing cable coming to 6,000m. Therefore, for a total of two circuits is 72,000m.

The length of earth conductor for each joint bay is approximately 43m (8m x 2.5m joint-bay with conductor 1m outside joint-bay wall, 1 x communication chamber x link box chamber). Therefore, for 20 joint bays, the length of earth conductor is 860m.

The total length of earth rods for joint bays is 40m (4 x 10m earth rods per joint bay). Therefore, for 20 joint bays, the length of earth rod is 800m.

Cable Installation Materials

High Density Polyethylene (HDPE) HDD duct will require up to 72km of ducting for the two circuits.

Road Construction

The haul route along the cable corridor (within the working corridor), together with the access tracks to the cable corridor will require approximately 17,000m^3 of road construction material.

Road Surfacing – Road reinstatement - Asphalt

The road crossing reinstatement will require c. 2,000m^3 of asphalt.

Water for HDD at R772 and M11 Crossings

Approximately 200m^3 of water will be utilised for the R772 HDD per bore.

Approximately 450m^3 of water will be utilised for the M11 HDD per bore.

In both cases, water will be brought to site in tankers.

Bentonite for HDD at R772 and M11 Crossings

Approximately 10m^3 of bentonite will be utilised for the R772 HDD per bore.

Approximately 22.5m^3 of bentonite will be utilised for the M11 HDD per bore.

R772 and M11 HDD Materials

High Density Polyethylene (HDPE) HDD duct will require up to 400m of ducting for the two circuits at the R772 HDD crossing and 1km of ducting at the M11 HDD crossing.

Temporary Construction Compounds (HDD)

Approximately 9,500m^3 of crushed stone will be imported for the HDD compounds at R772 and M11.

Approximately 380 tonnes of steel for sheet piling will be imported to create access and compound area, if HDD is used as the M11 crossing option.

6.9.2.3 Onshore 220kV Substation

Crushed Stone - Imported Structural Fill

Approximately 70,000m^3 of granular fill will be imported for the substation site.

Concrete in Substation

The substation foundations and the other concrete structures on the site will require c. 6,000m^3 of concrete.

Steel Reinforcement

The reinforced concrete elements in the substation will require approximately 340 tonnes of reinforcing steel.

Structural Steel

The structures on the substation site will require c. 484 tonnes of structural steel.

Steel Cladding

The buildings on the substation site will require approximately 2,600m^2 of roof and wall cladding.

Road Construction – Bituminous Material

The permanent site access tracks and internal roads will require c. 2,200m^3 of bituminous material.

Temporary Construction Compounds

The temporary construction compound for construction of the substation will be situated within the substation site on existing hardstanding, and therefore a separate area will not be required and no additional materials are envisaged to be required.

Flood Improvement Works

Approximately 800m^3 of suitable cohesive structural fill will be imported for the flood improvement works and 700m^3 for working area and access route.

Additional 125 tonnes of steel will be imported for sheet piling.

6.9.2.4 NETN Connection

Crushed Stone and Stone Chippings

Approximately 1,700m^3 of crushed stone structural fill will be imported for the temporary works areas and access route, for the tower construction.

Concrete in the Tower Foundations

The tower foundations and the other concrete structures on the site will require c. 500m^3 of concrete.

Steel Reinforcement

The reinforced concrete elements in the towers will require approximately 35 tonnes of reinforcing steel.

Structural Steel

The towers to facilitate the tie-in will require approximately 60 tonnes of structural steel.

6.10 Safety Management

6.10.1 Health and Safety

The requirements of the Safety, Health and Welfare at Work Act 2005 (Government of Ireland, 2005), the Safety, Health and Welfare at Work (Construction) Regulations, 2013 (Government of Ireland, 2013), as amended, (the "Regulations") and other relevant Irish and EU safety legislation will be complied with at all times during the construction works for the proposed development.

As required by the Regulations, a Health and Safety Plan has been formulated which addresses health and safety issues from the design stages through to completion of the construction and maintenance phases. This plan will be reviewed and updated as required, as the development progresses.

In accordance with the Regulations, a 'Project Supervisor Design Process' has been appointed and a 'Project Supervisor Construction Stage' will be appointed for each construction works package.

The Project Supervisor Construction Stage will assemble the Safety File as the project progresses on site.

The Contractor will be required to ensure all Health and Safety, Fire Safety and security requirements are met.

All construction staff and operatives will be inducted into the security, health and safety and logistic requirements on site prior to commencing work.

All Contractors will be required to progress their works with reasonable skill, care and diligence and to proactively manage the works in a manner most likely to ensure the safety, health and welfare of those carrying out construction works, all other persons in the vicinity of the working areas and interacting stakeholders.

Contractors will also have to ensure that, as a minimum, all aspects of their works and project facilities comply with legislation, good industry practice and all necessary consents.

6.10.2 Traffic Management Plan

A Construction Traffic Management Plan (CTMP) has been prepared and is included in the CEMP. The plan will be further developed by the Contractor, prior to construction and will be agreed with Wicklow County Council.

The Construction Traffic Management Plan minimises the disruption to the public and the road users in the vicinity of the working areas during the construction phase of the works. The plan will include all suitable temporary signage, barriers and hoarding as necessary.

Chapter 13 *Traffic and Transport* provides more information on the issues addressed in the plan.

6.10.3 Environmental Incident and Emergency Response Plan

An Environmental Incident and Emergency Response Plan has been prepared, which will cover all foreseeable risks during the construction stage, including fire, flood, collapse and accidental spills and releases of hazardous substances. The plan will be further developed by the Contractor, prior to construction commencing. In further developing the plan, the Contractor will be required to liaise with the emergency response services. Further information on the emergency response plan is presented in the CEMP, provided in **Appendix 6.1**.

Appropriate site personnel will be trained as first aiders and fire marshals.

6.11 Environmental Management

Every effort will be made to ensure that any significant environmental effects will be avoided, prevented or reduced during the construction phase of the proposed development. The CEMP, provided in **Appendix 6.1**, will be further developed by the appointed Contractors prior to construction commencing.

The CEMP comprises all the construction mitigation measures proposed in the EIAR. The Contractor will include any additional measures imposed as a condition of the planning approval. Implementation of the CEMP will ensure disruption and nuisance will be kept to a minimum.

The CEMP has regard to the guidance contained in the handbook published by Construction Industry Research and Information Association (CIRIA) in the UK; Environmental Good Practice on Site Guide, 4th Edition (CIRIA, 2015).

The CEMP is in accordance with relevant legislation and guidance and will be effective for the duration of the construction works. The CEMP will be a live document during the construction phase and will be updated/added to as construction progresses.

6.11.1 General Measures

Steps will be taken to reduce the probability of an incident occurring and to also reduce the magnitude of any incident by a combination of good site environmental management procedures, including additional precautions when operating machinery close to watercourses, soil management, staff training, contingency equipment and emergency plans.

Key measures identified to reduce the risk of pollution, erosion and sedimentation of waterways include:

- Secure oil and chemical storage in over-ground bunded areas, limited to the minimum volume required to serve immediate needs with specified delivery and refuelling areas;
- No refuelling or fuel storage within 50m of waterways and only on a sealed surface;
- Emergency spill kits will be retained onsite at sensitive locations, with portable kits provided to plant and equipment operators;
- Cessation of work and development of measures to contain and/or remove pollutant should an incident be identified;
- Silt traps will be employed and maintained in appropriate locations;
- Temporary interception bunds and drainage ditches will be constructed up slope of excavations to minimise surface runoff ingress and in advance of excavation activities; and
- Excavation and earthworks will be suspended during and immediately following periods of heavy rainfall to minimise sediment generation and soil damage.

6.11.2 Landfall

For the HDD at the landfall, any groundwater or rainwater that collects in the HDD drilling pit will be pumped away. Then it will be discharged onto the adjacent land, not directly into a waterway, and through a filter medium. This will avoid the build-up of silt, as some granular material will, inevitably, be pumped out with the water from the trench. Any bentonite (or similar HDD drilling head lubrication material) will be handled and removed by the drilling Contractor. The volume of bentonite (or similar material) will be determined by the ground conditions encountered and length of HDD. Typically for a land-based HDD rigs the volume of bentonite would be approximately 5m^3 per shift, and for the landfall HDD rig, the volume of bentonite would be approximately 15m^3 per shift.

6.11.3 Connection from Landfall to the Onshore 220kV Substation

The cables will be installed in ducts, so the only section of trench that will be open is that which is being excavated and in which ducts are being installed. Excavated cable trenches will be backfilled as the works progress, as soon as installation is complete, and any cement bound surround material has cured sufficiently.

Any groundwater or rainwater that collects in a trench will be pumped to locations agreed with the landowners and local authorities. Typically, this will be onto adjacent land, not directly into waterways, and through a filter medium, to avoid the build-up of silt, as some granular material will, inevitably, be pumped out with the water. The pump flowrates will match that of the water into the trench, as it must be kept generally free of water. A single pump with a 75mm hose will usually be adequate to deal with rainwater running into a trench. A similar arrangement will apply at joint bays, where a sump will be cast into the concrete base for a pump.

For the R772 and M11 crossings, the control of water collecting in the HDD pits will be as described above, in **Section 6.11.2.**

6.11.4 Onshore 220kV Substation

Steps will be taken to reduce the probability of an incident occurring and to also reduce the magnitude of any incident from a combination of good site environmental management procedures, including additional precautions when operating machinery close to watercourses, soil management, staff training, contingency equipment and emergency plans.

In addition to the measures described above:

- Dust generation and dermal exposure during site construction works, until the made ground is capped, will be controlled by appropriate dust control measures e.g. water sprays and suitable personal protective equipment.
- Where the asphalt layer is being removed, this will occur in phases and the asphalt will be replaced with granular fill as soon as possible to prevent the generation of windblown dust.
- All made ground excavated in the course of installing underground services, which is not suitable for reuse on site, or surplus to requirements, will be stockpiled, tested and classified for recovery or disposal. Refer to **Chapter 16** *Resource and Waste Management* for further information.

It is noted that the Avoca River Business Park’s existing flood defences provide protection for the present day 0.1% AEP (annual exceedance probability), which is expected to adequately protect the works during construction.

6.11.5 Connection from Substation to NETN

The precautions to minimise the impacts of the works detailed in **Sections 6.11.1 and 6.11.4** above will be implemented for the construction of the connection to the transmission system.

6.12 Decommissioning Activities

6.12.1 Landfall and Cable Route

As described in **Chapter 5** *Description of the Development*, on cessation of operation, the cables and ducts will be left in place. The above ground structures such as the marker posts will be removed. The works will require a small workforce and will be of short duration. The environmental management measures specified in the CEMP, which are relevant to the decommissioning activities, will be implemented.

6.12.2 Onshore 220kV Substation

As described in **Chapter 5** *Description of the Development*, on cessation of operation, the substation will be decommissioned. The substation will be de-energised, the equipment will be removed, and the buildings and structures will be disassembled or demolished down to ground level. The decommissioning plant required will be similar to that required for the construction phase of the substation. The workforce required will be smaller and the duration of the works will be shorter. The environmental management measures specified in the CEMP, which are relevant to the decommissioning activities, will be implemented.

6.13 References

Construction Industry Research and Information Association (CIRIA) 2015 *Environmental Good Practice on Site Guide. 4th Edition*

GNI (2016) *Safety Advice for Working in the Vicinity of Gas Pipelines*

Government of Ireland (2013) *Safety, Health and Welfare at Work (Construction) Regulations 2013*

Government of Ireland (2005) *Safety, Health and Welfare at Work Act 2005*

EirGrid (February 2016) *Substation Civil and Building Works*

EirGrid 110kV, 220kV and 400kV Underground Cable Functional Specification, General Requirements (March 2020)

EirGrid (January 2019) *110 / 220 / 400 kV Gas Insulated Switchgear (GIS) Connected to the Transmission System*

EirGrid (December 2019) *Earthing and Lightning Protection Function Specification*

Department Transport Tourism Sport (2019) *Traffic Signs Manual*

Transport Infrastructure Ireland (2013) *Specification for Road Works Series 600 - Earthworks (including Erratum No. 1, dated June 2013)'*