GREENLINK
MARINE ENVIRONMENTAL IMPACT ASSESSMENT REPORT - IRELAND

NON TECHNICAL SUMMARY

P1975_R4500_RevF1
July 2019

Greenlink Interconnector
- connecting the power markets
in Ireland and Great Britain

Greenlink
INTERCONNECTOR

Co-financed by the European Union
Connecting Europe Facility

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CONTENTS

1. Introduction

1.1 The Proposed Development

Greenlink Interconnector Limited (GIL) is proposing to develop an electricity interconnector (Greenlink) linking the existing electricity grids in Great Britain and Republic of Ireland. The Greenlink project will consist of two converter stations, one close to the existing EirGrid substation at Great Island in County Wexford (Ireland) and one close to the existing National Grid substation at Pembroke in Pembrokeshire (Wales). The converter stations will be connected by underground cables (onshore) and subsea cables (offshore).

Greenlink is configured so that power will be able to flow in either direction at different times, depending on supply and demand in each country.

Greenlink is designated as a European Union Project of Common Interest (PCI), project number 1.9.1, under the provisions of European Union Regulation No. 347/2013 on guidelines for Trans-European Network for Energy (TEN-E Regulations) and has successfully applied for funding under the Connecting Europe Facility. This makes it one of Europe's most important energy infrastructure projects and grants it the "highest national significance" possible. The requirement and need for Greenlink has been reinforced by the Commission for Regulation of Utilities Water and Energy (CRU) (Ireland) and Ofgem (GB) and via the completion of a Cost Benefit Analysis which demonstrates that Greenlink offers economic benefit to consumers in both jurisdictions.

The landfall points for the submarine cables are Baginbun Beach, County Wexford and Freshwater West, Pembrokeshire. The overall length of the interconnector is approximately 159km of submarine cabling and approximately 7km and 23km of onshore cable in Wales and Ireland respectively.

The Environmental Impact Assessment Report (EIAR), to which this Non-Technical Summary (NTS) relates covers the Irish Marine components of Greenlink from mean high-water springs (MHWS) at the Irish landfall at Baginbun Beach, County Wexford out to the 12nm limit. This is defined as the Proposed Development and comprises:

- Two high voltage direct current (HVDC) electricity power cables;
- A smaller fibre-optic cable for control and communication purposes;
- All associated works required to install, test, commission and complete the aforementioned cables; and
- All associated works required to operate, maintain, repair and decommission the aforementioned cables, including five repair events over the 40 year lifetime of Greenlink.

The onshore cable route between Baginbun Beach and Great Island crosses the Campile River. Assessment on the effects of the 'Campile Estuary' component of

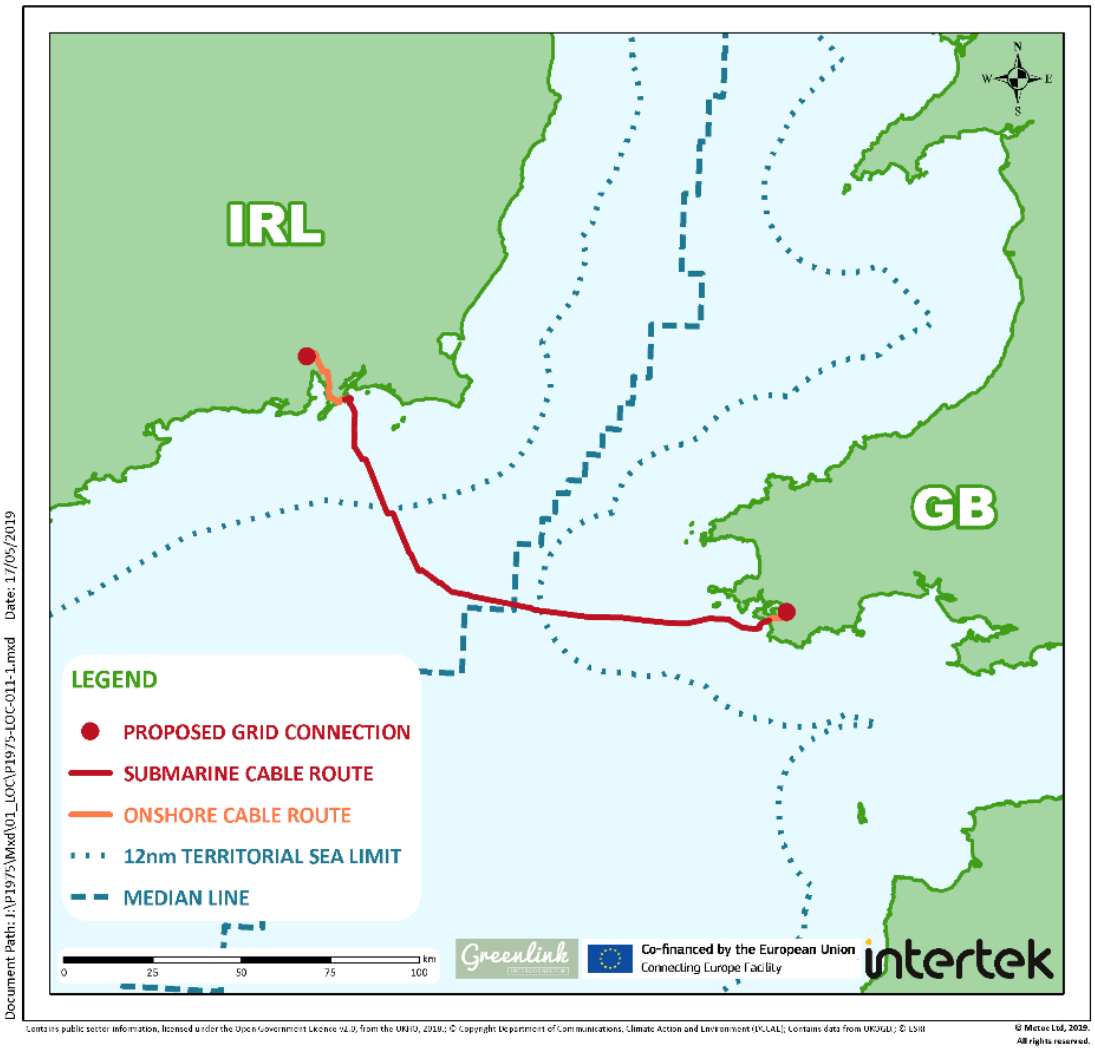
Greenlink, which encompasses the area of foreshore between MHWS either side of the river is provided in the EIAR.

Information is also provided on the Irish Offshore components of Greenlink, which comprises all aforementioned works from the 12nm limit to the UK/Ireland median line.

This EIAR will be submitted to the Department of Housing, Planning and Local Government – Foreshore Unit in line with the Foreshore Acts 1933 – 2011 in support of an application for a Foreshore Licence.

Separate EIARs / Environmental Statements will be prepared which cover individually the Welsh Onshore; the Welsh Marine (the submarine route from the Ireland/UK median line to MHWS at the Welsh landfall); and the Irish Marine (the submarine route from MHWS at the Irish landfall at Baginbun Beach, County Wexford to the 12nm limit and Irish Offshore (the submarine route from the 12nm limit to the Ireland/UK median line). These include a full cumulative effects assessment of all components of the project. Chapter 16 of this EIAR includes the cumulative assessment for the Proposed Development and Campile Estuary. As the EIARs / Environmental Statements are submitted they will be available online at www.greenlink.ie.

Figure 1-1 Greenlink route overview



1.2 Need for the Project

Regional investment and jobs	•Greenlink represents around €400m/£350m of private capital investment in Ireland and Wales and will create jobs during construction and operation as well as knockon economic benefits.
An integrated European Grid	•Interconnection has a vital role to play in connecting energy generation between countries to provide reliable and affordable power for all. Greenlink will have strategic importance, by doubling the interconnection capacity between Ireland and GB and contribute to each country's interconnection targets.
Security of supply	•The construction of Greenlink will deliver increased security of supply for electricity consumers, by diversifying energy sources and providing additional import and export capacity in both countries.
Integration of renewable energy	•Greenlink improves the integration of renewable technologies in Ireland and GB supporting the growth of the green energy sector, which offers significant economic and environmental benefits to both countries.
Better energy price competition	•Greenlink will deliver greater market integration and competition in the provision of electricity, ultimately providing significant benefits to consumers in Ireland, GB and continental Europe.

2. Development of Greenlink

A full description of the alternatives considered and route development is provided in Chapter 3 of the Greenlink Marine EIAR. The following sections summarise the key points.

2.1 Connection point selection

2.1.1 Irish and GB Transmission Networks

The importance of Greenlink, linking the Irish and GB Transmission Networks, is recognised through its PCI status which makes it one of Europe's most important energy infrastructure projects and granting it the "highest national significance" possible. The requirement and need for Greenlink has been reinforced by Ofgem (GB) and CRU (Ireland) via the completion of a Cost Benefit Analysis which demonstrates that Greenlink offers economic benefit to consumers in both jurisdictions.

2.1.2 Transmission Network Substation Connection Options

The configuration of any interconnector project is influenced by the location of the existing network infrastructure, its ability to accommodate the required connection capacity, any requirement for network reinforcements, and other factors such as environmental constraints. A review of these factors was undertaken for both the Irish and GB Transmission Networks by EirGrid and National Grid Electricity System Operator, respectively.

2.1.3 Irish Transmission Network

A review of suitable points of connection was undertaken in Ireland. Connection locations on the east of Ireland were assessed. Following a network review the most suitable location on the east of the Irish Transmission Network was found to be the Great Island Substation in County Wexford.

2.1.4 GB Transmission Network

The National Grid completed a Connections and Infrastructure Options Note process to assess potential grid connection locations within the GB Transmission Network. Connection locations to the west of the GB Transmission Network were assessed.

The Connections and Infrastructure Options Note process is a defined procedure which is used for all large electricity users and generators seeking connection to the GB electricity network. This process considers both the cost benefit of different connection options and the engineering limitations of the existing network.

Eight substations were initially considered as potential connection points. National Grid Electricity System Operator then completed a Cost Benefit Analysis for the four remaining options (Alverdiscott 400kV, Swansea North 400kV, Pembroke 400kV and Pentir 400kV). Table 2-1 summarises route distances between Ireland and the four options.

Table 2-1 Summary of project distances

	Distance (km)		
Site	**Onshore**	**Offshore**	**Total Distance**
Alverdiscott 400kV	38	222 (direct)	260
Pembroke 400kV	36	159 (known constraints included)	195
Swansea North 400kV	59	207 (direct)	266
Pentir 400kV	49	220 (direct)	269

Note: It was acknowledged that length of direct offshore routes is likely to increase by 10 to 20% as constraints become known and therefore costs would increase accordingly.

After completing the Connections and Infrastructure Options Note and Cost Benefit Analysis, National Grid Electricity System Operator determined the most economical connection point to be Pembroke 400kV substation, requiring only a busbar extension to provide a connection point for Greenlink. National Grid Electricity System Operator also concluded that the site facilitates the connection from other points of view (environmental, consenting etc) and as such is the preferred connection point in Wales.

2.2 *Landfall options*

Following identification of Great Island substation as the connection point, GIL commissioned a number of studies to determine a suitable landfall site. A decision was taken early on to discount a route up the River Barrow estuary directly to Great Island for the following reasons:

- The River Barrow Estuary adjacent to the Great Island substation forms part of the River Barrow and River Nore Special Area of Conservation (SAC), an important fish breeding (spawning) area.
- Although there is a navigation channel through the estuary to the Port of Waterford in which water depths reach 10m, water depths across most of the estuary are typically 5m or less. Constraints in this area include:
    - Navigation channels, dredged channels and designated anchor zones which are avoided where possible when routeing a cable due to the risk posed to the cable from dredging and accidental anchoring.
    - Long stretches of shallow water depths are technically difficult from a cable installation perspective, requiring very slow moving anchored barges. This can lead to increased levels of disruption (e.g. to fishing and commercial shipping), habitat disturbance and higher costs.

Ten potentially suitable landfall locations were identified in County Wexford, which were visited and assessed using a range of environmental, technical and economic criteria. Criteria assessed included vessel access, beach composition, amenity

impact, environmental constraints (e.g. presence of protected sites), exposure, coastal erosion, access to beach, cable engineering and protection requirements, obstructions and existing infrastructure. Shown on Figure 2-1 the ten sites were Rathmoylan Cove, Boyce's Bay, Sandeel Bay, Carnivan Bay, Baginbun Beach, Dollar Bay, Booley Bay, Newtown Beach, Bannow Beach and Cullenstown Beach.

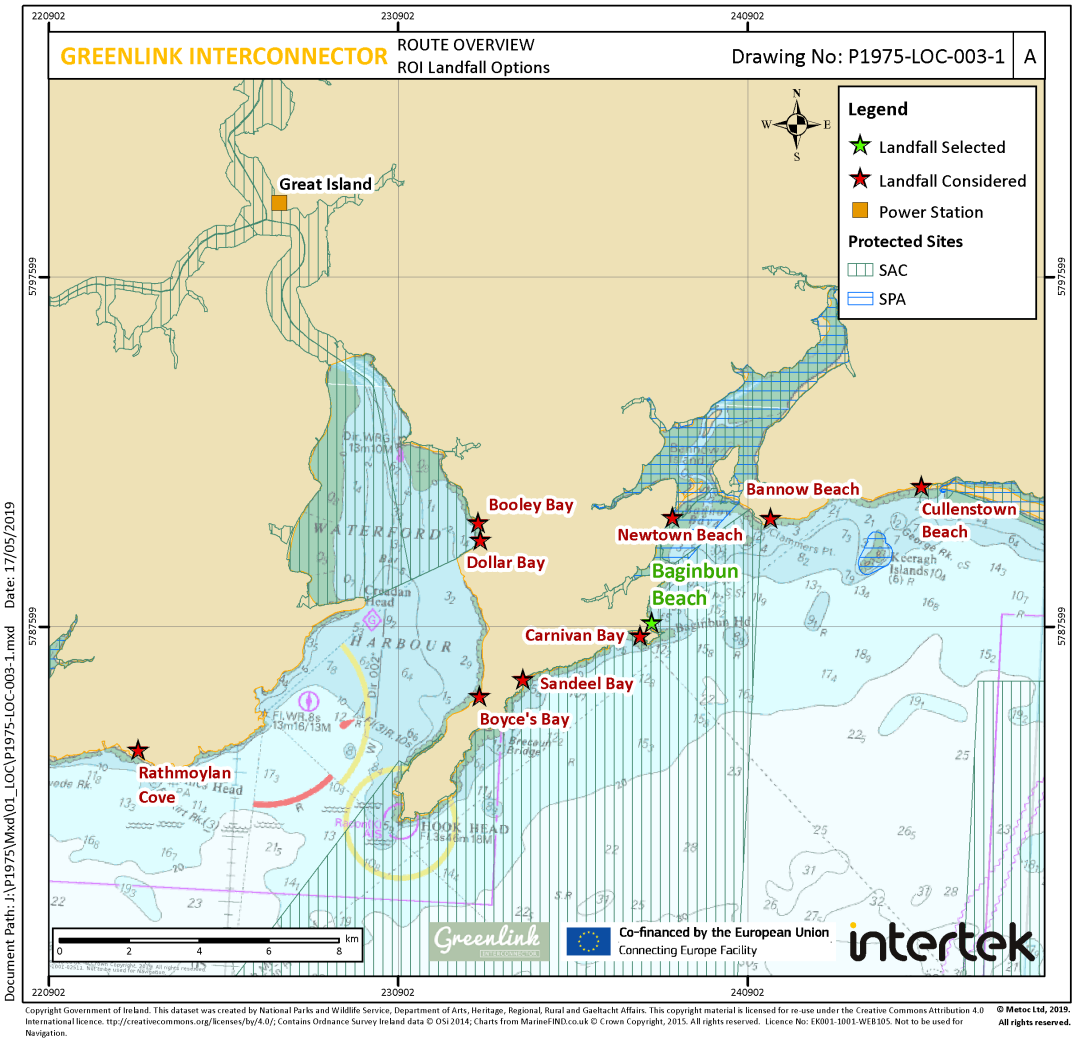
Of the ten potential sites, six were discounted as less preferential on environmental and technical grounds. Four 'preferred' landfall options were recommended for further investigation; Baginbun Beach, Booley Bay, Boyce's Bay and Sandeel Bay.

Booley Bay was discounted due to the level of dredging at Duncannon, putting both the cable and the dredging at risk. Sandeel Bay was discounted due to costs and environmental considerations associated with rocky reef within the Hook Head SAC.

Baginbun Beach was selected as the preferred Irish landfall location as it yielded the shortest overall cable route length and met the requirements the other landfall options fall short on. However selection as the preferred option was dependent on the results of the cable route survey. The survey needed to demonstrate that the submarine cable route could be installed without significantly affecting the integrity of the Hook Head SAC. Boyce's Bay was selected as an alternative option if the cable route survey indicated Baginbun Beach was not a feasible option.

Following the cable route survey, Baginbun Beach was selected as the preferred landfall. For the landfall selection process please refer to the Greenlink Marine EIAR – Technical Appendix L.

Figure 2-1 Landfall options



2.3 *Offshore Route Selection*

Route development has been an iterative process involving cycles of consultation, refinement and survey. The submarine cable route has been designed to avoid or reduce environmental effects while also accommodating other factors.

Three main objectives have driven route development:

- To avoid where possible, or otherwise minimise the distance through which the route crosses reef habitat within the Hook Head SAC (Ireland) and Pembrokeshire Marine / Sir Benfro Forol SAC (Wales);
- To avoid where possible, or otherwise minimise the distance through which the route crosses the Castlemartin Firing Range in Wales; and
- To minimise disruption to shipping associated with Waterford Port (Ireland) and Milford Haven (Wales) and offshore traffic separation schemes.

Initial desk-top studies undertaken in 2015 identified offshore routes between Freshwater West and three short-listed landfalls in Ireland. These routes were refined and developed following consultation with the National Parks & Wildlife Service (NPWS).

Ahead of the cable route surveys, the route options were re-examined in light of new data and consultation undertaken with the Port of Waterford Company. The preferred route (Route A) to Baginbun Beach was selected for survey and a short option (Option D) developed on the nearshore approach to avoid an area of outcropping rock identified on bathymetric survey data obtained from INFOMAR (see Chapter 3, Figure 3-5 Drawing P1975-LOC-007 and Figure 3-6 Drawing P1975-BATH-005).

Minor route development was undertaken during the cable route survey. Mapping of the bedrock on the approach to Baginbun Beach shows that installation of the cable along Route A would likely require external cable protection e.g. rock berm or concrete mattresses, in order to protect the cable. Therefore, Option D was chosen as the preferred route. Although Option D increases the length of the cable, it avoids the sensitive reef habitat.

Extensive route development was carried out in Welsh waters which sought to avoid or reduce the route length across sensitive reef habitat.

3. Description of the Proposed Development

3.1 Submarine cable route description

The submarine cable corridor derived from preliminary cable route engineering, consultation with stakeholders and survey is shown in Figure 3-1 (Drawing P1975-CORR-002). Kilometre points (KPs) have been assigned to the route running from KP0 at MHWS, Freshwater West, Wales to KP159.27 at MHWS, Baginbun Beach. The proposed submarine cable corridor crosses the UK/Republic of Ireland median line at KP73.8 and enters Irish territorial waters at approximately KP123.52.

The Proposed Development is generally 500m wide. The final cable configuration will only need a small part of this width for installation (of the order of 10-20m). It is proposed to finalise the precise position of the submarine cables within the corridor after permits are granted but before installation has commenced. This will allow for optimisation of the final laid submarine cables to minimise engineering and environmental challenges.

Cables will be bundled together as a pair with no separation between the cables apart from a short distance at the HDD exit point.

3.2 Indicative programme

For a scheme of this size to be constructed it is expected to take approximately 36 months from start to finish. The project is envisaged to commence on-site construction in late 2020 and be fully operational in 2023. Table 3-1 presents an indicative programme of marine works for Greenlink.

Table 3-1 Indicative programme for marine works

Activity	Duration (months)	2021				2022			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Landfall preparations – Ireland*	3								
Landfall preparations – Wales*	5								
Pre-lay survey	1								
Route preparation	1								
Cable lay & burial	3								
External cable protection installation	1								

* Sequencing of landfall preparation works may change

GREENLINK INTERCONNECTOR

PROPOSE DEVELOPMENT

ROI Waters

Drawing No: P1975-CORR-002	A

Legend

- Application Area Points
- Greenlink Route Centreline (Indicative)
- Proposed Development
- Irish Offshore
- Wales Marine
- ROI Mean High Water
- ROI 12nm Territorial Sea Limit
- Median Line

N W E S

Id	Latitude WGS1984	Longitude WGS1984	Eastings UTM30N	Northings UTM30
1	51° 54' 32.960" N	6° 38' 24.536" W	249636.44	5757197.42
2	52° 1' 48.220" N	6° 43' 54.361" W	244027.72	5770957.3
3	52° 1' 53.017" N	6° 44' 39.189" W	243181.53	5771149.4
4	52° 3' 39.469" N	6° 46' 45.167" W	240953.32	5774560.92
5	52° 8' 50.021" N	6° 47' 7.332" W	241032.14	5784172.53
6	52° 10' 2.678" N	6° 48' 16.186" W	239841.97	5786484.62
7	52° 10' 22.757" N	6° 48' 22.507" W	239754.53	5787110.95
8	52° 10' 49.568" N	6° 48' 11.146" W	240013.69	5787927.54
9	52° 10' 57.889" N	6° 48' 17.953" W	239897.98	5788191.27
10	52° 11' 2.379" N	6° 48' 34.325" W	239594.5	5788346.25
11	52° 10' 51.304" N	6° 49' 6.304" W	238969.49	5788036.23
12	52° 10' 43.517" N	6° 49' 49.035" W	238145.65	5787838.61
13	52° 10' 35.141" N	6° 49' 48.661" W	238139.07	5787579.58
14	52° 10' 36.575" N	6° 48' 56.009" W	239140.94	5787571.09
15	52° 9' 55.573" N	6° 48' 40.210" W	239374.26	5786289.21
16	52° 8' 37.458" N	6° 47' 29.378" W	240593.04	5783806.5
17	52° 3' 33.747" N	6° 47' 9.716" W	240476.86	5774408.6
18	52° 1' 38.341" N	6° 44' 50.249" W	242947.47	5770707.09
19	52° 1' 34.452" N	6° 44' 8.154" W	243743.12	5770545.69
20	51° 54' 34.090" N	6° 38' 54.129" W	249073	5757260.63

NOTE: Not to be used for Navigation

Date	Tuesday, April 23, 2019 08:39:30
Projection	WGS_1984_UTM_Zone_30N
Spheroid	WGS_1984
Datum	D_WGS_1984
Data Source	DCCAE; OSI; CDA; GEBCO; UKHO; MarineFind
File Reference	J:\P1975\Mxd\03_CORR\ P1975-CORR-002.mxd
Created By	Chris Goode
Reviewed By	Emma Langley
Approved By	Anna Farley

Co-financed by the European Union Connecting Europe Facility

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3.3 Pre-installation works

3.3.1 Survey requirements

Although detailed engineering surveys have been completed for the proposed submarine cable corridor (autumn 2018 – spring 2019), further surveys will be completed prior to the commencement of cable installation. This typically takes place 3-6 months ahead of installation.

The primary objective of these surveys is to confirm that no new obstructions have appeared on the seabed since the detailed engineering surveys, and to complete an unexploded ordnance (UXO) clearance survey. The survey will involve a range of standard geophysical survey techniques such as multi-beam echosounder (MBES), side scan sonar (SSS), sub-bottom profiler (SBP) and magnetometer.

3.3.2 Route preparation

Prior to the start of marine cable installation, it is essential to ensure the proposed centreline is clear of obstructions that may hinder the installation works. A pre-lay grapnel (a wire with a string of specially designed hooks) will be towed along the entire route to remove any debris.

3.3.3 Route preparation at subsea cable crossing

Greenlink crosses one out-of-service telecommunications cable, the Celtic telecommunications cable, within the Proposed Development at KP139. GIL is in discussion with the cable owners to cut the cable.

The Irish Offshore component of Greenlink crosses a further four in-service telecommunications cables. The Greenlink cables will cross the telecommunications cables on a 'bridge' comprised of either aggregate (rock) or concrete mattresses. This first layer of protective material will be positioned during route preparation. Construction of the remainder of the crossing will occur once the cables are laid, and will consist of a graded rock berm approximately 120m in length, up to 1.2m high, covering an area of 1009m^2.

3.3.4 UXO clearance

During route design a UXO desk top study was prepared (1st Line Defence 2018), which describes the risk of encountering UXO's along the cable route. The Proposed Development crosses areas of the Celtic Sea where historically sea mines have been used.

The primary objective will be to avoid encountered potential UXO by micro-routeing within the permitted corridor. If re-routeing around a particular potential UXO appears not to be possible, and visual inspection confirms a UXO, then if it is safe to do so the UXO will be removed. As a last resort demolition measures will be undertaken in accordance with Best Practice.

While the requirement for UXO detonation is not expected, for the purposes of this assessment it is assumed that one UXO denotation will be required.

3.4 Cable installation

The cable lay operation will be performed on a 24-hour basis. It will be undertaken by a cable lay vessel (CLV); a specialist ship designed specifically to carry and handle long lengths of heavy power cables. Other vessels, such as a jack-up barge or a cable lay barge and small work boats may be used to support the CLV particularly in the nearshore area where water depths are shallow.

Two cable installation techniques are being considered for the Proposed Development:

- Simultaneous lay and burial – in this operation the CLV may tow the burial equipment or it is deployed by another vessel navigating close behind, creating effectively a single large spread. The cables are fed into the burial equipment directly from above and the cables are buried as the spread progresses along the route.
- Post-lay burial – in this operation the CLV lays the cables on the seabed first. A post-lay burial vessel follows to bury the cables. The post-lay burial vessel may be some physical distance, or indeed some days, behind the lay vessel, so there are two discrete operations separated physically and in time.

Guard vessels may be deployed in areas where the cables are exposed on the seabed prior to burial or external protection being applied.

Due to the length of the route, it may be necessary to install the cables in two sections. A cable joint will be made on board the cable lay vessel, at which point the vessel is likely to remain in position for up to a week.

3.5 Cable burial and protection

The seabed varies along the cable route from sands and gravelly sand/ sandy gravel with local areas of gravel and silt. Bedrock is found outcropping and sub-cropping close to the Co. Wexford coastline. The choice of burial technique or protection method will depend upon the seabed conditions in each section. The preference is burial in the seabed as this provides the best protection. External cable protection will be required at the telecommunication cable crossings.

There are three generic types of equipment for installation cables into the seabed:

- Jetting machines – use water jets to fluidise the seabed and allow the cable to sink into the seabed.
- Cable ploughs - like ploughs used in farming, a narrow blade (the plough ‘share’) is pulled through the seabed to create a furrow.
- Cutting - a trench is cut using a wheel or a driven chain cutter to break and move rock and hard sediments.

A typical trench is up to 1m wide. The overall footprint of the installation machinery is approximately 15m. Whilst jetting is considered to have the least effect on the environment because the footprint of the tool is smaller than other installation tools such as ploughs, the use of jetting tools does result in higher suspended sediment concentrations. However, in a review of seabed disturbance from various activities it was observed that disturbance resulting from jetting was largely restricted to fines(e.g. clay and silt particles) and remained low in comparison with dredging and some fishing techniques (BERR 2008).

The recommended target burial depths along the cable length were determined in a detailed Cable Burial study completed in 2019 (Intertek EWCS 2019) using the Carbon Trust cable burial risk assessment (CBRA) methodology. This concluded the target burial depth is 1.0m for all areas of loose sediment (sands / gravels) and 0.6m for areas of glacial till. A preliminary assessment of cable installation methods is presented in Table 3-2.

Table 3-2 Potential installation method

Cable Protection Option	Length (km)	
	Proposed Development	Irish Offshore
Burial in sediment (jetting or ploughing)	35.63	49.24
External cable protection only	0.02	0.48
Potential burial in rock or external cable protection	0.00	0.00
Total	**35.65**	**49.72**

3.6 *Landfall installation*

The landfall is where the marine cables come ashore. In Ireland it is Baginbun Beach, County Wexford.

The shore crossing will be accomplished by horizontal directional drilling (HDD) which will exit seaward of the low water mark. The cable ducts will pass approximately 10m below the beach. There will be no works on the beach at Baginbun Beach between MHWS and mean low water.

HDD is a surface-launched process for boring a hole, under any sensitive features, to a point a suitable distance in the nearshore. A pipe is inserted into the drilled hole which is used as a duct into which the cables are installed.

The land cables will connect with the marine cables in transition joint pits. These will be dug above MHWS (away from the beach) within the area defined as the temporary HDD compound in Figure 3-2. Three ducts will be drilled at each landfall; two for use, and one as a spare. The fibre optic cable will be installed in a duct with one of the power cables.

The ducts will fan out of the TJP to achieve exit points for the marine cables in the nearshore, with a separation distance of approximately 10m. From the exit point the cables will then merge back together, usually within 100m to form the bundle. The cables and duct exits will be buried into the sediment.

Preliminary design of the HDD has been undertaken, but the final design will be completed by the Installation Contractor. Based on the geological conditions at Baginbun Beach, the HDD is likely to exit within the orange hatched area presented in Figure 3-2 (Drawing P1975-INST-002).

The HDD will be engineered to exit into a deep sediment unit where post-lay burial of the cables and the ducts can be achieved. Review of the geophysical data suggests that burial in sediment is achievable past the 9m water depth contour. There is a risk that due to the underlying geology, the HDD could exit at an angle which would mean that a small area of external cable protection could be required at the end of each active duct to protect the cable as it transitions from the duct to the seabed.

The installation sequence for each of the submarine cables and the fibre optic cable is likely to be similar, and will be defined by the Installation Contractor. An indicative methodology is provided below:

- The end of the duct accepting the cable will be dug out using an excavator positioned on a jack-up barge or anchored barge.
- Material excavated will be left adjacent to the pit and refilled after the cable pull-in. The submarine cable would be floated to the exit point of the duct. Small work boats and divers would support this activity.
- The submarine cable would then be connected to the messenger wire pre-installed in the duct and winched from a position close to the TJP through the duct; whereupon it can be jointed to the onshore cables.
- The cable is then installed away from the beach either using a plough or trencher (as per the offshore installation section above).

Figure 3-2 Indicative location of HDD compound – Baginbun Beach, County Wexford

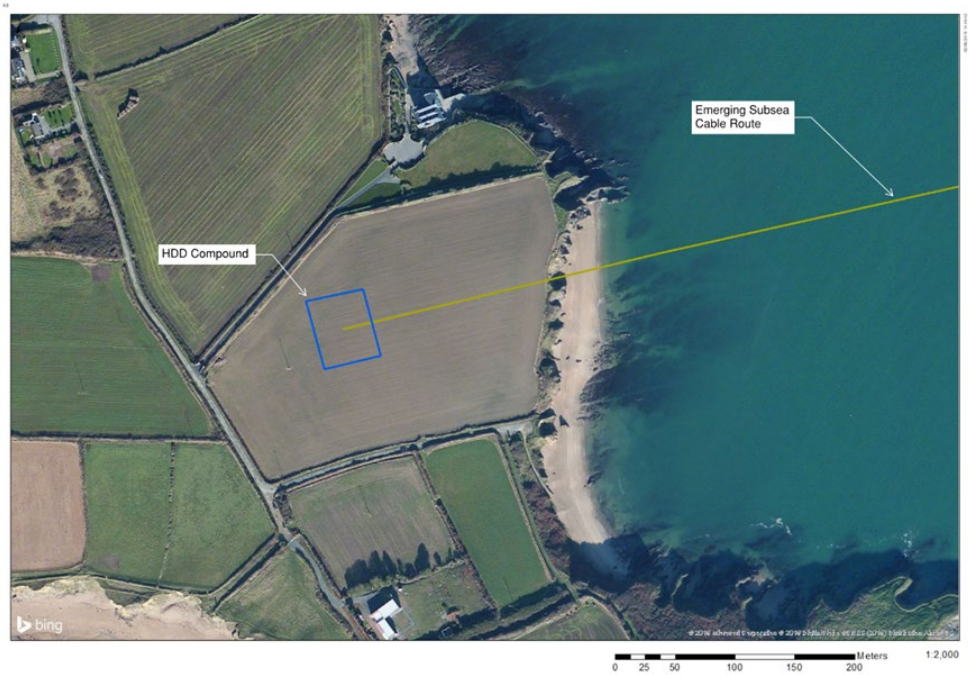
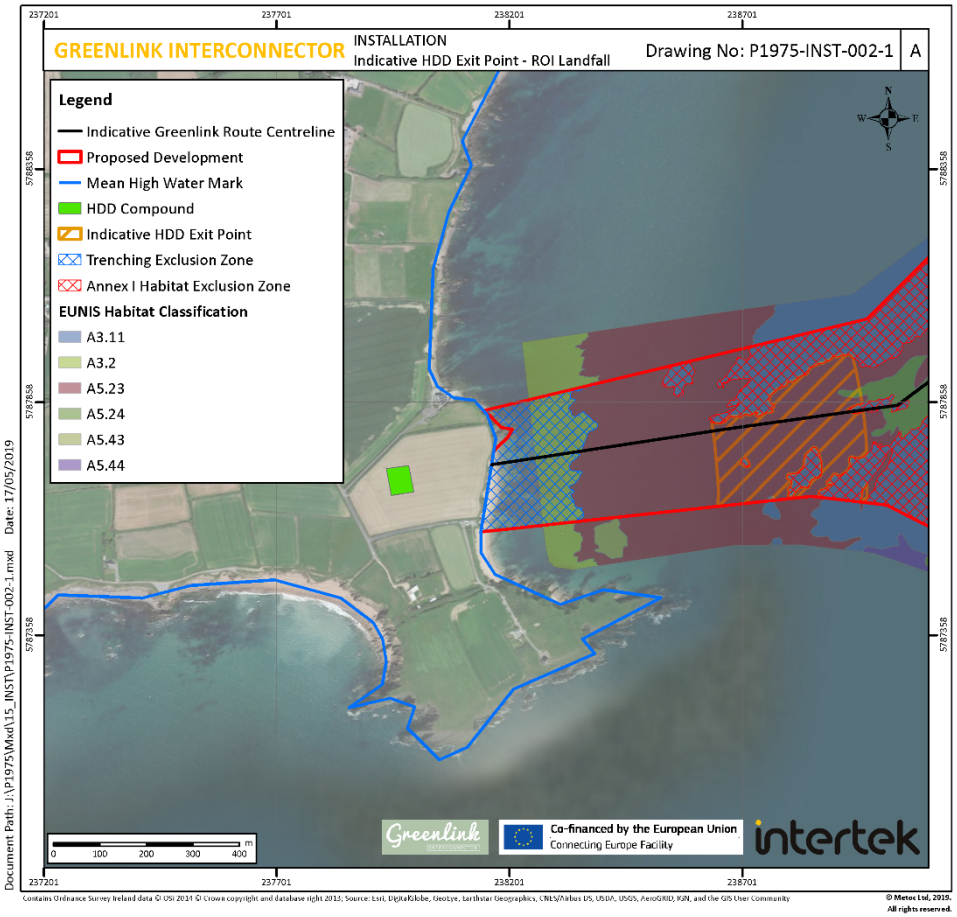


Figure 3-3 Indicative HDD exit point (Drawing P1975-INST-002-1)



3.6.2 Campile Estuary

The onshore cable route between Baginbun Beach and Great Island crosses the Campile River. It is proposed to use HDD under the Campile Estuary to make the crossing. The depth of the ducts will be greater than 10m below the river bed. Compounds either side of estuary will be setback above MHWS, within areas of improved agricultural grassland primarily used as pasture.

Figure 3-4 (overleaf) shows the location of the HDD compounds in relation to the Campile Estuary. The 'Campile Estuary' component of Greenlink encompasses the area of foreshore between MHWS on either side of the river.

3.7 Cable operation

3.7.1 Emissions

During operation of the cables emissions to the environment will consist of magnetic (B) and induced electric (iE) fields and heat. The influence of Greenlink on the background geomagnetic field along the cable route has been calculated to be low with B and iE fields dissipating to natural background levels within 2m of the bundled cables and 12m from the unbundled cables at the HDD exit points i.e. prior to them being bundled together.

Temperature increases in the upper sediments of the seabed over buried cables are not expected to emanate further than 1m from the cable and exceed 2°C.

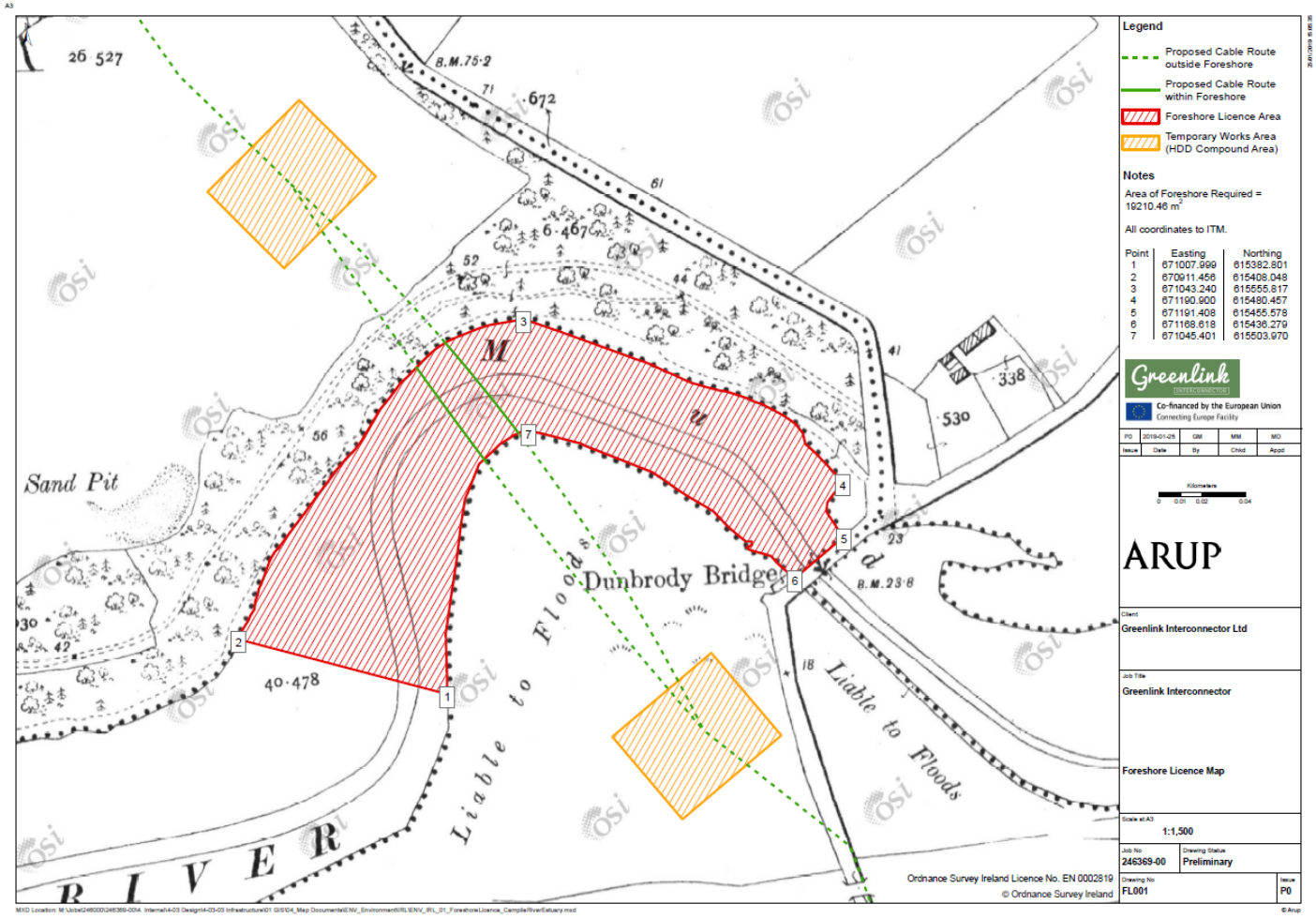
3.7.2 Maintenance and repair

It is likely that routine inspection surveys using standard geophysical survey equipment and/or remotely operated vehicles to monitor buried depth and integrity of rock berms will be undertaken, particularly in the initial years of operation, and should the local environmental conditions change or be suspected as having changed.

Once installed, marine cables are not expected to require routine maintenance. If a cable fault is detected, usually as a consequence of damage cause by external interaction e.g. trawlers and commercial ship anchors, the relevant section of the cable will be located and retrieved to surface for inspection and replacement. It may be necessary to unbury the cable prior to cable recovery. A repair will typically be carried out by either one or two vessels.

The extra length of a repaired short cable section means it cannot be returned to its exact previous alignment on the seabed. The excess cable will be laid on the seabed in a loop off to one side of the original route. The additional joints and the extra cable length will be buried, typically using jetting machines deployed from either the repair vessel itself or a separate specialised vessel.

Figure 3-4 Campile Estuary crossing



3.8 Decommissioning

GIL recognise the importance of considering the decommissioning process at an early stage and should decommissioning be undertaken the operation will be conducted according to the standard industry protocol at the agreed time.

At the end of the cable's life the options for decommissioning will be evaluated.

The objectives during the decommissioning process will be to minimise both the short and long term effects on the environment whilst making the sea safe for others to navigate. Based on current regulations and available technology, the following level of decommissioning is proposed and has been assessed:

- Cables - to be either removed or to be left safely in-situ, buried to below the natural seabed level
- Mattresses - to be left in-situ
- External cable protection - to be left in-situ

3.9 Embedded Mitigation

Greenlink has been developed through an iterative process that sought to avoid or reduce potential environmental effects. Steps taken to reduce environmental disturbance include:

- Sensitive environmental features were identified through a desk-based assessment that used publicly available datasets e.g. INFOMAR bathymetry, NPWS habitat maps.
- An additional route option D was surveyed that sought to avoid crossing an area of reef habitat by following a possible sand channel.
- Geophysical survey was widened in selected places to investigate the extent of potential reef habitat and sand wave features to see if they could be avoided.

In addition, to the route engineering that has taken place, the project will comply with international and national statute which is designed to avoid or abate negative environmental effects.

Embedded mitigation which forms part of the design of Greenlink is outlined in Chapter 4 of the Greenlink Marine EIAR.

4. Approach to the Assessment

4.1 Environmental Impact Assessment

EIA is a process that identifies the likely significant effects of a project and suggests ways that those effects that are classed as Significant can be avoided, reduced or managed. EIA is a requirement under Irish law for certain types of projects that are likely to cause significant effects.

The current requirements for EIA for projects offshore in Ireland are set out in the Environmental Impact Assessment (EIA) Directive 2014/52/EU (amending Directives 2011/92/EU and 85/337/EEC) on the assessment of the impacts of certain private and public projects on the environment (EIA Directive).

The proposed interconnector does not constitute a "project" listed within either Annex I or Annex II to the EIA Directive. Accordingly, an EIA is not required in relation to the proposed interconnector.

GIL has been advised that the project categories listed in the EIA Directive must be understood by reference to a wide scope and broad purpose. GIL is therefore following the EIA process for all project components. An Environmental Impact Assessment Report / Environmental Statement will be submitted with all relevant applications for consent.

Under the EIA Directive, there are three stages to the EIA process: screening, scoping and assessment. Whilst the scoping stage is not mandatory, it is strongly encouraged as Best Practice. In line with the EIA Directive, GIL undertook scoping to assist in identifying the key environmental pressures surrounding the Proposed Development. The responses received from statutory and non-statutory stakeholders has helped to provide direction on the topics the EIAR should focus on.

The impact assessment takes into account guidance published by the Environmental Protection Agency (EPA), the European Commission, the Department of Housing, Planning and Local Government, The National Parks & Wildlife Service, the Institute of Environmental Management and Assessment, and the Chartered Institute of Ecology and Environmental Management.

The significance of effects has been assessed using classifications described in the EPA guidance. The significance of the effects range from 'Imperceptible' through 'Not Significant', 'Slight', 'Moderate', 'Significant' to 'Very Significant / Profound'. Effects were regarded as Not Significant if they fell into the categories imperceptible, not significant or slight; and Significant if they fell into the categories moderate, significant or very significant/profound. The description of the impact assessment methodology adopted for the Proposed Development is set out in Chapter 5 of the EIAR.

A number of specialist studies and surveys have been carried out to inform the EIA. The data collected throughout these assessments and surveys have been used to

define the baseline conditions against which effects have been measured and predicted, in turn helping to define the Project Specific Mitigation required.

The assessment of significance is undertaken prior to any Project Specific Mitigation. Project Specific Mitigation will generally only be proposed if effects are Significant. Project Specific Mitigation are measures to be adopted and implemented during construction and operation that are over and above legal compliance. Appropriate, feasible and cost-effective mitigation measures have been proposed as necessary in each topic Chapter. All Project Specific Mitigation commitments made in the EIAR are additionally listed in a Schedule of Mitigation provided as Chapter 17 of the EIAR.

The significance assessment is repeated taking into consideration the application of Project Specific Mitigation, to determine whether there is likely to be a significant residual effect.

The information contained within the EIAR is divided into individual topic Chapters that cover the physical, biological and human environment. Chapters follow a common structure (shown below).

1. Topic Chapter	1.1 Data Sources
	1.2 Consultation
	1.3 Existing Baseline
	1.4 Potential Pressure Identification and Zone of Influence
	1.5 Embedded Mitigation
	1.6 Significant Assessment
	1.7 Project Specific Mitigation
	1.8 Residual Effect

4.2 *Natura Impact Statement*

Certain habitats and species of European importance are protected under the EU Habitats Directive (92/43/EEC) and Birds Directives (2009/147/EC), creating a network or protected areas referred to as Natura 2000 sites. A key requirement of the Habitats Directive is that the effects of any plan or project, alone, or in combination with other plans or projects, on the Natura 2000 site network, should be assessed before any decision is made to allow that plan or project to proceed. This process is known as the Appropriate Assessment (AA) process.

The AA process consists of four sequential steps. Each step in the assessment process precedes and provides a basis for other steps. The results at each step must be documented so there is transparency of the decisions made. The Proposed Development crosses one Natura 2000 site; Hook Head SAC. The Proposed Development is not directly connected with or necessary to the management of the SAC. Therefore it is necessary that the Proposed Development should be subject to the AA process.

Stage 1 Screening and Stage 2 Natura Impact Statement has been submitted alongside the EIAR in the Greenlink Marine Natura Impact Statement. This concludes that the Proposed Development and Campile Estuary will not have an adverse effect on the integrity of a Natura 2000 site either alone or in combination with other plans or projects.

4.3 Consultation

Early consultation is a critical first step in the development of a comprehensive and balanced EIA. GIL started discussions in 2016 with the Foreshore Unit, National Parks & Wildlife Service and Port of Waterford Company. Meetings have helped to inform route development, discuss potential areas of conflict and inform environmental assessment. Wider consultation with other stakeholders and the public commenced in 2018. Consultation remains an ongoing process to ensure that consultee comments and recommendations are appropriately captured. A summary of the received responses up to submission of the Foreshore Licence application (June 2019) and how they have been taken into account in finalising the EIAR is presented at the start of each relevant topic chapter.

As a proponent of a PCI project, GIL is also required to conduct public and stakeholder consultation meetings through a variety of means set out in Annex IV(5) of the PCI Regulation. Wider public participation was achieved through:

- Regular updates to the Project website (www.greenlink.ie);
- Public consultation meetings;
- Newspaper notices published in both local and national newspapers; and
- Provision of public information brochure (TEN-E Regulation Information Brochure) – published before the start of formal public consultation and updated throughout the development process.

5. Summary of Environmental Effects

5.1 Physical Conditions and Marine Processes

Existing baseline: The seabed is generally characterised by flat or a gradually varying seabed with very gentle to gentle slopes. The water depth slowly increases from the landfall to a bathymetric trough in the St George's Channel, just before the Ireland/UK median line. The maximum depth along the route is 116m.

Seabed sediments within the Proposed Development consists mainly of gravelly sand to sandy gravel. Mega ripples and rippled sand are present. Within the Hook Head SAC, abundant outcropping bedrock is present on either side of the Proposed Development, with the proposed route following a sediment channel through the middle. The Irish Offshore route passes through consistent sand and sandy gravels. Mega ripple areas are present throughout, commonly associated with gravel sediments. A few sand wave crests are present. Sampling confirmed sediments are not contaminated.

Baginbun Beach is a concentric beach orientated north to south. A thin veneer of sand (coarse sediment) approximately 1m deep lies on consolidated material and bedrock. The cove is sheltered by Baginbun headland, to the south, and a 300m fringing rock reef. Low cliffs form the back of the beach.

EIA conclusion: The potential pressures considered by the assessment included penetration and disturbance including abrasion; changes in suspended solids (water clarity); water flow (tidal current) changes; and physical change (to another seabed type). The EIA process concluded that there is the potential for **significant effects** if trenching is undertaken across the bedrock reef identified within the Proposed Development. All other effects were assessed as not significant.

Project Specific Mitigation proposed: Due to the potential for significant effects on bedrock reef, Project Specific Mitigation in the form of exclusion zones have been established around the habitat within the Proposed Development. No intrusive works will be carried out on Baginbun Beach as this would involve crossing the fringing reef. GIL will ensure that the Installation Contractor adheres to these exclusions by ensuring the HDD exit point and final cable trench avoids the bedrock.

Residual effect: The EIA concluded implementation of the Project Specific Mitigation will remove the pressure-receptor pathways for significant effects to bedrock reef resulting in No effect.

5.2 Intertidal, Benthic and Estuarine Ecology

Existing baseline: The intertidal zone at Baginbun Beach contains a complex mosaic of rock platforms and sand filled gullies supporting a variety of biotopes, which are dominated by fucoids (brown algae), kelp, aggregations of honeycomb worms and barnacles.

A total of 12 subtidal habitats were identified by the benthic survey. The Proposed Development crosses the Hook Head SAC for approximately 8km. Two habitats of conservation importance were identified, large shallow inlets and bays; and reef (sub-type bedrock reef). None of the invertebrate species listed as Qualifying Interests for the Hook Head SAC were identified in the grab samples. Areas of Laminaria sp. was identified on outcropping bedrock within the Irish Offshore.

The section of the Campile River that the onshore cables cross is part of the River Barrow and River Nore SAC. The Campile River at Dunbrody Bridge is tidal, with regular fluctuations in salinity and turbidity, and in the rate and direction of water flow. The shoreline habitat is classified as upper salt marsh habitat that has developed along the Campile River Channel.

EIA conclusion: The potential pressures considered by the assessment included penetration and disturbance including abrasion; siltation rate changes; physical change (to another seabed type); and electromagnetic field effects. The EIA concluded that there will be **No effect** on estuarine habitats. There is the potential for a **significant effect** if trenching is undertaken on Bedrock Reef habitat. All other effects were assessed as not significant, including the deposit of external cable protection at the HDD exit points.

Project Specific Mitigation Proposed: The Proposed Development has been optimised to avoid the majority of the Bedrock Reef habitat, by following a sediment channel. Exclusion zones have been established around the bedrock reef habitat within the Proposed Development. No intrusive works will be carried out on Baginbun Beach as this would involve crossing the fringing reef. GIL will ensure that the Installation Contractor adheres to these exclusions by ensuring the HDD exit points and final cable trench avoids the Reef habitat.

As Best Practice, Project Specific Mitigation has been proposed to either remove the need for external cable protection, or reduce the footprint at the HDD exits. If external cable protection is used, monitoring has been recommended to validate the EIA conclusions and support decision making for future applications.

Residual effect: The EIA concluded implementation of the Project Specific Mitigation will remove the pressure-receptor pathways for significant effects to Bedrock Reef habitat resulting in No effect.

5.3 *Fish & Shellfish*

Existing baseline: The Proposed Development crosses or is close to the spawning grounds (the location where eggs are laid) for seven commercially important fish species. The waters of the area also act as a nursery for ten commercially important fish species. Of the demersal species present in the area, sandeel and herring are known to be particularly sensitive to seabed disturbance. This is because they lay their eggs on the sediment and live within close contact with the sediments. A sandeel and herring habitat assessment has been conducted to support the EIA process. It concluded that the Proposed Development crosses the Dunmore East

herring spawning ground and that the Irish Offshore component of Greenlink close to the Ireland/UK median line interacts with 1.75km^2 of potential sandeel habitat.

The EC Habitats Directive Annex II listed species Sea lamprey, River lamprey, Twaite shad and Atlantic salmon are likely to be present within the Proposed Development as they are Qualifying Interests of the River Barrow and River Nore SAC.

EIA conclusion: The potential pressures considered by the assessment included penetration and disturbance including abrasion; physical change (to another seabed type); underwater noise changes; and electromagnetic changes. The EIA concluded that of the species present herring (including allis and twaite shad which are members of the same family) are likely to be marginally more sensitive and, activities which disturb the seabed could have **significant effects** on herring. All other effects were assessed as **not significant.**

While the mitigation proposed will not reduce the residual effects of habitat loss and change on bottom-dwelling species, it will however prevent the effects associated with penetration or disturbance and physical change to the seabed during the most critical time of the herring lifecycle (October to January).

Project Specific Mitigation proposed: Seasonal restrictions will be implemented to ensure that intrusive works during the peak herring spawning period (October to January) is avoided.

Residual effect: Implementation of the project specific mitigation will reduce the significance of effects on herring to **not significant** as herring eggs and larvae will not be present on the seabed outside of this time and no pressure-receptor pathway will exist.

5.4 Birds

Existing baseline: During winter bid counts, eighteen species were countedat Campile Estuary and eleven species at Baginbun Beach. This included four species listed on Annex I of the EC Birds Directive at Campile Estuary (Little Egret, Kingfisher, Red-throated Diver and Dunlin) and three species at Baginbun Beach (Great Northern Diver, Merlin (overflying) and Red-throated Diver). There are four Special Protection Areas (SPAs) within 10km of the Proposed Development supporting a range of seabirds, wetland and waterbirds (including waders and wildfowl).

EIA conclusion: The pressure visual disturbance i.e. from the presence of vessels, was considered by the assessment. The EIA concluded that the significance of effects on all birds is **not significant.**

Project Specific Mitigation proposed: The EIA concluded the Proposed Development and Campile Estuary will not have any significant effect on birds. Project Specific Mitigation has been proposed in the Irish Onshore EIAR to further reduce the significance of effects from the HDD drilling at Campile estuary. This has been included in the Irish Marine EIAR and will ensure that onshore works are scheduled to reduce the sensitivity of estuarine and intertidal birds.

Residual effect: Residual effects have been assessed as **not significant**.

5.5 Marine Mammals and Reptiles

Existing baseline: Harbour porpoise and short-beaked common dolphin are the most abundant and commonly sighted species in the Proposed Development, with seven other species also observed. All cetaceans are European Protected Species.

Grey seal use the area around the Saltee Islands for breeding, moulting, foraging and resting and have been observed in the waters of the Proposed Development. Harbour seal are Qualifying Interests of the River Slaney Valley SAC and although may use the Proposed Development for foraging are infrequent visitors. Otter, a Qualifying Interest of the River Barrow and River Nore SAC and are known to use the Campile Estuary and Baginbun Beach. Rare sightings of leatherback turtles have been recorded in coastal waters.

EIA conclusion: The potential pressures considered by the assessment included underwater noise changes; and electromagnetic changes. The EIA concluded that the generation of underwater noise from continuous sources such as geophysical survey, and cable installation / repair will have effects assessed as **not significant** on marine mammals. There is the potential that detonation of a UXO may be required, and if this occurs the detonation could cause brief, but extensive disturbance to marine mammals and may cause injury. The EIA concluded that this would be a **significant effect**.

Project Specific Mitigation proposed: The most effective mitigation is to avoid the need for detonation completely. Mitigation embedded into the design of the project seeks to do this by establishing a decision making strategy in which UXO detonation is the last option. If detonation is required as best practice GIL will require Contractors to follow the Department of Arts Heritage and the Gaeltacht (DAHG) 'Guidance to Manage the Risk to Marine Mammals from Man-made sound sources in Irish Waters'. However, to further reduce the significance of effect, GIL has selected a range of Project Specific Mitigation. In addition to following the DAHG Guidance, passive acoustic monitoring (PAM) will be used during periods of darkness and poor visibility (e.g. fog and increased sea states) to support the marine mammal observer watches. Acoustic deterrent devices will also be used and smaller charges will be deployed in a soft start procedure to encourage animals to flee the area.

Residual effect: The measures proposed are in line Industry Best Practice for UXO detonation and implementation will reduce the significance of the effect to **not significant**.

5.6 Protected Sites

The Proposed Development has been subject to the AA process as it crosses the Hook Head SAC (Site Code: IE0000764) and the Campile Estuary HDD crosses the River Barrow and River Nore SAC (Site Code: IE0002162).

A detailed Stage 1 screening assessment has been conducted on the Proposed Development and Campile Estuary which concluded that significant effects are likely or uncertain on the Qualifying Interests and conservation objectives of three sites:

- Hook Head SAC (site code: IE0000764)
- Saltee Islands SAC (site code: IE0000707)
- Slaney River Valley SAC (side code: IE0000781)

The assessment concluded that there was **no potential for cumulative effects** with other plans or projects.

Further to screening, a Stage 2 Natura Impact Statement has been provided, which concludes:

- Effects on the Hook Head SAC Qualifying Interests Reef and Shallow Inlets and Bays from cable installation and external cable protection during installation and repair and maintenance will not adversely affect the long-term achievement of conservation objectives. The Proposed Development **will not affect the integrity of the SAC**, either alone or in combination with other plans or projects.
- Significant effects on the Saltee Islands SAC and Slaney River SAC Qualifying Interest grey seal and harbour seal, from the detonation of UXO (if required) can be reduced to levels whereby the conservation objectives of the SACs are not adversely effected, by the implementation of Industry Best Practice mitigation i.e. the use of acoustic deterrent devices, soft-start and passive acoustic monitoring. The Proposed Development **will not affect the integrity of the SACs**, either alone or in combination with other plans or projects.

The Greenlink Marine NIS has been submitted alongside the Greenlink Marine EIAR - Ireland.

5.7 *Commercial Fisheries*

Existing baseline: There is a wide spatial distribution of commercial fishing in the Irish and Celtic Sea, with demersal and shellfish species being the most important in terms of landings by weight and value. The most important demersal target species include; cod, haddock, ling, monkfish, plaice, ray, skate and sole. Key shellfish species include; lobster, *Nephrops*, crabs, scallops, razor clams and whelks. Scallop dredging is a key fishing activity in the waters surrounding the Wexford coastline. Shrimp is another key target species for many vessels, including those landing into Dunmore East and Kilmore Quay. Pelagic fish landings are mainly of herring and mackerel, and of relatively less economic importance compared to demersal and shellfish species. The herring fishery located in the bay between Hook Head and the Saltee Islands is particularly important during late summer/autumn.

EIA conclusion: The potential pressures considered by the assessment included temporary displacement of fishing activity; temporary habitat disturbance affecting commercial stocks; permanent habitat loss affecting commercial stocks; changes in suspended sediments (water clarity); snagging; change in water depth; and

electromagnetic changes. The effects of these pressures were generally assessed as **not significant** due to the embedded mitigation incorporated into the project design e.g. fisheries liaison, notices to mariners, use of guard vessels. The exception was if external cable protection is used within the Dunmore East spawning grounds during a cable repair event. In the unlikely event that burial in sediment is not achievable there is the potential for a **significant effect**.

Project Specific Mitigation proposed: Seasonal restrictions will be implemented within the Dunmore East spawning ground to ensure that the deposition of external cable protection, if required during cable repair, will not disturb herring eggs or larvae. In addition project specific mitigation will be implemented over the life-time of Greenlink to ensure the risks to commercial fisheries are managed effectively. Operational phase asset management surveys will be reviewed and any areas of cable exposure/reduced depth of burial communicated to the fishing industry via Notice to Mariners.

Residual effects: It was noted that residual effects remain for example from permanent loss of habitat in herring spawning grounds, temporary displacement of fishing activity, and the risk of snagging the cables. However, residual effects were assessed as **not significant.**

5.8 *Shipping and Navigation*

Existing baseline: A Navigation Risk Assessment has been undertaken for the Proposed Development and is presented in Chapter 13. There are a number of navigation features near the Proposed Development associated with harbour, anchoring areas, disposal grounds, existing subsea cables, navigation lines and traffic separation zones, all of which are charted to aid navigation. The area with the highest shipping traffic intensity is associated with the entrance to the Waterford Estuary and Harbour; the Proposed Development runs parallel approximately 10km distance from this area. The Tuskar Rock traffic separation scheme (TSS) lies to the north of the Irish Offshore components of Greenlink. Greenlink crosses perpendicular to the traffic lanes associated with this TSS.

EIA conclusion: The potential pressures considered by the assessment included displacement of vessels; change in water depth; and electromagnetic changes effecting navigation systems. Water depths at the HDD exit points are sufficient that only a slight electromagnetic change will be experienced at the sea surface. This will have a localised and imperceptible effect on magnetic compasses. The EIA concluded the effect n from electromagnetic changes will be **not significant**. All other effects were assessed as slight which is **not significant.**

Project Specific Mitigation proposed: No project specific mitigation is proposed.

Residual effect: No significant residual effects.

5.9 Offshore Infrastructure and Other Marine Users

Existing baseline: Baginbun Beach is a popular public beach. It was highlighted during public consultations that commemorations will be held at Baginbun Beach in 2020 to mark the 350th anniversary of the Anglo-Norman landings. Commemorations are likely to occur during the first bank holiday weekend in May 2020.

The Proposed Development lies within an area of the Celtic Sea where there is limited offshore infrastructure. There are no proposed or existing marine aggregate extraction areas, offshore wave energy sites, offshore tidal energy sites or windfarms within 40km of the Proposed Development. The closest active oil and gas licence (Dunmore) is approximately 20km south. The Naval Service carry out annual fleet exercises which in the past have included operations throughout the St George's Channel and Celtic Sea. SSE Renewables (Ireland) Ltd has applied for a Foreshore Licence to conduct marine survey to support the development of an offshore windfarm (Celtic Sea Array) in the region. Part of the survey area will overlap with the Proposed Development.

EIA conclusion: The potential pressures considered by the assessment included: visual disturbance to beach users; restricted access on the beach; and restricted development options. Access to the beach will not be restricted but the EIA concluded that the presence of project vessels in the nearshore could have a **significant effect** on recreational beach users. This recognises that sensitivity will be dependent on timings of the works. For example, if it coincides with the peak tourist season or Anglo-Norman commemoration event. There is the potential that the Proposed Development could restrict development options for offshore wind but the effect was assessed as **not significant.**

Project Specific Mitigation proposed: No intrusive works will be undertaken on on Baginbun Beach. In addition, all works in the nearshore will be avoided between July and August (inclusive). GIL will liaise with the local council and councillors with regards the Anglo-Norman commemoration event to confirm location and viewing points. Efforts will be made to reduce presence of vessels within the nearshore area during the selected weekend.

Residual effects: The implementation of the Project Specific Mitigation will reduce also residual effects to **not significant**.

5.10 Marine Archaeology

Existing baseline: Analysis of the marine geophysical datasets identified 64 anomalies with archaeological potential. Of the 64 anomalies identified, none were identified as wreck sites or as having high archaeological potential. A review of the sub-bottom seismic survey data has identified 11 areas where features of archaeological potential are present. All anomalies have been mapped and will be avoided.

EIA conclusion: The assessment considered both direct disturbance to archaeological assets and indirect disturbance e.g. as a consequence of changes to marine processes.

It concluded that all effects will be **not significant**. This conclusion took into consideration embedded mitigation which includes implementing a protocol for reporting unexpected archaeological finds and a scheme-specific Underwater Archaeology Impact Assessment.

Project Specific Mitigation proposed: Archaeological exclusion zones will be implemented around the geophysical anomalies identified.

Residual effect: **No residual effect**.

6. Cumulative Effects Assessment (CEA)

6.1 Methodology

The CEA undertaken for the Proposed Development was based on the UK Marine Management Organisations Strategic Framework for Scoping Cumulative Effects (MMO 2014). It used a pressure – receptor approach to screen other projects and plans. Given the short-term and localised nature of the Proposed Development, most effects will be restricted to a zone within 10km either side of the cable corridor; therefore in line with similar interconnector projects, a search area of 10km was selected.

Known types of projects and plans considered by the CEA include:

- Renewable energy projects i.e. wave power, offshore wind farms;
- Sites for marine aggregate dredging and disposal;
- Cables and pipelines;
- Oil and gas exploration and development;
- Carbon Capture and Storage; and
- Military Practice Areas.

Commercial fisheries, shipping and recreational beach use were scoped out of the CEA as they are considered baseline conditions in the area.

14 projects and plans were identified within the search area that fell under the categories, disposal sites; cables; oil and gas; aquaculture; scientific survey; and offshore wind.

Following consideration of the spatial and temporal overlaps, it was identified that there was a common pressure-receptor pathway between the Proposed Development and 3 projects and plans:

- Kilmore Quay Disposal Site,
- Seaweed Harvesting
- Celtic Sea Array – geophysical, geotechnical and benthic survey to inform design of potential future offshore windfarm.

6.2 CEA Results

The CEA concluded that there was the potential for cumulative effects between the Proposed Development and the Celtic Sea Array survey however the **cumulative effects are not significant**.

7. Summary and Conclusions

Greenlink is a proposed subsea and underground electricity interconnector cable between the existing electricity grids in the Republic of Ireland and Great Britain with a nominal capacity of 500 megawatts. Greenlink will provide a new interconnector between EirGrid's Great Island substation in County Wexford (Ireland) and the National Grid's Pembroke substation in Pembrokeshire (Wales). The power will be able to flow in either direction at different times, depending on supply and demand in each country.

Greenlink has been awarded Project of Common Interest (PCI) status by the European Commission, making it one of Europe's most important energy infrastructure projects and granting it the "highest national significance" possible. The requirement and need for Greenlink has been reinforced by strong policy support demonstrated by:

- the Commission for Regulation of Utilities Water and Energy (CRU) (Ireland) and Ofgem (GB) and via the completion of a Cost Benefit Analysis which demonstrates that Greenlink offers economic benefit to consumers in both jurisdictions;
- the inclusion of the Greenlink in the draft National Energy and Climate Plan 2021 – 2030; and
- the key assumption presented in the Climate Action Plan 2019 that additional interconnection will be added in 2025 and 2026 by the two planned interconnectors i.e. Celtic Interconnector and Greenlink.

The EIAR presents a comprehensive assessment of the potential effects of the installation, operation (including maintenance and repair) and decommissioning of the Proposed Development and sets out Embedded Mitigation and proposes Project Specific Mitigation to avoid or reduce significant effects to an acceptable level.

The Embedded Mitigation and Project Specific Mitigation will form the basis of an Environment Management Plan to be implemented during the installation and operation of the submarine cables.

Following the environmental impact assessment of the residual effects on the physical, biological and human environments, the following can be concluded:

- Baginbun Beach is a popular public beach, fringed by important reef habitat in the intertidal zone; a Qualifying Interest of the Hook Head Special Area of Conservation. Intrusive works on the beach have the potential to cause significant effects to both the public and the sensitive habitat. GIL is proposing to employ a trenchless technique (horizontal directional drilling) whereby the sensitive habitat and beach is avoided. This will ensure there is **no effect on Baginbun Beach and intertidal habitats.** To further minimise public disturbance GIL has committed to avoiding works during the peak tourist season (July and August).
- The main effects associated with the Proposed Development are predicted to be localised, temporary disturbance to the seabed during installation. For the majority of subtidal habitats (benthic communities) and fish species this will result in effects which are **not significant**. Trenching across areas of Reef habitat

and herring spawning grounds could cause **significant effects**. Project Specific Mitigation in the form of exclusion zones and seasonal restrictions have been proposed that either remove the pathway for effects or reduce the significance of the residual effects to **not significant**.

- Installation, maintenance and decommissioning activities will generate underwater noise which has the potential to cause slight disturbance effects to fish and marine mammals. For all the activities proposed, with the exception of UXO detonation, the assessment concluded that the effects will be **not significant**.
- If required, UXO detonation has the potential to have a **significant effect** on marine mammals including grey seal, a Qualifying Interest of the Saltee Island SAC, and harbour seal, a Qualifying Interest of the Slaney River Valley SAC. The most effective mitigation is to avoid the need for detonation completely, but if this is not feasible, Project Specific Mitigation, following Industry Best Practice has been proposed. Implementation of measures such as using passive acoustic monitoring to support marine mammal observer watches, the use of acoustic deterrent devices and soft start charges to encourage animals to flee will reduce the significance of the residual effect to **not significant**.
- The preferred protection method is to bury the cables in the seabed. However, external cable protection will be required at third-party asset crossings and may be required at the HDD exit points. A cable burial plan will be produced by the Installation Contractor outlining proposed method statements and cable protection requirements for approval by the Foreshore Unit and discussion with fisheries stakeholders to reduce/avoid disruption to fisheries interests as much as possible. Effective channels of communication will be established and maintained between the appointed Installation Contractor and commercial fishing interests. This will include the appointment of a Fisheries Liaison Officer (FLO). Guard vessels may be used if sections of the cable are exposed between lay and burial.
- The Proposed Development crosses the Hook Head SAC for 8km from the Baginbun Beach landfall. In relation to the site and the Qualifying Interests the EIA concluded:
  - Areas of outcropping Bedrock Reef have been avoided through routeing along a sediment channel. Bedrock Reef has also been identified in the nearshore area, extending out from the intertidal zone. GIL is committed to avoiding effects on this habitat by using a trenchless technique; horizontal directional drilling. Exclusion zones have been established around the Qualifying Interest to avoid effects.
  - If the cables cannot be fully buried into the sediment unit at the HDD exit points, it is possible that external cable protection may be placed within the Qualifying Interest habitat 'Shallow Inlets and Bays'. Project Specific Mitigation will be implemented to reduce the likelihood of the contingency being required, and if necessary to reduce the footprint of the deposits. The external cable

protection will cover a very small area of the habitat (equivalent to less than 0.0004% of the Qualifying Interest) and will provide a suitable hard substrate for colonisation. Colonisation of the external cable protection by reef species is expected in the medium-term and the overall significance of the effect has been assessed as **not significant**.

- The EIA concluded that the significance of effects on all seabirds (including Qualifying Interests of Special Protection Areas) is **not significant**. This took into consideration the presence of the vessels associated with installation, operation or decommissioning activities.
- During operation, the cables will generate low electromagnetic fields that will diminish to natural background levels within 2m from the bundled cables and 12m from the unbundled cables at the HDD exit points. There will be **no significant effects** on biological receptors (e.g. fish, marine mammals) and the fields will not interfere with navigation systems for commercial shipping or recreational boating.
- The presence of the cable installation vessels will cause temporary disturbance to fishing and shipping activity in the vicinity of the Proposed Development. Disruption will be limited to discrete sections of the Proposed Development, confined to the location of the maintenance or repair activity, or progressing along the Proposed Development during installation and decommissioning. Procedures to minimise disruption near high density shipping areas will be developed and implemented. The residual effect has been assessed as **not significant**.
- The EIA concluded the effects on marine archaeology will be **not significant**. This conclusion took into consideration embedded mitigation which includes preparing a scheme-specific Underwater Archaeology Impact Assessment and establishing a protocol for reporting archaeological discoveries. Archaeological exclusion zones will be implemented around the geophysical anomalies identified during the cable route survey.
- There will be **no significant cumulative effects** with other existing and proposed projects and plans during the installation and operation of the Proposed Development. The potential for cumulative effects has been identified but all effects are not significant.
- Any effects from decommissioning activities (cable removal) will be broadly similar to those during installation. The appropriate method of cable decommissioning will be considered towards the end of the interconnectors life. This will consider hazards presented by leaving the cables in situ and potential disturbances if removed entirely. The effects of removal are predicted to be slight and temporary in nature, and will be considered thoroughly at the time of removal.