

GREENLINK ENVIRONMENTAL STATEMENT -  
ONSHORE WALES  
NON-TECHNICAL SUMMARY

March 2020

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

*Greenlink*  
INTERCONNECTOR

# Contents

	Page
<b>Glossary</b>	<b>3</b>
<b>1 Introduction</b>	<b>5</b>
1.1 Non-Technical Summary	5
1.2 The Proposed Development	5
1.3 Need for the Project	6
1.4 Consenting Process	9
1.5 Structure of the Environmental Statement (ES)	9
<b>2 Description of the Proposed Development</b>	<b>10</b>
2.1 Proposed Development Summary	10
2.2 Proposed Development Timeline	10
2.3 Cable Installation	10
2.4 Temporary Landfall HDD Compound	11
2.5 Converter Station	13
2.6 Enabling Works	14
2.7 Environmental Management Plan	14
2.8 Decommissioning	14
<b>3 Consideration of Alternatives</b>	<b>18</b>
3.1 Introduction	18
3.2 Landfall Selection	18
3.3 Converter Station Siting Options	19
3.4 Onshore HVDC Route Selection	20
3.5 Highway Alignment Options	20
3.6 Agricultural Alignment Options	22
3.7 Onshore HVAC Route Selection	22
3.8 Summary and Conclusion	22
<b>4 Approach to the Assessment</b>	<b>23</b>
4.1 Environmental Impact Assessment	23
4.2 Baseline Environment	23
4.3 Habitats Regulations Assessment	25
4.4 Consultation	25
<b>5 Summary of Environmental Effects</b>	<b>28</b>
5.2 Biodiversity	28
5.3 Landscape and Visual Assessment	29

5.4	Historic Environment	30
5.5	Traffic and Transport	30
5.6	Noise and Vibration	34
5.7	Air Quality	34
5.8	Water Environment	38
5.9	Soils, Geology and Hydrogeology	38
5.10	Material Assets	39
5.11	Socio-Economics	39
5.12	Cumulative Effects	39
<b>6</b>	<b>EIA Summary Matrix</b>	<b>40</b>



## Glossary

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AA	Appropriate Assessment
AOD	Above Ordnance Datum
CEMP	Construction Environmental Management Plan
CIRIA	Construction Industry Research and Information Association
EU	European Union
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
ES	Environmental Statement
GB	Great Britain
Greenlink	The entire Greenlink interconnector project, comprising: Ireland Onshore, Ireland Offshore, Wales Offshore and Wales Onshore
GIL	Greenlink Interconnector Limited (the developer of Greenlink)
HDD	Horizontal Directional Drilling
HGV	Heavy Goods Vehicle
HRA	Habitats Regulation Assessment
HV	High Voltage
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
NGR	National Grid Reference
NRW	Natural Resources Wales
PCC	Pembrokeshire County Council
PCI	Project of Common Interest
PCNPA	Pembrokeshire Coast National Park Authority
Proposed Development [Onshore Component of Greenlink in Wales]	Refer to the description of the Proposed Development in Section 1.1.5 below for details.
PRoW	Public Right of Way
SAB	SuDS Approving Body

SAC	Special Area of Conservation
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
SuDS	Sustainable Urban Drainage System
TEN-E	Regulation (EU) No 347/2013 guidelines for trans-European energy infrastructure
TJB	Transition Joint Bay
TPO	Tree Preservation Orders
UXO	Unexploded Ordnance

# 1 Introduction

## 1.1 Non-Technical Summary

- 1.1.1 This Non-Technical Summary (NTS) provides a summary of the Environmental Statement (ES) and reports the outcomes of the Environmental Impact Assessment (EIA) process. An EIA seeks to identify likely significant impacts, both positive and negative, resulting from a Proposed Development. Where likely significant effects are identified, the ES identifies mitigating measures that avoid, reduce or cancel potential adverse effects and integrates necessary mitigation measures into the design, programme or construction methodology.
- 1.1.2 This NTS, the ES and planning application documents - Planning Design and Access Statements and supporting drawings - have been submitted to Pembrokeshire County Council (PCC) and Pembrokeshire Coast National Park Authority (PCNPA) for consideration of grant of planning permission.
- 1.1.3 This NTS aims to provide a summary in a manner accessible to the public. Further details are available in the full ES available at [www.greenlink.ie](http://www.greenlink.ie)

## 1.2 The Proposed Development

- 1.2.1 Greenlink Interconnector Limited (GIL) is proposing to develop an electricity interconnector (Greenlink) linking the existing electricity grids in Great Britain and Republic of Ireland. Greenlink 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. The project is designated as a European Union Project of Common Interest (PCI).
- 1.2.2 As shown in Figure 1.1, the landfall points for the submarine cables are Freshwater West, Pembrokeshire and Baginbun Beach, County Wexford. The overall length of the interconnector is approximately 159.27km of submarine cabling and approximately 7km and 23km of onshore cable in Wales and Ireland respectively.
- 1.2.3 The ES, to which this NTS relates covers the Welsh Onshore components of Greenlink from the beach at Freshwater West, Pembrokeshire to the connection with the National Grid substation, located within the Pembroke Power Station in Pembrokeshire. This is defined as the Proposed Development and comprises the following: a temporary landfall compound near Freshwater West, underground electricity and fibre optic cables, an improved road from Wallaston Cross to a new converter station close to the National Grid substation located within the Pembroke Power Station, Pembrokeshire and a temporary construction compound in a field south of the converter station to support building of the converter station.
- 1.2.4 Separate ESs will be prepared which cover individually the Welsh Onshore (the subject of this ES); the Irish Onshore; the Irish Marine and Irish Offshore (the

submarine route from Baginbun Beach to the Ireland/UK median line); and the Welsh Marine. Figure 1.3 illustrates the respective areas covered for each of these documents. Once submitted, these will be available online at [www.greenlink.ie](http://www.greenlink.ie).

- 1.2.5 A summary document which summarises all components of Greenlink (Welsh Onshore, Welsh Marine, Irish Offshore, Irish Marine, Irish Onshore), is available online at [www.greenlink.ie](http://www.greenlink.ie).
- 1.2.6 Pre-Application Consultation with the public and key stakeholders was undertaken between 18<sup>th</sup> December 2019 and 22<sup>nd</sup> January 2020. The draft ES and draft planning application documents - Planning, Design and Access Statements and supporting plans - were made available via the Greenlink project website [www.greenlink.ie](http://www.greenlink.ie) throughout this period. All comments received during the pre-application consultation have been taken into account in finalising the ES and planning application documents prior to formal submission.

### 1.3 Need for the Project

<i>Regional investment and jobs</i>	<ul style="list-style-type: none"><li>•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.</li></ul>
<i>An integrated European Grid</i>	<ul style="list-style-type: none"><li>•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.</li></ul>
<i>Security of supply</i>	<ul style="list-style-type: none"><li>•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.</li></ul>
<i>Integration of renewable energy</i>	<ul style="list-style-type: none"><li>•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.</li></ul>
<i>Better energy price competition</i>	<ul style="list-style-type: none"><li>•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.</li></ul>

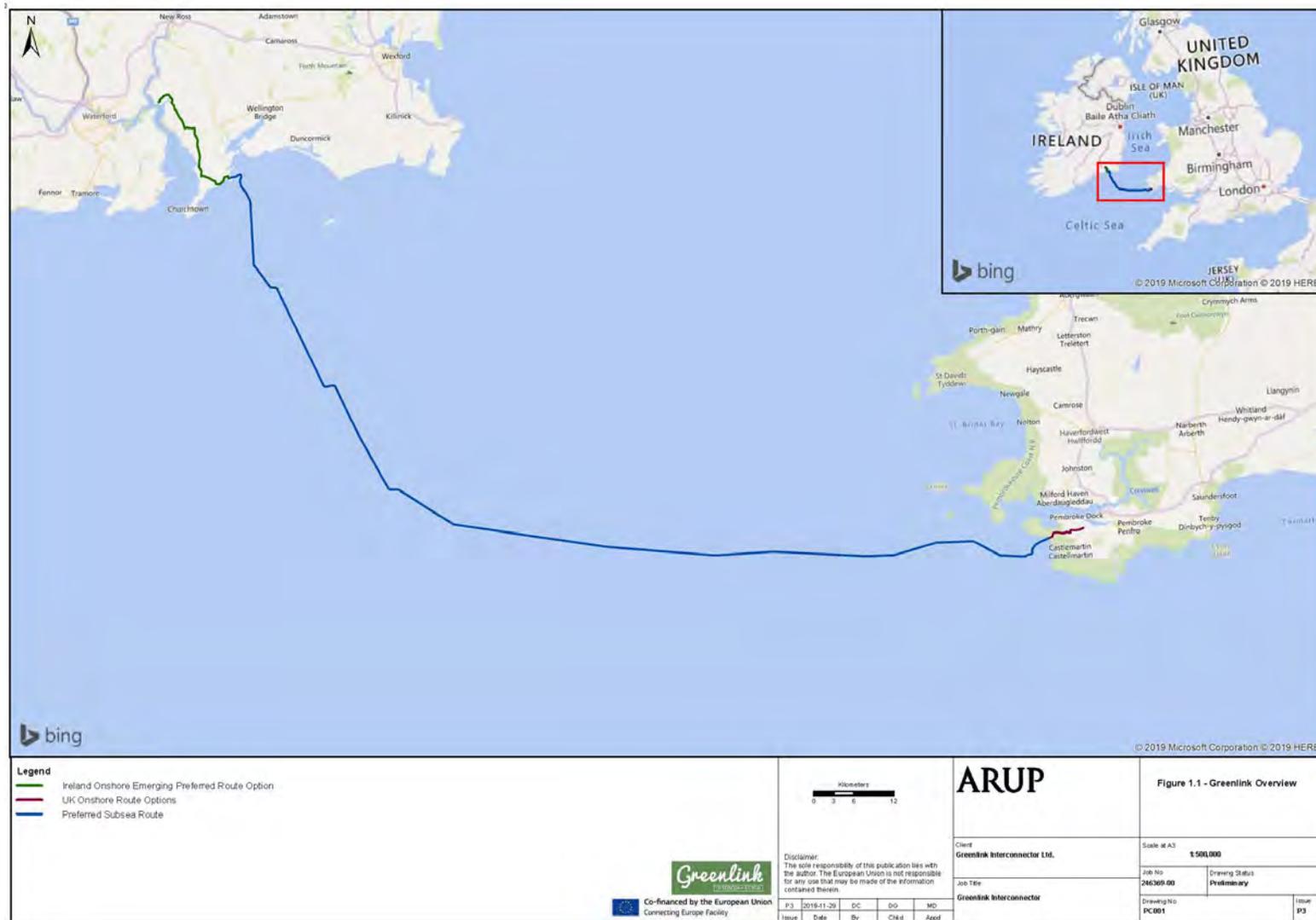


Figure 1.1 Greenlink - All Components of the Greenlink Project

For more information:  
 W: [www.greenlink.ie](http://www.greenlink.ie)

Co-financed by the European Union  
 Connecting Europe Facility

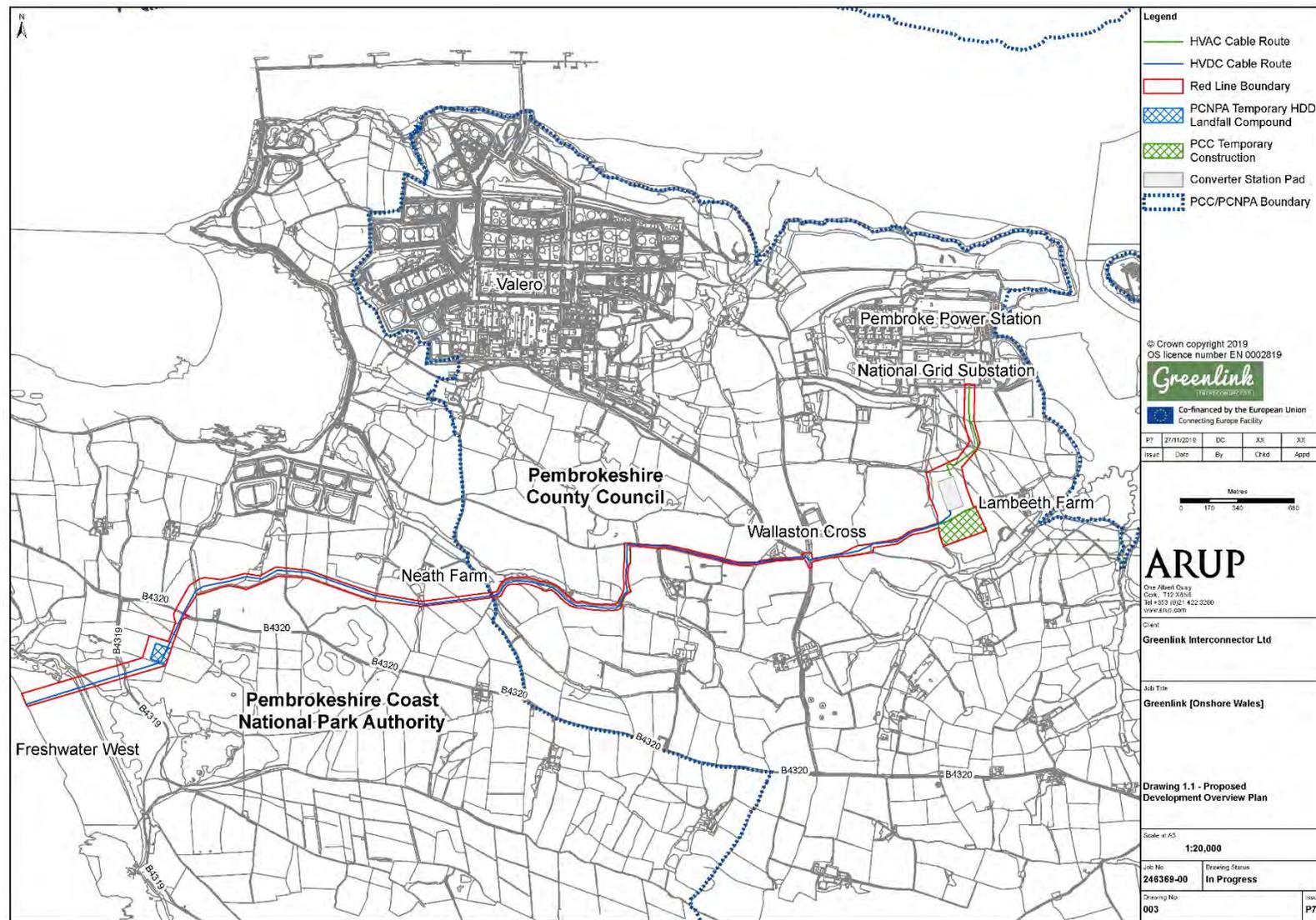


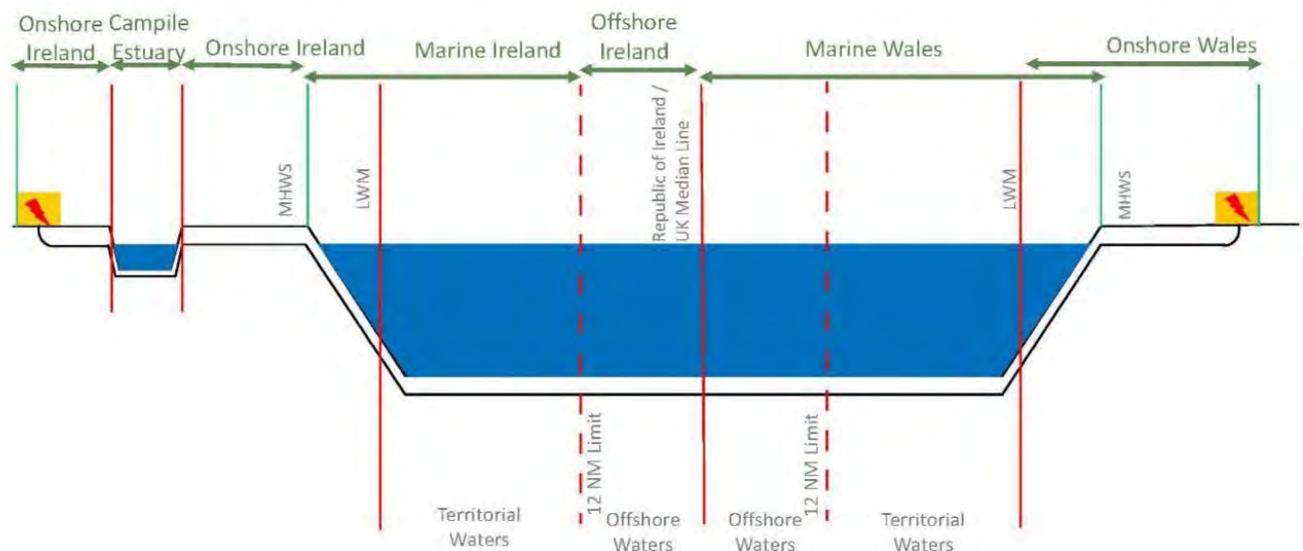
Figure 2.2 Greenlink Onshore Wales - Proposed Development

For more information:  
 W: [www.greenlink.ie](http://www.greenlink.ie)

## 1.4 Consenting Process

1.4.1 The ES will be submitted to Pembrokeshire County Council and the Pembrokeshire Coast National Park Authority in support of three applications for planning permission. The scale and nature of the Proposed Development requires that three separate planning applications are required, as outlined below:

- Full Planning Application [Major Development] - Temporary landfall compound and underground HVDC cables laid with fibre optic cables for control and communication purposes (within Pembrokeshire Coast National Park Authority jurisdiction);
- Full Planning Application [Major Development] - Underground HVDC and underground HVAC cables both laid with fibre optic cables for communication purposes (within Pembrokeshire County Council jurisdiction);
- Outline Planning Application [Major Development] - Indicative converter station arrangement and upgraded permanent access road (within Pembrokeshire County Council jurisdiction).



Key: MHWS – Mean high-water springs LWM – Low Water Mark

**Figure 1.3 Greenlink Components: Onshore Ireland, Marine Ireland, Offshore Ireland, Marine Wales, Onshore Wales (Proposed Development).**

## 1.5 Structure of the Environmental Statement (ES)

1.5.1 The ES comprises:

- Volume I: An overview of the EIA process, a glossary of terms, a full description of the Proposed Development and the environmental assessment reports.
- Volume II: Figures and Drawings.
- Volume III: Technical Appendices. Non-Technical Summary - this document.

## 2 Description of the Proposed Development

### 2.1 Proposed Development Summary

2.1.1 The Welsh Onshore components of Greenlink; referred to as the 'Proposed Development', consist of the following permanent and temporary elements:

- **Landfall Compound** - A temporary Landfall Compound at Freshwater West, where the HVDC cable will be installed below the beach and dunes at Freshwater West by Horizontal Directional Drilling (HDD);
- **HVDC Cables** - Two High-Voltage Direct Current (HVDC) electricity cables, installed underground from the landfall site to the Converter Station. HDD will be utilised to install cable ducts below the Angle road (B4320). The HVDC cables will be installed within a trench approximately 700mm wide;
- **Access Road** - An upgraded permanent access road from Wallaston Cross to the Converter Station;
- **Converter Station** - A Converter Station situated close to the existing National Grid substation, located within the Pembroke Power Station;
- **Construction Compound** - A temporary Construction Compound directly south of the proposed Converter Station;
- **HVAC Cables** - Three High-Voltage Alternating Current (HVAC) electricity cables installed underground connecting the converter station to the National Grid substation; and
- **Fibre Optic Cables** - Fibre optic cables for control and communication purposes, laid underground with the HVDC and HVAC cables.

2.1.2 The ES considers the installation, operation, maintenance and decommissioning of the Proposed Development. A site location plan for the Proposed Development is included above as Figure 1.2.

### 2.2 Proposed Development Timeline

2.2.1 A large infrastructure project such as Greenlink takes several years from concept to construction, including technical design, obtaining the relevant permits and consultation with a variety of stakeholders. Subject to obtaining planning approval and the relevant permits and licences, construction of the Proposed Development is anticipated to commence in Q4 2020. Greenlink is expected to be fully operational in 2023.

### 2.3 Cable Installation

2.3.1 The onshore cables will be buried approximately 850mm underground in a single trench, installed in plastic ducts to simplify the construction process and alongside fibre optic cables installed in a separate duct. The trench will be approximately 700mm wide. Protective covers, such as steel plates may be employed as a physical barrier above the ducts at culvert crossings where the cables may be shallower; in addition, yellow warning tape will be laid above as

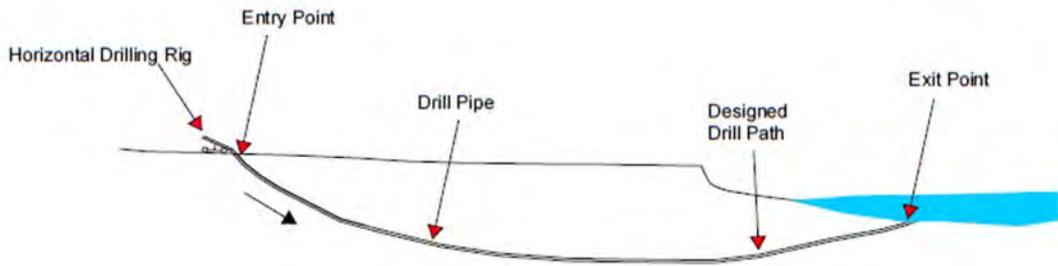
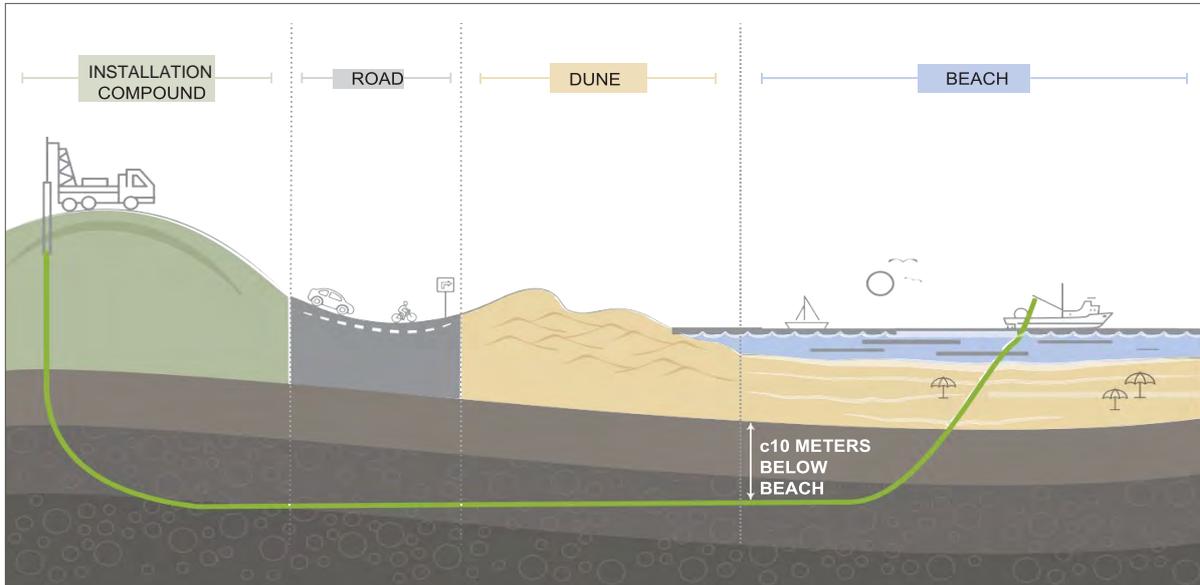
a precautionary measure to avoid accidental excavation. All cable infrastructure will be installed at a depth to ensure that there is no interference to local land uses; such as ploughing. Following installation, the land will be restored, and land use activities will be able to resume unaffected.

- 2.3.2 Cables will be installed within agricultural land and within highways. A 5m wide haul road may be required to install cables in agricultural land. Joint bays will also be required approximately every kilometre, to allow individual cable reels to be joined together. Joint bays will be temporary and underground, facilitating the pulling of cables through the ducts and allowing a clean and safe space for jointing.
- 2.3.3 The cable route in Ireland and Wales has been carefully aligned to avoid impacting landscape and boundary features, such as hedgerows and treelines, but where such effects are unavoidable, working widths will be minimised, temporary connectivity measures employed, and full replacement of hedgerows provided post-installation. Following installation agricultural land and highways will be restored to pre-construction conditions.

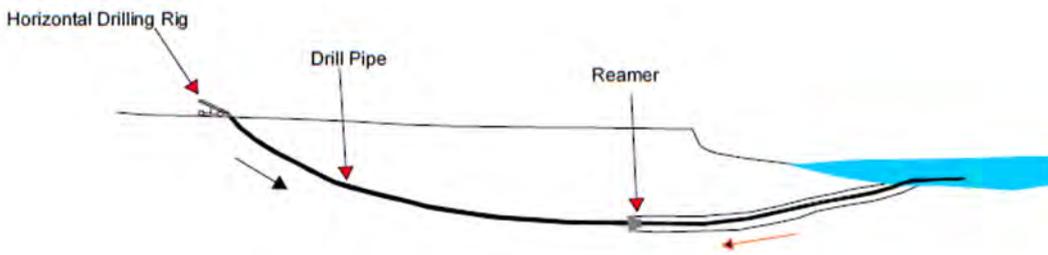
## 2.4 Temporary Landfall HDD Compound

- 2.4.1 A temporary landfall compound (approximately 100m x 100m) will be set up within agricultural land and sensitively located outside of protected sites. The landfall compound is required to allow the underground installation of the electricity cables, which will be installed deep below the field, B4319 road to Freshwater West, dunes and Freshwater Beach such that there is no effect on these features and no interruption of access to the beach. A temporary haul road will provide access along the cable route from the B4320 to the landfall compound ensuring construction traffic will be able to avoid disruption to the local road network.
- 2.4.2 The cables will emerge below the low water mark so no cables will be visible at any stage, neither during nor post-installation. Installation work at the landfall is anticipated to last for approximately 3 months and will be scheduled to avoid the most popular periods of July and August. Once commenced, the HDD activity will continuously operate over a 24-hour period until each bore is complete. Consequently, lighting will be required to provide a safe working area. Directional lighting will be employed to minimise light spill onto residences and adjacent areas and lighting configured to a minimum to meet health and safety requirements.
- 2.4.3 The marine cables will be connected to the terrestrial cables in an underground Transition Joint Bay (TJB) within the landfall compound. Following completion of the HDD and jointing activities, all cabling and jointing infrastructure will be below ground. Following installation of the landfall cables the temporary landfall compound will be restored to agricultural land use.
- 2.4.4 The cables will be installed using a method referred to as Horizontal Directional Drilling (HDD), which is illustrated in Figure 2.1 and described below.

### HDD Landfall Installation Overview



A small diameter pilot hole is drilled from the entry point, under the sea bed, to the exit point.



Next, a reaming tool is pulled back through the pilot hole to enlarge the hole. More than one pass may be required to make the hole larger than the diameter of the pipe

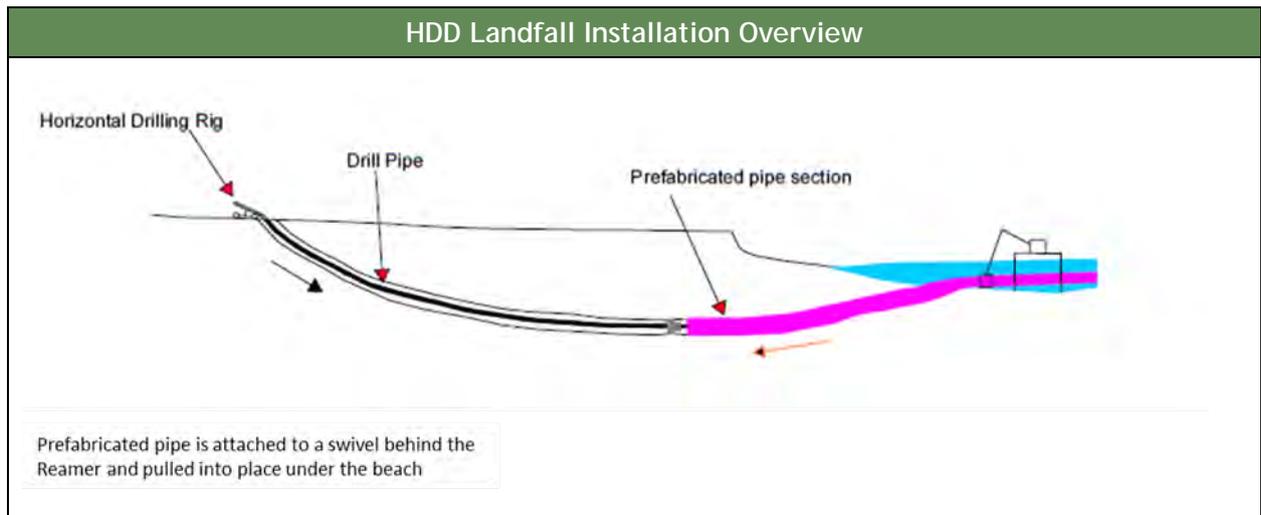


Figure 2.1 HDD Landfall Installation Overview

## 2.5 Converter Station

2.5.1 Two indicative converter station arrangements have been developed to inform the EIA, Option 1 and Option 2; refer to Figure 2.2 and Figure 2.3 respectively. Option 1 presents a squarer converter hall design, relative to the elongated converter hall design of Option 2. Following appointment of a contractor, the design will be determined and refined accordingly. For the purposes of the EIA, the maximum parameters of the respective options have been assessed within each EIA topic assessment. The maximum and minimum dimensions of core components are included within Table 3.4 below and portrayed in Volume II, Drawing 2.13 of the ES. Indicative views are presented in Figures 2.4 to 2.6 below from key viewpoints identified in Figure 5.1.

2.5.2 The maximum heights of key converter station elements are: a converter hall  $\leq 21\text{m}$ , potential gantries  $\leq 23\text{m}$  height and a lightning tower  $\leq 26\text{m}$ . The core visual element would be the converter hall, for which the cladding design and colour will be sympathetic to the local environment with landscape screening provided to mitigate any landscape and visual effect. The indicative converter station footprint is circa 1.85 hectares (185m x 100m).

Table 2.1 Maximum and Minimum Parameters of Core Converter Station Infrastructure

Component	Maximum	Minimum
<b>Converter Hall and DC Terminations Building</b>		
Length (m)	127m	64m
Width (m)	46m	28m
Height (m)	21m	14m
<b>Lightning Mast</b>		
Length (m)	N/A	N/A
Width (m)	N/A	N/A

Component	Maximum	Minimum
Height (m)	26m	24m
<b>Gantry</b>		
Length (m)	N/A	N/A
Width (m)	N/A	N/A
Height (m)	23m	20m

## 2.6 Enabling Works

- 2.6.1 Enabling works will be required in advance of constructing the Proposed Development. The existing access road to the converter station from Wallaston Cross will be widened as a permanent improvement to facilitate construction access. A temporary construction compound will be installed in an arable field to the south of the converter station with an anticipated footprint of approximately 100m x 100m and located as per Figure 1.2. The construction compound will be in use for the duration of the construction and commissioning stages, whereupon all aspects of the construction compound will be removed and the field restored to agricultural land use.

## 2.7 Environmental Management Plan

- 2.7.1 An outline Construction Environmental Management Plan (CEMP) has been prepared to provide a framework for managing environmental risks, ensuring best environmental practice is adhered to; refer to Volume III, Appendix 2.1: Outline CEMP for details.

## 2.8 Decommissioning

- 2.8.1 The converter station and HVAC / HVDC cables will be decommissioned when Greenlink ceases operation. The operational life of the Proposed Development is expected to exceed 40 years. When it becomes appropriate to decommission the interconnector, each item of equipment will be removed for recycling or disposal as appropriate, based on the waste regulations at the time of decommissioning. All civil works within the Proposed Development will be removed and the site will be returned to its previous state. The environmental impact of decommissioning would be evaluated at the time before a decision is made.

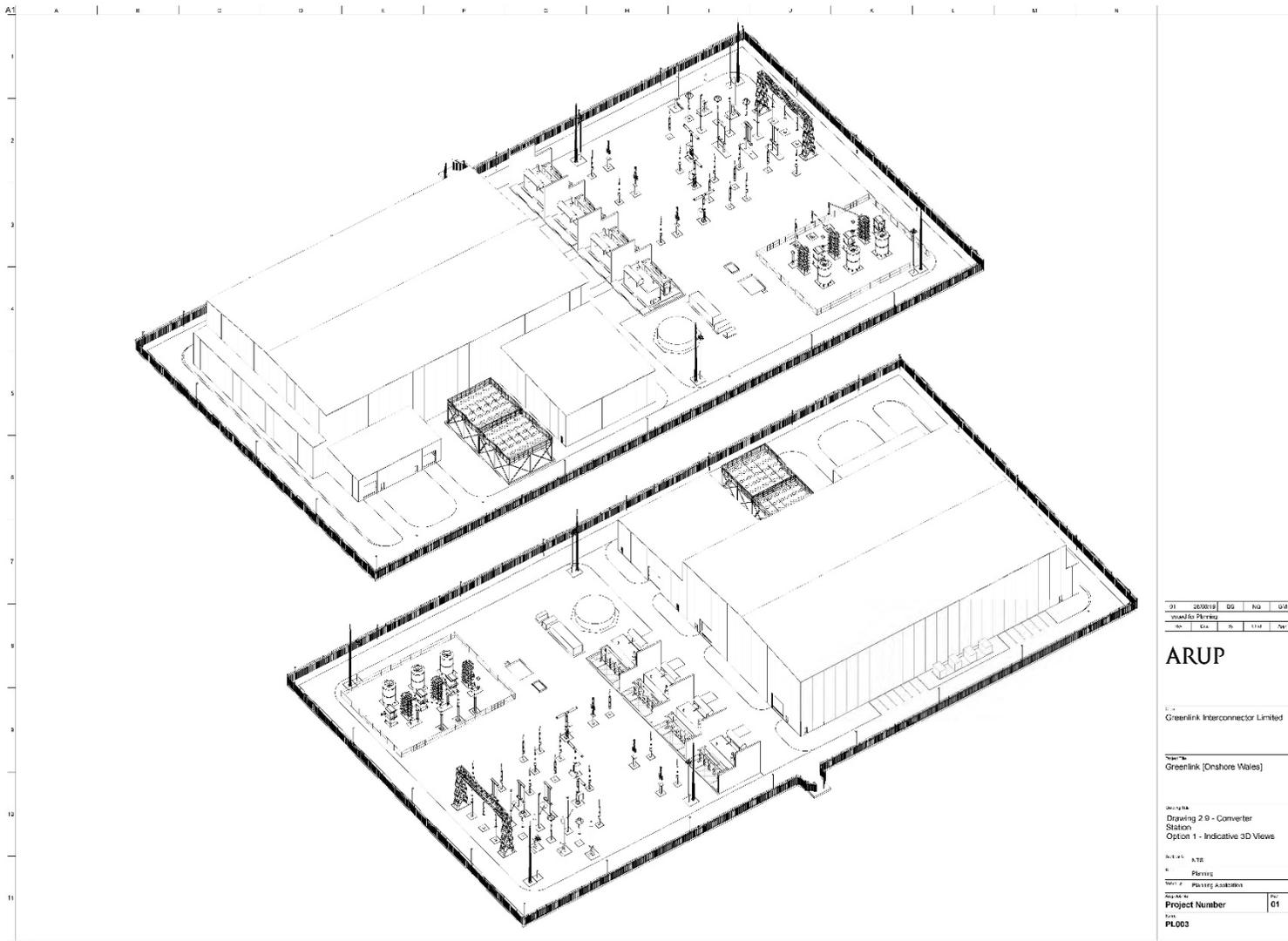


Figure 2.2 Converter Station Option 1 [Indicative]

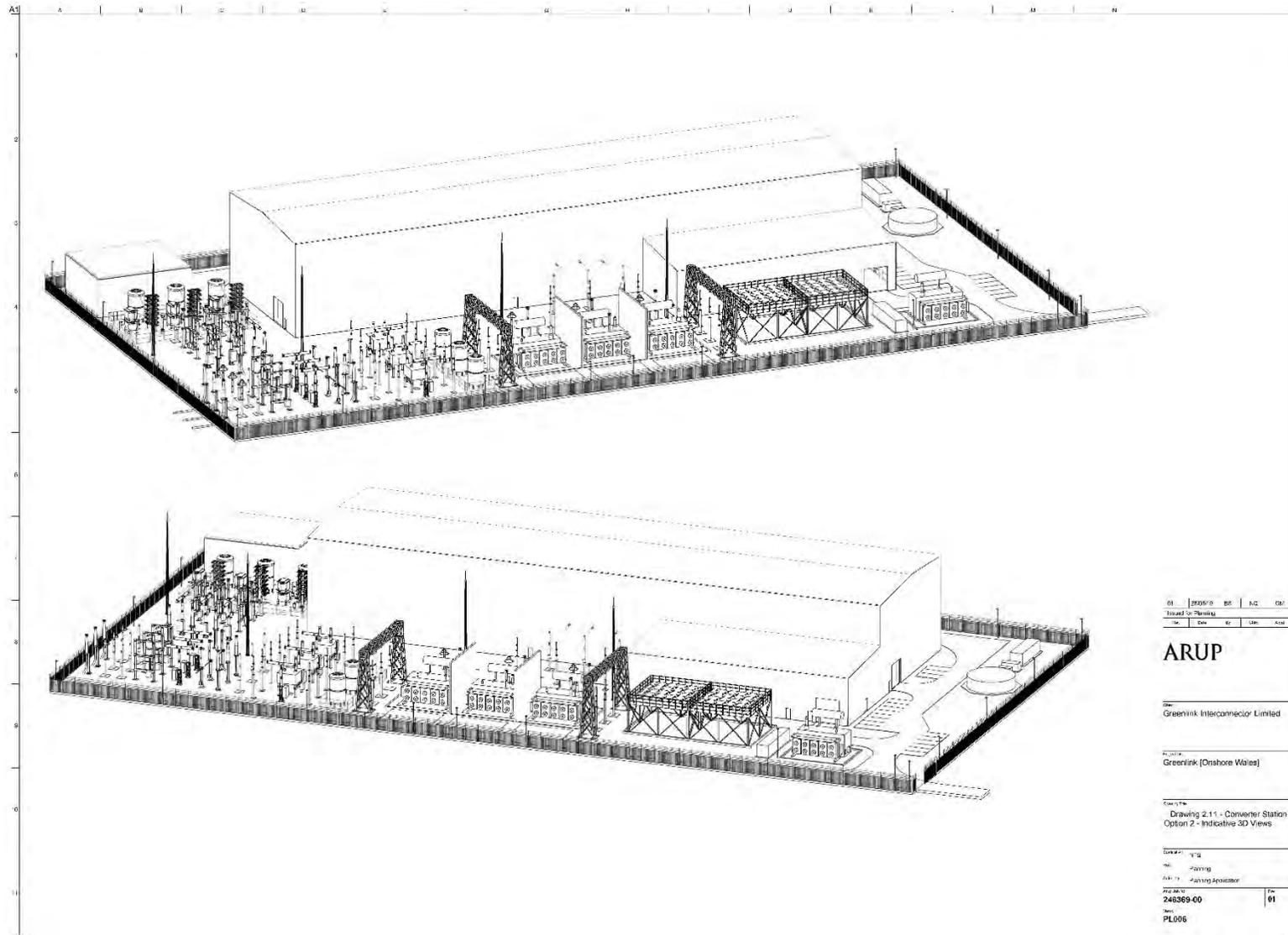


Figure 2.3 Converter Station Option 1 [Indicative]

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**Figure 2.4: Indicative View 14: Converter Station Option 1 [no green / grey cladding and no tree planting / vegetation screening]**



Figure 2.5: Indicative View 14: Converter Station Option 1 [with green cladding, but no tree planting / vegetation screening]



Figure 2.6: Indicative View 6: Converter Station Option 1 [no green / grey cladding and no tree planting / vegetation screening]

## 3 Consideration of Alternatives

### 3.1 Introduction

- 3.1.1 A full description of the alternatives considered and route development is provided in Chapter 3 of the Greenlink Onshore Wales ES. The following sections summarise the key points.
- 3.1.2 The initial tasks comprised determination of a feasible landfall site, an onshore cable route between the landfall site and the connection point at the National Grid Substation within the Pembroke Power Station, circa 7km to the east, and identifying an appropriate converter station location sited in close proximity to the substation, both for technical and environmental reasons.

### 3.2 Landfall Selection

- 3.2.1 Following identification of existing National Grid substation, located within the Pembroke Power Station, as the connection point for Greenlink, an options appraisal study of the Pembrokeshire coastline was undertaken.

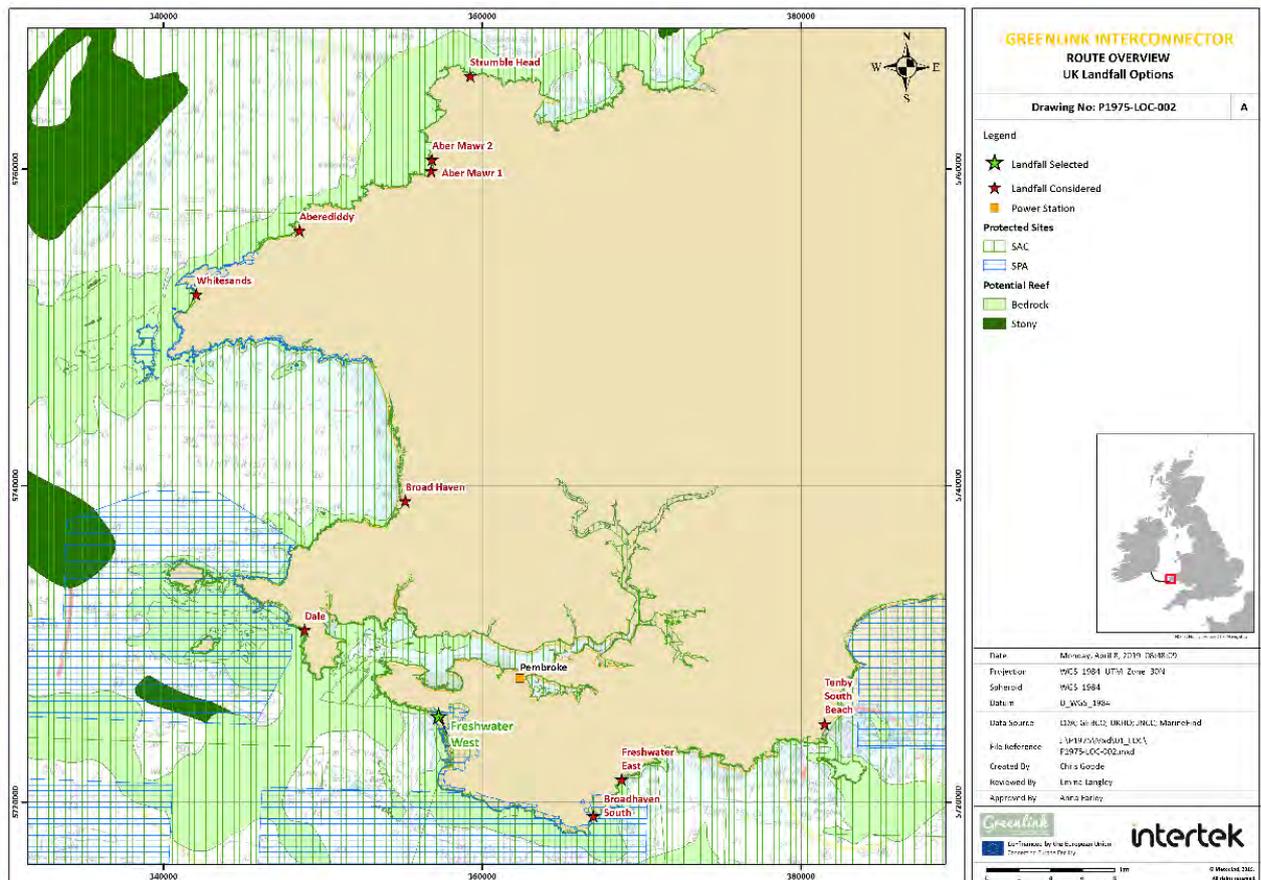


Figure 3.1 Landfall Options

- 3.2.2 Following identification of Pembroke substation as the connection point, an options appraisal study of the Pembrokeshire coastline was undertaken to determine a suitable landfall site. Eleven potentially suitable landfall locations

in Pembrokeshire were identified and assessed using a range of environmental, technical and economic criteria; refer to Figure 3.1. Assessment criteria included: vessel access, beach composition, amenity impact, environmental constraints (e.g. presence of European sites), exposure, coastal erosion, access to beach, cable engineering and protection requirements, obstructions and existing infrastructure. Of the eleven potential sites, nine were discounted as less preferential on environmental and technical grounds; refer to Chapter 3 - Alternatives Considered for details. Two 'preferred' landfall options were recommended for further investigation; Broad Haven and Freshwater West.

- 3.2.3 The Broad Haven landfall has minimal offshore routeing constraints but the main disadvantage was that the onshore route would require a technically challenging crossing of the Milford Haven estuary. The main benefit was that it avoided an offshore route through the Castlemartin Firing Range.
- 3.2.4 The Freshwater West landfall provided the shortest onshore route to the converter substation and tie in point. It was recognised that the sand dunes behind the beach are environmentally sensitive but that a trenchless technique (Horizontal Directional Drilling (HDD)) could be used to avoid disturbance to the beach and dunes. Offshore the route was highly constrained due to the proximity of the Castlemartin Firing Range and Milford Haven harbour mouth. However, consultation with the Ministry of Defence and Port of Milford Haven Authority determined that the co-location of a submarine cable, the military firing range and port activities was possible. Therefore, Freshwater West was chosen as the preferred landfall.

### 3.3 Converter Station Siting Options

- 3.3.1 In selecting the converter station sites, the primary consideration was siting in close proximity to the existing National Grid substation within Pembroke Power Station to minimise energy loss (via heat) from the HVAC cables. Additional constraints assessed in selecting converter station locations included: ground conditions, topography, feasibility of construction operations, presence of hazards, environmental sensitivities and ease of road access.
- 3.3.2 Following an initial appraisal process, three potential converter station locations were identified in Wales: Options 1 to 3 were subject to both desk-based and site survey and investigation to determine a preferred site. Please refer to Figure 3.2 for the location of each converter station option overlaid with environmental constraints.
- 3.3.3 Following environmental surveys, landowner discussions and investigation of technical requirements, Converter Station Option 3 emerged as the preferred location for the converter station in Wales having the least potential environmental impacts. The converter station will be located within the circa 6.2-hectare field at NGR: SM 93390 01637 that is bounded by high scrubby hedgerows and a small watercourse within a wooded corridor to the west; the latter forms part of an historic Tree Preservation Order. The landform dips from south to north between 40mAOD (Above Ordnance Datum) and 20mAOD, relative to Green Hill to the west at 73mAOD. The Wales Coast Path traverses to the north and east of the site whilst the private access to the south of the converter station field forms a Public Right of Way (PRoW). The site is located within the industrial setting of the Milford Haven Waterway Historic Landscape

Area in proximity to the Pembroke B Power Station and adjacent to the 400kV electricity pylons connecting to the power station.

### 3.4 Onshore HVDC Route Selection

- 3.4.1 Once the landfall and the potential converter station locations were identified, numerous route options were assessed across the c. 7km long study area. The initial route options were developed and refined, informed by various technical and environmental surveys informing design and the EIA. The various cable route options considered throughout the appraisal are presented in Figure 3.2 overlaid with environmental constraints.
- 3.4.2 Constraints were mapped including landownership, environmental sensitivities and technical requirements to identify potential route options. Technical requirements included: seeking a direct route from landfall to the converter station, avoiding existing utilities and limitations of available technology to accommodate topography and ground conditions; which precluded access via steep valleys, potentially contaminated land or water supply embankments. Environmental aspects included: avoidance of protected wildlife and historic sites, maximising distance from local residences, aiming for existing field gaps (gates, hedgerows gaps), utilising roads or fields with lower biodiversity value and avoidance of sensitive wildlife features.

### 3.5 Highway Alignment Options

- 3.5.1 To minimise effects on environmental features, the initial options sought to locate the HVDC cable route within the road along a large proportion of the route. One option was to locate the cables within the B4320 from Broomhill Cottage (NGR: SM 88605 00993) to the junction at the Rhoscrowther / Chevron turnoff (NGR: SR 92586 99975), prior to following the route north to Wallaston Cross. This option was identified early in optioneering to have a significant impact on local communities and tourist traffic due to potential prolonged road closures along the B4320, where the road narrows to a single-track highway and conflict with numerous key services.
- 3.5.2 An additional road option was considered to the north of the study area, utilising the unnamed road (access to Angle Bay - NGR: SM 90084 01679) and laying the cables within the single-track road, east towards Wallaston Cross. This option required identifying a route through the historic petrochemical storage tanks (NGR: SM 89569 01702), which risked disturbing potential contaminated land and aligning the route in direct proximity to the Angle Bay SSSI with sensitive features including *Zostera* sp. (seagrass beds) and overwintering birds. An alternative route was considered, traversing south and east of the storage tanks, although this route was technically constrained by a deep wooded gorge (NGR: SM 89990 01660) with ponds and streams at the base making open cut and HDD construction technically difficult and potentially damaging to a key habitat and linear commuting features for protected species.

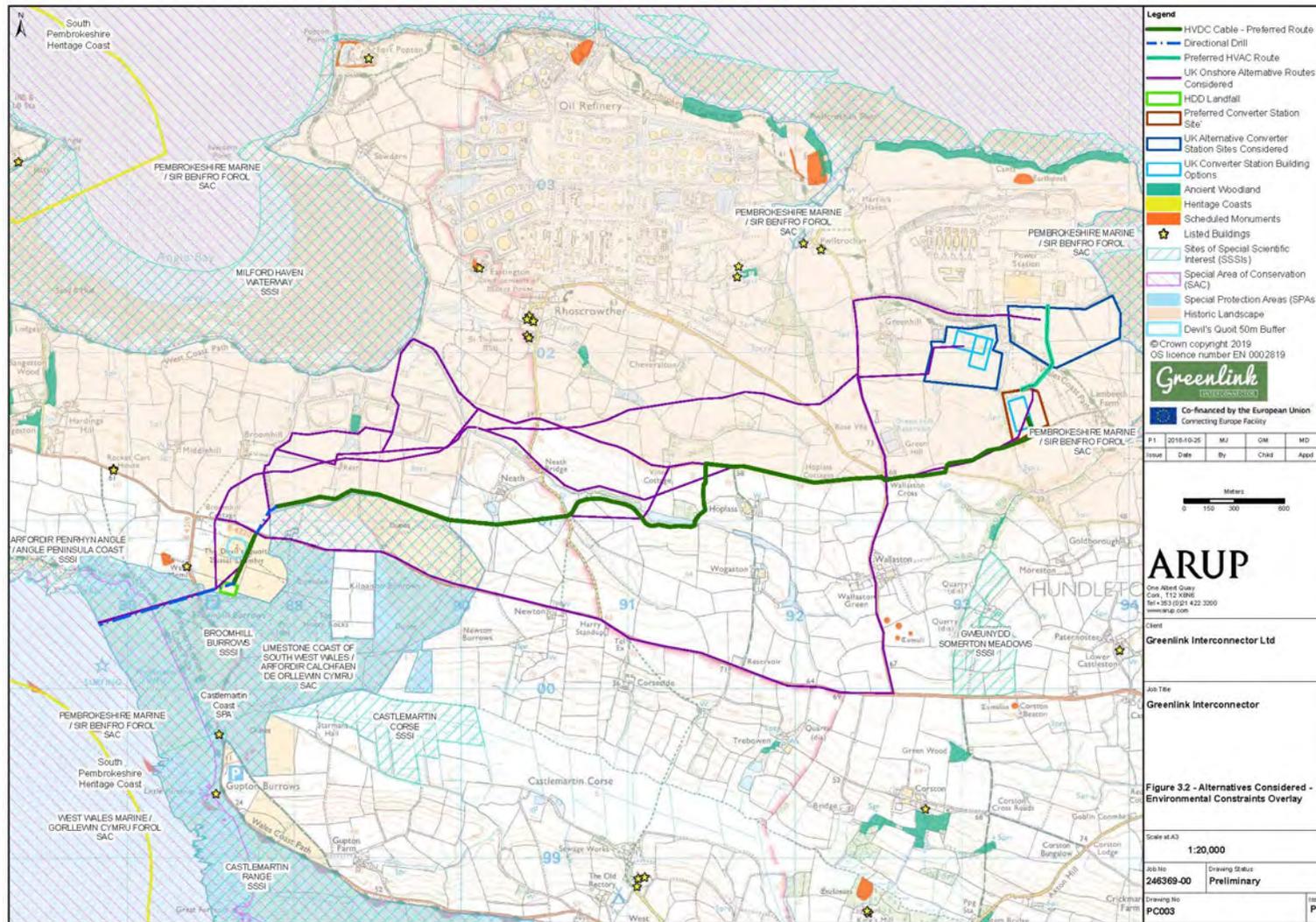


Figure 3.2 Cable Route and Converter Station Options Considered overlaid with Environmental Constraints

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 W: [www.greenlink.ie](http://www.greenlink.ie)

## 3.6 Agricultural Alignment Options

- 3.6.1 Agricultural route options were primarily constrained by environmental and technical constraints but focussed on crossing points for sensitive features; particularly stream and woodland corridors. To minimise environmental risks at the stream corridor south of the historic Vine Cottage, existing accesses were targeted. Initially, the access west of the water supply (NGR: SM 91105 01041) was considered preferable since this option avoided woodland; however, this was revised to the east of the water supply (NGR: SM 91398 00985) following consideration of risk relating to the long-term stability of the embankment.
- 3.6.2 The chosen HVDC cable route was adopted to avoid sensitive features and reduce potential effects where avoidance was not possible. Further detail on the cable corridor and relevant constraints are described in Chapter 2, Section 2.5.3 of the ES.

## 3.7 Onshore HVAC Route Selection

- 3.7.1 The HVAC cable route from the converter station to the power station has been designed to minimise the impact on hedgerows, due to the presence of protected species; particularly dormice. The cable route emerges from the converter station field within the hedgerow gap on the northern field boundary, before following further gaps in hedgerows and treelines north and east to avoid existing infrastructure, crossing the Wales Coast Path at NGR: SM 93526 01919, before continuing north to the connection bay on the eastern side of the National Grid substation.

## 3.8 Summary and Conclusion

- 3.8.1 Following optioneering and design refinement across Greenlink and the Proposed Development and focussing on the assessment of alternatives and evolution of design in Wales, the likely environmental effects have been reduced through adoption of the proposed design relative to:
1. Other technologies that may require a greater scale of development or incur greater losses (e.g. heat) to the environment;
  2. Locations of key assets to minimise installation disruption to communities and the environment; and
  3. Sensitive alignment of both marine and terrestrial HVDC and HVAC cables to avoid sensitive habitats and species features as far as practicable and minimise effects on landowners and communities.

## 4 Approach to the Assessment

### 4.1 Environmental Impact Assessment

- 4.1.1 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. The EIA process comprises three stages: screening, scoping and assessment.
- 4.1.2 Screening - GIL received a Screening Direction from Welsh Government in 2017, which concluded that the Proposed Development was not EIA Development. Notwithstanding the above Screening Direction, GIL determined to undertake a robust and transparent process and concluded to submit separate Environmental Statements with all applications for consent.
- 4.1.3 Scoping - GIL obtained an EIA Scoping Opinion from Pembrokeshire County Council and the Pembrokeshire Coast National Park Authority in 2018. The Scoping Opinion was based on a Scoping Report submitted by GIL and confirmed agreement or otherwise of which aspects of the environment should be addressed in the ES.
- 4.1.4 Assessment - The EIA takes into consideration consultation responses from stakeholder input and public engagement, limitations and assumptions related to each discipline and considers interrelationships between chapters. The EIA also considers the potential interactions between each component of Greenlink and potential interactions with other developments in the wider area.
- 4.1.5 Each topic chapter provides details of the methodology for baseline data collection and the approach to the assessment of effects. In accordance with the EIA Regulations, the ES considers the likely significant effects of construction, operation and decommissioning of the Proposed Development. The description of the impact assessment methodology adopted for the Proposed Development is set out in Chapter 5 of the ES.
- 4.1.6 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 mitigation measures required. All project specific mitigation commitments made in the EIA are additionally listed in a Schedule of Mitigation provided as Chapter 17.
- 4.1.7 The EIA represents a worst-case assessment based on two converter stations options and utilises the maximum parameters considering all design criteria. As such, refinement during the detailed design may lead to reductions in design parameters and a concomitant reduction in potential effects.

### 4.2 Baseline Environment

- 4.2.1 The ES describes the baseline scenario for each environmental topic area and highlights the constraints applicable to each relative to the Proposed Development.

4.2.2 A number of notable sensitive environmental features are present in the vicinity of the Proposed Development, as shown in Figure 3.2. These include the sensitive areas listed in Table 4.1.

**Table 4.1 Sensitive Features within the vicinity of the Proposed Development**

Site Name	Designation Type	Proximity
Pembrokeshire Coast National Park	National Park	Within - Landfall and HVDC Cable Route
Pembrokeshire Marine Special Area of Conservation (SAC)	Natura 2000 Site / European Protected Site	Within - Underground HVDC Landfall via HDD
Limestone Coast of South West Wales SAC	Natura 2000 Site / European Protected Site	Within - Underground HVDC Landfall via HDD
Castlemartin Coast Special Protection Area (SPA)	Natura 2000 Site / European Protected Site	Within - Underground HVDC Landfall via HDD
Broomhill Burrows Site of Special Scientific Interest (SSSI)	Nationally Important Biodiversity Site	Within - Underground HVDC Landfall via HDD
South Pembrokeshire Heritage Coast	Heritage Coast	Within - Underground HVDC Landfall via HDD
Milford Haven Waterway	Historic Landscape Area	Within - Converter Station, HVDC and HVAC Cable Route
Public Rights of Way / Wales Coast Path	PRoW / National Trail	Within - HVAC Cable Route
Tree Preservation Order	TPO [PCC]	<50m - Converter Station
Devil's Quoit Burial Chamber	Scheduled Monument [Cultural Heritage]	< 100m - HVDC Cable Route
War Memorial at Freshwater West	Grade II Listed Building [Cultural Heritage]	c. 200m - HVDC Cable Route
Gravel Bay Anti-Aircraft Battery	Scheduled Monument [Cultural Heritage]	c. 300m - HVDC Cable Route
Milford Haven Waterway	Nationally Important Biodiversity Site	c. 500m - HVAC Cable Route

4.2.3 Potential effects on these features are considered within the individual technical chapters of this ES and within relevant supporting documents, including: a Statement to Inform a Habitat Regulations Assessment (HRA) Report [Volume III, Appendix 6.11].

## 4.3 Habitats Regulations Assessment

- 4.3.1 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 of protected areas referred to in the UK as European sites. In the UK the Conservation of Habitats and Species Regulations 2017, referred to as the 'Habitats Regulations', require consideration as to whether a plan or project has the potential to have an adverse effect on the integrity of a European site either alone or in combination with other plans and projects. This process is known as Habitats Regulations Assessment (HRA).
- 4.3.2 The HRA process consists of four sequential steps. Briefly, these include:
- Stage 1 Screening to identify potential effects.
  - Stage 2: Appropriate Assessment where impacts on protected sites are determined.
  - Stage 3 requiring an assessment of alternative options should an impact be identified on a protected site's integrity.
  - Stage 4 to determine the imperative need for a project and secure compensatory measures.
- 4.3.3 The Proposed Development is located within the vicinity of four European Sites. The Proposed Development is not directly connected with or necessary to the management of the European sites. Therefore, under the Habitats Regulations it is necessary that the Proposed Development should be subject to the HRA process.
- 4.3.4 Stage 1 Screening and Stage 2 Information to Inform Appropriate Assessment has been submitted alongside the ES. It is provided in Volume III, Appendix 6.11 of the ES and concludes no adverse effect on site integrity following the application of mitigation measures; e.g. replacement hedgerows to maintain connectivity of bat flightlines.

## 4.4 Consultation

- 4.4.1 Early consultation is a critical first step in the development of a comprehensive and balanced EIA. GIL started discussions in 2015 with Pembrokeshire County Council, Pembrokeshire Coast National Park Authority, Natural Resources Wales, Milford Haven Port Authority and Castlemartin Firing Range. 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.
- 4.4.2 As a PCI project, GIL is also required to conduct public and stakeholder consultation meetings through a variety of means. Wider public participation was achieved through:
- Development and regular updates to the Project website ([www.greenlink.ie](http://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 - Volume III, Appendix 1.2 of the ES) - published before the start of formal public consultation and updated throughout the development process.

4.4.3 GIL have held public consultation events at key points throughout the development process, aimed to keep local communities informed and to allow a forum to discuss any opportunities or concerns. Dates and venues of public engagement events are outlined in Table 4.1 below.

**Table 4.2 Greenlink Public Consultation Events**

Consultation Event	Consultation Stage	Consultation Venue	Consultation Dates
Public Consultation Event - May 2018	Optioneering	Pembroke Dock: Pater Hall Hundleton: Sports Pavillion Angle: Village Hall	29 May 2018; 14:00 - 20:00 30 May 2018; 14:00 - 20:00 31 May 2018; 14:00 - 20:00
Public Consultation Event - December 2018	Outline Design / Post-EIA Scoping Submission	Pembroke Dock: Pater Hall Angle: Village Hall Hundleton: Sports Pavillion	3 December 2018; 14:00 - 20:00 4 December 2018; 14:00 - 20:00 5 December 2018; 14:00 - 20:00
Traffic and Transport Consultation	Traffic and Transport Plans	Pembroke Town Hall	4 April 2019; 10:00 - 13:00
Public Consultation Event - June 2019	Initial Designs and Assessment Outputs	Pembroke Town Hall Angle: Village Hall Pembroke Dock: Pater Hall Hundleton: Sports Pavillion	24 June 2019; 14:00 - 20:00 25 June 2019; 14:00 - 20:00 26 June 2019; 14:00 - 20:00 27 June 2019; 16:00 - 20:00
Public Consultation Event - December 2019	Pre-Application Consultation [Draft ES, Draft Planning Documents]	Hundleton: Sports Pavillion Angle: Village Hall Pembroke Dock: Pater Hall	2 December 2019; 14:00 - 20:00 3 December 2019; 14:00 - 20:00

Consultation Event	Consultation Stage	Consultation Venue	Consultation Dates
		Pembroke Town Hall	4 December 2019; 14:00 - 18:00 5 December 2019; 14:00 - 20:00

## 5 Summary of Environmental Effects

- 5.1.1 This section presents a summary of the environmental assessment process and the conclusions of each topic chapter regarding the significance of the potential effects of the Proposed Development; including both beneficial and adverse effects of construction, operation and maintenance and decommissioning.
- 5.1.2 The conclusions take into account the mitigation detailed within each topic chapter and collated in Volume I, Chapter 17: Schedule of Mitigation of the ES and embedded within Volume III, Appendix 2.1: Outline Construction Environmental Management Plan (CEMP). The outcome of each EIA topic is summarised below along with the respective determination of EIA significance.
- 5.1.3 The following terms have been highlighted to emphasise relevant conclusions on environmental effects; as follows: **not significant**, **significant** and **significant beneficial**.

### 5.2 Biodiversity

- 5.2.1 With the inclusion of the proposed mitigation measures secured through the Outline CEMP, construction effects are considered to be reduced to levels that are **not significant** and the construction activities could be undertaken lawfully subject to the granting of licences by NRW. Subject to the agreement of the operational lighting strategy for the converter station with Pembrokeshire County Council and NRW, the effects of the operation of the Proposed Development can either be avoided or reduced to levels which are **not significant**.
- 5.2.2 Protected sites will not be directly affected, and indirect effects will be managed by best practice construction practice, e.g. CIRIA and Guidelines for Pollution Prevention, secured through the Outline CEMP, which will avoid these effects or reduce them to levels which are considered to be **not significant**.
- 5.2.3 Potential effects on mobile features of European Sites are limited to lesser and greater horseshoe bats, associated with temporary effects on flightlines during cable installation across hedgerows. Mobile screening will be provided during such activities to provide connectivity within hedgerow gaps to maintain bat flightlines, whilst replacement hedgerow will avoid any operational effects; therefore, reducing potential effects to **not significant**.
- 5.2.4 Dormice are presumed to be present across the study area and may be affected by habitat loss and severance between habitats. Embedded mitigation throughout design of the cable corridor avoided the majority of hedgerows and woodland such that mitigation is only required at a few locations resulting in effects considered to be **not significant**. Standard ecological mitigation will be required to avoid and reduce effects on wider protected species with minor adverse effects reduced to negligible as a result (**not significant**).
- 5.2.5 Any hedgerows affected by the Proposed Development will be reinstated following cable installation, whilst the converter station site has been designed to avoid encroachment into the Root Protection Zone (RPZ) of the adjacent

Tree Preservation Order (TPO) woodland, effects on both receptors are therefore reduced to **not significant**.

- 5.2.6 Replacement planting with native species of local provenance, including dormouse foraging habitat, will be provided to deliver enhancement and expansion of important bat and dormouse habitat; including improving connectivity between woodland blocks by enhancing landscape screening to the south of the converter station resulting in a moderate beneficial effect (**significant beneficial**).

## 5.3 Landscape and Visual Assessment

- 5.3.1 The EIA predicts temporary and localised **significant** effects during installation of the cables at the temporary landfall compound. The temporary compound required to allow the HDD method will be present for approximately three to six months, HDD activities will avoid the core visitor period of July and August and the temporary compound area will be fully restored following installation. However, the sensitive location triggers a significant effect despite the temporary nature of the works. Following installation, the landscape and visual effects of the cable installation are assessed as **not significant**.
- 5.3.2 Construction of the converter station is predicted to result in both **significant** and **not significant** effects depending on the location of the viewpoints in relation to local topography; refer to Figure 5.1. Once operational, the temporary construction compound will be removed, and the field restored. Based on the maximum parameters approach used to undertake the landscape and visual assessment, a number of key viewpoints within Pembrokeshire County Council maintain a **significant** effect into operation; refer to Figures 2.4 to 2.6. Effects on the Pembrokeshire Coast National Park are assessed as **not significant**.
- 5.3.3 A number of mitigation measures have been proposed including:
- Planting c. 15m high trees around the perimeter of the converter station site to act as visual screening; refer to Figure 5.2.
  - Utilising cut-and-fill to set the converter station pad lower into the landform.
  - Colour rendering and design solutions to blend the building into the landscape, making it less visually prominent - Figure 2.4 versus Figure 2.5; note landscape planting (trees and hedges) as mitigation is not included.
- 5.3.4 Once the landscape planting reaches maturity a number of receptors will become **not significant**, whilst certain viewpoints are assessed as likely to retain a **significant** landscape and visual effect where topography restricts the efficacy of the mitigation at the outline design stage.
- 5.3.5 Following appointment of a contractor and selection of a converter station design at the detailed design stage, design-specific mitigation measures, e.g. colour gradation or block colour to break up the outline of building, will be developed aiming to reduce the significance of operational effects. Furthermore, the maximum parameters assessed within this ES may be reduced at detailed design leading to reduced landscape and visual effects during operation.

- 5.3.6 In addition to woodland and scrub planting around the converter station that has been designed to support local protected species, additional woodland planting is proposed to the west of the construction compound field to link two discrete woodland blocks and provide connectivity as a biodiversity and landscape and visual enhancement considered to represent a moderate beneficial (**significant beneficial**) effect.

## 5.4 Historic Environment

- 5.4.1 Historic Environment features associated with the Proposed Development are presented in Figure 5.3.
- 5.4.2 The EIA identified temporary minor/moderate adverse effects on the setting of heritage assets during construction. Moderate effects are considered **significant** in terms of the EIA Regulations; however, these will reduce to neutral (**not significant**) following construction of the Proposed Development.
- 5.4.3 The assessment identifies minor to major adverse and therefore **significant** effects on buried archaeological remains during construction. However, these will be reduced to minor adverse (**not significant**) by the implementation of mitigation integrated into the Outline CEMP and would therefore be considered **not significant**.
- 5.4.4 This assessment has identified that there will be a permanent minor adverse (**not significant**) effect on heritage assets, principally direct impacts on buried archaeological remains, and changes to the setting of upstanding assets. These effects are considered **not significant** in the context of the EIA Regulations.

## 5.5 Traffic and Transport

- 5.5.1 Traffic and Transport effects of the Proposed Development are deemed to be negligible or minor adverse and **not significant** for both construction and operational phases. The proposed construction traffic route to the Proposed Development is presented in Figure 5.5. Where minor effects are identified, mitigation measures and recommendations have been included within the Framework Construction Traffic Management Plan and are to be considered in preparation of the Full Construction Traffic Management Plan to be prepared by the Contractor and agreed with the Council prior to the start of construction. General construction traffic will have a minor adverse effect on a temporary basis and will be managed via the Framework Construction Traffic Management Plan.
- 5.5.2 Abnormal load delivery may be via a highway or marine route; should abnormal loads be routed through Pembroke, further survey would inform the final routing to be detailed within the Full Construction Traffic Management Plan. Operational traffic has been assessed as **not significant** due to negligible change in baseline.

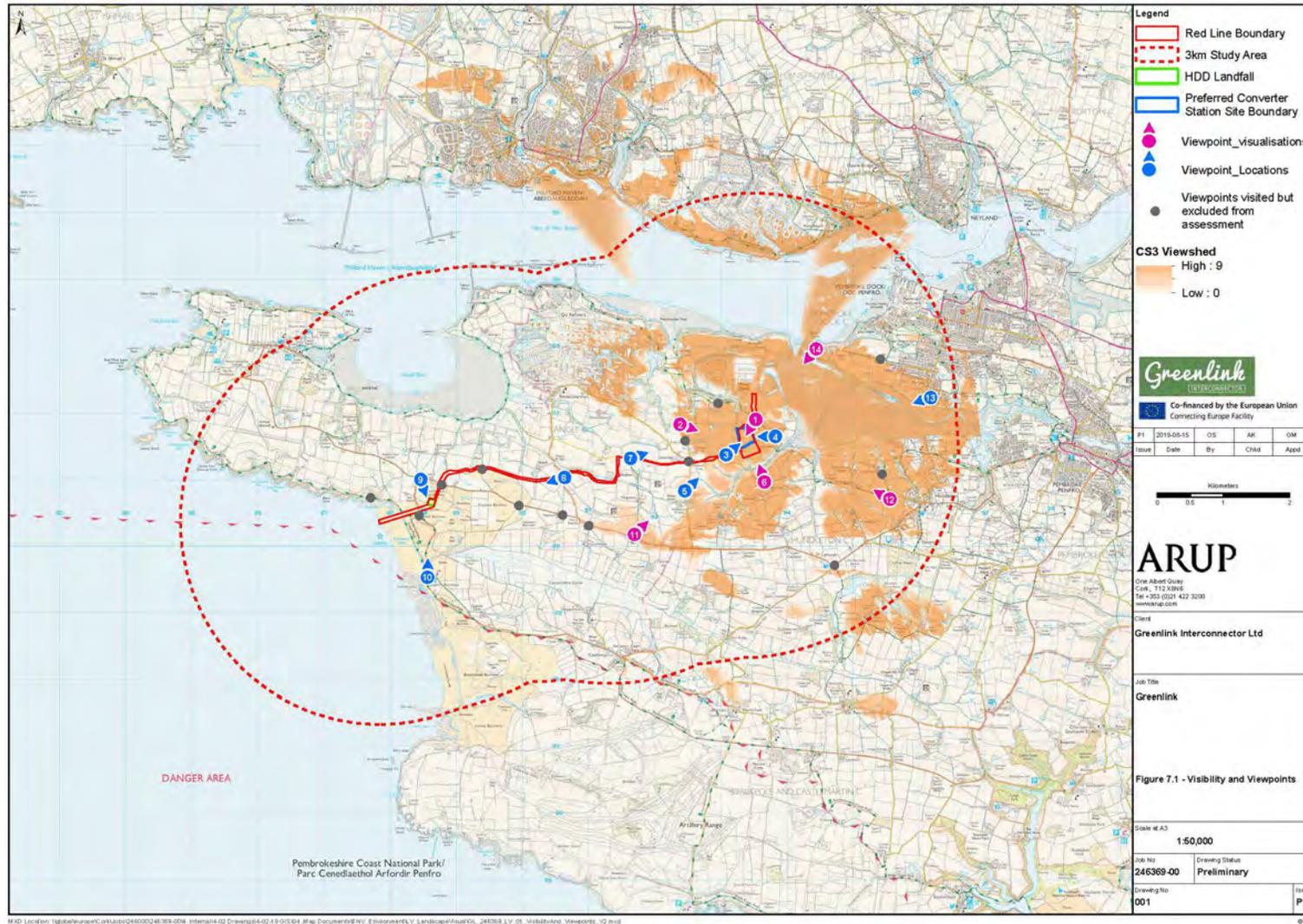


Figure 5.1: Viewpoints and Zone of Visual Influence (without trees, etc.)

For more information:  
 W: [www.greenlink.ie](http://www.greenlink.ie)



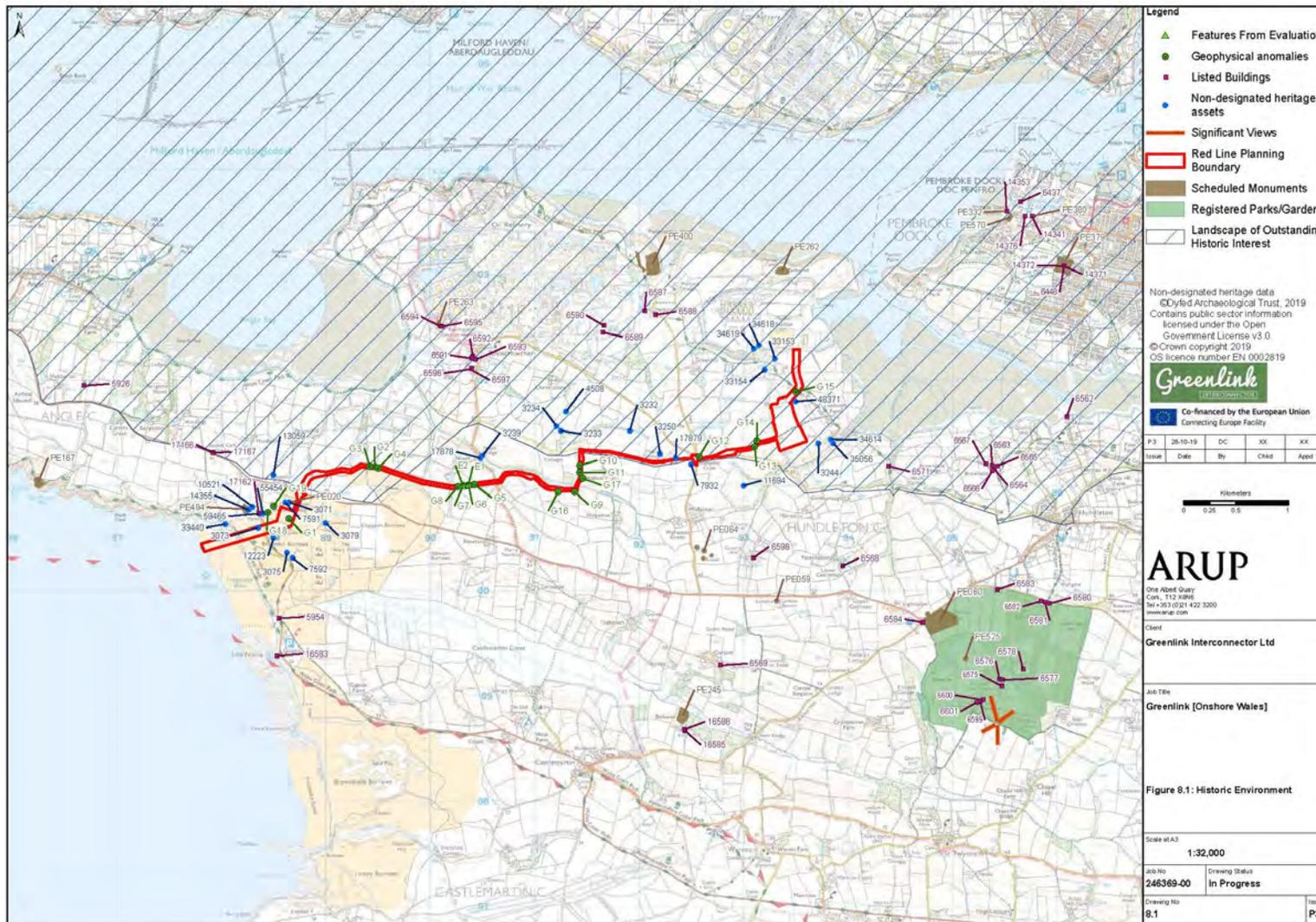


Figure 5.3: Historic Environment Features

## 5.6 Noise and Vibration

- 5.6.1 An assessment of noise and vibration effects due to the construction of the converter station and cable route has been conducted, according to the principles and methods set out in British Standards; refer to Figure 5.4 for the location of key receptors. The effects are predicted to have a **significant** adverse effect on one receptor (Hoplass Cottages) for a short time as the cable laying works pass by. Construction noise and vibration would be managed using Best Practicable Means and secured via the Outline CEMP.
- 5.6.2 Construction traffic has been assessed on the approaches to the converter station and on the final section of road towards Lambeeth Farm where HGVs would access the converter station site and compound. The noise impacts from HGV movements relative to the ambient noise levels has been assessed as **not significant**.
- 5.6.3 An assessment of noise effects due to the operation of the converter station has been conducted, according to the principles and methods set out in British Standards to determine the noise levels reaching sensitive receptors relative to the existing background noise levels. As a result of the design measures to address noise emission from the dominant noise generating plant items, noise levels from the converter station would be below the measured background noise levels. Operational noise parameters are proposed to limit converter station noise to as close to background levels as practicable, in line with BS4142, and secured via the Outline CEMP. Therefore, the operational noise effects of the converter station are assessed to be **not significant**.

## 5.7 Air Quality

- 5.7.1 The EIA concluded that the impacts of dust soiling and particulate emissions from construction traffic are negligible and **not significant**. Construction traffic (Figure 5.5) has been routed to avoid the Pembroke Air Quality Management Area (AQMA), with only minimal abnormal loads potentially transiting through the AQMA; secured via Volume III, Appendix 9.1, Annex C: Framework Construction Traffic Management Plan (CTMP) of the ES.
- 5.7.2 A dust impact assessment also concluded no likely significant effect following review of construction activities and mitigation embedded within the Outline CEMP, to be adopted and developed within the full CEMP following the appointment of a Contractor.
- 5.7.3 Local emissions during the operational phase are restricted to periodic use of maintenance vehicles and temporary generator testing and are therefore assessed as negligible and **not significant**.

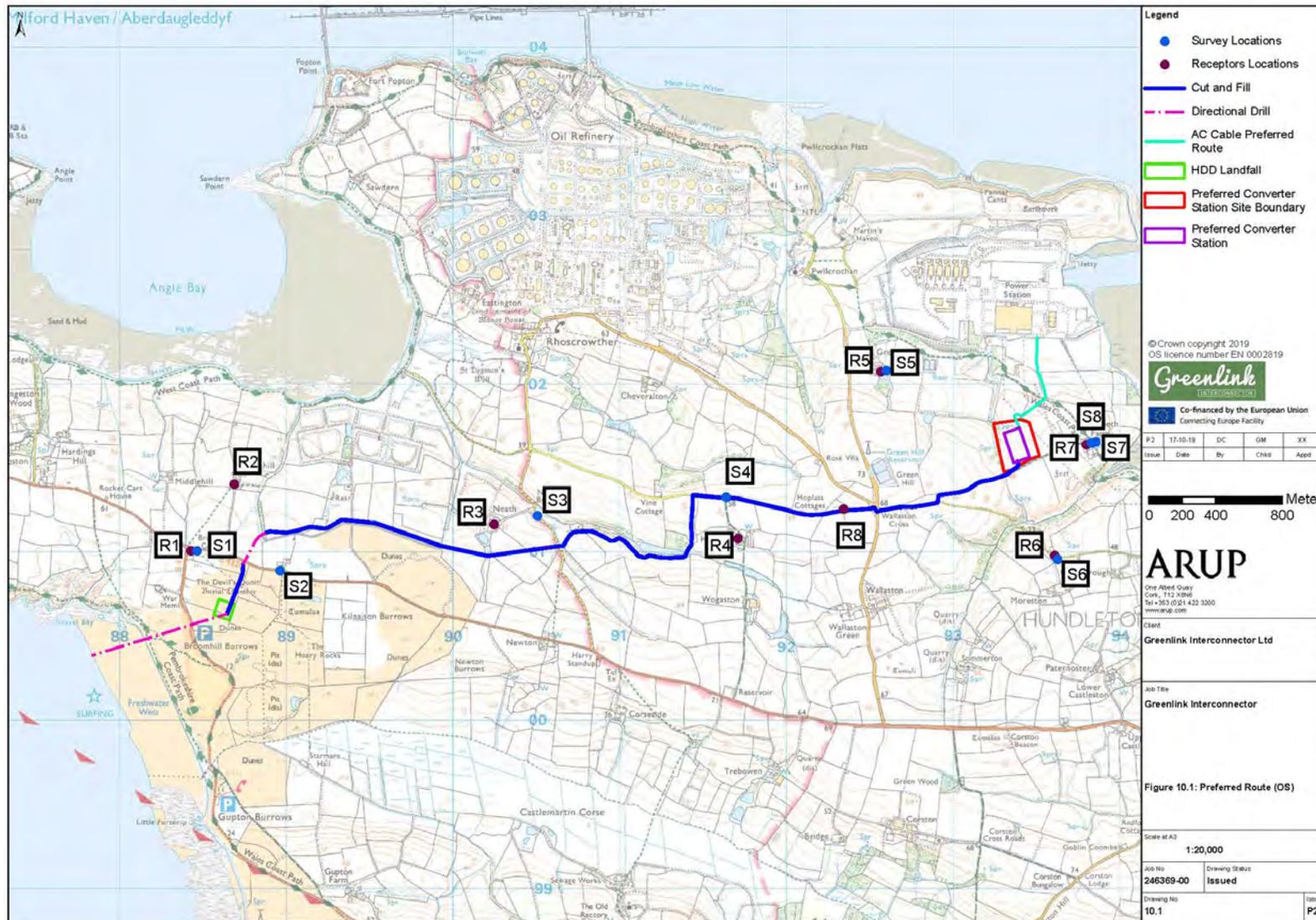


Figure 5.4: Receptors for Construction and Operational Noise Assessment

For more information:  
 W: [www.greenlink.ie](http://www.greenlink.ie)

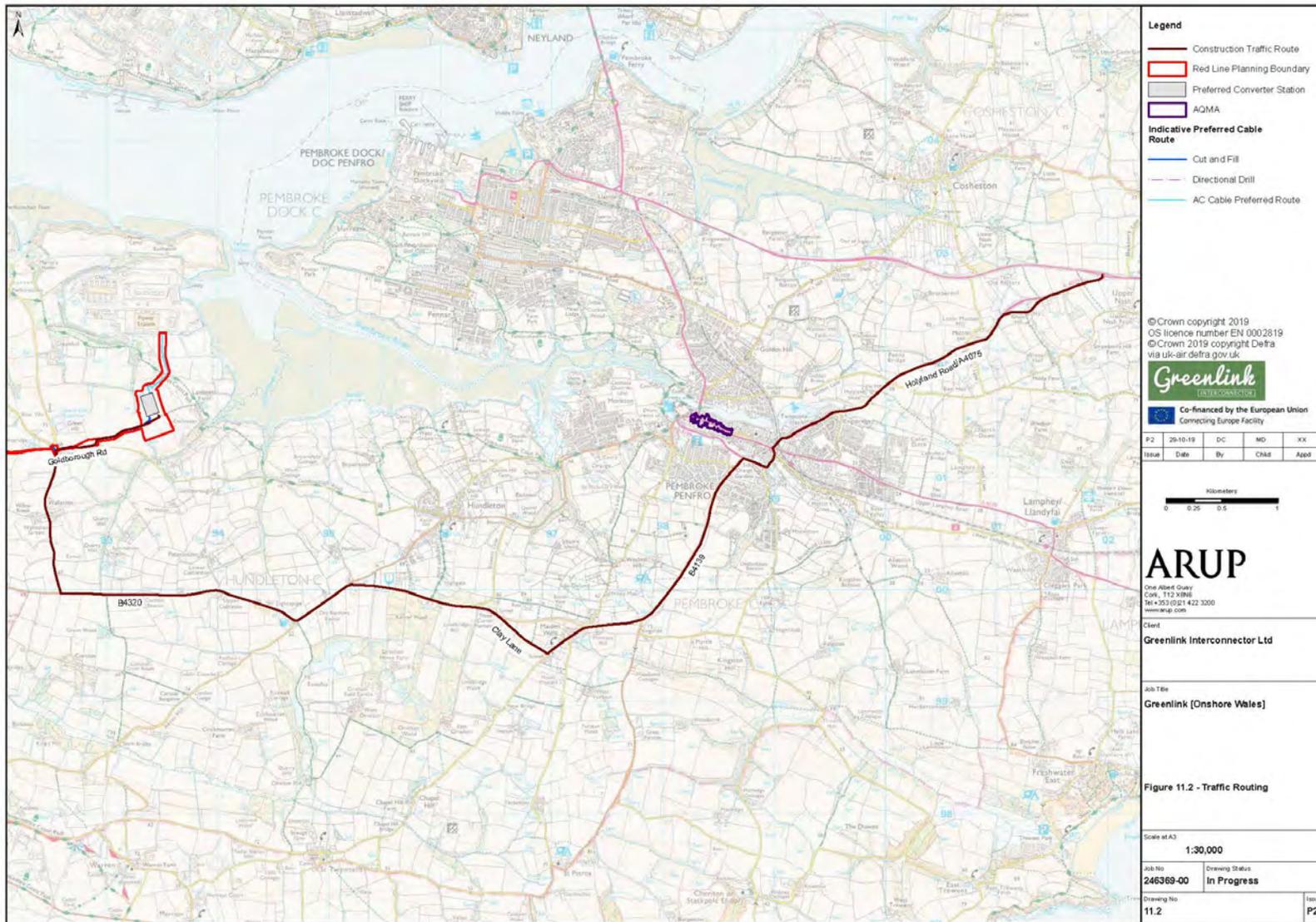


Figure 5.5: Construction Traffic Route

For more information:  
 W: [www.greenlink.ie](http://www.greenlink.ie)



Figure 5.6: Economic and Recreational Receptors

For more information:  
 W: [www.greenlink.ie](http://www.greenlink.ie)

## 5.8 Water Environment

- 5.8.1 Groundwater and surface water effects during the construction phase have been assessed as neutral or slight and **not significant**, supported by a Water Framework Directive (WFD) Screening Assessment. The Outline CEMP secures mitigation measures to manage construction activities near water; including compliance with Guidelines for Pollution Prevention 5: Working near Water.
- 5.8.2 A preliminary SuDS Approval Body (SAB) Consent will be submitted to demonstrate that sustainable development principles apply to the operational design of the converter station. Adherence to preliminary SAB Consent requirements; including adoption of the SuDS hierarchy to ensure resilient drainage via implementation of bioretention swales and an attenuation pond within the converter station site and sensitive design of culvert reinstatement is assessed as neutral or minor beneficial and **not significant** for the operational phase.

## 5.9 Soils, Geology and Hydrogeology

- 5.9.1 The EIA concluded that there will be a slight-to-moderate adverse effect on the geology, soil and hydrogeology during construction and **not significant** in the context of the EIA Regulations. During construction, HDD activities and cable installation design represent embedded mitigation reducing the magnitude of impact to negligible (not significant) by minimising excavation widths and depths.
- 5.9.2 Cable installation would primarily be within natural ground, with made ground localised to private access tracks; no known sources of contamination are present. Geology at the converter station is of negligible importance due to the restricted area of impact and type and nature of local geology with no made ground identified; the requirement for earthworks predicts a minor adverse impact (**not significant**).
- 5.9.3 Hydrogeology would not be affected at the landfall site due to the depth of groundwater (c.6m bgl); effects of HDD on the Secondary (A) aquifer are deemed to be temporary, minor and localised (**not significant**). Groundwater would typically be below construction depth for cable installation, whereas converter station earthworks may temporarily intercept groundwater; potential pollution effects would be managed by Guidelines for Pollution Prevention, which are secured within the Outline CEMP. As such, no licenced groundwater extractions or controlled waters would be affected by the Proposed Development and has been assessed as **not significant**.
- 5.9.4 Unexploded Ordnance (UXO) risk is determined to be: Low, Low-Medium and Medium risk across the Proposed Development. Site-Specific UXO Toolbox talks would be implemented for all invasive works and UXO Specialist On-Site Support provided in Medium UXO Risk Areas.
- 5.9.5 No effects on soils, geology and hydrogeology are predicted during operation as proposed maintenance activities are not predicted to have any effect. As such, it is concluded that there will be neutral or negligible effects during operation, which is **not significant**.

## 5.10 Material Assets

- 5.10.1 The likely significance of environmental effects from the use of material resources and the generation and management of waste during construction and operation have been assessed in accordance with relevant guidance; LA 110. The EIA concluded that there will be a neutral effect (**not significant**) on the on-site material sources, a slight/neutral adverse effect (**not significant**) on the imported off-site material sources and a slight/moderate adverse effect (**significant**) on the off-site waste and materials management infrastructure.
- 5.10.2 The Outline CEMP secures measures to minimise potential effects on material assets requiring adherence to the waste hierarchy and require preparation of a Materials Management Plan as part of the full CEMP prior to construction.
- 5.10.3 Following application of the mitigation proposed, including re-purposing materials via waste transfer stations, construction effects are assessed as **not significant**. During the operational phase the assessment concluded that effects would be **not significant**.

## 5.11 Socio-Economics

- 5.11.1 During the construction phase, the EIA concludes a range of effects across receptors (Figure 5.6) from minor adverse (**not significant**) to minor beneficial (**not significant**) and moderate beneficial (**significant beneficial**) for creation of construction jobs and training opportunities and induced spend by the local workforce.
- 5.11.2 During operation the EIA concludes that effects would be negligible (**not significant**) for all receptors; however, the EIA concludes a moderate adverse and **significant** effect resulting from the permanent loss of the converter station field following construction of the converter station that cannot be replaced.

## 5.12 Cumulative Effects

- 5.12.1 **Cumulative effects (combined effects with other aspects of the Proposed Development or other plans and projects)** include a review of interrelationships between topic chapters, interactions between the wider components of Greenlink (Marine Wales, Marine Ireland, Onshore Ireland) and other plans and projects within the study area ( Co-Generation Facility at Valero Refinery and Pembrokeshire Dock Marina).
- 5.12.2 No effects were identified that would act cumulatively with any residual effects of the Proposed Development. As such, the assessment concluded that cumulative effects would be **not significant**.

## 6 EIA Summary Matrix

Table 6.1 EIA Summary Matrix

EIA Topic	Construction	Operation	Decommissioning
Biodiversity	Not Significant	Significant (Beneficial)	Not Significant
Landscape & Visual	Majority Receptors - Not Significant  Multiple Visual Receptors - Significant [Temporary; construction - duration varies: <6 months at landfall; c. 3 years at converter station]	Majority Receptors - Not Significant  One Visual Receptor - Significant [Temporary; 1-3 years]  Three Visual Receptors - Significant [Additional mitigation to be considered at detailed design]	Majority Receptors - Not Significant  Multiple Visual Receptors - Significant [Temporary; construction - duration varies: <6 months at landfall; c. 3 years at converter station]
Historic Environment	Majority Receptors - Not Significant  Heritage Setting Effects - Significant [Temporary; construction].	Not Significant	Not Significant
Traffic & Transport	Not Significant	Not Significant	Not Significant
Noise & Vibration	Majority Receptors - Not Significant  Single Receptor - Significant [Temporary; up to one month duration]	Not Significant	Not Significant
Air Quality	Not Significant	Not Significant	Not Significant
Water Environment	Not Significant	Not Significant	Not Significant
Soils, Geology & Hydrology	Not Significant	Not Significant	Not Significant
Material Assets	Not Significant	Not Significant	Not Significant
Socio-Economics	Significant (Beneficial)	Majority Receptors - Not Significant  Loss of Agricultural Land - Significant	Not Significant
Cumulative Effects	Not Significant	Not Significant	Not Significant