Scotland England Green Link 2 - English Onshore Scheme

Environmental Statement: Volume 2

Chapter 2: Project Development and Alternatives

May 2022

For: National Grid Electricity Transmission

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2. Project Development and Alternatives

2.1 Introduction

In accordance with Regulation 18(3)(d) and Schedule 4 part 2 of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (2017 Regulations), this chapter will provide a description of the reasonable alternatives studied by the applicant which are relevant to the Project and its specific characteristics, and the main reasons for the option chosen, taking into account the effects of the Project on the environment.

This chapter sets out the need for the Project and describes how the English Onshore Scheme has been identified; firstly, in response to the need case and secondly, how the Scheme has evolved and the alternatives that have been considered taking account of National Grid Electricity Transmission's (NGET) statutory duties under the Electricity Act 1989.

2.2 Background

In response to the UK and Scottish Government's legally binding targets to reach net zero in their greenhouse gas emissions by 2050 and 2045 respectively, the way in which energy is generated is undergoing transformational change. The past year has seen increased ambition for offshore wind in particular with the UK Government's Ten Point Plan re-affirming the commitment to reach 40 gigawatts (GW) of installed capacity by 2030 and the recent Scotwind leasing round awarding rights to develop up to 25 GW of offshore wind capacity in Scottish waters. Huge volumes of renewable energy generation including onshore and offshore wind as well as interconnectors will connect to the electricity transmission system over the coming years.

In order to economically and efficiently transmit this energy from where it is generated to where it is needed, there is a requirement to increase the capability of the electricity transmission system. Electricity demand is predominantly located in the south of the country, leading to high north-south power flows. These flows are highly variable due to the intermittent nature of renewable generation and interconnection. The north-south flows contribute significantly to potential constraints across the transmission system. To operate the network safely and efficiently, north-south power flows across the Scotland England boundary cannot not exceed the capability of the network between the two regions.

In the short to medium-term, increased power flows through Scotland and between Scotland and England are caused by generation already connected to the transmission network, and by generation which is contracted to connect to the network in the Scotland and North of England region. In the medium to long-term there are significant increases in north to south power flows across a diverse and credible range of scenarios including a tripling of wind generation connected to the network in Scotland by 2030, driving higher north-to-south power transfers, and at least a doubling of transfer requirements from northern Scotland to the Midlands over the next 10 years. New reinforcements will be required to increase network capability, facilitate these power flows and get energy to where it is needed.

2.3 Need for the Project

2.3.1 Overview of the Electricity Transmission System

The electricity transmission system across Great Britain is divided by a number of boundaries. These are notional lines used to represent areas of high-power flows between different parts of the system (see **Figure 2-1**). The boundaries split the transmission network into parts crossing critical transmission circuit paths that carry power between areas where power flow limitations may be encountered. When flows across a boundary are forecast to be above the capability of the network then energy generation needs to be managed to ensure that the capability of network is not exceeded. Managing shortfalls in network capability across boundaries results in additional costs, referred to as 'constraint costs', to operate the network. A network with no constraints would indicate that there has been over-investment in the network. This is because some level of constraint is expected as part of the economic operation of the network. However, where excessive constraints occur then investment in new infrastructure may be needed to provide additional network capability and avoid restricting energy generation on one side of a boundary and incurring constraints costs.

2.3.2 Network Planning

The balance between the cost of investing in the network against the cost of constraints to ensure investment occurs at the right time and in the right place is undertaken through a series of annual activities overseen by National Grid Electricity System Operator (National Grid ESO), an entirely separate entity to NGET. These annual network planning activities include:

- Future Energy Scenarios (FES) – these are developed annually by National Grid ESO with input from industry and other stakeholders. The FES represent a range of different, credible ways in which the energy system could evolve taking account of policy and legislation, including net zero targets.
- Electricity Ten Year Statement (ETYS) – using data from the FES, National Grid ESO undertakes and annual assessment to identify points on the transmission system where more network capability is needed to ensure that energy is delivered efficiently and reliably to where it is needed.
- Network Options Assessment (NOA) – the Transmission Owners and other stakeholders respond to ETYS with solutions to address network capability requirements. These are assessed by National Grid ESO so that the most economic and efficient solutions are recommended to proceed, and others told to hold or stop.

The need for the Project has been identified and assessed as part of this continuous annual cycle of network planning activity. In the first NOA (NOA 2015/16) a subsea High Voltage Direct Current (HVDC) link between Peterhead and Hawthorn Pit was given a 'proceed' signal. The need for reinforcement on the east coast has continued to strengthen since then in response to both connected and contracted generation connections as well as alignment of the FES with net zero targets established by the UK and Scottish Governments. This is demonstrated by 'proceed' signals given to some form of one or more subsea HVDC links on the east coast in every subsequent NOA publication including the most recent NOA 2021/22 publication which gave 'proceed' signals to four such reinforcements:

- E2DC - Torness to Hawthorn Pit (known as SEGL1 currently in development),
- E4D3 - Peterhead to Drax (known as SEGL2 and part of which is the subject of this ES),
- E4L5 - Peterhead to South Humber, and
- TGDC - South east Scotland to South Humber.

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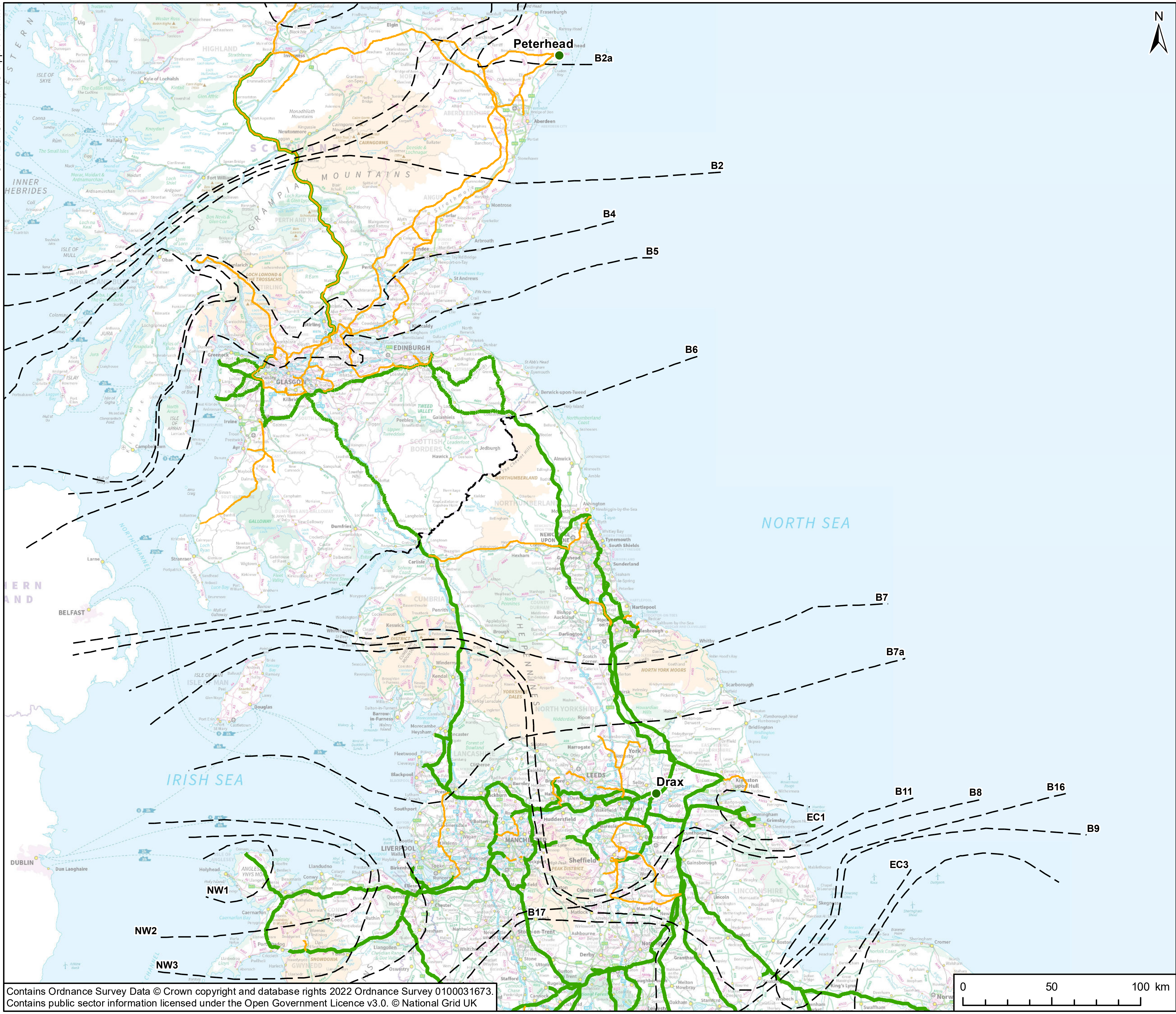

Coordinate System: British National Grid

Scale @ A3 1:2,000,000

nationalgrid

PROJECT

Scotland England Green Link 2

KEY

- Connection Point (Substation) Location
- Network Transmission Boundary

High Voltage Transmission System

- 275 kV
- 400 kV

TITLE

Figure 2-1
Overview of the Great Britain Electricity Transmission Network Boundaries

REFERENCE

SEGL2_T_ES_2-1_v1_20220325

SHEET NUMBER	DATE
1 of 1	25/03/2022

2.3.3 Need for the Project

As described above the fundamental need for the Project is based on providing additional network capability across transmission network boundaries in Scotland and England and to increase capability to accommodate (primarily) additional North-South flows on the network. This is due to increasing quantities of power generation (particularly onshore and offshore wind generation) and interconnection capacity in Scotland and the north east of England which will significantly increase cross-border and north-south boundary transfer requirements over time.

By overlaying current transmission system boundary capabilities with required capability based on the scenarios set out in FES 2020 and 2021 there is a clear need to increase network capability. The required transfers across all four FES (Steady Progression, Leading the Way, Consumer Transformation and System Transformation) significantly exceed capability, indicating a strong need for reinforcement.

For those transmission network boundaries within NGET's licence area (B6, B7, B7a and B8) the required boundary transfer capability typically starts to increase in all four FES by the mid-2020s with the divergence between existing and required capability becoming more pronounced in the late 2020s.

- Boundary B6: The boundary transfer requirements for B6 already exceed the existing boundary capability. The required boundary transfer capability starts to pick up in all four FES in the early 2020s with a significant gap of more than 5 gigawatts between capability and requirements starting to emerge by the mid-2020s. The shortfall in capability is on average, 5.3 GW in 2027 increasing to almost 6.4 GW in 2029 across all four FES.
- Boundary B7: The required boundary transfer capability on B7 starts to pick up in all scenarios in the mid-2020s with a significant gap between capability and requirements starting to emerge in the mid-2020s. The shortfall in capability is on average 4.4 GW in 2027 and increases to 5.6 GW by 2029 across all four FES.
- Boundary B7a: The required boundary transfer capability on B7a is more variable across the different scenarios. In FES 2019 the requirement to reinforce B7a is in excess of 7.5 GW in the most extreme scenario but there is no requirement in other scenarios.
- Boundary B8: The required boundary transfer capability on B8 is also more variable across the different scenarios. More recent FES outputs have indicated a requirement to reinforce across B8 by 7-9 GW within similar period to those described above.

The divergence between existing and required boundary transfer capability between now the late 2020s drives the need for the Project. Reinforcements to provide increased boundary transfer capability are required to ensure the economic and efficient operation of the transmission system in line with NGET's statutory obligations. This will prevent excessive constraints from occurring and allow the network to keep pace with projected growth in renewable generation supporting the UK and Scottish Governments' net zero ambitions. Further information regarding current capability and boundary transfer requirements in all four FES is available in the ETYS prepared by National Grid ESO (Scottish Boundaries Ref 2-1) and North of England Boundaries Ref 2-2).

Reflecting the need case, the primary objective of the Project is to reinforce the electricity network and increase transmission network capability between Scotland and northern England by 2029 in order to enable the efficient and economic transmission of electricity.

2.4 Approach to developing the Project

As a transmission licence holder under the Electricity Act 1989 (1989 Act), NGET has a number of statutory duties which it must comply with when developing and maintaining its network. In accordance with Section 9(2) of the 1989 Act, the holder of a licence authorising the transmission of electricity must develop and maintain an efficient, coordinated and economical electricity transmission system and to facilitate competition in the supply and generation of electricity.

In terms of Schedule 9 of the 1989 Act, NGET is required in formulating any 'relevant proposals' such as the Project, to (a) have regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or physiographical features of special interest and of protecting sites, buildings and objects of architectural, historic or archaeological interest; and (b) do what he reasonably can to mitigate any effect which the proposals would have on the natural beauty of the countryside or on any such flora, fauna, features, sites, buildings or objects.

Taking account of this, NGET has considered the natural environment, cultural heritage, landscape and visual quality, and also includes the impact of its works on communities, such as the effects of noise and disturbance from construction in developing the Project.

The statutory responsibilities outlined above underpin NGET's approach to developing new infrastructure projects such as the Project. This is illustrated below in **Figure 2-2**. The first three stages (Strategic Proposal, Options Identification and Selection and Assessment and Land Rights) have informed the identification of the English Onshore Scheme. At each of these stages, NGET has considered a range of engineering, economic, environmental and social factors consistent with its statutory duties. In addition, consultation has been undertaken with stakeholders and members of the public at key stages providing the opportunity to feedback on alternatives and inform the identification of the English Onshore Scheme.

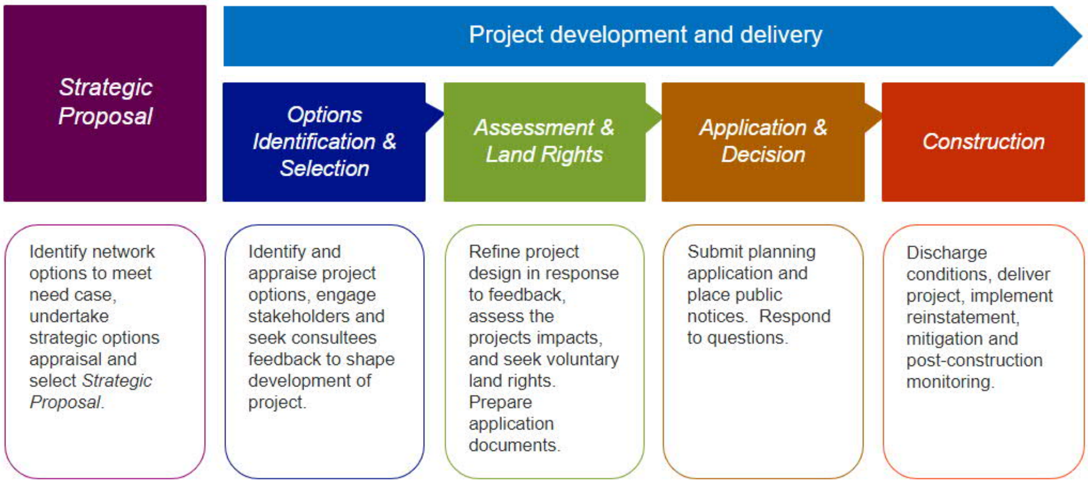

Figure 2-2: NGET Approach to Project Development & Delivery

2.5 Strategic Proposal

The first step in developing the Project was to undertake a Strategic Options Appraisal with the objective of identifying the Strategic Proposal, that is the preferred point within NGET's licence area that would best meet the need case by providing additional network capability when required and while also taking account of NGET's statutory and licence obligations.

In developing the Project, consideration was given to developing subsea HVDC links from Peterhead Substation in Aberdeenshire, Scotland to substations within NGET's licence area from Blyth in the north to Spalding North in the south. Overhead line options were considered and discounted as part of this exercise as they would not meet the need case of providing additional cross-border transmission capability by 2029.

The strategic options assessed comprised a fixed 'start' point on the network in Scotland at Peterhead, which was identified by Scottish and Southern Electricity Networks (SSEN). Peterhead was identified by SSEN as the 'start' point for any link due to its location close to the existing transmission network and proximity to the coast. Exporting power out of the north east of Scotland via a HVDC link connected at Peterhead Substation, which is currently under construction, is supported by the upgraded high capacity 400 kilovolt (kV) network in the region.

The Strategic Options Appraisal identified a number of alternative 'end' points at substations on the network in NGET's licence area from Blyth Substation in Northumberland to as far south as Spalding North Substation in Lincolnshire. The objective of the strategic options appraisal was to identify a preferred Strategic Proposal which would best meet the need case by providing additional network capability when required and while also taking account of NGET's statutory and licence obligations.

For each strategic option different factors were assessed including:

- Technical considerations: this included different transmission technologies, the additional network capability it would provide as well as factors influencing construction and operation.
- Boundary transfer capability: this included consideration of the level of boundary transfer capability that could be provided.
- Environmental and socio-economic impacts: this included high-level consideration of the potential impacts of different options on the environment and people.
- Programme and cost implications: this included consideration of how much different options might cost and how long it would take to develop, consent and construct them.

At a strategic level, a key factor influencing all of the options considered was the distance between the 'start' and 'end' points. A shorter reinforcement connecting in the north of NGET's licence area would cross fewer transmission network boundaries (see **Figure 2-1**) and provide less network capability but could be delivered more quickly alleviating potential constraints in the short term. Conversely a longer reinforcement would cross more transmission network boundaries and provide greater network capability but would take longer to deliver increasing the risk of constraints in the short term.

Longer reinforcements from Peterhead to 'end' points in the east of England cross more transmission network boundaries so provide greater amounts of additional network capability. Consideration was given to a number of potential 'end' points on the east coast including existing substations at Drax in North Yorkshire, Cottam in Nottinghamshire and Bicker Fen in Lincolnshire. All of these substations are located some way inland requiring longer onshore cable routes, however, while options closer to the coast are present these are typically located further north and do not provide as much additional network capability. The options at Cottam and Bicker Fen would require the cable routes to cross with a number of additional environmentally protected sites both offshore and onshore including potentially the Southern North Special Area of Conservation (SAC), Greater Wash Special Protection Area (SPA), Humber Estuary SPA, SAC and Site of Special Scientific Interest (SSSI) as well as the Lincolnshire Wolds Area of Outstanding Natural Beauty (AONB). Drax was identified as the preferred 'Strategic Proposal' because it could deliver similar amounts of additional network capability as Cottam or Bicker Fen when required while avoiding crossing and impacting on the additional environmentally protected sites offshore and onshore which would be required for options at either Cottam or Bicker Fen.

2.6 Options Identification and Selection

2.6.1 Overview

Following identification of Drax as the Strategic Proposal, a route and site selection study was undertaken firstly considering alternative landfall and converter station sites and secondly underground cable routes between them. The objective of this step was to identify preferred landfall and converter station sites and an underground cable route taking account of NGET's statutory duties which would form the basis of the English Onshore Scheme. This step comprised environmental and engineering studies as well as consultation with key statutory consultees including East Riding of Yorkshire and Selby District Councils, Natural England, the Environment Agency and Historic England. It concluded with the identification of a preferred scheme which is the English Onshore Scheme which was then subject to public consultation.

Table 2-1 provides a summary of the key environmental considerations which have informed the identification and assessment of alternative sites and routes.

Table 2-1: Summary of Key Environmental Siting and Routeing Considerations

Consideration	Description
Biodiversity	Consideration of the potential impact of alternative sites and/ or routes on designated and non-designated sites, priority and other important habitats.
Physical Environment	Consideration of the proximity of alternative sites and/ or routes to, or extent within flood risk zones, as well as the locations or crossings of water courses, drains or

Consideration	Description
	other surface water features. Consideration of the potential to encounter existing contaminated land.
Historic Environment	Consideration of the potential direct and indirect impact of alternative sites and/ or routes on designated and non-designated archaeological or heritage assets as well as the potential to encounter unrecorded archaeology.
Landscape and Visual	Consideration of the potential impact of alternative sites and/ or routes on landscape designations and landscape character.
Marine	Consideration of the potential impact of habitats or features that have the potential to be affected by cable installation primarily through direct disturbance and removal during cable trenching and burial activities, and/ or placement of cable protection.
Socio-economic and Community	Consideration of the potential impact of alternative sites and/ or routes on Public Rights of Way (PRoW), cycle routes and other socio-economic receptors.
Planning Consents and Allocations	Consideration of the potential impact of alternative sites and/ or routes on proposed planning applications, consents or allocations at the time of the appraisal.
Access	Consideration of the proximity of alternative sites and/ or routes to existing main roads (in particular A-class roads) as well as potential access routes to alternative sites and/ or routes.

2.6.2 Landfall Site Selection

The landfall is where the subsea cables connect to onshore cables at a buried transition joint pit (TJP). As shown in **Figure 2-3** six potential landfall sites between Bridlington to Hornsea were identified and assessed. The assessment considered a range of environmental and engineering constraints including proximity to settlements, scattered military remains, landfall accessibility, coastal erosion rates, designated sites including Flamborough Head Special Area of Conservation (SAC) and Holderness Marine Conservation Zone (MCZ) as well as other infrastructure such as offshore wind farm export cables which come ashore in the area.

Based on an initial review, landfalls LF05 south of Barmston Sands and LF06 at Skipsea were discounted. While both are technically feasible, they would have greater potential for environmental effects due to crossing the Holderness Inshore MCZ and/ or the Greater Wash Special Protection Area (SPA). A more detailed appraisal was undertaken of the remaining four landfalls: LF01 and LF02 located north and south of Fraisthorpe respectively and LF03 and LF04 located to the north of Barmston.

A key differentiating factor between the four landfall locations is the potential interaction with the proposed Hornsea 4 Offshore Wind Farm export cable route. The avoidance of this cable route, either in the marine or terrestrial environment, is preferrable in order to ensure that there are no additional engineering requirements, such as rock protection in shallow waters to protect the subsea cables, as this increases the potential for adverse environmental impacts. Both LF03 and LF04 would require to cross Hornsea 4 as well as potentially interact with the Dogger Bank Offshore Wind Farm export cables (which make landfall just south of Barmston). Due to a combination of the potential environmental effects and engineering constraints, landfalls LF03 and LF04 were discounted. While LF01 and LF02 are both located to the north of Hornsea 4, LF02 is in much closer proximity. This reduced separation makes it less preferable due to the potential for environmental effects and engineering constraints.

Given that it avoids the requirement to cross the proposed Hornsea 4 export cables (offshore and onshore) and avoids environmental designations and settlements, LF01 to the north of Fraisthorpe was identified as the preferred landfall site. It is located on open agricultural land, outside of areas at risk of coastal erosion with good access from the A165 and provides a technically feasible landfall with fewer engineering challenges.

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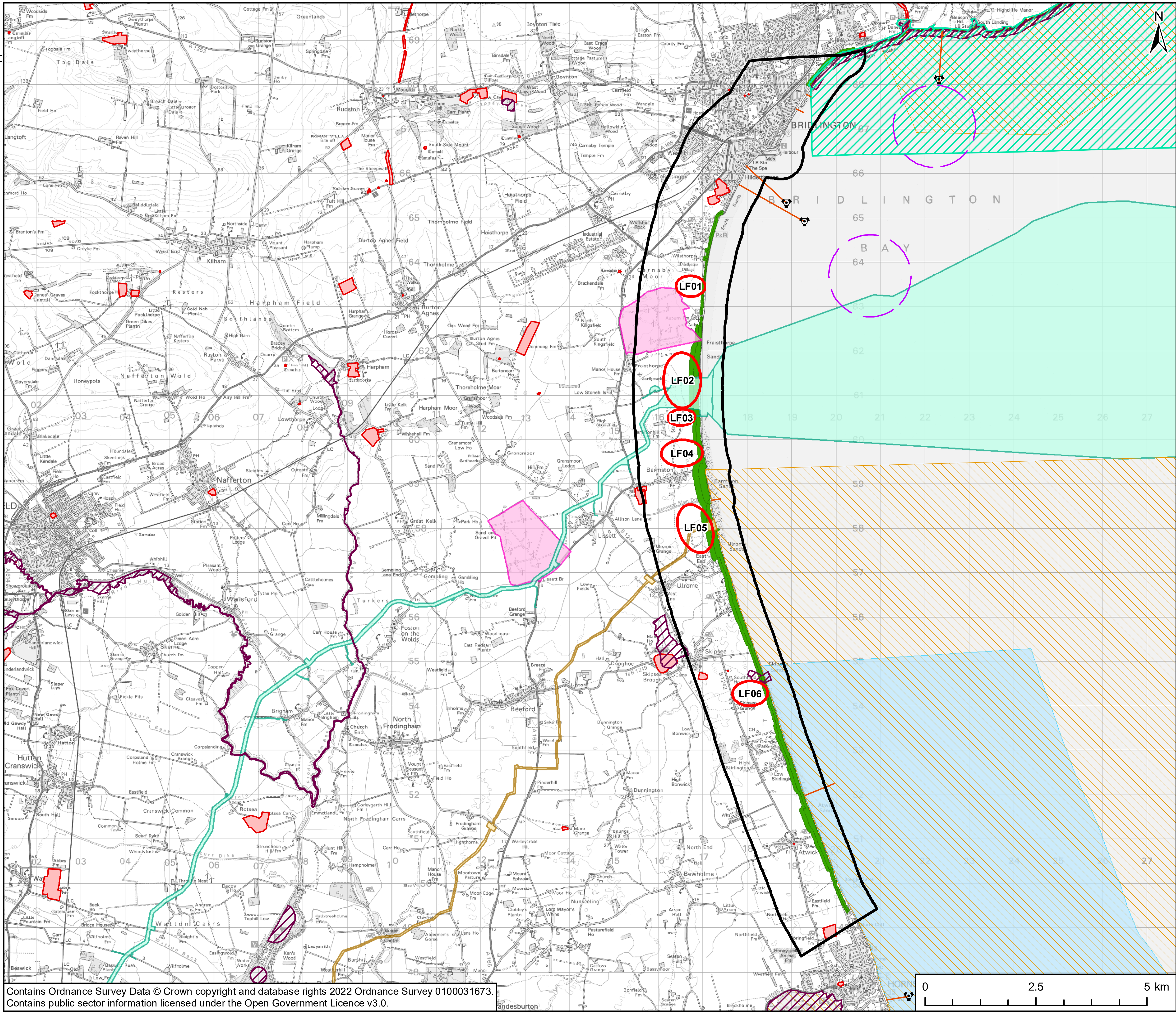

Coordinate System: British National Grid

0 2.5 5 km

Scale @ A3 1:80,000

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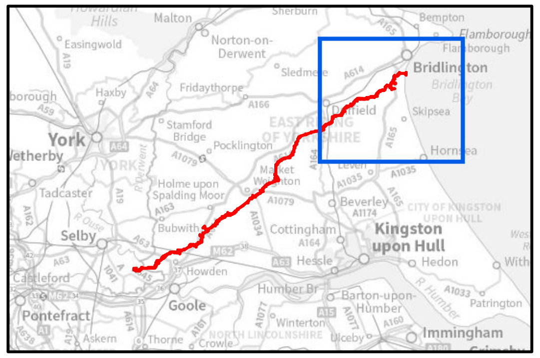
PROJECT

Scotland England Green Link 2

KEY

- Landfall Study Area
- Short-listed Landfall Location
- Diffuser
- Outfall Pipeline
- Dumping ground
- Special Area of Conservation
- Site of Special Scientific Interest
- Special Protection Area
- Scheduled Monument
- Hornsea4 DCO Order Limits
- Dogger Bank Onshore Order Limits
- Onshore Wind Farm Boundary
- Marine Conservation Zone
- National Coastal Erosion Risk Mapping - Derived Maximum Extent



TITLE

Figure 2-3
Potential Landfall Locations

REFERENCE

SEGL2_T_ES_2-3_v2_20220526

SHEET NUMBER: 1 of 1

DATE: 26/05/2022

2.6.3 Converter Station Site Selection

Converter stations are the key components of HVDC links. They enable electricity to be converted from Alternating Current (AC) to Direct Current (DC) or vice versa depending on the direction of operation. Converter stations contain specialist electrical equipment, some which must be located indoors in buildings potentially up to 30 m tall, while others could be located outdoors or in smaller buildings. For the purposes of the converter station site selection, an approximate footprint of 6 hectares (ha) was used.

As shown in **Figure 2-4**, a shortlist of eight potential converter station sites (CS15, CS16, CS17, CS21, CS22, CS23, CS27 and CS42) within 5 km of the existing Drax Substation were identified and assessed. The assessment considered environmental effects and engineering for each option including potential impacts on landscape, visual amenity, ecology and cultural heritage as well as routeing to/ from the site and access from the road network.

Given the presence of the Drax Power Station and the need to install AC cables from the converter station to the substation, it is preferable for the converter station to be located as close as possible to Drax Power Station. While larger sites which provide more flexibility were identified further away from Drax, these would introduce industrial-type development into more characteristically rural areas and have potentially greater environmental effects. Sites closer to Drax Power Station may be smaller but by locating the converter station closer to the Drax Power Station, the proposed converter station is more effectively integrated into its surroundings as a result of other industrial-type developments, and this also reduces the length of underground cable required to connect to Drax Substation.

Table 2-2 provides an overview of the eight sites considered and the outcomes of the assessment.

Table 2-2: Summary of Alternative Converter Station Sites

Site	Key Converter Station Siting Assessment Findings
CS15	This site is located to the north of the Drax Power Station site. While its location next to Drax provides some benefits, its proximity to the Drax Priory, a scheduled monument, was a key reason for discounting this option. It was considered that a converter station in this location could have a significant impact on the setting of the Priory.
CS16	This site is located to the north of the Drax Power Station site. It overlaps with part of a biodiversity mitigation area that formed part of the Drax Re-Power for which a Development Consent Order (DCO) was granted. While the Re-Power project is not proceeding the area is also part of an environmental mitigation area as part of the Drax Bio-Energy Carbon Capture Storage (BECCS) proposal which is being developed.
CS17	This site is located to the east of the Drax Power Station site on agricultural land. Existing woodland to the north of the site would provide some screening and filtering of views, however, the site is somewhat offset from Drax and in some views would be seen as extending the industrial character of Drax.
CS21	This site is located to the west of the Drax Power Station site on agricultural land. Constraints influencing this option include potential setting effects on designated assets including Camblesforth Hall (grade I listed building) and impacts on priority habitat. A key constraint on this option is the impact it has on cable routeing requirements as it increases both DC and AC route lengths and associated impacts. Through the appraisal process the subsequent identification of a proposed solar farm at this location presented an additional constraint.
CS22	This site is located to the west of the Drax Power Station site on agricultural land. While the site provides significant space, its location means that a converter station at this site would be seen as extending the industrial character of Drax westwards. As with CS21 key constraint on this option is the impact it has on cable routeing requirements as it increases both DC and AC route lengths and associated impacts.
CS23	This site is located to the west of the Drax Power Station site on agricultural land. Of the shortlisted options it was the most distant from Drax and the connection point at Drax Substation. As with CS21 and CS22 a key constraint on this option is the impact it has on cable routeing requirements as it increases both DC and AC route lengths and associated impacts.
CS27	This site is located to the south of the Drax Power Station site and south of the A645. This option was considered to have the potential for significant impacts on landscape character and the setting of Castle Hill scheduled monument by extending the industrial character of Drax southwards. Its location also presented a number of engineering challenges associated with the AC cable route to

Site	Key Converter Station Siting Assessment Findings
	Drax Substation including crossing the A645, proximity to settlement and existing utilities. Through the appraisal process, the subsequent identification of a proposed solar farm at this location presented an additional constraint.
CS42	This site is located to the east of the Drax Power Station directly across the road from the existing Drax Substation. This site benefits from its immediate proximity to Drax Power Station and the Substation. These provide opportunities to integrate the converter station with less landscape and visual impacts compared to other sites while also reducing the length of the AC route required and associated impacts to a minimum.

Two sites, CS17 and CS42, were identified as the most feasible sites taking account of technical requirements, potential environmental effects and engineering constraints. While both sites are similar, CS42 is located on agricultural land across the road from Drax Substation and the wider Drax Power Station and therefore CS42 was identified as the preferred converter station site. CS42 was considered to have less landscape and visual impacts than CS17 because the proposed converter station would be seen in the immediate context of Drax Power Station.

2.6.4 Underground Cable Routeing

Routeing was undertaken in a two-step process, firstly identification of broad route corridors and secondly identification of potential route alignments within those corridors. This took account of the alternative landfall and converter stations which were being considered as well as key constraints within the wider area such as towns and villages, sites designated/ protected for ecological, heritage and landscape reasons, land use and other natural and built features such as woodland, rivers and roads as well as engineering constraints for example crossings, topography and ground conditions. The objective of routeing was to identify a preferred route which was technically feasible whilst on balance causing the least impact on the environment and people.

A broad north east to south west route corridor was identified as illustrated in **Figure 2-5**. This provided a direct route corridor between potential landfall and converter station sites. Where possible the identification of the route corridors sought to avoid sensitive areas such as sites designated for environmental reasons and settlements. In some instances, some constraints for example the River Hull Headwaters Site of Special Scientific Interest (SSSI) or the Yorkshire Wolds Important Landscape Area (ILA), were unavoidable due to their scale or nature. In other instances, where avoidance of constraints did not result in significant route deviations then alternative corridor sections were identified, for example alternative routes around settlements such as Skerne and Hutton Cranswick or areas where existing land use would preclude routes such as at Gransmoor Quarry.

Following on from the identification of broad route corridors, consideration was given to preliminary route alignments within them. This focused on the development of a more detailed route alignment considering construction requirements and more localised engineering and environmental constraints such as accessibility and local wildlife sites. The result of this was an approximate 69 km long preliminary route alignment following as direct a route as possible mainly through agricultural land from the preferred landfall site (LF01) north of Fraisthorpe to the preferred converter station site at Drax.

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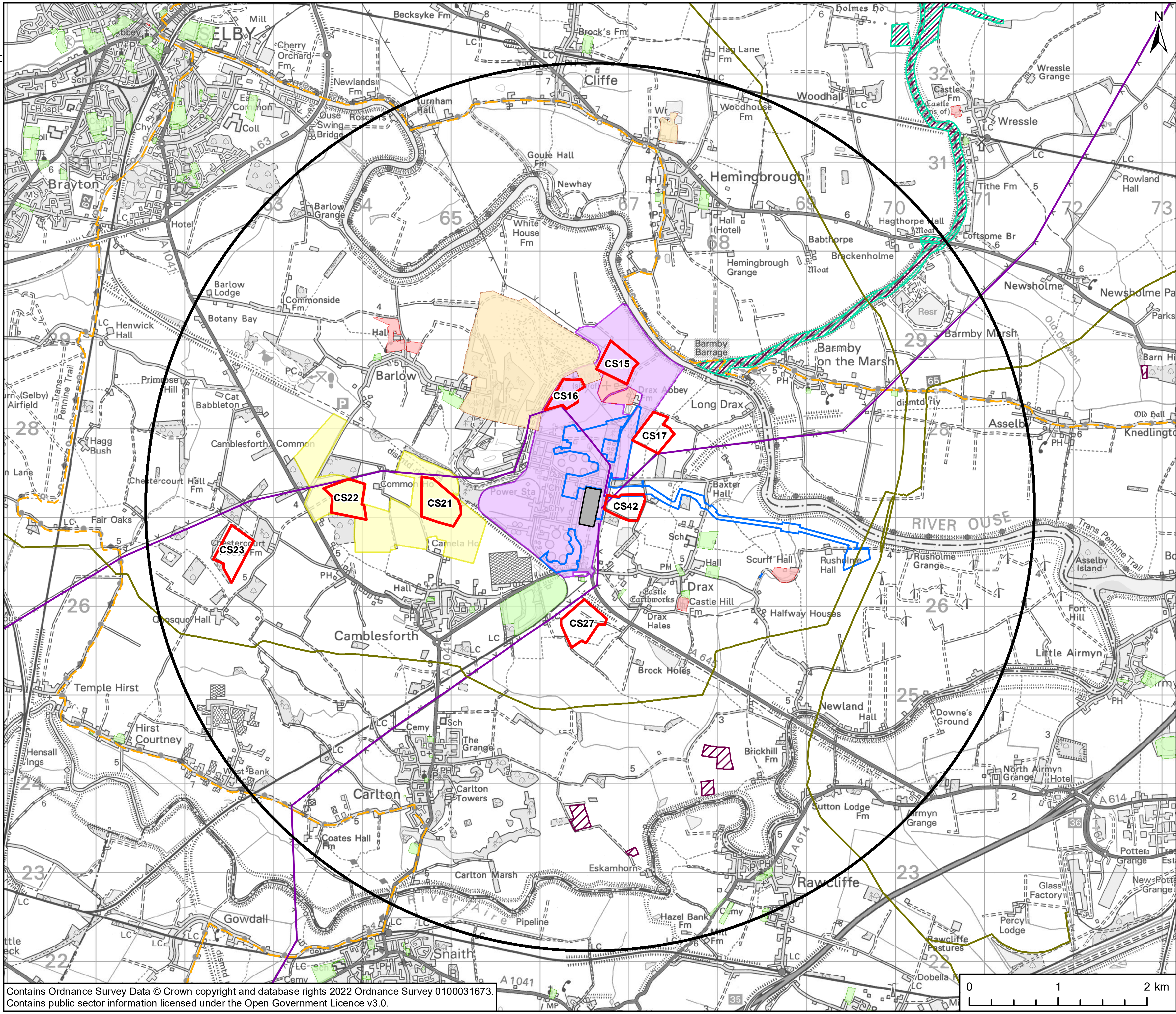

Coordinate System: British National Grid

Scale @ A3 1:40,000

nationalgrid

PROJECT

Scotland England Green Link 2

KEY

- Short-listed Converter Station Site
- Converter Station Study Area
- Drax 400kV Substation
- National Grid Gas Pipeline
- National Grid Overhead Line
- Sustrans National Cycle Route
- Drax Repowering Proposed Order Limits
- Special Area of Conservation
- Site of Special Scientific Interest
- Scheduled Monument
- Permitted Waste Site - Authorised Landfill
- Greenspace Site
- Drax Bioenergy with CCS DCO Boundary
- Camblesforth Solar Farm

TITLE

Figure 2-4
Potential Converter Station Locations

REFERENCE

SEGL2_T_ES_2-4_v2_20220526

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1 of 1

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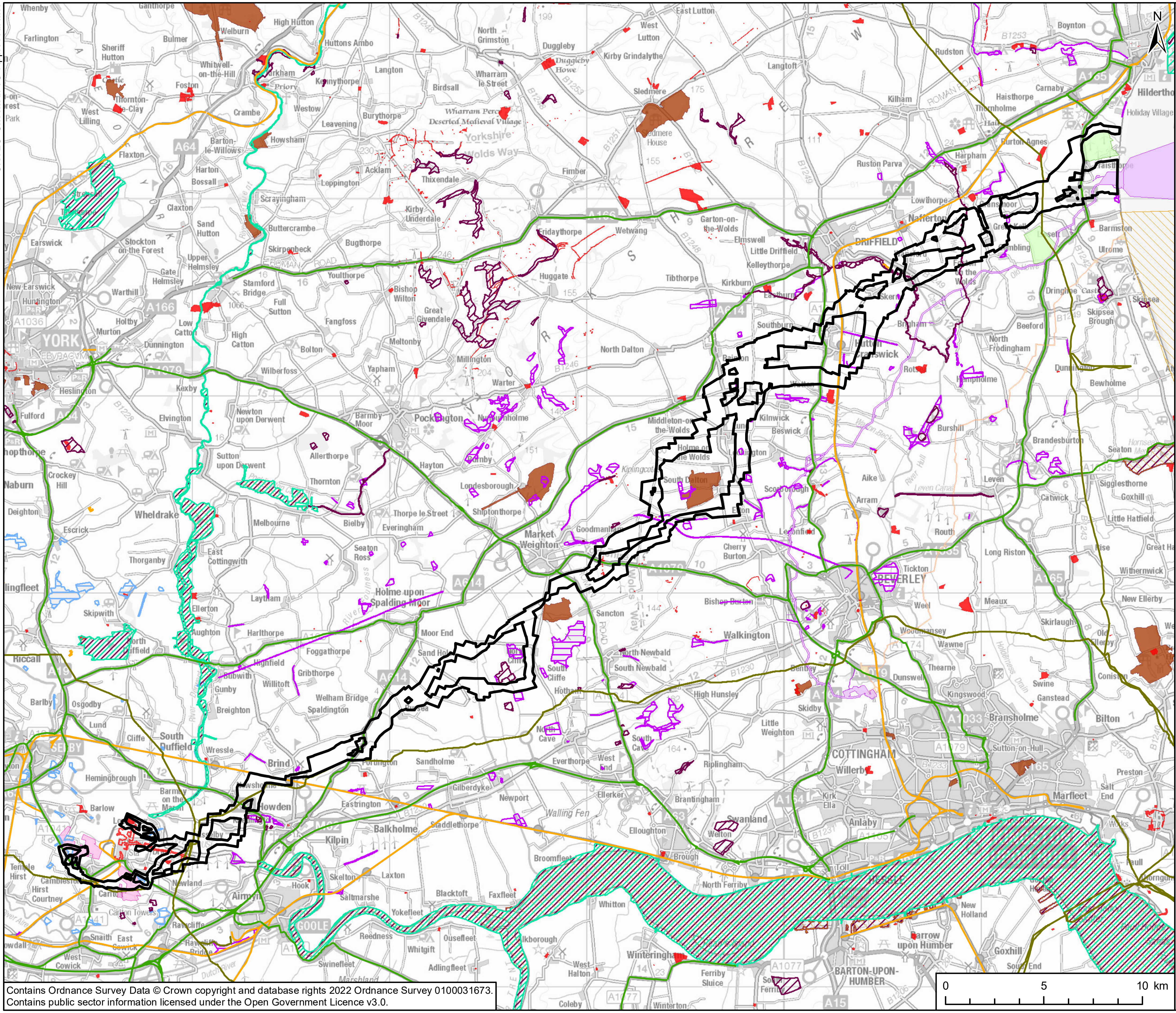

Coordinate System: British National Grid

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PROJECT

Scotland England Green Link 2

KEY

- Preliminary Route Corridor
- National Grid Gas Pipeline
- Major Road
- Railway Track
- Special Area of Conservation
- Special Protection Area
- Site of Special Scientific Interest
- Site of Importance for Nature Conservation
- Local Wildlife Site
- Scheduled Monument
- Registered Park and Garden
- Drax Repower – DCO Order Limits
- Hornsea 4 – DCO Order Limits
- Onshore Wind Farm Boundary
- Dogger Bank – DCO Order Limits (Onshore)
- Solar Farm Boundary

TITLE

Figure 2-5
DC Cable Route Corridors

REFERENCE

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1 of 1 | 25/03/2022

2.6.5 Subsea Cable Routeing

In parallel with the identification and assessment of alternative sites and routes for the English Onshore Scheme, consideration was also given to alternative subsea cable routes as part of the identification of the Marine Scheme. While largely separate studies there was overlap in consideration of alternative landfall sites described at 2.5.2 and how this influenced onwards terrestrial and marine routeing. The objective of the subsea cable routeing study was to identify a route to be subject to a seabed survey.

As per the development of the underground DC cable corridor and route, the subsea cable routeing options were identified and assessed in an integrated and iterative approach considering the potential effects on the environment and other sea users alongside technical and engineering feasibility. Outline marine corridors were identified for all potential connection options, in line with the Strategy Options Appraisal as described in section 2.5, taking account of environmental, physical, socio-economic and built infrastructure constraints. These included:

- Nature conservation designations,
- Seabed habitat,
- Fish ecology,
- Marine mammals,
- Ornithology,
- Water depth,
- Disposal, aggregate and dredging sites,
- Geology,
- Marine plan areas,
- Fishing and leisure activities,
- Defence activities,
- Shipping,
- Wrecks and obstructions,
- Pipelines and cables,
- Renewable energy infrastructure, and
- Oil and gas infrastructure.

Following the confirmation of the connection points of the Project between Peterhead and Drax, the marine corridors were further reviewed and refined to develop the marine survey corridor. This exercise sought to further develop the proposed cable installation corridors to optimise routeing.

The preferred marine survey corridor identified as a result of the above process is approximately 436 km in length and broadly follows a southernly/ south-easterly direction from the Scottish landfall at Bramford Sands and then parallels the coastline from Northumberland to Flamborough Head at approximately 50-60 km from the coast, before turning in to the English landfall at Fraisthorpe.

The cable route interacts with the Buchan Ness to Collieston Coast Scottish Special Protection Area (SPA) but avoids any other marine designated areas. The proposed route has been designed to minimise crossing areas of sensitive and challenging seabed geology such as subcropping/ outcropping rock or sandwaves. However, the detailed bathymetry around the Scottish landfall, as well as across the southern end of the route, clearly indicates subcropping/ outcropping rock features, as well as sandwaves close to the Scottish landfall.

The route of the Project has been designed to minimise interactions with spoil grounds, extraction areas, harbour limits and military training areas where possible. All charted and known wrecks have been routed around with many of the wrecks being readily identifiable in the bathymetry data. A total of 17 crossings with existing and planned infrastructure have been identified, and is predominantly lightly fished, with the exception of the areas immediately adjacent to the Scottish and English landfalls.

2.7 Assessment and Land Rights

The route alignment has been developed further through the Environmental Impact Assessment (EIA) process while also taking account of landowner and other stakeholder requirements. This has resulted in modifications to the route alignment in response to detailed site surveys and landowner feedback as well as consideration of installation methods and the siting of temporary construction requirements such as access routes, compounds and drainage. Some of the changes are highly localised and relate to minor deviations while other modifications have involved a greater level of re-routeing. A summary of changes includes:

- A minor change in response to a developer's request to realign the route where it crosses land to the north east of Skerne and avoid crossing part of a now consented solar farm.
- A minor change in response to landowner feedback to modify the proposed route and where it crosses the railway line within Sunderlandwick Estate.
- A larger deviation in response to feedback from the quarry operator to amend where the proposed route crosses Gransmoor Quarry and avoid impacting on future quarry plans.
- A minor change in response to landowner feedback to modify the proposed route to the north-east of Gransmoor village.
- A minor change in response to landowner feedback to modify the route where it crosses a proposed holiday park near Spaldington.
- A minor change to the route alignment between the landfall and the A165 in response to landowner feedback.
- A minor change to the location of a temporary construction compound in land at Welham Bridge in response to landowner feedback.
- A number of amendments in the approach to crossings of assets or environmental features have been made on the basis of preliminary environmental assessment and engagement with consultees. These have mainly included the commitment of non-open cut installation methods (such as Horizontal Directional Drilling (HDD)) to install the cable underneath the asset or feature in question and minimise or avoid direct disruption.

2.8 Summary and Conclusions

In identifying the English Onshore Scheme, NGET has assessed a range of alternatives at both strategic and project-specific levels. This has included assessment of alternative connection points to the transmission system in NGET's licence area as well as alternative landfall and converter station sites and underground cable routes. In assessing these alternatives, NGET has considered technical, environmental and economic factors consistent with its statutory duties and feedback received consultation with statutory and non-statutory consultees, landowners and members of the public.

The results of specialist studies through each of the three steps shown in **Figure 2-2** (Strategic Proposal, Options Identification and Selection, Assessment and Land Rights) and feedback received from consultation have informed the identification and development of the English Onshore Scheme.

Through consideration of alternatives NGET has identified the English Onshore Scheme which is considered to best balance technical, environmental and economic factors consistent with its statutory duties with feedback received from consultation with statutory and non-statutory consultees, landowners and members of the public.

2.10 References

Ref 2-1 Electricity Ten Year Statement – Scottish Boundaries. Available at: https://www.nationalgrideso.com/research-publications/etys/electricity-transmission-network-requirements/scottish-boundaries

Ref 2-2 Electricity Ten Year Statement – North of England Boundaries. Available at: https://www.nationalgrideso.com/research-publications/etys/electricity-transmission-network-requirements/north-england-boundaries