Scotland England Green Link 2 - English Onshore Scheme

Environmental Statement: Volume 1

Non-Technical Summary

May 2022

For: National Grid Electricity Transmission

Prepared for:

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Glossary

Term	Definition
Access	The means by which to approach or enter land, property and assets.
Alternating Current (AC) electricity transmission	Electric power transmission in which the voltage varies in a sinusoidal fashion. This is the most common form of electricity transmission and distribution.
Ancient woodland	Any area that has been continually wooded since at least 1600 AD and have developed irreplaceable, complex ecosystems.
Baseline Condition	The environment as it appears (or would appear) immediately prior to the implementation of the project together with any known or foreseeable future changes that will take place before completion of the project.
Bedrock	Rock that underlies loose deposits such as soil or alluvium.
Biodiversity	The variability among living organisms from all sources, including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part of. This includes diversity within species, between species and of ecosystems.
Cable installation	Overarching term for the process in which the ground or seabed is prepared, and cable(s) laid.
Clay	An inorganic component of soil derived from the weathering of rock and comprising particles less than 0.002 mm in equivalent diameter.
Climate Change	This refers to a change in the state of the climate, which can be identified by changes in average climate characteristics which persist for an extended period, typically decades or longer.
Connection point	The point on the National Electricity Transmission System (NETS) where Scotland England Green Link 2 connects.
Construction	Development of installing infrastructure, such as converter stations and permanent accesses.
Construction Compound	A temporary construction site associated with works including hard standings, lay down and storage areas for construction materials and equipment, and welfare facilities for construction staff.
Converter station	Facility containing specialist equipment (some indoors and some potentially outdoors) for the purposes of converting electricity from AC to DC or DC to AC.
Dewater	Removal of water from solid material or soil.
Direct Current (DC) electricity transmission	Electric power transmission in which the voltage is continuous. This is most commonly used for long distance point to point transmission.
English Onshore Scheme	All components of the Project between connection point and MLWS in England.
Erosion	The removal of sediment or bedrock from the bed or banks of a channel by flowing water occurring mostly during high flows and flood events. Forms various river features such as scour holes and steep outer banks.
Flood Zone 1	The area of the floodplain where there is a low risk of flooding (less than a 1 in 1,000 annual probability of river flooding, or 1 in 1,000 annual probability of sea flooding in any year).
Glacial Till	Unsorted glacial sediment deposited directly by a glacier.
Greenhouse Gas	Atmospheric gases that absorb and emit infrared radiation emitted by the Earth's surface, the atmosphere and clouds.
Groundwater	Water found underground in porous glacial strata and soils.
Habitat	The place or type of site where an organism or population naturally occurs. Often used in the wider sense referring to major assemblages of plants and animals found together.

Term	Definition
Heritage Asset	A building, monument, site, place, area or landscape of historic value.
Historic	Associated with past human activity.
Human Health	A state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity.
Hydrology	The scientific study of the movement, distribution, and quality of water on Earth and other planets, including the water cycle, water resources and environmental watershed sustainability.
Hydrogeology	The nature, distribution and movement of groundwater in soils and rocks, including aquifers.
Impact	Change that is caused by an action; for example, land clearing (action) during construction which results in habitat loss (impact).
Inert Waste	Waste which is neither chemically nor biologically reactive and will not decompose, or only very slowly e.g., concrete.
Land Use	What land is used for, based on broad categories of functional land cover, such as urban and industrial use and the different types of agriculture and forestry.
Landfall	The area where offshore cables come ashore
Landform	The shape and form of the land surface which has resulted from combinations of geology, geomorphology, slope, elevation and physical processes.
Landscape	An area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors.
Listed Building	A building of special architectural or historic interest. Listed buildings are graded I, II* or II, with Grade I being the highest. Listing includes the interior as well as the exterior of the building.
Made Ground	Land where natural and undisturbed soils have largely been replaced by man-made or artificial materials. It may be composed of a variety of materials including imported natural soils and rocks with or without residues of industrial processes (such as ash) or demolition material (such as crushed brick or concrete).
Magnitude	The size of something.
Marine Scheme	All components of the Project within the marine area between MHWS Scotland and MHWS England.
Mesolithic	Archaeological period between the Upper Paleolithic and the Neolithic.
Mitigation	Measures intended to avoid, reduce and, where possible, remedy significant adverse environmental effects.
Monitoring	An assessment of the performance of the project, including mitigation measures. This determines if effects occur as predicted or if operations remain within acceptable limits, and if mitigation measures are as effective as predicted.
Net Zero	The balance between the amount of greenhouse gas produced and the amount removed from the atmosphere. Net zero is reached when the amount of greenhouse gas added is no more than the amount taken away.
Operational	The functioning of a project on completion of construction.
Phase 1 Habitat Survey	A habitat classification and field survey technique to record semi-natural vegetation and other wildlife habitats.
Population	All individuals located in a particular location (this can be local, regional or at a national scale).
Principal Aquifer	Aquifers previously designated as major aquifer.
Protected Species	Species of wild plants, birds and animals which are afforded protection through legislative provisions.
Ramsar	Wetlands of international importance designated under the Ramsar Convention.

Term	Definition
Receptor	A defined individual environmental feature usually associated with population, fauna and flora that has potential to be affected by a project.
Recovery (waste)	Any operation, the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy.
Recycling	Any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes.
Renewable Energy	Energy comes from natural sources or process that can be replenished.
Risk Assessment	An assessment of the probability of a hazard occurring that could result in an impact.
Sand	Soil particles from 0.06 mm-2.0 mm in equivalent diameter. Fine sand particles are from 0.06 mm-0.2 mm; medium sand from 0.2 mm-0.6 mm; and coarse sand from 0.6 mm-2.0 mm.
Scoping	The process of identifying the issues to be addressed by the Environmental Impact Assessment process. It is a method of ensuring that an assessment focuses on the important issues and avoids those that are considered to be not significant.
Scoping Boundary	Red line boundary illustrated within the Scoping Report to identify the location of the Project.
Scoping Report	A report which records the outcomes of the scoping process and is typically submitted as part of a formal request for a Scoping Opinion.
Scotland England Green Link 2	Scheme from Peterhead to Drax. Also referred to as the Project in respective Environmental Statements and Appraisal Reports.
Screening	The formal process undertaken to determine whether it is necessary to carry out a statutory Environmental Impact Assessment with the EIA Regulations.
Scottish Onshore Scheme	All components of the Project between connection point and MLWS in Scotland.
Sediment	Organic and inorganic material that has precipitated from water to accumulate on the floor of a water body, watercourse or trap.
Sensitive Receptor	Can include residential properties, gardens, schools, hospitals, care homes, public open spaces, and public access.
Severance (land)	The splitting of a land holding into more than one part, for example through the introduction of a new section of road.
Severance (walkovers, cyclists and horse riders)	The extent to which members of communities are able (or not able) to move around their community and access services/ facilities.
Soil	An assemblage of mineral particles and/ or organic matter which includes variable amounts of water and air (and sometimes other gases).
Stakeholder	An organisation or individual with a particular interest in a project.
Study Area	The spatial area within which environmental effects are assessed (i.e., extending a distance from the project footprint in which significant environmental effects are anticipated to occur).
Subsoil	Layer (or stratum) of soil immediately beneath the surface topsoil.
Substation	Part of an electrical generation, transmission, and distribution system. Transforms voltage from high to low, or the reverse.
Superficial Deposits	A geological deposit that was laid down during the Quaternary period. Such deposits were largely formed by river, marine or glacial processes but can also include wind-blown deposits known as loess.
Topsoil	Natural topsoil or manufactured topsoil, varies in depth with soil type but usually covering the top 20-30 cm in which plants can grow healthily.

Term	Definition
Transition Joint Pit	Buried concrete pad with joint connecting offshore and onshore cables located above MHWS.
Viewpoint	A place from which something can be viewed.
Waste	Any substance or object which the holder disposes or intends / is required to dispose.
Working Width	Width of the onshore cable construction area which includes haul road, spoil storage and temporary drainage during cable installation (see above).

Abbreviations

Abbreviation	Definition
AC	Alternating Current
AIL	Abnormal Indivisible Load
ALC	Agricultural Land Classification
ATC	Automated Traffic Count
BEIS	Department for Business, Energy and Industrial Strategy
BMV	Best and Most Versatile
BNG	Biodiversity Net Gain
CEMP	Construction Environmental Management Plan
CTMP	Construction Traffic Management Plan
DC	Direct Current
EIA	Environmental Impact Assessment
ERYC	East Riding of Yorkshire Council
ES	Environmental Statement
FTE	Full Time Equivalent
GCN	Great Crested Newt
GI	Ground Investigation
GW	Gigawatts
ha	hectare
HDD	Horizontal Directional Drill
HGV	Heavy Goods Vehicle
HRA	Habitat Regulation Assessment
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
INNS	Invasive Non-Native Species
km	kilometre
kV	kilovolt
LGV	Light Goods Vehicle
LWS	Local Wildlife Site
m	metre

Abbreviation	Definition
mm	millimetre
MMO	Marine Management Organisation
MMP	Material Management Plan
MS-LOT	Marine Scotland Licensing Operations Team
NCR	National Cycle Route
NETS	National Electricity Transmission System
NGET	National Grid Electricity Transmission
NTS	Non-Technical Summary
PEAR	Preliminary Ecological Appraisal Report
PRoW	Public Right of Way
SDC	Selby District Council
SEGL	Scotland England Green Link
SMP	Soil Management Plan
SPA	Special Protection Area
SSEN	Scottish and Southern Energy Networks
SSSI	Site of Special Scientific Interest
SWMP	Site Waste Management Plan
TJP	Transition Joint Pit
TCPA	Town and Country Planning Act
UK	United Kingdom

1. Introduction

National Grid Electricity Transmission (NGET) is proposing the construction of two new High Voltage Direct Current (HVDC) links which will operate as electricity superhighways from Scotland to England. The Scotland to England Green Link 2, or SEGL2 for short, is one of these Projects and, if approved, will run under the North Sea from Peterhead in Aberdeenshire, Scotland, to Drax in North Yorkshire, England. Its sister Project, SEGL1, will run via the North Sea from the Torness area in East Lothian, Scotland to Hawthorn Pit (between Murton and South Hetton) in County Durham, England.

SEGL2 is being jointly developed with Scottish and Southern Energy Networks (SSEN); however, consents for the English Onshore Scheme i.e., all onshore project components in England, are being sought by NGET. National Grid and SSEN own the high-voltage electricity transmission network in England and Wales, and in northern Scotland respectively. They are responsible for making sure electricity is transported safely and efficiently from where it is produced to where it is needed.

This Non-Technical Summary (NTS) presents the findings, in non-technical language, of the Environmental Impact Assessment (EIA) for the onshore components of SEGL2 within England.

The Environmental Statement (ES), which reports on the findings of the EIA, has been co-ordinated and reviewed by AECOM on behalf NGET. Technical chapters have been completed by a combination of authors from AECOM, Capita, Wardell Armstrong and Mott MacDonald.

1.1 Why Do We Need SEGL2?

As part of their commitments to tackling climate change, the UK and Scottish Governments have set legally binding targets to become net-zero in all greenhouse gases by 2050 for England and Wales and 2045 for Scotland. To meet these targets the UK will need to continue the shift away from traditional forms of energy generation to heat homes, charge vehicles and power businesses, and there will be a greater need for cleaner, greener energy

To support its climate change commitments the UK Government has also identified a target of delivering 40 gigawatts (GW) of renewable wind energy by 2030, a fivefold increase on what the UK produce today and enough to power every home in the UK.

Much of the growth in the generation of renewable electricity has been / will be in Scotland. To help deliver this greener energy to homes and businesses across the UK, the capability of the network between Scotland, with its renewable energy reserves, and England, where the electricity is most needed must be increased.

SEGL2 is a 2 gigawatt (GW) HVDC link which will increase the capability of the network to deliver more green electricity to the rest of the UK. If approved and completed, it will be able to carry enough electricity to power up to **2 million homes** across the UK.

1.2 How SEGL2 Will Work

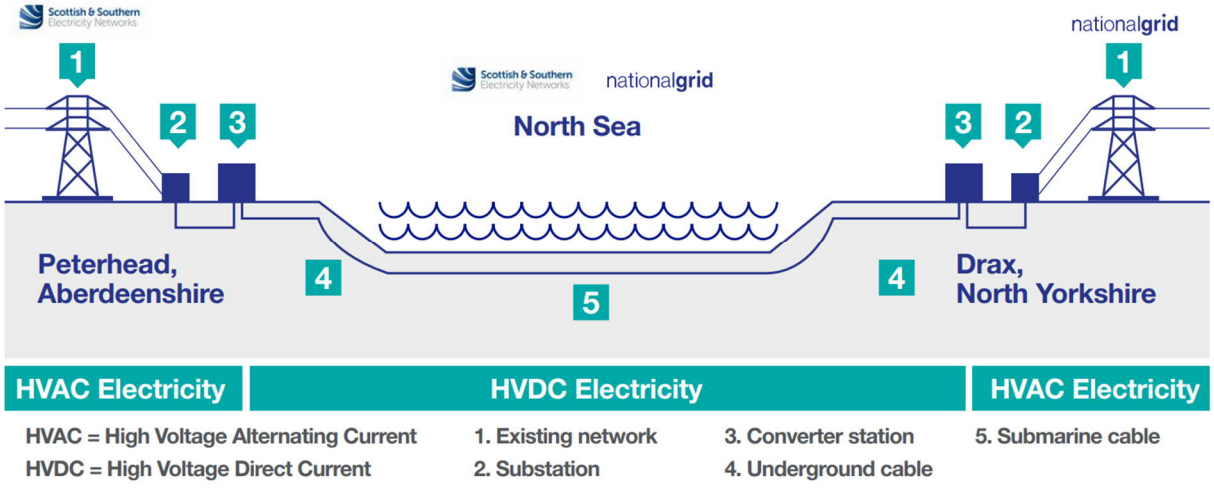

Figure NTS-1: Schematic Overview of Scotland England Green Link 2

SEGL2 will allow the transfer of electricity from Scotland to England (and vice versa as required) via a cable under the seabed, connected to a converter station and electricity substation in each country via an onshore underground cable.

The national electricity transmission system in England and Scotland predominantly uses alternating current (AC) technology, which is also used by the distribution networks (which transport electricity to homes and businesses). However when transmitting electricity over long distances and in larger volumes, HVDC technology is more efficient. When using HVDC technology converter stations are required at either end of the transmission link to convert the electricity between alternating current (AC) and direct current (DC), and vice versa.

SEGL2 comprises both HVDC and HVAC technology as described below:

- **Scottish Onshore Scheme:** A converter station at Peterhead in Aberdeenshire, Scotland which is connected to the new Peterhead Substation (currently under construction) by approximately 500 m of underground HVAC cables. From the converter station approximately 2 km of underground HVDC cable will be installed to a landfall at Sandford Bay;
- **Marine Scheme:** Approximately 436 km subsea HVDC cable from Sandford Bay on the east coast of Scotland to Fraisthorpe Beach in East Riding of Yorkshire, in the east of England. The Marine Scheme is being developed jointly by NGET and SSEN who will be submitting marine licence applications to the Marine Scotland Licensing Operations Team (MS-LOT) and the Marine Management Organisation (MMO). Whilst scoping advice confirmed that the Marine Scheme is not considered to be 'EIA Development', the licence applications will be supported by a non-statutory Environmental Appraisal Report; and
- **English Onshore Scheme:** Approximately 69 km of underground HVDC cable in East Riding of Yorkshire and North Yorkshire from the landfall at Fraisthorpe Beach to the proposed converter station close to the existing Drax Substation in Selby. The converter station will be connected to the existing substation by approximately 500 m of AC underground cable.

The end of to end alignment of the SEGL2 is shown on **Figure NTS 2**. This NTS, and other corresponding parts of the ES are written with specific regard to the components of SEGL2 that comprise the **English Onshore Scheme**.

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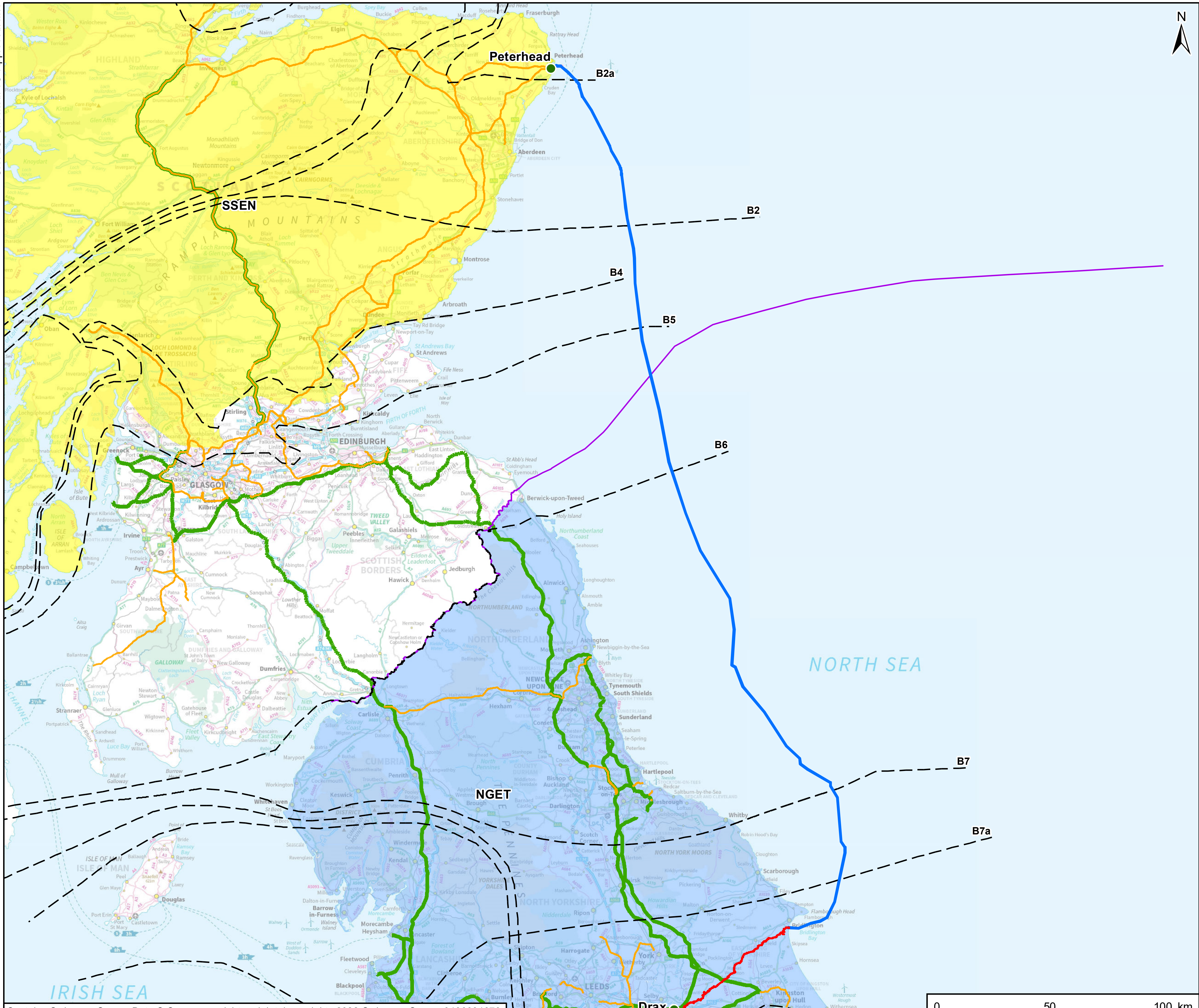

Coordinate System: British National Grid

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PROJECT

Scotland England Green Link 2

KEY

- Planning Application Boundary - English Onshore Scheme
- Marine Scheme
- England/Scotland Border
- Connection Point (Substation) Location
- Network Transmission Boundary

High Voltage Transmission System

- 275 kV
- 400 kV

Transmission Operator Boundary

- National Grid Electricity Transmisison (NGET) Licence Area
- Scottish and Southern Electricity Networks (SSEN) Licence Area

TITLE

Figure 2
The Project

REFERENCE

SEGL2_T_NTS_2_v1_20220531

SHEET NUMBER

1 of 1

DATE

31/05/2022

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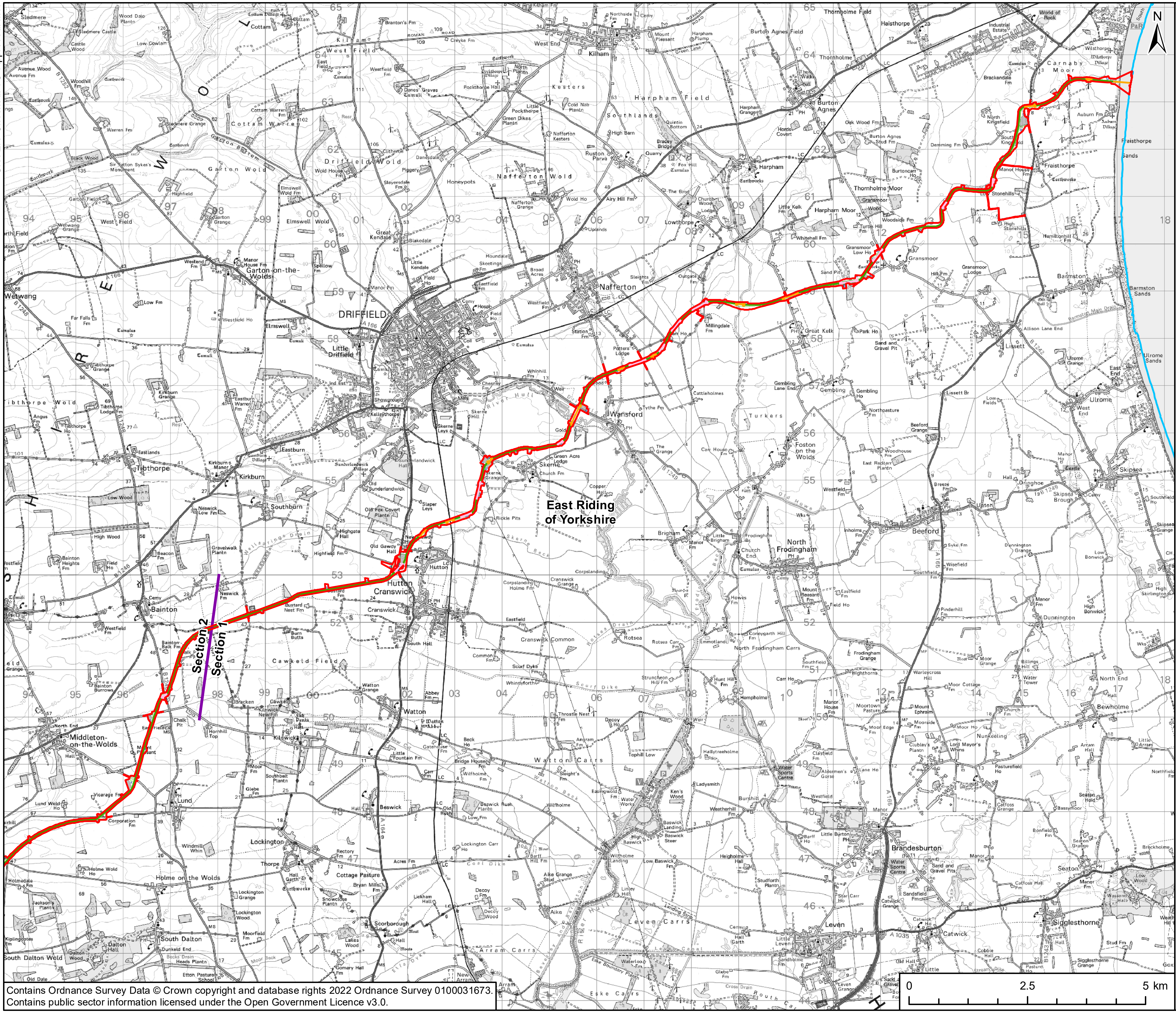

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Coordinate System: British National Grid

0 2.5 5 km

Scale @ A3 1:75,000

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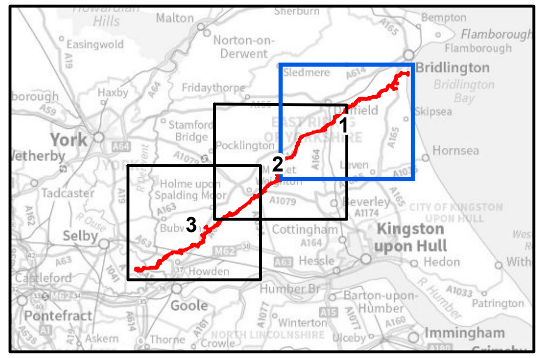
PROJECT

Scotland England Green Link 2

KEY

- Planning Application Boundary
- Route Section Break
- Mean Low Water Springs
- HDD - Proposed
- HDD - Unless Otherwise Agreed to be Open Cut
- DC Cable Alignment – Open Cut
- DC Cable Route Working Width (40m)
- Temporary Attenuation Pond and Outfall
- Temporary Construction Compound



TITLE

Figure 3
SEGL2 English Onshore Scheme

REFERENCE

SEGL2_T_NTS_3_v1_20220531

SHEET NUMBER: 1 of 3

DATE: 31/05/2022

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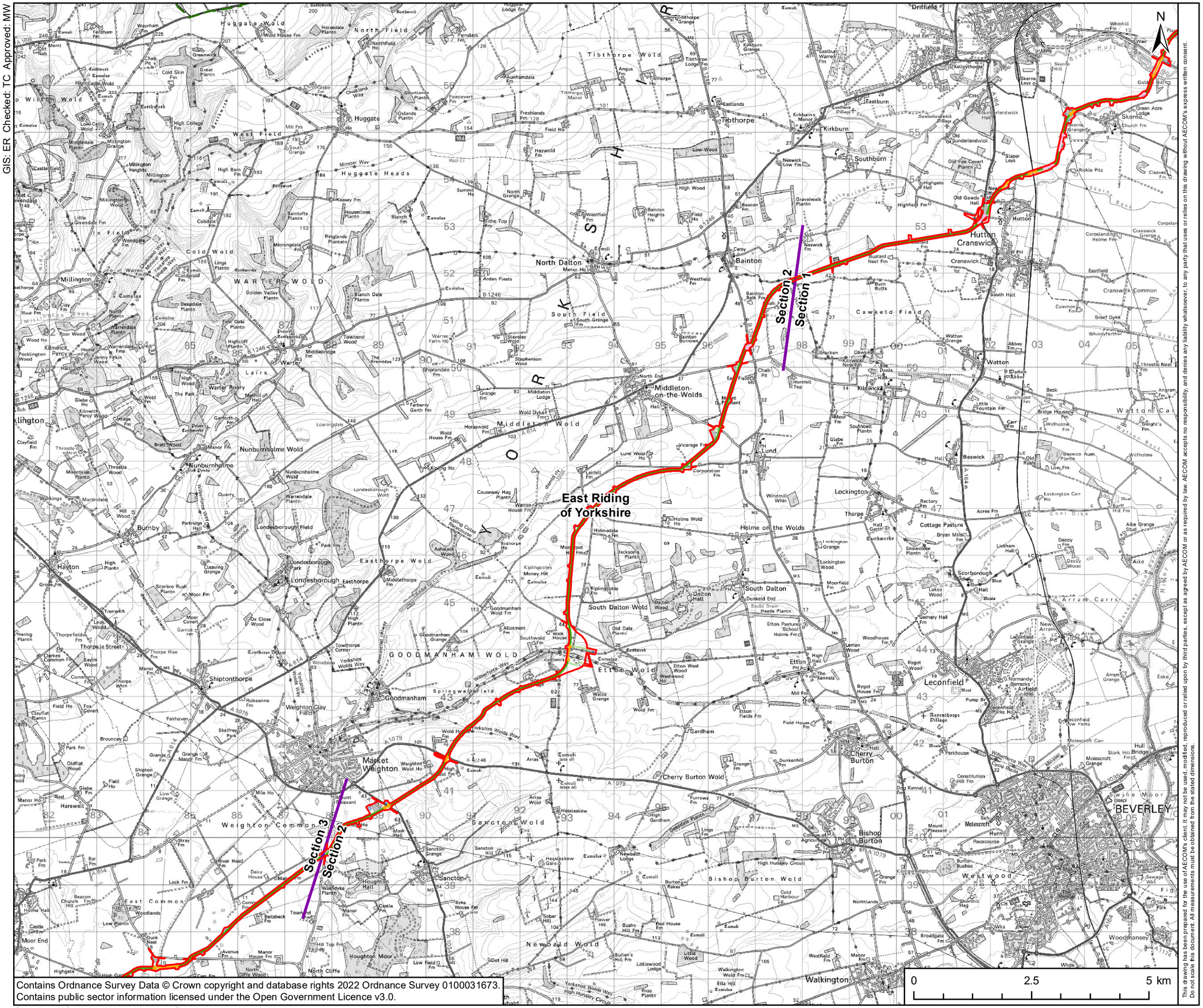

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PROJECT

Scotland England Green Link 2

KEY

- Planning Application Boundary
- Route Section Break
- District Borough Unitary Boundary
- HDD - Proposed
- HDD - Unless Otherwise Agreed to be Open Cut
- DC Cable Alignment – Open Cut
- DC Cable Route Working Width (40m)
- Temporary Attenuation Pond and Outfall
- Temporary Construction Compound

TITLE

Figure 3
SEGL2 English Onshore Scheme

REFERENCE

SEGL2_T_NTS_3_v1_20220531

SHEET NUMBER: 2 of 3

DATE: 31/05/2022

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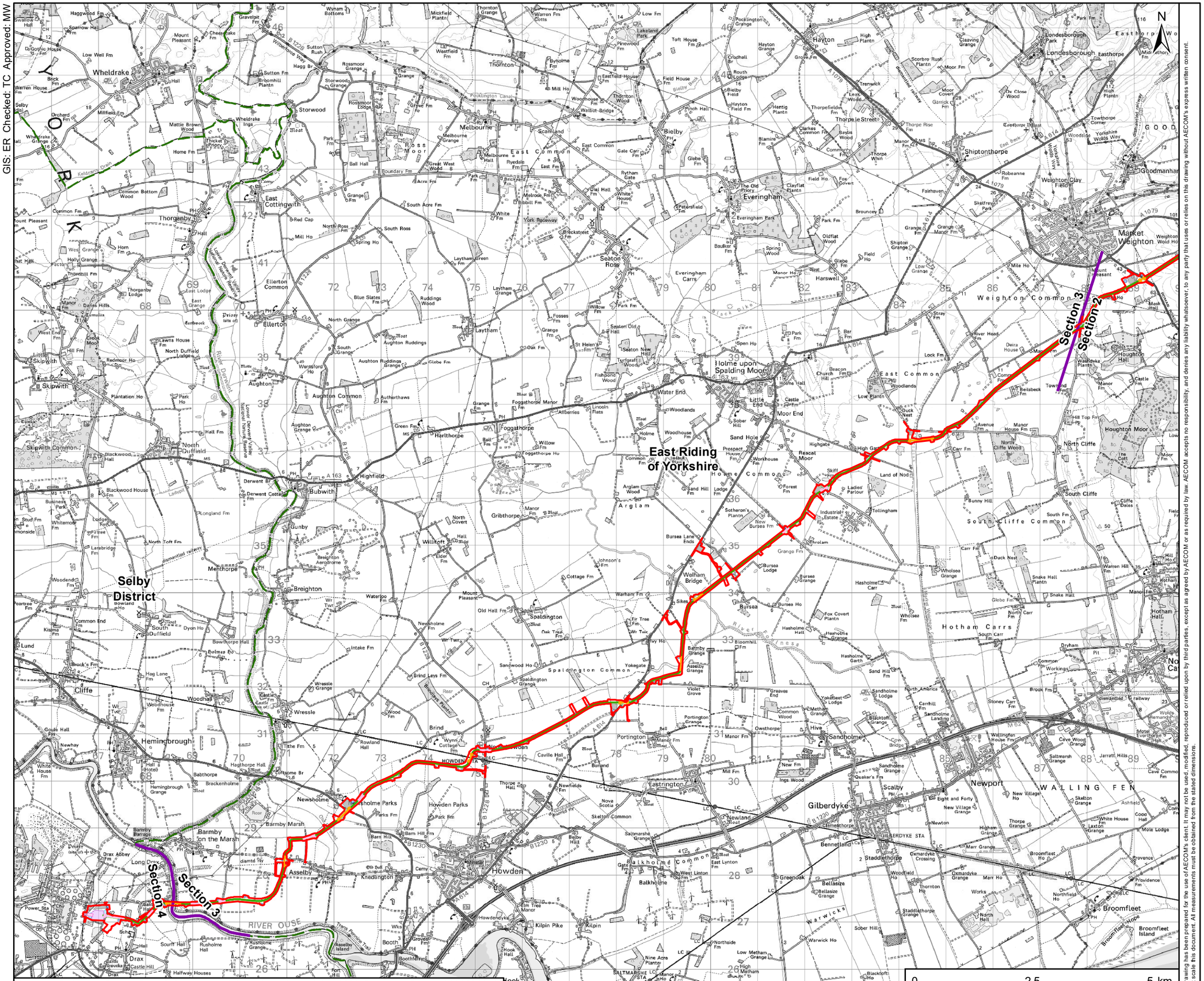

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Scale @ A3 1:75,000

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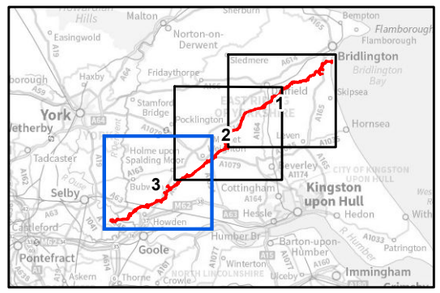
PROJECT

Scotland England Green Link 2

KEY

- Planning Application Boundary
- Route Section Break
- District Borough Unitary Boundary
- HDD - Proposed
- HDD - Unless Otherwise Agreed to be Open Cut
- DC Cable Alignment – Open Cut
- DC Cable Route Working Width (40m)
- AC Cable Route Working Width (60m)
- Temporary Attenuation Pond and Outfall
- Temporary Construction Compound
- Permanent Attenuation Pond
- Converter Station Area



TITLE

Figure 3
SEGL2 English Onshore Scheme

REFERENCE

SEGL2_T_NTS_3_v1_20220531

SHEET NUMBER: 3 of 3

DATE: 31/05/2022

2. The English Onshore Scheme

2.1 General Overview

This section discusses the English Onshore Scheme in more detail. SEGL2 is a complex electricity transmission system. NGET has developed a design for the purpose of the EIA and to seek planning permission, which establishes the maximum extent of the proposed development (maximum parameters). These maximum parameters include identifying all land required (both permanently and temporarily) to construct the English Onshore Scheme (for example the cable corridors, access points and construction compounds), the location and height of buildings and electrical equipment as well as associated development, including hardstanding areas, drainage and landscape planting. Worst-case assumptions regarding construction techniques, programme, and traffic volumes have also been made. This is in accordance with the 'Rochdale Envelope' approach as discussed below.

This 'Rochdale Envelope' (Ref NTS-1) approach is employed where the nature of the proposed development means that some details of the scheme have not been confirmed (for instance the precise dimensions of structures) when the application is submitted, and flexibility is sought by including maximum parameters within the planning application. This ensures that the planning application considers a worst-case scenario for the proposals so that, if the development is approved, the final design will not have a greater impact on the environment or local communities than was assessed.

The Project is a complex electricity transmission system reinforcement, which comprises the following components, which are also shown on Figure NTS-3:

- Transition Joint Pit (TJP), within an area to the north of Fraisthorpe, East Riding of Yorkshire, referred to as the landfall. The TJP is an underground concrete bay which connects the offshore HVDC cables to the onshore HVDC cables;
- Approximately 69 km of two underground HVDC cables (and fibre optic cable(s)) between the TJP and the proposed converter station adjacent to Drax Power Station, in Selby District. This includes the provision of temporary accesses and a temporary haul road along the cable route, construction compounds, and drainage attenuation features to facilitate cable installation;
- Converter station buildings and outdoor electrical equipment together with internal roads, security fencing and landscaping;
- A permanent converter station access road from a new junction off New Road;
- Up to 500 m of underground HVAC cables connecting the new converter station to the existing Drax 400 kV Substation;
- Creation of woodland and areas of improved grassland to enhance local biodiversity to the east of the proposed converter station site (east of Wren Hall Lane); and
- Temporary construction compounds, temporary work areas, and temporary vehicle access arrangements to facilitate construction of the converter station.

For ease of describing the proposed route, and for the identification and assessment of potentially significant impacts, the English Onshore Scheme is split in to four Route Sections. Route Sections 1, 2 and 3 fall within East Riding of Yorkshire Council (ERYC), and Route Section 4 is within Selby District Council (SDC) these are also illustrated in **Figure NTS-3.** The four Route Sections are:

- Route Section 1 – Landfall to Bainton;
- Route Section 2 – Bainton to Market Weighton;
- Route Section 3 – Market Weighton to River Ouse; and
- Route Section 4 – River Ouse to Drax Substation.

A high level description of each of these route sections can be found in **Section 2.3: Proposed Underground HVDC Cable Route.**

2.2 Landfall

The landfall is where the English Onshore Scheme and Marine Scheme meet. The marine (subsea) cables will connect to onshore cables at a buried Transition Joint Pit (TJP), which is located north of Fraisthorpe, East Yorkshire. To minimise impacts at the landfall and to minimise work within the intertidal zone, the cables will be installed using Horizontal Directional Drilling (HDD), as shown in **Figure NTS-4**. The TJP will be set back from the coastline, beyond the coastal erosion risk area to avoid future cable exposure and to reduce risk of exacerbating any existing erosion. The TJP is located approximately 150 m inland from the Mean High Water Springs (MHWS).

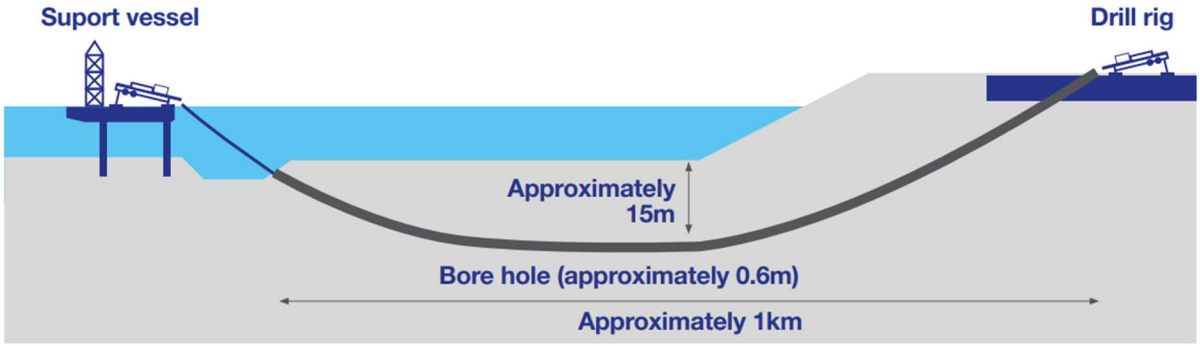


Figure NTS-4: Indicative Landfall HDD Cross Section

2.3 Proposed Underground HVDC Cable Route

2.3.1 Route Description: Route Section 1 – Landfall to Bainton

The proposed route extends in a general south-westerly direction from the landfall location at Fraisthorpe. From the TJP the proposed route extends across Carnaby Moor in a westerly direction north of Fraisthorpe Wind Farm, before crossing the A165 and extending southwards across open agricultural land. This section of the route avoids the proposed working area and export cable route of the Hornsea Project Four Offshore Wind Farm which is located approximately 2 km south. The route crosses the Earl's Dyke and the Burton Agnes to Paull gas pipeline west of the A165 before continuing in a south-westerly direction.

The proposed route continues in this direction for approximately 6 km, passing the settlement of Gransmoor to the north and between the villages of Great Kelk (south of the route) and Little Kelk (north of the route). The proposed route crosses minor roads, PRoWs, smaller watercourses and unnamed drains until reaching Kelk Beck, a main river and tributary of the River Hull that is designated as a Site of Special Scientific Interest (SSSI) (River Hull Headwaters). After crossing Kelk Beck via HDD, the proposed route continues for approximately 4 km to the village of Wansford. The proposed route runs approximately 750 m north of the village of Wansford to avoid residences and providing separation to the community.

At Wansford the proposed route crosses the B1249, Driffield Canal and the River Hull between Whinhill Lock and Wansford Lock. South of this crossing the proposed route extends further westwards towards the village of Bainton crossing the Driffield to Hull railway line and the A164 whilst bypassing the villages of Skerne and Hutton Cranswick.

2.3.2 Route Description: Route Section 2 – Bainton to Market Weighton

From Bainton, as the proposed route extends south to Middleton-on-the-Wolds the English Onshore Scheme enters into the Yorkshire Wolds – an Important Landscape Area (ILA). Between Middleton-on-the-Wolds and Lund the proposed route continues south through areas of open agricultural land. Dalton Hall and the associated Registered Park and Garden is passed to the west. The proposed route continues south to the crossing of the Wilberforce Way Long Distance Walking Route and Local Nature Reserve (LNR) (Etton-Gardham Disused Railway/Kiplingcotes Road Earthworks).

From the crossing of the Wilberforce Way, the proposed route continues for approximately 6 km in a south-westerly direction towards the town of Market Weighton. There are crossings of the Yorkshire Wolds Way and two trunk roads, the A1079 and A1034, as the route passes Market Weighton to the south and extends into Route Section 3. At the boundary between Route Sections 2 and 3 the proposed route exits the Yorkshire Wolds ILA.

2.3.3 Route Description: Route Section 3 – Market Weighton to River Ouse

Route Section 3 starts to the south of Market Weighton, adjacent to Houghton Hall and the associated Registered Park and Garden, and the proposed route continues south-westerly for approximately 15 km passing through agricultural land, between Holme upon Spalding Moor (north of the route) and the Tollingham industrial estate (south of the route) towards Howden. Crossings are also required of the Market Weighton Canal, River Foulness and the A614 before reaching Howden.

The proposed route extends north of Howden before extending immediately south across the Selby railway line (ensuring a right-angle crossing) to the west of the settlement. The alignment again continues to the southwest towards Asselby, extending through agricultural and plantation (willow and fir/spruce) land and crossing the A63. The proposed route crosses Main Street to the west of Asselby village in a largely north-south direction before heading in an easterly direction to the proposed crossing point of the River Ouse and in to Route Section 4.

2.3.4 Route Description: Route Section 4 – River Ouse to Drax Substation

The crossing of the River Ouse is to the south of Redhouse Lane, with the proposed route extending to the southwest to cross Main Road (through Drax) to the north of Read School. The proposed route continues west, to the south of Wren Hall, and into the proposed converter station site immediately to the east of the Drax Power Station and existing Drax 400 kilovolt (kV) Substation.

2.3.5 Physical Characteristics of the Underground DC Cable Route

The exact configuration of the proposed HVDC cable route is subject to detailed design following appointment of a Contractor. However, the design on which the EIA is based, and with which the detailed design will comply, is based upon general key characteristics expected for a scheme of this nature. **Table 2-1** below summarises some of these characteristics; and further details can be found in ES Vol.2 (Main Report), **Chapter 3: Description of the English Onshore Scheme**.

Table 2-1: Underground HVDC Cable Route – Key Characteristics

Factor	Details
Length of Route	• Approximately 69 km
Cable Rating	• +/- 525 kV
Cable number and dimensions	• Two HVDC cables will be installed. An optional fibre optic cable may be installed with the HVDC cables for monitoring. • Each HVDC cable is approx. 15 cm in diameter
Trench width/depth	• Two HVDC cables in a single trench. • Width: up to 1.5 m. • Depth: – Whether HDD or open cut installation is utilised the minimum depth of coverage will be 900 mm. – The depth of installation will be deeper at locations where HDD is used.
Backfill material	• A thermally suitable material (such as cement bound sand (CBS), or alternative), protective tile, warning tape, subsoil and topsoil (from stockpiled excavated material).
Working width	• 40 m wide. • Working width includes provision for: – the cable trench,

Factor	Details
	– cable joint bays, – soil storage, – materials and equipment laydown, and – temporary haul road. The working width extends at HDD locations or at complex crossings where additional space is needed.
Cable joint bays	• Permanent buried footprint of approximately 60 m^2 (within the working width). • Required approximately every 800 m to 1.5 km. • Estimated to require 72 joint bays along the proposed route (this is subject to the Contractor's design).
Drainage	• Header drains will be installed throughout the underground cable route to intercept the clean surface water runoff to the header drains. • Filter drains will be installed throughout the underground cable route to collect runoff from the haul road and discharge into various dirty ponds along the route. • Attenuation storage is proposed primarily through ponds, the scaling of which has accounted for a 1 in 100 year return period plus 40% increase in peak rainfall to account for climate change. • Outfalls are proposed to the nearest watercourse or drain. Where there is no watercourse within the vicinity of the works (namely through the Yorkshire Wolds) it is proposed that infiltration is used to dispose of surface water.
Permanent easement	• Typically 15 m (wider at crossing locations)
Permanent Infrastructure	• Cable markers may be installed at crossing points with roads to identify the presence of the cable. However there is no other necessary permanent above ground infrastructure associated with the proposed route.

2.3.6 Cable Installation

The proposed HVDC cable will be installed by a combination of open trench and trenchless (HDD) methods. Open trench methods will be utilised in open agricultural land. Trenchless methods will typically be utilised where obstacles (watercourses, roads, railway lines, flood defences or other utilities) need to be crossed.

Currently 28 trenchless HDD crossings are proposed for the installation of the cables. A further 16 HDD crossings are proposed but which may be crossed via open trench methods should it be agreed with the relevant stakeholder. A full list of these is provided in the ES Vol.2 (Main Report, **Chapter 3: Description of the English Onshore Scheme)**, and the locations of the crossings are shown in **Figure NTS-3**. There will be two small compounds associated with each HDD crossing, one at either side, known as the launch compound and the receiving compound.

Cable installation and commissioning for the proposed route is scheduled to take approximately five years. The installation programme assumes a start date for installation activities in late 2024 and for the cable to be commissioned prior to the end of 2029.

Typical work activity phasing for the installation of the DC cables would include:

- Pre construction surveys or environmental mitigation as necessary Swathe boundary fence installation works.
- Bellmouth creation and amending existing access routes (where necessary);
- Establishing the construction compounds to facilitate delivery of plant and material to start installation activities;
- Creation of haul road/working width;
- Cable trench excavation and HDD of sensitive crossing;
- Establishing joint bays;
- Cable laying/ pulling through ducts; and

- Cable trench backfilling and reinstatement.

Cable installation is not required to be undertaken sequentially; as a result, installation could occur in multiple sections along the length of the proposed route in parallel and therefore installation is unlikely to be completed in a linear fashion. This will limit the extent and duration of construction activity at any given location including the length of time that land remains disturbed for. The exact programme will depend on a number of factors including the underlying ground conditions and installation methods used.

2.3.7 Temporary Construction Requirements

2.3.7.1 Construction compounds

Temporary construction compounds will typically be utilised for the storage of plant and machinery and stockpiling materials, as well as the provision of site management offices, welfare facilities for staff (kitchen facilities, storerooms, toilet facilities) and parking.

A summary of the proposed temporary construction compounds is provided below:

- Landfall – specific compound provided for HDD installation across the intertidal area.
- Primary (main compound) – major cable compounds at either end of the scheme and one central location. There are three primary compound locations on the proposed route:
  - A165 (Fraisthorpe);
  - A1034 (Market Weighton); and
  - A63 (Newsholme).
- Secondary (strategic location with good access). There are 10 secondary compound locations on the proposed route:
  - B1249 (Wandsford);
  - Driffield Road (Skerne) (1 of 2);
  - Driffield Road (Skerne) (2 of 2);
  - A164 (Hutton) (1 of 2);
  - A164 (Hutton) (2 of 2);
  - Beverley Road (Lund);
  - Skiff Lane (Tollingham);
  - A614 east (Bursea);
  - A614 west (Portington); and
  - Redhouse Lane (Drax).
- Tertiary (satellite compound accessed from the haul road). Generally located where there is flat ground and otherwise a large gap between compounds. There are four tertiary compound locations along the DC cable route:
  - Gransmoor Lane (Gransmoor Quarry);
  - Cliffe Lane (North Cliffe);
  - Unnamed road (east of Middleton on the Wolds); and
  - Unnamed road (Kiplingcotes, South Dalton).

The location of the proposed temporary construction compounds is shown on **Figure NTS-3**.

2.3.8 Operation of Underground DC Cable

The operational activity along the proposed DC cable route would mainly be limited to non-intrusive inspections. There is also the potential for localised intrusive works for cable repairs, however this is unlikely. Cable repair works would be similar to those undertaken at installation, but on a much smaller scale as only the damaged section of cable would be replaced.

2.4 Proposed Converter Station

As detailed in section 1.2, converter stations are key components of the DC electricity transmission system, converting electricity from AC to DC and vice versa.

2.4.1 Site Description

The proposed converter station site is located immediately east of the existing Drax Power Station, North Yorkshire. The converter station is illustrated on **Figure NTS-6**. The footprint of the converter station will be approximately 5 ha and is located on agricultural land, bounded by New Road to the West and Wren Hall to the south and east.

Access to the site is proposed via a new permanent access road (approximately 200 m) from the existing highway network, off New Road, providing direct access to the A645.

The proposed converter station comprises a range of specialist electrical equipment some of which must be located within buildings as well as some which can be located outdoors.

2.4.2 Physical Characteristics

The converter station will comprise the following components within the secure fenced compound:

- *DC Hall* - the underground DC cables terminate here. The switch hall also contains DC switchgear to connect to power electronics. This equipment will be enclosed in a building up to 30 m high. This includes the height of any lightning rods that may be required for safety;
- *Valve Halls and AC Inductors* – these contain high voltage power electronics equipment that converts electricity from DC to AC and vice-versa. This equipment must be located indoors in buildings up to 30 m high within a controlled environment;
- *Control Building* – this contains control panels and associated operator stations, protection and communication equipment, offices and welfare facilities and other auxiliary systems all located within an enclosed building up to 15 m high;
- *Transformer bays* – these change the AC voltage to an appropriate level for transmission via the AC system/ or prior to conversion to DC. The transformers are normally sited outdoors and separated by concrete fire protection walls. Typical dimensions are approximately 15 m long by 15 m wide by 16 m high. Cooling fans are also provided on transformers. Noise enclosures can be fitted around the transformers if required;
- *AC Switch gear and filters ("switch yard")* – connects the converter station to the AC transmission system. It includes a range of electrical equipment including harmonic filtration and reactive compensation equipment, circuit breakers, transformers, busbars and insulators. The main function is to allow the effective integration of the DC system into the AC system;
- *Diesel Backup Generator* – the converter station requires its own power typically provided at 11 kV, the diesel back-up generator will be used to provide back-up electricity supply in the event of a failure of the low voltage electricity supply; and
- *Spares Building* – this building houses spare parts and components; this will be supplemented by hardstanding areas provided for storage of a spare transformer and spare cable drums.

It is also likely that tall lighting columns will be needed so that maintenance works can be carried out during hours of darkness. These will be designed to avoid light pollution for example by lighting only critical areas within the site and only being switched on when needed.

The converter station site will be within a fenced compound with restricted access. A 2 m high palisade fence will be erected around the site, this will be established at the start of construction and retained for

operation. The site will also be monitored by CCTV and security gates will be in place for restricted/controlled access.

An indicative image of a converter station of the scale proposed at the converter station site is presented in **Figure NTS-5**.

Figure NTS-5: Indicative image (looking from the north) of the proposed converter station

2.4.3 Reinstatement, Landscaping and Biodiversity Net Gain

A landscape plan illustrating the location and extent of proposed landscape planting is contained in **Figure NTS-7**. The landscape mitigation has been developed jointly as part of the ecological and landscape and visual impact assessment, to develop a plan that enhances opportunities for greater biodiversity as well as mitigating any visual impacts, and aligning to the surrounding environment.

NGET have committed to achieving 10% Biodiversity Net Gain (BNG) as part of the English Onshore Scheme, and the development of the mitigation and offsetting strategy to achieve BNG has been interrelated with the ecology and landscape and visual disciplines.

The landscaping plan has been developed to support the ambitions of achieving 10% BNG whilst also aligning with the existing planting structure within the near vicinity. The landscaping is predominantly made up of a focus of woodland planting on the eastern boundary of the proposed converter station site along Wren Hall Lane, to enhance this existing green corridor and soften views of the converter station from properties to the east in Drax around the perimeter of the proposed site. The remaining areas of the site will be a combination of species rich grassland, scrub and marginal planting around the attenuation basins.

In addition to the landscaping around the converter station, an area of biodiversity enhancement has been identified to the immediate east of the converter station site, south of Wren Hall. This area includes a mix of habitats including the creation of native broadleaved woodland and enhancing areas of existing grassland for the improvement of biodiversity.