

Shetland Renewable Connections Project

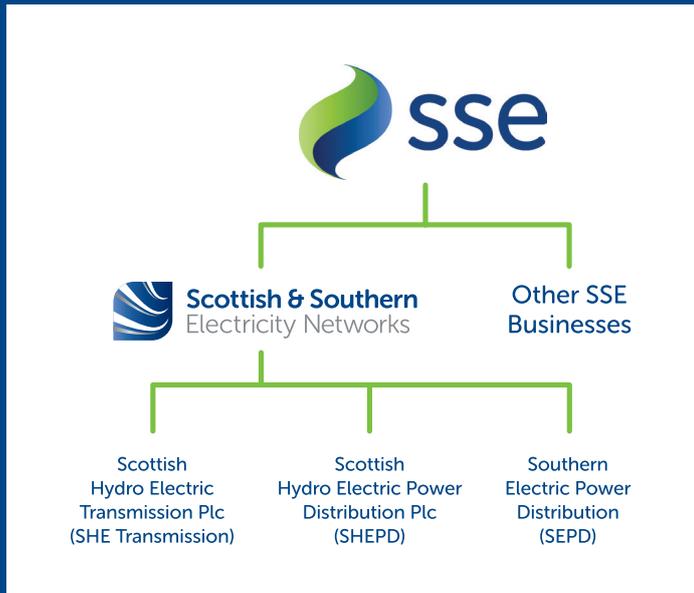
Information Brochure
July 2020



Scottish & Southern
Electricity Networks

Who we are

We are Scottish and Southern Electricity Networks, operating under licence as Scottish Hydro Electric Transmission Plc (SHE Transmission) for the transmission of electricity in the north of Scotland.



In total we maintain about 5,000km of overhead lines and underground cables – easily enough to stretch across the Atlantic from John O’Groats all the way to Boston in the USA.

Our network crosses some of the UK’s most challenging terrain – including circuits that are buried under the seabed, are located over 750m above sea level and up to 250km long.

The landscape and environment that contribute to the challenges we face also give the area a rich resource for renewable energy generation. There is a high demand to connect from new wind, hydro and marine generators which rely on Scottish and Southern Electricity Networks to provide a physical link between the new sources of power and electricity users. Scottish and Southern Electricity Networks is delivering a major programme of investment to ensure that the network is ready to meet the needs of our customers in the future.

Our responsibilities

We have a licence for the transmission of electricity in the north of Scotland and we are closely regulated by the energy regulator Ofgem.

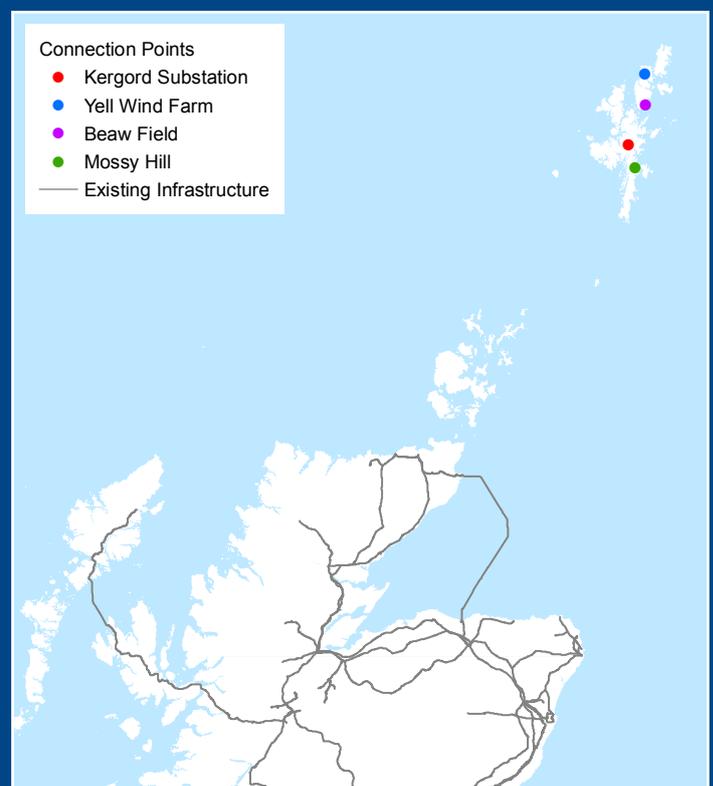
Our licence stipulates that we must develop and maintain an efficient, co-ordinated and economical system of electricity transmission.

What is the difference between Transmission and Distribution?

Electricity Transmission is the transportation of electricity from generating plants to where it is required at centres of demand. The Electricity Transmission network, or grid, transports electricity at very high voltages through overhead lines, underground cables and subsea cables. Our transmission network connects large scale generation, primarily renewables, to central and southern Scotland and the rest of Great Britain. It also helps secure supply by providing reliable connection to the wider network of generation plans.

The Electricity Distribution network is connected into the Transmission network but the voltage is lowered by transformers at electricity substations, and the power is then distributed to homes and businesses through overhead lines or underground cables.

Overview of renewable development on Shetland



Project Background

As Transmission operator for the North of Scotland, we have a license requirement to provide connections for generators looking to connect to the GB transmission network. In Scotland, Transmission voltages are 132kV, 275kV and 400kV. Larger generation schemes usually connect to the Transmission system and the lower voltage parts of the system are called distribution networks. In Scotland, these local distribution networks operate below 132kV whereas in England, the distribution network includes 132kV.

There is currently significant renewable generation proposed on Shetland and to provide these generators with a connection we will require to create a transmission connection from each windfarm to the proposed Kergord 132kV Substation and HVDC Converter Station, ultimately enabling the export of renewable generation from Shetland to the Scottish mainland at Noss Head in Caithness via the proposed Shetland HVDC link.

To enable these connections, the following transmission project elements are required:

- A new 132kV Switching Station located on Yell to connect Energy Isles and Beaw Field Windfarms;
- New 132kV connections from the proposed Yell Switching Station to Energy Isles (Yell) and Beaw Field windfarms, likely to be overhead line with sections of underground cable;
- A new 132kV transmission connection from Yell Switching Station to Kergord 132kV Substation and HVDC Converter Station. This will consist of a combination of 132 kV land cable, overhead line and a subsea cable between Yell and Mainland Shetland; and
- A combination of new 132kV land cable and overhead line to connect Mossy Hill windfarm to Kergord Substation.

Shetland HVDC Project

In July and October 2019, we held public consultation events in relation to the Shetland HVDC project, which would see the delivery of a single 600MW subsea circuit from Weisdale Voe in Shetland to Noss Head in Caithness, where it will connect to the existing Caithness-Moray transmission link.

All relevant planning applications at this stage of the project have been applied for.

The Shetland HVDC Link also has the potential to support Shetland’s future electricity needs and maintain security of supply for local homes and businesses. The Shetland islands are presently supplied by Lerwick Power Station, anticipated to reach the end of its operational life and to cease operations by 2025.

To meet Shetland’s future electricity needs, Scottish Hydro Electric Power Distribution (SHEPD) is proposing a new Grid Supply Point Substation at Gremista, currently the subject of an offer for connection to Kergord 132kV substation.

In May 2020, the energy regulator, Ofgem, provisionally approved the construction of a 600MW transmission connection from Shetland to the north of Scotland mainland. Viking Wind Farm have now reached a positive Final Investment Decision and the project is currently awaiting the outcome of Ofgem’s consultation prior to commencing construction.

Renewable Generation

The table below highlights the requests received from renewable generation developments proposed on Shetland which have triggered the requirement for the Shetland Renewable Development project:

Scheme Description	Size
Energy Isles (Yell) Wind Farm, Yell	120MW WIND
Beaw Field Wind Farm, Yell	72MW WIND
Mossy Hill Wind Farm, Mainland Shetland	50MW WIND

Development Process

Connection Options

New 132kV transmission connections are needed between the proposed Kergord substation and a landfall in north mainland Shetland, and on Yell. Overhead line routing is a balance between environmental, technical and economic considerations. Stakeholder and public consultation are also a key part of overhead line routing.

- Environmental considerations include natural heritage, cultural heritage, location of residential properties, landscape and visual impact, land use and planning.
- Engineering considerations include the location of existing infrastructure including existing 33kV and 11kV overhead lines and underground cables, elevation, flood risk, ground conditions, construction and maintenance.
- Economical considerations include both capital cost and ongoing operational costs due to inspections and maintenance.

For this project, new overhead lines will follow existing roads and access wherever practicable. This is to minimise any impact on areas of sensitive peatland habitat away from existing roads and settlements and will also minimise the length of new access track construction required for the works. This will also reduce health and safety risks associated with constructing and maintaining a line in a remote location.

The impact on local communities is also an important consideration, and once the connection route is refined further, discussions with local communities and landowners is a key part of reaching a preferred alignment.

Upcoming activities

The project is at an early stage, so environmental desk studies, walkovers and surveys will take place in 2020 and 2021 to provide information for overhead line routing.

Bird surveys started in April 2020 and will be ongoing for 18 months, providing important information on the behaviour and distribution of bird species. Archaeology desk studies and walkovers will also be undertaken to understand the location of cultural heritage features, and to ensure that any impacts on these features can be minimised.

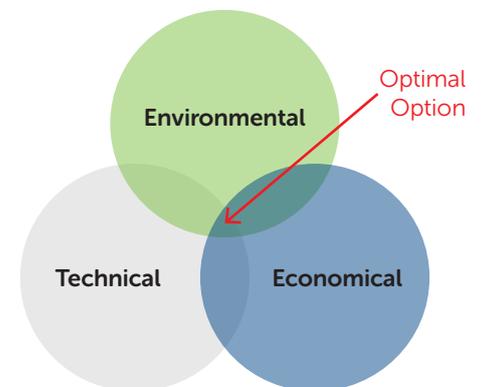


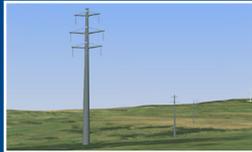
Photo courtesy of ORCA

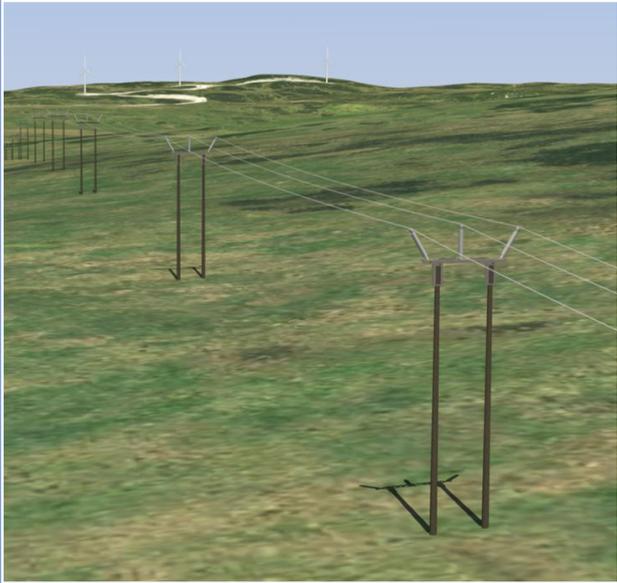
Technology Options

In order to achieve the necessary connection capacity, various technology options are being considered.

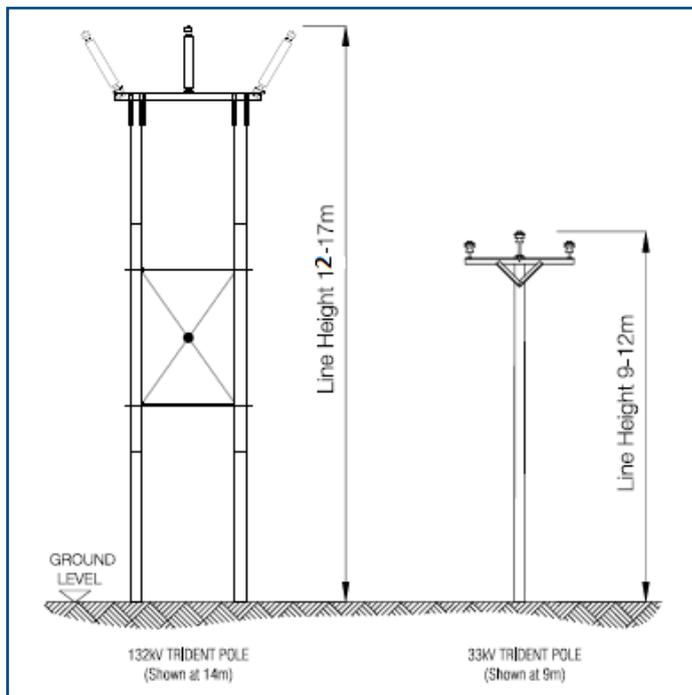
Technology options are assessed against a range of criteria including system requirements, technical, environmental, programme, health and safety and cost. Whilst technically feasible, a Steel Lattice Tower (pylon) solution was ruled out of this assessment.

The options identified in the adjacent table are considered technically feasible:

		
<p>Single Circuit Wood Pole Lines Standard Pole height is between 11-17m and pole spacings are in the range 80-120m</p>	<p>Two Single Circuit Wood Pole Lines These would be positioned in parallel, approx. 50m apart or can follow different routes</p>	<p>NeSTS (New Suite Transmission Structures) Single Circuit</p>
		
<p>Composite Pole Lines Standard pole height would be between 22-26m and pole spacings are approx. 200m</p>	<p>Underground Cabling 132kV AC power cables; either ducted or directly buried, in an underground trench nominally 1m below ground level.</p>	<p>NeSTS (New Suite Transmission Structures) Double Circuit</p>

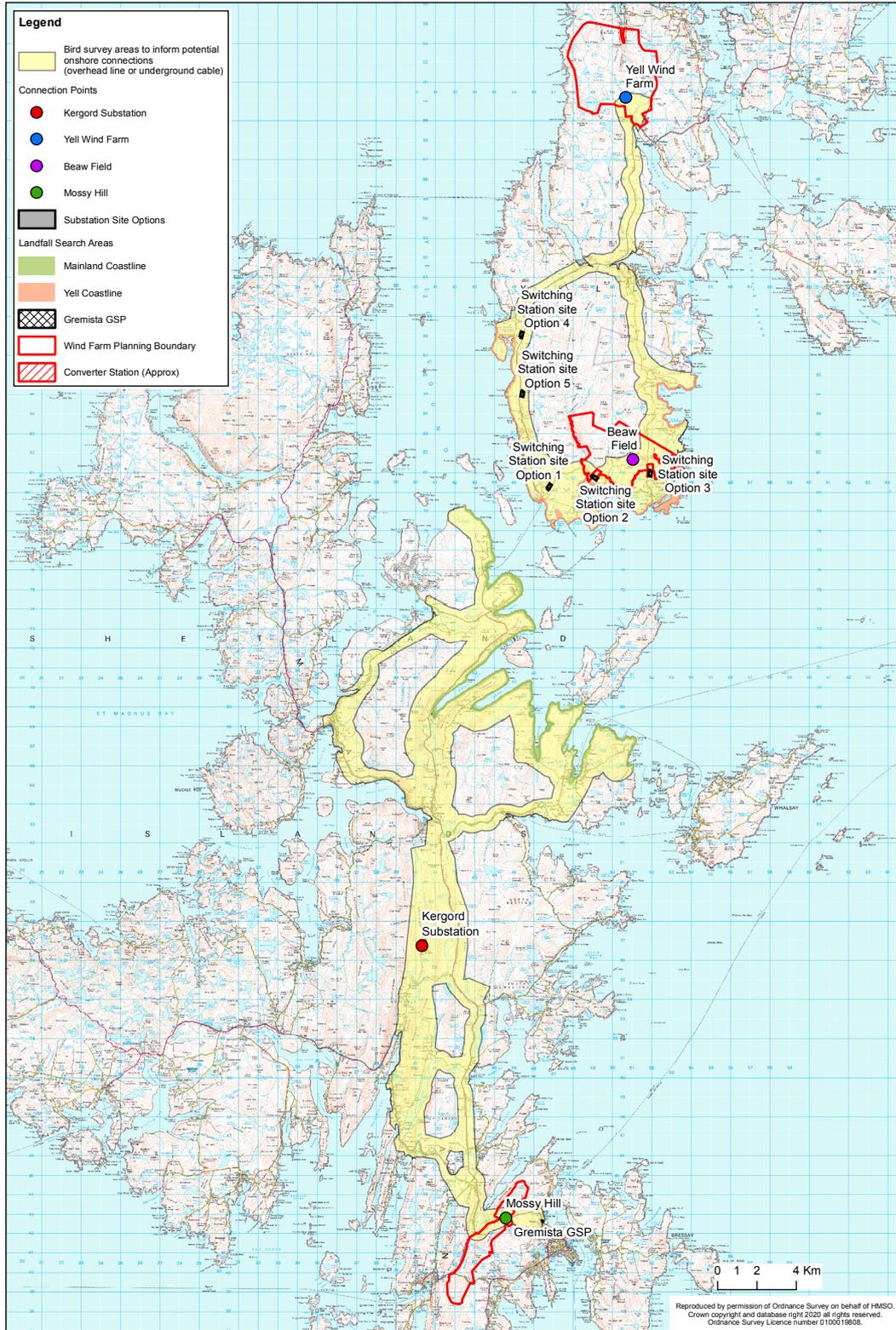


The preferred solution is single circuit trident wood pole with traditional and new technology conductors, although sections of alternative technology, eg underground cable and alternative supports, may be required in some areas to accommodate environmental and technical constraints.

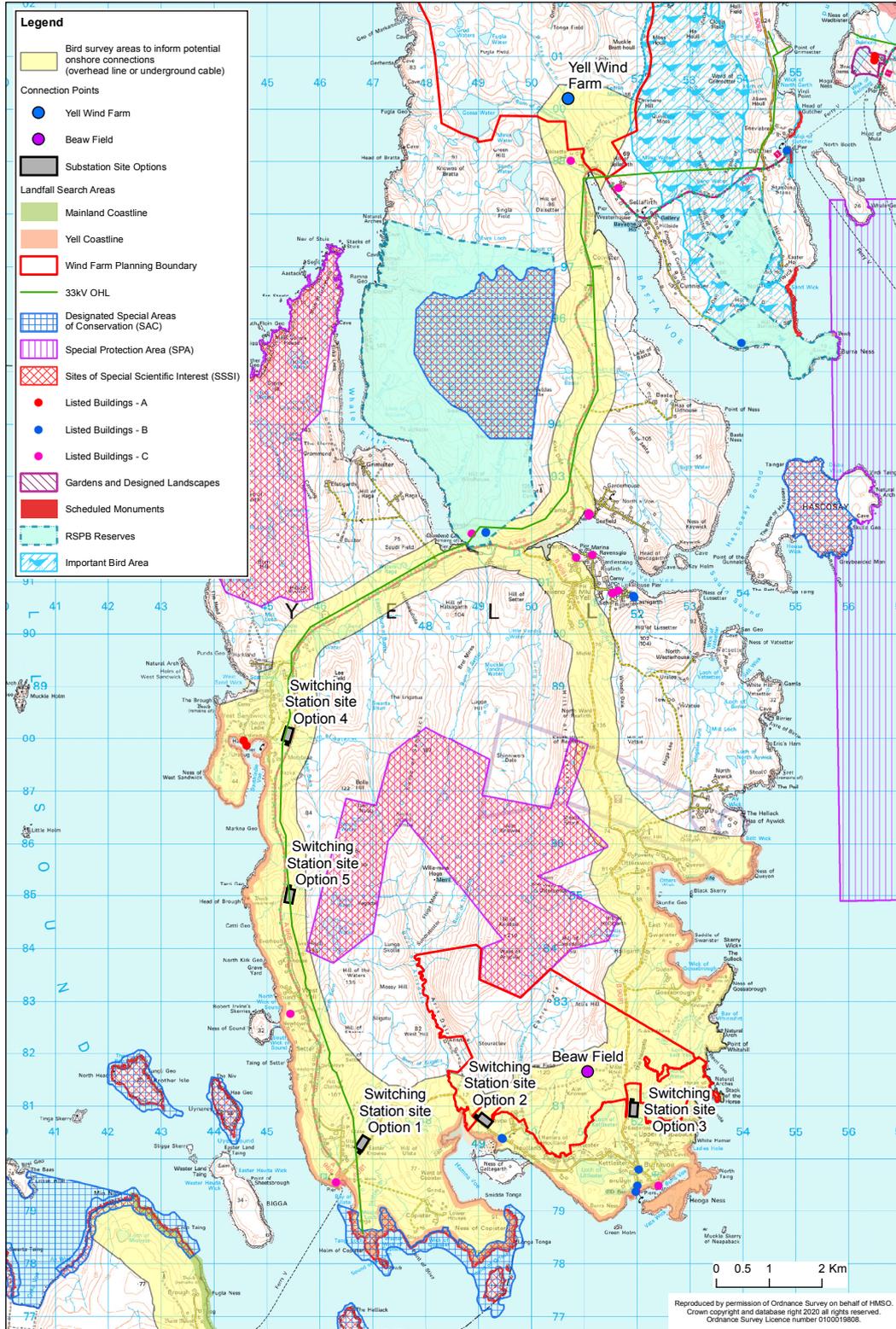


The above diagram is an approximate height comparison between the preferred solution for the 132kV Shetland Renewable Connections transmission project and existing distribution infrastructure commonly seen on the Shetland Islands.

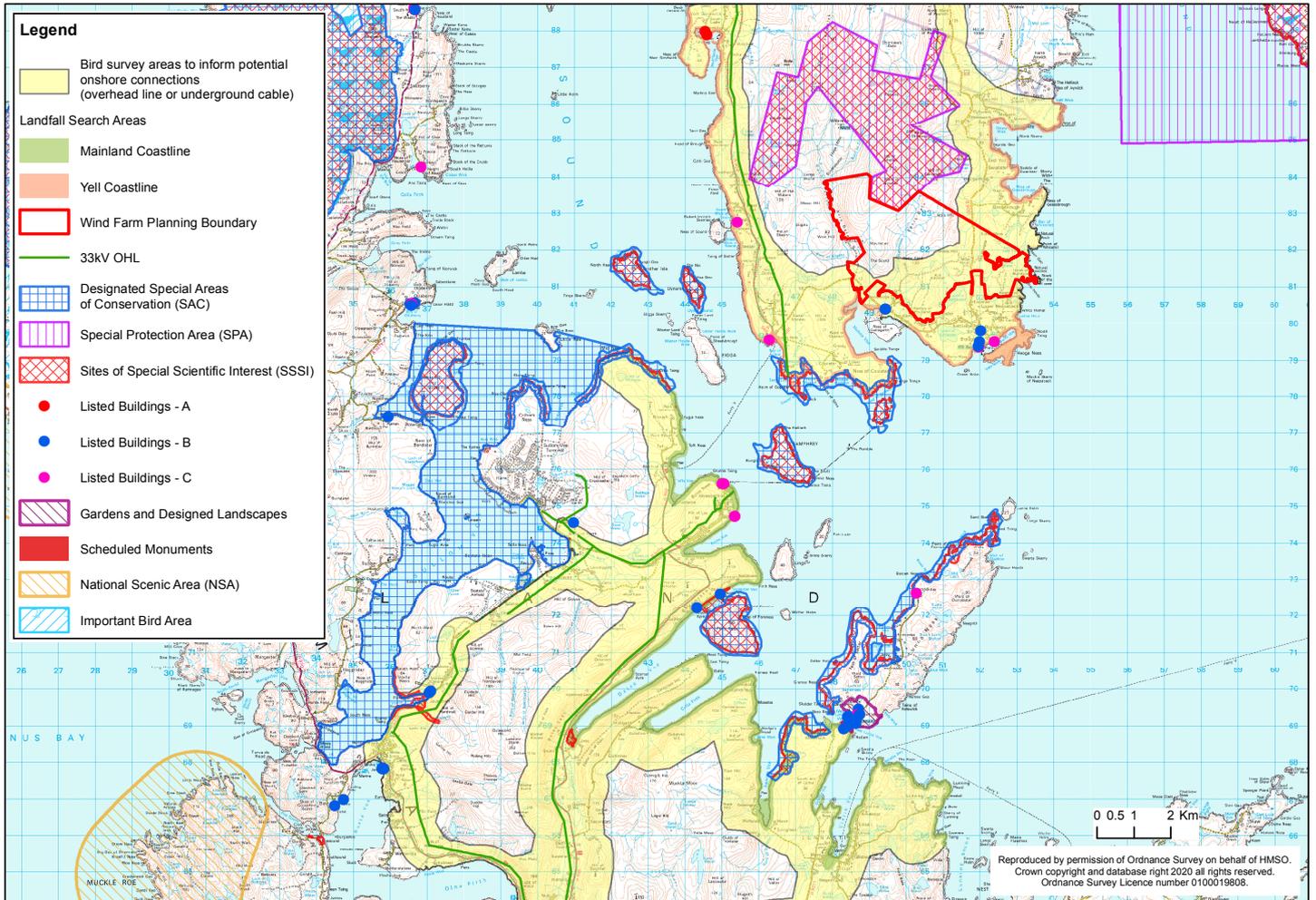
Project Overview Map



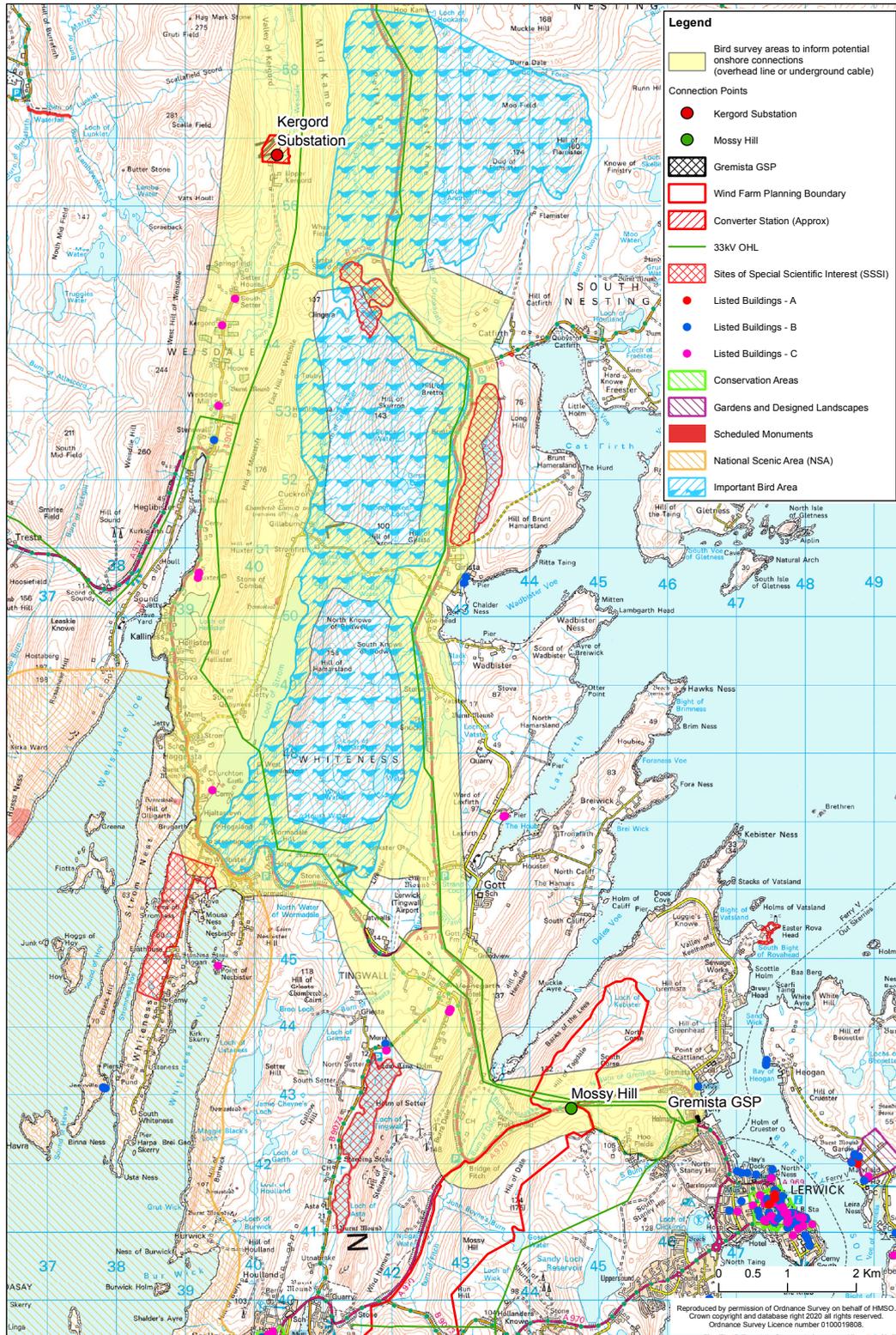
Yell Switching Station Sites



Yell – North Mainland



Kergord, Mossy Hill and Gremista

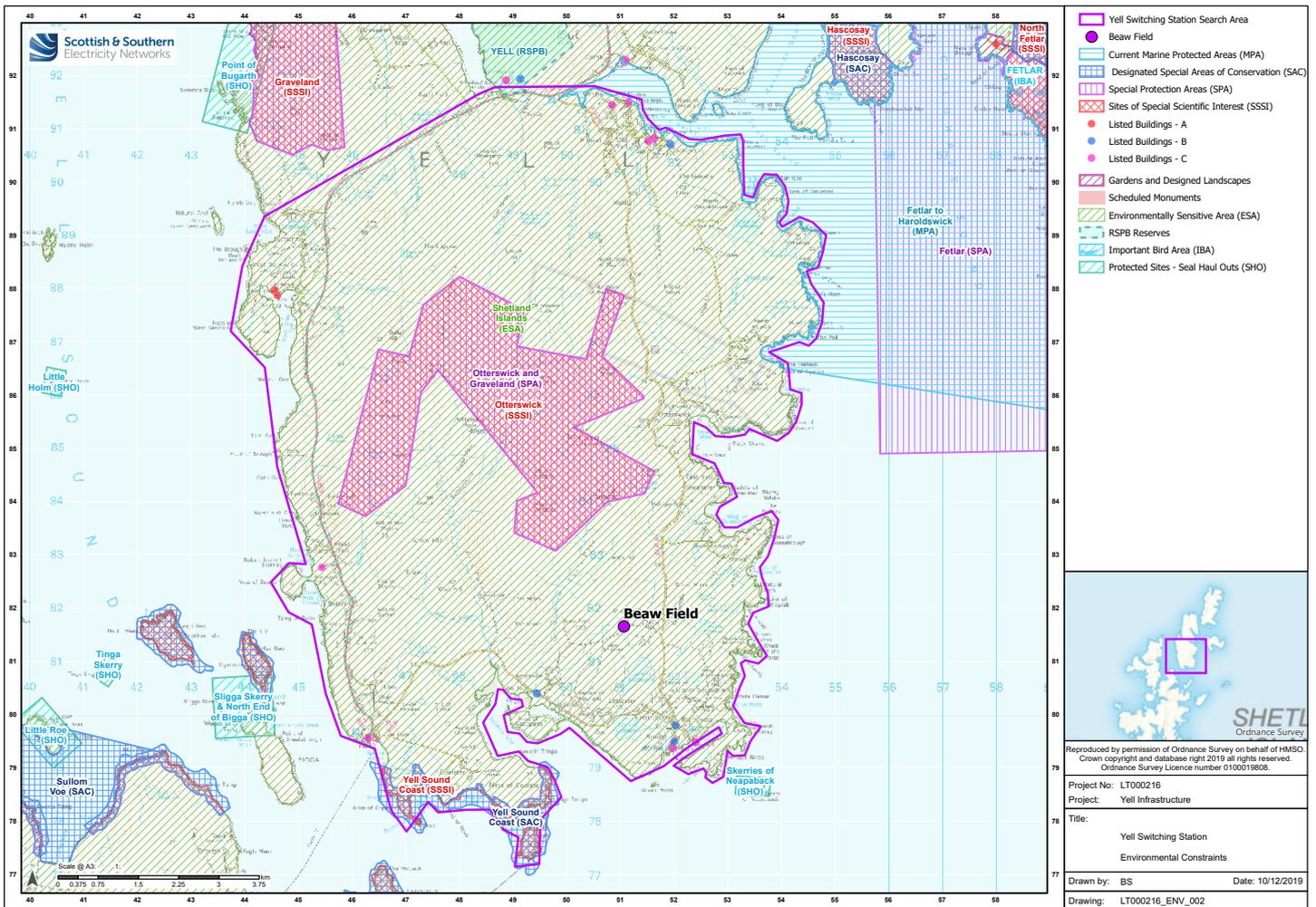


Switching Station

The search for sites – what has happened so far?

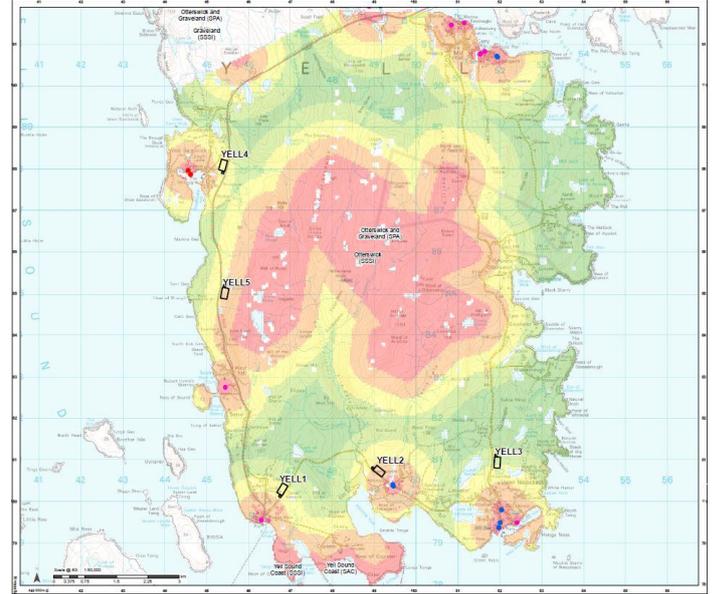
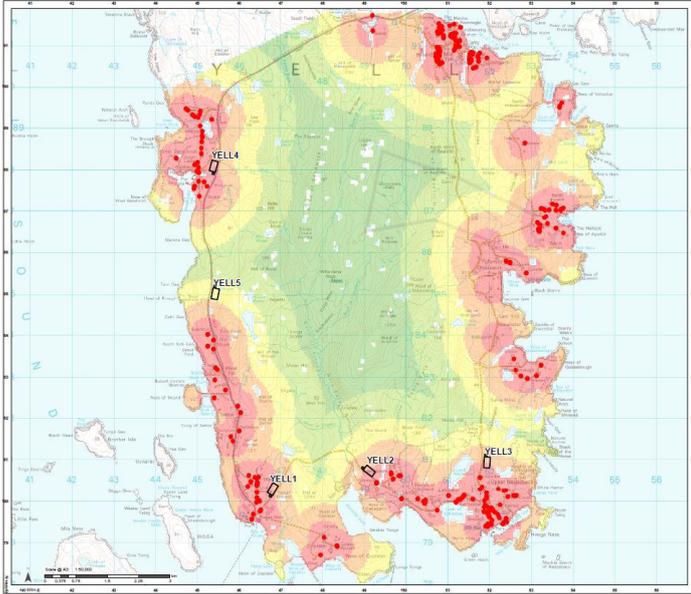
A preliminary search for switching station sites was carried out in 2019. This involved a combination of desktop analysis and site visits to identify potential options. Potential site options identified during the site visits were also examined against known environmental constraints. This desk-based assessment used information obtained from the statutory authorities and other recognised publicly available sources of environmental data.

Some examples of the data that informed the search for site options are presented below.



Yell Switching Station search area and environmental designations

Switching Station



Proximity to properties and proximity to environmental designations – GIS analysis of potential switching station site options

This process led to five potential site options being identified, which were subject to further site visits to confirm their suitability and are now being presented to stakeholders and the public for initial comment.

Technical engineering requirements, **financial** considerations, **environmental** considerations, as well as **feedback** from the public exhibitions will all be considered throughout the ongoing site selection process. This will allow the sites to be ranked in order of preference, which will lead to a preferred site being proposed for the development.

Detailed design

Once a preferred site has been identified, a more detailed design will be developed. This will include an electrical layout and a civil design of the site including earthworks, drainage, access tracks and fencing. Overhead line and cable connections to the site will also be developed.

A ground investigation, which will include boreholes and trial pits, will be required to provide information on ground conditions to further inform the design. An Environmental Impact Assessment will also be undertaken, including detailed ecology surveys and an archaeological assessment of the site.

The layout and area requirements used to inform the initial process are based on the largest probable footprint and also include a buffer around the site to allow for any earthworks and screening. Technology options are being developed that will refine the area and size of the switching station with key considerations including environmental impact during both construction and operation.

A specific indication of footprint and building size will become available at future consultation.

What happens next?

A basic layout and building design is currently being developed with an allowance for a temporary construction compound. It will also include an allowance for earthworks and planting and provide opportunities to enhance biodiversity on the site. This basic layout will be used for environmental, technical and cost assessments.

The environmental assessment criteria includes ecology, ornithology, cultural heritage, land use and landscape and visual impact. Technical assessment criteria includes construction timescales, maintenance, connectivity, and health and safety considerations. An initial cost appraisal will examine cost differences between developing the different site and technology options, including aspects such as the length of access track needed.

To inform these assessments, further walkover studies, breeding bird surveys and peat probing will be undertaken at each location.

Switching Station Considered Sites



Subsea Cable

SHE Transmission is developing a 132kV subsea cable route to connect Yell 132kV Switching Station and Kergord 132kV substation. Key route option selection criteria include:

1. Minimise impact on the environment
2. Minimise impact on other sea users
3. Meet a 40yr design life

At this early stage of development, it is anticipated that the subsea cable route will range between 4 - 20km.

A range of publicly available information, including bathymetry, habitats, geology and the location of other assets such as pipelines and cables has been used to assess route options. As Yell sound is a very dynamic and busy area of sea, a Multibeam sonar recce survey is planned of the pink area shown on the map. The survey data will be integrated with existing Bathymetry, landfall and onshore data to allow a route to be developed that minimises the overall impact of the project whilst enabling the delivery of a secure, environmentally sensitive and cost-effective connection.

The planned survey work and subsequent assesment of data will enable route refinement and the eventual narrowing down to a $\pm 100\text{m}$ wide cable corridor for a marine license application. This is currently planned for the second half of 2021. The 132Kv subsea cables are likely to be constructed of either copper or aluminum conductor, polymeric insulation and lead alloy sheath, with an outer armour wire layer. Both single and three-core cable types are currently being considered. Until such time as the landfall location and seabed installation conditions are better understood, requirements such as route length and burial depth cannot be defined.

Ongoing Considerations

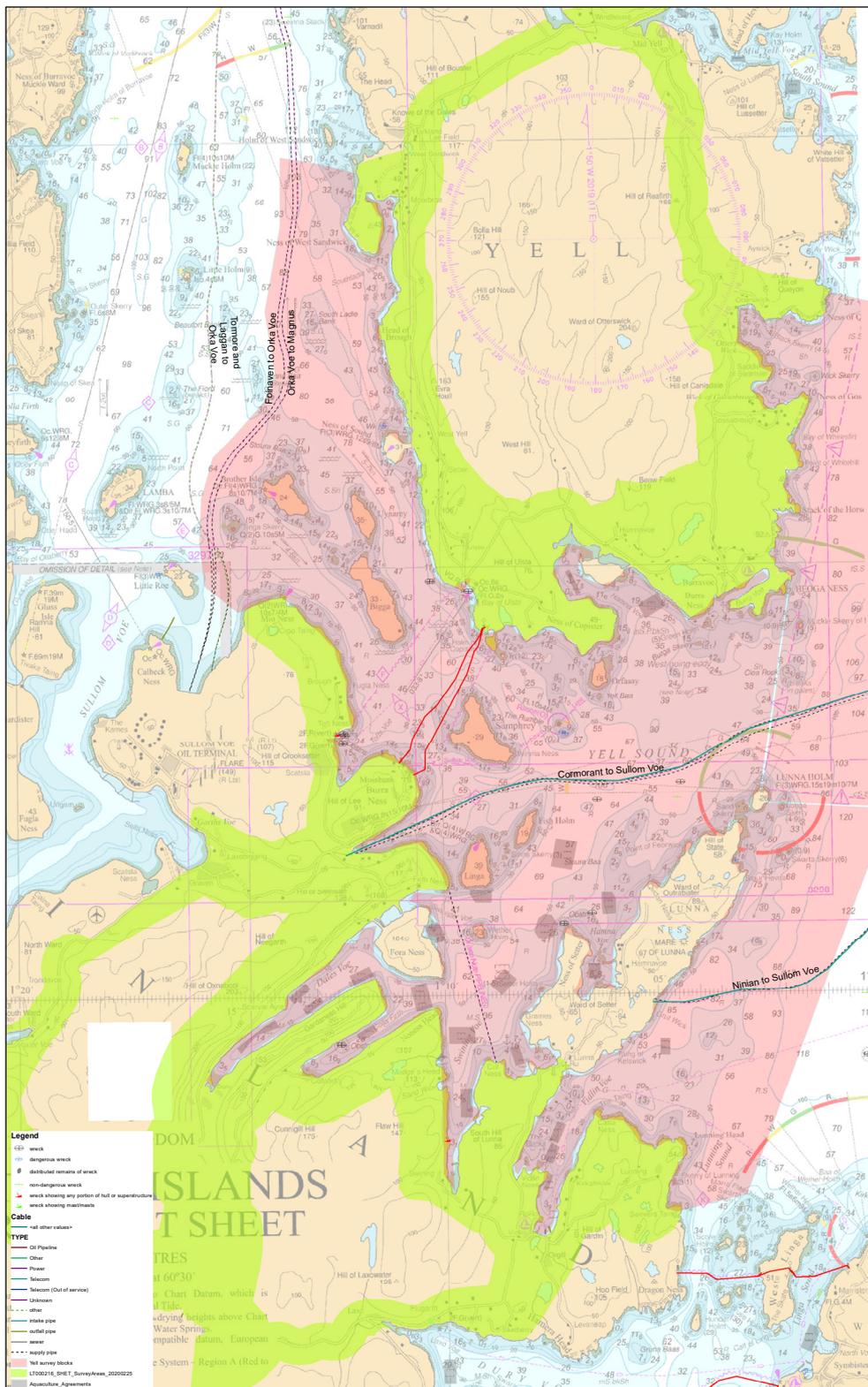
- Coordination of design and route engineering with OHL and substation elements of project
- Potential changes to rated capacity and current carrying requirements and the impacts to project scope; i.e. changes to customer requirements (windfarm developers)
- Physical hazards to the installation, such as seabed conditions, third-party assets and tidal forces
- CDM (Construction Design and Management) Regulations (2015); i.e. safety in design and risk mitigations from concept design through to eventual decommissioning

Installation

- The installed cable system will require adequate mechanical protection to ensure a 40-year serviceable life
- Detailed installation methodology will be engineered during the project's detailed design phase
- Detailed engineering will include a geotechnical survey of the chosen cable corridor and subsequent analysis and CBRA (cable burial risk assessment)
- It can be reasonably assumed, cables will be contained within ducts at each landfall transition and will be protected using a combination of natural seabed material (after burial) and, in harder seabed areas, by alternative means such as placement of imported rock



Subsea Cable Survey Area



Next steps

Planning Applications

Yell 132kV Switching Station

The proposed switching station will become part of a new 132kV electricity transmission network on Shetland, so will be classed as a 'National' development for planning purposes.

Once the preferred location for the switching station is confirmed, a Proposal of Application Notice (PoAN) will be Submitted to Shetland Islands Council (SIC), after which further public engagement will take place to gather feedback on topics such as location, design and amenity. That feedback will be reported to SIC along with the detailed plans and reports in support of our planning application. An Environmental Impact Assessment (EIA) Screening Opinion will also be submitted to SIC in advance of the planning application so that the Council's views can be taken into account and incorporated into our assessment.

The planning application process for the switching station is anticipated to take around 6 – 9 months.

132kV Overhead Lines

In order to facilitate the connection of substations, new 132kV overhead lines will be constructed.

Once a preferred route is proposed, the public shall be further consulted to take account of feedback before the final route is selected. Similar to the switching station, an Environmental Impact Assessment (EIA) screening option will be submitted to the Scottish Governments Energy Consents Unit (ECU) to ensure their views can be taken into account and incorporated.

The proposed new overhead route will need to be determined under a Section 37 (s37) application which will be submitted to the ECU. That application will also include all supporting information to justify the selection of technology, location and routing proposed. It is anticipated that the s37 consenting process for overhead lines will take around 6-9 months.

Wind farm connections

Substation sites will also be needed at Beaw Field, Energy Isles and Mossy Hill Wind Farms sites to connect and export the wind generation via predominantly new 132kV trident wood pole overhead lines. Each developer is responsible for obtaining planning permission for these sites.

Subsea Cable

Several licences and consents will be required to enable the installation of the subsea cable;

1. Marine Works Licence from Shetland Island council
2. Works Licence from Sulome Voe Harbour Authority, depending on the location of the works
3. Marine Licence from Marine Scotland for the installation and operation of the cable
4. Crown Estate Scotland Lease

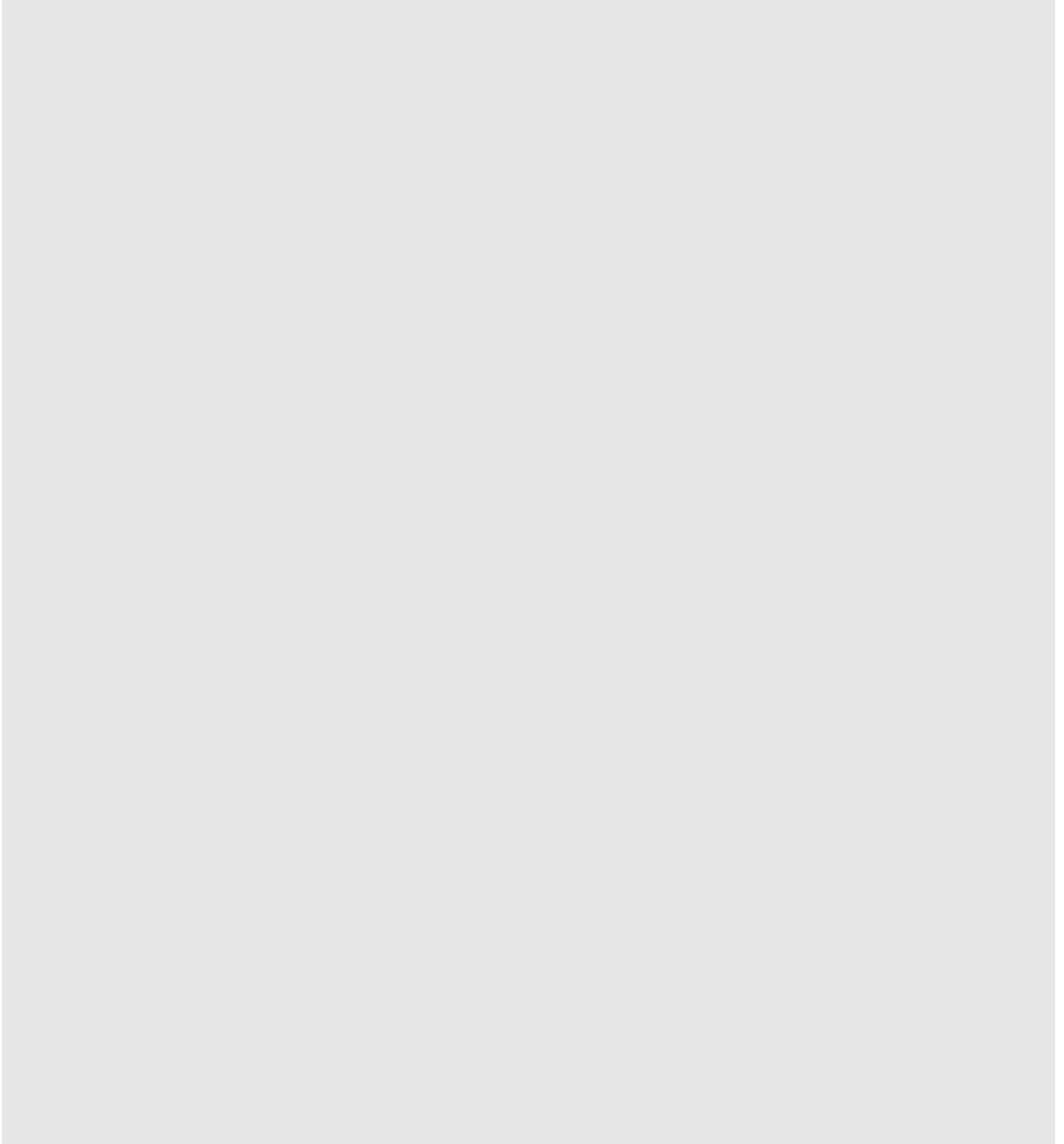
To support this work, we will be undertaking assessments of the potential impact of the works on the environment and other sea users. We are proposing producing both a traditional written report and an online interactive version. The aim of this is to make our work as accessible as possible.

Future Activities



Please note that due to this early stage of development dates are currently indicative and subject to change.

Notes



How do I have my say?

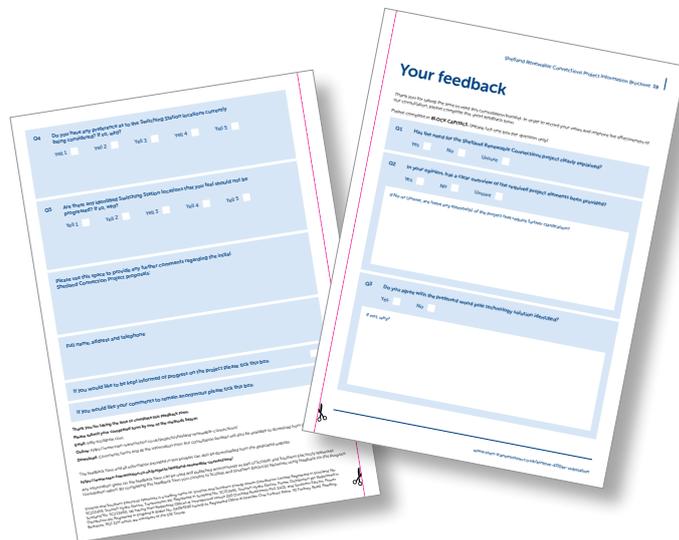
Comments

We understand and recognise the value of the feedback provided by members of the public during all engagements and consultations.

At this early stage of development, we are keen to receive your views and comments which can be provided to the project team by completing a feedback form at the back of this booklet, filling out the online feedback form or by writing to Kelly Scott, Community Liaison Manager.

We will be seeking feedback from members of the public and Statutory Bodies until 16:00, Friday 21 August 2020.

All received feedback will be assessed and the proposed options adapted where necessary



Community Liaison Manager, Kelly Scott

 kelly.scott@sse.com

 07443 772 946

 Kelly Scott
Scottish and Southern
Electricity Networks,
1 Waterloo Street
Glasgow, G2 6AY



Additional information

Information will also be made available via the project webpage and social media channels:

Project Website:
<https://www.ssen-transmission.co.uk/projects/shetland-renewable-connections/>

Follow us on Twitter:
[@ssencommunity](https://twitter.com/ssencommunity)

Your feedback

Thank you for taking the time to read this consultation booklet. In order to record your views and improve the effectiveness of our consultation, please complete this short feedback form.

Please complete in **BLOCK CAPITALS**. (Please tick one box per question only)

Q1 Has the need for the Shetland Renewable Connections project clearly explained?

Yes No Unsure

Q2 In your opinion, has a clear overview of the required project elements been provided?

Yes No Unsure

If No or Unsure, are there any element(s) of the project that require further clarification?

Q3 Do you agree with the preferred wood pole technology solution identified?

Yes No

If not, why?



Q4 Do you have any preference as to the Switching Station locations currently being considered? If so, why?

Yell 1

Yell 2

Yell 3

Yell 4

Yell 5

Q5 Are there any identified Switching Station locations that you feel should not be progressed? If so, why?

Yell 1

Yell 2

Yell 3

Yell 4

Yell 5

Do you have any comments regarding the search areas being explored to identify a preferred route?

Full name, address and telephone

If you would like to be kept informed of progress on the project please tick this box.

If you would like your comments to remain anonymous please tick this box.

Thank you for taking the time to complete this feedback form.

Please submit your completed form by one of the methods below:

Email: kelly.scott@sse.com

Online: <https://www.ssen-transmission.co.uk/projects/shetland-renewable-connections/>

Download: Comments forms and all the information from this consultation booklet will also be available to download from the project website.

The feedback form and all information provided in this booklet can also be downloaded from the dedicated website:

<https://www.ssen-transmission.co.uk/projects/shetland-renewable-connections/>

Any information given on the feedback form can be used and published anonymously as part of Scottish and Southern Electricity Networks consultation report. By completing this feedback form you consent to Scottish and Southern Electricity Networks using feedback for this purpose.

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