

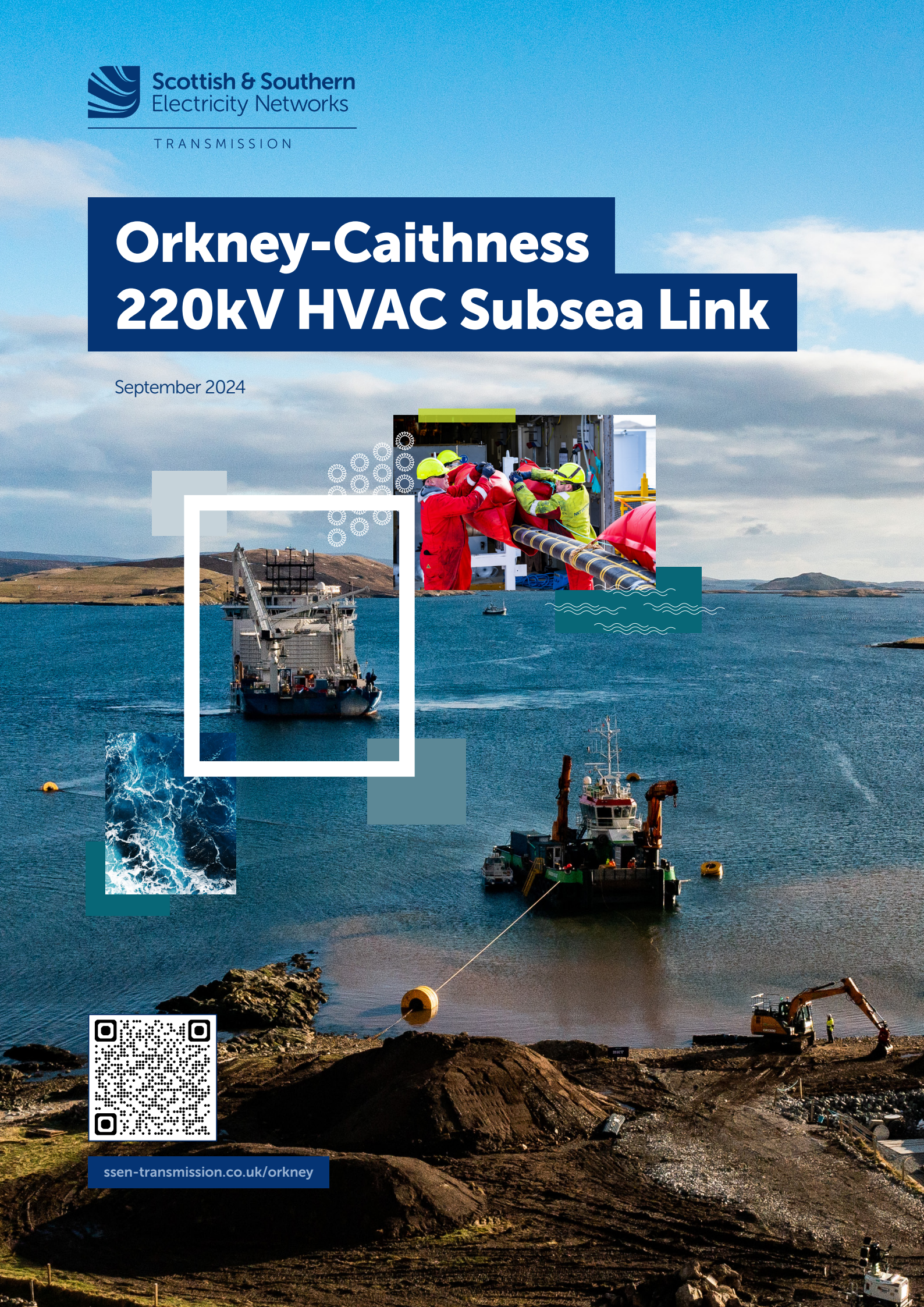


Scottish & Southern
Electricity Networks

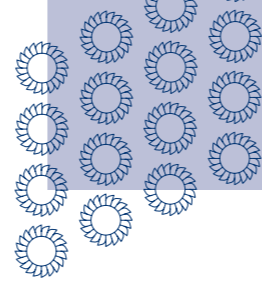
TRANSMISSION

Orkney-Caithness 220kV HVAC Subsea Link

September 2024



ssen-transmission.co.uk/orkney



Contents

Powering change together The Pathway to 2030	03 04	What's happening now? Engaging with communities Biodiversity net gain Keeping in touch	14 16 18 20
Project need	06		
Project overview	07		
Infrastructure	08		
Project timeline	10		

Powering change together



The time has come to further enhance Scotland's energy infrastructure, providing power for future generations as we move towards net zero.

The shift to a cleaner, more sustainable future is about more than climate change. It's about ensuring future generations have the same opportunities to thrive as we have all had.

Countries around the world are investing in their energy infrastructure to support the demands of modern economies and meet net zero targets. The UK is leading the way in building a modern, sustainable energy system for the future.

We all have a part to play

When it comes to net zero, we have to be in it together. The UK and Scottish governments have ambitious net zero targets, and we're playing our part in meeting them.

We work closely with the National Grid Electricity System Operator to connect vast renewable energy resources—harnessed by solar, wind, hydro and marine generation—to areas of demand across the country. Scotland is playing a big role in meeting this demand, exporting two thirds of power generated in our network.

But there's more to be done. By 2050, the north of Scotland is predicted to contribute over 50GW of low carbon energy to help deliver net zero. Today, our region has around 9GW of renewable generation connected to the network.

At SSEN Transmission, it is our role to build the energy system of the future.

We're investing £20 billion into our region's energy infrastructure this decade, powering more than ten million UK homes and 20,000 jobs, 9,000 of which will be here in Scotland.

Who we are

We're responsible for maintaining and investing in the electricity transmission network in the north of Scotland. We're part of SSE plc, one of the world's leading energy companies with a rich heritage in Scotland that dates back more than 80 years. We are also closely regulated by the GB energy regulator Ofgem, who determines how much revenue we are allowed to earn for constructing, maintaining and renovating our transmission network.

What we do

We manage the electricity network across our region which covers a quarter of the UK's land mass, crossing some of the country's most challenging terrain. We connect renewable energy sources to our network in the north of Scotland and then transport it to where it needs to be. From underground and subsea cables and overhead lines to electricity substations, our network keeps your lights on all year round.

Working with you

We understand that the work we do can have an impact on communities. So we're committed to minimising our impacts and maximising all the benefits that our developments can bring to your area. We're regularly assessed by global sustainability consultancy AccountAbility for how we engage with communities. That means we provide all the information you need to know about our plans and how they will impact communities like yours. The way we consult is also a two-way street. We want to hear people's views, concerns, or ideas and harness local knowledge so that our work benefits their communities: today and long into the future. You can share your views with us at: ssen-transmission.co.uk/talk-to-us/contact-us/



More information about the policies and documents driving the need for the energy system for the future can be found here:



The Pathway to 2030

Building the energy system of the future will require delivery of significant infrastructure over the next few years. In partnership with the UK and Scottish governments, we're committed to meeting our obligation of connecting new, renewable energy to where it's needed by 2030.

Achieving Net Zero

By 2030, both the UK and Scottish governments are targeting a big expansion in offshore wind generation of 50GW and 11GW respectively. The Scottish Government has also set ambitious targets for an additional 12GW of onshore wind by 2030.

Across Great Britain, including the north of Scotland, there needs to be a significant increase in the capacity of the onshore electricity transmission infrastructure to deliver these 2030 targets and a pathway to net zero.

Securing our energy future

And it's not just about net zero. It's also about building a homegrown energy system, so that geopolitical turmoil around the world doesn't severely impact the UK and push up energy prices.

The UK Government's British Energy Security Strategy further underlines the need for this infrastructure, setting out plans to accelerate homegrown power for greater energy independence. The strategy aims to reduce the UK's dependence on and price exposure to global gas wholesale markets through the deployment of homegrown low carbon electricity generation supported by robust electricity network infrastructure.

Meeting our 2030 targets

In July 2022, National Grid, the Electricity System Operator (ESO), published the Pathway to 2030 Holistic Network Design (HND). This set out the blueprint for the onshore and offshore transmission infrastructure that's required to support the forecasted growth in the UK's renewable electricity. It's an ambitious plan that will help the UK achieve net zero.

What does this mean for you?

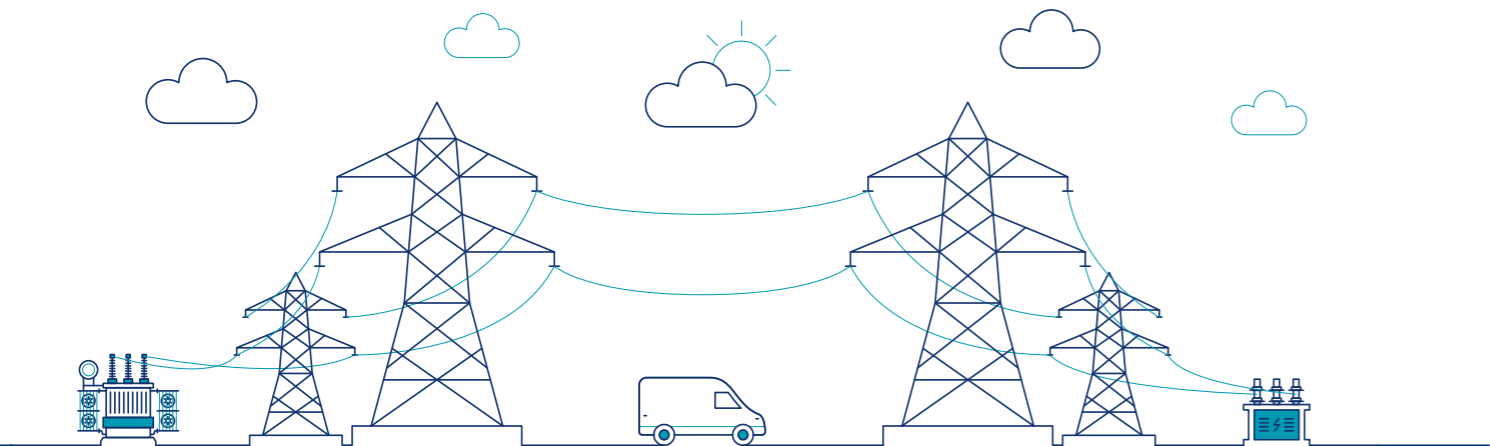
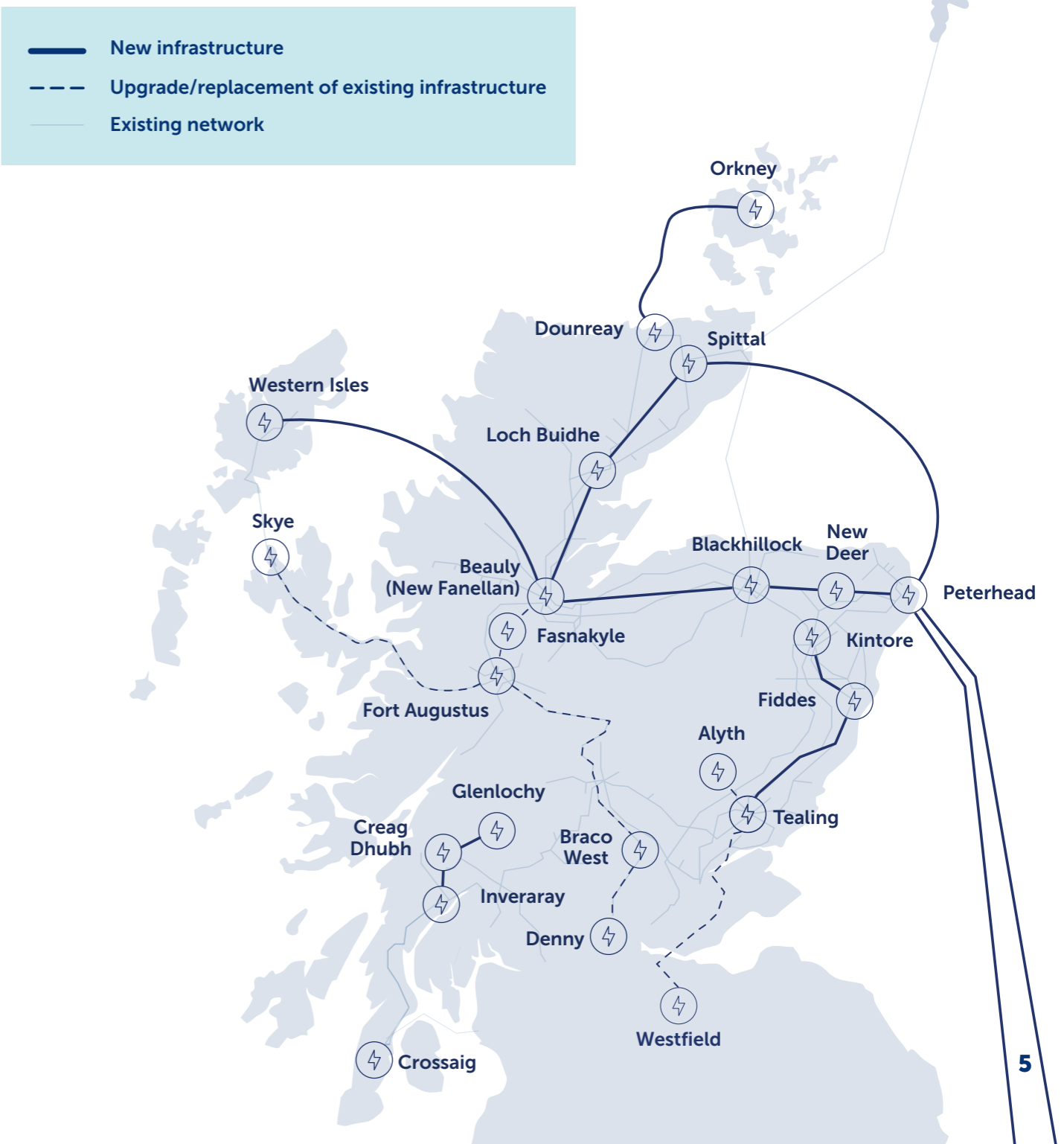
The Orkney Islands currently have no transmission infrastructure and are presently served by 2x36km long, 33kV subsea cables from Thurso Grid Supply Point (GSP) in Caithness. As a result of pipeline generation of 373.8MW transmission infrastructure is required to connect Orkney to the mainland for the purpose of exporting this power into the UK's transmission system and onward to the end user.

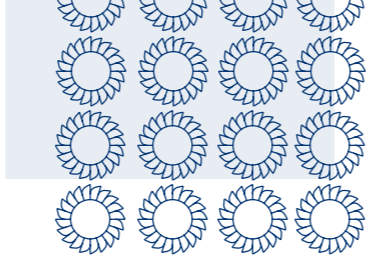
Future network investment requirements

Our 2030 targets are the first step on the transition to net zero. The UK Government has a target to decarbonise our electricity system by 2035 and fully decarbonise our economy by becoming net zero by 2050, with the Scottish Government committing to net zero five years earlier, by 2045.

To achieve these targets, further investment in new low carbon electricity generation and the enabling electricity transmission network infrastructure will be required.

The next stage of strategic network planning across Great Britain has now been outlined in the independent Electricity System Operator, National Grid ESO's, 'Beyond 2030' report, published in March this year. For the north of Scotland, the ESO's plan recommends several new and upgraded onshore and offshore reinforcements that the ESO has assessed are required to help deliver net zero targets. These projects, which will be subject to extensive public consultation, are at the very early stages of development and further details will be set out in due course.





Project need

SSEN Transmission welcomed the publication by Ofgem in which the energy regulator has given its final approval of need for long awaited and much needed plans to provide a subsea electricity transmission link to Orkney.

The Orkney Islands are home to some of the world's greatest resources of renewable electricity, from established onshore wind, to emerging marine technologies, where Orkney is at the forefront of global developments in marine energy generation.

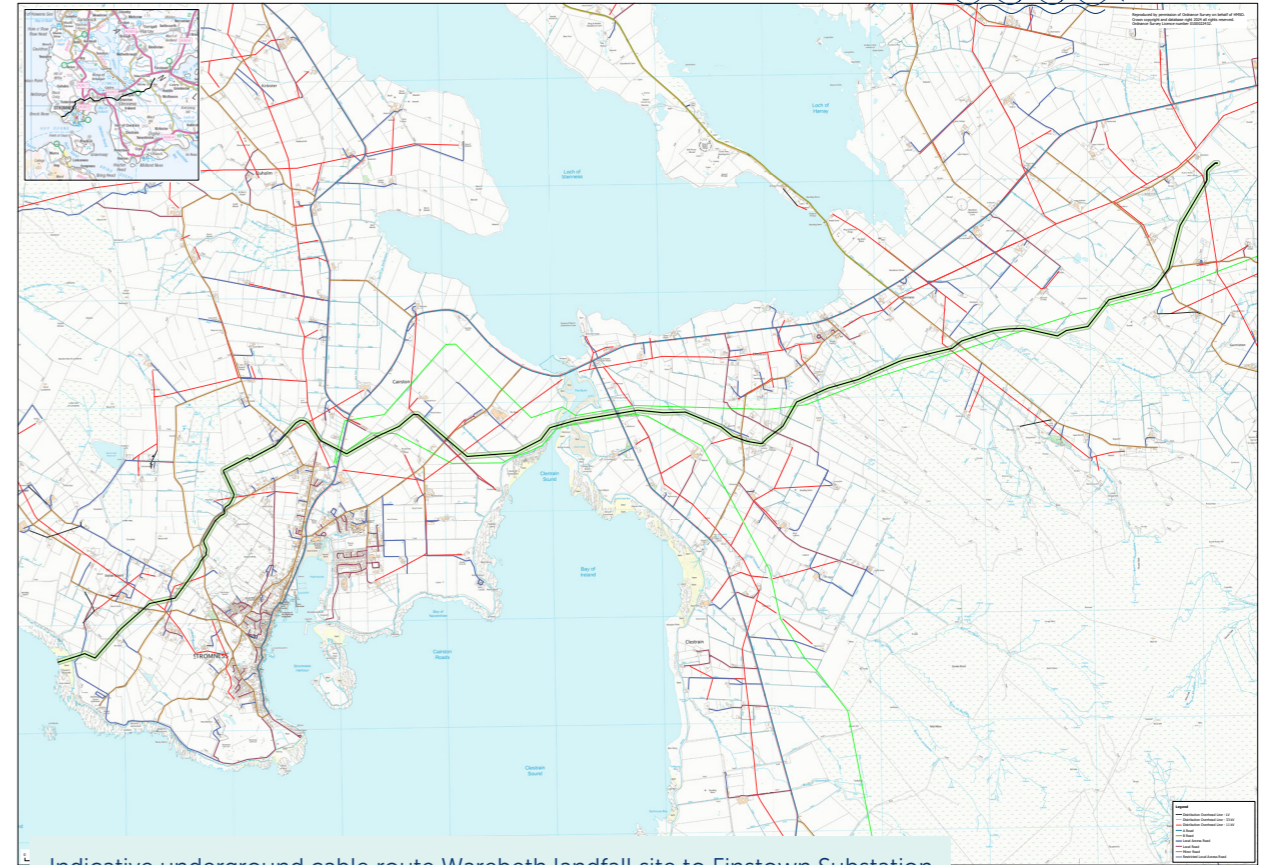
All planning consents are in place for the point-to-point connection, with work underway to plan the on-island infrastructure required to connect and transport Orkney renewable generators to Finstown substation before onward transmission to demand centres in the north of Scotland and beyond.

The Orkney transmission link will enable the connection of up to 220MW of new renewable electricity and consists of a new substation at Finstown in Orkney, and around 53km of subsea cable, connecting to a new substation at Dounreay in Caithness. This also means that Orkney will benefit from the mainland network as the new system will allow power transmission in both directions.



Indicative subsea cable route, Dounreay to Warebeth

Project overview



Indicative underground cable route Warebeth landfall site to Finstown Substation

The project scope is to design and install a High Voltage AC transmission system between Finstown in Orkney and Dounreay in Caithness, capable of transmitting no less than 220MW of power. This transmission system is to be composed of the following components:

- Finstown (Orkney) Substation – A new build substation, designed as the connection point to the grid for local generators around Orkney. The substation will transform the voltage to 220kV for transmission of this power to the UK mainland. This Substation will also provide a grid connection point for local power distribution.
- An onshore underground High Voltage AC Cable, approximately 14km in length, connecting the Finstown Substation to the Subsea Cable Landfall point, terminating at Warebeth on the West Coast of the Orkney Mainland.
- A Subsea High Voltage AC Cable, approximately 53km in length, connecting the landfall at Warebeth, to Dounreay on the Caithness coast of the UK mainland, then a short underground cable section to the Dounreay Substation.
- Dounreay West Substation – A new build substation to facilitate connection to the national grid. This will step up the voltage to 275kV for the connection into the existing infrastructure at the current Dounreay Substation, where there will also be some modification work.

In 2019 Public Consultations took place in both Orkney and Reay on the Mainland where community members had the opportunity to hear about the project and give feedback to the project team.

Infrastructure

Why are subsea cables important?

Subsea electricity transmission cables are important critical infrastructure that carry power from areas where power is generated to areas of higher demand where the power is consumed.

The proposed subsea HVAC cable for the Orkney Transmission project will be approximately 53km in length, linking the landing sites on Warebeth on Orkney and Dounreay on the Caithness coast. The subsea HVAC cable shall be a single three core cable.

This cable will be installed within the currently licenced marine cable corridor. This corridor is 200m wide to allow for further route refinement as detailed engineering progresses.

Where feasible, the offshore cables will be buried in the seabed to protect them. In areas where burial is not feasible, the cable will be protected using rock berms placed on top of the cables or an external cable protection system.

Onshore cable and landfall

Cable landfalls, or landing points, are the locations where our subsea cables come ashore.

Where possible, subsea cables are buried under the seabed to protect the cable from damage. When bringing the cable ashore for Orkney, horizontal directional drilling (HDD) will be used to drill and install ducts underground through the shoreline. The cable is then pulled through the ducts and terminated onshore.

From this termination the onshore cable will be installed from this landfall to the new Finstown Substation.

This onshore cabling will all be installed underground.

What is a HVAC substation?

An Alternating Current (AC) substation is a modern component in the UK's energy network.

It is used to switch generators, equipment, and circuits or lines in and out of a system. It also is used to change AC voltages from one level to another.

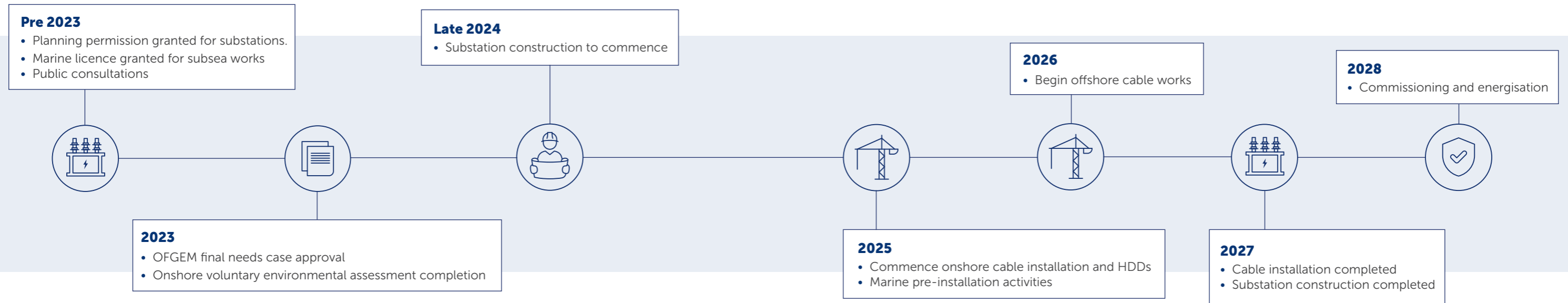
Substation requirements

A substation requires a large area of level ground. All equipment would be contained within large, metal clad, climate-controlled buildings, with other smaller auxiliary buildings adjacent. All of the finished building designs are subject to approval with the local planning authority.

The buildings would typically consist of steel cladding with a pitched roof. The colour of the buildings are subject to approval with the local planning authority. Landscaping around the substation will be sculpted to flow with the natural landscaping of the surrounding hills to minimise visual impact on the area.

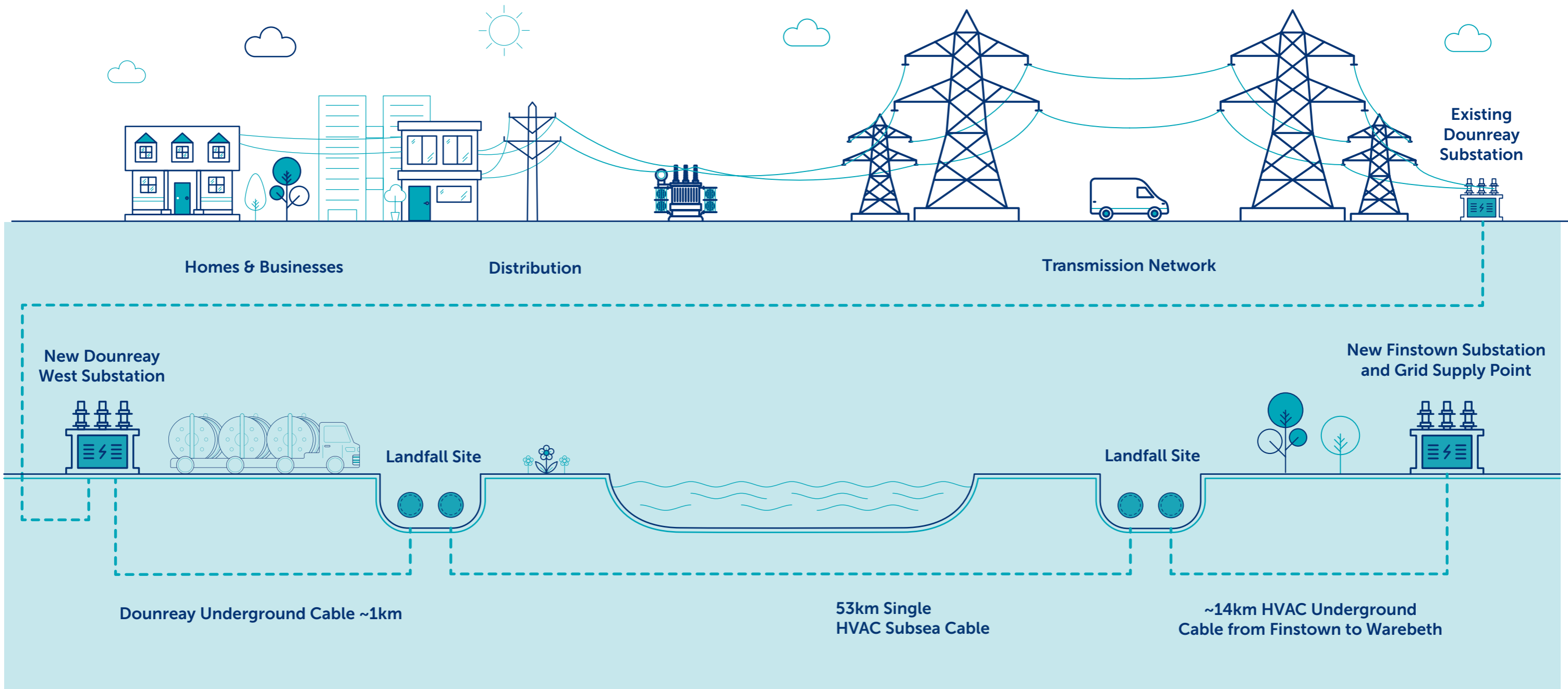


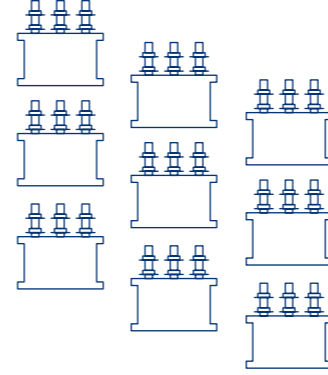
Project timeline



How will it work?

The final outcome of this project is for this infrastructure to connect and add to the main transmission network on the mainland. This also means that Orkney will benefit from the mainland network as the new system will allow power transmission in both directions.





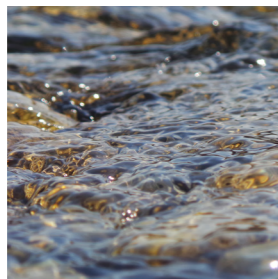
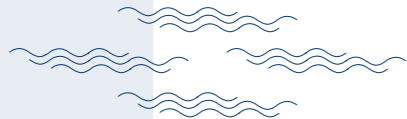
What's happening now?

As we move into the construction phase of this project you can expect to see a hive of different activities taking place across the project route. This may seem daunting however we will do everything we can to minimise the impact that our works have on local communities.

The different components which make up the project (substations and cables) are all at different stages, read on to hear what has been happening and what you can expect to see in the coming months.

Substations

We are delighted to announce the appointment of Siemens Energy – BAM Joint Venture as the Principal Contractor to design and build the Finstown Substation.



Finstown

Various teams have been on site since August 2023 conducting investigations works which have informed the final design of our Finstown Substation platform. In consultation with the County Archaeologist, prior to the start of construction in Autumn 2024, archaeological trenching and excavation works to investigate, record and to preserve archaeology on the site are taking place.

Boundary fencing will be in place in advance of main works starting and the adjacent landowner has constructed a farm access track around the substation site.

Moving forward we are currently working to discharge all pre-commencement planning conditions before the mobilisation of our contractor and their workforce to start the main works which is expected to commence late September/October.

Once all planning conditions are in place we will begin with the creation of the access road and junction off the main road (A965). This will require a lane closure and traffic management lights of which we will give advance notice. As this progresses, we will also be carrying out site preparation works, setting up our site office/storage facilities, initial drainage and earth works (which will include blasting) and the setup of the temporary accommodation buildings.



An arial view of the Finstown Substation site showing the archaeological works.

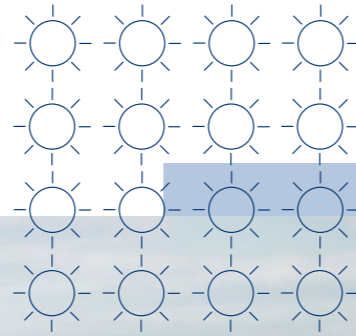


An indicative view of Finstown Substation including construction compound and temporary workforce accommodation.

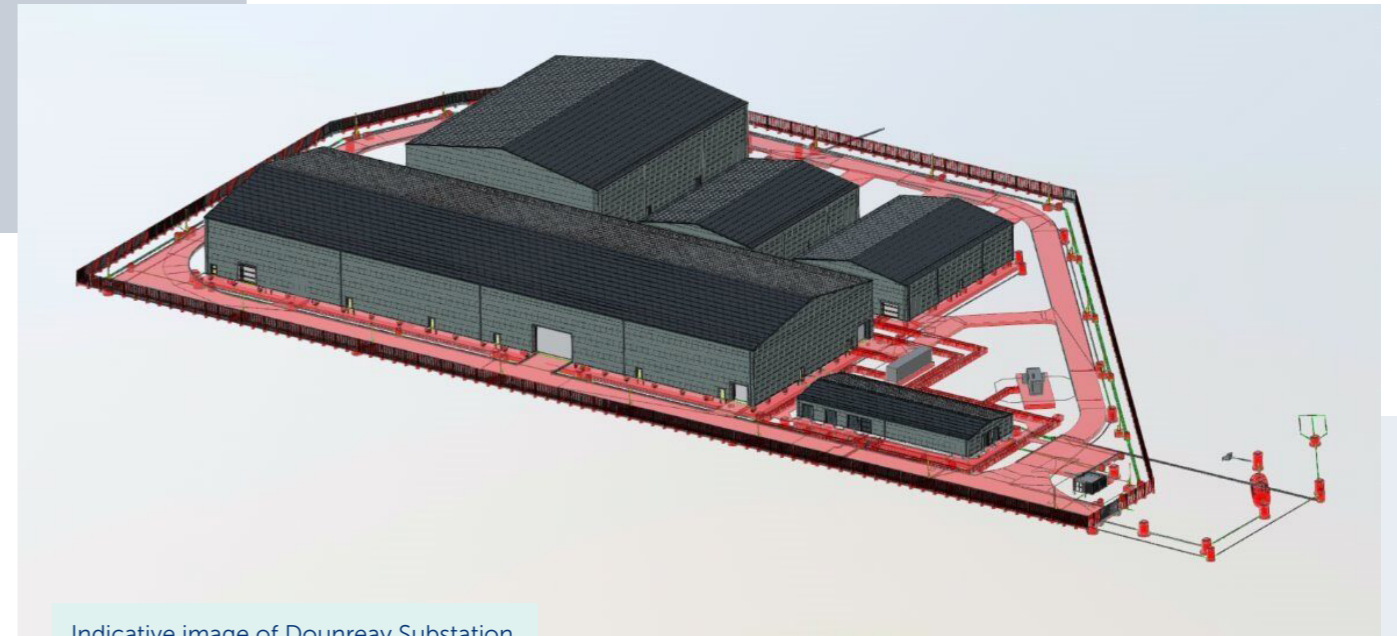
Temporary Workforce Accommodation

Various teams have been on site since August 2023 conducting investigations works which have informed the final design of our Finstown Substation platform. In consultation with the County Archaeologist, prior to the start of construction in Autumn 2024, archaeological trenching and excavation works to investigate, record and to preserve archaeology on the site are taking place.

Due to the size of the workforce required throughout the projects lifecycle, we will be constructing workforce accommodation at the Finstown substation site. This will be temporary in nature and will be removed upon completion of the project.



An indicative view of temporary accommodation buildings



Indicative image of Dounreay Substation.

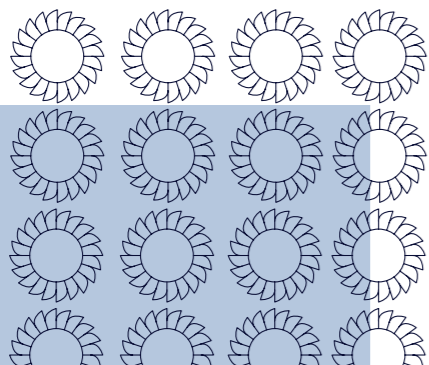
Dounreay West Substation

Ground Investigation works concluded at Dounreay in May 2024 to establish ground conditions on site.

We have been working with the contractor and The Highland Council to discharge all pre-commencement planning conditions before mobilisation to the Dounreay Site.

Once these are in place, the contractor will begin with the set up of site offices and contractor compound which will be in place for phase 1 of the works.

Phase 1 of the works will include: erection of boundary fencing (which will remain for the duration of the works), creation of construction access road to the site, site preparation works, initial drainage and earthworks.



Cables

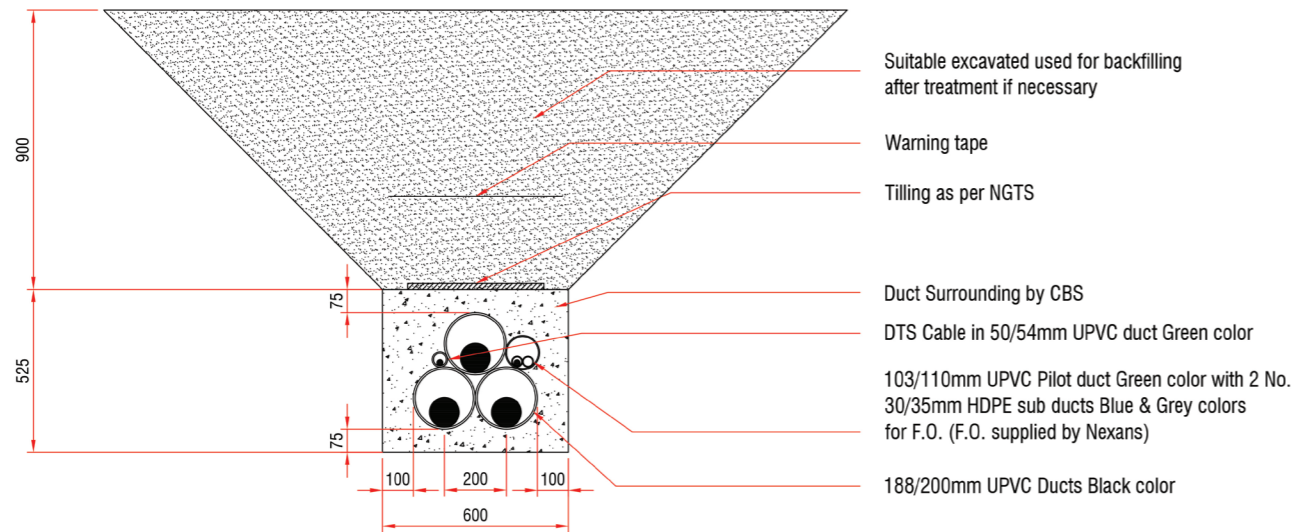
Underground Cable

Ground investigation works including trial pits and boreholes were undertaken in May/June 2024 with further Archaeological and Existing Utility investigations due to be undertaken in September 2024 and detailed design for trench systems, horizontal directional drilling and drainage along the route is currently underway. From January 2025 the temporary main site compound off the A964 near the Brig 'o' Waith will begin construction along with final survey works along the cable route.

The main construction of the trench and associated temporary works will begin from March 2025 and will continue until the Autumn. In 2026 the cable itself will be pulled into the ducts in sections and joined together before testing and commissioning. Final reinstatement of the land and decommissioning of the site compound will take place towards mid 2028.



Typical (Agricultural)



An example of how the cable is laid. The image shows an area of 2.4m however this can increase up to 6m in areas of poor ground conditions.

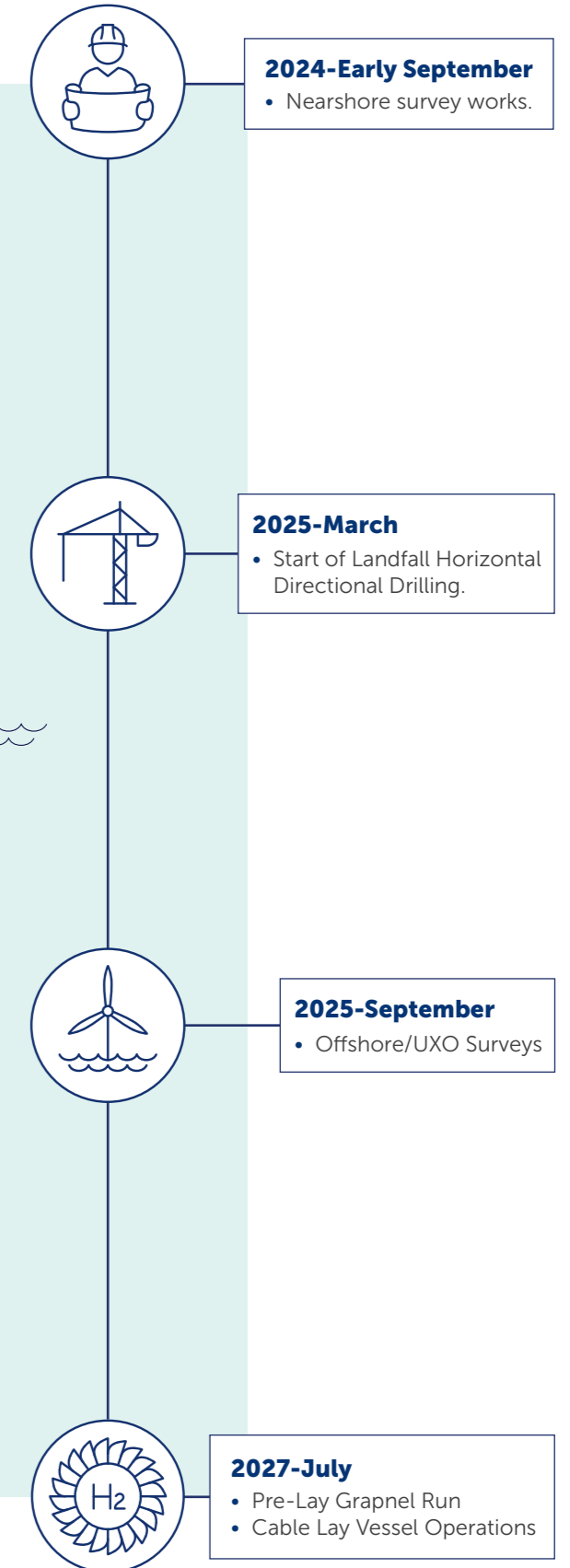
Subsea Cable

We will be working with a local surveyor to understand the lay of the seabed to carry out a number of Nearshore Surveys from 5m to around 20m water depth. We're glad and fortunate to be using a local expert who knows the waters incredibly well, after utilising their experience in the past for a previous project we can't wait to work with them again.

The information and data gained from these surveys will help us understand any potential areas to avoid and provide a 3D Cross section so that future contractors can plan their works correctly with minimal disturbance to the marine environment. This data will also help in mitigating risks to divers carrying out work in an already turbulent area.



Indicative Subsea Cable Timeline



Frequently Asked Questions

Is this project consented?

Yes, this project was consented in 2019.

Will there be any Overhead Lines?

The cable from the Substation in Finstown to the landfall site in Warebeth is all underground. There are no Overhead Lines for this project.

How is the underground cable laid?

Cable landfalls, or landing points, are the locations where our subsea cables come ashore. When bringing the cable ashore for Orkney, horizontal directional drilling (HDD) will be used to drill and install ducts underground through the shoreline. The cable is then pulled through the ducts and terminated onshore. From this termination the onshore cable will be installed from this landfall to the new Finstown Substation. This onshore cabling will all be installed underground in three cable ducts within a single trench system at a depth which will allow farming activities to occur unhindered and reduce the risk of accidental utility strikes. The trench will be excavated within an approximately 50m wide corridor on the Orkney side with the actual trench being around 5-6m wide depending on depth and ground conditions. Topsoil will be set aside and retained for reinstatement with the subsoil either retained or replaced with cement bound sand (CBS) around the cable ducts. Alongside the cable trench where possible a temporary access haul road will be constructed to allow access along the route whilst reducing damage to the land and removing traffic from the public roads network where possible. Additionally in certain sections further HDDs will be used to cross the A965 and sensitive watercourses to reduce both disruption to the general public and the environment. Following the completion of works the land will be reinstated to its previous condition and returned to the landowners. Where cable joints are located a small access cabinet will be placed to allow monitoring and testing of the cable during operation. These cabinets will look similar to those found on the telephone network and will be placed in as unobtrusive a location as possible.

Why are you building temporary accommodation on site at Finstown?

By housing the workforce on site we limited the impact on local infrastructure, such as vehicles on the roads or using up valuable accommodation across the island. These decisions were made in collaboration with Stakeholders.

Can the buildings be reused once the project is completed?

The accommodation units are leased from a contractor and will be removed upon completion of the project.

How is the workforce getting to site?

The main workforce will be flown in on chartered flights and transported by bus to site. This will limit the number of vehicles on local roads and avoid impact on scheduled ferries and flights.

Will there be road closures?

Part of our planning conditions is a traffic management plan and at times throughout the project, we may have to temporarily close sections of roads. If this is required notifications will go out ahead of works.

Future Projects – What else is happening?

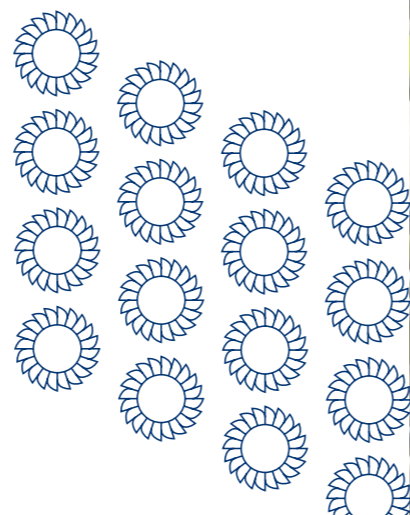
Back in 2017 when this project was originally presented to stakeholders you were also presented with information from Windfarm Developers who are looking to connect into the Finstown Substation.

These Developers will all be at different planning stages, information will be released when available.

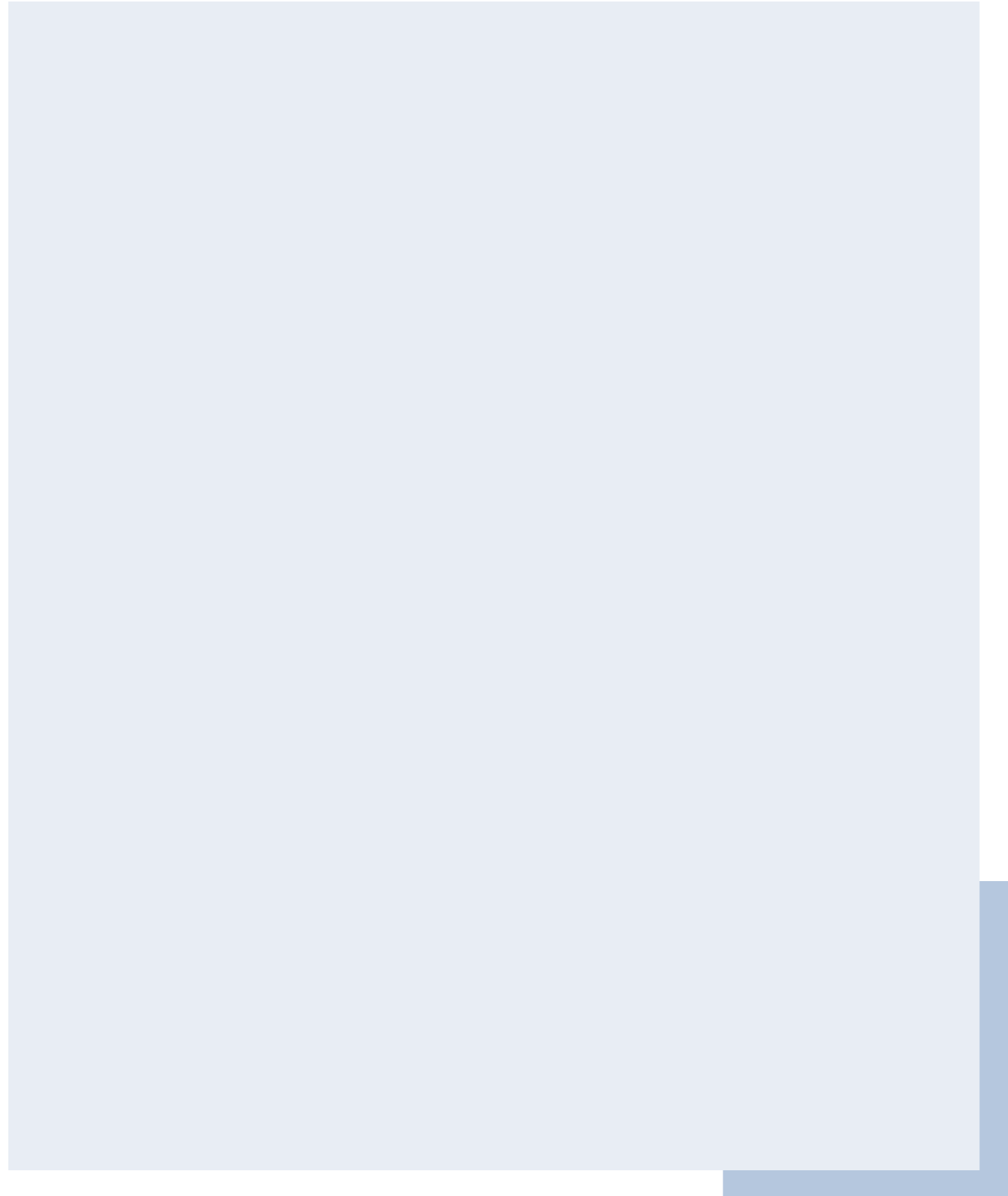
Eday

Local generation in the surrounding areas to Eday will be connected to a proposed indoor substation in Eday, from which generation will be connected to the grid via a single 132kV transmission connection back to the new Finstown Substation.

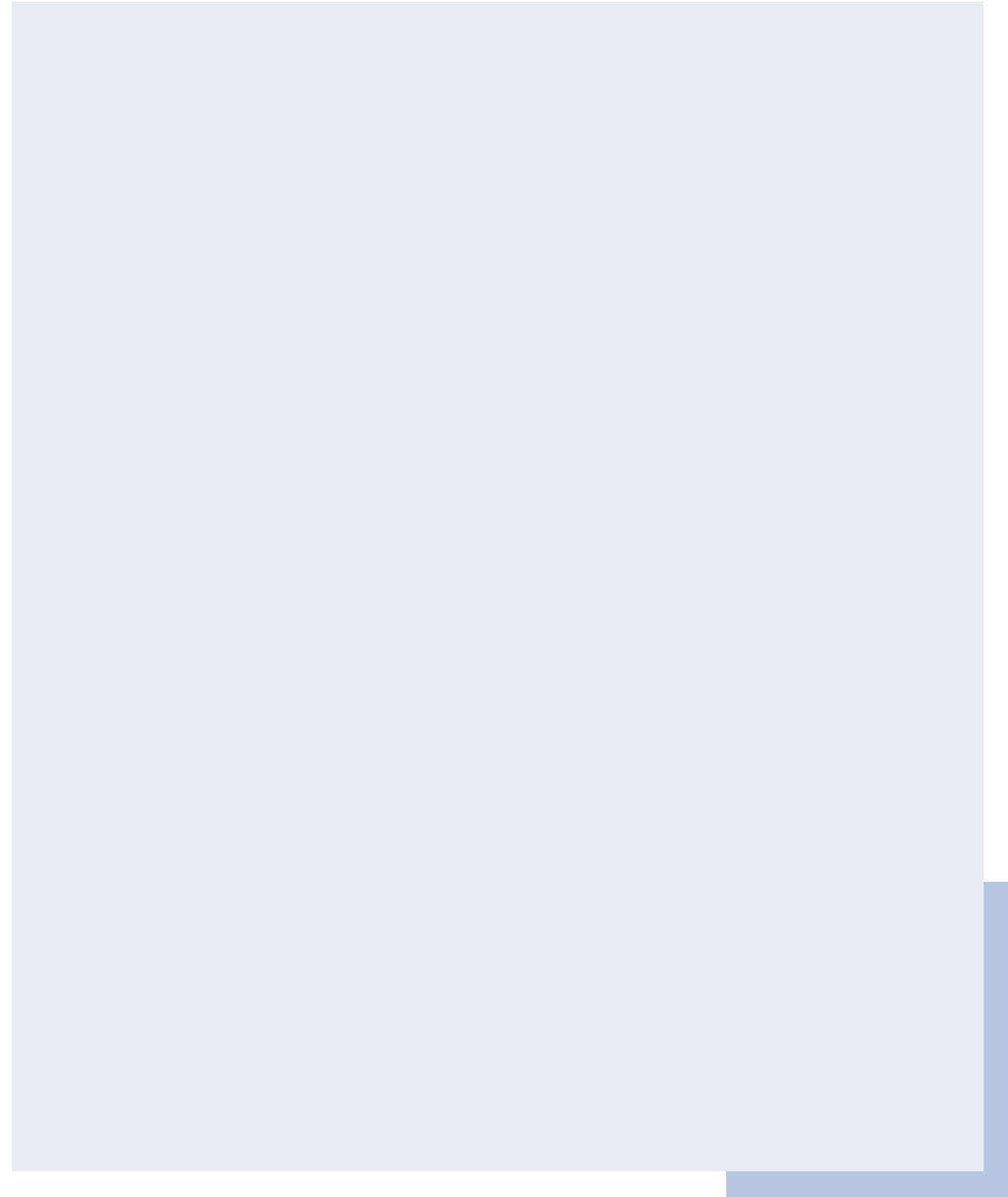
This project is very early in its development lifecycle and regular updates will be provided through consultations.

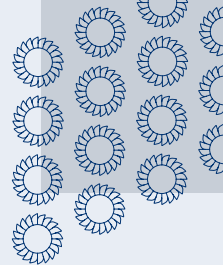


Notes



Notes





Keeping in touch?

We value community and stakeholder feedback.
Without this, we would be unable to progress our projects.

Our Community Liaison team

Each project has a dedicated Community Liaison Manager who works closely with community members to make sure they are well informed of our proposals and that their views, concerns, questions or suggestions are put to our project teams.

Throughout the life of our projects, you will hear from us regularly. We aim to establish strong working relationships by being accessible to key local stakeholders such as community councils, residents' associations and development trusts, and regularly engage with interested individuals.

The project team is keen to establish a Community Liaison Group for Orkney. If you would be interested in joining us to hear project updates, share plans with your community and to be the local voice back to the project team then please email: Orkney.Engagement@sse.com



Community Liaison Manager

Jeni Herbert

-  10 Harbour Road,
Inverness IV1 1SN
-  07500 120 097
-  orkney.engagement@sse.com

Ross Irvine | Land Manager

-  10 Harbour Road,
Inverness IV1 1SN
-  07586 290 854
-  ross.irvine@sse.com



To support everyone online, we provide accessibility and language options on our website through 'Recite Me'. The accessibility and language support options provided by 'Recite Me' include text-to-speech functionality, fully customisable styling features, reading aids, and a translation tool with over 100 languages, including 35 text-to-speech.

Please select "Accessibility" on our website to try out our inclusive toolbar."

Additional information:



The best way to keep up to date is to sign up to project updates via the project webpage:

ssen-transmission.co.uk/orkney

You can also follow us on social media:

-  @assentransmission
-  @SSETransmission

