| MSIP Re-opener Application Stage 1 – Kincardine – Wishaw (Clyde's Mill) 400kV Reinforcement | | |
|---|---|---|
| **Ofgem Scheme Reference/ Name of Scheme** | SPT200263 / Kincardine – Wishaw (Clyde's Mill) 400kV Reinforcement | |
| **Investment Category** | Wider Works | |
| **Primary Investment Driver** | Thermal Uprating | |
| **Secondary Investment Driver** | - | |
| **Licence Mechanism/ Activity** | Special Condition 3.14 Medium Sized Investment Projects Re-opener and Price Control Deliverable/ Clause 3.14.6 (c) | |
| **Materiality Threshold exceeded (£3.5m)** | Yes, as a single project due to the threshold for activity 3.14.6 (c) | |
| **PCD primary Output** | Installation of Clyde's Mill 400kV Substation. | |
| **Total Project Cost (£m)** | 59.38 | |
| **Funding Allowance (£m)** | To be confirmed | Requested |
| **Delivery Year** | 2027/28 | |
| **Reporting Table** | Annual RRP – PCD Table | |
| **PCD Modification Process** | Special Condition 3.14, Appendix 1 | |

| Issue Date | Issue No | Amendment Details |
|---|---|---|
| 31st January 2023 | 1 | First issue of document. |

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# Table of Contents

## 1. Abbreviations / Terminology

Table 1: Table of Abbreviations

| Abbreviation | Term |
|---|---|
| **ACSR** | Aluminium Conductor Steel Reinforced |
| **AAAC** | All Aluminium Alloy Conductor |
| **AIS** | Air Insulated Switchgear |
| **AOD** | Above Ordnance Datum |
| **BEIS** | Department for Business, Energy & Industrial Strategy |
| **CEC** | Connection Entry Capacity |
| **CfD** | Contract for Difference |
| **CION** | Connection and Infrastructure Options Note |
| **EISD** | Earliest In Service Date |
| **EoL** | End of Life |
| **ESO** | Electricity System Operator |
| **FES** | Future Energy Scenario |
| **FNC** | Final Needs Case |
| **GIS** | Gas Insulated Switchgear |
| **GSP** | Grid Supply Point |
| **HND** | Holistic Network Design |
| **HTLS** | High Temperature Low Sag |
| **HVDC** | High Voltage, Direct Current |
| **INC** | Initial Needs Case |
| **ITT** | Invitation to Tender |
| **Km** | Kilometre |
| **kV** | Kilovolt |
| **LC** | Licence Condition |
| **LOTI** | Large Onshore Transmission Investment |
| **LSpC** | Licence Special Condition |
| **MITS** | Main Interconnected Transmission System |
| **MSCDN** | Mechanically Switched Capacitor with Damping Network |
| **MSIP** | Medium Sized Investment Project |
| **MW** | Megawatt |
| **NETS SQSS** | National Electricity Transmission System Security and Quality of Supply Standard |
| **NGET** | National Grid Electricity Transmission |
| **NGESO** | National Grid Electricity System Operator |
| **NOA** | Network Options Assessment |
| **OEM** | Original Equipment Manufacturer |
| **OHL** | Overhead Line |
| **OTNR** | Offshore Transmission Network Review |
| **OFTO** | Offshore Transmission Owner |
| **PCD** | Price Control Deliverable |
| **RIIO** | Revenue = Incentives + Innovation + Outputs |
| **SGT** | Supergrid Transformer |
| **SHET** | Scottish Hydro Electric Transmission |
| **SPA** | Special Protection Area |
| **SPT** | SP Transmission |
| **SPEN** | SP Energy Networks |

| | |
|---|---|
| **SSSI** | Site of Special Scientific Interest |
| **STC** | System Operator – Transmission Owner Code |
| **TEC** | Transmission Entry Capacity |
| **UK** | United Kingdom |
| **VDUM** | Volume Driver Uncertainty Mechanism |

## 2. Reference Documents

Table 2: Table of Reference Documents

| Document Reference | Title |
|---|---|
| **SPEN-RIIO-T2_Business_Plan** | SP Energy Networks RIIO T2 Business Plan 2021 - 2026 |
| **RIIO-T2 MSIP Re-opener Application – Stage 1** | Kincardine North 400kV Substation |

## 3. Introduction

This MSIP Re-opener application sets out SP Transmission's (SPT) plans to establish Clyde's Mill 400kV Substation. The purpose of the project is to facilitate increased power transfer into and through the SPT network from renewable developments across the north of Scotland. These works are programmed to commence in the RIIO-T2 period (April 2021 – March 2026) and complete in 2027/28, during the RIIO-T3 period.

In the period since the RIIO-T2 business plan was submitted, expected increases in onshore and offshore wind generation, supported by the 2021 and 2022 Future Energy Scenarios (FES), confirm the need to deliver significant additional transmission capacity through central and southern Scotland in the period to the end of the current decade and beyond.

To ensure the electricity transmission system enables a timely transition to Net Zero, in line with United Kingdom (UK) and Scottish Government targets of 2050 and 2045 respectively, asset intervention must be considered in the context of both current and future system requirements. It is vital that the risk of repeated intervention on strategic routes and assets (and therefore repeated system access for construction purposes) is minimised, in particular where the need for such intervention within the operational lifetime of the replacement asset may reasonably be foreseen.

This project was recommended to proceed by National Grid Electricity System Operator (NGESO) as part of the Network Options Assessment (NOA) published January 2022[1] reference NOA7 code DWUP – "*Establish a 400kV single circuit corridor south from Kincardine North, on existing OHL routes, to Wishaw substation or Clyde's Mill substation".* It was identified by NGESO as 'Required for 2026' in the Offshore Transmission Network Review (OTNR) Holistic Network Design (HND)[2] and recommended to proceed in the associated NOA7 Refresh[3] published July 2022.

Recognising the subsequent stages of system reinforcement which are similarly signalled as 'optimal' by the NOA7 and HND processes, it is proposed to progress this (DWUP) project with a scope of work which involves the development of a new Clyde's Mill 400kV Substation and the establishment of a 400kV single circuit from Kincardine North to Clyde's Mill. This option delivers a similar uplift in boundary capability to the Wishaw alternative, but helps to minimise the risk of stranded investment and system access requirements. Project timing is dictated by the need for additional boundary capability through central and southern Scotland.

It is proposed to establish Clyde's Mill 400kV Substation in a 'three switch' configuration, utilising Air Insulated Switchgear (AIS). The project scope and programme of works will be closely aligned with the proposed Kincardine North 400kV Substation (LWUP) project, to ensure an economic, efficient and co-ordinated overall programme of works.

The development of a new Clyde's Mill 400kV Substation and the establishment of a 400kV single circuit from Kincardine North to Clyde's Mill:

- Is aligned with further planned reinforcement of north to south transfer capability across Boundaries B4 and B5, which have been recommended to proceed by the Network Options Assessment (NOA) process (e.g. ref. NOA7 codes DWNO, TKUP, BDUP and LCU2).

[1] Network Options Assessment 2021/22, January 2022
[2] The Pathway to 2030 Holistic Network Design (ref. Appendix 1).
[3] Network Options Assessment 2021/22 Refresh, July 2022

- Will support the maximisation of transfer capability via existing transmission overhead line routes, prior to the construction of new overhead line routes e.g. Denny – Wishaw (ref. NOA7 code DWNO), helping to relieve thermal bottlenecks in the SPT network which can impact Scottish import and export capability.

The proposed development of Clyde's Mill 400kV Substation will help to ensure the network is ready for the changes required by Net Zero targets. Capable of modest expansion, the proposed configuration will enable the future establishment of a 400kV single circuit connection from Clyde's Mill to Strathaven 400kV Substation (ref. NOA code CVUP).

This MSIP Re-opener application is submitted in accordance with Licence Special Condition (LSpC) 3.14.6 and relates specifically to LSpC 3.14.6 activity (c):

*"3.14.6 The licensee may apply to the Authority for a direction amending the outputs, delivery dates or associated allowances in Appendix1 in relation to one or more of the following activities:*

*(c) a Boundary Reinforcement Project that has received a NOA Proceed Signal in the most recent NOA"*

The needs case for the development of Clyde's Mill 400kV Substation and the factors that have an impact on the timing and scope of works are discussed in the following sections. Full justification for the preferred investment option is presented, together with a detailed description of the proposed solution.

The estimated total project cost may be subject to change. As agreed with Ofgem, a second stage MSIP submission will be made at the right time relating to the associated amendments outputs, delivery dates and allowances to be detailed as Price Control Deliverables (PCDs) in LSpC 3.14 Appendix 1.

### 3.1 Structure of Document

This MSIP Re-opener application is structured as follows:

**Section 4 – Background and Needs Case**

This section outlines the background to the proposed works and details the key project drivers.

**Section 5 – Assessment of Options**

This section sets out the approach taken to considering the distinct options available to address the needs identified in Section 4. The results of an evaluation of the alternative options are presented and the reasoning behind the selection of the preferred option is summarised.

**Section 6 – Proposed Works**

This section provides a description of the proposed solution. It sets out the scope and other key supporting information.

**Section 7 – Project Cost Estimate**

This section summarises the estimated cost of the selected option.

**Section 8 – Project Delivery**

This section outlines the approach which will be taken to deliver the project.

### 3.2 Requirements Mapping Table

Table 3 maps the requirements set out within Chapter 3 of the RIIO-T2 Re-opener Guidance and Application Requirements Document[4] against specific sections within this document.

Table 3: Requirements Mapping Table

| Section | Description | Relevant Section(s) in RIIO-T2 Re-opener Guidance and Application Requirements Document |
|---|---|---|
| 3 | Introduction | 3.3, 3.4 |
| 4 | Background and Needs Case | 3.8, 3.9, 3.10, 3.11 |
| 5 | Assessment of Options | 3.13, 3.14, 3.21, 3.22 |
| 6 | Proposed Works | 3.14, 3.16 |
| 7 | Project Cost Estimate | 3.12, 3.19, 3.20 |
| 8 | Project Delivery | 3.15, 3.17 |

[4] RIIO-2 Re-opener Guidance and Application Requirements Document: Version 2

# 4. Background and Needs Case

## 4.1 Statutory and Licence Obligations on SP Transmission plc

SP Transmission plc (SPT) is licenced under section 6(1)(b) of the Electricity Act 1989 ("the 1989 Act") to transmit electricity. The licence is granted subject to certain standard and special conditions. Under section 9(2) of the 1989 Act, SPT is required to fulfil the following duty:-

- *To develop and maintain an efficient, co-ordinated and economical system of electricity transmission; and*
- *To facilitate competition in the supply and generation of electricity.*

This statutory duty is reflected in SPT's transmission licence. In addition, SPT has the following obligations pursuant to its licence conditions (LCs):-

- To at all times have in force a System Operator-Transmission Owner Code (STC) which, amongst other things, provides for the co-ordination of the planning of the transmission system (LC B12);
- To at all times plan and develop its transmission system in accordance with the National Electricity Transmission System Security and Quality of Supply Standard (NETS SQSS) and in so doing take account of National Grid Electricity System Operator's (NGESO's) obligations to co-ordinate and direct the flow of electricity on, to and over the GB transmission system (LC D3);
- To make available those parts of its transmission system which are intended for the purposes of conveying, or affecting the flow of, electricity so that such parts are capable of doing so and are fit for those purposes (LC D2); and
- To offer to enter into an agreement with the system operator on notification of receipt of an application for connection, or for modification to an existing connection (LC D4A).

Section 38 and Schedule 9 of the 1989 Act also impose duties on SPT when formulating any relevant proposals. In response to statutory and licence obligations upon it, SPT therefore requires to ensure that the transmission system is developed and maintained in an economic, co-ordinated and efficient manner, in the interests of existing and future electricity consumers, balancing technical, economic and environmental factors.

## 4.2 Key Project Drivers - Load Related

In June 2019, the UK parliament passed legislation introducing a binding target to reach net zero greenhouse gas emissions by 2050. In Scotland, the Scottish Parliament has committed Scotland to becoming a net zero society by 2045. The timely connection of low carbon generation, such as onshore and offshore wind, will play a vital role in reaching these legislated net zero targets.

The UK Government announced in October 2020 its commitment to make the UK a world leader in green energy and boosted the UK Government's previous 30GW target for offshore wind to 40GW by 2030. The current Scottish Government ambition is 20GW of onshore wind and 11GW of offshore wind in Scotland by 2030. Further commitments, by the UK Government in October 2021, to decarbonise the power system by 2035, as well as British Energy Security Strategy[5] published April 2022 (which raises the UK Government ambition to 50GW of offshore wind by 2030), further support the requirement for investment in the existing electricity transmission system to enable the timely connection and integration of the required renewable generation sources.

[5] British energy security strategy - GOV.UK (www.gov.uk)

On 9th September 2021, the Department for Business, Energy & Industrial Strategy (BEIS) announced a £265m[6] budget per year for the Contracts for Difference (CfD) Allocation Round 4, which launched on 13th December 2021 and concluded on 7th July 2022. For the first time since 2015, established technologies, including onshore wind, were able to bid. Given lowering technology costs and a favourable subsidy regime, this will support a considerable number of onshore renewables projects to successfully transition from project inception and development through to energisation[7]. The next CfD auction, Allocation Round 5, is due to open in March 2023, with annual auction rounds expected thereafter.

### 4.2.1 Offshore Wind Connections - ScotWind

The results of the ScotWind leasing process, a programme managed by Crown Estate Scotland to lease areas of the seabed around Scotland for offshore wind farm development, were announced on the 17th January 2022[8]. In summary:

- 17 projects with a capacity totalling 24.8GW were selected out of a total of 74 applications, and have been offered option agreements which reserve the rights to specific areas of seabed.
- A total of just under £700m will be paid by the successful applicants in option fees and passed to the Scottish Government for public spending.
- Initial indications suggest a multi-billion pound supply chain investment in Scotland.
- Of the 17 projects selected in January 2022, 6 are in the ScotWind East region[9] with a combined capacity of 10.5GW and option fees totalling £324.5m, of which 3 are in the East 1 Zone, with a combined capacity of 6.7GW and option fees totalling £199.8m.

Since the announcement of the initial ScotWind leasing results in January 2022, an additional 2.7GW of offshore wind has been leased in an area East of Shetland, taking the total ScotWind generation to 27.6GW.

The ScotWind results underline both the scale of development potential off the north and east coasts of Scotland and the commitment from industry to delivering the investments in energy infrastructure necessary to meet Net Zero targets. Off the north and east coasts of Scotland in particular, there is very high potential for offshore wind generation, in areas illustrated by the BEIS/ Ofgem Offshore Transmission Network Review[10] (OTNR) Generation Map[11].

ScotWind offshore developments are expected to contribute towards the Scottish Government ambition of 11GW of offshore wind by 2030 and make a significant contribution towards 2045 and 2050 Net Zero targets.

It is vital that the onshore transmission system is developed in a timely manner so as to enable the benefits of ScotWind to be realised and contribute to the Scottish Government's offshore wind ambition of 11GW by 2030.

[6] Biggest ever renewable energy support scheme backed by additional £265 million - GOV.UK (www.gov.uk)
[7] BEIS - Electricity Generation Costs (2020)
[8] Crown Estate Scotland - ScotWind offshore wind leasing delivers major boost to Scotland's net zero aspirations
[9] Sectoral Marine Plan for Offshore Wind Energy
[10] Offshore Transmission Network Review
[11] OTNR - Generation Map

### 4.2.2 Future Energy Scenarios

Each year, NGESO produces a set of Future Energy Scenarios (FES) for use by the Transmission Owners (TO's) as network investment planning backgrounds. Through application of the criteria set out in the NETS SQSS, the FES provide an indication of the capacity requirements of the system based upon the potential future connection of generation and changing demand profiles.

The north to south power transfer requirements on all of the northern transmission system boundaries increase significantly over the coming years due to the connection of new renewable generation throughout Scotland as part of the energy transition to meet legislated Net Zero targets. This trend is clearly demonstrated by the transfer requirements on the boundary between the SHET and SPT areas (Boundary B4), and through the central belt of Scotland in the SPT area (Boundary B5).

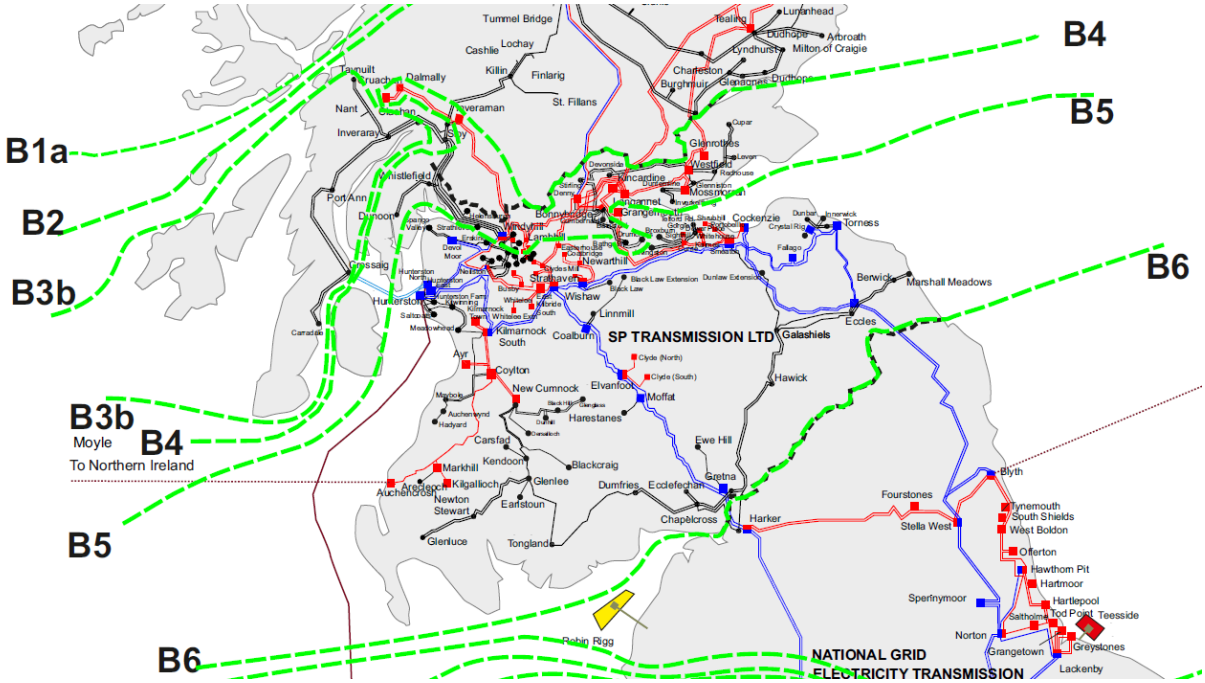


Figure 1: Network boundaries across SPT's network

Figure 2 indicates the 2021 FES and 2022 FES required transfer capability on the B4 boundary. Existing capability is already exceeded, broadly consistent with all Scotland and North England boundaries, driven by generation developments under the Connect and Manage regime, with the difference becoming extremely pronounced by the mid to late 2020s in all scenarios.

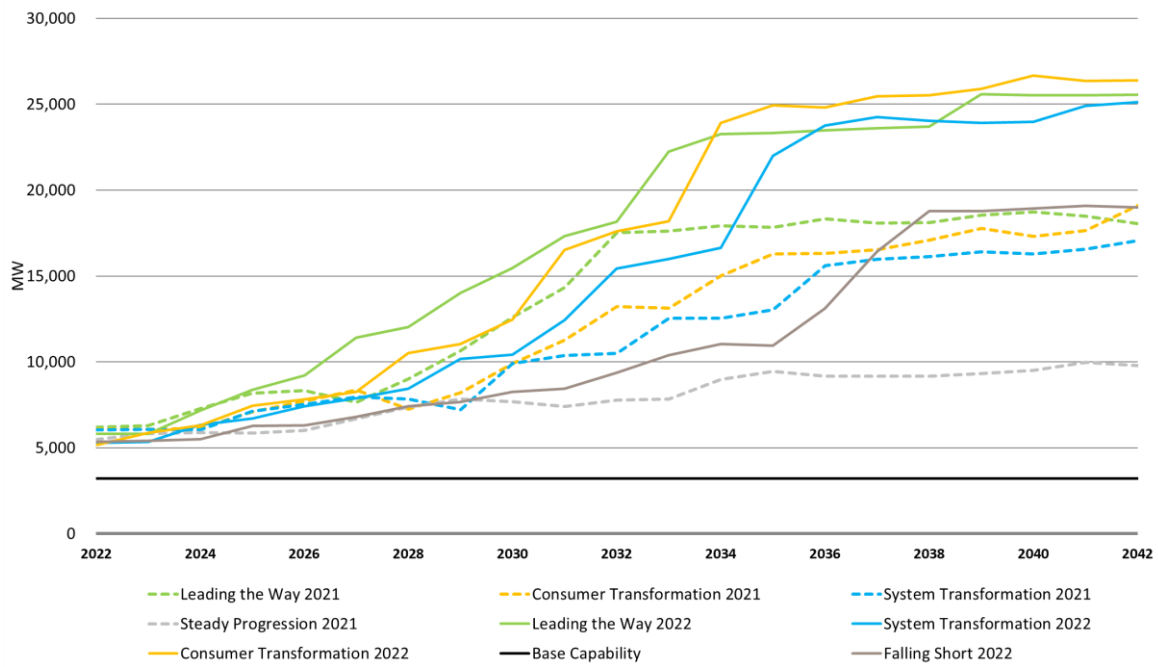


Figure 2: Required Transfer and Base Capability for boundary B4

The current capability of transmission network boundary B4 is approximately 3,200MW. Figure 2 above shows a required transfer of up to 15.5GW by 2030 and up to approximately 25GW by 2035.

Figure 3 indicates the 2022 FES required transfer capability on the B5 boundary. The trends above are similar to those on the B4 boundary and are predominantly due to the connection of onshore and offshore wind across the north of Scotland. Generation connecting in the north of the SPT area and parts of SHE Transmission's Argyll and Kintyre area will drive further increase in the required transfer capability on this boundary.

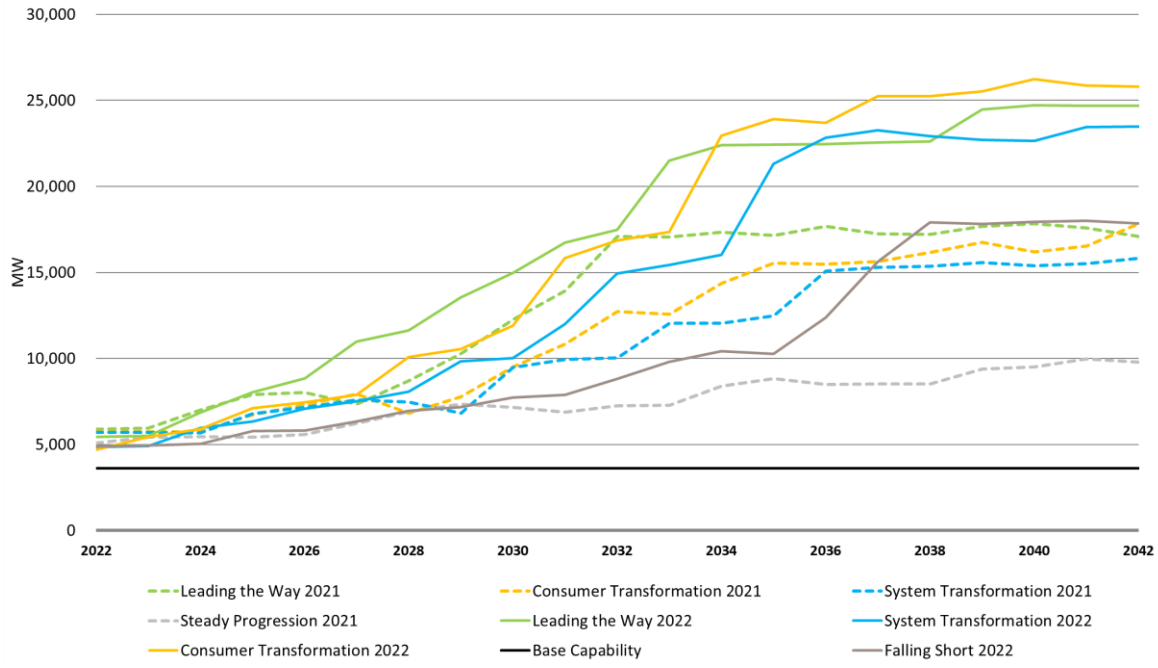


Figure 3: Required Transfers and Base Capability for boundary B5

The current capability of transmission network boundary B5 is approximately 3,600MW. Figure 3 above shows a required transfer of up to 15GW by 2030 and up to approximately 24GW by 2035.

Figures 2 and 3 show that in the coming years the unconstrained boundary flows on B4 and B5 are set to increase significantly. In order to maintain an efficient and economic transmission system whilst economically integrating additional renewable generation, significant system reinforcement is required in an unprecedented timeframe.

### 4.2.3 Network Options Assessment (NOA)

The Network Options Assessment process (ref. Standard Licence Condition C27) demonstrates the need to make significant investment in the capability of the existing transmission system through Scotland and the north of England to accommodate significant growth in renewable generation. This is required to maintain and operate an economic and efficient transmission system. It is critical that the network is ready to accommodate the scale of projected renewable capacity growth, required to support legislated Net Zero targets, whilst also enabling significant constraint savings.

The 2021/22 NOA Report, published in January 2022, supports the proposal in this paper to progress the development of a new Clyde's Mill 400kV Substation and the establishment of a 400kV single circuit from Kincardine North to Clyde's Mill (ref. NOA7 code DWUP), giving the project a "Proceed" recommendation. This recommendation continued to be supported through the NOA Refresh, published in July 2022.

Furthermore, the 2021/22 NOA Report and associated NOA Refresh recommended that additional network investment projects across the B4 and B5 boundaries are also required as part of a wider strategy comprising a series of co-ordinated projects, enabled by the development of Kincardine North 400kV Substation (ref. NOA code LWUP) and aligned with this project (ref. NOA code DWUP), to maximise transfer capability via existing transmission overhead line routes (ref. NOA codes LCU2, TKUP and BDUP), in advance of the construction of new overhead line routes e.g. Denny – Wishaw (ref. NOA7 code DWNO). These subsequent projects will continue to be developed and will be the subject of separate regulatory submissions.

## 4.3 Alignment with RIIO-T2 Strategic Goals

As described in our RIIO-T2 plan[12] for the five-years to the end of March 2026, to mitigate the impacts of climate change and achieve a low-carbon energy system requires a level of focused effort and commitment never seen before. The mass electrification of transport and heat has only started and there is a huge amount required to build on the timely progress already made in the electricity sector.

Energy networks are critical to achieving the wider Net Zero emissions targets and with continued engagement with consumers, network users and our wider stakeholders, we've set a progressive plan in place to facilitate a Net Zero future. Our RIIO-T2 plan sets out four strategic goals – informed by our stakeholder priorities – that will keep us moving towards this sustainable future. These goals and their alignment with the development of Clyde's Mill 400kV Substation, are summarised in Figure 4.

Further detail regarding how this proposal aligns to our four Strategic Goals is outlined below:

[12] SP Energy Networks RIIO-T2 Business Plan

**Take a leading role in delivering a Net Zero future that is consistent with government objectives.**

Clyde's Mill 400kV Substation will enable both increased transmission capacity and the amount of renewable generation connected to the GB electricity network, contributing towards a reduced reliance on fossil fuel electricity generation sources.

**Deliver the benefits of increased cost-efficiency to network users and consumers by continually innovating and applying whole system solutions.**

Clyde's Mill is a significant new 400kV substation development to the south-eastern outskirts of Glasgow. Its purpose is to facilitate increased power transfer into and through the SPT network from renewable developments across the north of Scotland.

SPT's intention is to construct Clyde's Mill 400kV as an AIS substation, avoiding the addition of $SF_6$ to SPT's inventory, as far as technology maturity permits. This is in accordance with SPT's RIIO-T2 Environmental Action Plan[13].

**Maintain world-leading resilience and system operability to ensure security of supplies throughout the energy transition.**

The works will enable additional transmission capacity as well as the capability to connect new sources of renewable generation, with demand for network capacity expected to increase significantly following the recent ScotWind leasing round announcement.

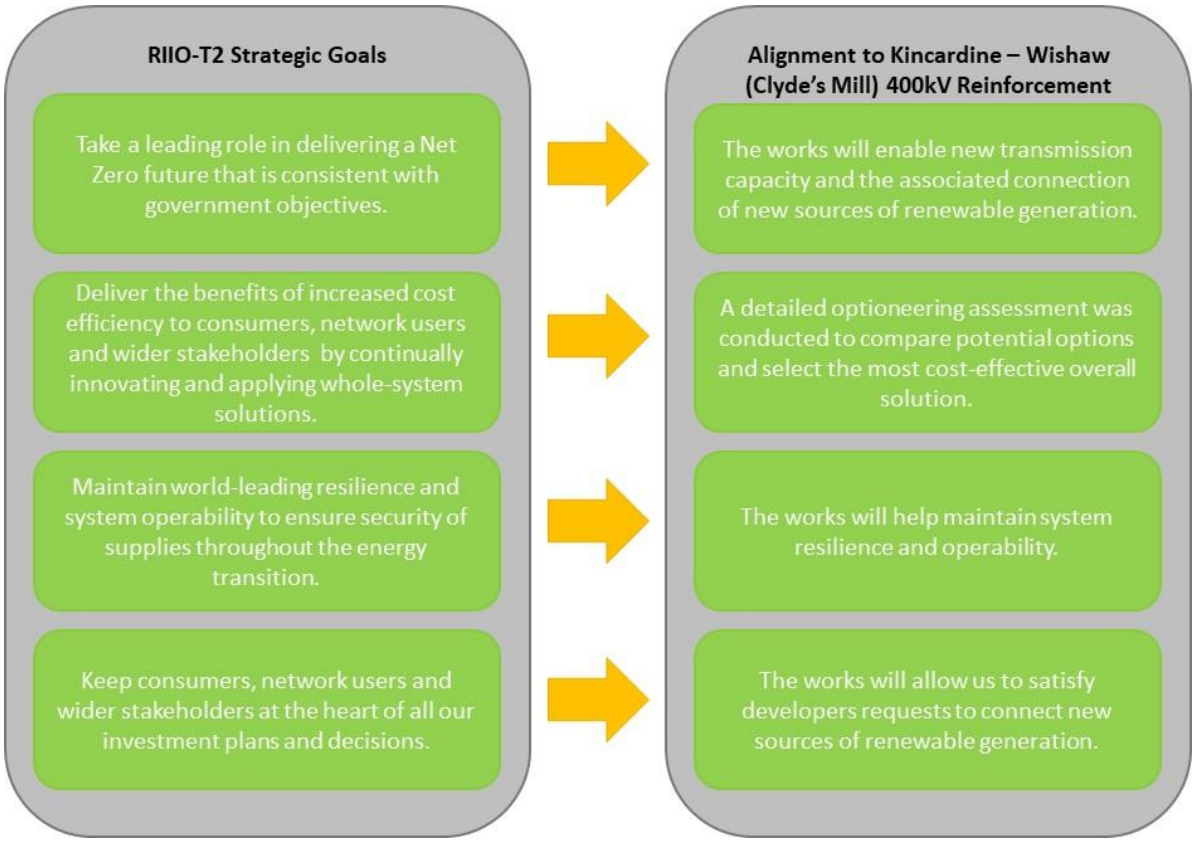


Figure 4: Alignment of the Clyde's Mill 400kV Substation Proposal with SPT RIIO-T2 Strategic Goals

[13] https://www.spenergynetworks.co.uk/userfiles/file/RIIO-T2_Annex_7_Environmental_Action_Plan.pdf

**Keep network users and consumers at the heart of all our investment plans and decisions.**

The completion of Clyde's Mill 400kV Substation is required to maintain and operate an economic and efficient transmission system, and allow SPT to satisfy network users' requests for connection, consistent with our statutory and licence responsibilities.

Key stakeholders will be consulted during the development of the proposed solution and we will continue to engage with stakeholders throughout the project development and delivery process.

The completion of Clyde's Mill 400kV Substation will continue to align with our future strategic ambitions.

# 5. Assessment of Options

## 5.1 Existing System Configuration

Existing transmission assets in the central area are indicated in Figure 5 below (and Appendix A).

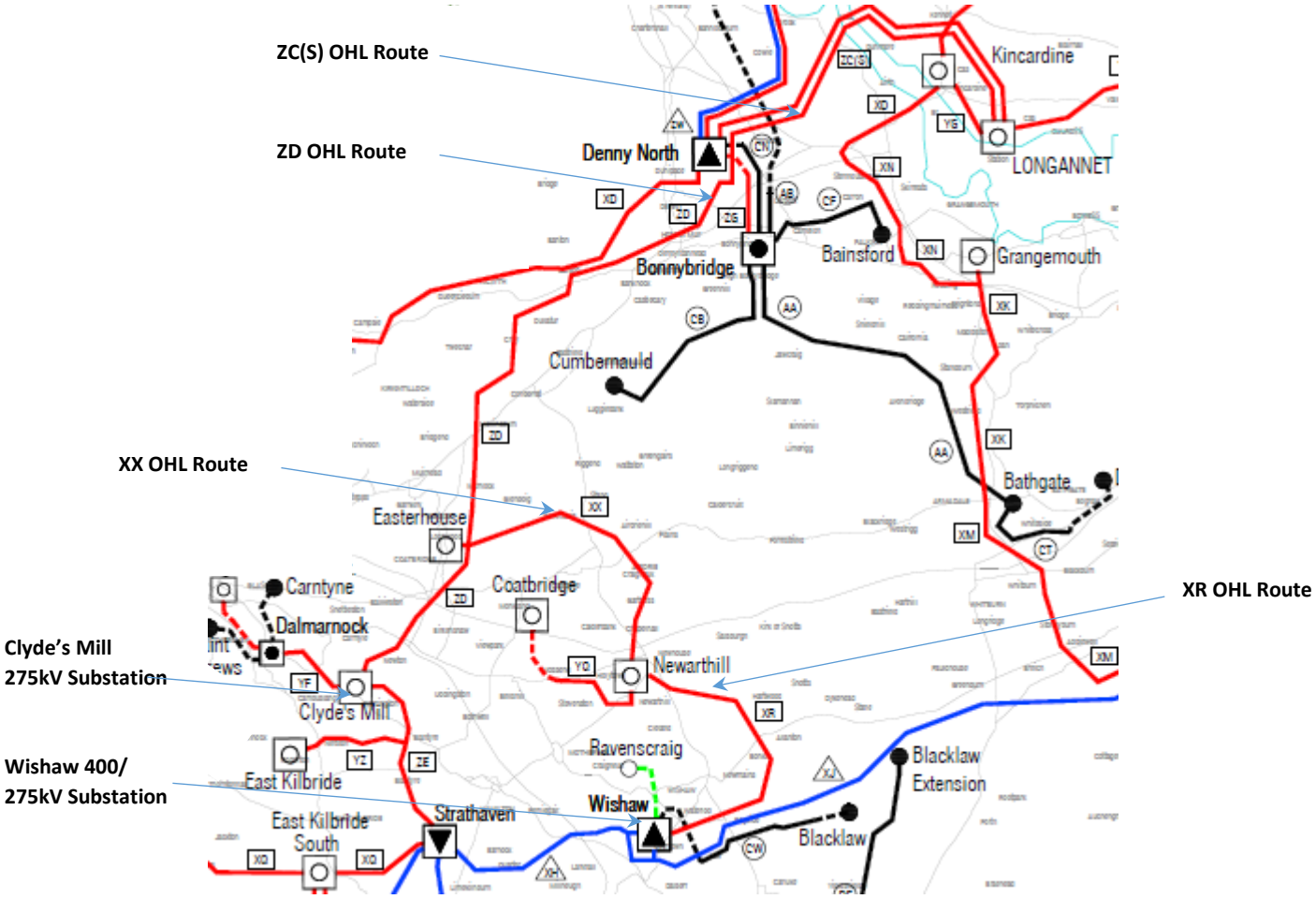


Figure 5 Geographic Indication of Transmission Configuration in Central Area[14]

Clyde's Mill 275kV Substation serves five Grid Supply Points (GSP's) to the east and southeast of Glasgow. It is connected to the Main Interconnected Transmission System (MITS) via two double circuit overhead line routes operating at 275kV. It is an outdoor Air Insulated Switchgear (AIS) substation configured in a double busbar arrangement.

As detailed Figure 6, Clyde's Mill 275kV Substation connects the following circuits:

- Dalmarnock/Charlotte Street No.1
- Dalmarnock/Charlotte Street No.1
- Easterhouse/ Newarthill 275kV
- East Kilbride/ Strathaven No.1 275kV
- East Kilbride/ Strathaven No.1 275kV
- Longannet 275kV
- Clyde's Mill Supergrid Transformer No.1 (SGT1), 275/33kV 120MVA
- Clyde's Mill SGT2, 275/33kV 120MVA

[14] Assets indicated in blue operate at 400kV, assets in red operate at 275kV and assets in black operate at 132kV.

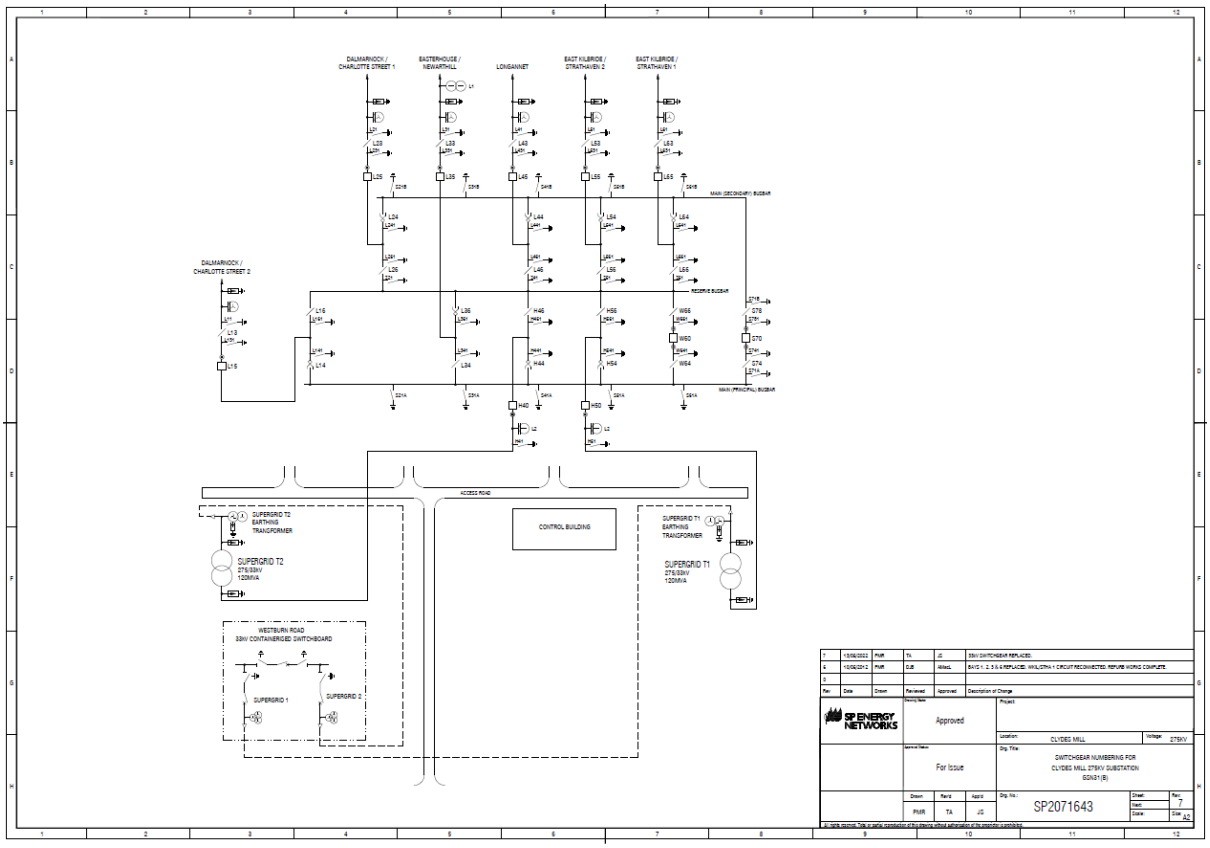


Figure 6 Existing Configuration – Clyde's Mill 275kV Substation

Wishaw 400kV Substation is connected to the MITS via two double circuit overhead line routes operating at 400kV and via two 400/275kV 1000MVA SGT's. It is an indoor substation utilising Gas Insulated Switchgear (GIS) configured in a double busbar arrangement.

As detailed Figure 7, Wishaw 400kV Substation connects the following circuits:

- Smeaton 400kV
- Strathaven 400kV
- Wishaw SGT8, 400/275kV 1000MVA
- Wishaw SGT9, 400/275kV 1000MVA

Figures 8 and 9 similarly provide details of the existing system configuration at Newarthill and Easterhouse 275kV Substations respectively.

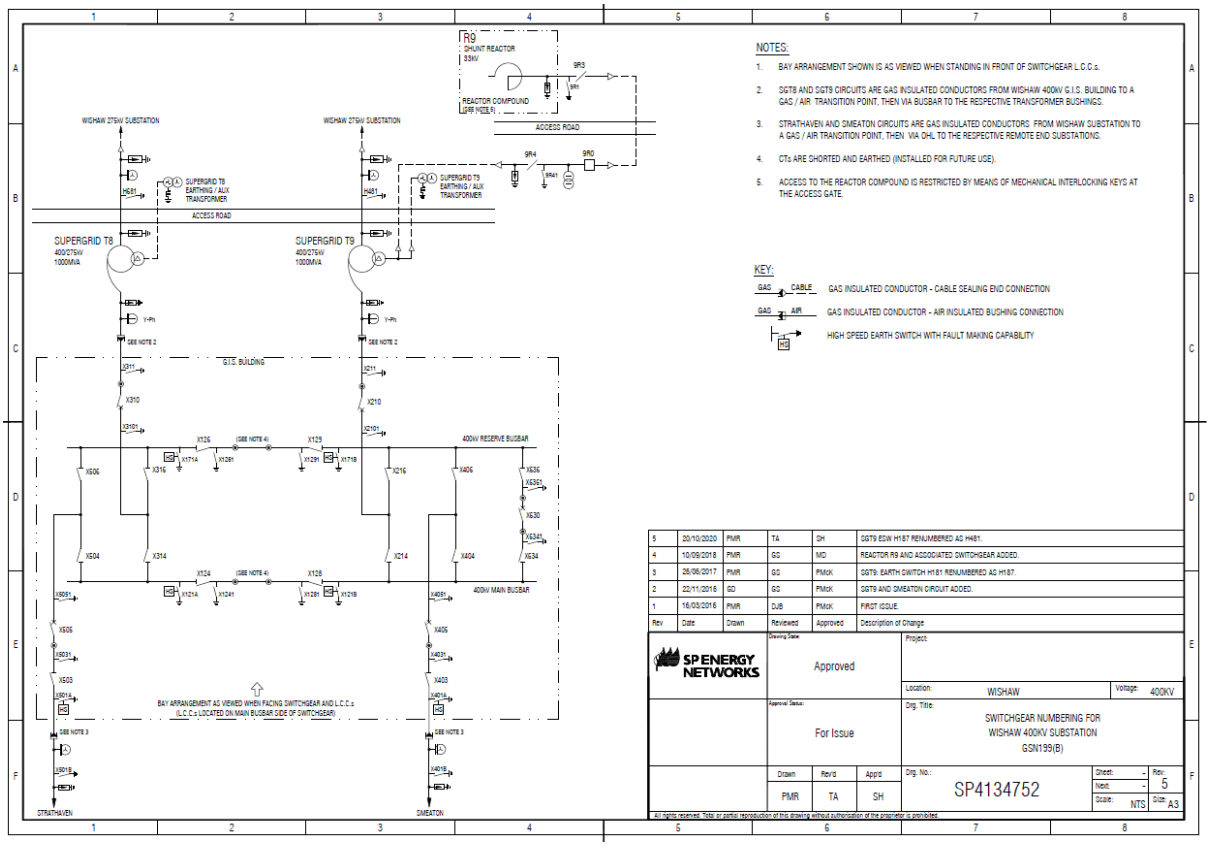


Figure 7 Existing Configuration – Wishaw 400kV Substation

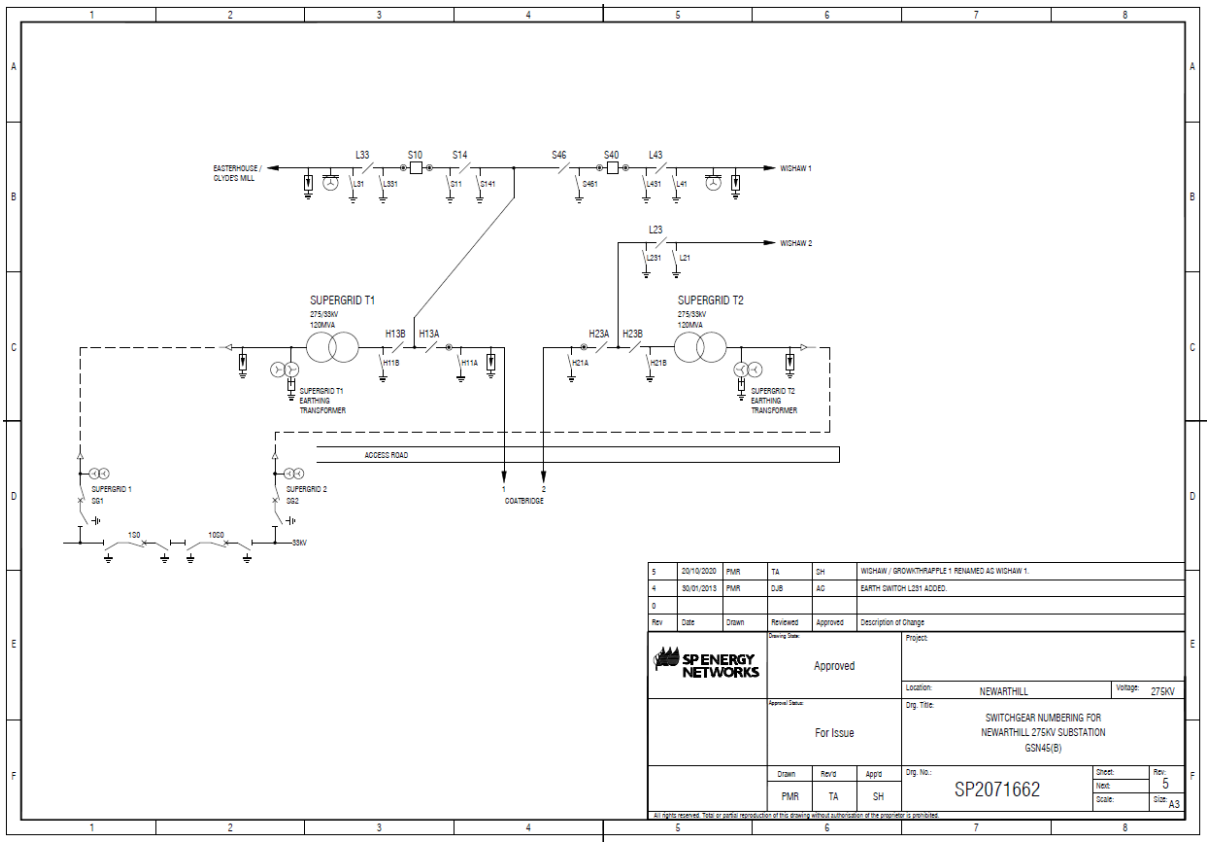


Figure 8 Existing Configuration – Newarthill 275kV Substation

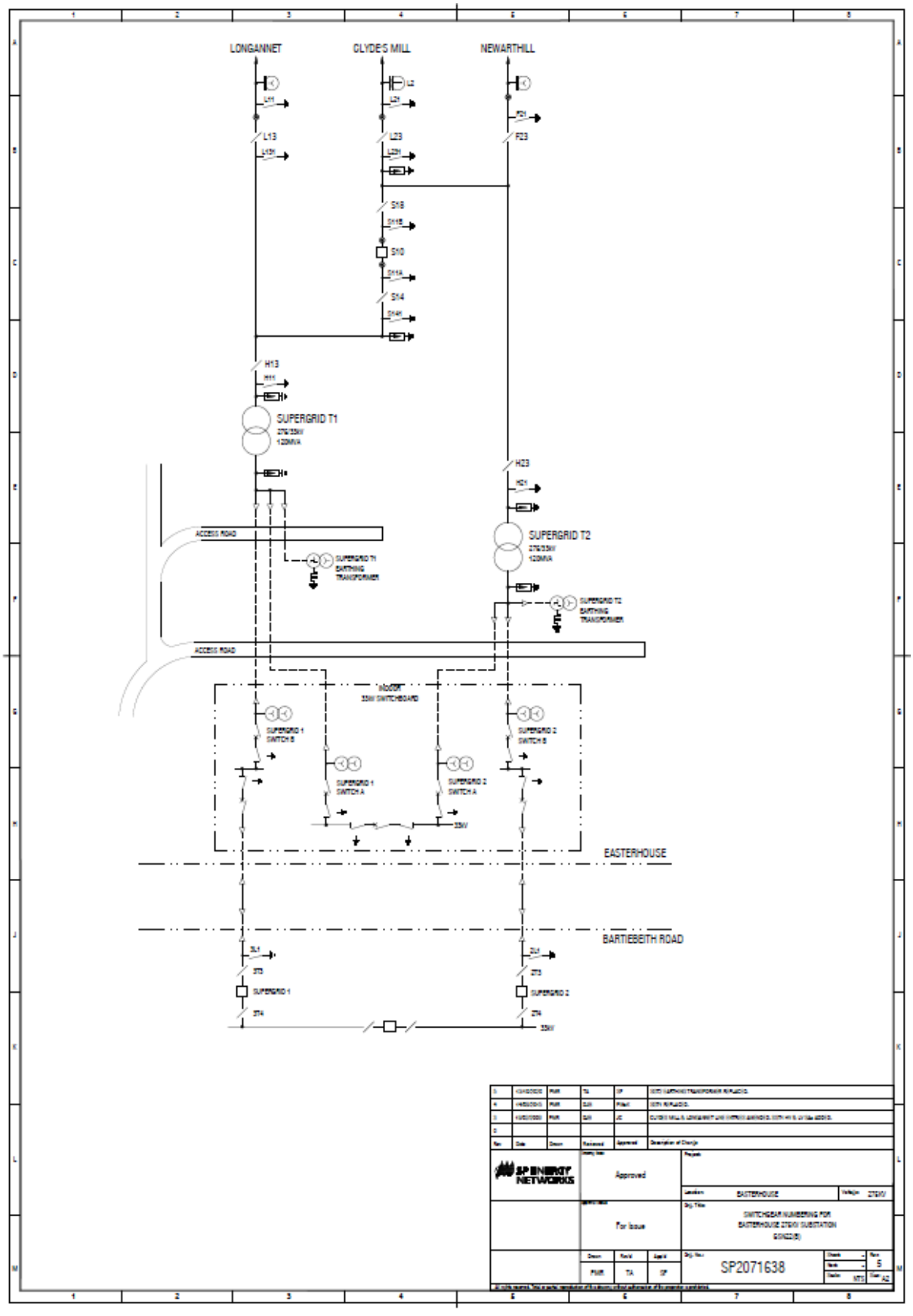


Figure 9 Existing Configuration – Easterhouse 275kV Substation

## 5.2 Planned System Configuration – HND/ NOA Projects

Following the ESO's publication of the HND and NOA7 Refresh on 7th July 2022, the following projects were highlighted for progression within SPT's network area.

Table 4 Status within HND – Required for 2030 Targets

| NOA7R Code | Description | NOA7 EISD |
|---|---|---|
| **DNEU** | Installation of a new 400/275kV 1000MVA Supergrid transformer (SGT2) at Denny North 400kV substation. | 2025 |
| ***DWUP***[15] | ***Establish a 400kV single circuit corridor south from Kincardine North, on existing overhead line (OHL) routes, to Wishaw substation or Clyde's Mill substation.*** | ***2026*** |
| **E2DC** | Establish a High Voltage Direct Current (HVDC) subsea link from a new Branxton 400kV Substation (near Torness) to Hawthorn Pit in the northeast of England. Branxton will facilitate the connection of offshore renewable developments as well as the reinforcement of capacity between Scotland and England. | 2027 |
| **LWUP** | Establish a new 400kV substation north of Kincardine and connect to Denny North at 400kV, integrating load and non-load related investment drivers and enabling significant reinforcement of transfer capacity through central Scotland. | 2027 |
| **VSRE** | Replace existing OHL conductor on the strategic east-west Strathaven - Smeaton (XH/XJ route) corridor with modern high temperature low sag (HTLS) conductor. | 2027 |
| **DWNO** | Establish a new 400kV OHL from Bonnybridge substation to an existing OHL north of Glenmavis, together with associated substation works, conductor replacement and voltage uprating on existing OHL routes. | 2028 |
| **EHRE** | Replace existing OHL conductor on the southern (Elvanfoot - Harker) section of the strategic north-south Strathaven - Harker (ZV route) corridor with modern high temperature low sag (HTLS) conductor. | 2028 |
| **BDUP** | Uprate the Beauly - Denny OHL route to double circuit 400kV operation. | 2029 |
| **DLUP** | Establish a new 400kV substation at Windyhill and a 400kV single circuit corridor, on existing overhead line routes, between Windyhill, Lambhill and Denny North. | 2029 |
| **VERE** | Replace existing OHL conductor on the northern (Strathaven - Elvanfoot) section of the strategic north-south Strathaven - Harker (ZV route) corridor with high temperature low sag (HTLS) conductor. | 2030 |
| **TGDC** | Creation of a second new High Voltage Direct Current (HVDC) Eastern subsea link from the SPT area, to south of the Humber estuary, in the northeast of England, together with associated onshore works. | 2031 |
| **TKUP** | Establish new 400kV substations at Mossmorran, Westfield and Glenrothes to establish a 400kV double circuit corridor, on existing overhead line routes, between Kincardine North and the SSEN Transmission Tealing substation. Scope includes further works within the SSEN-T area. | 2032 |

Table 5 Status within NOA7 – Proceed

| NOA7R Code | Description | NOA7 EISD |
|---|---|---|
| **CMNC** | Creation of a new 400kV double circuit OHL route and associated substation infrastructure from southeast Scotland to the northwest of England. | 2033 |
| **WCNC** | Creation of a new 400kV double circuit OHL route and associated substation infrastructure from southwest Scotland to the northwest of England. | 2036 |
| **TLNO** | Creation of a new 400kV double circuit OHL route and associated substation infrastructure from east central Scotland to the northeast of England. | 2037 |

[15] This project.

Table 6 Status within NOA7 – Hold

| NOA7R Code | Description | NOA7 EISD |
|---|---|---|
| **LCU2** | Establish a 400kV single circuit corridor south from Kincardine North, on existing OHL routes, towards the Strathaven - Smeaton (XH/XJ route) corridor, west of Edinburgh and Currie/ Smeaton substations. | 2031 |

Table 7 Status within NOA7 – Do Not Start

| NOA7R Code | Description | NOA7 EISD |
|---|---|---|
| **CVUP** | Establish a 400kV single circuit corridor south from Clyde's Mill to Strathaven on existing OHL routes, with associated substation development at Clyde's Mill, Strathaven and near East Kilbride. | 2031 |

As described in our response to Ofgem's consultation on Accelerating Onshore Electricity Transmission Investment, dated 6th September 2022, due to the rapidly changing energy landscape, projects recommended to 'hold' or 'do not start' in one NOA may already be 'late' when assessed against the requirements of the next iteration of the ESO's FES. With work already well underway on the HND Follow Up Exercise, to ensure an additional circa 17GW of ScotWind generation can be accommodated on the network, we anticipate one specific project in SPT's area currently with a 'hold' signal (LCU2) and one specific project currently with a 'do not start' signal (CVUP), will change to 'proceed', informed by FES 2023 and the HND Follow Up Exercise.

There is also a need to deliver non-load related asset replacement on the associated overhead line routes within the RIIO-T3 period. For this reason, we are continuing to review and refine the scope and timing of these works with a view to continuing to integrate load and non-load related drivers in an economic, efficient and co-ordinated manner minimising system access requirement.

### 5.3 Overview of Options

This section provides a description of the options considered to facilitate a 400kV single circuit connection south from the planned Kincardine North 400kV Substation, utilising (as far as is possible) existing OHL routes, towards the Wishaw or Clyde's Mill substation sites. These works form part of a wider suite of reinforcement works designed to increase power transfer into and through the SPT network from renewable developments across the north of Scotland in an economic, efficient and co-ordinated manner.

Table 8 below presents a summary of the options considered.

Table 8: Options Summary

| | Option | Outcome of Initial Review | Reason for Rejection |
|---|---|---|---|
| **1** | Do Nothing or Delay | Rejected | A 'Do Nothing' or 'Delay' option is not credible in relation to this project and would be inconsistent with SPT's various statutory duties and licence obligations. Timely progression of the uprating of transfer capability through the SP Transmission system is crucial to ensure continued security and reliability of supply, while alleviating constraints on the GB transmission system, enabling growth in renewable electricity and support the transition to Net Zero emissions in the most economic way. |

| | Option | Outcome of Initial Review | Reason for Rejection |
|---|---|---|---|
| **2** | Establish a 400kV single circuit south from Kincardine North, on existing OHL routes, to Wishaw substation. | Proposed for Further Consideration | - |
| **3** | Establish a 400kV single circuit south from Kincardine North, on existing OHL routes, to Clyde's Mill substation. | Proposed for Further Consideration | - |

Options 2 and 3 provide feasible solutions. These options are discussed in further detail in the following sections.

### 5.3.1 Base System Configuration

Figure 10 indicates the planned configuration of the system upon completion of works forming part of the Kincardine North 400kV Substation MSIP project (which is the subject of a separate MSIP Re-opener application).

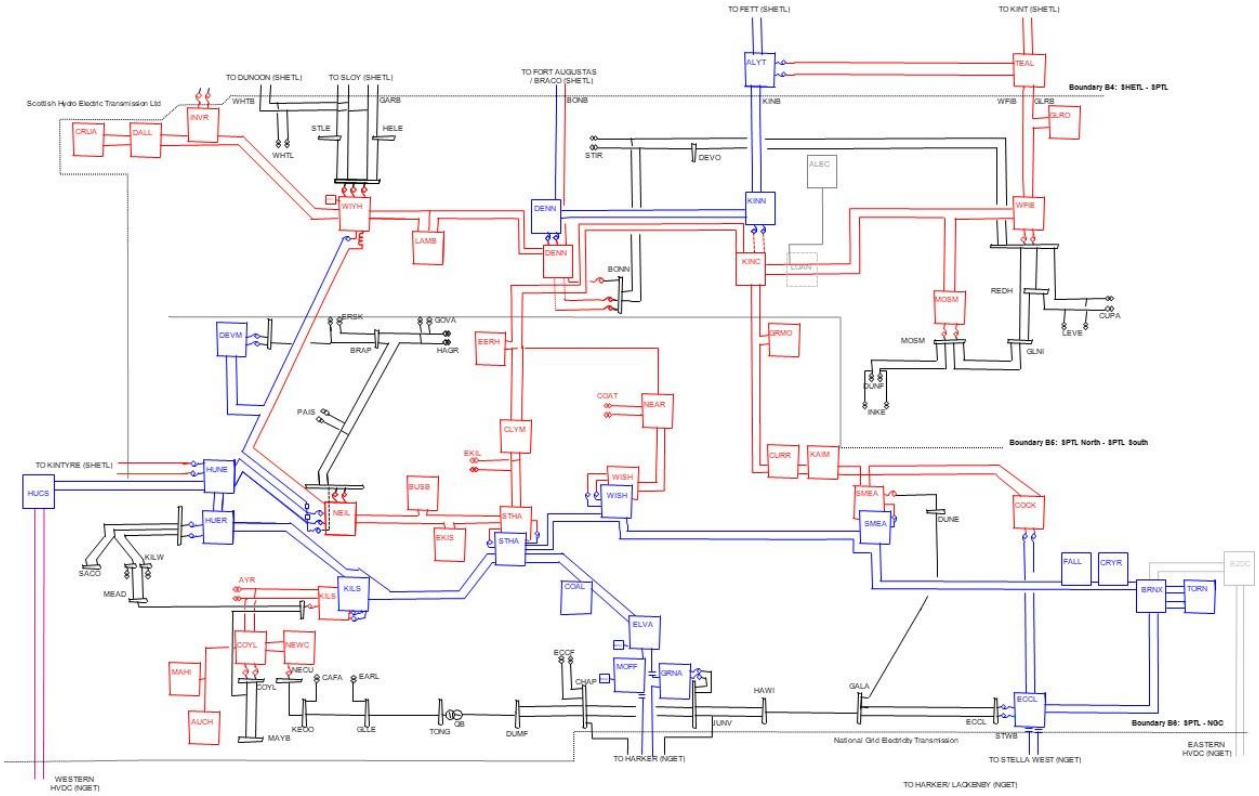


Figure 10: Single Line Diagram, post Kincardine North 400kV Substation (ref. NOA code LWUP)

Figure 10 above is considered the 'base' system configuration i.e. the starting point for the purposes of this MSIP Re-Opener application.

### 5.3.2 Works Common to Options 2 and 3

Both Options 2 and 3 involve the establishment of one bay of 400kV GIS double busbar switchgear and associated connections at the planned Kincardine North 400kV Substation, together with voltage uprating of one side of the existing:

- ZC(S) double circuit overhead line route, from the site of the planned Kincardine North 400kV Substation to Denny North 400kV Substation; and
- ZD double circuit overhead line route, from the existing Denny North 400/275kV Substation site to the north of the existing Easterhouse 275kV Substation.

Both ZC(S) and ZD routes currently operate at 275kV and are insulated for 400kV operation. It is not proposed to modify the existing (quad Zebra ACSR and twin Araucaria AAAC) OHL conductor system on these OHL routes as part of this project, however appropriate consents and land agreements will be required to facilitate operation of the routes at 400kV, together with all necessary works to ensure acceptable clearances (e.g. to ground) when operating at the higher voltage level.

### 5.3.3 Option 2 - 400kV Single Circuit from Kincardine North to Wishaw Substation

This option involves establishing 400kV single circuit connection, utilising existing overhead line routes (as far as is possible), from Kincardine North 400kV Substation to Wishaw 400kV Substation.

The resulting system configuration is indicated schematically in Figure 11.

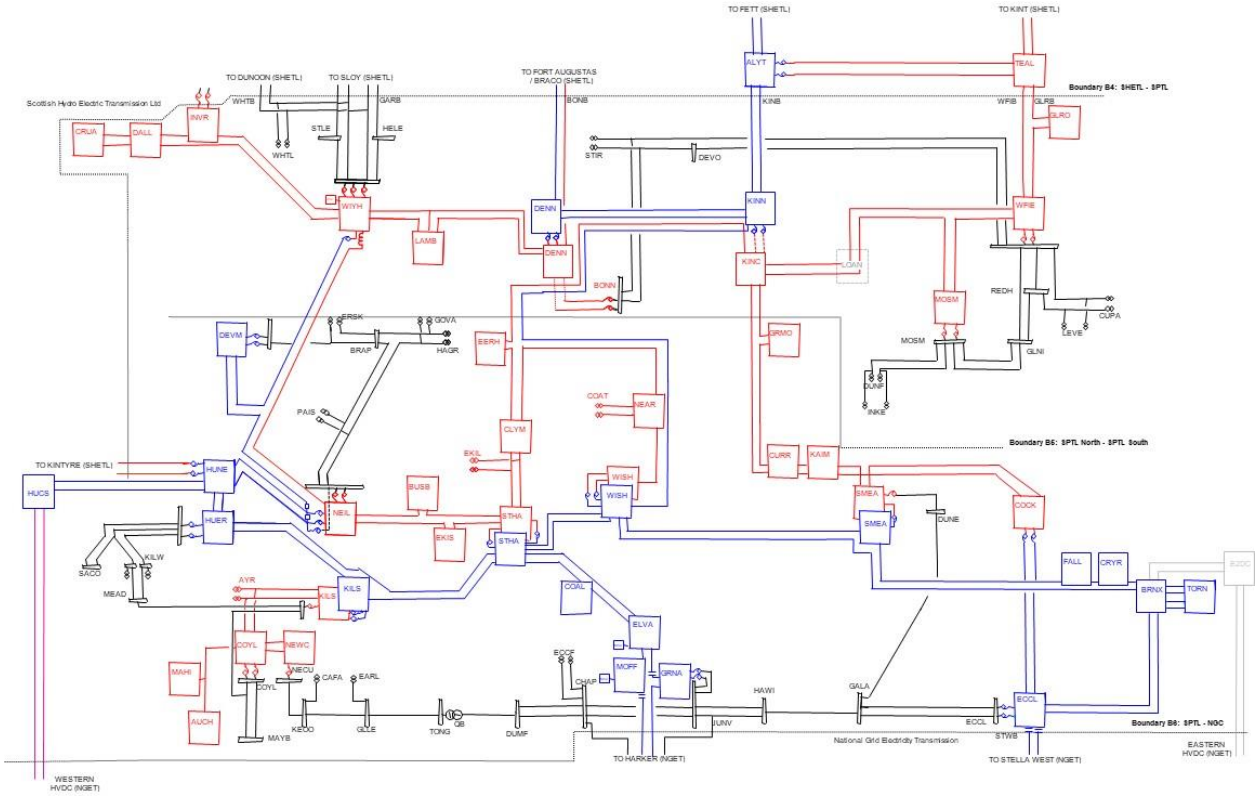


Figure 11: Single Line Diagram, Option 2

A short section of new OHL would be required, approximately 1km to the north of Easterhouse 275kV Substation, in order to connect the eastern side of ZD route to the northern side of XX route. This short section of new OHL would require Section 37 consent and involve the construction of two new terminal towers, one on each of ZD and XX OHL routes, together with associated reconfiguration work.

For circuit thermal rating purposes, the existing 1965 vintage twin Zebra ACSR OHL conductor system on the northern/ eastern side of the L2 specification XX route, between Easterhouse and Newarthill, would be replaced with a High Temperature Low Sag (HTLS) conductor system. Similarly the existing 1965 vintage twin Zebra ACSR OHL conductor system on the eastern side of the L2 specification XR route, between Newarthill and Wishaw, would be replaced with a HTLS conductor system.

At Newarthill 275kV Substation, the existing overhead line entries would be diverted locally in order to deliver a 400kV connection on the eastern side of the existing compound. The existing Newarthill-Wishaw No.1 and No.2 275kV connections would be reconfigured.

At Wishaw 400kV Substation, the Newarthill-Wishaw No.1 275kV circuit would be connected via suitably rated 400kV cable system (requiring three cables per phase) to a new 400kV feeder bay in the existing 400kV GIS building. The existing Strathaven-Torness 400kV circuit would also be turned into Wishaw 400kV Substation in order to balance post-fault transfer west towards Strathaven and east towards Smeaton. A new 400kV bus section circuit breaker would be installed i.e. in total Wishaw 400kV GIS Substation would be extended by three new feeder bays and one bus section bay.

To retain connectivity to Clyde's Mill 275kV Substation, the existing Clyde's Mill-Easterhouse-Newarthill 275kV circuit would be reconfigured, and connections removed at Easterhouse, so as to form a Clyde's Mill-Newarthill 275kV circuit.

### 5.3.4 Option 3 - 400kV Single Circuit from Kincardine North to Clyde's Mill Substation

This option involves establishing 400kV single circuit connection, utilising existing overhead line routes, from Kincardine North 400kV Substation to a new Clyde's Mill 400kV Substation.

The resulting system configuration is indicated schematically in Figure 12.

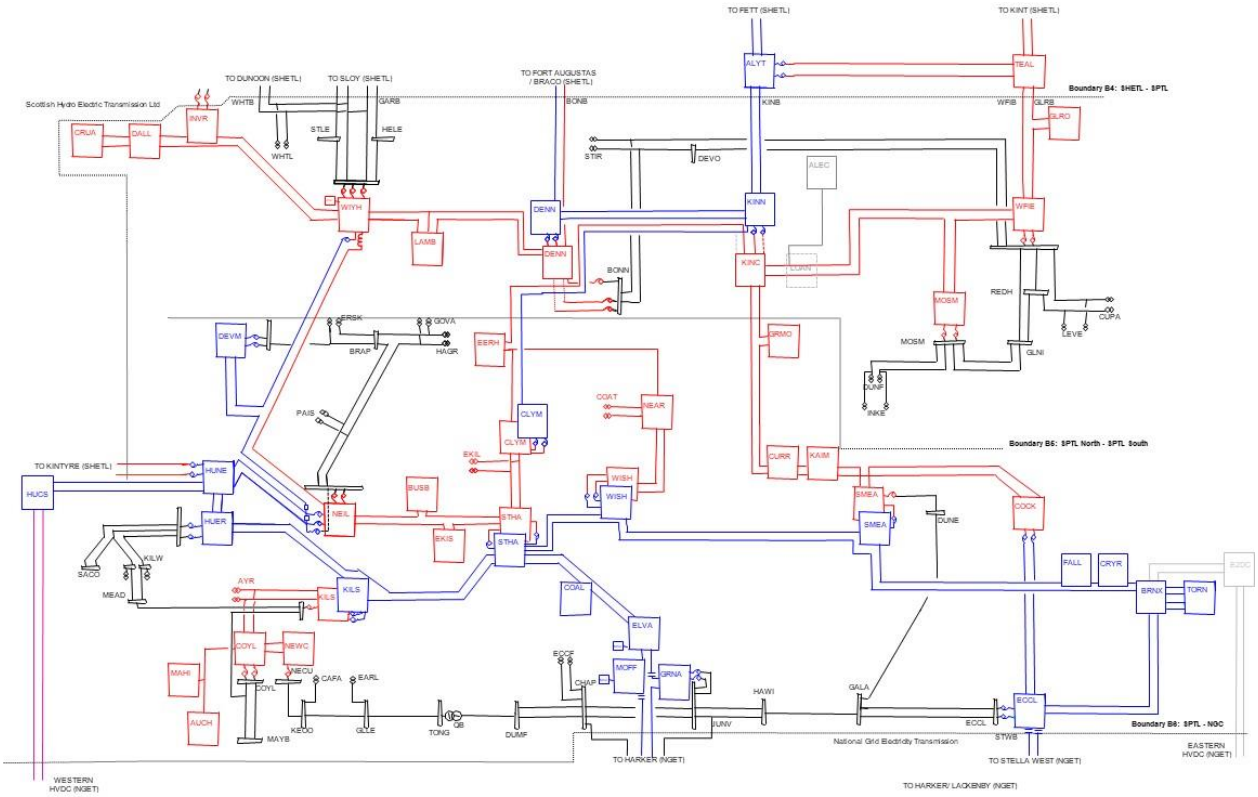


Figure 12: Single Line Diagram, Option 3

Immediately to the north of the existing Clyde's Mill 275kV Substation compound, on land currently owned by SPT, a new 400kV AIS substation would be established. The new 400kV substation would be of 'three switch' configuration, equipped with a 400kV bus section circuit breaker and two 400/275kV 1000MVA inter-bus transformers. Each transformer would be controlled by a 400kV AIS circuit breaker. The existing ZD and YF overhead line entries would be diverted locally in order achieve the required connections into the new 400kV compound.

In view of the resulting fault infeed with two new 400/275kV inter-bus transformers installed at Clyde's Mill, it would be necessary to uprate the short circuit rating of Easterhouse 275kV Substation from 31.5kA to 40kA, primarily impacting some existing primary equipment and civil structures.

### 5.4 Option Assessment

As described in our RIIO-T2 Business Plan Annex 8[16], while most engineering justification papers have a CBA aligned with the RIIO-T2 CBA model, projects in the following categories do not:

- Live projects rolling over from RIIO-T1, since they have already initiated, with decisions made during the previous price control.
- Customer connection projects, as the proposed approach is based on agreement with the connecting party as they will bear a sizeable proportion of the costs incurred.
- TO Reinforcements associated with new connections, where the options considered are evaluated purely based on the lowest cost solution, which meets the project objectives, as the benefits are all comparable.
- Projects justified through the Network Options Assessment Process as these are subject to an extensive and rigorous CBA process by the Electricity System Operator who can consider market options, and different options which may be offered by Transmission Owners.

Projects in the four categories above have an associated document (this MSIP Re-Opener application in respect of the Kincardine – Wishaw (Clyde's Mill) 400kV Reinforcement) explaining the feasible options and the reasoning behind the selection of the preferred investment option.

The short-listed options considered to facilitate a 400kV single circuit connection south from the planned Kincardine North 400kV Substation, utilising (as far as is possible) existing OHL routes, towards the Wishaw or Clyde's Mill substation sites, as part of a wider suite of reinforcement works designed to increase power transfer into and through the SPT network from renewable developments across the north of Scotland in an economic, efficient and co-ordinated manner, are described in Section 5.3 while Table 9 summarises the key benefits and disadvantage of each option.

Both Option 2 and Option 3 enable an operational transfer capability of approximately 4,200MW on boundary B5. Power system analysis has also confirmed that both Option 2 and Option 3 perform similarly in relation to their impacts on transient stability.

Option 2 involves a marginally higher capital cost and the establishment of a short section of new 400kV overhead line to the north of Easterhouse 275kV Substation presents consenting and programme risk. These overhead line works, which have an estimated cost of £2.5m, would also become stranded upon completion of later stages of planned system reinforcement.

While compliant with the NETS SQSS requirements in respect of the demand connection criteria, Option 2, by virtue of the creation of a direct Kincardine North – Wishaw 400kV circuit, reduces the

[16] Annex 8 - Cost Benefit Analysis Methodology (spenergynetworks.co.uk)

number of infeeds, and therefore security of supply, to the Easterhouse, Clyde's Mill, East Kilbride and Newarthill demand groups, relative to the existing system and Option 3.

Option 3 increases the three phase fault rating of Easterhouse 275kV Substation, consistent with short-term requirements driven in part by contracted new connections activity local to the site.

On balance, Option 3 is therefore considered the preferred investment option to facilitate a 400kV single circuit connection south from the planned Kincardine North 400kV Substation, utilising (as far as is possible) existing OHL routes, towards the Wishaw or Clyde's Mill substation sites.

There is no market based alternative to the preferred investment option.

Table 9: Option Benefits, Drawbacks and Selection Outcome

| | Option | Estimated Capital Cost[17] | Key Advantage | Key Disadvantage | Option Outcome |
|---|---|---|---|---|---|
| **2** | Establish a 400kV single circuit south from Kincardine North, on existing OHL routes, to Wishaw substation. | £60.76m | Delivers B5 boundary capability as per Option 3. | Marginally higher capital cost relative to Option 3.<br>Involves new section of OHL north of Easterhouse to connect ZD and XX routes, est. £2.5m. This will be stranded in later stages of system reinforcement and presents consenting and programme risk.<br>Reduces the number of infeeds, and therefore security of supply, to the Easterhouse, Clyde's Mill, East Kilbride and Newarthill demand groups relative to the existing system and Option 3. | Rejected |
| **3** | Establish a 400kV single circuit south from Kincardine North, on existing OHL routes, to Clyde's Mill substation. | £59.38m | Delivers B5 boundary capability as per Option 2.<br>Marginally lower capital cost relative to Option 2.<br>Avoids the need for a new section of OHL north of Easterhouse to connect ZD and XX routes.<br>Retains the current number of infeeds, and therefore security of supply, to the Easterhouse, Clyde's Mill, East Kilbride and Newarthill demand groups.<br>Scope of works is aligned with future 400kV connection from Clyde's Mill to Strathaven, and with the need to increase the fault rating of Easterhouse 275kV Substation in the short-term. | | **Proposed** |

[17] All values are estimated Direct capital costs in 2018/19 values.

## 6. Proposed Works

This Section 6 describes the scope of works to be undertaken as part of this MSIP Re-opener application.

### 6.1 Substation Works at Clyde's Mill 400kV Substation

The configuration of Clyde's Mill 400kV AIS Substation, proposed to be constructed immediately to the north of the existing 275kV compound so as to minimise the extent of platform civil works, is indicated in Figure 13.

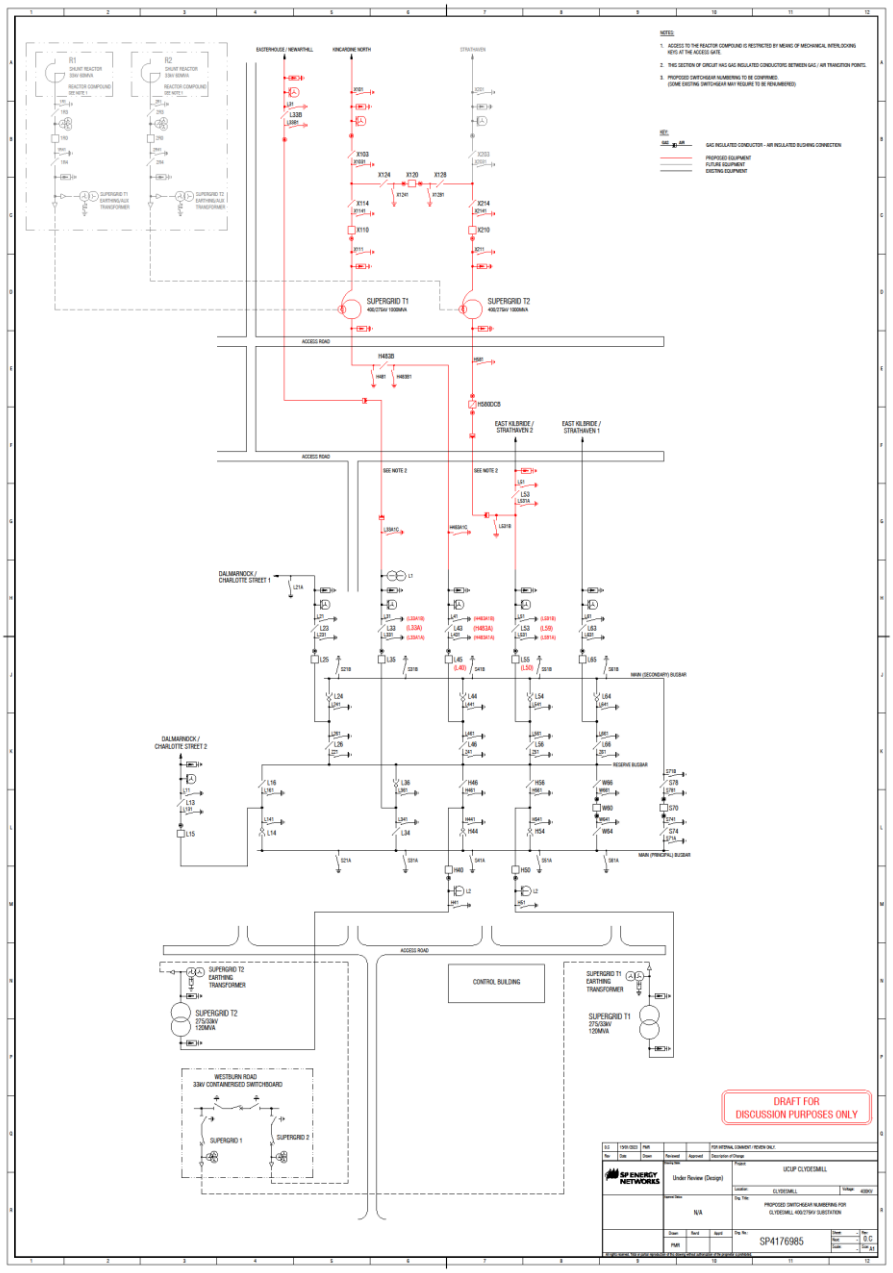


Figure 13: Option 3 – Connectivity Requirements for Clyde's Mill 400kV Substation

The new 400kV substation will be of a 'three switch' configuration, equipped with a 400kV bus section circuit breaker and two 400/275kV 1000MVA inter-bus transformers. Each transformer will be controlled by a dedicated 400kV AIS circuit breaker.

The new Clyde's Mill 400kV AIS Substation will initially connect the following circuits:

- Kincardine North 400kV
- Clyde's Mill SGT3, 400/275kV 1000MVA
- Clyde's Mill SGT4, 400/275kV 1000MVA

The detailed design of the site will incorporate provision for the future establishment of a 400kV single circuit connection from Clyde's Mill to Strathaven 400kV Substation (ref. NOA code CVUP), via the eastern side of the ZE overhead line route.

The existing Clyde's Mill-East Kilbride-Strathaven No.2 275kV circuit shall be reconfigured within the existing Clyde's Mill 275kV compound so as to facilitate the connection of the new Clyde's Mill SGT4, while avoiding the need for a new bay of 275kV switchgear.

Space shall also be retained within the wider site design for the future connection of reactive compensation equipment, as well as the future development of a 400kV GIS substation, although there is no indication of the development of the latter being necessary at this time.

### 6.1.1 Substation Works At Kincardine North 400kV Substation

The configuration of Kincardine North 400kV GIS Substation, proposed to be constructed adjacent to the existing Kilbagie crossing, approximately 1.5km north of Kincardine, is indicated in Figure 14. This (DWUP) project requires the provision of one bay of 400kV GIS switchgear at Kincardine North 400kV Substation, as outlined in light blue in Figure 14 below.

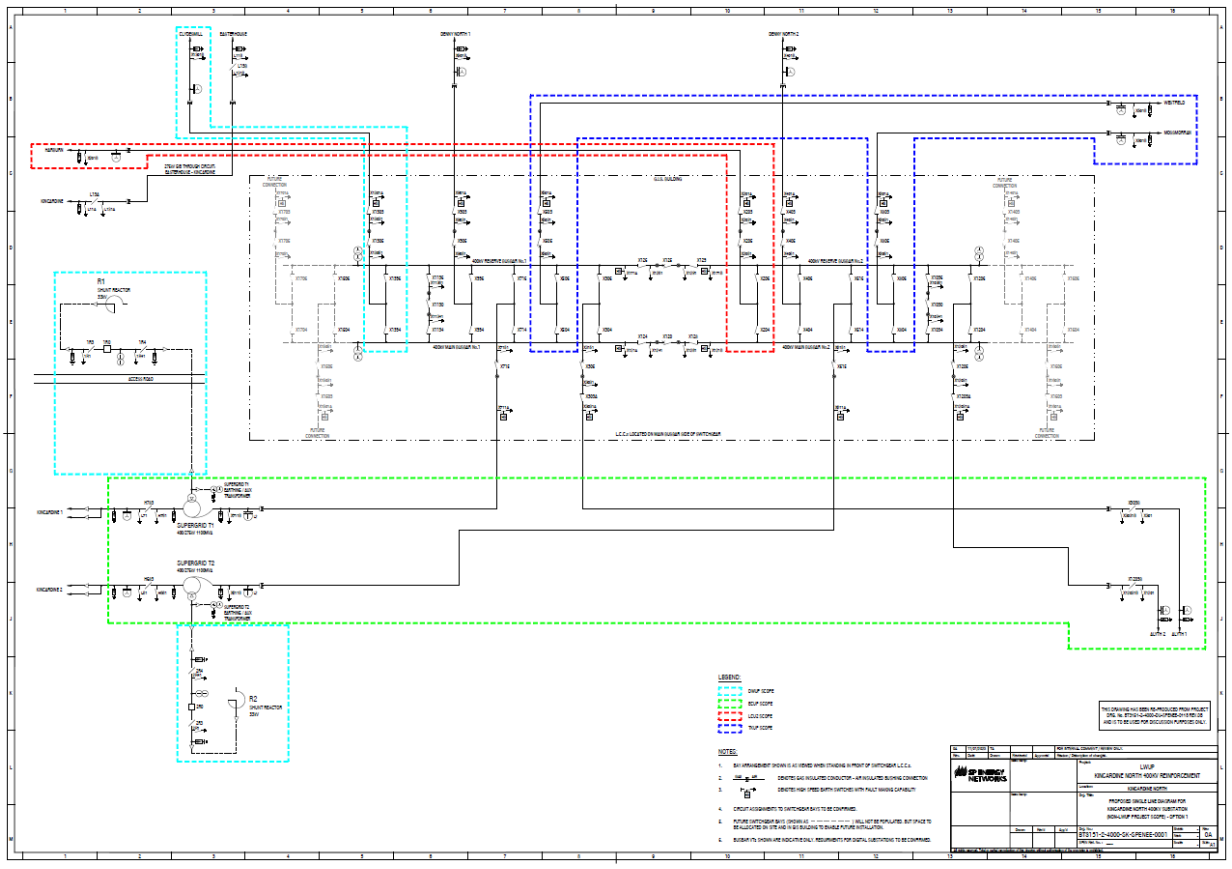

Figure 14: Option 3 – Connectivity at Kincardine North 400kV Substation

Note that the estimated project cost detailed in Table 9 includes provision for two 33kV 60MVAr air cored shunt reactors, each connected to the 33kV tertiary winding of a 400/275kV transformer. This provision is common to both Option 2 and Option 3, and reflects the uprating of circuits presently operating at 275kV to 400kV operation and the associated requirement for voltage control equipment to mitigate high voltage under low demand/ low power transfer conditions.

It is proposed at this time that these two units are installed at Kincardine North 400kV Substation, one 33kV 60MVAr air cored shunt reactor connected to the 33kV tertiary winding of each of the 400/275kV 1100MVA transformers on site. The final transformers to which these units will be connected will be confirmed however as part of the Stage 2 submission associated with this MSIP Re-opener Application.

#### 6.1.2 Substation Works At Easterhouse 275kV Substation

At Easterhouse 275kV Substation, the short circuit rating of the site shall uprated from 31.5kA to 40kA. This will include the assessment and uprating where necessary of primary equipment, civil structures and earthing systems.

### 6.2 Overhead Line Works

#### 6.2.1 Works on ZC(S) and ZD Routes

Both ZC(S) and ZD routes currently operate at 275kV and are insulated for 400kV operation. It is proposed to uprate to 400kV operation:

- the southern/ eastern side of ZC(S) route, from the site of the planned Kincardine North 400kV Substation to Denny North 400kV Substation; and
- the eastern side of ZD route, from the existing Denny North 400/275kV Substation site to the north of the existing Easterhouse 275kV Substation.

Appropriate consents and land agreements will be required to facilitate operation of the routes at 400kV, together with all necessary works to ensure acceptable clearances when operating at the higher voltage level.

#### 6.2.2 Works at Clyde's Mill

ZD and YF overhead line routes shall be diverted as required in order to achieve the line entries required to the new Clyde's Mill 400kV Substation compound.

Through detailed project design and informed by site surveys, integrating both overhead line and substation design, the extent of the local overhead line works will seek to mitigate associated environmental impacts and wider project programme risks.

### 6.3 Civil Engineering Works

Clyde's Mill 275kV switchgear will be of an outdoor AIS design. The primary civil engineering works forming part of the DWUP project will comprise:

- The design and construction of the site civil platform and in the area of the ZD and ZE overhead line entries;
- The design and construction of foundations and structures necessary to support the equipment within the area above; and
- Enabling works to achieve the above e.g. works to facilitate temporary and/or enduring accesses for construction, operation and maintenance purposes.

### 6.4 Environmental and Consent Related Works

SPT will take a co-ordinated approach to all aspects of these works in view of the need to deliver an overall and integrated solution which recognises potential interaction and cumulative impacts.

The Clyde's Mill 400kV Substation project requires planning consent from South Lanarkshire Council. Section 37 consent will be required to facilitate the overhead line voltage uprating works required on ZC(S) and ZD routes, and the diversion of ZD and YF routes at the Clyde's Mill site.

A Pre-Application Notification is planned to be submitted to South Lanarkshire Council in August 2023, followed by public consultation in October 2023. A full and formal planning application is planned to be submitted to South Lanarkshire Council in March 2024.

### 6.5 Stakeholder Engagement

SPT's Stakeholder Engagement Plan for Clyde's Mill 400kV Substation will be closely aligned to our wider Stakeholder Engagement commitments as outlined in our RIIO-T2 business plan. It will centre around timely engagement with a wide range of stakeholders to achieve mutually acceptable outcomes. We recognise that stakeholders' influence and interest in the project will vary as the project develops and that stakeholders' opinions may change over time.

## 6.6 Future System Development

Figure 15 indicates the configuration of the system upon completion of works forming part of this MSIP Re-opener application[18].

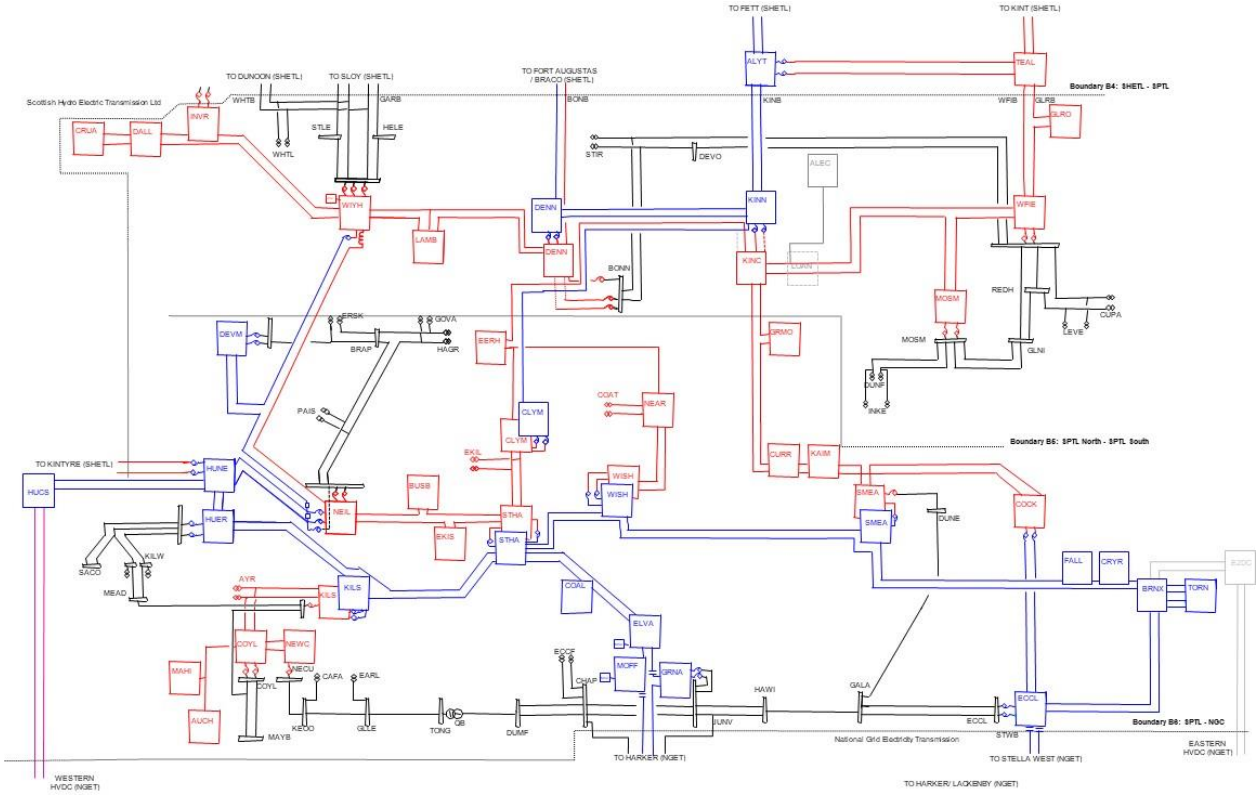


Figure 15: NOA Codes LWUP and DWUP (to Clyde's Mill 400kV Substation)

While subject to ongoing detailed design, analysis and programming, Figures 16 to 22 provide an indicative view of system configuration (with a focus on the B4 and B5 boundaries) upon completion of each related NOA scheme referenced above.

Note that the delivery sequence of these future works remains subject to ongoing detailed design and separate regulatory approval(s). Figures 16 to 22 should therefore be considered to be indicative only.

[18] Note that Figure 15 includes an indication of the NOA project DNEU, indicated here as a second 400/275kV inter-bus transformer at Denny North. The DNEU project is currently expected to be funded via the VDUM and does not form part of this MSIP Re-opener application.

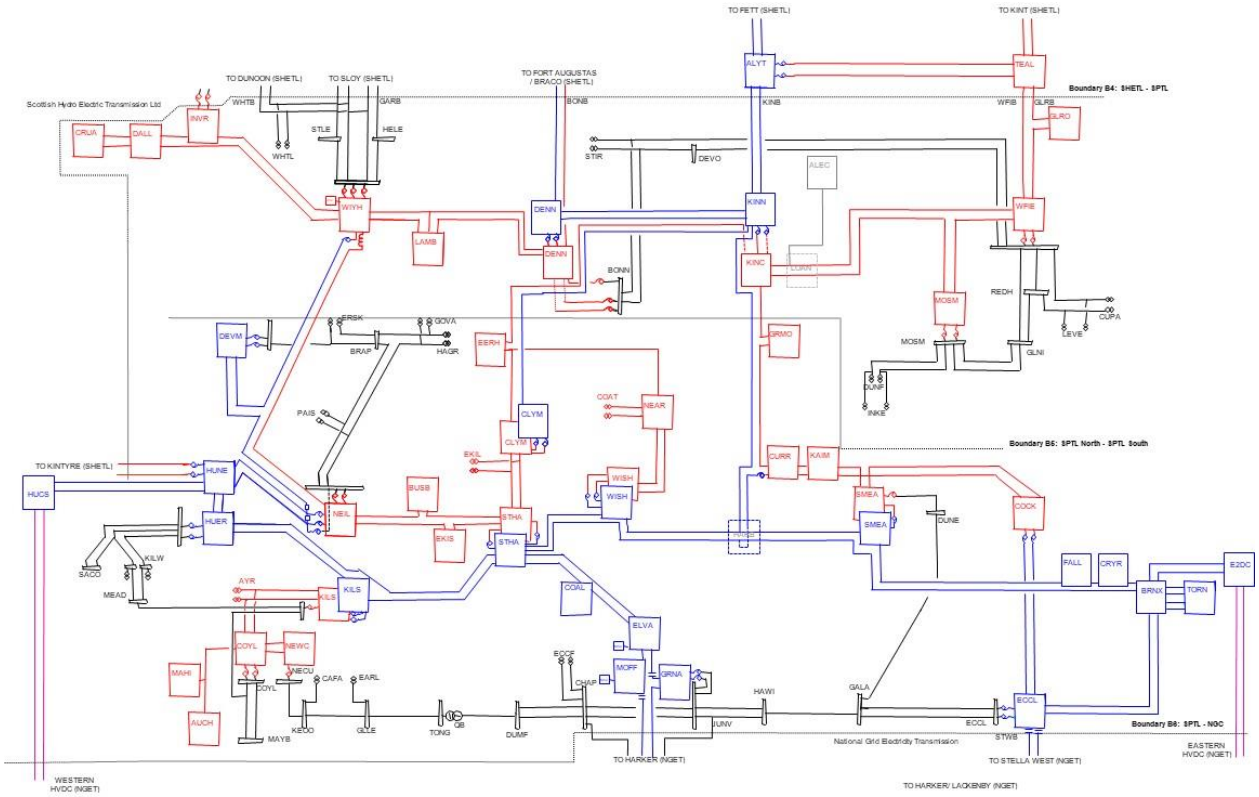


Figure 16: NOA Codes LWUP, DWUP (to Clyde's Mill) and LCU2 (part/ intermediate stage)

Figure 16 indicates a potential intermediate stage in the delivery of the LCU2 project, with a reduced scope of work intended to deliver a 400kV north to south connection in accelerated timeframes.

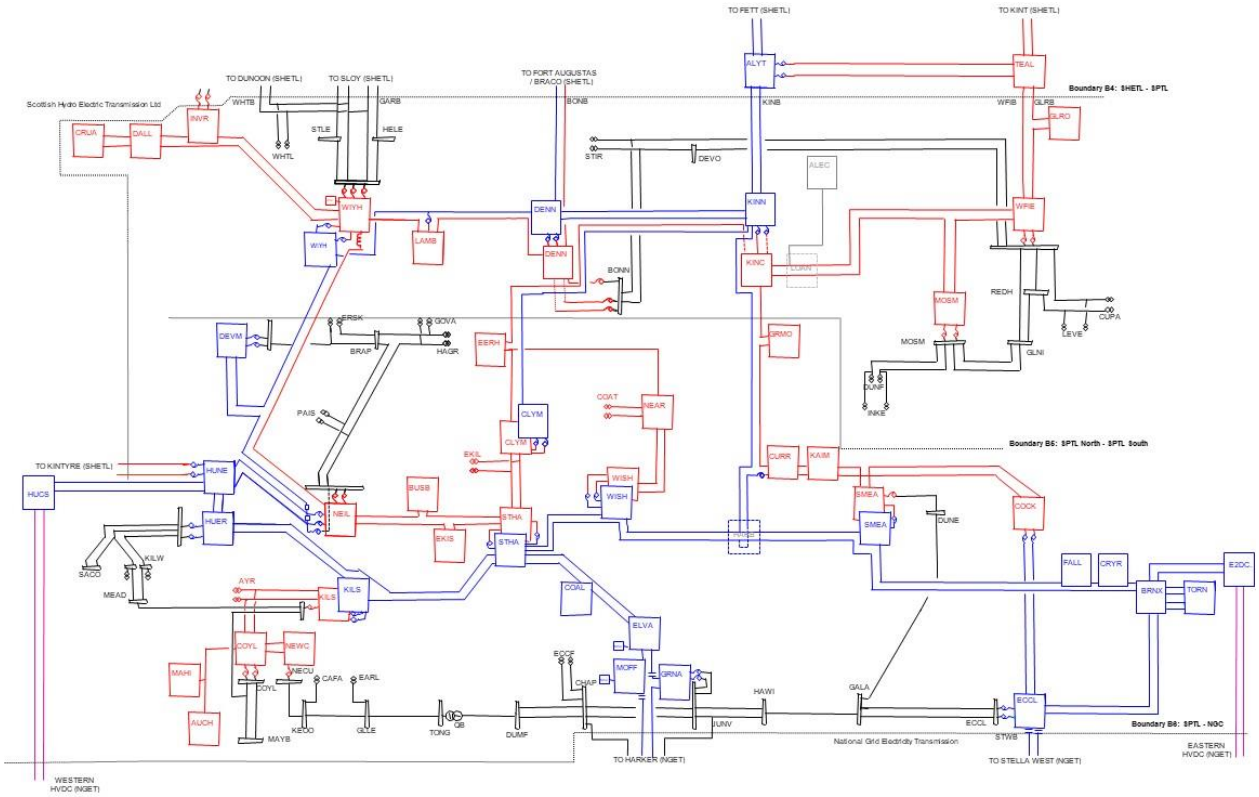


Figure 17: NOA Codes LWUP, DWUP (to Clyde's Mill), LCU2 (part) and DLUP

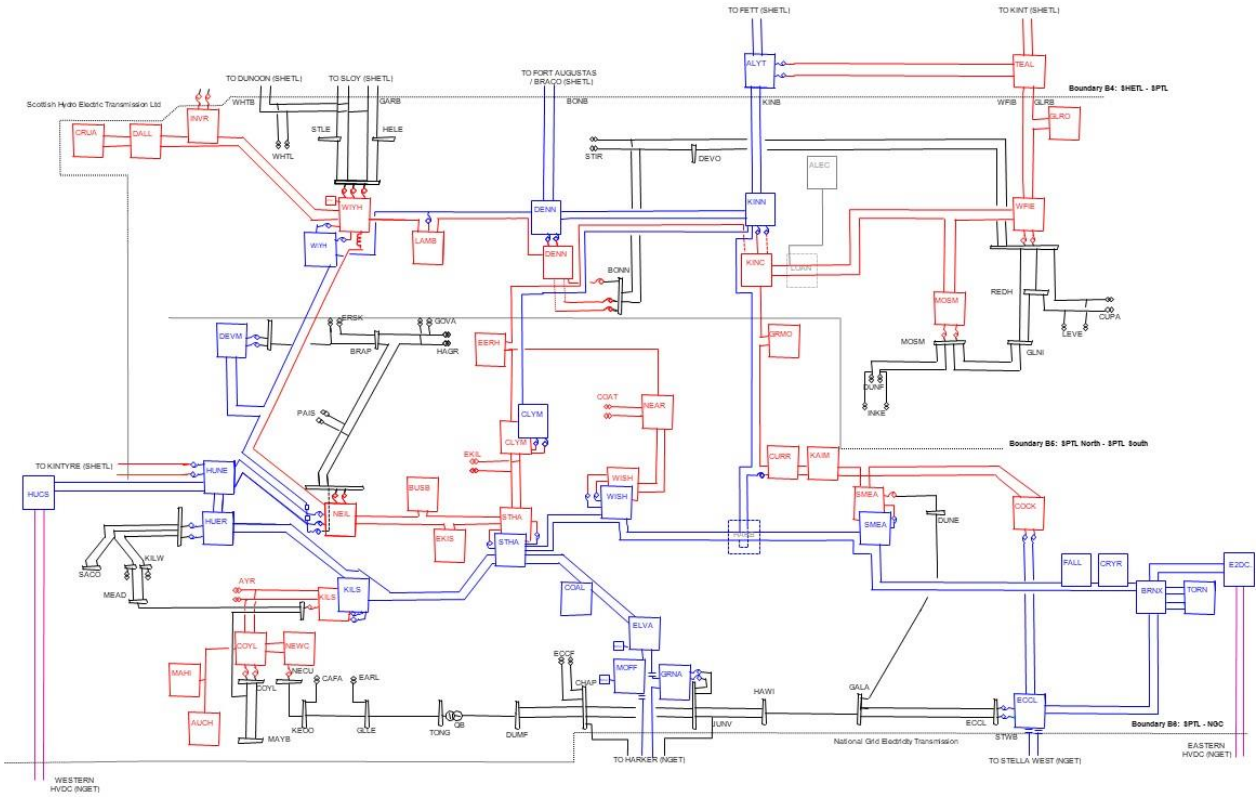


Figure 18: NOA Codes LWUP, DWUP (to Clyde's Mill), LCU2 (part), DLUP and BDUP

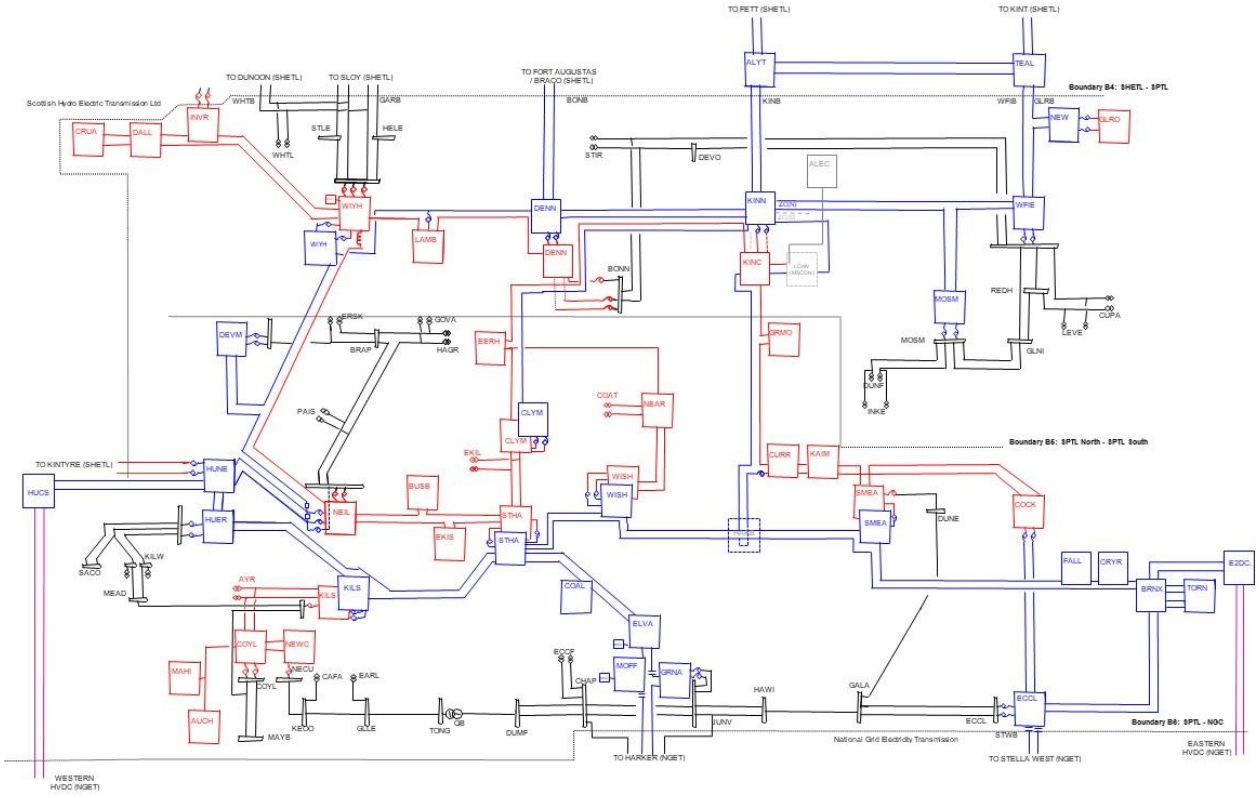


Figure 19: NOA Codes LWUP, DWUP (to Clyde's Mill), LCU2 (part), DLUP, BDUP and TKUP

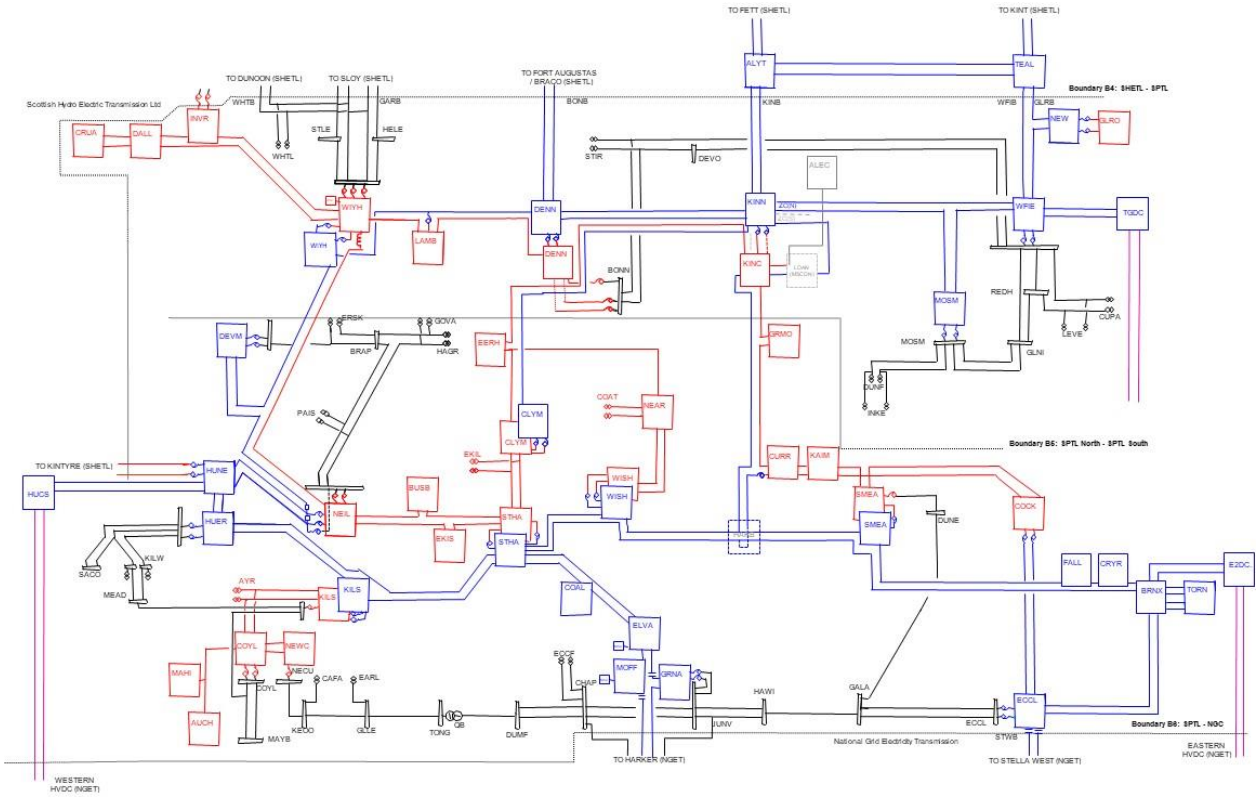


Figure 20: NOA Codes LWUP, DWUP (to Clyde's Mill), LCU2 (part), DLUP, BDUP, TKUP and TGDC

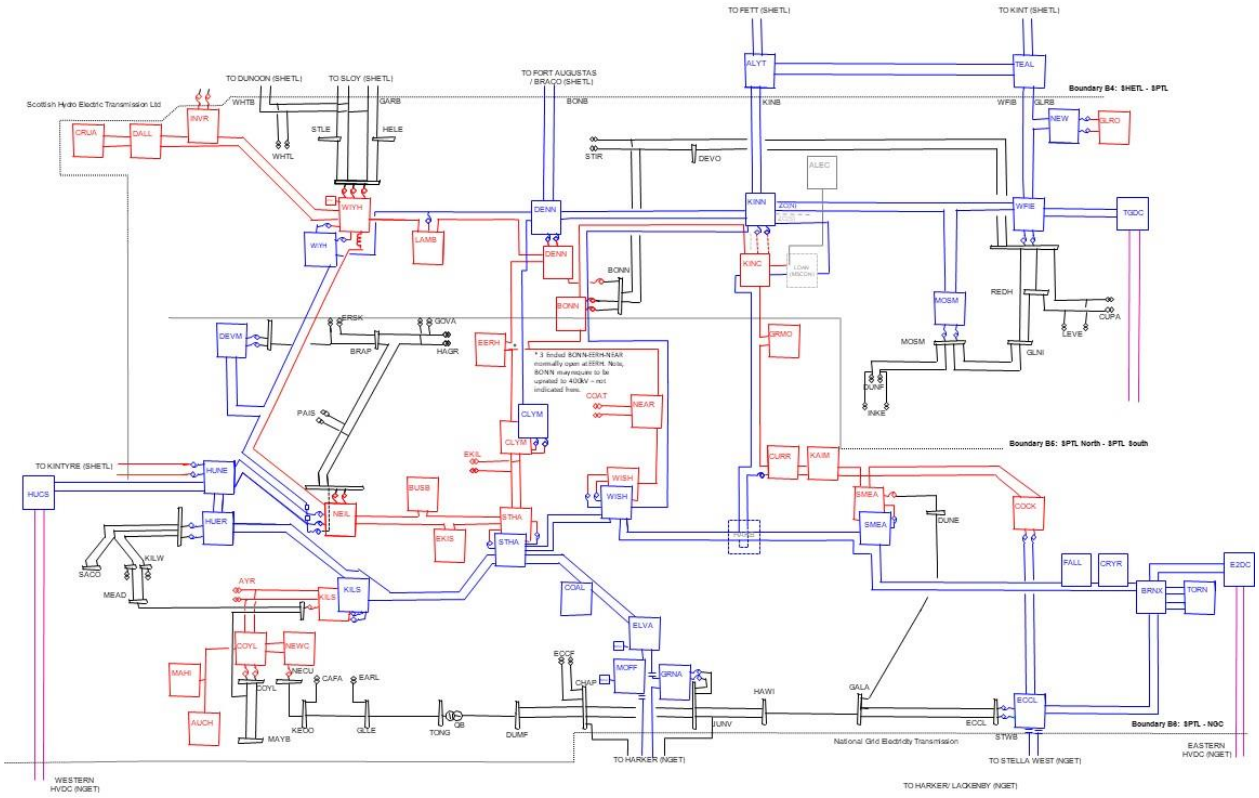


Figure 21: NOA Codes LWUP, DWUP (to Clyde's Mill), LCU2 (part), DLUP, BDUP, TKUP, TGDC and DWNO

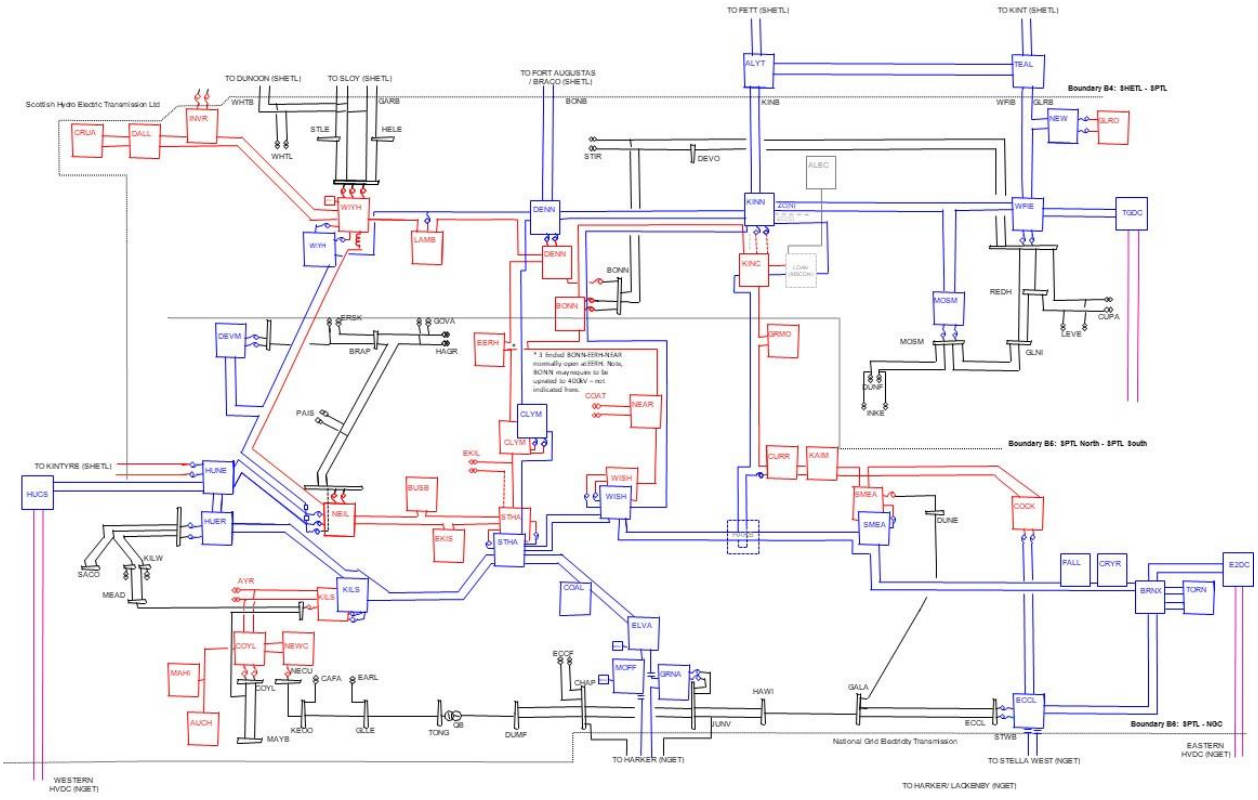


Figure 22: NOA Codes LWUP, DWUP (to Clyde's Mill), LCU2 (part), DLUP, BDUP, TKUP, TGDC, DWNO and CVUP

## 7. Project Cost Estimate

As agreed with Ofgem, a further (Stage 2) MSIP submission will be made at the right time relating to the associated amendments to the outputs, delivery date and allowances to be detailed in LSpC 3.14 Appendix 1. The detail in this section is therefore indicative pending that further submission.

### 7.1 Estimate Total Project Costs

Aligned with the format of the Re-Opener Pipeline Log, Table 10 details the expected energisation year and the current view of potential direct capital expenditure. The (RIIO-T2) allowances will be subject to the Opex escalator mechanism:

Table 10: Estimated Incidence of Expenditure

| | Potential direct capex value per year, £m, 18/19 price base | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Energisation Year | Yr 21/22: direct capex | Yr 22/23: direct capex | Yr 23/24: direct capex | Yr 24/25: direct capex | Yr 25/26: direct capex | Yr 26/27 (T3): direct capex | Yr 27/28 (T3): direct capex | RIIO-T2 Total: direct capex | Total: direct capex |
| 2027/28 | 0.08 | 0.10 | 0.15 | 7.24 | 21.70 | 22.73 | 7.38 | 29.27 | 59.38 |

### 7.2 Regulatory Outputs

The initial indicative primary asset outputs are identified in Table 11 below:

Table 11: Regulatory Outputs Table (Volumes)

| Asset Category | Asset Sub-Category Primary | Voltage | Forecast Additions / Activity | Forecast Disposals |
|---|---|---|---|---|
| **Kincardine North 400kV Substation:** | | | | |
| Circuit Breaker | CB (Gas Insulated Busbar) (ID) | 400kV | 1 | 0 |
| | | | | |
| **Clyde's Mill 400/275kV Substation:** | | | | |
| Circuit Breaker | CB (Air Insulated Busbar) (OD) | 400kV | 3 | 0 |
| Circuit Breaker | CB (Air Insulated Busbar) (OD) | 275kV | 1 | 0 |
| Other switchgear | Disconnector (AIS) (OD) | 400kV | 5 | 0 |
| Other switchgear | Disconnector (AIS) (OD) | 275kV | 3 | 0 |
| Transformer | Interbus Transformer | 400 | 2 | 0 |
| Wound plant | Reactor | 33 | 2 | 0 |
| Overhead Tower Line | Tower | 400 kV | 1 | 2 |
| Overhead Tower Line | Tower | 275 kV | 1 | 1 |

Note that as part of this Stage 1 submission the table above is indicative of primary asset additions and disposals only and will be further developed at Stage 2 e.g. the uprating of overhead line assets from 275kV to 400kV operation, such as on ZC(S) and ZD routes, is not indicated above.

## 8. Delivery

We have applied our project management approach to ensure that this project work is delivered safely, and in line with the agreed time, cost and quality commitments. We have a proven track record of delivering essential transmission network upgrade projects and will draw upon this knowledge and experience to effectively manage these works. We have assigned a dedicated Project Manager to the works at every stage who will be responsible for overall delivery of the scope and is the primary point of contact for all stakeholders.

### 8.1 Delivery Schedule

A standard approach has applied to the planning phase of these works and that will continue for the reporting and the application of processes and controls throughout the lifecycle. Table 12 summarises the key milestones within the delivery schedule.

Table 12: Key Milestone

| Milestone | Phase | Estimated Completion Date |
|---|---|---|
| **1** | Invitation(s) to Tender Issued | October 2023 |
| **2** | Planning Application Submission (Substation) | March 2024 |
| **3** | Planning Application Submission (Overhead Line) | April 2024 |
| **4** | Award Transformer Contract | June 2024 |
| **5** | Award Enabling Civil Works Contract (Clydes Mill Substation Platform) | July 2024 |
| **6** | Planning Decision Received (Substation) | August 2024 |
| **7** | Award Main Works Contract (Civils, Non-GIS Plant, Installation, Commissioning) | September 2024 |
| **8** | Works Start on Site | September 2024 |
| **9** | Planning Decision Received (Overhead Line) | April 2025 |
| **10** | Transfer Existing Circuits | October 2026 – July 2027 |
| **11** | Completion of Works | December 2027 |

Regular meetings with the Project and Construction Management Teams shall be undertaken to assess the ongoing effectiveness of the Project Management interfaces.

The Project Manager will facilitate internal Project Team Meetings, in which project progress and deliverables will be reviewed and any arising risks or issues will be discussed and addressed.

### 8.2 Risk and Mitigation

A Risk Register has been generated collaboratively during the initial design stages to identify any risks, which if realised, could result in deviation from the delivery plan. Mitigation strategies have also been developed to manage the risks identified and these will be implemented by the Project Manager. The

risk register shall remain a live document and will be updated regularly. Currently, the top scheme risks are:

### 8.3 Quality Management

SPT adopts a "life cycle" approach to Quality Management in major project delivery. Our Management Systems are certified to ISO 9001, ISO 14001 and ISO 45001. Various areas applicable to these standards ensure a quality product is delivered. The significant areas detailed below:

#### 8.3.1 Quality Requirements During Project Development

Any risk or opportunity that may affect the quality of the product are detailed in the Project Risk Register (that is noted in Section 6.5 above).

The suppliers of main equipment may also receive a Factory Acceptance Test Inspection when the asset is being built.

#### 8.3.2 Quality Requirements in Tenders

Each contract that SPT issues has a standard format. Specifically in relation to quality, this will include a Contractors' Quality Performance Requirement (CQPR). This CQPR represents a specification that details roles and responsibilities for all parties during the works, frequency and format of reporting. It will also specify the document management process to be adhered to during the delivery of the project. In addition to the CQPR, each project has a contract specific Quality Management Plan, detailing the inspection and testing regime for works as well as the records to be maintained.

#### 8.3.3 Monitoring and Measuring During Project Delivery

SPT Projects undertake regular inspections on projects and contractors to monitor and measure compliance with SPT Environmental, Quality and Health and Safety requirements, as detailed in the contract specifications for the work. All inspections are visual, with the person undertaking the inspection ensuring that evidence of the inspection and any actions raised are documented.

The following inspections are completed:

- Quality Inspections (monthly)
- Environmental Inspections (monthly, with weekly review by third party Environmental Clerk of Works)
- Safety Assessments & Contractor Safety Inspection (daily, with full time Site Manager)
- Project Management Tours (monthly)

The scope of audits and Inspections is to determine compliance with:

- Procedures & Guides
- Planned arrangements for ISO 9001, 14001 & 18001
- Legal and other requirements.

### 8.3.4 Post Energisation

SPT Projects and SPT Operations carry out a Defect Liability Period Inspection within the Contract Defect Liability Period with the aim of identifying any defects and rectifying them with the contractors.

## 9. Conclusion and Recommendations

This MSIP Re-opener application demonstrates the need to establish Clyde's Mill 400kV Substation, with works commencing in the RIIO-T2 period (April 2021 – March 2026) and completing in the RIIO-T3 period. This project will enable the timely and co-ordinated increase in power transfer into and through the SPT network from renewable developments across the north of Scotland.

The development of a new Clyde's Mill 400kV Substation and the establishment of a 400kV single circuit from Kincardine North to Clyde's Mill:

- Is aligned with further planned reinforcement of north to south transfer capability across Boundaries B4 and B5, which have been recommended to proceed by the Network Options Assessment (NOA) process (e.g. ref. NOA7 codes DWNO, TKUP, BDUP and LCU2).
    - Will support the maximisation of transfer capability via existing transmission overhead line routes, prior to the construction of new overhead line routes e.g. Denny – Wishaw (ref. NOA7 code DWNO), helping to relieve thermal bottlenecks in the SPT network which can impact Scottish import and export capability.

The main conclusions of this submission are:

- The timely connection of low carbon generation, including onshore and offshore wind, will play a vital role in reaching legislated net zero targets, and is aligned with SPT's RIIO-T2 strategic goals.
- It is necessary to make significant investment in the capability of the existing transmission system through Scotland and the north of England to accommodate growth in renewable generation. This is required to maintain and operate an economic and efficient transmission system. It is critical to allow the network to keep pace with projected growth to support legislated Net Zero targets whilst also enabling significant constraint savings.
- An MSIP Re-opener application is required in respect of these works.

We, respectfully, request Ofgem's agreement to the following:

- The option being progressed addresses a clear customer need and represents value to UK consumers, therefore, the works should proceed based on the preferred solution (Option 3).
- Efficient expenditure is fully funded where necessary to maintain programme timelines and mitigate project delivery risk e.g. order long-lead equipment, prior to the second stage MSIP submission and assessment.

## Appendix A - SP Transmission System, Geographic Overview