MSIP Re-opener Application Stage 2 – Coalburn SGT4 Installation		
Ofgem Scheme Reference/ Name of Scheme	SPT200200 / SPT-RI-263 - Coalburn SGT4	
Investment Category	Local Enabling (Entry)	
Primary Investment Driver	Connection of customer-driven onshore wind generation	
Licence Mechanism/ Activity	Special Condition 3.14 Medium Sized Investment Projects Re-opener and Price Control Deliverable/ Clause 3.14.6 (a)	
Materiality Threshold exceeded (£3.5m)	Yes, as a single project due to the threshold for activity 3.14.6 (a)	
PCD primary Output	Generation: (MW)	
Total Project Cost (£m)	15.159	
Funding Allowance (£m)	To be confirmed	Requested £15.159m
Delivery Year	2024/25	
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 Stage 2 document.

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Table of Contents

1. Abbreviations / Terminology

Table 1: Table of Abbreviations

Abbreviation	Term
ACM	Asbestos Containing Material
AIS	Air Insulated Switchgear
BEIS	Department for Business, Energy & Industrial Strategy
CDM	Construction Design and Management
CEC	Connection Entry Capacity
CION	Connection and Infrastructure Options Note
CT	Current Transformer
ESO	Electricity System Operator
GSP	Grid Supply Point
ITT	Invitation to Tender
Km	Kilometre
kV	Kilovolt
LC	Licence Condition
LSpC	Licence Special Condition
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
OHL	Overhead Line
PCD	Price Control Deliverable
RIIO	Revenue = Incentives + Innovation + Outputs
SCADA	Supervisory Control and Data Acquisition
SGT	Supergrid Transformer
SHET	Scottish Hydro Electric Transmission
SPT	SP Transmission
SPEN	SP Energy Networks
STC	System Operator – Transmission Owner Code
VDUM	Volume Driver Uncertainty Mechanism
VT	Voltage Transformer

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	SPT-RI-263 - Coalburn SGT4

3. Introduction

In January 2022 SP Transmission (SPT) submitted a Medium Sized Investment Projects (MSIP) Re-opener application to Ofgem, setting out its plans to carry out reinforcement work at Coalburn 400/132kV Substation within the RIIO-T2 period (April 2021 – March 2026). These works comprise reconfiguration and the installation of a fourth Supergrid Transformer (SGT) at Coalburn 400kV Substation, increasing the substation capacity and enabling the connection of 288MW of contracted onshore wind generation.

In line with the provisions of the RIIO-2 Re-opener Guidance and Application Requirements Document[1] and as agreed with Ofgem, SPT separated the MSIP Re-Opener application into two stages:

> Stage 1: providing full justification for the preferred investment option, together with a detailed description of the proposed solution; and
>
> Stage 2: a further submission, to be made at the right time, relating to the associated amendments to the outputs, delivery date and allowances to be detailed as a Price Control Deliverable (PCD) in LSpC 3.14 Appendix 1.

SPT's MSIP Re-opener application submission of January 2022 formed Stage 1 of this application[2].

In April 2022 Ofgem published its provisional decision on its first stage assessment of SPT's MSIP Re-opener application, noting "*the installation of a fourth 360MVA Supergrid Transformer (SGT) and the subsequent substation works represent the optimal option for the consumers"*[3].

This document, which should be read in conjunction with the Stage 1 submission referenced above, forms SPT's Stage 2 submission as part of the MSIP Re-opener application, submitted in accordance with Licence Special Condition (LSpC) 3.14.6 and relates specifically to LSpC 3.14.6 activity (a):

"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:

(a) a Generation Connection project, including all infrastructure related to that project, the forecast costs of which are at least £4.24m more or less than the level that could be provided for under Special Condition 3.11 (Generation Connections volume driver)"

Applying the RIIO-T2 Generation Connections Volume Driver Uncertainty Mechanism (VDUM) to this project results in the £15.16m estimated total project cost being £8.77m higher than the £6.39m allowance provided by the VDUM. An MSIP Re-opener application therefore remains required.

3.1 Structure of Document

This MSIP Re-opener application is structured as follows:

Section 4 – Background and Needs Case

The background and need case for the proposed works was described in detail within the SPT's Stage 1 MSIP Re-opener application submission of January 2022. This section therefore summarises only relevant updates in the period since the Stage 1 submission.

[1] RIIO-2 Re-opener Guidance and Application Requirements Document: Version 2
[2] 2022-01-31 Coalburn - Stage 1 MSIP Reopener Application
[3] Provisional decision on the first stage assessment of SPT's MSIP re-opener application

Section 5 – Proposed Works

The description of the proposed solution and project scope was described in detail within the SPT's Stage 1 MSIP Re-opener application submission of January 2022. This section therefore summarises only relevant refinement and confirmation in scope in the period since Stage 1 submission.

Section 6 – Project Cost Estimate

This section summarises the estimated cost of the selected option.

Section 7 – Project Delivery

This section outlines the approach which is being taken to deliver the project.

Section 8 – Conclusions and Recommendations

This section summarises the conclusions and includes recommendations to be taken.

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, 3.11
5	Proposed Works	3.14
6	Project Cost Estimate	3.12, 3.19, 3.20
7	Project Delivery	3.15, 3.16, 3.17

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

4. Background and Needs Case

SPT's Stage 1 MSIP Re-opener application submission of January 2022 (Section 4) described in detail the background and needs case for the proposed works. Both the needs case and proposed works were supported by Ofgem in its provisional decision of April 2022.

This section therefore summarises only relevant updates in the period since the Stage 1 submission.

The need case for the proposed works remains unchanged.

4.1 Coalburn 400/132kV Substation – Connection of Additional Onshore Wind Capacity

As described in Section 4.4 of the Stage 1 submission, five developments totalling at that time 274MW, cannot be accommodated without reinforcement of the existing 840MVA inter-bus SGT capacity at Coalburn. The status of these five developments as at January 2022 is summarised in Table 4 below:

Table 4: Contracted Generation - Additional Inter-bus Transformer Capacity Required, January 2022

Site	Connection Status	Consent Status	Capacity (MW)
Hagshaw Hill Repower Phase 1	Contracted	Consented	30.0
Hagshaw Hill Repower Phase 2	Contracted	Consented	54.0
Douglas West Extension	Contracted	Consented	60.0
Cumberhead West	Contracted	Consented	100.0
Little Gala (via new Lesmahagow GSP)	Contracted	In progress	29.9
Total Capacity (MW)			**273.9**

In the period since the Stage 1 submission, the capacity of Cumberhead West Wind Farm has increased by 14MW, increasing the total onshore wind capacity dependent on the proposed works from 274MW to 288MW. Four of the five developments were also successful in securing Contracts for Difference (CfD) in Allocation Round 4, the results of which were announced by the Department for Business, Energy & Industrial Strategy (BEIS) on 7th July 2022[5]. The current status of the five onshore wind developments is summarised in Table 5 below:

Table 5: Contracted Generation - Additional Inter-bus Transformer Capacity Required, January 2023

Site	Connection Status	Consent Status	Capacity (MW)
Hagshaw Hill Repower Phase 1	Contracted	Consented with CfD	30.0
Hagshaw Hill Repower Phase 2	Contracted	Consented with CfD	54.0
Douglas West Extension	Contracted	Consented with CfD	60.0
Cumberhead West	Contracted	Consented with CfD	114.0
Little Gala (via new Lesmahagow GSP)	Contracted	In progress	29.9
Total Capacity (MW)			**287.9**

[5] BEIS - Contracts for Difference Allocation Round 4 Results

5. Proposed Works

SPT's Stage 1 MSIP Re-opener application submission of January 2022 (Sections 5 and 6) described in detail the scope of the proposed works. This scope of work was supported by Ofgem in its provisional decision of April 2022. This section therefore summarises only relevant refinement/ confirmation in scope in the period since the Stage 1 submission and provides a status update.

5.1 Confirmation of Project Scope

As described in the Stage 1 submission (Section 6), the most appropriate option to deliver the required capacity upgrade at Coalburn 400/132kV Substation is to install a fourth SGT. Along with installing the additional Supergrid transformer, the substation layout will be amended so as to balance the incoming load between the new and existing assets and resolve a fault level issue that would arise with the connection of additional generation. The layout at Coalburn 400/132kV Substation will be changed to create two 132kV busbar systems, 'Busbar System A' and 'Busbar System B'.

At the time of the Stage 1 submission, it was envisaged that Busbar System A would connect SGT1 and SGT2, with a non-firm thermal capacity of 480MVA and would serve Linmill GSP, whilst Busbar System B would connect SGT3 and SGT4, with a non-firm thermal capacity of 720MVA. It was noted in Section 6.1 b) however that this remained subject to final design confirmation, so as to ensure the parallel operation of SGT3 and SGT4 did not lead to fault infeed limits being exceeded.

Following engagement with the manufacturer of SGT4 regarding its impedance specification, the alternative arrangement indicated in the Stage 1 submission has been confirmed as necessary. This alternative arrangement increases the non-firm thermal capacity of 'Busbar System A' by 120MVA, from 480MVA to 600MVA, and reduces the non-firm thermal capacity of 'Busbar System B' by 120MVA, from 720MVA to 600MVA. The overall transformer capacity remains unchanged at 1200MVA. This change to ensure acceptable fault infeed performance will be achieved via the relocation of Coalburn SGT1 within the substation site (such that it will operate in parallel with SGT3) and the installation of the new 400/132kV 360MVA transformer in the current position of SGT1 (such that it will operate in parallel with SGT2).

The final proposed configuration at Coalburn 400/132kV Substation is indicated in Figures 1 and 2:

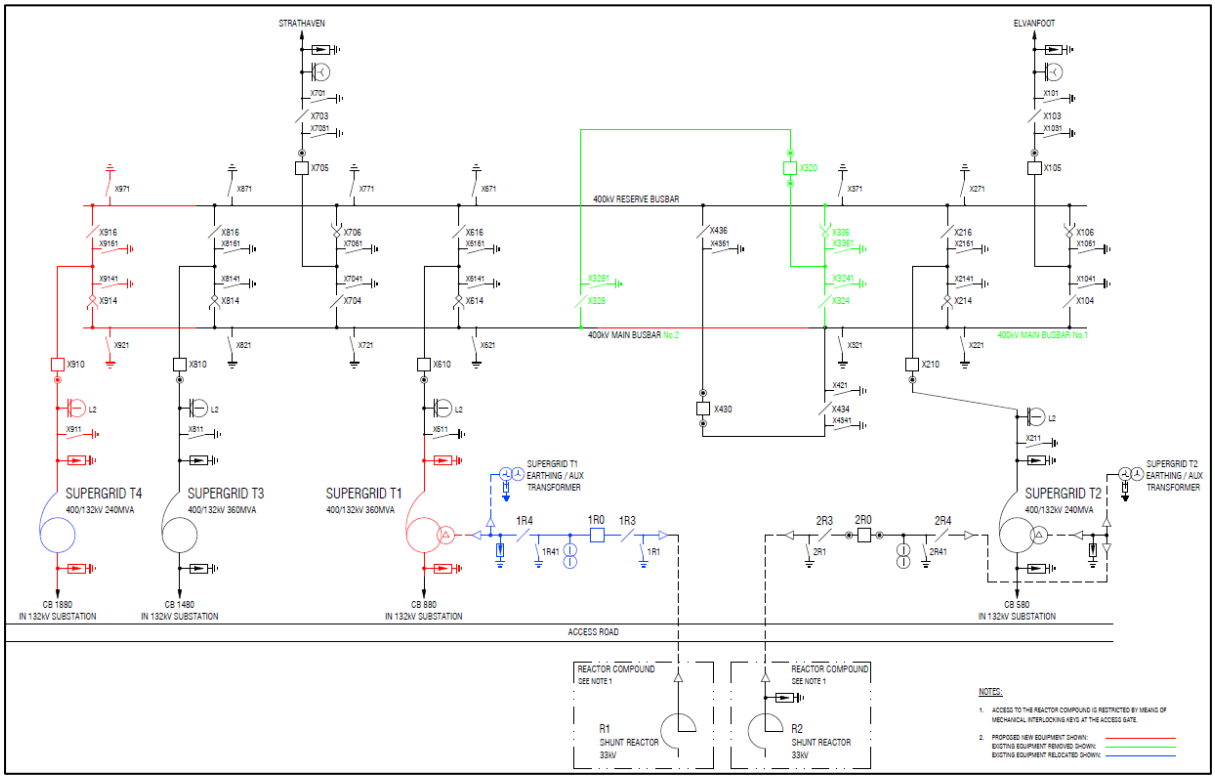

Figure 1: Proposed Configuration – Coalburn 400kV Substation

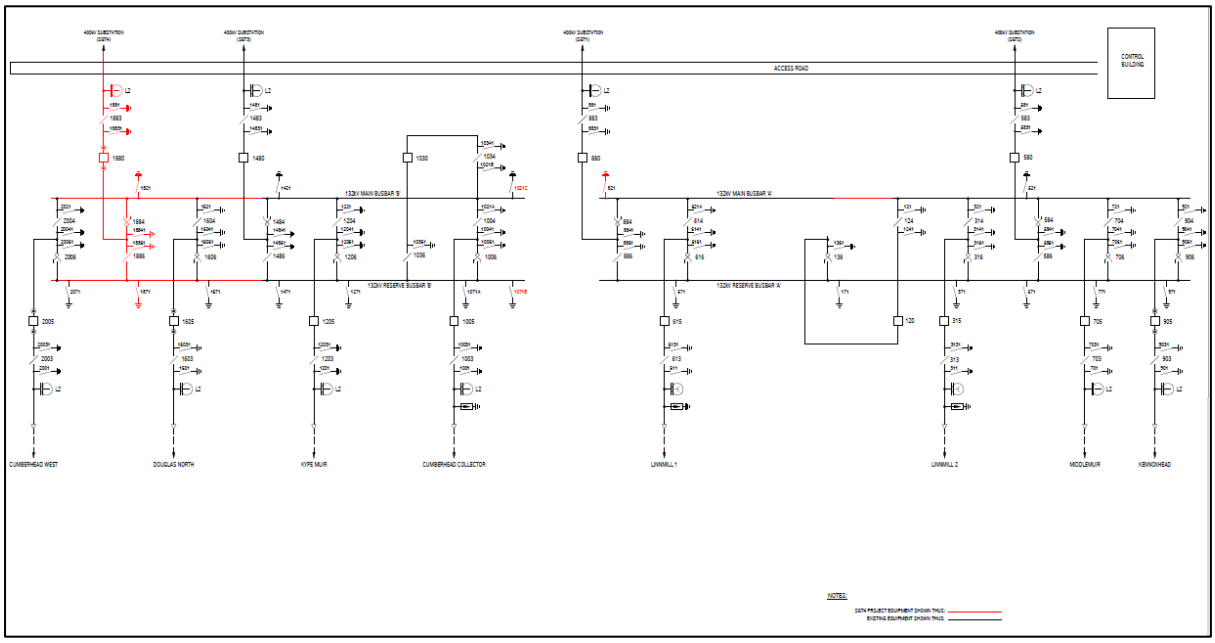

Figure 2: Proposed Configuration – Coalburn 132kV Substation

Volumes quoted within the associated "ET2 UM Submission Template" include works undertaken in 2021 to swap 132kV bays 6 and 10 (refer section 5.2 c)) which is not shown in Figure 2. This work required 2 off CVTs single phase CVT added in bay 6 and 2 off single phase CVT removed in bay 10.

5.2 Project Status Update

This section includes a brief status update on the proposed works described in the Stage 1 submission (Section 6):

a) Pre-Engineering Works

To date, all works have been completed as per Stage 1 submission including a condition survey of the SGT1 240 MVA transformer that now requires to be moved to the substation extension as explained in section 5.1.

b) Installation of Additional Supergrid Transformer

As an update from the Stage 1 submission, the new 360MVA transformer is on order with design reviews and manufacturing ongoing.

c) Substation Layout Changes

As an update from the Stage 1 submission, 132kV bays 6 and 10 have been swapped to move the Coalburn-Linmill 1 and (as was) Coalburn - Galawhistle 132kV circuits to the correct locations for the future 132kV board split (substation extension required). This work was done in October 2021 at the same time as the Coalburn- Galawhistle 132kV cable diversion and the TORI 155 Coalburn Linmill 1 cable upgrade to manage the work efficiently.

d) Protection & Control Works

Protection and control works are still required on both the 400kV and 132kV busbar systems to allow for the two 132kV boards to be implemented. Apart from the 132kV bay swap mentioned in sub-section c). no further works have been done to date.

e) Civil Engineering Works

As an update from the Stage 1 submission the platform extension works were completed in November 22 with civil works for the construction of new foundations/ducting/cable troughs/earthing and internal roads for the additional plant and transformer bund in the extension area ongoing.

5.3 Environmental and Consents Works

The following consents are now in place for the project:

- Planning consent from South Lanarkshire Council for the extension of the existing Coalburn Substation compound (the extension sits out with SPEN's original operational land area therefore Permitted Development Rights did not apply).
- Land purchase for the additional area required.

6. Project Cost Estimate

As agreed with Ofgem, a stage 2 submission will be made in January 2023 relating to the associated amendments to the outputs, delivery date and allowances to be detailed in LSpC 3.14 Appendix 1.

6.1 Estimated Total Project Cost

Aligned with the format of the Re-Opener Pipeline Log, Table 6 details expected energisation year and our current view of potential direct capital expenditure in RIIO-T2.

Table 6: Estimated Incidence of Expenditure

		Potential direct capex value per year, £m, 18/19 price base								
Energisation Year	Pre-RIIO-T2: direct capex	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
2024/25	0.179	2.327	4.726	5.638	2.289	0.000	0.000	0.000	14.980	15.159

6.2 Detailed Costs

Table 7 below provides a cost breakdown representing the latest view of Direct costs for the proposed investment, including details of the procurement strategy and the cost maturity for each contract.

Table 7: Direct Costs, Procurement Strategy and Cost Firmness

Contract Name	Contract Start	Current Finish Date	Cost (£m)	Procurement Strategy	Cost Firmness
[redacted]					

Contract Name	Contract Start	Current Finish Date	Cost (£m)	Procurement Strategy	Cost Firmness
[redacted]					

Contract Name	Contract Start	Current Finish Date	Cost (£m)	Procurement Strategy	Cost Firmness
[redacted]					
Total			**15.159**		

6.3 Procurement Strategy

SPT Procurement strategy follows a disaggregated model, within which contracts are disaggregated and tendered separately to maximise cost efficiencies. On this project the major contracts to be awarded are for Platform Enabling, Civil Works (in the extension area and original substation), electrical installation/commissioning Balance of Plant works and Cable Supply and installation for the Galawhistle 132kV circuit diversion.

SPT also procure several items of equipment directly with manufacturers, utilising ongoing frameworks SPT have in place with various suppliers. These frameworks are tendered competitively to achieve the best market rates and are valid for a period of 2 years, giving cost certainty and best market rates. The new 360MVA transformer was procured via a bulk order to obtain economies of scale.

Individual contract tendering details are included in the Table provided in Section 6.2.

6.4 Cost Maturity

Aligned with the classification outlined within the OFGEM LOTI Re-Opener Guidance Document published on 29th March 2021 Table 8 below includes the assessment of cost firmness.

Status of individual contracts is detailed in Table 7 provided in Section 6.2.

Table 8: Cost Firmness Assessment

Cost Firmness as per OFGEM classification	Total Direct Cost (£m)	Total Cost (%)
[redacted]		
TOTAL	**15.159**	**100%**

As it can be seen in Table 8, 60.7% of the total costs are either incurred already or have been contracted, giving high confidence in our cost submission.

6.5 Project Risk and Mitigation

Table 9 below provides a breakdown of the individual project risks followed by further detailed explanation regarding mitigation and likelihood.

Table 9: Risk Quantification

Risk	Description	Probability	Value (£m)
[redacted]			

[redacted]

6.6 Potential Volume Driver Allowance

Applying the RIIO-T2 Generation Connections VDUM to this project results in a £6.392m allowance provided by the VDUM. The allowance is calculated as per Table 10.1 below. Please note that this excludes the further allowance permitted under Licence Special Condition 3.36 Opex escalator to provide a better comparison to direct expenditure.

Table 10.1: Volume Driver Allowance

Volume Driver (*2018/19 price base)*		£m/unit	Unit	Volume Driver Allowance (£m)
Project	Fixed Cost	1.700	1.00	1.700
Shared Use	Generation Connection Capacity, MVA	0.010	360	3.600
	Cable <1km	1.820	0.6	1.092
Total				**6.392**

Table 10.2: Comparison of Volume Driver Allowance and Estimated Cost

		Potential direct capex value per year, £m, 18/19 price base								
Description	Pre-RIIO-T2: direct capex	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
Allowance	0.000	1.598	1.598	1.598	1.598	0.000	0.000	0.000	6.392	6.392
Cost	0.179	2.327	4.726	5.638	2.289	0.000	0.000	0.000	14.980	15.159
Variance	-0.179	-0.729	-3.128	-4.040	-0.691	0.000	0.000	0.000	-8.588	-8.767

The potential VDUM allowance for the project is lower than the estimated cost by £8.77m. This is more than £4.24m, which is the threshold set in LSpC 3.14.6(a) for consideration under this uncertainty mechanism.

6.7 Total Allowance Request

SPT requests that the following allowance is provided through the MSIP Re-opener mechanism to deliver the works described within Section 5. The (T2) allowance will be subject to the Opex escalator mechanism:

Table 11: Requested Direct Allowances

	Direct allowance requested per year, £m, 18/19 price base						
	Pre-RIIO-T2	Yr 21/22:	Yr 22/23:	Yr 23/24:	Yr 24/25:	Yr 25/26:	Total (£m)
Direct Allowances Requested	0.179	2.327	4.726	5.638	2.289	0.000	15.159

It is acknowledged that a portion of the investment occurred in RIIO-T1, however, there was no means to fund such works. It was not a T1 baseline scheme and the T1 uncertainty mechanism (LSpC 6F) could not fund as the output would be delivered in RIIO-T2.

6.8 Regulatory Outputs

It is proposed that the associated Price Control Deliverable is defined as follows:

Table 12: Price Control Deliverable

OSR	Scheme Name	Output	Allowance* Oncosted)	Delivery Date
SPT200200	SPT-RI-263 - Coalburn SGT4	Installation of Coalburn SGT4 (360MVA) and associated works at Coalburn 400/132kV Substation (as detailed in Figures 1 and 2 of this Stage 2 MSIP submission).	£17.19m	31st December 2024

*Include Indirect costs calculated using the Opex Escalator uplift (13.4%) on Direct costs.

7. Project 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 this project. We have assigned a dedicated Project Manager to this project who will be responsible for overall delivery of the scope and is the primary point of contact for all stakeholders.

7.1 Delivery Schedule

A standard approach has been applied to the planning phase of this project and that will continue for the reporting and the application of processes and controls throughout the project lifecycle. Table 13 summarises the key project milestones within the delivery schedule.

Table 13: Key Project Milestone

Milestone	Project Phase	Completion Date
1	ITT Main Platform Enabling Works	June 2021 - Complete
2	Award Main Platform Works	January 2022 - Complete
3	Consents Obtained	February 2022 - Complete
4	Commence Main Site works	April 2022 - Complete
5	Complete Site works	December 2024 - Forecast date

7.2 Alignment with other projects

The Coalburn SGT4 project is one of several projects at Coalburn 400/132kV Substation during the RIIO-T2 period. Other project works include:

- Coalburn Shunt Reactor R2 (installation of a 33kV 60Mvar shunt reactor); and
- New connection projects including:
    - Kennoxhead Windfarm
    - Cumberhead West Windfarm
    - TORI 251 Project for the revised 132kV connection of Douglas North substation to Coalburn substation

The works for Coalburn SGT4 will be co-ordinated with these other projects.

The capital expenditure estimate in Section 7.1 is incremental to the projects detailed above and is related to the installation of Coalburn SGT4.

7.3 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:

7.3.1 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.

7.3.2 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.

7.3.3 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.

7.3.4 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.

7.4 Stakeholder Engagement

SPT is committed to delivering optimal solutions in all of the projects we undertake. A key part of this is engaging with relevant stakeholders throughout the project development and delivery process. Stakeholders can include customers, regulatory bodies and other statutory consultees, national and local government, landowners, community groups, and local residents and their representatives (e.g., MPs, MSPs and councillors).

Community impacts associated with construction activities are considered at project initiation by completion of a Community Communications Plan, which details the stakeholders relevant to the project, the communication channels that will be used to engage with them, the information that will be provided to and sought from them, and the timescales over which this will happen. It considers any

particular sensitivities that may require increased stakeholder consultation and details specific events that will be held with stakeholders during the course of the project.

As part of this project, SPT has engaged with statutory consultees associated with the planning application for these works - the Local Authority, SEPA and NatureScot - and the third-party landowner Forestry Land Scotland. We have also engaged with the other stakeholders, including community councils and local residents.

Due to the location and nature of this project, no particular sensitivities or community impact issues have been identified, but a general level of interest from local representatives has been noted and we will continue to engage with them throughout the project.

Stakeholder engagement to date has informed the details of the construction and permanent drainage details for the works.

8. Conclusion and Recommendations

This MSIP Re-opener application demonstrates the need to carry out infrastructure work at Coalburn 400/132kV Substation, within the RIIO-T2 period (April 2021 – March 2026), to enable the timely and efficient connection of 288MW of contracted onshore wind generation.

The main conclusions of this submission are:

- The timely connection of low carbon generation, such as onshore 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 invest in transmission infrastructure at Coalburn 400/132kV Substation to facilitate the connection of 288MW of contracted onshore wind generation, this having been identified as the most economic and efficient option.

- Applying the RIIO-T2 Generation Connections VDUM to this project results in the £15.16 estimated cost being £8.77m higher than the £6.39m allowance provided by the VDUM. An MSIP Re-opener application is therefore required. Submission of this MSIP Re-opener application is aligned with the contracted connection programme.

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

- The option being progressed (supported by Ofgem in its provisional decision of April 2022) addresses a clear customer need and represents value to consumers.

- By virtue of being founded on market-tested costs, the proposed allowance value represents the real efficient cost of the works and should be fully funded.

- [redacted]