Scottish & Southern Electricity Networks

TRANSMISSION

Tealing PST Bypass

Medium Sized Investment Project (MSIP) Submission

January 2025

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Contents

Executive Summary

Project Name	Tealing Phase Shifting Transformer (PST) Bypass Project					
Investment Driver	[redacted]					
Start Year	2025					
End Year	2027					
Total Installed Cost Estimate (£m nominal prices)	[redacted]					
Total Installed Cost Estimate (£m 18/19)	[redacted]					
Cost Estimate Accuracy (%)	[redacted]					
Project Spend to date (£m 18/19)	[redacted]					
Spend Profile	**21/22**	**22/23**	**23/24**	**24/25**	**25/26**	**T3**
£m, 18/19 prices	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
£m nominal	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Table 1: Project Summary

This application is submitted in accordance with Part C of Special Condition 3.14 (Medium Sized Investment Projects (MSIP) Re-opener) of our Licence[1]. This application[2] presents the costs required to install two Phase Shifting Transformer (PST) bypasses on the Tealing-Kintore section of the SSEN Transmission network. The installation of the two PST bypasses on the XT1 feeder and XT2 feeder at Tealing substation will ensure continued power flow during instances when parts of the main network infrastructure are unavailable due to maintenance, upgrades, or faults, etc, [redacted]

This project is associated with the East Coast 400kV Upgrade project[3] and East Coast 275kV Upgrade project[4], both of which were included in our RIIO-T2 plan and for which we have a Price Control Deliverable (PCD) in our licence (Special condition 3.9). [redacted]. We have continued to keep under review the most appropriate way of providing the necessary resilience, and improvements in PST design has made it possible to integrate two bypasses, one for each PST, without requiring separate installations.

[1] Special Conditions to Scottish Hydro Electric Transmission Plc's Electricity Transmission Licence (20 October 2023)

[2] While the total cost of the project does not exceed the minimum threshold for an MSIP, this submission is being presented alongside other applications which have a cumulative value above 0.5% of ex ante average base revenue. Therefore, a MSIP remains the most appropriate funding mechanism for DLR.

[3] NOA code Is ECUP

[4] NOA code ECU2

[redacted]

- The works for the bypass of XT2 will be complete in [redacted]; and
- The works for the bypass of XT1 will be completed in [redacted].

[redacted]

[redacted]

We are seeking allowances of [redacted] around the Phase Shifting Transformers (PST) on the XT1 feeder and XT2 feeder at Tealing substation by 30 June 2027.

All costs in this submission are in nominal price base, however we have converted the total cost estimate and the spend profile into 18/19 prices within the table 1 above to ensure compliance with the Re-opener Guidance document.

We are requesting that the Opex Escalator (OE) is not applied to any of our MSIP or VISTA applications. We have previously provided Ofgem with evidence that the mechanism is no longer appropriate in this context.

1 Introduction

Scope

In accordance with Scottish Hydro Electric Transmission Plc's Special Licence Condition '3.14 Medium Sized Investment Projects Re-opener and Price Control Deliverable (MSIPRE)' we are submitting this reopener application in line with paragraph [redacted]

This document sets out the optioneering and cost justification for Tealing PST Bypass project, which forms part of our overarching MSIP application. This project meets the materiality thresholds set out within the Licence.

Figure 1: Kintore to Tealing Map Reference

As part of our RIIO-T2 program, [redacted] we have identified the need for two bypasses on the Tealing-Kintore section of the SSEN Transmission network.

This project will deliver a bypass solution on the Phase Shifting Transformers (PST) on the XT1 feeder and XT2 feeder at Tealing substation to ensure continued power flow during instances when parts of the main network infrastructure are unavailable [redacted]

The bypass scope will consist of the following key elements:

- Three 275kV RCP Disconnectors with Integral Earth Switch for XT1 circuit
- Three 275kV RCP Disconnectors with Integral Earth Switch for XT2 circuit
- Busbar modifications, including new Post insulators for final design
- Associated Civil works for the new equipment, modification to existing ducting, trough and drainage works.
- Modifications to the protection schemes and SCADA system for both PST1 and 2

[redacted]

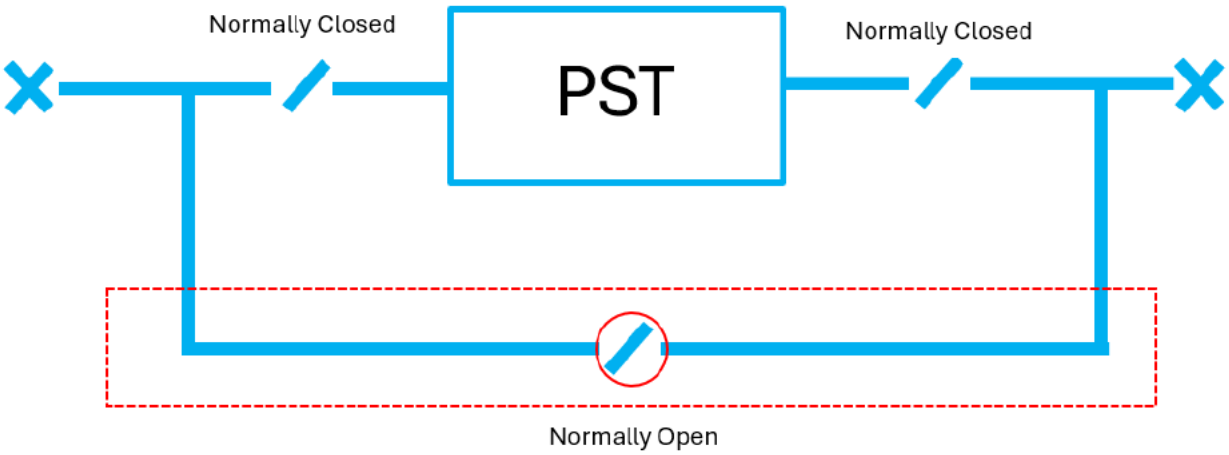

Figure 2: PST with Bypass Illustration

Structure and content of MSIP Submission

This document focuses on the option assessment and preferred solution for the Tealing PST Bypass and is structured as follows:

Section 1: Project Introduction

This section provides an overview of the project background. We provide the reasons why the project is necessary. We present the planned activities and include background information (and outputs) that give emphasis to the need for the works.

Section 2: Project Investment Driver

This section explains the rationale behind the project, outlining the key drivers that necessitate its development.

Section 3: Optioneering and preferred solution

This section presents all the options considered to address the need. It presents a summary of the process undertaken to identify the preferred technology along with the clear criteria used to assess the various options. The preferred solution is described in terms of key features including how that option has addressed the need.

Section 4: Stakeholder engagement

This section includes evidence on the stakeholder engagement activities undertaken (and planned) in relation to the proposal. It has not been limited to stakeholders who are materially affected.

Section 5: Delivery

This section outlines the approach for implementing the project, including key milestones, timelines, and coordination with other planned works. It details how the project will be managed, the governance framework in place, and the measures taken to ensure efficient execution.

Section 6: Procurement Strategy

This section explains our approach to procurement for the project.

Section 7: Cost information

This section includes evidence of expenditure justification, cost drivers, forecasting, risk, and mitigation while outlining the costing approach and rationale for each project element.

Section 8: Conclusion

This section provides summary detail of the selected option. It sets out the scope and outputs, costs and timing of investment and where applicable other key supporting information. The conclusion clarifies the next steps and reiterates critical timeline of project and key milestones such as Ofgem decision.

Requirement Mapping

Licence and Guidance Requirement	Submission Section
Statement setting out what MSIP the application relates to	Section 1
Amendments requested to outputs, delivery dates or allowances	Section 5
Clear statement on needs case	Section 2 & 3
Justification of technical need and, where relevant, the consumer benefit that the MSIP is expected to deliver	Section 2
Explanation of options assessment	Section 3
Clear description of preferred option	Section 3
Clear description of stakeholder engagement and whole system opportunities	Sections 4
Statement that costs (incurred or expected) exceed the Materiality Threshold, but are less than £100m	Executive Summary
Statement that costs are confined to those incurred or expected on or after 1st April 2021	Section 6 & 7
Explanation of the basis of the calculation any amendments requested to allowances	Section 7

Table 2 - Requirement Mapping

2 Project Investment Driver

Key Points

[redacted]

Investment Driver

The installation of one bypass per PST at Tealing, with a total of two PSTs, is critical to fulfilling our role in supporting the UK and Scotland's Net Zero ambitions, as outlined in our RIIO-T2 business plan, A Network for Net Zero. [redacted]

When the T2 Business Plan was drafted back in 2019, it included a request for allowances to reinforce the transmission network in the east and north-east of Scotland. This included the East Coast Onshore 275kV Upgrade; East Coast Onshore 400kV Incremental Reinforcement; and the North East 400kV projects. At this point in time, we were aware of the potential need to install the PST Bypasses at Tealing but the need for this system protection was not fully confirmed, or understood, at the time of writing the East Coast Reinforcement Engineering Justification Papers. In addition to this, there were space constraints at the Tealing substation which meant that the inclusion of the PSTs together with the bypasses was not feasible, and extending the site was not an option due to constraining features on all sides. Therefore, we would have had to site the PSTs at a satellite location at a material increase in cost, increased delivery timescales and the possibility of planning being rejected.

The decision was made to submit the East Coast Reinforcement EJPs in the T2 plan without the Tealing PST Bypasses included, whilst we undertook further analysis and development of the need and options for installation. The intention was to request further allowances through a T2 reopener mechanism for this PST bypass once a preferred solution had been identified which is what we are now doing through this MSIP 2025 submission.

When the double circuit from Kintore – Fetteresso – Alyth – Kincardine is upgraded to 400kV (as part of the East Coast Upgrade (ECUP) project), the 275kV double circuit between Kintore and Tealing [redacted]

Key Drivers for the Tealing Bypass

[redacted]

[redacted]

Future-Proofing the Network:

- [redacted] the Tealing bypass will deliver enduring benefits by enabling maintenance or fault-related outages of the PSTs without taking the 275kV overhead lines (OHLs) offline. This flexibility reduces system constraints and associated costs.

Alignment with Business Strategy

The project is aligned with SSEN Transmission's RIIO-T2 business strategy (Figure 3 Our Five Clear Goals), and will deliver the following outputs and benefits:

[redacted]

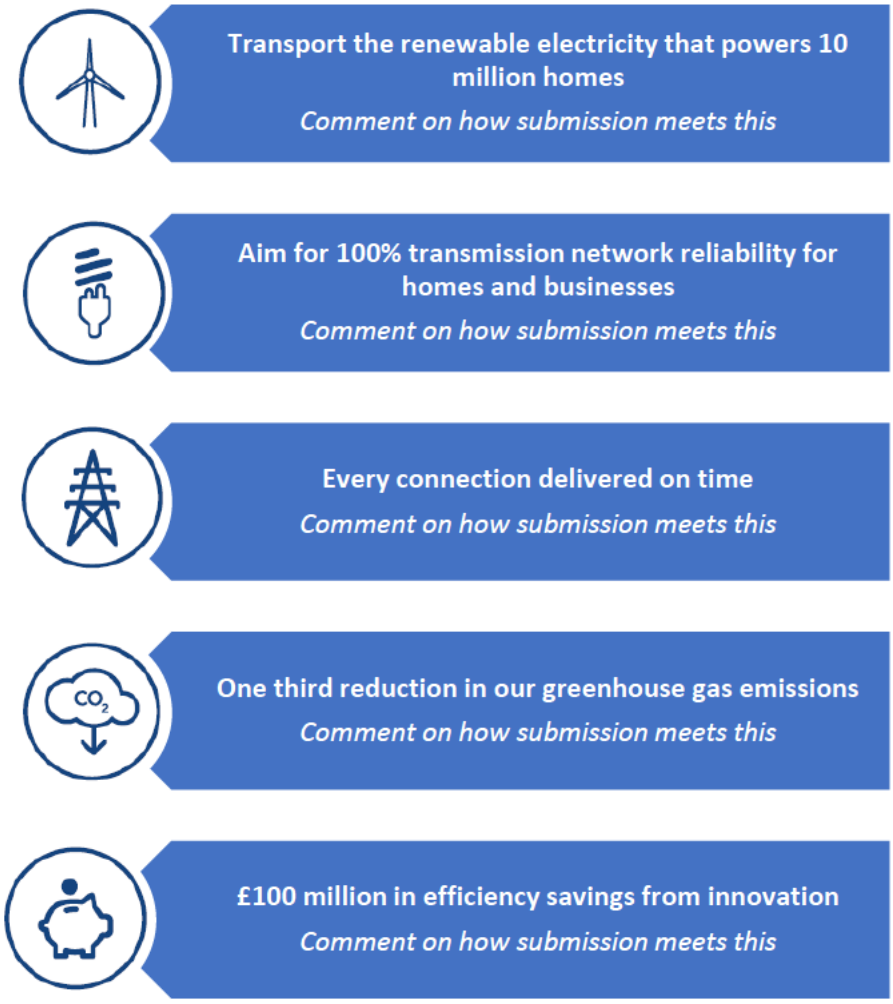

Figure 3: Our Five Clear Goals

3 Optioneering & Preferred Option

Key Points

[redacted]

[redacted]

Initially, space constraints at the design stage made it infeasible to include two bypasses within the Tealing substation. At the time, available Phase Shifting Transformer (PST) designs were significantly larger, requiring additional space and necessitating a separate satellite compound to accommodate both PSTs and bypasses, which would increase project cost, risk and complexity. However, with advancements in PST design maturity, the units have become more compact, allowing for better alignment with the available space and engineering requirements. This improved design has allowed for the integration of the bypasses at Tealing without requiring separate installations.

[redacted]

Detailed Analysis

[redacted] The options we considered to meet this need are summarised in the table 3.

[redacted]

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[redacted]

Commentary and proceed decision on each of the options listed in table 3 is provided here.

Option A: Do nothing – Discounted

[redacted]

Option B Manual busbar installation – Discounted

[redacted]

Option C: Switched bypass – Progressed

[redacted]

Preferred Option

The bypass option is the only identified option that addresses the critical requirements [redacted]

The main element of the scope is as follows:

- Three 275kV RCP Disconnectors with Integral Earth Switch for XT1 circuit;

- Three 275kV RCP Disconnectors with Integral Earth Switch for XT2 circuit;
- Busbar modifications, including new Post insulators for final design;
- Associated Civil works for the new equipment, modification to existing ducting, trough and drainage works; and
- Modifications to the protection schemes and SCADA system for both PST1 and 2.

[redacted]

The project is managed in line with our Large Capital Project governance framework, ensuring it is governed, developed, approved and executed safely. As part of this governance, a project programme and Project Development Plan are in place to ensure adequate resourcing, clear reporting mechanisms, and adherence to a structured schedule.

[redacted]

4 Stakeholder Engagement

Key Points

- We ensure meaningful and transparent engagement with stakeholders, including local communities, energy partners, and internal teams, to maintain trust and deliver infrastructure projects aligned with Net Zero goals.
- The Tealing PST Bypass Project, located within the existing substation, is designed to minimise disruption. Previous community engagement, including information sessions and regular updates, has fostered open communication, a practice we will continue throughout the project.
- [redacted] and leveraging local supply chains, we aim to support local economic development while collaborating with NESO and other Transmission Operators to share learning and advance innovative, efficient solutions.

Our Commitment to Stakeholder Engagement

We understand it is essential that key stakeholders, including local communities, and their representatives understand the need for, and benefits of, any proposed programme of works relating to the Transmission Infrastructure in our license area. In addition, we arrange regular external assurance audits on our Stakeholder Engagement Strategy and delivery plans to ensure we are operating to the highest standards of stakeholder engagement.

We work hard to ensure stakeholders' views are considered throughout the development of our projects. In this chapter, we will describe our approach to engagement for the Tealing PST Bypass and outline our ongoing commitment to engaging with interested or impacted stakeholders in an effective and timely way.

Our Stakeholder Engagement

Tealing Bypass

The adjacent key stakeholder groups were identified as having a direct or indirect interest, impact or influence, in the project development.

We will continue to review this to ensure relevant stakeholders are included across each stage of the project development, implementation, and operational lifespan to ensure they remain informed of the project progress, understand the underlying aims of the project and that their views are considered in any decision making.

Figure 4 – Stakeholder groups

As the Tealing PST Bypass Project will sit fully within the existing Tealing substation, we expect this will cause minimal, if any, disruption to local communities during installation and maintenance. We have not engaged with communities specifically on this stage of the Tealing PST Bypass Project. However, Community Liaison Manager, present throughout the overarching 275KV and 400KV east-coast line upgrades, has provided a point of contact for community members to raise questions throughout the project. An in-person community information session was held in 2023 in the Edzell Community, plus there are regular updates on the project website, to keep community members informed, while also explaining the resultant wider benefits of our work to consumers. We have worked hard to ensure there has been ongoing open and honest engagement on this project and this level of commitment will continue throughout the duration of the Tealing PST Bypass Project.

Wider engagement, with energy partners and stakeholders including the National Energy System Operator (NESO), other Electricity Transmission Operators, generators and politicians, has shown there is broad consensus that the evolution of a smarter, more flexible, electricity grid will be required to meet the changing needs of GB as it adapts to deliver Net Zero. [redacted] Continued ongoing engagement with the NESO will ensure we are following their guidance across each stage of project development.

Throughout the development process we have carried out extensive internal engagement across our multi-disciplinary teams to ensure innovation, best practice and efficiencies are adopted which protect end consumers from any unnecessary costs. We will also collaborate with other Transmission Operators (TOs) to share learning where similar projects are being developed to help meet Scottish and UK carbon emissions targets.

We are committed to ensuring we develop an efficient and coordinated network which delivers significant economic benefits for the local communities which host our infrastructure. [redacted]

Stakeholder Engagement Next Steps

Our next steps regarding stakeholder engagement on the Tealing PST Bypass Project are primarily around:

- Working with our supply chain to deliver and install the required materials.
- Communicating with communities surrounding the site of works to minimise any disruption.
- Sharing learning with other Transmission Owners (TO's) and the NESO for consideration when developing similar projects.

5 Delivery

Key Points

[redacted]

Overview of Chapter

The purpose of this section is to outline the approach that the project has developed to demonstrate our readiness to deliver this project. This covers the following:

- Our governance framework – how we will work together and the tools we will deploy to ensure that the project is governed, developed, approved and executed in a consistent and effective manner;
- Our project structure and leadership – how the project is effectively structured for the construction stage;
- Our project delivery plan and approach – what we will deliver and by when, including key dates and dependencies.

Our application of SHESQ (Safety, Health, Environment, Sustainability and Quality) measures will ensure we execute the project with these considerations at the forefront of our approach.

Our principal focus in project delivery will always be ensuring the safety of our people, our contractors and the public. As a company, we are committed to meeting all our obligations regarding: planning consents; protecting and enhancing the environment; improving sustainability practices; the application of technical and quality standards; accurate statutory and regulatory reporting of the project's performance; and, to ultimately provide an economic, efficient and timely solution that meets the needs of consumers now and for the operational life of the assets.

Large Capital Project Framework

It is critical that all major investment projects are governed, developed, approved, and executed in a consistent and effective manner whilst achieving safe, sustainable, and timely execution of major projects/portfolio. The financial governance threshold for Large Capital Projects in SSEN Transmission is a project investment value greater than £10 million (nominal). The Tealing PST Bypass project is being developed and executed in accordance with the principles of SSEN's Large Capital Projects Governance Framework manual (MA-COR-LCP-001) and the Gate Keeping Procedure (PR-COR-LCP-020).

A stage and gate procedure structure as identified in the LCP framework governs the entire lifecycle of the project undergoing five stages to completion as illustrated within Figure 5 below.

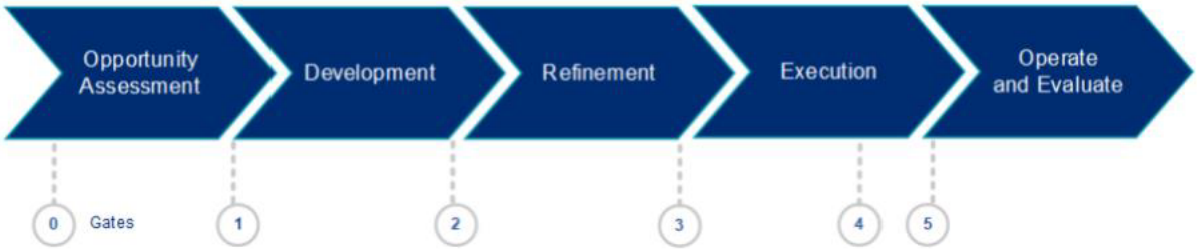

Figure 5 – LCP Governance Framework

The process is phased with six gates (0-5) at appropriate decision points, with clear consistent deliverables for each gate. This section will focus on the specific Procurement and Commercial deliverables contained therein.

This submission is based on the position as of January 2025. The delivery programme will continue to be developed ahead of Gate 3 in Spring 2025, after which construction activity will begin.

Governance Framework

Given the strong links with the East Coast 275kV project we will be using existing governance arrangements that have already been established for that project. Project Review Boards (PRBs) are in place, and this project will be incorporated within and integrated into the well-established governance framework.

Appropriate Project, Construction Management and Engineering teams are already in place in line with our East Coast 275kV project to fulfil our duties and legal responsibilities as both the Client and Principal Designer.

The Tealing PST Bypass project will require a significant level of both internal and external interface management due to the technical nature of the work and the close links to other works being carried out on the same site. An interface management plan will be incorporated into the existing plan under the East Coast 275kV project ahead of construction, ensuring effective management of interfaces relating to construction, Safety Health and Wellbeing and Quality (SHEQ) teams.

Delivery Programme

The project is at a critical juncture. We are working to refine and agree a delivery plan with the principal contractor ahead of Gate 3 in Spring 2025:

[redacted]

- [redacted].

[redacted] This approach will minimise the disruption to consumers and keep costs efficient. Design work has already commenced.

[redacted]

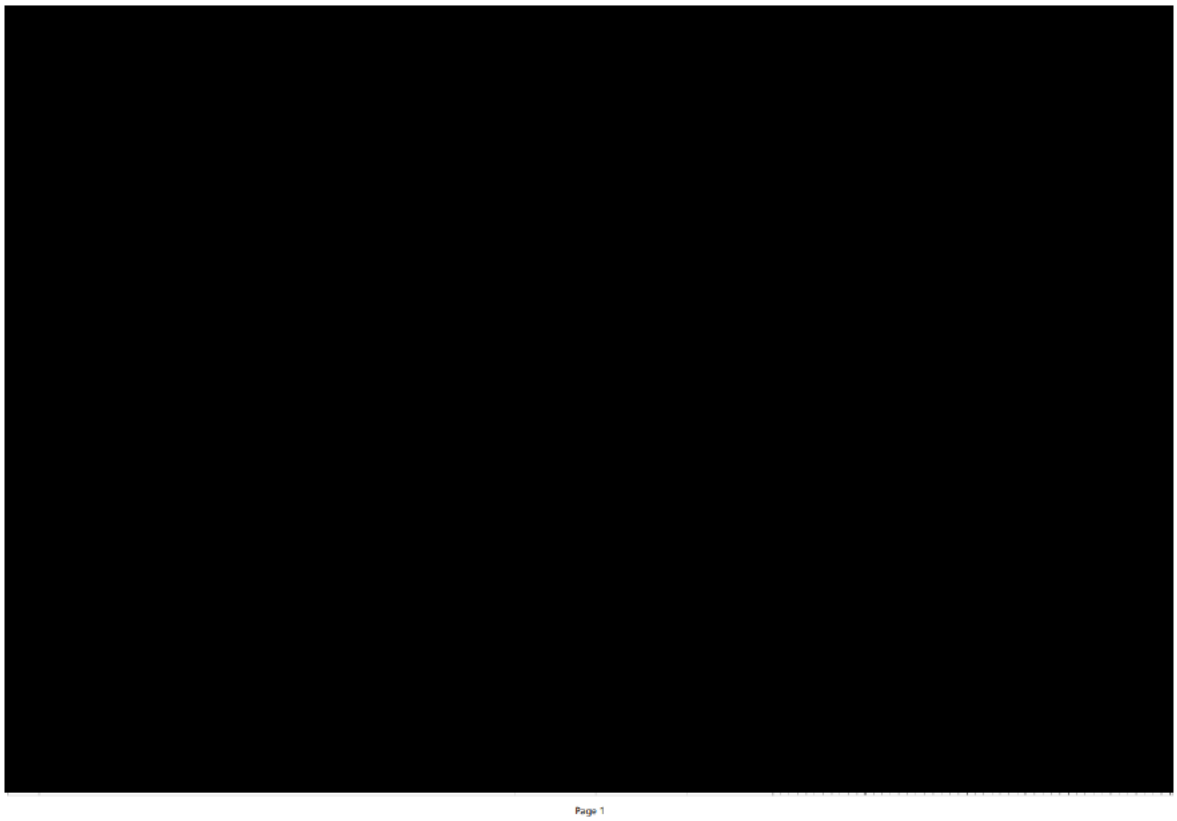

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Figure 6 – Tealing PST Bypass Delivery Summary

6 Procurement Strategy

Key Points

- [redacted]
- The project also leverages planned outages under the East Coast 275kV project to minimise additional network disruptions and ensure efficient project integration.
- [redacted]

[redacted]

[redacted]. Moreover, the existing site establishment and infrastructure under the East Coast 275kV project allows for seamless integration of the bypass works, reducing setup time and avoiding unnecessary disruptions.

This also allows us to utilise, where possible, the existing planned outages under the East Coast 275kV project to facilitate certain works for the bypass project. This approach minimises the need for additional outages on the network, ensuring efficient coordination between the two projects and reducing potential disruption to network operations.

The project is currently at a critical juncture regarding contractor costs. [redacted]

[redacted]

Table 4 - Procurement Cost Package (Nominal Prices)

7 Cost Information

Key Points

[redacted]

General Assumptions

The general assumptions that have been made in developing the cost estimate provided as part of this submission are listed below:

[redacted]

Costing Approach & Cost Breakdown

The current cost estimate (which is set out in detail in the accompanying cost template) is made up of:

[redacted]

- [redacted]

Contractor costs

[redacted]

[redacted]

[redacted]

Internal costs

[redacted]

Cost breakdown

[redacted]

Area	Cost Estimates (£m Nominal)	% of Project Costs
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]

Table 5. Class 3 Cost Estimates Breakdown

Risk

The Tealing PST Bypass project is managing risk in accordance with ISO31000, the International Standard on Risk Management, and the main principles outlined in SSE's Large Capital Projects (LCP) Governance Manual.

The Project Management Plan incorporates the Risk Management plan, which sets out the approach and processes the project will use to manage risk (both threats and opportunities) over the lifetime of the Project. This includes the key risks (threats and opportunities) faced by the project. [redacted]

[redacted]

Risk owners can simultaneously access the RMIS, which is an ongoing project activity designed to ensure that risk data is captured, kept up to date, and can be used to support project decision making. To supplement the ongoing updates to the RMIS, the Tealing PST Bypass project team holds strategically timed risk workshops. These workshops are used to collectively review and challenge the Project Risk Register ahead of each key gate stage.

The development of the project risk register follows the principles of the LCP Governance Gated Process Manual. The risk register is a live document that evolves through continuous updates and contributions from the project team over the lifecycle.

Risk will be reviewed by the Project Manager with:

- Updated reports detailing the status of Risks and Actions to highlight risks/ actions requiring attention; and
- Monthly report, showing risk progress (new risks, opportunities, new actions, and closed items); risk gaps, usage, quality of the information being recorded and where the risk focus needs to be going forward for the Project.

Key project risks	Proposed Mitigation
[redacted]	[redacted]
[redacted]	[redacted]

[redacted]	
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]

Table 6: Key Project Risk Breakdown

[redacted]

Future Cost Update

[redacted]:

- [redacted] and
- [redacted].

8 Conclusion

The Tealing PST Bypass project is a critical investment necessary to meet [redacted]

[redacted]

Stakeholder engagement for the Tealing development was conducted through the broader engagement activities for the overarching 275kV and 400kV East Coast Upgrade projects. This approach ensured that stakeholders were informed about the project within the context of the wider infrastructure improvements, rather than through a separate, Tealing specific engagement process. Engagement with local communities, energy partners, and internal teams will continue to ensure smooth project delivery. [redacted], NESO, and other Transmission Operators supports efficient delivery and knowledge sharing.

The procurement strategy ensures seamless integration with existing works at the site, optimising efficiencies and mitigating risks associated with multiple contractors operating in a constrained environment. [redacted].

[redacted]

We are submitting the MSIP to secure the necessary allowances to deliver the Tealing PST Bypass project and ensure [redacted]. Our submission outlines the project's costings and funding requirements, supporting our request for an allowance of [redacted]

Scheme Name	Output	PCD Delivery Date	Allowance (£m) (Nominal Price Base)
Tealing PST Bypass (PT001176)	Complete installation of a bypass around the Phase Shifting Transformers (PST) on the XT1 feeder and XT2 feeder at Tealing substation	30 June 2027	£14.712m

Table 7: Key Requested Price Control Deliverable

Glossary of terms

Appendix A

Acronym	Definition
BDUP	Beauly Denny Upgrade Project
ECUP	East Coast Upgrade Project
EJP	Engineering Justification report
[redacted]	[redacted]
[redacted]	[redacted]
LCP	Large Capital Project
MSIP	Medium Sized Investment Project
NESO	National Energy System Operator
NZ UIOLI	Net Zero Use-It-Or-Lose-It
OE	Opex Escalator
PCD	Price Control Deliverable
PRB	Project Review Bored
PST	Phase Shifting Transformers
SHESQ	Safety, Health, Environment, Sustainability and Quality
SHEQ	Safety Health and Wellbeing and Quality
SPT	Scottish Power Transmission
TORI	Transmission Owner reinforcement Instruction
TSO	Transmission System Operator

List of supplementary documents and evidence

Supporting documentation will be provided in due course

Appendix B