

400kV and 275kV Telecomms Resilience Project - OFGEM justification paper	
Name of Scheme/Programme	400kV and 275kV Resilience
Primary Investment Driver	Asset Health
Scheme reference/mechanism or category	SPNLT2055 Non-Lead Asset – Protection, Control, Telecoms and Metering
Output references/type	NLRT2SP2055
Cost	£ 19.4m
Delivery Year	2026
Reporting Table	C0.7 Non-load Master / C2.2a Scheme Summary
Outputs included in RIIO T1 Business Plan	No

Issue Date	Issue No	Amendment Details
July 2019	Issue 1	First issue of document
December 2019	Issue 2	Cost updated

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1 Introduction

Telecommunications are essential to provide both protection signalling and SCADA monitoring for the transmission network to ensure safe, reliable and secure electrical network management. Historically, copper pilot cables were the standard communications medium, but as technology has advanced, there has been a requirement to migrate towards fibre technology. This allows for greater data transmission and will therefore support the modern protection and communications protocols.

This paper proposes works to enhance the resilience of the telecomms network providing critical services for the main interconnected 275kV and 400kV systems.

The works will be carried out progressively over the RIIO-T2 period to maintain continuity of service.

2 Background Information

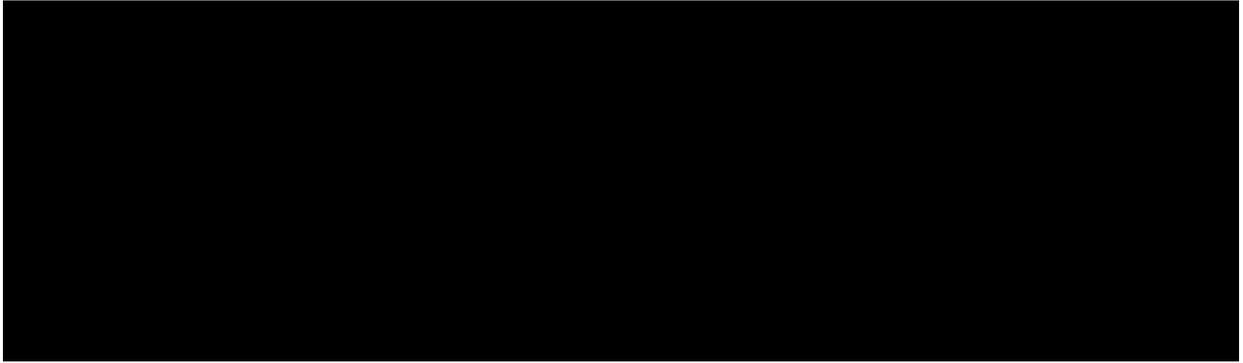
It is a requirement to enhance the existing provision of critical telecommunications services to SPT 275kV and 400kV substations.

The transition to renewable generation sources has seen significant changes to loading patterns on the network. The large capacity of predominantly wind generation results in very high transfers through the SPT area on high wind days with a corresponding reliance on imports at times of low wind generation. Security of supply to the whole of Scotland is susceptible to any disruption to, or loss of, circuits on the main interconnected system such that simultaneous loss of multiple communications services will have a significant impact to the electrical network. The increasing reliance on telecommunication services requires the enhancement of the SPT operational telecoms network to meet this requirement for increased resilience and reliability. The need for resilient telecommunications in the event of a widespread loss of power has also been assessed.

The following criteria have been proposed as the level of service required for the main interconnected 275kV and 400kV systems.

- 1) Any single failure of the telecoms network infrastructure should not result in any loss of 275/400kV circuits
 - a. Failure of equipment
 - b. Failure of a fibre cable
 - c. Failure of single power supply
- 2) The complete loss of a site should not result in the loss of any 275/400kV services that do not ingress or egress at that site.
 - a. Failure of all equipment on site
 - b. Failure of all fibre cables at a site
 - c. Failure of all power supplies at site

To deliver the above requirements, SPT engaged with other Transmission Owners (TOs) and telecommunications companies to determine the industry practice to ensure network resilience. The design principles below are proposed to be adopted in the proposed solution



3 Optioneering

The following is a summary of the options considered for this project.

	Option	Status	Reason for rejection
1	Do nothing: Maintain the existing telecoms network as is.	Rejected	Rejected on the basis that system security would be too compromised by this approach in both the short and long term and would not deliver the network resilience as required.
2	Diversity: Delivery of a diverse system to ensure that no single failure or any single site loss should reduce the telecoms network	Proposed	-

4 Detailed analysis

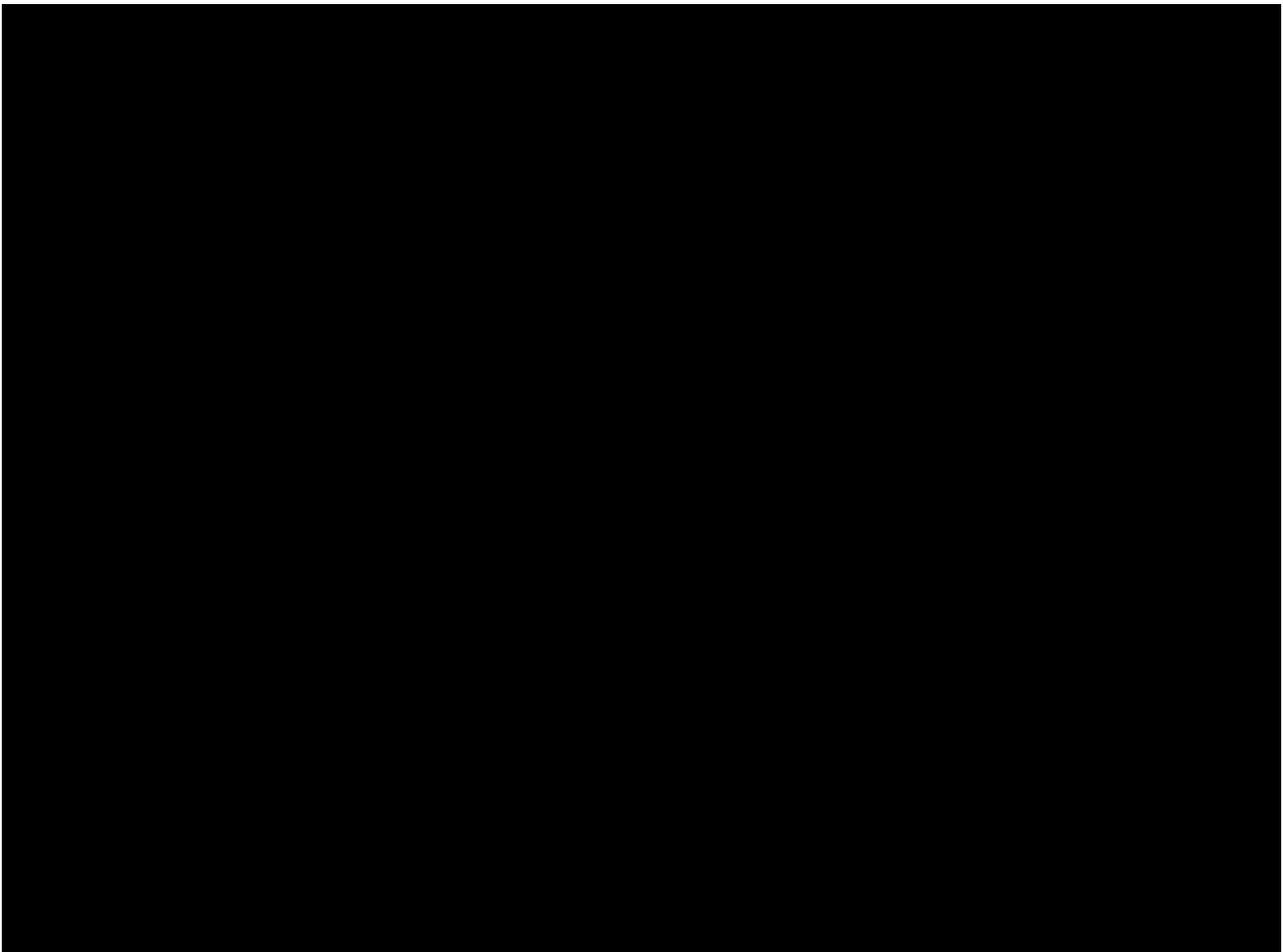
4.1 Selected option

The current operational telecomms systems have evolved over time as new requirements for protection, control, and other services have emerged. The short lives of this type of asset and the rapid pace of change in telecommunications technology have also led to a large number of varieties of service provision. Some of the limitations of technologies which are being superseded have been shown to impair the resilience of the services. The expected levels of logical separation and redundancy within the substation nodes have proven not to be realised. Further physical and logical separation has proven to be necessary to avoid telecomms and transmission network disruption from credible failures.

Option 2, the diverse RED/Back communications network, not only delivers the resilience that the transmission network requires, but also takes on aligns the practices of the onshore TOs to ensure that a wide consistent approach is delivered to the interconnected and interdependent networks.

4.2 Delivery Strategy

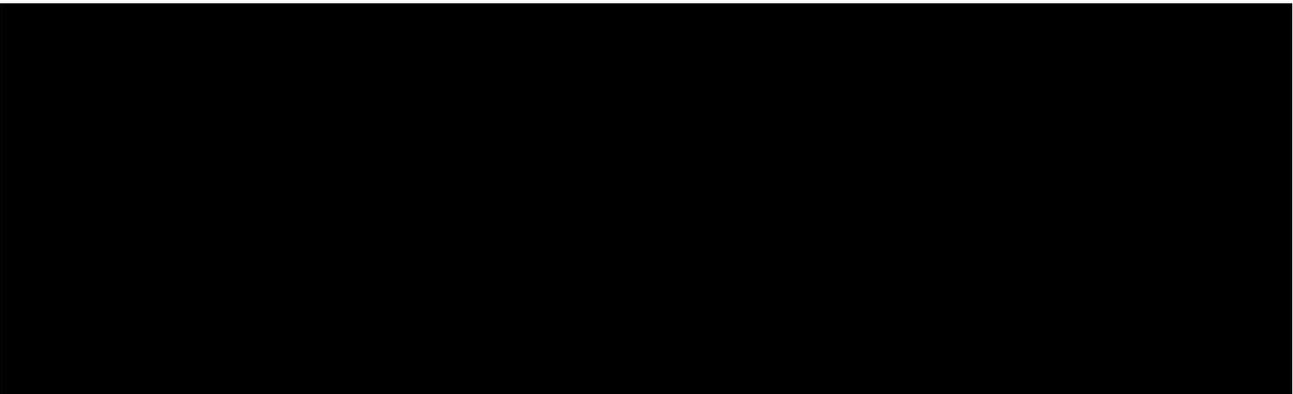
To achieve the required levels of resilience, the following scope of work is proposed for the delivery of the proposed solution



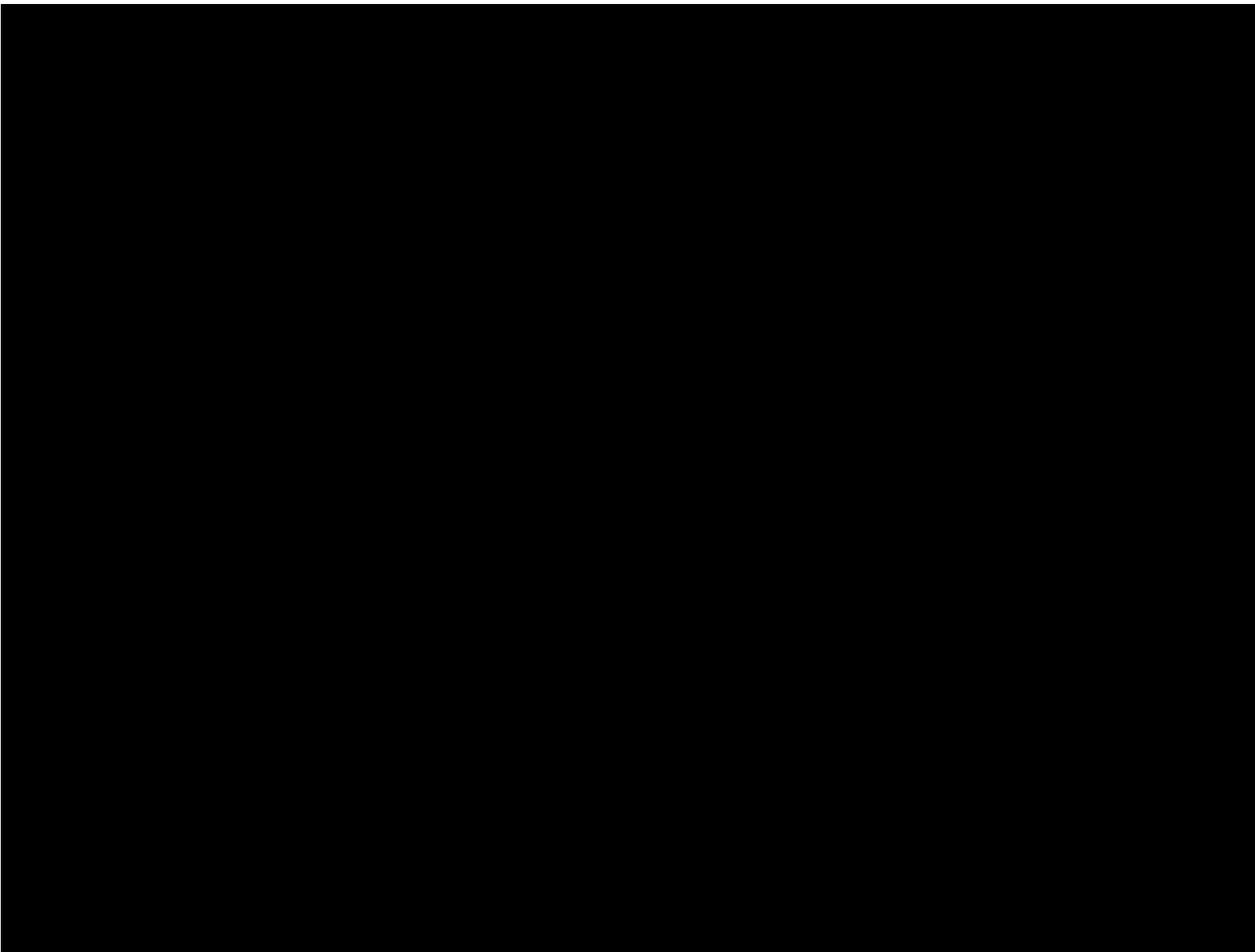


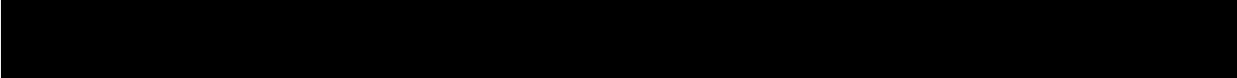
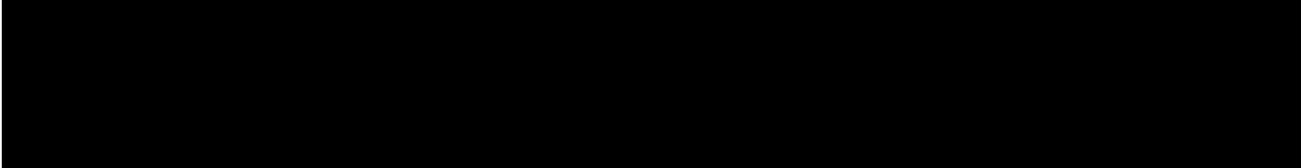
It is proposed to implement the mitigation as per the below outline plan.

2021 (RIIO-T2 Yr1)



2022-2023 (RIIO T2 Yr2 and Yr3)



**2024 (RIIO T2 Yr4)****2025 (RIIO T2 Yr5)****4.3 Environment & Sustainability**

The SPT sustainability approach is to prioritise reuse, then refurbish and finally replace if there is no other option. Within this project the same ethos will apply. As the project is mainly focussed on increasing reliance and introducing diversity, there will be a large volume of new equipment installed. However SPT will undertake assessments at each site to ensure that existing equipment is retained and used as part of the solution, or where made redundant but still operational, reused at another location.

4.4 Innovation

Innovation is a key component to deliver developments in all aspects of work. While the technology used in the project will be standard with a proven track record and the topology adopted in line with industry standards, SPEN will look to use innovate ways of project delivery and installation to deliver the reliant telecoms network required.

5 Conclusion

The transmission network is critically dependent on highly resilient and available telecomms systems. Telecomms assets and systems have evolved due to rapid technology changes and relatively short asset lives. Service experience has highlighted a need to enhance the telecomms network to meet the required levels of resilience and availability to facilitate the energy system transition

The proposed solution achieves this requirement and creates an aligned approach in the GB transmission system to deliver a resilient telecoms network for the future

- costs: £ 19.4 m
- Timing of investment: RIIO-ET2 period
- Declared outputs: N/A

6 Future Pathways – Net Zero

We have reviewed this project against the criteria set out within the business plan guidance and have assessed that it does not prevent achievement of our Net Zero plans or lead to stranded assets.

7 Outputs included in RIIO T1 Plans

N/A