Network Rail Innerwick Capacity Increase			
Name of Scheme/Programme	*Network Rail Innerwick Capacity Increase*		
Primary Investment Driver	*Load – Thermal Capacity*		
Scheme reference/ mechanism or category	*SPT20099* *SPT200100*		
Output references/type	*LRT2SP2037*		
Cost	• *£3.530m – total project costs* ○ Network Rail funded – £3.530		
Delivery Year	*RIIO T2 – 2023*		
Reporting Table	*B0.7 Load Master Data* *B4.2a Scheme Summary* *B4.5 Scheme Asset Data* *B4.5a Scheme Asset Data* *B4.6 Scheme Output Profile*		
Outputs included in RIIO T1 Business Plan	*No*		
Spend apportionment (£m)	**T1**	**T2**	**T3**
	0.793	**2.737**	**0.000**

Issue Date	Issue No	Amendment Details
July 2020	Issue 1	First issue of document – Draft Determination Update

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1. Introduction

An application has been received from Network Rail to provide an increase to the traction supply capacity of the Innerwick Feeder Station connected at Innerwick 132kV substation, located near Torness in East Lothian. The subsequent offer was accepted. A TO Construction Agreement (SPT-TOCO-567) is in place for these works. Network Rail have requested an increase from the current per-circuit half-hourly average capacity of 10MVA to 14MVA, with a 1-minute instantaneous peak load increase to 25.2MVA.

The primary driver for investment at Innerwick Feeder Station is the provision of an increase in demand supplied to Network Rail in response to a connection application received. In developing the proposed solution at the substation, we have worked collaboratively with Network Rail to ensure that the whole electricity system is considered and an economic, co-ordinated and efficient solution is selected.

2. Background Information

This paper supports the proposal for an increased demand connection by Network Rail at the Innerwick Feeder Station located in the East Lothian area. Network Rail currently have a 25kV supply from Innerwick Feeder Station consisting of 2 x 132/25kV, 10MVA transformers. The site is fed from Torness 132kV substation via 2 x 132kV underground cable circuits. Dunbar 132kV GSP is radially fed from this substation via the BK route, consisting of ~7.8km overhead line and ~3.7km underground cable, as shown in Figure 1.

Network Rail are seeking a demand connection capacity of 14MVA (30 min average) and 25.2MVA (1 min peak).

This engineering justification paper outlines the works proposed to facilitate the increase in demand thermal capacity that has been included in baseline funding as part of our business plan. Network Rail are already at present contracted to connect, with the associated works progressing through the project development phase.

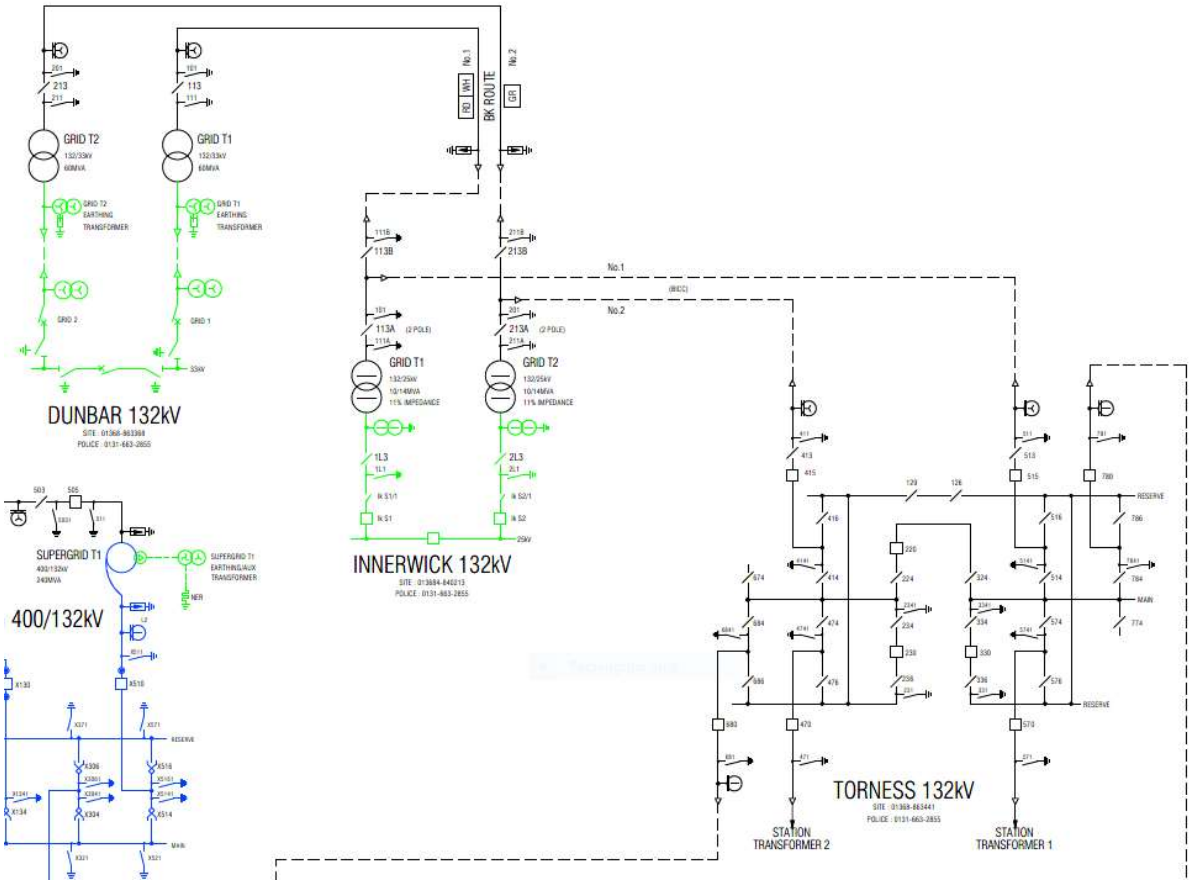

Figure 1. Existing 132kV network between Torness, Innerwick and Dunbar

3. Optioneering

The table below presents a summary of the options considered for this project.

	Option	Status	Reason for rejection
(a)	No Intervention	Rejected	Not compliant with SQSS.
(b)	Increase the rating of T1 and T2.	Rejected	Uprating of T1 and T2 has been investigated and it is not considered feasible to achieve the required 30 min average and 1 min peak ratings.
(c)	Replace Innerwick T1 and T2 with higher-rated units.	Proposed	-

4. Detailed Analysis

To accommodate the required increase in demand, the existing 132/25kV, 10MVA transformers will be replaced with new 18MVA units. A schematic of the proposed works is given in Figure 2.

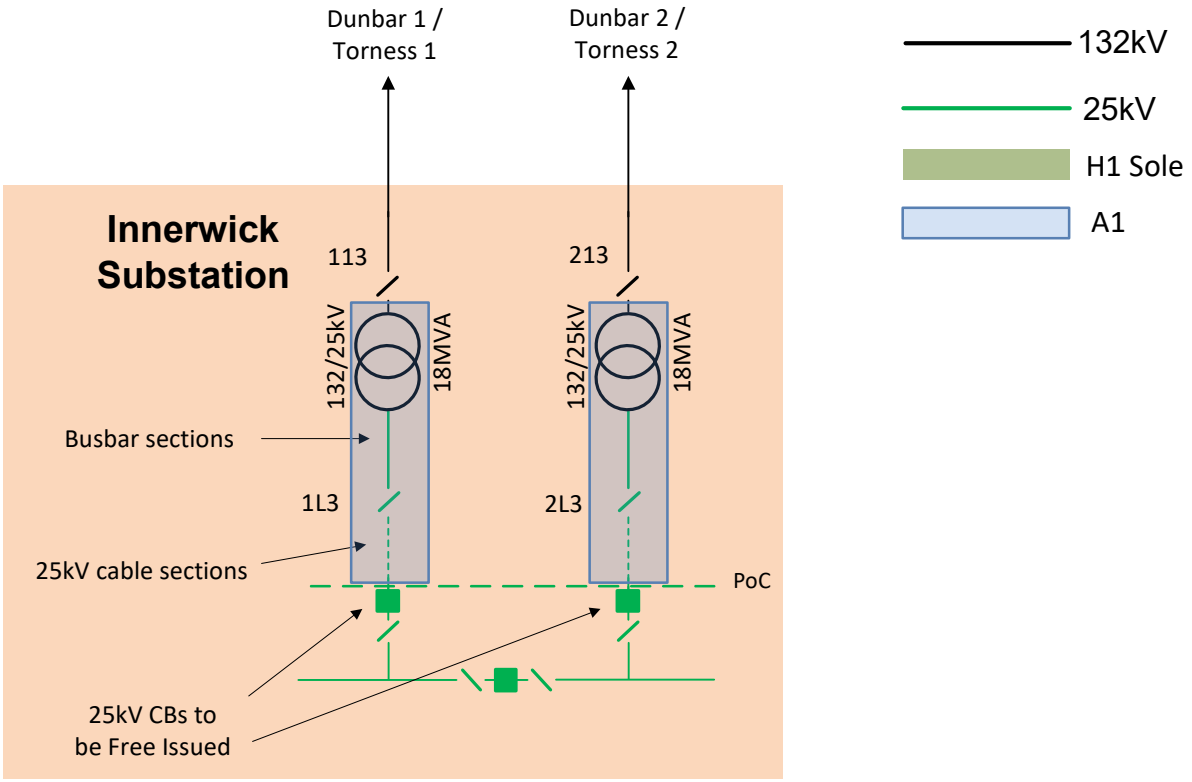

Figure 2. Proposed network configuration

The maximum load requested by Network Rail of a 1 minute peak of 25.2MVA is the highest expected load and is within the proposed traction transformers' long time (x1.5) and short time (x1.8) emergency loading capabilities.

Network studies have shown that the level of voltage unbalance at Innerwick 132kV will remain within limits[1], for the 30 minute average and 1 minute peak loading conditions for the worst-case network outage condition where a 400/132kV SGT at Torness is out of service. Therefore, the increase in unbalanced loading at Innerwick is acceptable and no further mitigation is required.

5. Conclusion

SP Transmission has a statutory obligation, that on notification from the System Operator (National Grid ESO) of a receipt of an application for connection or modification of an existing connection: to offer to enter into an agreement with the system operator to connect the third party.

The proposed solution has been developed in co-ordination with Network Rail.

[1] See Grid Code CC.6.1.5 (b) and CC.6.1.6, and the requirements of Engineering Recommendations P29 and P24.

Project Summary:

- Forecast Costs – £3.530m
    - Network Rail funded – £3.530m
- Timing of Investment – 2020/2023
- Outputs:
    - Addition – 2 x 132/25kV 18MVA Single Phase Traction Transformers
    - Disposal – 2 x 132/25kV 10MVA Single Phase Traction Transformers

Outputs included in RIIO T1 Plans

Not Applicable.

6. Future Pathways – Net Zero

Primary Economic Driver

The primary driver for investment for the proposed works is the provision of an increase in Network Rail traction supply capacity at Innerwick 132kV substation in response to a request from Network Rail.

Payback Periods

A CBA has not been undertaken for the proposed scheme installation.

Pathways and End Points

The proposed solution has suitable capacity to accommodate the currently proposed demand at the site.

Asset Stranding Risks

There is minimal risk of asset stranding associated with the installation of the proposed works as the proposed substation is to feed the electrification plans associated with Network Rail. Should the developers terminate the proposed works will be revised and the scope amended as appropriate.

Sensitivity to Carbon Prices

The proposed scheme is not sensitive to carbon price.

Future Asset Utilisation

The utilisation of the proposed assets would be increased by increased traffic on the Network Rail system.

Whole Systems Benefits

The works proposed are to facilitate increasing electrification of the rail network; as such there is some Whole System interaction with Transport networks.