Core Document
CD1.10

PITS-WIBA-TEMP Justification

Background: The three transmission cable routes - Pitsmoor (PITS)-Templeborough (TEMP), Pitsmoor - Wincobank (WIBA) and Wincobank - Templeborough are 275kV cables circuits known to be in poor asset health condition with multiple oil leaks and poses number of environmental and reputational threats to National Grid. More importantly, large sections of all three circuits are located within a railway embankment. The embankment is known to be unstable with significant risk of subsidence. Parts of neighbouring distribution network cable troughs have already collapsed, which led to the decommissioning of distribution cables. Inevitably, National Grid cable troughs are next in line to collapse so it is paramount that the issue is resolved quickly.

In terms of asset health, key focuses are two cable bridges over a canal and a river. This is where the damage to the cable lead sheaths have caused multiple oil leaks. Additionally, the bridges themselves are in poor condition and will require replacement in the near future. The risk of subsidence, condition of the cables and the reputational damage have all led to a decision to rationalise the network.

Option 1: Rationalised Replacement - Recommended

Double circuit into PITS-WIBA (Figure 1). This option removes the need for PITS-TEMP and WIBA-TEMP circuits. An opportunity to effectively rationalise the network and this proved to be the most cost effective option (see Table 1). The 6km circuit replacement is a new route which eliminates the risks arises from railway embankment, cable bridge and environmental issues (oil leak), etc. Some of the key risks with this route is that it is a busy urban area with numerous constructability challenges and several underground services.

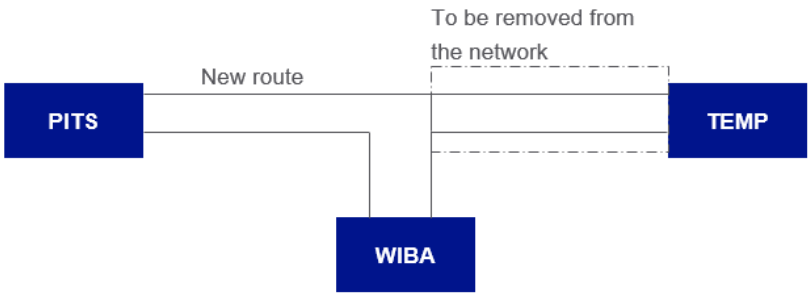

Figure 1: PITS-WIBA Replacement (new route).

Option 2: Full Replacement – Rejected

The full replacement of PITS-TEMP, PITS-WIBA and WIBA-TEMP. This option is a 12.4km circuit replacement of the existing cable route. It removes all the risks associated with the current route, however the length of the route and the location introduces new risks. The area is heavily congested, the route is highly complex (retaining wall, near railway and motorway, etc.) with multiple stakeholder involvement. This may lead to long delays and issues with constructability.

Option 3: Target Replacement (Oil Filled/XLPE) - Rejected

A potential option would be to replace the high-risk areas with a mixture of oil filled cables and XLPE (Figure 2) – mainly around railway embankment and cable bridges. There are only few oil-filled cable manufactures left and the lead time is about 2 years, delaying the construction and increasing risk of

failure. Technical feasibility related to jointing oil filled to XLPE cable remains an issue. Above all, introducing new oil filled cables poses further environmental risks, and the asset health for part of the route is still in risk of failure.

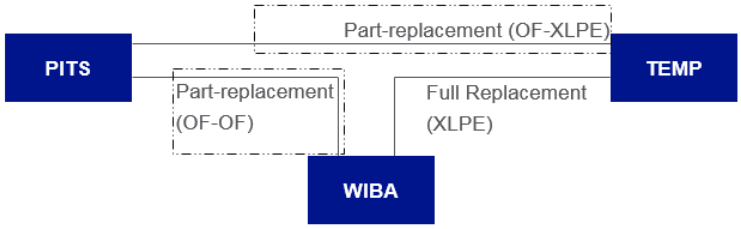

Figure 2: Target replacement – oil filled and XLPE.

Option 4: Target Replacement (XLPE) – Rejected

This option is similar to option 3. Replacement of oil filled cable with XLPE in only high priority areas. The technical feasibility of connecting new XLPE cable to the existing oil filled cables are unknown. The cost of hybrid joint bays, and space (5* larger) is substantial compared to full replacement. Furthermore, additional space would be required for oil tanks and ancillary equipment.

Option 5: Do Nothing - Rejected

Multiple risks including failure of cable, loss of supply, oil leaks – polluting river and canal, safety (subsidence - railway), etc. Also, continue to maintain this route means high operational costs and emergency repairs.

Table 1: Option - Cost Analysis

	Option 1	**Option 2**	**Option 3**	**Option 4**
Description	Rationalised Replacement	Full Replacement	Target Replacement (Oil Filled/XLPE)	Target Replacement (XLPE)
Cost	£40m	£64m	£48m	£61m
NPV	(£34m)	(£54m)	(£41m)	(£52m)
Annualised NPV Ranking	1	4	2	3
Circuit Length	6km	12 km	9 km	11km
Key Risks	• Complex route • Urban area	• Congested route • Long replacement	• Asset health issue remains. • Technical feasibility • Potential for oil leaks.	• Technical feasibility • Asset health issue remains.

Conclusion

Considering all the options, a rationalised replacement (option 1) seems to be the most logical option. This not only reduces the cost to consumers, but proves to be most the cost effective, constructible and safe option.