



Powerlink Queensland

Project Specification Consultation Report

25 September 2018

Maintaining reliability of supply at Kamerunga Substation

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Summary

Located approximately 10 kilometres north west of Cairns, Kamerunga Substation, established in 1976, is a major injection point into the Ergon Energy distribution network. Planning studies have confirmed there is an enduring need for the substation to maintain the supply of electricity in the Cairns area.

Both the primary plant and secondary systems at Kamerunga Substation are nearing the end of their technical service lives with identified condition and obsolescence issues. The substation is also susceptible to major flooding events which could result in damage to equipment leading to loss of supply.

Much of the substation's primary plant, the equipment through which the electrical power passes, has reached the end of its technical service life, resulting in performance degradation increasing the risk to supply in the Cairns area. In addition, the site has inherent design issues including insufficient electrical clearances (currently managed through temporary measures), poor drainage and a single 125V DC supply system.

Secondary systems are the control, protection and communications equipment that are necessary to operate the transmission network and prevent damage to primary systems when adverse events occur. Many of the secondary systems at Kamerunga Substation are nearing the end of their technical service lives and have become or are becoming obsolete, where they are no longer supported by the manufacturer and have only limited, or no spares available. Under the National Electricity Rules (the Rules), Transmission Network Service Providers (TNSPs) are required to provide sufficient secondary systems, including redundancies, to ensure the transmission system is adequately protected.

In the case of extreme weather events causing flooding such as cyclones, studies have shown the substation would be inundated with 1.25 metres of water during a 1 in 100 year flood event and 1.6 metres for a 1 in 200 year event, resulting in extensive damage to its protection and control systems and loss of supply. This would result in a significant risk to supply in the area, while also leaving Powerlink operating Kamerunga Substation outside the recommended State Planning Policy guidelines for major substation infrastructure to allow the substation to service community needs during and immediately following a flood event.¹

The state of the primary plant and secondary systems at Kamerunga substation, along with the existing flood risk, presents Powerlink with a range of reliability of supply, safety and compliance risks requiring resolution.

Powerlink is required to apply the RIT-T to this investment

This investment is driven by an obligation under the Rules, and is classified as a 'reliability corrective action' under the RIT-T.

Four credible options have been identified to address the identified need

A Base Option reflecting a conventional approach to ensuring continued compliance with the secondary systems obligations in the Rules, along with a staged replacement of primary plant has been identified to serve as the basis of comparison between options. This approach involves a full secondary systems and telecommunications equipment replacement, housed in a new prefabricated building, along with the staged replacement of selected primary plant over an eight year period.

This option has then been compared with three other options in which the secondary systems are all fully replaced in a single stage and the primary plant replaced with either the current Air Insulated Switchgear (AIS) technology, or an alternative Gas Insulated Switchgear (GIS) technology, in a single stage.

Options 2 and 3 include improved switching functionality to address the potential for outages on the Barron Gorge feeders and Kamerunga transformers should the Woree feeder trip.

Options 1, 2 and 3 provide improved flood resilience by 2022 while the Base Option does not address the flood issues until 2028.

¹ Queensland Government, Department of Infrastructure, Local Government and Planning – State Planning Policy – state interest guidelines, Natural hazards, risks and resilience, April 2016

A summary of the credible options is given in Table 1.

Table 1: Summary of credible options

Option	Description	Indicative capital cost (\$million, 2017/18)	Indicative annual O&M costs (\$million, 2017/18)
Base Option	Single stage secondary system replacement. Staged AIS primary plant replacement. Flood operable by October 2028	26.70	0.20
Option 1	Single stage secondary system replacement. Single stage AIS primary plant replacement. Flood operable by October 2022	23.20	0.19
Option 2	Single stage secondary system replacement. Single stage GIS primary plant replacement including additional switching functionality. Flood operable by October 2022	23.88	0.08
Option 3	Single stage secondary system replacement. Single stage AIS primary plant replacement including additional switching functionality. Flood operable by October 2022	23.75	0.12

Powerlink has also considered whether non-network options could address the identified need. A non-network option that avoids replacement of secondary systems and primary plant would need to replicate the support that Kamerunga Substation provides the Ergon Energy 22kV network in meeting the Rule's reliability obligations on an enduring basis.

Powerlink welcomes submissions from potential proponents who consider that they could offer a credible non-network option that is both economically and technically feasible.

Submissions

Powerlink welcomes written submissions on this *Project Specification Consultation Report*. Submissions are particularly sought on the credible options presented.

Submissions are due on or before Friday 21 December 2018.

Please address submissions to:

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