January 2026

Powerlink 2027-32 Revenue Proposal

Project Pack

CP.02617 Kamerunga Substation Rebuild

Project Status: Stage 1 Approved

Network Requirement

The Kamerunga Substation was established in 1976 and is the major injection point into the Ergon Energy 22kV network supplying the Kamerunga, Cairns and northern beaches area, including Cairns Airport. The substation includes two 132/22kV transformers to connect Ergon Energy and provides 132kV connection for the Barron Gorge Hydro Power Station to the transmission network.

The primary plant, transformers 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 and transformers 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 is at risk of inundation during flooding from cyclones and in this regard does not meet current State Planning Policy requirements [1].

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 NER, Powerlink is required to provide sufficient secondary systems, including redundancies, to ensure the transmission system is adequately protected [1].

Joint planning studies[1] have confirmed that in order to continue to meet the reliability standard in Powerlink's Transmission and Ergon Energy's Distribution Authorities, the services currently provided by Kamerunga Substation are required into the foreseeable future to meet ongoing customer requirements.

With an increasing likelihood of faults and longer rectification periods arising from the ageing substation assets remaining in service, Powerlink must undertake reliability corrective action if it is to continue to meet its jurisdictional obligations and the standards for reliability of supply set out by AEMO and in the NER.

Recommended Option

The identified need and credible options are currently being assessed via a public Regulatory Investment Test for Transmission (RIT-T) consultation process being conducted jointly with Ergon Energy. This RIT-T consultation process includes identified investment needs associated with both the Kamerunga Substation and the Woree to Kamerunga 132kV transmission line (CP.02003). Under the credible options identified in the Project Specification Consultation Report (PSCR) the scope of the Kamerunga Substation Rebuild is common across both credible options [1]:

Option 1: Greenfield Air Insulated Switchgear (AIS) at Kamerunga Substation by 2028.

Option 2: Greenfield AIS at Kamerunga Substation by 2028.

Cost and Timing[2]

The estimated cost of option 1 to rebuild Kamerunga Substation is $96.3 million ($2025/26) [2].

Target Commissioning Date: November 2030.

[1] Powerlink, *2025 Transmission Annual Planning Report*, page 61.
[2] This is Powerlink's current estimate of cost and timing and has been updated since the publication of the PSCR in December 2024

Documents in CP.02617 Project Pack

Public Documents

1. Maintaining Reliability of Supply Kamerunga, Cairns and northern beaches area – Project Specification Consultation Report
2. CP.02617 Kamerunga Substation Rebuild – Project Management Plan

18 DECEMBER 2024

Maintaining reliability of supply to Kamerunga, Cairns and northern beaches area

Project Specification Consultation Report

Preface

Powerlink Queensland is a Transmission Network Service Provider (TNSP) that owns, develops, operates and maintains Queensland's high-voltage electricity transmission network. The network transfers bulk power from Queensland generators to electricity distributors Energex and Ergon Energy Corporation Limited (Ergon Energy), part of the Energy Queensland Group, and to a range of large industrial customers.

Ergon Energy manages an electricity distribution network which supplies electricity to more than 765,000 customers, spanning one million square kilometres, which accounts for 97% of the state of Queensland. Ergon Energy's electricity network consists of approximately 160,000 kilometres of powerlines and one million power poles, along with associated infrastructure such as bulk supply and zone substations. Ergon Energy also own and operate 33 stand-alone power stations that provide supply to isolated communities across Queensland which are not connected to the main electricity grid.

This Project Specification Consultation Report has been prepared in accordance with version 217 of the National Electricity Rules (NER), and the Regulatory Investment Test for Transmission (RIT-T) Instrument (November 2024) and RIT-T Application Guidelines (November 2024). The RIT-T Instrument and Application Guidelines are made and administered by the Australian Energy Regulator.

The NER requires Powerlink to carry out forward planning to identify future reliability of supply requirements, which may include replacement of network assets or augmentations of the transmission network. Powerlink must then identify, evaluate and compare network and non-network options (including, but not limited to, generation and demand side management) to identify the preferred option which can address future network requirements at the lowest net cost to electricity customers.

Powerlink also has obligations under the NER to address power system security requirements identified by the Australian Energy Market Operator in its annual System Security Reports.

The main purpose of this document is to provide details of the identified need, credible options, technical characteristics of non-network options, and categories of market benefits likely to impact selection of the preferred option. In particular, it encourages submissions from potential proponents of feasible non-network options to address the identified need.

This document also provides customers, stakeholders and communities with information on the potential investment/s (network and non-network) that are required in the near-term to meet an identified need, and offers the opportunity to provide input into the future development of the transmission network in Queensland.

More information on the RIT-T process and how Powerlink applies it to ensure that safe, reliable and cost-effective solutions are implemented to deliver better outcomes to customers is available on Powerlink's website.

A copy of this report will be made available to any person within three business days of a request being made. Requests should be directed to the Manager Network and Alternate Solutions by phone ((07) 3860 2111) or email (networkassessments@powerlink.com.au).

Powerlink acknowledges the Traditional Owners and their custodianship of the lands and waters of Queensland and in particular, the lands on which we operate. We pay our respect to their Ancestors, Elders and knowledge holders and recognise their deep history and ongoing connection to Country.

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Executive Summary

Powerlink has identified the need to maintain reliability of supply to Kamerunga, Cairns and the northern beaches due to the deteriorating condition and obsolescence of key transmission network assets currently providing electricity services to these areas.

Key transmission network assets located in the Kamerunga, Cairns and northern beaches area

Kamerunga 132kV Substation

Located approximately 10 kilometres north-west of Cairns, Kamerunga Substation, established in 1976, is a major injection point into the Ergon Energy (part of the Energy Queensland Group) distribution network. Joint planning studies have confirmed there is an enduring need at Kamerunga to maintain the supply of electricity in the Cairns area and meet legislative requirements.

The primary plant, transformers 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 and transformers – 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 (NER), Powerlink is required to provide sufficient secondary systems, including redundancies, to ensure the transmission system is adequately protected.

In the case of extreme whether 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.

In August 2019, Powerlink published a Project Assessment Conclusions Report (PACR) to address the emerging condition risks at Kamerunga Substation. Based on information received subsequent to the conclusion of the consultation process, Powerlink identified a material change in circumstances due to the identification of an additional credible option not included in that Regulatory Investment Test for Transmission (RIT-T), and significant cost increases across all credible options assessed in the cost-benefit analysis undertaken for that RIT-T. This has resulted in a change to the preferred option and construction schedule recommended in the PACR, requiring reapplication of the RIT-T.

The identified need to maintain reliability of supply to Kamerunga assessed under the previous RIT-T consultation has been captured within the broader identified need of this RIT-T, as Kamerunga Substation is a key transmission network asset located in the Far North Queensland zone, providing electricity services to the Cairns and northern beaches area.

Woree to Kamerunga 132kV transmission line

The Woree to Kamerunga 132kV transmission line was first established in 1963. It is a double circuit 132kV steel tower transmission line operating in an aggressive tropical environment. The line is nearing the end of its technical service life with the majority of structures exhibiting signs of degradation.

Joint planning studies have confirmed there is an enduring need to maintain the supply of electricity currently provided by these assets to Kamerunga, Cairns and northern beaches area, as well as connecting the Barron Gorge Hydro Power Station to the transmission network.

Maintaining reliability of supply to Kamerunga, Cairns and northern beaches area

The condition and obsolescence of key transmission network assets currently providing electricity services to Kamerunga, Cairns and northern beaches area present Powerlink with a range of reliability of supply, safety and compliance risks.

Powerlink must therefore take action to maintain existing electricity services, ensuring an ongoing reliable, safe and cost-effective supply to customers in the Kamerunga, Cairns and northern beaches area.

Powerlink's Transmission Annual Planning Reports (TAPRs) in 2023 and 2024 identified the key assets under consideration in this RIT-T were being addressed as a joint planning project.

Powerlink and Ergon Energy are required to apply the Regulatory Investment Test given the credible options under consideration

The estimated capital cost of the most expensive credible option to maintain reliability of supply to Kamerunga, Cairns and the northern beaches area meets the minimum threshold (currently $7 million) to apply the RIT-T. In addition, given the credible options identified include potential works by Ergon Energy over the minimum cost threshold (currently $6 million) for the Regulatory Investment Test for Distribution (RIT-D), this RIT-T is also being undertaken to discharge Ergon Energy from its obligation to undertake a RIT-D.

As the identified need for the proposed investment is to meet reliability and service standards specified within Powerlink's Transmission Authority, guidelines and standards published by the Australian Energy Market Operator (AEMO), and Powerlink's ongoing compliance with Schedule 5.1 of the NER, it is classified as a reliability corrective action under the NER. Similarly, Ergon Energy has obligations to comply with reliability performance standards specified in its Distribution Authority issued under the *Electricity Act 1994* (Qld).

The identified need is not discussed in AEMO's most recent Integrated System Plan (ISP) and is therefore subject to the application and consultation process for RIT-T projects that are not actionable ISP projects.

Powerlink has developed two credible network options to address the identified need

Summary of Credible Options

Option	Description	Breakdown of costs ($m, 2024)	Total Cost of option ($m, 2024)	Indicative annual O&M costs ($m, 2024)
1	Rebuild of transmission line with Overhead/Underground Alignment by 2028 (Powerlink works). Greenfield Air Insulated Switchgear (AIS) (new 22kV switchboard) at Kamerunga Substation by 2028. Powerlink works include replacement of primary and secondary assets with AIS and land purchase. Ergon Energy works include 22kV switchgear, building and cut-in works.	103.2 78.0 20.0	**201.2**	0.2
2	Rebuild of transmission line with Underground Alignment by 2028 (Powerlink works) Greenfield AIS (new 22kV switchboard) at Kamerunga Substation by 2028. Powerlink works include replacement of primary and secondary assets with AIS, and land purchase. Ergon Energy works include 22kV switchgear, building and cut-in works.	123.3 78.0 20.0	**221.3**	0.2

Note: O&M denotes operations and maintenance.

Powerlink welcomes the potential for non-network options

To enhance engagement outcomes, Powerlink proactively applies an engagement strategy to each RIT-T consultation. The scope of engagement activities undertaken is dependent upon various considerations, such as the characteristics and complexity of the identified need and potential credible options outlined in the RIT-T stakeholder engagement matrix.

A non-network option that avoids the proposed replacement of the ageing assets would need to provide supply to the 22kV network of up to a peak of 85MW, and up to a peak of 1,200MWh per day on a continuous basis. The transmission line also facilitates the Barron Gorge Hydro Power Station connection in the area. Powerlink welcomes submissions from proponents who consider they could offer a potential non-network option that is both economically and technically feasible, on an ongoing basis.

Lodging a submission with Powerlink

Powerlink is seeking written submissions on this Project Specification Consultation Report (PSCR), on or before **WEDNESDAY, 26 MARCH 2025**, particularly on the credible options presented in this PSCR.

Please address submissions to:

Deni Mauro
Manager Network and Alternate Solutions
Powerlink Queensland
PO Box 1193
VIRGINIA QLD 4014
Telephone: (07) 3860 2111
Email: networkassessments@powerlink.com.au

1. Introduction

1.1. Powerlink asset management and obligations

Powerlink is committed to sustainable asset management practices. To ensure a consistent approach that delivers cost-effective and efficient services, Powerlink's Asset Management System is adapted from the Institute of Asset Management and aligns with ISO55000 Asset Management Standards.[1] Powerlink's approach to asset management delivers value to customers and stakeholders by optimising whole of life cycle costs, benefits and risks, while ensuring compliance with relevant legislation, regulations and standards. This is underpinned by Powerlink's corporate risk management framework and international risk assessment guidelines and methodologies.

1.2. Powerlink and Ergon Energy have undertaken joint planning to address the identified need

The objective of joint planning is to collaboratively identify network and non-network solutions to limitations which best serve the long-term interests of customers, irrespective of the asset boundaries (including those between jurisdictions).

Powerlink's joint planning framework with the Australian Energy Market Operator (AEMO) and other Network Service Providers (NSP) is in accordance with the requirements of the National Electricity Rules (NER).[2] The joint planning process results in integrated area and inter-regional strategies which optimise asset investment needs and decisions, consistent with whole of life asset planning.

In general, joint planning seeks to:

- understand the issues faced by the different network owners and operators
- understand existing and forecast network limitations between neighbouring NSPs
- help identify the most efficient options to address these issues, irrespective of the asset boundaries (including those between jurisdictions)
- influence how networks are operated and managed, and what network changes are required.

Powerlink's Transmission Annual Planning Reports (TAPRs) in 2023 and 2024 identified the key assets under consideration in this Regulatory Investment Test for Transmission (RIT-T) were being addressed as a joint planning project.[3]

1.3. Overview of the Regulatory Investment Test for Transmission

The purpose of a RIT-T is to identify the preferred investment option that meets the identified network need. The preferred option maximises the present value of economic benefits, taking into account changes to Australia's greenhouse gas emissions where relevant. If the identified need is for a reliability corrective action, the preferred option may have a net economic cost.[4]

[1] Refer to AS *ISO55000:2014 Asset Management – Overview, principles and terminology*.
[2] National Electricity Rules, clauses 5.14.3 and 5.14.4.
[3] Refer to Powerlink, *2024 Transmission Annual Planning Report*, page 215.
[4] National Electricity Rules, clause 5.15A.1(c) and chapter 10, glossary ('net economic benefit').

Powerlink applies the RIT-T to potential prescribed (regulated) investments in the transmission network where the estimated capital cost of the most expensive option exceeds $7 million.[5] The identified need referred to in this RIT-T – maintaining reliability of supply to Kamerunga, Cairns and northern beaches area – is not included in AEMO's most recent Integrated System Plan (ISP), published in June 2024. As such, this RIT-T is subject to the application and consultation process for RIT-T projects that are not actionable ISP projects.[6] This Project Specification Consultation Report (PSCR) is the first step in the RIT-T process.[7] More information on the RIT-T process is provided in Appendix 1.

Powerlink is undertaking this RIT-T with Ergon Energy Corporation Limited (Ergon Energy) which is part of the Energy Queensland Group. Given the credible options identified include potential works by Ergon Energy that are over the minimum cost threshold (currently $6 million) for the Regulatory Investment Test for Distribution (RIT-D), this RIT-T is also being undertaken to discharge Ergon from its obligation to undertake a RIT-D.[8]

1.4. Powerlink has identified a material change in circumstances subsequent to the completion of the Kamerunga Substation RIT-T completed in 2019

In August 2019, Powerlink published a Project Assessment Conclusions Report (PACR) to address the emerging condition risks at Kamerunga Substation. Based on information received subsequent to the conclusion of the 2019 consultation process, Powerlink has identified a material change in circumstances has occurred for that RIT-T due to:

- the identification of an additional credible option not assessed under the RIT-T; and
- significant cost increases across all credible options assessed under the cost-benefit analysis.

This has resulted in a change to the preferred option recommended in the PACR, requiring reapplication of the RIT-T.[9] Given this and:

- emerging transmission line structural corrosion risks between Woree and Kamerunga substations;
- the expected project delivery timing of the proposed options to address the condition risks of the primary plant and secondary systems at Kamerunga Substation; and
- based on network connectivity, the common identified need to maintain reliability of supply and provide electricity services to the area

there is an opportunity to identify and assess new credible options and subsequently identify the proposed preferred option under the RIT-T, as part of an integrated solution to maintain reliability of supply to the Cairns northern beaches area.

Powerlink is managing the network risk associated with the condition of the existing Kamerunga Substation site through established asset management practices, including regular planned maintenance checks, replacement of high-risk components if required (e.g. circuit breakers) and minor civil works, until the preferred option identified under this RIT-T is implemented.

[5] National Electricity Rules, clauses 5.15.3(a) and (b)(2) set the threshold at $5 million. The Australian Energy Regulator's (AER) 2021 cost threshold review increased the value to $7 million for three years from 1 January 2022.
[6] National Electricity Rules, rule 5.16.
[7] This RIT-T consultation process has been prepared in accordance with clauses 5.16.4(b) to (g) of the National Electricity Rules and AER, *Regulatory Investment Test for Transmission Application Guidelines*, November 2024.
[8] National Electricity Rules, clause 5.14.1.
[9] Refer to Appendix 2: NER Compliance Checklist.

2. Consumer, non-network and community engagement

More than five million Queenslanders and 241,000 Queensland businesses depend on Powerlink's performance. Powerlink recognises the importance of engaging with a diverse range of customers and stakeholders who have the potential to affect, or be affected by, Powerlink activities and/or investments.

Together with our industry counterparts from across the electricity and gas supply chain, Powerlink has committed to the Energy Charter. The charter is a national CEO-led collaboration that supports the energy sector towards a customer-centric future. Powerlink joins other signatories in committing to progress the culture and solutions needed to deliver more affordable, reliable and sustainable energy systems. Powerlink's Energy Charter Disclosure Statement for 2023/24 shows Powerlink's achievements against the principles of the Energy Charter.

2.1. Powerlink takes a proactive approach to engagement

Powerlink regularly hosts a range of activities to provide timely and transparent information to customers and stakeholders within the broader community.

Powerlink's annual Transmission Network Forum (TNF) is a primary vehicle used to engage with the community, understand broader customer and industry views and obtain feedback on key topics. It also provides Powerlink with an opportunity to further inform its business network and non-network planning objectives. TNF participants include customers, landholders, environmental groups, Traditional Owners, government agencies, and industry bodies.

Engagement activities such as the TNF help inform the future development of the transmission network and assist Powerlink in providing services that align with the long-term interests of customers. Powerlink also incorporates feedback from these activities into a number of publicly available reports.

2.2. Working collaboratively with Powerlink's Customer Panel

Powerlink's Customer Panel provides a face-to-face opportunity for customers and consumer representatives to give their input and feedback about Powerlink's decision-making, processes and methodologies. The panel also provides Powerlink with a valuable avenue to keep customers and stakeholders better informed, and to receive feedback about topics of relevance, including RIT-Ts.

The Customer Panel is regularly advised on the publication of Powerlink's RIT-T documents, and is briefed quarterly on the status of current RIT-T consultations as well as upcoming RIT-Ts. This provides an ongoing opportunity for the Customer Panel to ask questions and provide feedback to further inform RIT-Ts, and for Powerlink to better understand the views of customers when undertaking the RIT-T consultation process.

Powerlink will continue to provide updates to and request input from the Customer Panel throughout the RIT-T consultation process.

2.3. Transparency on future network requirements

Powerlink's annual planning review findings are published in the TAPR and TAPR templates (available via the TAPR portal). It provides early information and technical data to customers and stakeholders on potential transmission network needs over a 10-year outlook period. The TAPR plays an important part in planning Queensland's transmission network and helping to ensure it continues to meet the needs of Queensland electricity consumers and participants in the National Electricity Market (NEM).

Powerlink's 2021 to 2025 TAPRs identified an expectation that action would be required to maintain reliability of supply to the Cairns northern beaches area, and the 2024 TAPR included an update to the previous RIT-T to maintain reliability of supply at Kamerunga.[10] No submissions proposing credible and genuine non-network options have been received by Powerlink from prospective non-network solution providers in the normal course of business, in response to the publication of TAPRs, or as a result of stakeholder engagement activities.

2.4. Powerlink applies a considered approach to RIT-T engagement

Powerlink undertakes a considered and consistent approach to ensure an appropriate level of stakeholder engagement is undertaken for each individual RIT-T consultation. The scope of engagement activities is dependent upon various considerations, such as the characteristics and complexity of the identified need and potential credible options.

For all RIT-Ts, members of Powerlink's Non-network Engagement Stakeholder Register receive email notifications of publication of RIT-T reports. For projects where Powerlink identifies material or significant market benefits, additional activities such as webinars or dedicated engagement forums may be appropriate. For more information, see Powerlink's RIT-T stakeholder engagement matrix.

2.5. Community engagement

Powerlink recognises the importance of engaging with stakeholders who may reasonably be expected to be affected by the works required to meet the identified need described in this PSCR.

The engagement frameworks and strategies that underpin Powerlink's engagement approach include:

- The International Association for Public Participation (IAP2) spectrum[11], noting each stakeholder group has unique needs and requires an individual assessment on the spectrum;
- Powerlink's Stakeholder Engagement Framework, Community Engagement Strategy and Reflect Reconciliation Action Plan; and
- the Energy Charter Landholder and Community Better Practice Engagement Guide; and Better Practice Social Licence Guideline.

2.5.1. Powerlink assesses the requirement for community engagement based on the identified need

Powerlink undertakes an assessment of the potential for social and environmental impacts of anticipated replacement or augmentation projects well in advance of the identified need timing. Understanding if and when community engagement may be required, as well as the appropriate engagement approach, is an integral component of the early planning analysis needed to inform option identification, consideration of statutory processes (e.g. Ministerial Infrastructure Designation if required) and subsequent project development strategy and engagement plans.

Powerlink's engagement approach is tailored to maximise the accessibility of the proposed project's information to the stakeholder groups and/or communities affected by the project once the need to undertake community engagement is identified. Key stakeholders may include, but are not limited to, directly impacted and adjacent landholders, Traditional Land Owner groups, local residents, businesses and other organisations such as schools,

[10] Powerlink, *2024 Transmission Annual Planning Report*, October 2024, page 107.
[11] Refer to IAP2's website

community organisations and environmental groups as well as local government authorities and elected representatives within local and state governments.

2.5.2 Assessment and basis of assessment on the need for community engagement

Powerlink has assessed that community engagement would be required given the scope of works under consideration for any proposed network options to meet the identified need. This is due to:

- the least cost option to install Air Insulated Switchgear (AIS) at the existing Kamerunga Substation site is not technically feasible; and
- a substantial proportion of the transmission line requiring replacement traverses built-up residential, encroached development and a number of major and minor road crossings, potentially impacting local communities as well as causing access and construction work challenges.

2.5.3 Description of community stakeholder engagement and associated activities

Over the past five years, Powerlink has undertaken a range of community activities including the publication of newsletters and notices, as well as community information drop-in sessions held during October 2024 to discuss the potential project with landholders, Traditional Owner groups, residents and the wider community.

Powerlink has identified two credible options to maintain reliability of supply to Kamerunga, Cairns and northern beaches area which take into consideration potential community impacts. These options include the establishment of a proposed new substation in Barron River, approximately 600 metres from the existing Kamerunga Substation, and a proposed new line corridor between Kamerunga and Woree substations (refer to Section 5.1). Powerlink considers that the construction of a new overhead transmission line for the Redlynch to Woree section of the line is not feasible as it would pose significant impacts to the communities in residential areas. As a result, the credible options identified in this PSCR include only the construction of an underground cable between Redlynch and Woree, whereby no residential land or easements on private property will be required for construction.

In terms of community feedback, the majority of interest has been expressed by those who will be impacted by the delivery aspects of the proposed project works, rather than the options under consideration in this RIT-T. The matters raised include the removal of the overhead transmission line between Redlynch to Woree, when and how this may occur and whether the associated easement will be relinquished. These matters fall outside the scope of the credible options assessed under this RIT-T, and will be taken into consideration as part of the construction Project Engagement Plan, utilising the frameworks and strategies discussed in Section 2.5, subsequent to the conclusion of this RIT-T and identification of the proposed preferred option.

A range of additional engagement activities will be held as consultation on the works associated with proposed project progress and which is outside of the current RIT-T process. Detailed information on next steps, in particular status of the planning and environmental approvals process for the proposed project is available on Powerlink's website. Where appropriate, feedback received through community and stakeholder engagement activities will be used to inform changes and guide next steps including future activities, which will be discussed in subsequent reports published under this RIT-T.

3. Identified Need

In a RIT-T, the identified need is the objective Powerlink seeks to achieve by investing in the network.[12] The identified should be framed in terms of why an investment is required, rather than as a description of a particular solution to a network need. The RIT-T Application Guidelines also note that network and non-network options can address the identified need.[13]

3.1. Geographical and network need

Kamerunga Substation located approximately 10 kilometres north-west of Cairns consists of a switchyard operating at 132kV. It provides the only injection point to the 22kV network in the Cairns and northern beaches area, including Cairns Airport and connects the Barron Gorge Power Station to the transmission network.

The Woree to Kamerunga 132kV double circuit transmission lines, originally connected to Cairns, form part of Powerlink's Far North zone[14], providing critical supply to the Cairns and northern beaches region, as well as connecting the Barron Gorge Hydro Power Station to the 275kV network.

Figure 3.1 provides an overview of Powerlink's Far North zone.

Figure 3.1: Far North zone transmission network

[12] National Electricity Rules, chapter 10 (definition of 'identified need').
[13] AER, *Application Guidelines, Regulatory Investment Test for Transmission*, November 2024, page 13.
[14] See Powerlink's 2024 *Transmission Annual Planning Report*, October 2024, Section 6.7.1, which discusses Powerlink's standard geographic zones.

3.2. Description of identified need

Powerlink's Transmission Authority requires it to plan and develop the transmission network in accordance with good electricity industry practice, having regard to the value that end users of electricity place on the quality and reliability of electricity services. It allows load to be interrupted during a critical single network contingency, provided the maximum load and energy will not exceed 50 megawatts (MW) at any one time, or will not be more than 600 megawatt hours (MWh) in aggregate.[15] The Transmission Authority is also subject to a broader obligation under the *Electricity Act 1994* (Qld) (the Electricity Act) that Powerlink operate, maintain (including repair and replace if necessary) and protect its transmission grid to ensure the adequate, economic, reliable and safe transmission of electricity.[16]

The condition and obsolescence of key transmission network assets currently providing electricity services to Kamerunga, Cairns and northern beaches area, namely:

- the primary plant, transformers and secondary systems at Kamerunga Substation, along with the existing flood risk (refer to Section 3.2.1) and
- the deteriorating condition of the steel lattice towers between Woree and Kamerunga substations (refer to Section 3.2.2)

present Powerlink with a range of reliability of supply, safety and compliance risks which put at risk Powerlink's ongoing compliance with the reliability and service standards set out in the NER, Powerlink's Transmission Authority and applicable regulatory instruments.

Powerlink must therefore take action to maintain existing electricity services, ensuring an ongoing reliable, safe and cost effective supply to customers in the Kamerunga, Cairns and northern beaches area.

3.2.1 Kamerunga 132kV Substation

Kamerunga Substation, established in 1976, is a major injection point into the Ergon Energy distribution network The operation of a 22kV distribution network around Kamerunga, Cairns and Northern Beaches is critical and necessary for the continued supply of electricity into this area. The identified needs outlined below on the Powerlink network have flow-on implications for Ergon Energy's obligation to comply with reliability performance standards specified in its Distribution Authority issued under the Electricity Act 1994 (QLD).

The primary plant, transformers 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 and transformers, 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

[15] Transmission Authority No. T01/98, section 6.2(c).
[16] *Electricity Act 1994* (Qld), section 34(1)(a).

spares available. Under the NER, Powerlink is required to provide sufficient secondary systems, including redundancies, to ensure the transmission system is adequately protected.

In the case of extreme whether 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.[17]

3.2.2 Woree to Kamerunga 132kV transmission line

The Woree to Kamerunga transmission line was first established in 1963. It is a double circuit 132kV steel tower transmission line operating in an aggressive tropical environment, nearing the end of its technical service life with the majority of structures exhibiting signs of degradation.

3.3 Assumptions and requirements underpinning the identified need

Joint planning studies have confirmed that in order to continue to meet the reliability standard in Powerlink's Transmission and Ergon Energy's Distribution Authorities, the services currently provided by Kamerunga Substation and the Woree to Kamerunga transmission line and Woree are required into the foreseeable future to meet ongoing customer requirements.

With an increasing likelihood of faults and longer rectification periods arising from the ageing transmission lines remaining in service, Powerlink must undertake reliability corrective action if it is to continue to meet its jurisdictional obligations and the standards for reliability of supply set out by AEMO and in the NER.

4. Required Technical Characteristics for Non-network Options

The information provided in this section is intended to enable interested parties to formulate and propose genuine and practicable non-network solutions such as, but not limited to, local generation and demand side management initiatives.

Powerlink welcomes submissions from proponents who consider that they could offer a non-network solution by 2028 on an ongoing basis, and will investigate the feasibility of any potential non-network option proposed or otherwise identified.

4.1. Criteria for proposed network support services

Non-network solutions would need to provide supply to the 22kV network of up to a peak of 85MW, and up to a peak of 1,200MWh per day on a continuous basis. The transmission line also facilitates the Barron Gorge Hydro Power Station connection in the area.

Powerlink has identified the following common criteria that must be satisfied if proposed network support services are to meet supply requirements.[18]

[17] Queensland Government, *Department of Housing, Local Government, Planning and Public Works – State Planning Policy*, July 2017.

[18] Powerlink's Network Support Contracting Framework provides a general guide to assist potential non-network solution providers. This framework outlines the key contracting principles that are likely to appear in any network support agreement.

Size and location

- Proposed solutions must be large enough, individually or collectively, to provide the size of injection or demand response set out above.
- Due to the bulk nature of the transmission network, aggregation of sub 10MW non-network solutions will be the sole responsibility of the non-network provider.
- Notwithstanding the location of any solution, each proposal would require assessment in relation to technical constraints pertinent to the network connection, such as impacts on intra-regional transfer limits, fault level, system strength, maintaining network operability and quality of supply.

Operation

- A non-network option would need to be capable of operating continuously 24 hours per day over a period of years and would be required to provide notice of cessation of network support services several years in advance to allow Powerlink to address the identified need in time to meet its reliability of supply obligations.
- If a generation service is proposed (either standalone or in conjunction with other services), such operation will be required regardless of the market price.
- Proponents of generation services are advised that network support payments are intended for output that can be demonstrated to be additional to the plant's normal operation in the NEM.
- Where there are network costs associated with a proposed non-network option, including asset decommissioning, these costs form part of the scope of a non-network option and will be included in the overall cost of a non-network option as part of the RIT-T cost-benefit analysis.

Reliability

- Proposed services must be capable of reliably meeting electricity demand under a range of conditions and, if a generator must meet all relevant NER requirements related to grid connection.
- Powerlink has obligations under the NER, its Transmission Authority and connection agreements to ensure supply reliability is maintained to its customers. Failure to meet these obligations may give rise to liability. Proponents of non-network options must also be willing to accept any liability that may arise from its contribution to a reliability of supply failure.

Timeframe and certainty

- Proposed services must be able to be implemented in sufficient time to meet the identified need, using proven technology and, where not already in operation, provision of information in relation to development status such as financial funding and development timeline to support delivery within the required timeframe must be provided.

Duration

- The agreement duration for any proposed service will provide sufficient flexibility to ensure that Powerlink is pursuing the most economic long run investment to address the condition risks arising from the ageing assets at Kamerunga Substation and the 132kV transmission lines between Woree and Kamerunga substation.

5. Potential Credible Network Options to Address the Identified Need

5.1. Credible options

Powerlink has developed two credible network options to address the Kamerunga Substation and Woree to Kamerunga transmission line condition risks and compliance obligations between the Woree and Kamerunga substations:

- Option 1 – Rebuild of transmission line with Overhead/Underground Alignment by 2028; and Greenfield Air Insulated Switchgear (AIS) (new 22kV switchboard) at Kamerunga Substation by 2028.
- Option 2 – Rebuild of transmission line with Underground Alignment by 2028; and Greenfield AIS (new 22kV switchboard) at Kamerunga Substation by 2028.

Option 1 seeks easier access (compared to the existing easement) to build the replacement infrastructure. Under Option 1, work will commence in 2026, with Greenfield site establishment, overhead/underground line construction and associated commissioning works completed by December 2028. Option 2 seeks to minimise visual impacts to the project vicinity. Under Option 2, work will commence in 2026, with Greenfield site establishment, underground line construction and associated commissioning works completed by December 2028.

A summary of these options is shown in Table 5.1.

Table 5.1: Summary of credible options

Option	Description	Breakdown of costs ($m, 2024)	Total Cost of option ($m, 2024)	Indicative annual O&M costs ($m, 2024)
1	Rebuild of transmission line with Overhead/Underground Alignment by 2028 (Powerlink works). Greenfield AIS (new 22kV switchboard) at Kamerunga Substation by 2028. Powerlink works include replacement of primary and secondary assets with AIS and land purchase. Ergon Energy works include 22kV switchgear, building and cut-in works.	103.2 78.0 20.0	**201.2**	0.2
2	Rebuild of transmission line with Underground Alignment by 2028 (Powerlink works) Greenfield AIS (new 22kV switchboard) at Kamerunga Substation by 2028. Powerlink works include replacement of primary and secondary assets with AIS, and land purchase. Ergon Energy works include 22kV switchgear, building and cut-in works.	123.3 78.0 20.0	**221.3**	0.2

Note: O&M denotes operations and maintenance.

Each credible option addresses the major risks resulting from the end of life of primary plant and secondary systems at Kamerunga Substation, and the deteriorated condition of transmission line between the Woree and Kamerunga substations. The credible options allow Powerlink to meet its reliability of supply and safety obligations under its Transmission Authority, the Electricity Act and Schedule 5.1 of the NER, by the replacement of primary plant, secondary systems and deteriorated transmission line. The credible options also allow Ergon Energy to meet its obligations under its Distribution Authority.

5.2. Options considered but not progressed

Powerlink's initial assessment considered two options, other than the credible options discussed in section 5.1 of this PSCR, that potentially met the identified need. Table 5.2 summarises the reasons the additional options could not be included as credible options to be assessed in this RIT-T.

Table 5.2: Options considered but not progressed

Option	Reason(s) for not progressing
Rebuild of transmission line with Overhead/Underground Alignment by 2028. Brownfield Gas Insulated Switchgear (GIS) (Ergon Energy specification) at Kamerunga Substation by 2028. Transformer 1 replacement by 2030 and Transformer 2 replacement by 2045.	Subsequent detailed assessment of this option identified that Brownfield GIS is not technically feasible.
Rebuild of transmission line with Underground Alignment by 2028. Brownfield GIS (Ergon Energy specification) at Kamerunga Substation by 2028. Transformer 1 replacement by 2030 and Transformer 2 replacement by 2045.	Subsequent detailed assessment of this option identified that Brownfield GIS is not technically feasible.

5.3. Material inter-network impact

Powerlink does not consider that any of the credible options being considered will have a material inter-network impact, based on AEMO's screening criteria.[19]

[19] National Electricity Rules, clause 5.16.4(b)(6)(ii). AEMO has published guidelines for assessing whether a credible option is expected to have a material inter-network impact.

6. Materiality of Market Benefits

The NER requires RIT-T proponents to quantify a number of classes of market benefits for each credible option, unless the proponent can demonstrate that a specific category(ies) is/are unlikely to materially affect the outcome of the assessment of credible options.[20]

6.1. Market benefits that are material for this RIT-T assessment

Powerlink considers that changes in involuntary load shedding (expected unserved energy) between the credible options, set out in this PSCR, may impact the ranking of the credible options under consideration and that this class of market benefit could be material.

6.2. Market benefits that are not material for this RIT-T assessment

A discussion of each market benefit under the RIT-T that Powerlink considers not to be material is presented below.

- **Changes in patterns of generation dispatch:** replacement of transmission lines by itself does not affect transmission network constraints or affect transmission flows that would change patterns of generation dispatch. It follows that changes through different patterns of generation dispatch are not material to the outcome of the RIT-T assessment.
- **Changes in voluntary load curtailment:** a cable fault by itself does not affect prices in the wholesale electricity market. It follows that changes in voluntary load curtailment will not be material for the purposes of this RIT-T.
- **Changes in costs for other parties:** the effect of replacing transmission lines under the credible options considered are localised to the substation they are located at and do not affect the capacity of transmission network assets and therefore are unlikely to change generation investment patterns.
- **Differences in the timing of expenditure:** credible options for cable replacement do not affect the capacity of transmission network assets, the way they operate, or transmission flows. Accordingly, differences in the timing of expenditure of unrelated transmission investments are unlikely to be affected.
- **Changes in network losses:** credible options are not expected to provide any changes in network losses as replacing transmission lines does not affect the characteristics of primary transmission assets.
- **Changes in ancillary services cost:** there is no expected change to the costs of Frequency Control Ancillary Services (FCAS), Network Control Ancillary Services (NCAS), or System Restart Ancillary Services (SRAS) due to credible options under consideration. These costs are therefore not material to the outcome of the RIT-T assessment.
- **Changes in greenhouse gas emissions:** Powerlink does not consider that any of the credible options will materially affect greenhouse gas emissions, and the cost of quantifying any greenhouse gas emission benefits would involve a disproportionate level of effort compared to the additional insight it would provide.
- **Competition benefits:** Powerlink does not consider that any of the credible options will materially affect competition between generators, and generators' bidding behaviour and, consequently, considers that the techniques required to capture any changes in such behaviour would involve a disproportionate level of effort compared to the additional insight it would provide.

[20] National Electricity Rules, clauses 5.15A.2(b)(4), (5) and (6). See also AER, *Regulatory Investment Test for Transmission*, November 2024, paragraphs 10 to 13.

- **Option value:** Powerlink does not consider that the identified need for the options considered in this RIT-T is affected by uncertain factors about which there may be more clarity in future. As a consequence, option value is not a relevant consideration for this RIT-T.
- **Costs associated with social licence activities:** Powerlink does not consider that the cost of social licence activities is materially different between the credible options under consideration in this RIT-T. These costs are therefore not material to the outcome of the RIT-T assessment.

6.3. Consideration of market benefits for non-network options

Powerlink notes that non-network options may impact the wholesale electricity market (for example by displacing generation output). Accordingly, it is possible that several of the above classes of market benefits will be material where there are credible non-network options, depending on the specific form of the option.

Where credible non-network options are identified as part of the consultation process on this PSCR, Powerlink will assess the materiality of market benefits associated with these options. Where the market benefits are considered material, these will be quantified as part of the cost-benefit analysis.

7. Base Case

7.1. Modelling a base case under the RIT-T

In a RIT-T that is not an actionable ISP project, the base case is the situation in which the RIT-T proponent does not implement a credible option to meet the identified need, and continues with business-as-usual (BAU) activities.[21]

The assessment undertaken in the PADR will compare the costs and benefits of credible options to address the risks arising from an identified need with a base case. As characterised in the RIT-T Application Guidelines, the base case reflects a state of the world in which the condition and obsolescence issues arising from the ageing assets are only addressed through standard operational activities, with escalating safety, financial, environmental and network risks.[22]

To develop the base case, the existing condition and obsolescence issues are managed by undertaking operational maintenance or operational measures only. This results in an increase in overall risk levels as the condition and availability of the asset deteriorates over time. These increasing risk levels are assigned a monetary value that is used to evaluate the credible options designed to offset or mitigate these risk costs.

The base case therefore includes the costs of work associated with operational maintenance and the risk costs associated with the failure of the assets. The costs associated with equipment failures are modelled in the risk cost analysis and are not included in the operational maintenance costs.

The base case acts as a benchmark and provides a clear reference point in the cost-benefit analysis to compare and rank the credible options against each other over the same timeframe.

[21] AER, *Regulatory Investment Test for Transmission*, November 2024, glossary ('base case').
[22] AER, *Application Guidelines, Regulatory Investment Test for Transmission*, November 2024, page 21.

8. Cost Estimation

8.1. Regulatory requirements

Where the estimated capital cost of the preferred option exceeds $100 million, a RIT-T proponent must:

- outline the process undertaken to ensure cost estimates are accurate to the extent practicable having regard to the purpose of the relevant stage of the RIT-T;
- for all credible options, including the preferred option, apply the Association for the Advancement of Cost Engineering (AACE) cost estimation classification system, or identify an alternative system/arrangements and explain why the alternative is more appropriate/suitable than the AACE system.[23]

Further, for each credible option a RIT-T proponent must specify to the extent practicable and in a manner that is fit-for-purpose for the stage of the RIT-T:

- key inputs and assumptions adopted in deriving the cost estimate;
- main components of the cost estimate;
- methodologies and processes applied to derive the cost estimate;
- reasons in support of key inputs and assumptions adopted and methodologies and processes applied; and
- the level of, and basis for, any contingency allowance that has been included in the cost estimate.[24]

At the Project Assessment Draft Report (PADR) and PACR stages of a RIT-T, RIT-T proponents must include a quantification of costs, including a breakdown of operating and capital expenditure for each credible option.[25] At the PSCR stage however, information for each credible option is only required on total indicative capital and operating and maintenance costs, to the extent practicable.[26]

8.2. Basis of Estimation

The basis for the estimation for the credible options presented in this PSCR is outlined in the methodologies and processes used to derive cost estimates as described in Powerlink's Cost Estimation Methodology. The estimates are informed by the level of specific project information available at the time of PSCR preparation and will be updated accordingly in the PADR. Powerlink's Cost Estimation Methodology also provides context to the classes of estimate discussed in this section.[27]

Key inputs and assumptions

Option 1: Rebuild of transmission line with Overhead/Underground Alignment by 2028; and Greenfield Air Insulated Switchgear (AIS) (new 22kV switchboard) at Kamerunga Substation by 2028. High level project start by 2026.

A Class 5 Estimate has been produced for Option 1 line works with an accuracy range of -50% to +100%.

Powerlink has made the following scope assumptions in producing this estimate:

- Complete replacement of secondary and telecommunication systems at new Kamerunga site;

[23] AER, *Application Guidelines, Regulatory Investment Test for Transmission*, November 2024, pages 28-29.
[24] AER, *Application Guidelines, Regulatory Investment Test for Transmission*, November 2024, page 29.
[25] National Electricity Rules, clauses 5.16.4(k)(3) and (v)(1).
[26] National Electricity Rules, clause 5.16.4(b)(6)(v).
[27] The methodology is available on the RIT-T Consultations page of Powerlink's website.

- Complete replacement of primary plant at new Kamerunga site;
- Overhead transmission line from new Kamerunga site to Redlynch Substation and underground cables from Redlynch to Woree Substation;
- Overhead transmission line from existing Kamerunga site and new Kamerunga Substation;
- Associated 22kV Ergon Works; and
- Remote End Works at Barron Gorge PS and Woree Substation.

Option 2: – Rebuild of transmission line with Underground Alignment by 2028; and Greenfield AIS (new 22kV switchboard) at Kamerunga Substation by 2028. High level project start by 2026.

A Class 5 Estimate has been produced for Option 2 line works with an accuracy range of -50% to +100%.

Powerlink has made the following scope assumptions in producing this estimate:

- Complete replacement of secondary and telecommunication systems at new Kamerunga site;
- Complete replacement of primary plant at new Kamerunga site;
- Underground cables from new Kamerunga site to Woree Substation;
- Overhead transmission line from existing Kamerunga site and new Kamerunga Substation;
- Associated 22kV Ergon Works; and
- Remote end works at Barron Gorge Power Station and Woree Substation.

9. Submission Requirements and Next Steps

Powerlink invites submissions and comments in response to this PSCR from Registered Participants, AEMO, potential non-network providers and any other interested parties.

This is not a tender process – submissions are requested so that Powerlink can fulfil its regulatory obligations to analyse non-network options. In the event that a non-network option appears to be a genuine and practicable alternative that could satisfy the RIT-T, Powerlink will engage with that proponent or proponents to confirm cost inputs and commercial terms.

9.1. Submissions from non-network providers

Submissions should be presented in a written form and should clearly identify the author of the submission, including contact details for subsequent follow-up if required. If parties prefer, they may request to meet with Powerlink ahead of providing a written response.

Submissions from potential non-network providers should contain the following information:

- details of the party making the submission (or proposing the service);
- technical details of the project (capacity, proposed connection point if relevant, etc.) to allow an assessment of the likely impacts on future supply capability;
- sufficient information to allow the costs and benefits of the proposed service to be incorporated in a comparison in accordance with AER's RIT-T Application Guidelines;
- an assessment of the ability of the proposed service to meet the technical requirements of the NER;
- timing of the availability of the proposed service; and
- other material that would be relevant in the assessment of the proposed service.

Powerlink will publish submissions on the PSCR, subject to any claim of confidentiality by the person making the submission. Where confidentiality over part or all of a submission is made, this should be clearly identified.

Powerlink may also explore whether a redacted or non-confidential version of the submission can be made available.[28]

Powerlink is required to use all reasonable endeavours not to disclose any confidential information it receives. The obligation is subject to a number of exceptions, including that disclosure may be made:

- with the consent of the person providing the information; or
- to the AER, Australian Energy Market Commission or any other regulator having jurisdiction over Powerlink under the NER or otherwise.[29]

It should be noted that Powerlink is required to publish the outcomes of the RIT-T analysis. If parties making submissions elect not to provide specific project cost data for commercial-in-confidence reasons, Powerlink may rely on cost estimates from independent specialist sources.

9.2. Next steps

Powerlink intends to carry out the following process to assess what action, if any, should be taken to address future supply requirements.

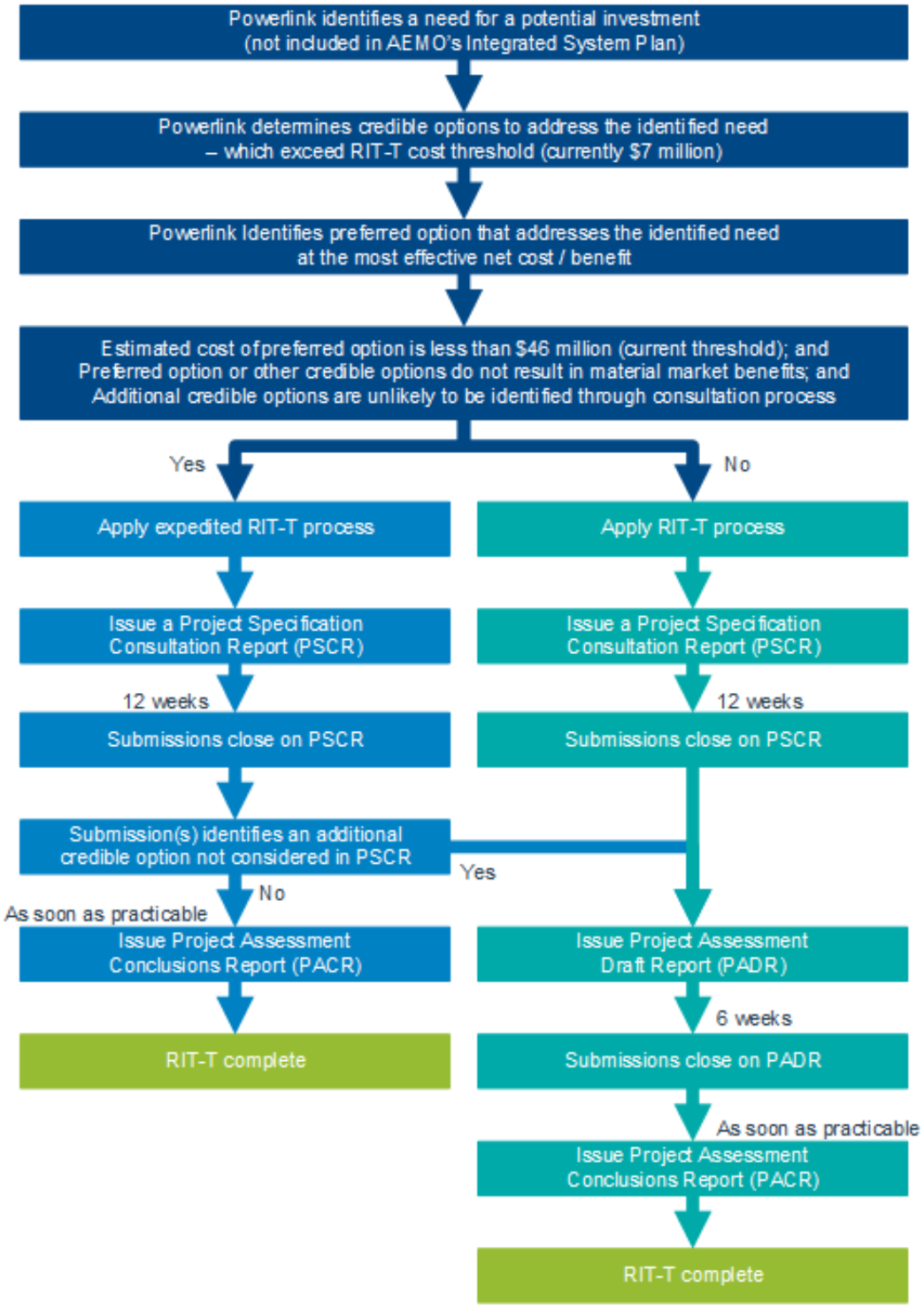
Part 1	PSCR Publication	18 December 2024
Part 2	Submissions due on PSCR Have your say on the credible options and propose non-network options	26 March 2025
Part 3	PADR Publication	June 2025
Part 4	Submission due on PADR	July/August 2025
Part 5	Publication of PACR Powerlink's response to any further submissions received and final recommendation on the preferred option for implementation	October 2025

Powerlink reserves the right to amend the timetable at any time. Amendments to the timetable will be made available on the Powerlink website (www.powerlink.com.au/rit-t-consultations).

[28] AER, *Application Guidelines, Regulatory Investment Test for Transmission*, November 2024, page 70.
[29] National Electricity Rules, rule 8.6.

Appendix 1: RIT-T Process

The flow chart below illustrates the RIT-T process where the need is not an actionable project in AEMO's ISP.



As stated, this PSCR is the first step in the RIT-T process. The PSCR:

- describes the reasons why Powerlink has determined that investment is necessary (the identified need), together with the assumptions used in identifying this need, including whether the need is as an actionable project in AEMO's latest ISP;
- provides potential proponents of non-network options with information on the technical characteristics that a non-network solution would need to deliver, in order to assist proponents to consider whether they could offer an alternative solution;
- describes the credible options that Powerlink currently considers may address the identified need;
- discusses why Powerlink does not expect specific categories of market benefit to be material for this RIT-T;
- describes how customers and stakeholders have been engaged with regarding the identified need; and
- provides stakeholders with the opportunity to comment on the credible options presented.[30]

[30] NER, clause 5.16.4(b).

Appendix 2: NER Compliance Checklist

This appendix outlines Powerlink's compliance with PSCR content requirements set out in sub-paragraphs (1) to (6) of clause 5.16.4(b) of the NER.

Table A3.1: NER Compliance Checklist

Sub-para	Requirement	Section of PSCR
(1)	Description of identified need	3.2
(2)	Assumptions used to identify the identified need	3.3
(3)	Technical characteristics of the identified need that a non-network option would be required to deliver	4.1
(4)	Discussion of identified need or credible options to meet the identified need in most recent ISP	N/A
(5)	Description of credible options	5.1
(6)	For each credible option, information about:	
	(i) technical characteristics of the option;	5.1
	(ii) whether the option is reasonably likely to have a material inter-network impact;	5.3
	(iii) the classes of market benefit that are likely / not likely to be material	6.1 – 6.2
	(iv) estimated construction timetable and commissioning date	5.1
	(v) indicative capital and operating and maintenance costs	5.1

N/A denotes not applicable.

Powerlink assessment regarding reapplication of the RIT-T to maintain reliability of supply at Kamerunga

The process in clause 5.16.4(z3) of the NER for a RIT-T proponent to reapply the RIT-T project in response to a material change in circumstances was expanded significantly in version 203 of the NER, which took effect on 9 October 2023. Prior to 9 October 2023, if a material change in circumstances occurred, the RIT-T proponent had to reapply the RIT-T unless otherwise determined by the AER. The expanded process does not apply, however, to a RIT-T project if, prior to 9 October 2023, the RIT-T proponent had prepared a PADR for the project (clause 11.154.2(b) of the NER). As Powerlink published a PADR to maintain reliability of supply at Kamerunga Substation in April 2019, Powerlink is reapplying the RIT-T as per clause 5.16.4(z3) of the NER at the time the PADR was published.

Appendix 3: RIT-T Application Guidelines Compliance Checklist

This appendix outlines Powerlink's compliance with binding requirements included in the RIT-T Application Guidelines.

Table A3.2: RIT-T Application Guidelines Compliance Checklist

Section of Guidelines	Topic	Requirements	Section of PSCR
3.5.3	Social licence costs	Provide the basis for any social licence costs, including any reference to best practice	5.1
3.5A.1	Cost estimation accuracy	Outline cost estimation process (as applicable to stage of the RIT-T)	8.2
3.5A.2	Cost estimation information	Details of inputs, assumptions and methodologies for each credible option (as applicable to the stage of the RIT-T)[31]	8.3
3.7.3	Market benefits	Calculation of changes in Australia's greenhouse gases	N/A
3.8.2	Sensitivities	Sensitivity analysis on all credible options	N/A*
3.11.2	Concessional finance	Provide sufficient detail about a concessional finance agreement	N/A
4.1	Community engagement	Description of assessment of requirement for community engagement and, as applicable, how engagement has been undertaken and any relevant concerns sought to be addressed, and how the proponent plans to engage with stakeholder groups.	2.5

Notes:

N/A denotes not applicable.

** Powerlink will include sensitivity analysis in the PADR.*

[31] Although the provisions in section 3.5A.2 of the RIT-T Application Guidelines are not included in the table of binding requirements at Appendix C of the Guidelines, Powerlink has added them to the compliance checklist as the provisions are expressed as being binding in section 3.5A.2 of the Guidelines.

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CP.02617 T053 Kamerunga Substation Rebuild Project Management Plan

Version History

Version	Date	Section(s)	Summary of amendment
1	1/05/2025	-	Initial issue

Table of Contents

1. Executive Summary

T053 Kamerunga 132kV substation was established in 1976 connecting Barron Gorge hydro power station and later extended in response to load growth in the Cairns area. Some of the older plant, both primary and secondary, is becoming unreliable and lack of spares and manufacturer support is leading to difficulties in ongoing maintenance. Further, the secondary systems equipment is housed in tunnel-entry panels which have exposed live terminals and limited workspace. This arrangement presents a safety hazard and does not meet current design standards.

The objective of this scope is construct and commission a single stage greenfield replacement of secondary systems and primary plant with AIS equipment (including 132/22kV transformers) on a new block of land approximately 350m southeast of the current Kamerunga Substation by December 2028. This project will follow the two (2) stage approval process and is subject to the Regulatory Test for Transmission (RIT-T) process. This project is dependent on the CP.02003 Woree - Kamerunga 132kV Line Reinvestment which comprises the development of the underground/overhead transition site at Redlynch, along with upgrades to the protection, control, automation, and communication settings at all remote locations as needed.

Briefly, the project consists of:

- **Work Package 1: Greenfield Substation (T274)** - The objective of this scope is to build Greenfield substation (T274) to bypass and replace T053 Kamerunga Substation.
- **Work package 2: Kamerunga Substation (T053)** - The project involves modifying transmission lines and feeders 7141 and 7142 at the new substation site, connecting them to the new substation, and adjusting feeders 7143 and 7184 to link through the T053 Kamerunga substation, enabling the Barron Gorge feeders to connect to the new substation.
- **Work Package 3: Barron Gorge PS Substation Remote End (T054)** - The Barron Gorge Power Station Substation requires updates to its protection, control, automation, and communications systems.

The current project scope report requests the commissioning date of December 2028 for the new assets however, this timeline is unachievable due to procurement, planning approvals and the requirement to interface with the new Energy Queensland 22kV substation. The new proposed completion date for this project is November 2030 and remains subject to EQL readiness for cutting over their feeders and commission the new switchyard as well as availability of site access in October 2026 post necessary property and environmental approvals.

To mitigate the asset risks, the delivery team has planned to energise the new substation T274 via one feeder from Woree, by December 2029, subject to timely achievement of the project funds approval and MID approval to access the construction site.

This Class 3 proposal remains valid until the Class 2 proposal is submitted or until there are changes to the conditions, assumptions, or exclusions stated in this document.

Key Project Milestones	Planned Dates
Class 3 Stage 1 Submission	31 July 2025
Stage 1 Approval	30 September 2025
Finalise RIT-T Pricing	6 August 2026
MID Approval	30 September 2026
Class 2 Stage 2 Submission	23 October 2026
RIT-T Approval	6 November 2026
Project Approval (issue of PAN)	20 December 2026
Site Possession - to carry out construction works	18 March 2027
Project Commissioned	30 November 2030

2. Overview of Estimated Costs

The following tables summarise the breakdown of the project estimate.

Estimate Components		Base Cost $	Escalated $
Base Estimate (A)		**96,275,957**	**102,686,205**
Contingency (Unknown Risk) (B)	4%	3,851,038	4,107,448
Mitigated Risk (Known Risk) (C)	16%	15,404,153	16,429,793
Total Proposed (B+C)	**20%**	19,255,191	20,537,241
Total Proposed Approval (A+B+C)		**115,531,148**	**123,223,446**

3. Project Definition

3.1 Project Scope

The scope of this project is to build Greenfield substation (T274) to bypass and replace the existing T053 Kamerunga Substation.

Figure 1: Kamerunga T053 location and Transmission Line Overview

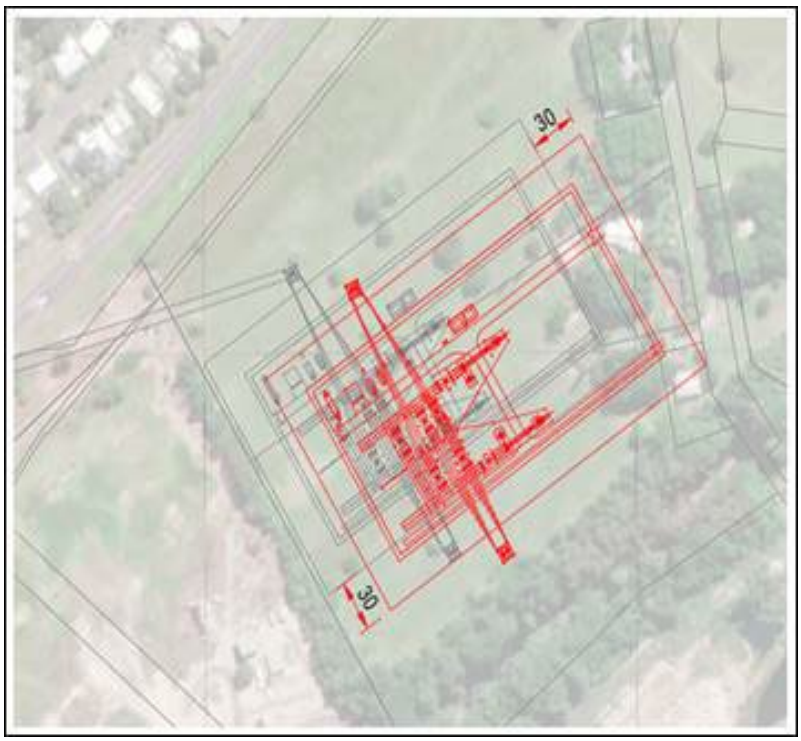

Figure 2: T274 proposed location, General Arrangement and Landing Spans Overview

Work Package 1 – Substation Works at T274 (New Greenfield Substation)

Establish a new 132kV / 22kV switchyard on a block of land approximately 350m southeast of current Kamerunga Substation, as shown in Figure 3, including:

- establish an access road, the switchyard platform, earth grid, perimeter fence oil separation tank and all required site infrastructure, including AC and DC supplies;

  Note: substation platform to provide for continued operation during a 1 in 200 years flood event
- design, construct and commission two (2) 132kV bus bars in a standard 'U' Bus configuration, including all structures and foundations;
- design, construct and commission seven (7) 132kV circuit breaker bays, including all structures and foundations and associated secondary systems, as follows:
  - 2 x 132kV circuit breaker bays to connect feeders to Woree;
  - 2 x 132kV circuit breaker bays to connect feeders to Barron Gorge;
  - 2 x 132kV circuit breaker bays to connect 132/22kV Transformers;
  - 1 x 132kV bus coupler bay
- allow space provision only in the substation layout for the future establishment of two (2) 132kV feeder bays required by EQ to meet load increases in the Smithfield area;
- allow space provision for Energy Queensland 22kV switchgear building and feeder connections;
- design, construct and commission all necessary secondary systems in support of the new 132kV switchyard within a demountable joint control/amenities building – the total number of secondary system panels is to be confirmed, but will include as a minimum;
  - 2 x bus zone protection panels,
  - 4 x 132kV feeder protection panels;
  - 2 x 132kV transformer (HV) protection panels;
  - 1 x bus coupler protection panel;
  - 2 x site infrastructure panels (including Station Common IED, Eng PC/HMI, WAN Routers, 2 Gateways, Site Core Switches, Firewalls);
  - 2 metering panels;
  - the new control building will be the substation entry point and must include master control fire and security panels;
- design, construct and commission all necessary telecommunications in support of the new 132kV switchyard;
- install two (2) sets of revenue and check metering for the 132/22kV transformers and the Barron Gorge generators;
- install OpsWAN, local and remote control facilities to current Powerlink standard, and SCADA link for Barron Gorge PS connection;
- relocate operational telephony and communications functions from T053 Kamerunga Substation to the new site;
- procure, supply and install 2 x new 132/22kV transformers, rating is 40/50/65MVA (ONAN/ODAN/ODAF) with 2 hour emergency over load rating of 97.5 MVA, with on load tap changer and cooling facilities, inclusive of foundation, bund, blast wall and connection to oil separation tank;

  Note: tap changer range to meet EQL requirements

- install an emergency diesel generator connection point;
- facilitate with EQL the location and construction of 22kV building and entry points for incoming 22kV feeders.
- investigate and report on EMF calculations for total of circuits down easement providing cost options to remediate any concerns:
- update SAP and all data and drawing information as necessary.

Figure 3: General Arrangement T274 (New Greenfield Substation)

Figure 4: Greenfield Substation T274 Single Line Diagram

Work package 2: Kamerunga Substation (T053)

- Modify transmission line, feeders 7141 and 7142, at the proposed new substation site to cut in both feeders to the new substation.
- Modify existing transmission lines, feeders 7143 and 7184, to connect through the T053 Kamerunga substation site onto the existing transmission line feeders, currently 7141 and 7142, to enable the Barron Gorge feeders to connect into the new substation.
- Remove and dispose of T053 decommissioned equipment that may directly impact on transmission line works.

Note: T053 Kamerunga is to remain operational with supply provided to EQL, until EQL confirm the relocation of all 22kV feeders from the existing site to the new substation site. This may require temporary protection modifications while the new substation is operational in parallel with T053 Kamerunga.

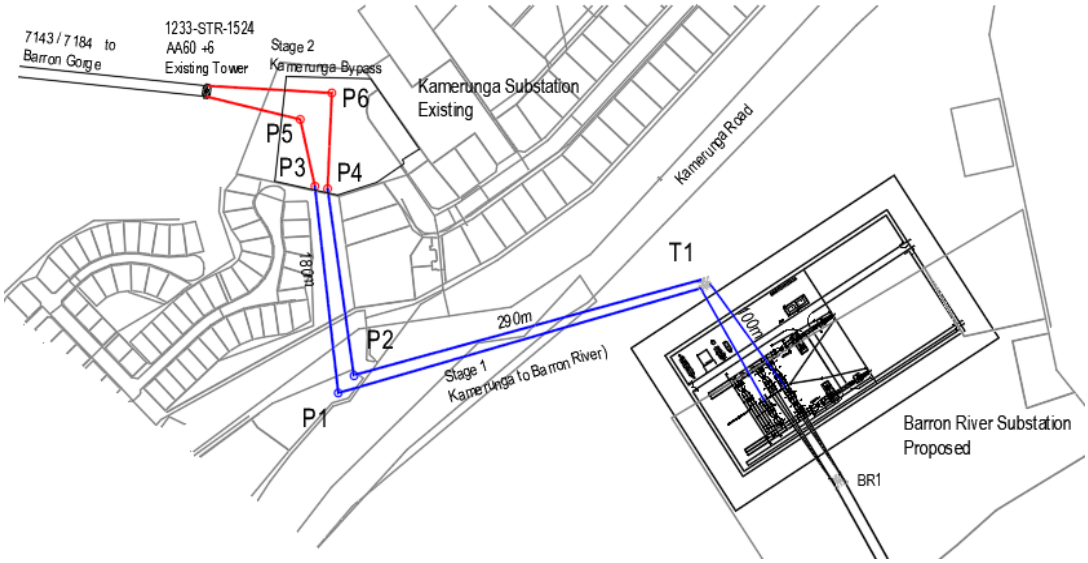

Figure 5: Kamerunga Bypass

Telecommunications

Telecommunication scope as follow:

- Construction and installation of two new OPGW from T054 Barron Gorge to T053 Kamerunga will be completed under OR.2490 project which will be extended to T274 under CP.2617 at final stage of T274 commissioning.
- Installing and commissioning OpsWAN at T274 and SCADA link for Barron Gorge PS connection; and
- Provide Telecommunication operational services including telephone, communications, & protection signalling.

Work Package 3: Barron Gorge PS Substation Remote End (T054)

Modify protection, control, automation and communications systems:

- the arrangement of Baron Gorge Power Station SCADA is different from other power stations. 2 Generator Unit RTUs are part of Powerlink's P2 Optonet ring and SCADA points are brought back to Powerlink Virginia via Powerlink 2 x NSC RTUs. The interface consists of alarms, status, and instrumentation/analogues. This site could be considered as a standard substation Conitel to DNP/IP conversion;
- the majority of works for the SCADA conversion will be carried out by Powerlink, whilst the Power Station will be involved with point to point testing:
    - replace P2 CPU card of NSC 1 and NSC2 C50 RTU with P3 card; and
    - install MUX Ethernet Interface cards;
    - configure the telecommunication network and provide 2 x independent physical IP connection according to OSD – SCADA Requirements for Operational Purposes Standard (A533375);
    - convert the Conitel database to DNP; and
    - carry out associated point to point testing.
- Update SAP and all data and drawing information as necessary.

3.2 Project Acquisitions, Approvals, and Management

Refer to the following summary table for the division of responsibility with property and approvals.

Project Component	Property	Planning	Environmental	Cultural Heritage
T274 Greenfield Substation	Powerlink	Powerlink	Powerlink	Powerlink
Woree to Redlynch UG Transmission	Powerlink	Powerlink	Powerlink	Powerlink
Redlynch to T274 Greenfield Substation OH Transmission	Powerlink	Powerlink	Powerlink	Powerlink
Redlynch Transition	Powerlink	Powerlink	Powerlink	Powerlink

Table 1: Project Acquisitions & Division of responsibilities

Note: Easement works do not form part of the scope, however, alignment with the Network Property Team should be considered during the easement widening/procurement process to ensure selection of a suitable, constructible alignment, under projects CP.01489 and CP.02731.

3.3 Assumptions

- This Class 3 proposal assumes that Ministerial Infrastructure Designation (MID) will be approved and site access available from October 2026
- Access to network and outage management resources are available
- All equipment in good condition and working order within existing substations
- All resources will be available including operational resources to complete construction, testing and commissioning activities
- Availability of site access for works as required
- Existing ground conditions are suitable for the construction of standard foundations
- Material to be removed off site for bulk earthworks is non-contaminated, classed as non-registered waste and requires no disposal certificates
- The substation pad will be constructed to a size to accommodate EQL switch room and assets.
- The final cut overs from Kamerunga to T274 will be pending on the EQL cutover schedule.
- Lead time for the supply of the AIS equipment is 24 months.
- Lead time for the supply of the Transformers is 30 months.
- Allowance for 20 days of wet weather per year over 4 years (total of 80 days) have been included in the estimate.
- Outage duration and return to service time provided in the staging plan, will be accepted by customers including EQL and Barron Gorge PS.

- Bridging Barron Gorge feeder is acceptable for an extended period of construction, if required. However, the Barron Gorge feeders should be paralleled to assure the continuous supply from PS will remain intact.
- The asset boundaries will change from the LV side of the Transformers to the EQL side of the station transformers.
- Approval will be granted by the Cairns Regional Council Planning Scheme and assumption the studies required to support Cairns Regional Council planning approval applications will assist in communication with affected landholders.
- Access road to new Kamerunga Substation is assumed to be based on existing route.
- No EPBC required for this project. The Ecological Assessment Report for the Kamerunga to Woree Transmission Line and substation replacement projects, completed in June 2024, concluded that with implemented mitigation measures, the project is unlikely to significantly impact Matters of National Environmental Significance (MNES), removing the need for a Commonwealth referral.
- New Kamerunga Substation Platform height is 2.5m above the median current ground level. It may vary from 2m to 4m in different points of the proposed platform.
- The estimate is based on current standard of Primary, Secondary Systems (SDM9.3) and Telecommunications equipment and security requirements (SoCI) and does not cater for any change or advancement in standards/technologies.

3.4 Exclusions

- Latent conditions
- Widening of existing easements for Transmission line works.
- No allowance for Extreme weather.
- Fluctuation in foreign exchange rates.
- No works to extend the life of the existing assets.
- No allowance for High water table.
- No allowance for the use of steel liners for overhead construction
- No allowance to energize the new substation via the existing Woree feeders.
- Rock or unsuitable material (asbestos and other contamination) including removal, treatment and disposal
- No allowance or contingency has been included for establishment temporary 22kV feeders from T274 back to the T053.
- Ongoing operational costs of T053 until the cut over and completion of the commissioning of T274, planned for 2029.
- Contingency plans and associated costs have not been considered if EQL is not ready in 2029.
- Installing additional earthing due to poor resistivity.
- T053 Kamerunga substation demolition Works. A separate project will be scoped to manage the decommissioning works additional to that required for this project.

- 22kV works required by EQL including any modification to their secondary system and/or cable termination.
- No allowance to cater for managing failure of equipment at existing T053 Kamerunga substation
- No allowance for any delays associated with Barron Gorge Power Station (such as outage restrictions, access etc.)
- The rating of the transformers is as specified in the PSR and does not account for any future load increase.
- Use of Live Substation crew are not considered
- Impacts of global logistics issues due to geopolitical tensions, shortage of labour, problems with shipping slots etc.

3.5 Project Interaction

Project Number and Description	Interaction	Planned Commissioning Date	Comment
CP.01489 T053 Kamerunga – Redlynch Line Easement Acquisition	Pre-requisite	December 2025	Identify an overhead alignment from Kamerunga Substation to PQ Redlynch land
CP.02731 Redlynch to Woree Easement Acquisition	Pre-requisite	December 2025	Identify a UG alignment from PQ Redlynch land to Woree Substation
CP.02513 OpsWAN and MPLS Replacement RAN 2	Interaction	August 2027	Upgrade protection systems at Woree and Kamerunga
OR.02940 BS1233 Barron Gorge Kamerunga OHEW Replacement	Interaction	December 2025	Replace existing OHEW with OPGW from BG PS to Kamerunga
CP.02003 Woree to Kamerunga 132kV line reinvestment	Dependant	December 2028	This project is dependent on CP.02617 to accommodate the new transmission line feeders from H039 Woree.

3.6 Project Risk

Project Component	Base Cost	% of Total Cost	% Known Risk	Known Risk	Total Proposed	Basis of Estimate	Risk
PLQ OVERHEADS	$14,695,269	15%	13%	$1,895,690	$16,590,959	• Detailed resource histogram estimate prepared alongside a developed project schedule.	• General increase in labour hours and associated costs. Additional support resources required pending finalisation of project approvals.
PLQ OTHERS	$6,678,014	7%	3%	$193,662	$6,871,677	• Qleave, Concept & Definition, Supply Chain Services and community funds.	• General unknown increases in associated costs.
DESIGN – PLQ	$4,752,775	5%	6%	$280,414	$5,033,188	• Powerlink design quotes based on standard design advices.	• Changes to design during Stage 1 development phase.
PROCUREMENT	$16,086,426	17%	3%	$482,593	$16,569,019	• Concept level plant schedule.	• Price fluctuation and delays in securing procurement items.
SPA	$36,423,567	38%	24%	$8,741,082	$45,164,649	• Powerlink design quote based on design advice and estimate from cost planner.	• Lack of project information including site surveys, geotechnical information. • Delays in receiving required approvals (i.e., MID, cultural heritage).
PATL	$5,619,600	6%	20%	$1,123,920	$6,743,520	• PLQ estimation supported by external cost planner.	
MSP	$11,159,085	11%	24%	$2,678,181	$13,837,266	• PLQ estimation.	• Changes in MSP scope as project matures and staging plan develops
NETOPS	$861,220	1%	1%	$8,612	$869,832	• PLQ estimation.	• Additional outages required above what has been assumed.
TOTAL	**$96,275,957**	**100%**	**16%**	**$15,404,154**	**$ 111,680,110**		

3.7 Project Opportunities

Project opportunities identified during Project Proposal phase are as follows:

No	Category	Opportunity Description	Likelihood (%)	Impact (M/M/S/M)
1	Approvals	Amendment to existing MID approvals	Low (25%)	Minor
2	Delivery	All relevant project work packages delivered by one contractor	Possible (50%)	Significant

3.8 Applicable Lessons Learnt

Applicable lessons learned that have been identified during the Project Proposal phase are as follows:

No	Project	Lesson Title	Expected Outcomes	Actual Outcome	Lesson Category	Recommended Changes
1	CP02849 Wambo Wind Farm Connection	Landholder Engagement & Communication	Clear and consistent communication with landholders, aligned expectations, and minimised delays in easement acquisition.	Engagement with landholders was delayed, inconsistent messaging from the Landholder Relations Team caused confusion, and there was repeated back-and-forth on landholder requirements.	Land Access	Ensure PM/SDM engage with landholders early, understand their specific requirements, and involve the Landholder Relations Team to set clear expectations and avoid miscommunication.
2	CP02849 Wambo Wind Farm Connection	Site Management & Communication	Clear communication and streamlined operations on site with one point of contact.	Multiple SDMs on site led to communication breakdown, lack of information sharing, and confusion over task status. Certain resources exploited the situation.	Construction	Ensure only one SDM is responsible for site operations and establish one centralised email/source of information for better coordination.
3	CP02849 Wambo Wind Farm Connection	Inspector & Contractor Roster Alignment	Alignment of rosters between Inspectors and Contractors to ensure consistent coverage.	Inspectors worked different rosters from the Contractor, leading to missed overlap periods and inefficiencies when they were unavailable.	Construction	Align Inspector rosters with Contractor schedules (e.g., matching the 19/9 roster) to ensure consistent coverage throughout the project.
4	CP02849 Wambo Wind Farm Connection	Cultural Heritage Management	Early visibility and execution of Cultural Heritage Management Plans (CHMP).	CHMPs were closely guarded, and no status updates were provided, leading to the project proceeding without an executed CHMP and relying on a TOR.	Cultural Heritage	Ensure early visibility and updates on CHMP progress and avoid relying on TOR in cases where an executed CHMP is necessary for compliance.
5	CP02689 Genex Kidston 275kV Connection	Undercrossing & Road Improvement Planning	Proactive management of undercrossing disruptions and public road improvements to minimise project delays.	Delays due to additional constraints, such as council approval requirements, public road improvements, and undercrossing impacts on productivity.	Planning & Approvals	Identify under crossings early, submit RFQs for underground solutions, and execute road improvements in accordance with approved Road Usage Agreements.
6	CP02689 Genex Kidston 275kV Connection	Substation Bench Imported Fill	Avoid delays and additional costs associated with the need for imported fill in substation earthworks.	Additional imported fill required for substation earthworks or rock encountered during construction.	Construction	Conduct early geotechnical investigations to identify the need for additional fill and mitigate unexpected costs.
7	CP02689 Genex Kidston 275kV Connection	Wet Season Impact	Minimise delays and additional costs caused by wet season impacts.	Construction delayed due to wet season rains, causing access issues, and impacting project timeline.	Financial & Contractual	Reduce the size of tower assembly and erection crews if access is impacted by rain; maintain and upgrade access tracks; ensure Trans Lines Contractor achieves PC before Christmas 2024 to avoid a third wet season delay.
8	CP02689 Genex Kidston 275kV Connection	Contractor Resource Constraint	Address potential labour shortages and resource constraints.	National uptake of Transmission Lines work has led to resource shortages, increasing costs.	Financial & Contractual	Assess resource availability early in the project and plan accordingly to mitigate additional costs due to resource constraints.
9	CP02689 Genex Kidston 275kV Connection	Change in Contract Prices	Control costs by managing changes in contract prices.	Unforeseen cost increases impacting the overall budget.	Financial & Contractual	Ensure any cost increases are closely monitored and justified and negotiate early where possible to limit the impact of price changes.

4. Project Contracting Strategy

4.1 Contracting Strategy

The CP.02617 and CP.02003 project teams met with Powerlink's Commercial team to discuss tendering strategies to ensure T274 to be constructed greenfield Substation will be energized by December 2028.

The project team plan to go to market in October 2025 with two separate tender options, aiming to award distinct contracts based on the work packages. This approach enables Powerlink to engage one SPA contractor and one specialist underground cable contractor, selecting them based on their expertise, recent performance, and prior experience with Powerlink projects. The work packages will be set up under the following two contracts:

Contract Package 1: Substation and Overhead Lines contract (SPA)

- **Part 1: Construction of Substation pad – (CP.2617)**

  This part includes the construction of a new pad and associated access road for the new substation.

- **Part 2: Construction – Substation and Overhead Lines**

  - **T274 Greenfield Substation – (CP.2617)**

    This separable portion includes the construction of a new 132kV/22kV switchyard and the required civil, electrical and mechanical services

    **Note: (Buildings and Secondary System to be designed and fabricated by PLQ)*

  - **T053 Kamerunga Substation and Overhead lines between T053 Kamerunga and T274 Greenfield Substation – (CP.2617)**

    This separable portion involves construction works to install the new structures inside existing Kamerunga substation and required structures for overhead feeders F7143 and F7184 to link through the T053 Kamerunga substation, enabling the Barron Gorge feeders to connect to the greenfield substation.

  - **Overhead Installation Redlynch to T274 Greenfield Substation – (CP.2003)**

    Construction of approximately 4km of a new double circuit 132kV Transmission line between Redlynch and T274 Greenfield Substation.

  - **H039 Woree Substation works – (CP.2003)**

    Demolition of the existing Capacitor bank at H039 Woree Substation, construction and installation of two new bays at H039 Woree Substation to accommodate the newly constructed 132kV underground Transmission line.

Contract Package 2: Underground contract

The new transmission circuits will consist of an underground component of approximately 10km between Woree and Redlynch, including the transition tie in at Redlynch. As mentioned above, this will consist of two separate tenders; One contract will be awarded for Design and site investigations to incorporate into design and the second will be for procurement and construction.

- **Part 1: Design and Investigations**
  - **Design Underground Cable (CP.2003)**
    - **Design Scope: Dual 132kV Underground Transmission Circuits – Woree to Redlynch**
    - The proposed scope involves the **engineering design of two 132kV underground transmission circuits** connecting the H039 Woree substation to the Redlynch transmission site. The alignment transitions from underground to overhead configuration, spanning an **approximate route length of 10 kilometres**.
    - Key inclusions:
      - **Detailed geotechnical investigations** to inform trenching, cable installation, and structural integrity.
      - **Route optimisation and constructability assessments** to support future delivery phases.
      - Integration with existing network infrastructure and compliance with Powerlink's technical standards and environmental requirements.

- **Part 2 - Procure Construct and Test**
  - **Procurement 132kV Cables for Underground Feeders (CP.2003)**

    Procurement of the feeder cables will be undertaken by the contractor through progression of design. It is assumed that the cables will be 800mm Copper in the Powerlink Design Advice, however an assumption and risk identifying that this may increase through the design process has been captured.
  - **Construction, Installation and Testing 132kV Underground Feeders (CP.2003)**

    This separable portion will comprise of excavation works, installation of joint bays, under-bores, installation of joint pits (x8), traffic control, cable installation, jointing and testing methods associated with the installation of 10km, 132kV dual circuit feeders from H039 to Redlynch transition site.

5. Project Financials

5.1 Two Stage Approval Process

The project value of CP.02617 and CP.02003 will exceed the RIT-T threshold of $8million requiring the two projects to follow the two-stage approval process. The project team has worked closely with NBD to ensure alignment of all the critical path activities required to commence construction in March 2027.

As part of the early work approvals: funds will be required for procurement activities, design, preliminary geotechnical investigations for design, labour and management as well as contract management and tendering process. A breakdown of these costs for early release is displayed below:

Description	Total
Design (incl design management, design by PQ)	$ 4,752,775
Procurement – Power Transformers	$ 8,140,000
Procurement (DTCB, CVT, disconnectors, surge diverters, earthing transformer)	$ 3,113,515
Work Package 1 Sub-Total	***$ 16,006,290***
Design (incl design management, design by PQ and UG Design Contractor)	$ 899,082
Procurement (steel & line materials)	$ 706,368
Work Package 2 Sub-Total	***$ 1,605,450***
Materials Procurement Team (incl contract services & procurement on-costs)	$ 1,577,133
PLQ Overheads (project management, commissioning & construction support)	$ 919,466
Actuals to date	$ 3,203,338
Sub-Total	***$ 5,699,937***
CP.02617 Stage 1 Approval Funds Total	***$ 23,311,677***

5.2 Asset Write-Off Table

CP.02617 Asset Write-off. Values current at 30th June 2025							
Functional Location	Description	Asset	Sub-numb	Book val.	Write-off %	Write-off Value	Currency
T053-D01-441-	132KV 1 TRANSF BAY(Deco CP.02617)	106175	0	385.47	100%	$ 385.47	AUD
T053-D02-442-	132KV 2 TRANSF BAY(Deco CP.02617)	106177	0	818.06	100%	$ 818.06	AUD
T053-D03-7142	7142 FEEDER BAY(Deco CP.02617)	106179	0	6.85	100%	$ 6.85	AUD
T053-D04-7141	7141 FEEDER BAY(Deco CP.02617)	106181	0	84.31	100%	$ 84.31	AUD
T053-D06-7184	7184 FEEDER BAY(Deco CP.02617)	106183	0	138.23	100%	$ 138.23	AUD
T053-D07-411-	132KV A-B BUS SECTION BAY(Deco CP.02617)	106185	0	3.28	100%	$ 3.28	AUD
T053-D08-7143	7143 FEEDER BAY(Deco CP.02617)	106186	0	134.96	100%	$ 134.96	AUD
T053-D01-441-	132kV 1 TRANSF BAY	130594	0	7,833.51	0%	$ -	AUD
T053-D02-442-	132KV 2 TRANSF BAY	130595	0	45,607.52	0%	$ -	AUD
Asset Class 10003 Sub - Bays				55,012.19		$ 1,571.16	AUD
T053-SIN	SUBSTATION INFRASTRUCTURE - T053(Deco CP.02617)	106192	0	489.00	100%	$ 489.00	AUD
T053-SIN	SUBSTATION INFRASTRUCTURE - T053	130596	0	26,208.53	0%	$ -	AUD
Asset Class 10005 Sub - Site Works				26,697.53		$ 489.00	AUD
T053-SSS-441-	132KV 1 TRANSF BAY(Deco CP.02617)	106176	0	0	100%	$ -	AUD
T053-SSS-442-	132KV 2 TRANSF BAY(Deco CP.02617)	106178	0	0.01	100%	$ 0.01	AUD
T053-SSS-7142	7142 FEEDER BAY(Deco CP.02617)	106180	0	0	100%	$ -	AUD
T053-SSS-7141	7141 FEEDER BAY(Deco CP.02617)	106182	0	0.14	100%	$ 0.14	AUD
T053-SSS-7184	7184 FEEDER BAY(Deco CP.02617)	106184	0	1.06	100%	$ 1.06	AUD
T053-SSS-7143	7143 FEEDER BAY(Deco CP.02617)	106187	0	1.06	100%	$ 1.06	AUD
T053-SSS-METR-REVMET1	TRANSF 1 ENERGY METERING (REVENUE)(Deco CP.02617)	106193	0	0.09	100%	$ 0.09	AUD
T053-SSS-METR-REVMET3	F7143 ENERGY METERING (REVENUE)(Deco CP.02617)	106194	0	0.09	100%	$ 0.09	AUD
T053-SSS-METR-REVMET4	F7184 ENERGY METERING (REVENUE)(Deco CP.02617)	106195	0	0.09	100%	$ 0.09	AUD
T053-SSS-METR-REVMET5	TRANSF 2 ENERGY METERING (REVENUE)(Deco CP.02617)	106196	0	0.09	100%	$ 0.09	AUD
T053-SSS-NBAY	NON BAY(Deco CP.02617)	106197	0	1.59	100%	$ 1.59	AUD
Asset Class 10007 Sub-Site Second Sys				4.22		$ 4.22	AUD
T053-SCO-DRIV-FO 25	FIBRE OPTIC DRIVER(3761)T053 TO T054(Deco CP.02617	102919	0	0	100%	$ -	AUD
T053-SCO-DRIV-FO 26	FIBRE OPTIC DRIVER(3763)T053 TO T051(Deco CP.02617	102920	0	0.05	100%	$ 0.05	AUD
T053-SCO-MUXP-2MB3762	2MBIT/S MUX(3762)T053 TO T054 MUX 75(Deco CP.02617	102921	0	0.19	100%	$ 0.19	AUD
T053-SCO-MUXP-2MB3764	2MBIT/S MUX(3764)T053 TO T051 MUX 74(Deco CP.02617	102922	0	0.19	100%	$ 0.19	AUD
T053-SCO-MPLS-1	ROOM 1 ROW A RACK 4 MPLS EQUIPMENT(Deco CP.02617	127098	0	0	100%	$ -	AUD
T053-SCO-MPLS-2	ROOM 1 ROW A RACK 5 MPLS EQUIPMENT(Deco CP.02617	127099	0	3.51	100%	$ 3.51	AUD
Asset Class 10200 Communication System				3.94		$ 3.94	AUD
					Total	$ 2,068.32	AUD

6. Project Planning Strategy

6.1 Milestones

The following milestones are required by the project team to deliver the project:

Major Project Milestones	High Level Timing
Stage 1 Approval - Partial PAA Issue	September 2025
Issue ITT for UG Design	October 2025
Award Contract for UG Design	December 2025
UG Design Finalize	June 2026
Issue Tender for UG (Supply and Construct)	June 2026
Issue Tender for SPA (Construction of Substations and Overhead Lines)	June 2026
Issue Tender for Substation Pad Construction	June 2026
Submit project pricing to finalize RIT-T Process	August 2026
Network Property - MID Approval	September 2026
Submission of Class2 Estimate	October 2026
RIT-T Finalised	November 2026
Board Submission	December 2026
Full PAN Release	December 2026
Award All Contracts to Contractors	January 2027
UG Construction Commencement	March 2027
Substation Pad Construction Commencement	March 2027
Woree & Kamerunga Substation Works Commencement	May 2027
Overhead Lines Construction Commencement	May 2027
Practical Completion by Underground Contractor	August 2029
New Substation Energization via One Feeder	December 2029
New Substation Full Commissioning	December 2030

6.2 Project Staging

The high-level project staging are as follows:

Stage	Activity/Stage Description	High Level Timing
0	Decommission 2 CAP at H039 Woree	August 2027
1	FAT new T274 Control Building +4	April 2028
2	FAT H039 Loose Panels	October 2027
3	T274 Barron River SPA Construction	July 2029
4	PATL Transmission Line Construction	August 2029
5	SPA Construct H039 new bays	February 2028
6	SAT & Stub new H039 bays	April 2028
7a	Site Integration & PSI T274 Barron River	September 2029
7b	SAT T274 Barron River	December 2029
7c	Energise T274 via Feeder 1	January 2030
7d	Energise Feeder 2 to T274	February 2030
8a	Commission T1 22kV Connection	February 2030
8b	Commission T2 22kV Connection	February 2030
9	Transfer F7142 and F7184	July 2030
10	Transfer F7141 and F7143	November 2030

For detail staging, refer to the Project Staging Plan

6.3 Project Schedule

Project timing shall be managed using a Project Schedule. Refer to the Project Schedule in PWA Server.

6.4 Network Impacts and Outage Planning

The small number of stages and the minimal impact on the transmission network.

For the proposal purpose only, it is assumed that outages will be available for cutovers and commissioning during the non-wet seasons.

Assumption is that the outage duration and return to service times provided in the staging plan, will be accepted by customers including EQL and Barron Gorge PS.

6.5 Project Delivery Strategy

Strategy to deliver the project as follows:

Description	*Responsibility*							
	Main Site				*Remote End(s)*			
	Powerlink	*Contractor*	*MSP – O&SD*	*MSP - Ergon*	*Powerlink*	*Contractor*	*MSP – O&SD*	*MSP*
Primary Design Systems (PSD):								
Earthworks	☒	☐	☐	☐	☐	☐	☐	☐
Civil and Structural	☒	☐	☐	☐	☐	☐	☐	☐
Electrical	☒	☐	☐	☐	☐	☐	☐	☐
Transmission Lines	☒	☐	☐	☐	☐	☐	☐	☐
Secondary Systems Design (SSD):								
Protection	☒	☐	☐	☐	☐	☐	☐	☐
Automation (Circuitry and Systems Configurations)	☒	☐	☐	☐	☐	☐	☐	☐
Telecommunication System Design (TSD):								
Data Networks	☒	☐	☐	☐	☐	☐	☐	☐
Bearer Networks	☒	☐	☐	☐	☐	☐	☐	☐
Construction:								
Earthworks	☐	☒	☐	☐	☐	☐	☐	☐
Civil	☐	☒	☐	☐	☐	☐	☐	☐
Construction (support structures, plant and equipment installation and demolition Works)	☐	☒	☐	☐	☐	☐	☐	☐
Secondary Systems Installation (loose panel's installation, panel modification, IED replacement, etc.)	☐	☐	☐	☒	☐	☐	☐	☐
Telecommunication Construction (including fibres)	☐	☒	☐	☐	☐	☐	☐	☐
Transmission Lines – Clearing, Access Tracks and Platforms	☐	☒	☐	☐	☐	☐	☐	☐
Transmission Lines - New Lines	☐	☒	☐	☒	☐	☐	☐	☐
Transmission Lines – Refit	☐	☐	☐	☐	☐	☐	☐	☐
Testing and Commissioning:								
Factory Acceptance Test	☐	☐	☒	☒	☐	☐	☐	☐
Site Acceptance Test (partial)	☐	☐	☒	☒	☐	☐	☐	☐
System Cut Over and Commissioning	☐	☐	☒	☒	☐	☐	☐	☐

Description	*Responsibility*							
	Main Site				*Remote End(s)*			
	Powerlink	*Contractor*	*MSP – O&SD*	*MSP - Ergon*	*Powerlink*	*Contractor*	*MSP – O&SD*	*MSP*
Other:								
Revenue Metering site works	☐	☐	☒	☒	☐	☐	☐	☐

6.6 Procurement Strategy

The procurement strategy for services and selected items are listed below. All other services and items shall be procured in accordance with Powerlink's Procurement Standard.

Description	Procurement Method
Services:	
SPA – D&C	ITT - Substation Panel Arrangement (SPA) – SPA to undertake construction associated to substation and overhead lines
Optical Fibre System	Shortform ITT – Standing Offer arrangement with preferred/preapproved suppliers
MSP – OSD	RFQ
MSP – Ergon	RFQ – Service Level Agreement
Turnkey for Underground	ITT – open market
Primary Plant and Equipment:	
HV Plant and Equipment	Period Contractors
Structures	ITT – Standing Offer arrangement with preferred/preapproved suppliers
Hardware and fittings	ITT – Standing Offer arrangement with preferred/preapproved suppliers
Transformers	ITT – Standing Offer arrangement with preferred/preapproved suppliers
Secondary Systems Equipment:	
IEDs	Period Contract
Panels, Kiosks, Boards and building fit-out	Shortform ITT – Standing Offer arrangement with preferred/preapproved suppliers
Control Building	Shortform ITT – Standing Offer arrangement with preferred/preapproved suppliers
DC Systems (Battery Banks and Charger)	Period Contract
Fire System	TBA
Security System	TBA

7. References

The following documents are applicable to this Project Management Plan.

Document name and hyperlink		Version	Date
Project Scope Report	 Project Scope Report CP.02617 Kar	**17**	**06/09/2024**