Regulatory Investment Test for Distribution (RIT-D)

Addressing Reliability Requirements in the Turkinje 66kV Network Area

Final Project Assessment Report

17 January 2023

ERGON ENERGY NETWORK

Part of Energy Queensland

EXECUTIVE SUMMARY

About Ergon Energy

Ergon Energy Corporation Limited (Ergon Energy) is part of Energy Queensland and manages an electricity distribution network which supplies electricity to more than 765,000 customers. Our vast operating area covers over one million square kilometres (around 97% of the state of Queensland) from the expanding coastal and rural population centres to the remote communities of outback Queensland and the Torres Strait.

Our electricity network consists of approximately 160,000 kilometres of powerlines and one million power poles, along with associated infrastructure such as major substations and power transformers.

We 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.

Republication of the Notice

It should be noted that a Notice for the Turkinje Substation was previously published in October 2020, however due to the project being deferred due to internal resource constraints, the Draft Project Assessment Report (DPAR) was not published. A notice was republished on 31 October 2022 and a Draft Project Assessment Report published on 16 November 2022.

The project identified need remains the same (see Identified Need below) with the project delivery date extended to December 2027. The estimated cost has also changed due to increases in the cost of materials and resources, with new estimates reflecting these increases.

Identified Need

A condition assessment of the Turkinje 132/66kV Bulk Supply Substation (T055) 66kV primary plant and secondary systems has identified assets that are nearing the end of their technical service lives with identified condition, safety and obsolescence issues.

These primary plant and secondary system assets:

- are forecast to reach the end of their technical service lives based on a combination of Condition Based Risk Management (CBRM) modelling and known issues with problematic assets, which are required to be replaced or decommissioned to manage the safety and network risks associated with unplanned failure
- include 66kV circuit breakers, 66kV voltage and current transformers, electromechanical and static protection relays, porcelain post and segmented porcelain insulators used on rotary isolators

Failure of the primary plant and secondary systems is a risk to network security which may lead to a breach of legislated Safety Net requirements and exposes customers to the risks and consequences of an increasingly unreliable electricity supply. Catastrophic failure of plant or secondary systems presents a safety risk to staff as well as to the general public.

Planning studies have confirmed there is an enduring need for the 66kV to maintain the supply of electricity in the Tablelands area.

The purpose of this project is to address the risk to safety and network security posed by poor condition and problematic assets.

Approach

The National Electricity Rules (NER) require that, subject to certain exclusion criteria, network business investments for meeting service standards for a distribution business are subject to a Regulatory Investment Test for Distribution (RIT-D). Ergon Energy has determined that network investment is essential in this case for it to continue to provide electricity to the consumers in the Turkinje substation supply area in a reliable, safe and cost-effective manner. Accordingly, this investment is subject to a RIT-D.

Ergon Energy published a Draft Project Assessment Report for the above described network constraint on 16 November 2022. No submissions were received by the closing date of 30 December 2022.

Two potentially feasible options have been investigated:

- **Option A:** Complete 66kV bus 1 & 2 replacement with Air Insulated Switchgear (AIS), recover existing 66kV bus structure and switchgear.
- **Option B:** Complete 66kV bus 1 & 2 replacement with Gas Insulated Switchgear (GIS), recover existing 66kV bus structure and switchgear.

This Final Project Assessment Report (FPAR), where Ergon Energy provides both technical and economic information about possible solutions, has been prepared in accordance with the requirements of clause 5.17.4(o) of the NER.

Ergon Energy's preferred solution to address the identified need is Option A – Complete 66kV bus replacement with Air Insulated Switchgear.

CONTENTS

1. INTRODUCTION

This Final Project Assessment Report has been prepared by Ergon Energy in accordance with the requirements of clause 5.17.4(o) of the NER.

This report represents the final stage of the consultation process in relation to the application of the RIT-D on potential credible options to address the identified need for the Turkinje 66kV network area.

In preparing this RIT-D, Ergon Energy is required to consider reasonable future scenarios. With respect to major customer loads and generation, Ergon Energy has, in good faith, included as much detail as possible while maintaining necessary customer confidentiality. Potential large future connections that Ergon Energy is aware of are in different stages of progress and are subject to change (including outcomes where none or all proceed). These and other customer activity can occur over the consultation period and may change the timing and/or scope of any proposed solutions.

1.1. Response to the DPAR

Ergon Energy published a Draft Project Assessment Report for the identified need in the Turkinje 66kV network area on the 16 November 2022. No submissions were received by the closing date of the 30 December 2022.

1.2. Structure of the Report

This report:

- Provides background information on the network capability limitations of the distribution network supplying the Turkinje 66kV area.
- Identifies the need which Ergon Energy is seeking to address, together with the assumptions used in identifying and quantifying that need.
- Describes the credible options that are considered in this RIT-D assessment.
- Quantifies costs and classes of material market benefits for each of the credible options.
- Describes the methods used in quantifying each class of market benefit.
- Provides details of classes of market benefits that are not considered material to this RIT-D assessment and provides explanations as to why these classes of market benefits are not considered material.
- Provides the results of Net Present Value (NPV) analysis of each credible option and accompanying explanatory statements regarding the results.
- Identifies the proposed preferred option, including detailed characteristics, estimated commissioning date, indicative costs, and noting that it satisfies the RIT-D.
- Provides contact details for queries on this RIT-D.

1.3. Dispute Resolution Process

In accordance with the provisions set out in clause 5.17.5(a) of the NER, Registered Participants or Interested Parties may, within 30 days after the publication of this report, dispute the conclusions made by Ergon Energy in this report with the Australian Energy Regulator. Accordingly, Registered Participants and Interested Parties who wish to dispute the conclusions outlined in this report based on a manifest error in the calculations or application of the RIT-D must do so within 30 days of the publication date of this report. Any parties raising a dispute are also required to notify Ergon Energy. Dispute notifications should be sent to demandmanagement@ergon.com.au

If no formal dispute is raised, Ergon Energy will proceed with the preferred option to Install a complete 66kV bus 1 & 2 replacement with Air Insulated Switchgear (AIS) and recover existing 66kV bus structure and switchgear.

1.4. Contact Details

For further information and inquiries please contact:

E: demandmanagement@ergon.com.au
P: 13 74 66

2. BACKGROUND

2.1. Geographic Region

Turkinje substation supplies nine zone substations, two major mining customers, and a major sugar mill via five 66kV feeders.

In conjunction with supply of the networks' load base and major townships Mareeba, Atherton, Malanda, Dimbulah, Ravenshoe and Mount Garnet, the 66kV network enables renewable generation from the Ravenshoe wind farm (12MW), Tablelands Sugar mill (17MW) and approximately 16MW of rooftop Micro Embedded Generation Units (MEGU) connected to the LV (230/400V) network. In future, Mossman Zone Substation and its associated sugar mill will be re-supplied from the Turkinje Substation 132kV transmission network.

The geographical location of Ergon Energy's sub-transmission network and substations in the area is shown in Figure 1 and Figure 2.

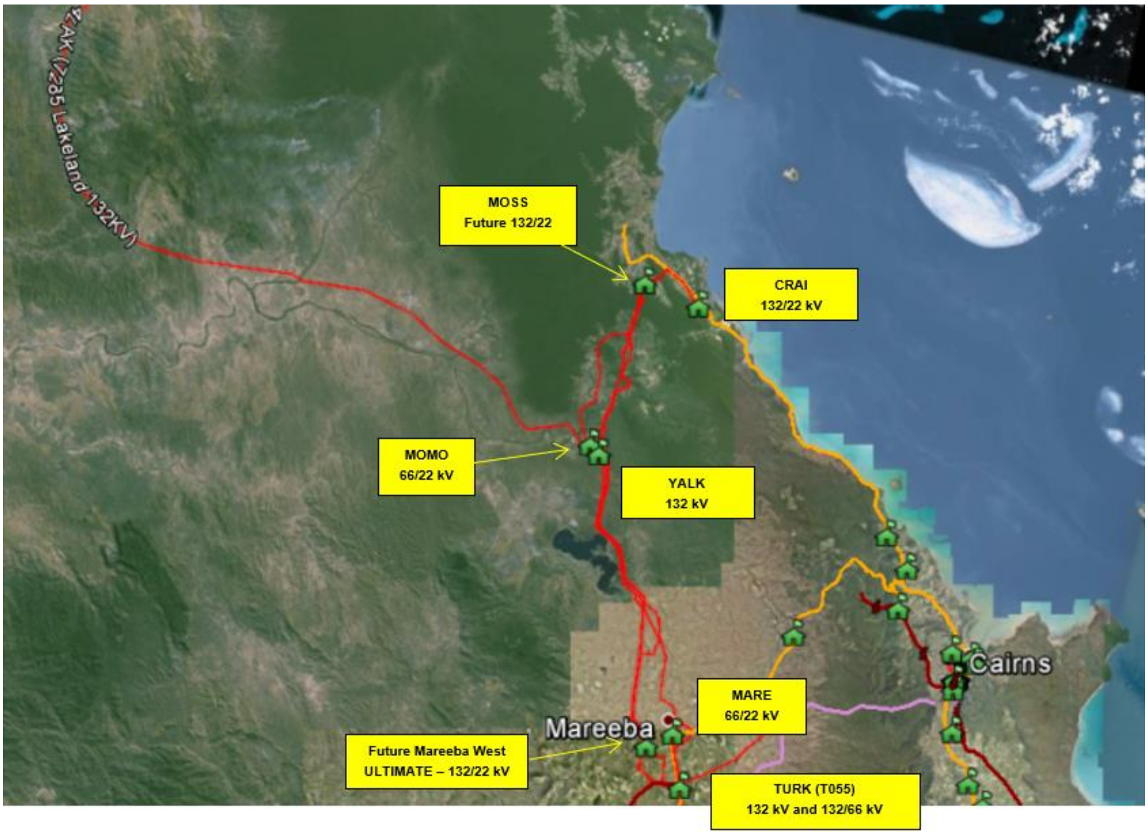


Figure 1: Existing North network arrangement (geographic view)

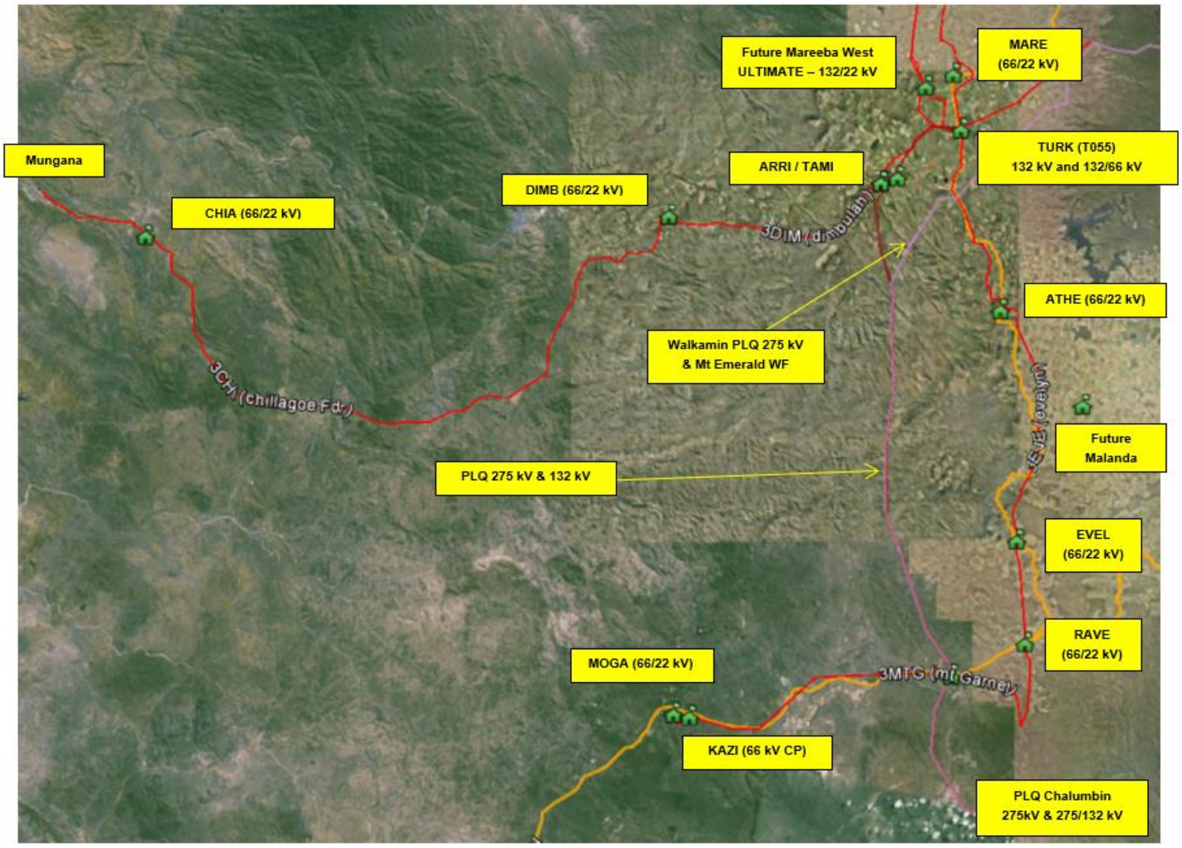


Figure 2: Existing West and South network arrangement (geographic view)

2.2. Existing Supply System

The Turkinje 132/66kV substation is a Powerlink Queensland (PLQ) / Ergon Energy Corporation Limited (EECL) shared site comprising of outdoor 132kV and 66kV primary plant assets supplying 34,336 customers of which 27,658 are supplied via the 66kV network. Peak load in 21/22 was 64MVA. Turkinje is the only 66kV node within the Atherton Tablelands sub-transmission (66kV) network linking two PLQ 60/80MVA 132/69kV transformers to supply nine zone substations, two major mining customers, and a major sugar mill via five 66kV feeders.

A significant portion of the 66kV primary plant in Turkinje substation was manufactured between 1961 and 1964 and is now approaching the end of its technical service life. The conditions of the primary plant and secondary systems pose significant safety risks to staff working in proximity to these assets and expose customers to the risks of an increasingly unreliable 66kV electricity supply.

A schematic view of the existing sub-transmission network arrangement is shown in Figure 3 and the geographic view of Turkinje Substation is illustrated in Figure 4.

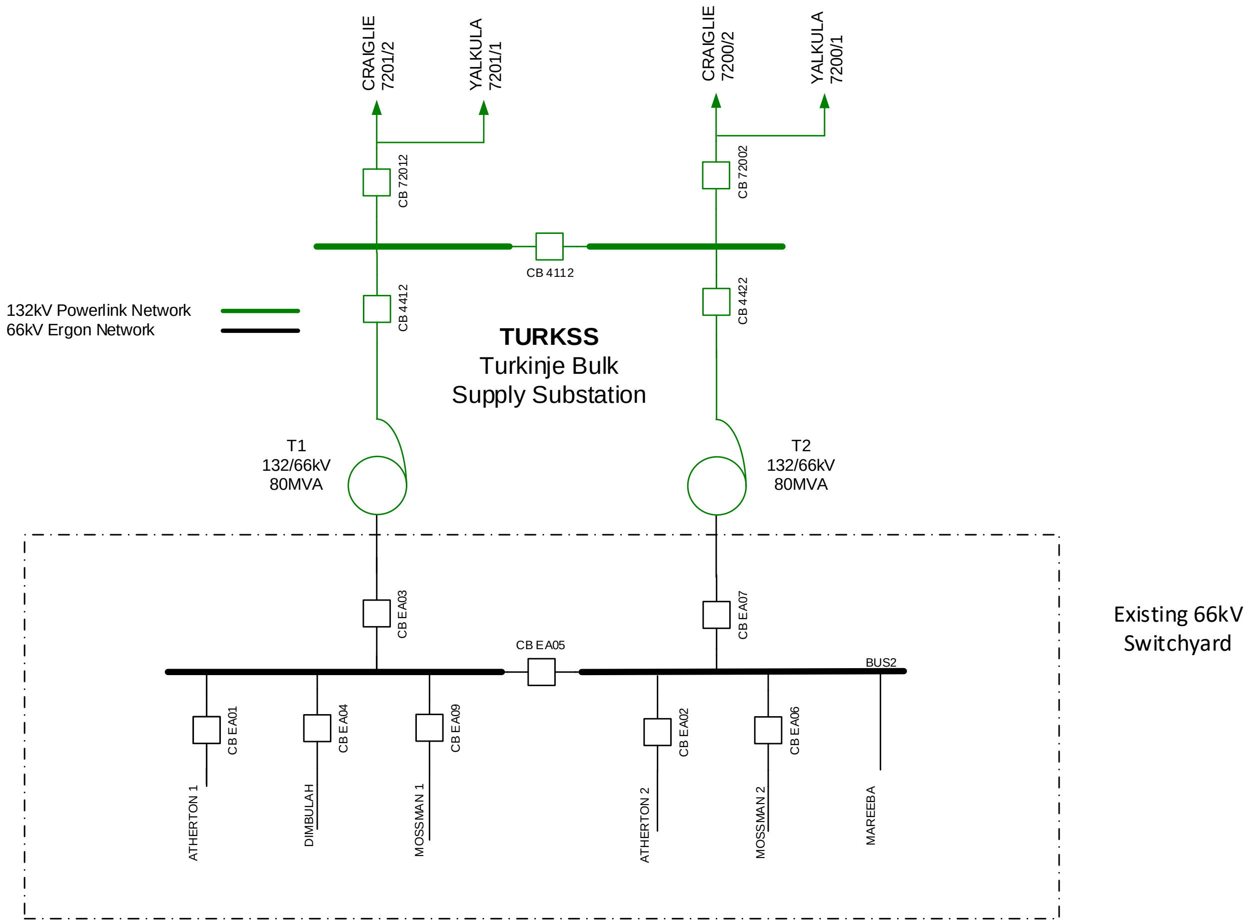


Figure 3: Existing network arrangement (schematic view)

Figure 4: Existing Turkinje geographic view

2.3. Load Profiles / Forecasts

The load at Turkinje Substation comprises a mix of residential and commercial/industrial customers. The load is summer peaking, and the annual peak loads are predominantly driven by mining, pumping and irrigation.

2.3.1 Full Annual Load Profile

The full annual load profile for Turkinje Substation over the 2021/22 financial year is shown in Figure 5. It can be noted that the peak load occurs during summer.

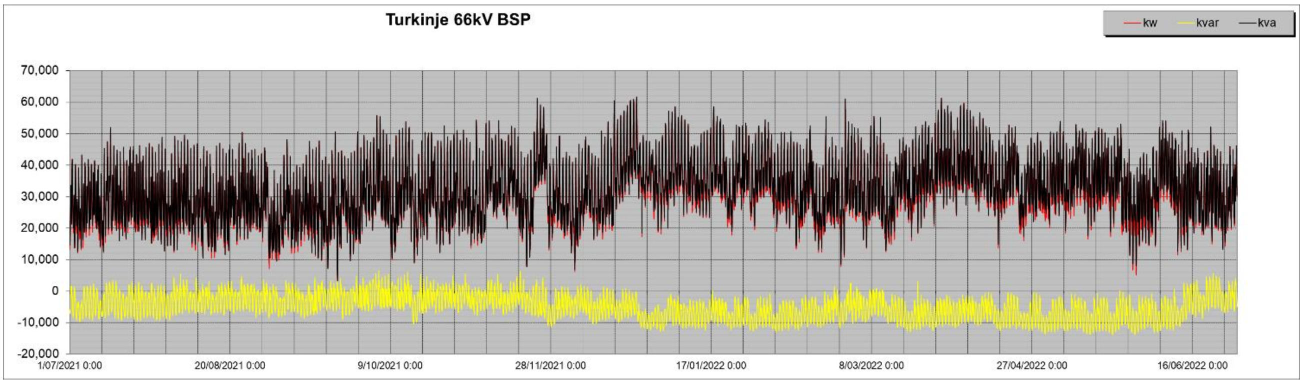


Figure 5: Substation actual annual load profile

2.3.2 Load Duration Curve

The load duration curve for Turkinje Substation over the 2021/22 financial year is shown in Figure 6.

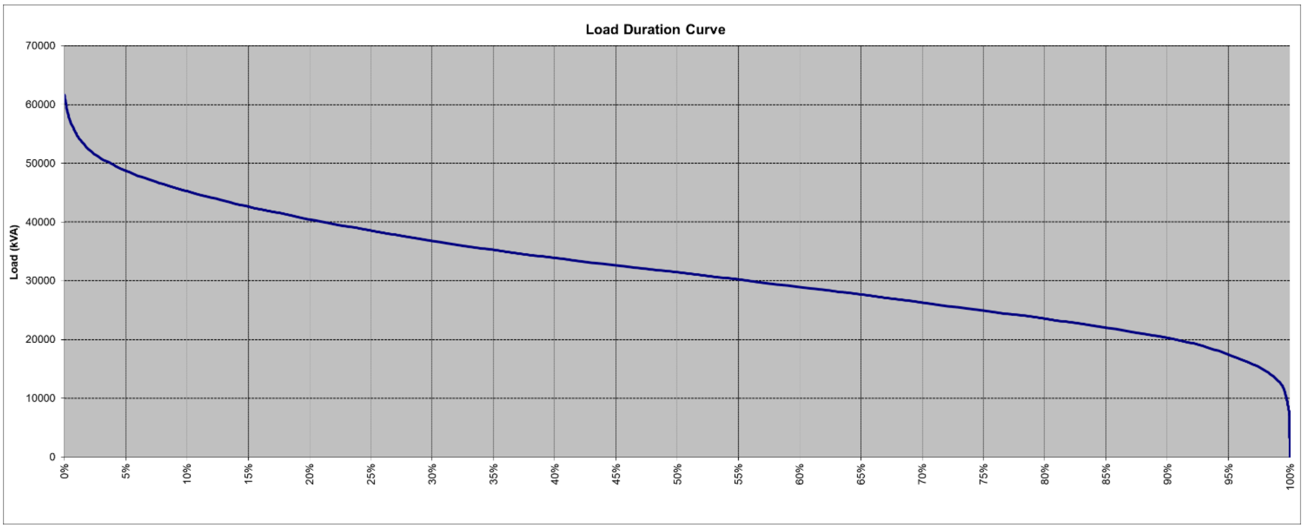


Figure 6: Substation load duration curve

2.3.3 Average Peak Weekday Load Profile (Summer)

The daily load profile for an average peak weekday during summer is illustrated below in Figure 7. It can be noted that the summer peak loads at Turkinje Substation are historically experienced in the late afternoon and evening.

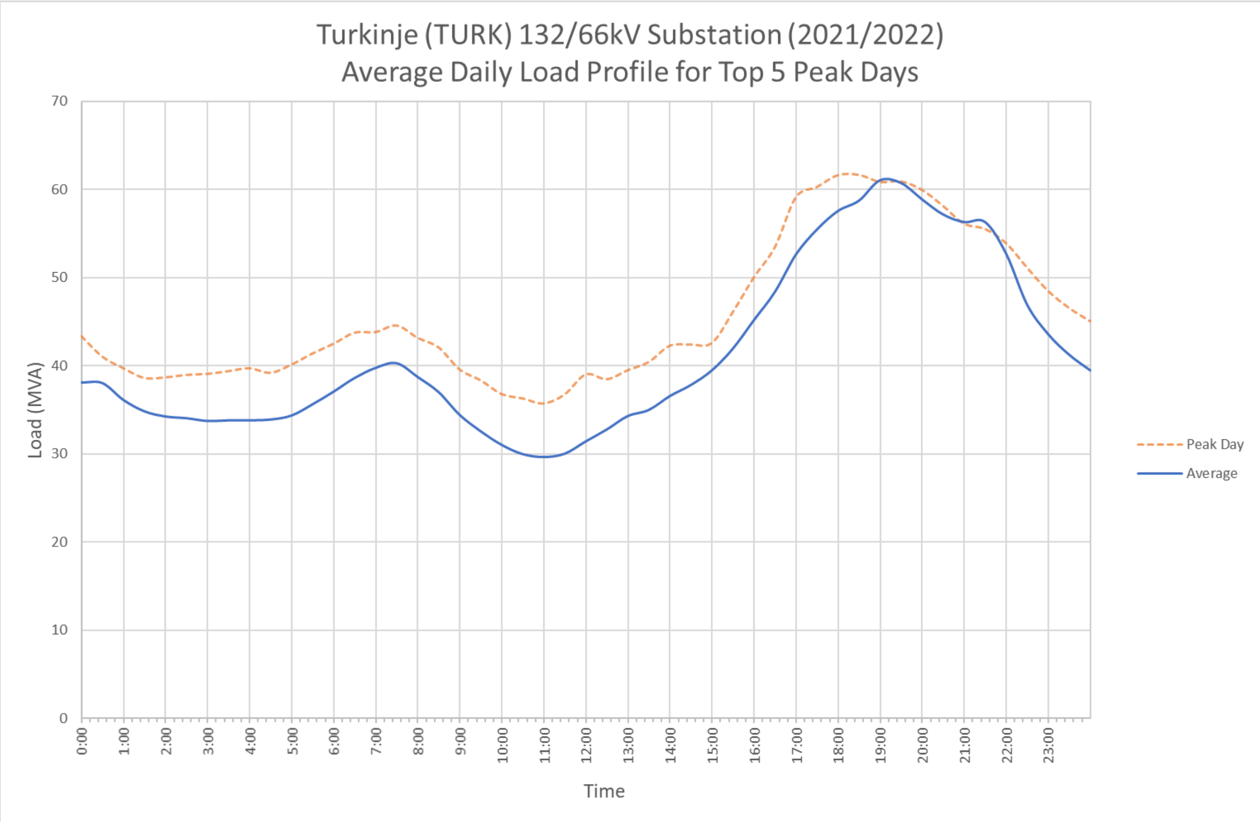


Figure 7: Substation average peak weekday load profile (summer)

2.3.4 Base Case Load Forecast

The 10 PoE and 50 PoE load forecasts for the base case load growth scenario are illustrated in Figure 8. The historical peak load for the past six years has also been included in the graph.

It can be noted that the historical annual peak loads have fluctuated over the past five years, primarily due to seasonal variation in pumping and irrigation load due to the quantity and timing of rainfall in the area. It can also be noted that the peak load is forecast to increase slightly over the next 10 years under the base case scenario.

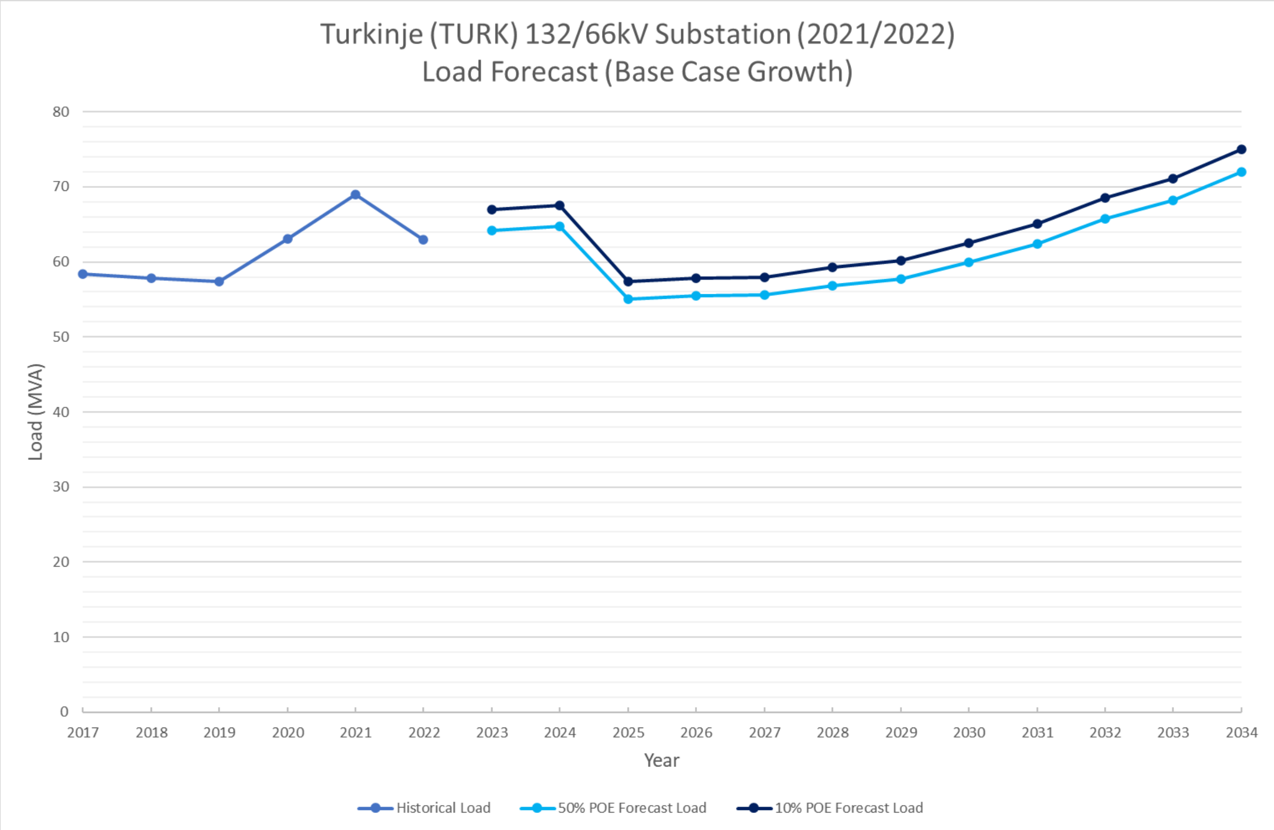


Figure 8: Substation base case load forecast

2.3.5 High Growth Load Forecast

The 10 PoE and 50 PoE load forecasts for the high load growth scenario are illustrated in Figure 9. With the high growth scenario, the peak load is forecast to increase over the next 10 years.

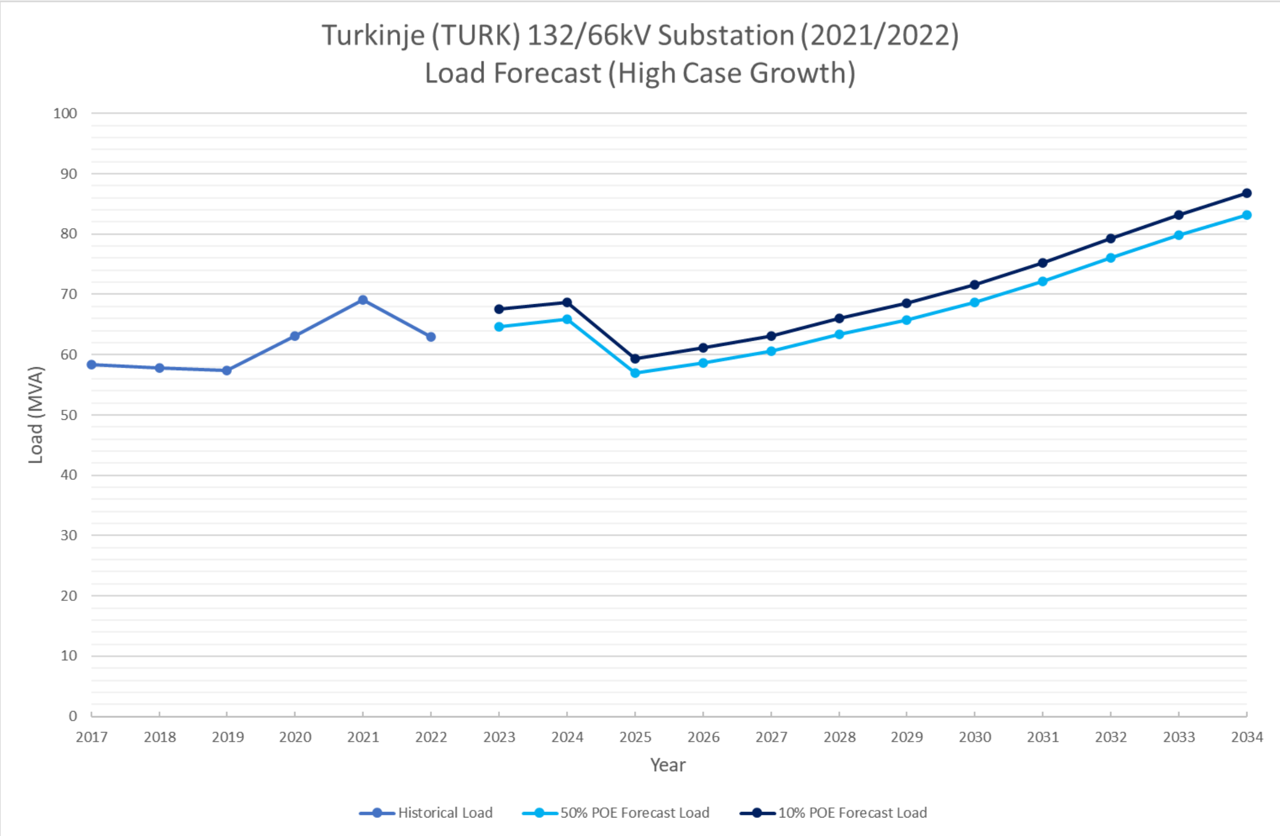


Figure 9: Substation high growth load forecast

2.3.6 Low Growth Load Forecast

The 10 PoE and 50 PoE load forecasts for the low load growth scenario are illustrated in Figure 10. With the low growth scenario, the peak load is forecast to remain relatively steady over the next 10 years.

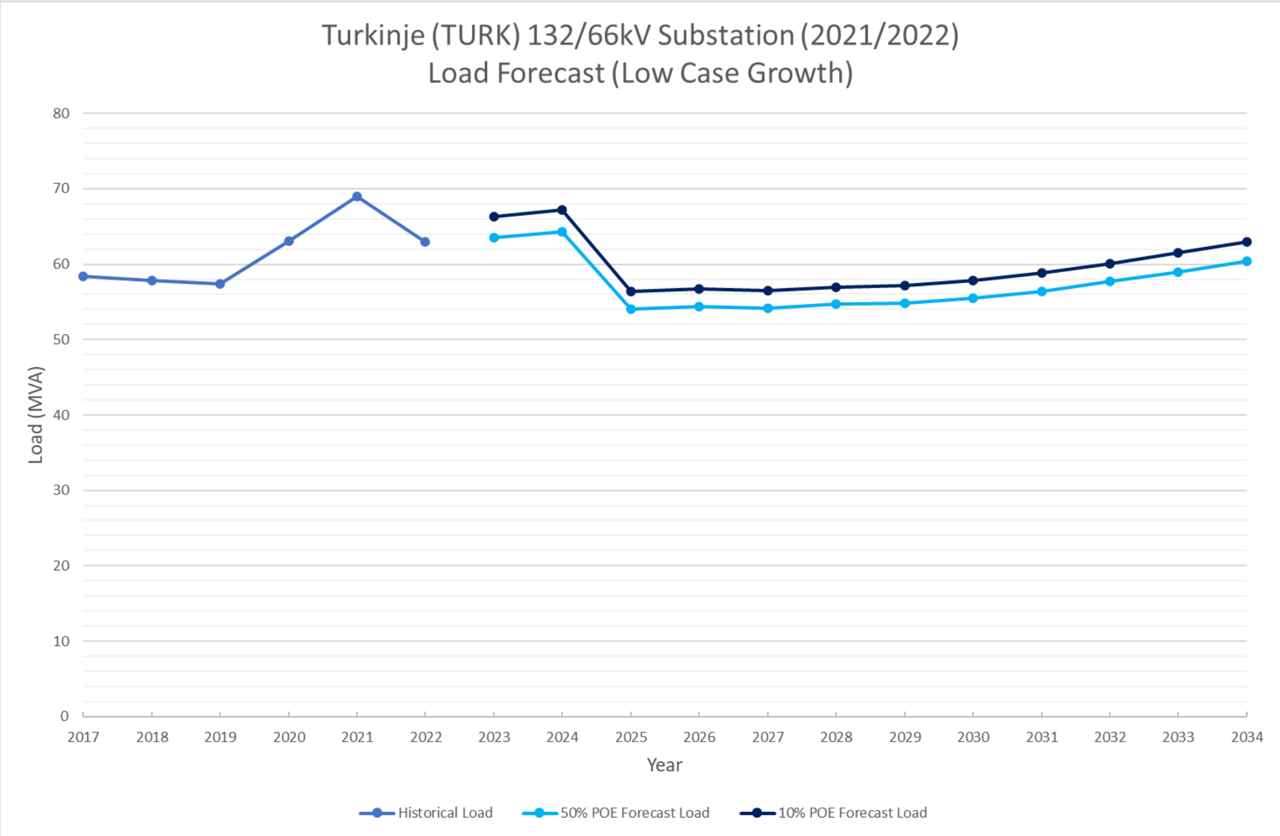


Figure 10: Substation low growth load forecast

3. IDENTIFIED NEED

3.1. Description of the Identified Need

3.1.1 Aged and Poor Condition Assets

A recent condition assessment has highlighted that a number of critical assets are at end of life and are in poor condition. The condition of these assets presents a considerable safety, environmental and reliability risk.

Condition data indicates that five 66kV circuit breakers, voltage and current transformers, bus support porcelain post insulators, isolators with segmented porcelain insulators and primary plant supporting structures at Turkinje Substation are reaching end of life. Aged 66kV plant can be seen in Figure 11.

A sustained 66kV bus fault at Turkinje Substation would result in loss of supply to at least 27,658 customers and two major generators. This includes loss of supply to entire rural towns such as Atherton, Mareeba and Dimbulah (it is expected that Mossman will no longer be fed via Turkinje Substation by the time this project goes ahead). In the event of a 66kV bus fault at Turkinje Substation, Ergon Energy will use ‘best endeavours’ to restore supply deploying generation for isolation/repair of the faulted bus section.

Figure 11: Existing Turkinje bus structure and aged 66kV plant

3.1.2 Risk Quantification Benefit Summary

Risk quantification analysis has been completed for both options which includes the value of customer reliability and cost of emergency replacement. The sum of the benefits of Option A in comparison to the counter-factual, which in this case is continuing the maintenance and operation of the existing circuit breakers and other end of life plant, are greater than $500,000 by 2054 as shown in **Figure 12**.

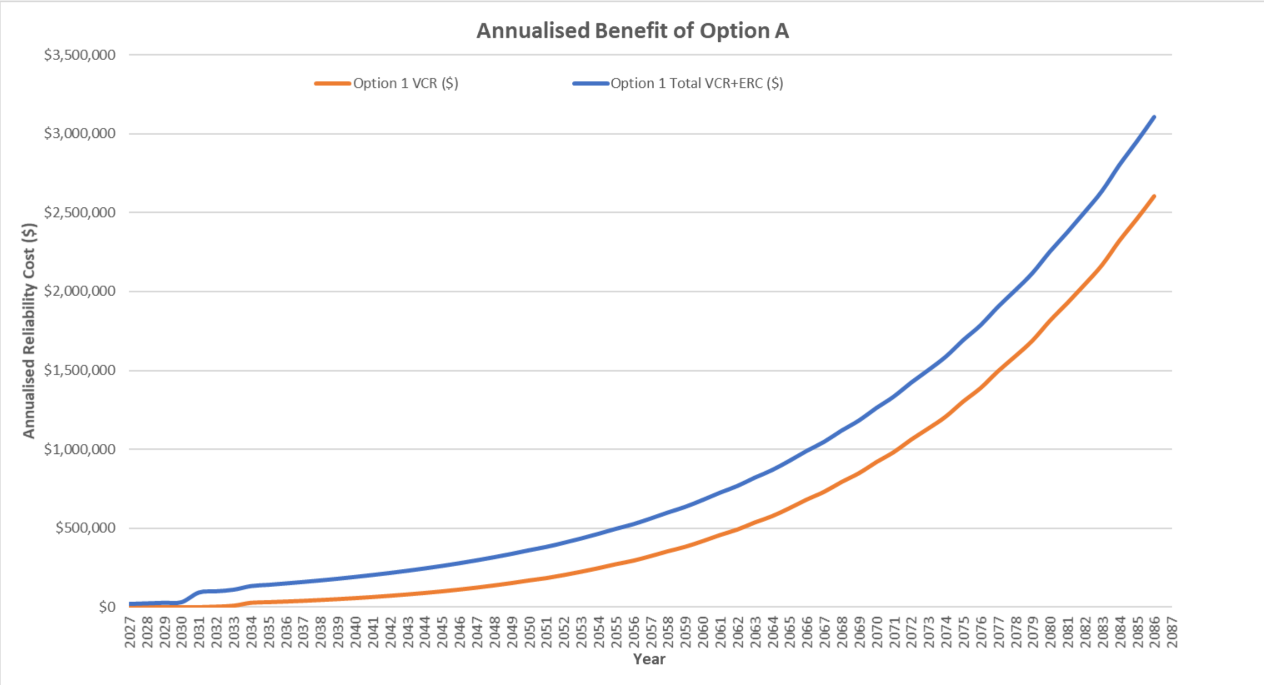


Figure 12: Annualised Benefit of Option A

3.2. Quantification of the Identified Need

3.2.1 Aged and Poor Condition Assets

A recent condition assessment has highlighted that a number of critical assets are at end of life and are in poor condition. The condition of these assets presents a considerable safety, environmental and reliability risk.

Condition data indicates that the five 66kV circuit breakers, voltage and current transformers, bus support porcelain post insulators, isolators with segmented porcelain insulators and primary plant supporting structures at Turkinje Substation are reaching end of life.

The deterioration of these primary system assets poses safety risks to staff working within the switchyard. It also poses a safety risk to the general public through the increased likelihood of protection relay mal-operation. Additionally, the poor condition of these assets significantly increases the likelihood of outages, resulting in a reduction in the level of reliability experienced by the customers supplied from Turkinje Substation.

Where Ergon Energy identifies an imminent asset safety risk, immediate temporary measures are put in place to ensure safety of staff and public until permanent remediation can be performed.

3.3. Assumptions in Relation to Identified Need

Below is a summary of key assumptions that have been made when the identified need has been analysed and quantified.

It is recognised that the below assumptions may prove to have various levels of correctness, and they merely represent a 'best endeavours' approach to predict the future identified need.

3.3.1 Forecast Maximum Demand

It has been assumed that forecast peak demand at Turkinje Substation will be consistent with the base case forecast outlined in Section 2.3.4.

Factors that have been taken into account when the load forecast has been developed include the following:

- load history;
- known future developments (new major customers, network augmentation, etc.);
- temperature corrected start values (historical peak demands); and
- forecast growth rates for organic growth.

3.3.2 Load Profile

Characteristic peak day load profiles shown in Section 2.3.3 are unlikely to change significantly from year to year and the shape of the load profile is assumed to remain virtually the same with increasing maximum demand.

4. CREDIBLE OPTIONS ASSESSED

4.1. Assessment of Network Solutions

Ergon Energy has identified two credible network options that will address the identified need.

4.1.1 Option A: Complete 66kV bus replacement with Air Insulated Switchgear

This option involves the installation of new Air Insulated Switchgear (AIS) at the front of the Turkinje Substation site to address the identified need.

A schematic diagram with the proposed network arrangement for Option A is shown in Figure 13 and Figure 14.

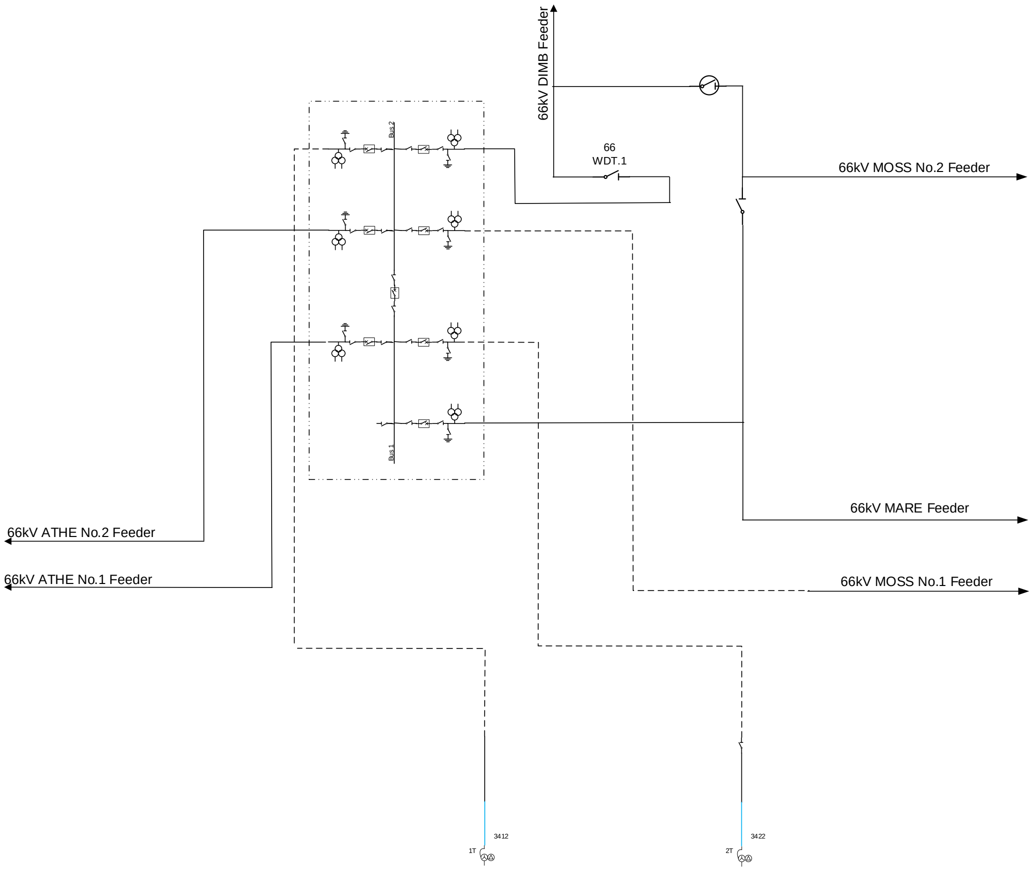


Figure 13 - Ultimate configuration of new AIS Bus

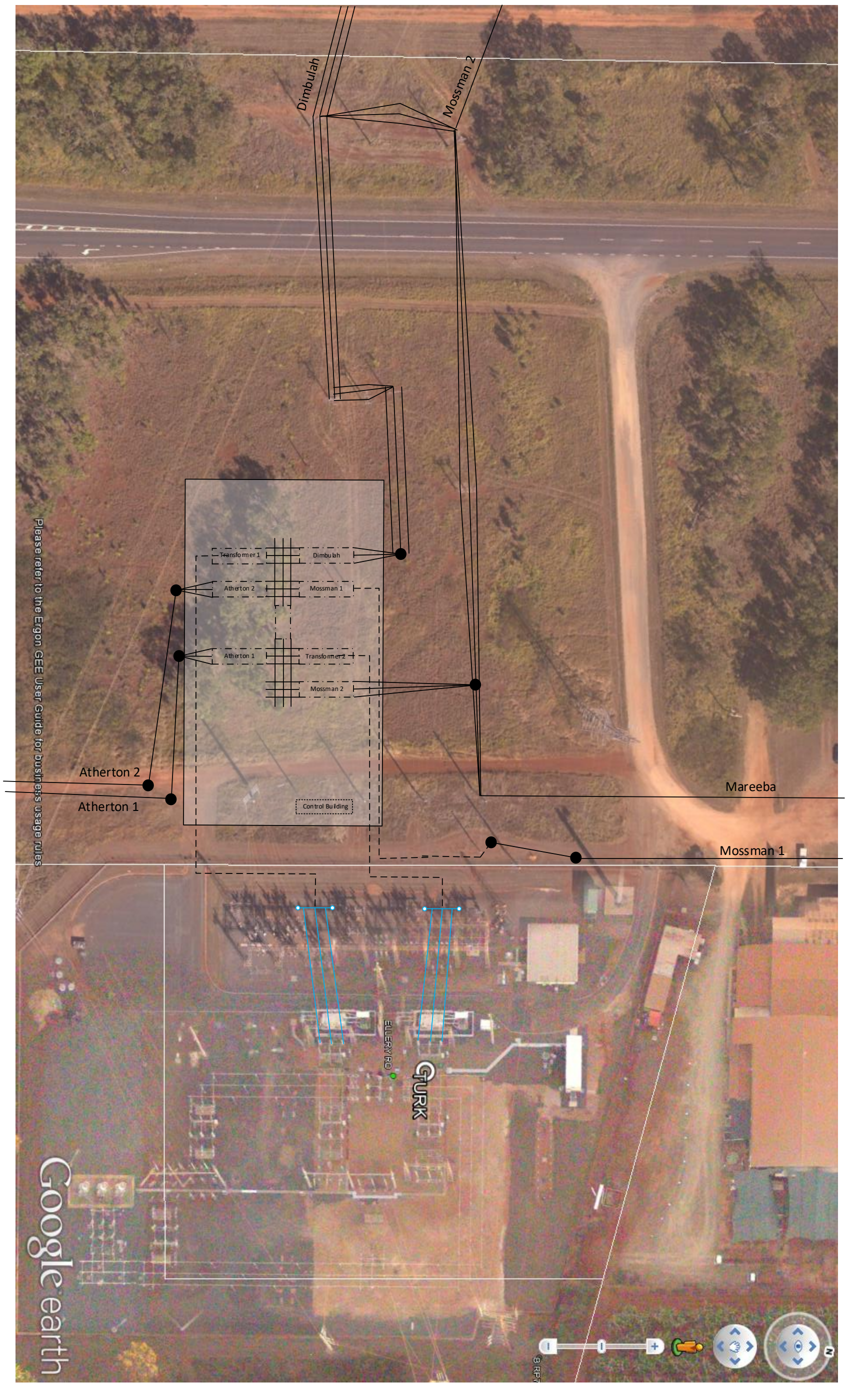


Figure 14 - AIS layout

4.1.2 Option B: Complete 66kV bus replacement with Gas Insulated Switchgear

This option involves the installation of new Gas Insulated Switchgear (GIS) at the front of the Turkinje Substation site in order to address the identified need. A schematic diagram of the proposed network arrangement for Option B is shown in Figure 15 and Figure 16.

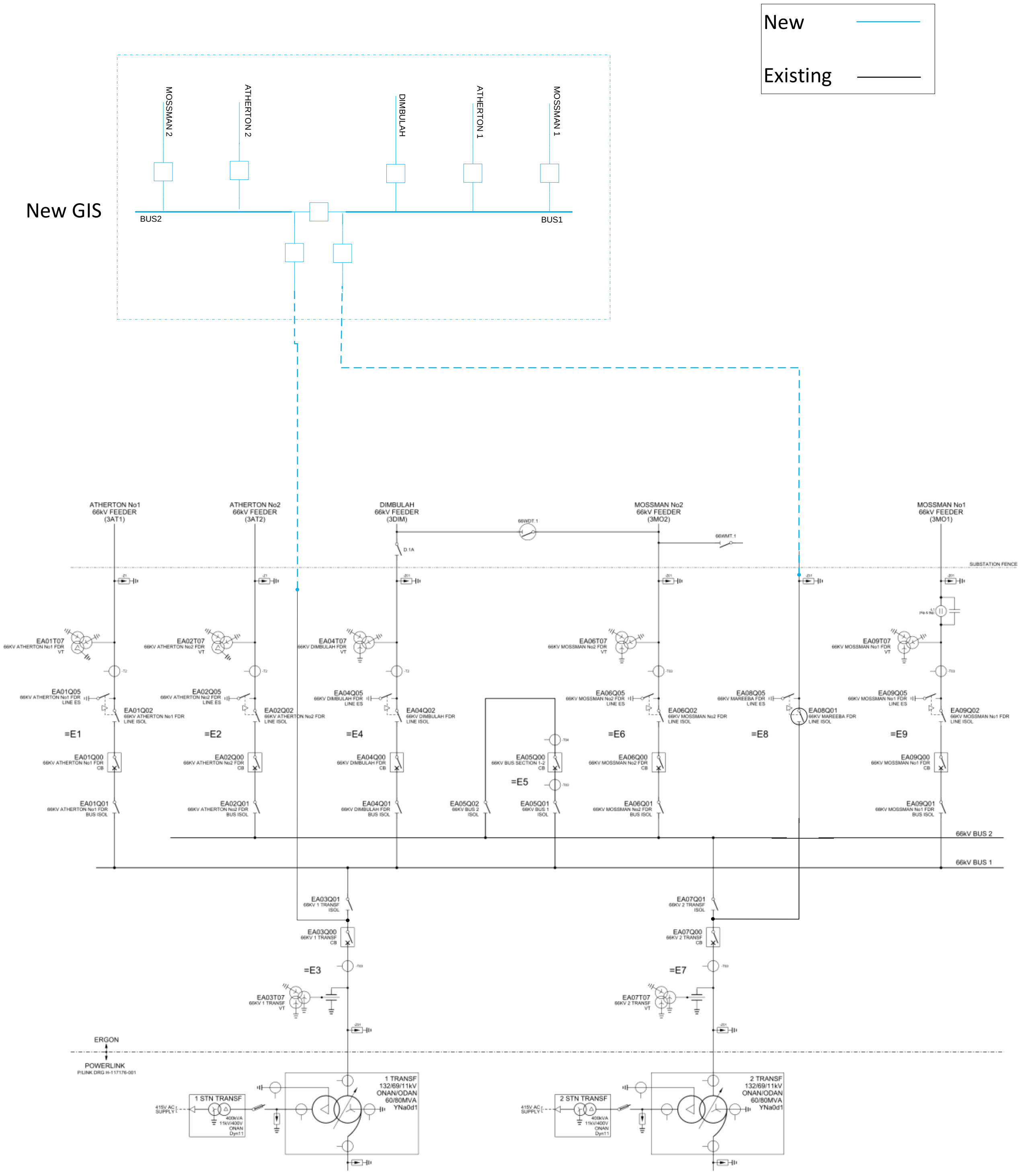


Figure 15 – Indicative Single Line Diagram of the proposed arrangement

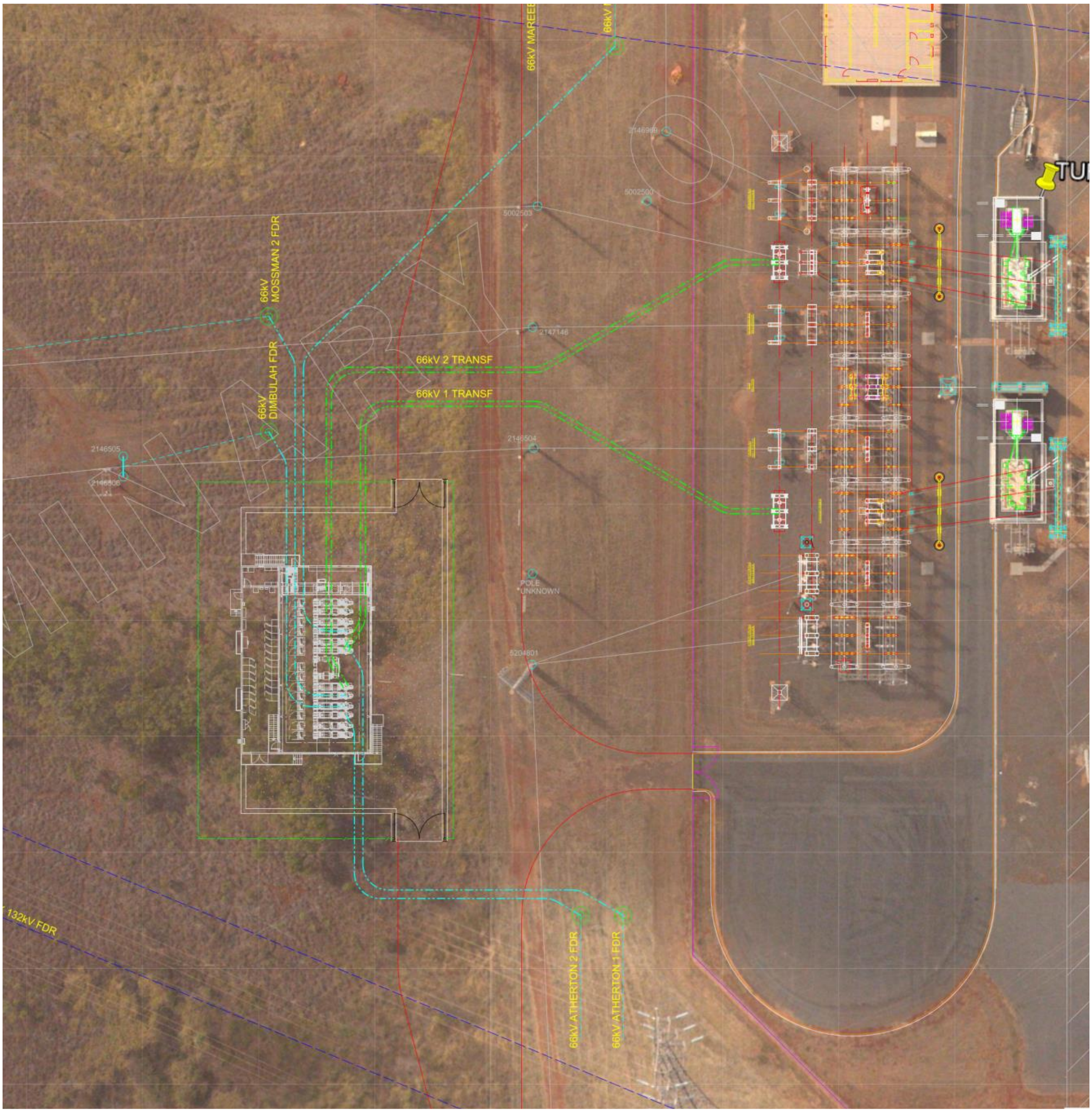


Figure 16 - Proposed GIS layout

4.2. Assessment of Non-Network Solutions

Ergon Energy's Demand & Energy Management (DEM) team has assessed the potential non network alternative (NNA) options required to defer the network option and determine if there is a viable demand management (DM) option to replace or reduce the need for the network options proposed.

Credible options must be technically and commercially viable and must be able to be implemented in sufficient time to satisfy the identified risk to the public and/or the network due to the identified constraints. It should be noted that Ergon Energy has already published a Notice of No Non-Network Options report outlining that in our view a Non-Network Solution is not possible in this case.

4.3. Customer Energy efficiency and power factor correction

Energy efficiency and power factor correction while offering permanent reductions has been assessed as not technically viable as this would only contribute to a fraction of the support required for the Turkinje Substation load.

4.3.1. Demand Response (curtailment of load)

Customer curtailment of load is an effective technique for network support where the need is for a short time period but is generally not viable for extended periods of time. A small portion of the Turkinje Substation residential load such as hot water systems, pool pumps and air conditioning is controllable load that can be switched off for short periods of time. In the Atherton Tablelands region large customer demand response is valued at $40-100/kVA (excluding acquisition costs). Targeted DM during the peak load periods on the 22kV network, if successful could reduce the demand. These options have been assessed as technically not viable as they would not provide the identified demand reduction required at Turkinje Substation and the load reduction would only be available for short periods of time.

4.3.2. Customer Solar Power / Energy Storage Systems

Business customers with large solar arrays are deemed to present a significant opportunity for targeted load control or load curtailment if coupled with a Battery Energy Storage System (BESS). There are currently around 5,600 customers connected to the Atherton Tablelands / Mossman network with inverter energy systems installed with a combined capacity of approximately 16MW. At present, only a very small percentage of customer solar power systems are coupled with a BESS. Solar customers without a BESS will not meet the technical needs of the demand reduction as their solar contribution may not be available when network support is required. This option has been assessed as technically not viable as it would not provide the identified demand reduction required to support the Turkinje Substation loads, would only provide support during daylight hours and the majority of these systems cease to operate during a network outage.

4.3.3. Large-Scale Customer Generation / Energy Storage

Large scale customer generation or energy storage is an effective technique for network support where the need is for a short time period but is generally not viable for extended periods of time. In the Atherton Tablelands / Mossman region large customer generation support is valued at $40-100/kVA (excluding acquisition costs). Note that this option commonly sources existing standby generators that can be operated in parallel with the network or separated from the network in an islanded arrangement to supply the customer's facility. Although the renewable energy projects under development in the Atherton Tablelands / Mossman area may possess the levels of generation support required to supply the Turkinje Substation loads, this option has been assessed as technically not viable as it is considered unlikely that these generators could supply the entire Turkinje Substation load on an enduring basis and maintain the required levels of reliability and power quality to customers in the Atherton Tablelands / Mossman area.

4.3.4. Non-Network Solution Summary

Ergon Energy has not identified any viable non-network solutions internally that will provide a complete or a hybrid (combined network and non-network) solution to provide the magnitude of network support required in the Turkinje Substation 66kV area to address the identified need.

4.4. Preferred Network Option

Ergon Energy's preferred internal network option is Option A, to install new 66kV air insulated switchgear at the front of the existing substation and transfer all existing feeders to the new switchgear.

Upon completion of these works, the asset safety and reliability risks at Turkinje Substation will be addressed. The preferred option will provide the greatest reliability benefit for customers, whilst also reducing expenditure on obsolete and non-compliant assets while ensuring more efficient use of design and construction resources.

The estimated capital cost of this option inclusive of interest, risk, contingencies, and overheads is $19.74 million. Annual operating and maintenance costs are anticipated to be 1.5% of the capital cost. The estimated project delivery timeframe has design commencing in October 2023 and construction completed by December 2027.

5. SUMMARY OF SUBMISSIONS RECEIVED IN RESPONSE TTO DRAFT PROJECT ASSESSMENT REPORT

On 16 November 2022, Ergon Energy published the Draft Project Assessment Report providing details on the identified need for the Turkinje 66kV network. This report provided both technical and economic information about possible solutions and sought information from interested parties about possible alternate solutions to address the need for investment.

In response to the Draft Project Assessment Report, Ergon Energy received no submissions by 30 December 2022, which was the closing date for submissions to the Draft Project Assessment Report.

6. MARKET BENEFIT ASSESSMENT METHODOLOGY

The purpose of the RIT-D is to identify the option that maximises the present value of net market benefits to all those who produce, consume and transport electricity in the National Electricity Market (NEM).

In order to measure the increase in net market benefit, Ergon Energy has analysed the classes of market benefits required to be considered by the RIT-D.

6.1. Classes of Market Benefits not Expected to be Material

The following classes of market benefits are not considered to be material for this RIT-D, and have not been included in this RIT-D assessment:

- Changes in voluntary load curtailment
- Changes in costs to other parties
- Changes in timing of expenditure
- Changes in load transfer capability
- Changes in network losses
- Option value

6.1.1 Changes in Voluntary Load Curtailment

Because none of the credible options include any voluntary load curtailment, any market benefits associated with changes in voluntary load curtailment have not been considered.

6.1.2 Changes in Costs to Other Parties

Ergon Energy does not anticipate that any of the credible options included in this RIT-D assessment will affect costs incurred by other parties.

6.1.3 Changes in Timing of Expenditure

None of the credible options included in this RIT-D assessment are expected to affect the timing of other distribution investments for unrelated identified needs.

6.1.4 Changes in Load Transfer Capability

None of the credible options included in this RIT-D assessment are expected to have an impact on the load transfer capability between the zone substations in the Turkinje Substation 66kV area.

6.1.5 Changes in Network Losses

Ergon Energy does not anticipate that any of the credible options included in the RIT-D assessment will lead to any significant change in network losses.

6.1.6 Option Value

The AER's view is that option value is likely to arise where there is uncertainty regarding future outcomes, the information that is available in the future is likely to change, and the credible options considered by the RIT-D proponent are sufficiently flexible to respond to that change[1].

Ergon Energy does not consider that the identified need for the options included in this RIT-D would be affected by uncertain factors about which there may be more clarity in future.

7. DETAILED ECONOMIC ASSESSMENT

7.1. Methodology

The Regulatory Investment Test for Distribution requires Ergon Energy to identify the credible option that maximises the present value of net economic benefit to all who produce, consume and transport electricity in the National Electricity Market.

Accordingly, a base case Net Present Value (NPV) comparison of the alternative development options has been undertaken.

Further to the scenarios considered, a Monte-Carlo analysis simulation was undertaken on the base case project timings to assess the projects sensitivity to a change in the parameters of the NPV model.

7.2. Key Variables and Assumptions

The economic assessment contains anticipated costs of providing, operating and maintaining the options as well as expected costs of compliance and administration associated with each option.

The present value comparison summary includes all costs directly associated with constructing and providing the option. This includes the cost of land and easements currently owned or to be acquired for network augmentation.

Interest on borrowings is not included as a cost in the comparison of options as it represents a cost of project financing, and as such is accounted for in present value calculations through the discounting of the project cash flows at the regulated WACC. The interest on borrowings is included in the Total Project Cost for which approval is being sought as it represents a legitimate cost of network augmentation.

[1] AER "Regulatory Investment Test for Distribution Application Guidelines", Section A6.
Available at: http://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/regulatory-investment-test-for-distribution-rit-d-and-application-guidelines

Table 1 outlines the major sensitivities analysed within the Monte-Carlo analysis which was undertaken to assess the sensitivity to a change in parameters of the NPV model.

Parameter	Mode Value	Lower Bound	Upper Bound
WACC	2.62%	2.62%	2.62%
Project Costs	Standard estimates	-40%	+40%
Project Costs	Preferred option estimates	-40%	+40%
Opex Costs	Calculated Opex	-10%	+10%

Table 1: Economic parameters and sensitivity analysis factors

7.3. Net Present Value (NPV) Results

An overview of the initial capital cost and the base case NPV results are provided in **Table 2**.

Option	Option Name	Rank	Initial Capital Cost	Net Economic Benefit ($ real)	PV of Capex ($ real)	PV of Opex ($ real)	Benefits NPV
A	Complete 66kV bus replacement with Air Insulated Switchgear	1	$17,802,720	-$5,201,000	-$17,803,000	-$6,742,000	$19,343,000
B	Complete 66kV bus replacement with Gas Insulated Switchgear	2	$18,108,177	-$6,044,000	-$18,108,000	-$6,858,000	$18,922,000

Table 2: Base case NPV ranking table

Further to the scenarios considered, a Monte-Carlo analysis simulation was undertaken on the base case project timings to assess the projects sensitivity to a change in the parameters of the NPV model. The Monte-Carlo analysis undertook 1000 simulations of all the variables. Table 3 shows the percentage of times each option was the most economical across the simulations and also the average NPV cost of all the simulations.

Option Number	Option Name	Rank 1	Rank 2	Average NPV
A	Complete 66kV bus replacement with Air Insulated Switchgear	66.3%	33.7%	-$4,923,000
B	Complete 66kV bus replacement with Gas Insulated Switchgear	33.7%	66.3%	-$5,732,000

Table 3: Monte Carlo Analysis for Base Case Forecast

Option A is the lowest cost option in the weighted average results across the two scenarios. Option A also has the lowest average cost and is the most economical in 66.3% of cases in the Monte-Carlo simulations.

Based on the detailed economic assessment, Option A is considered to provide the optimum solution to address the forecast limitations and is therefore the recommended development option.

7.4. Selection of Preferred Option

Ergon Energy's preferred internal network option is Option A, to install new 66kV air insulated switchgear at the front of the existing substation and transfer all existing feeders to the new switchgear.

Upon completion of these works, the asset safety and reliability risks at Turkinje Substation will be addressed. The preferred option will provide the greatest reliability benefit for customers, whilst also reducing expenditure on obsolete and non-compliant assets while ensuring more efficient use of design and construction resources.

The estimated capital cost of this option inclusive of interest, risk, contingencies and overheads is $19.74 million. Annual operating and maintenance costs are anticipated to be 1.5% of the capital cost. The estimated project delivery timeframe has design commencing in October 2023 and construction completed by December 2027.

7.5. Satisfaction of RIT-D

The proposed preferred option satisfies the RIT-D.

This statement is made on the basis of the detailed analysis set out in this report. The proposed preferred option is the credible option that has the highest net economic benefit under the most likely reasonable scenarios.

8. CONCLUSION

The Final Project Assessment Report (FPAR) represents the final stage of the consultation process in relation to the application of the RIT-D.

Ergon Energy intends to take steps to progress the proposed preferred option to ensure any statutory non-compliance is addressed and undertake appropriately justified network reliability improvements, as necessary.

8.1. Preferred Option

Ergon Energy's preferred internal network option is Option A, to install new 66kV air insulated switchgear at the front of the existing substation and transfer all existing feeders to the new switchgear.

Upon completion of these works, the asset safety and reliability risks at Turkinje Substation will be addressed. The preferred option will provide the greatest reliability benefit for customers, whilst also reducing expenditure on obsolete and non-compliant assets while ensuring more efficient use of design and construction resources.

The estimated capital cost of this option inclusive of interest, risk, contingencies and overheads is $19.74 million. Annual operating and maintenance costs are anticipated to be 1.5% of the capital cost. The estimated project delivery timeframe has design commencing in October 2023 and construction completed by December 2027.

8.2. Satisfaction of RIT-D

The proposed preferred option satisfies the RIT-D.

This statement is made on the basis of the detailed analysis set out in this report. The proposed preferred option is the credible option that has the highest net economic benefit under the most likely reasonable scenarios.

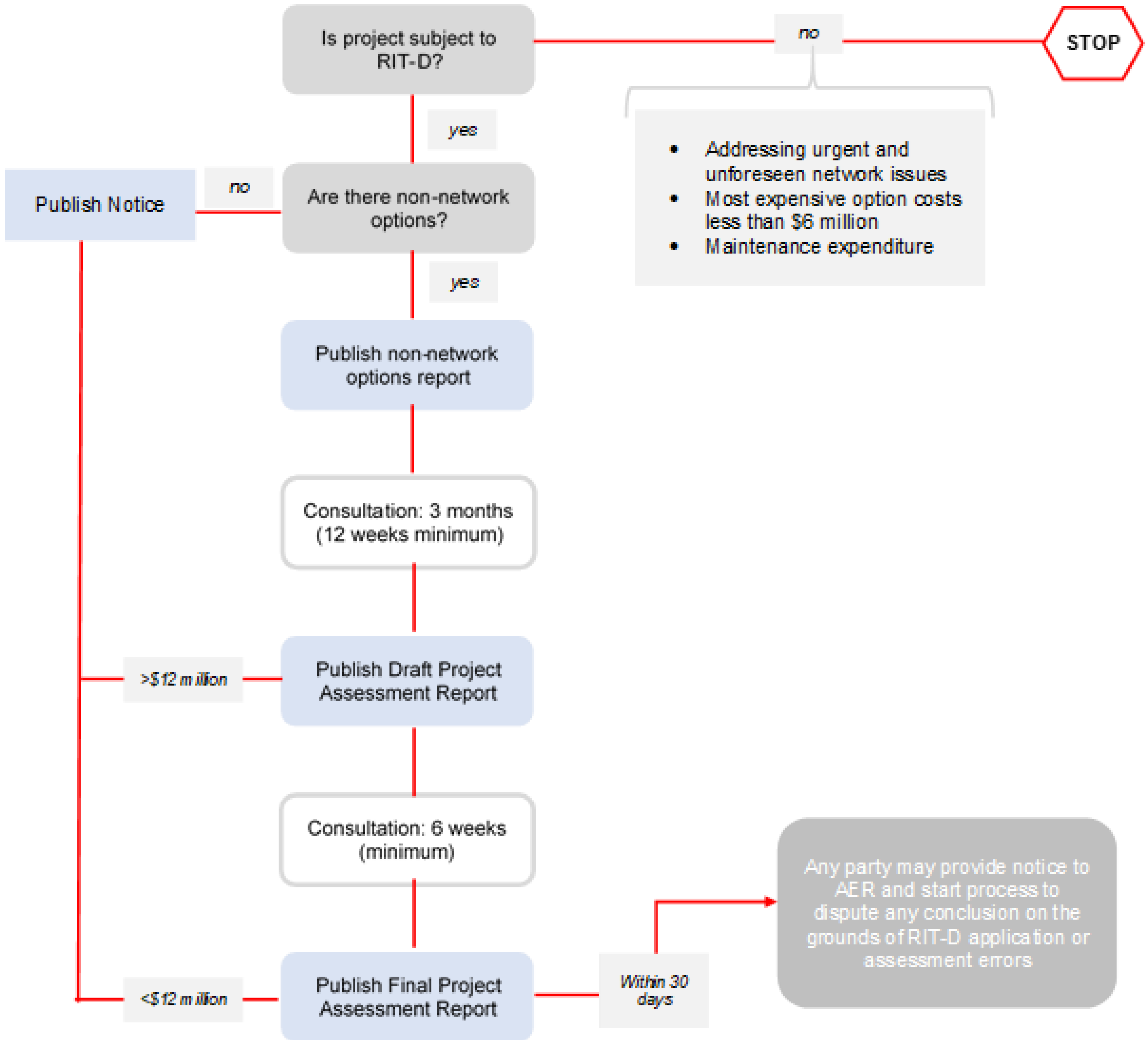
9. COMPLIANCE STATEMENT

This Final Project Assessment Report complies with the requirements of NER section 5.17.4(j) as demonstrated below:

Requirement	Report Section
(1) a description of the identified need for investment;	3
(2) the assumptions used in identifying the identified need (including, in the case of proposed reliability corrective action, why the RIT-D proponent considers reliability corrective action is necessary;	3.3
(4) a description of each credible option assessed	4
(5) where a *Distribution Network Service Provider* has quantified market benefits in accordance with clause 5.17.1(d), a quantification of each applicable market benefit of each credible option	6
(6) a quantification of each applicable cost for each credible option, including a breakdown of operating and capital expenditure	3.2 & 7
(7) a detailed description of the methodologies used in quantifying each class of costs or market benefit	6 & 7
(8) where relevant, the reasons why the RIT-D proponent has determined that a class or classes of market benefits or costs do not apply to a credible option	6
(9) the results of a NPV analysis of each credible option and accompanying explanatory statements regarding the results	7
(10) the identification of the proposed preferred option	7.4
(11) for the proposed preferred option, the RIT-D proponent must provide: (i) details of the technical characteristics; (ii) the estimated construction timetable and commissioning date (where relevant); (ii) the indicative capital and operating costs (where relevant); (iv) a statement and accompanying analysis that the proposed preferred option satisfied the RIT-D; and	7.3, 7.4 & 7.5

(v) if the proposed preferred option is for reliability corrective action and that option has a proponent, the name of the proponent	
(12) contact details for a suitably qualified staff member of the RIT-D proponent to whom queries on the draft report may be directed.	1.4

APPENDIX A – THE RIT-D PROCESS



Source: AEMC, *Rule determination: National Electricity Amendment (Replacement expenditure planning arrangements) Rule 2017*, July 2017, p. 64.