



Non-Network Options Screening Report

Supplying the Mt Cottrell area

October 2024

Contents

1	INTRODUCTION	3
1.1	Identified need.....	4
1.2	Possible network solutions.....	4
1.3	Submissions	5
2	QUANTIFICATION OF IDENTIFIED NEED	6
2.1	Network Overview.....	6
2.2	Load Characteristics and Demand Forecasts.....	7
2.3	Network Risk.....	13
2.4	Credible Network Options.....	14
3	ASSUMPTIONS AND METHODOLOGIES.....	15
3.1	Demand Forecasts	15
3.2	Financial model inputs	15
4	POTENTIAL DEFERRED AUGMENTATION.....	16
4.1	Potential deferred augmentation charges.....	16
4.2	Minimum requirements that will form part of our assessment.....	16
5	LODGING A SUBMISSION	17
6	REFERENCES	18
7	DEFINITIONS	19

1 Introduction

This document sets out the parameters that a non-network option (NNO) or Stand-Alone Power System (SAPS) option would need to meet to be considered a credible option in solving the identified need within this report.

The metropolitan Melbourne western growth corridor (west of Melbourne) is an area of rapidly developing domestic subdivisions and commercial / industrial load centres.

A new substation at Mount Cottrell (MTC) driven by customer loads, the subject of a separate RIT-D process, is anticipated to be in operation in 2025, supplied out of Deer Park Terminal Station (DPTS).

The area of interest for this report includes Mount Cottrell and the areas around it including established growth areas of Truganina to the east, Werribee to the south and Melton to the north.

The Mount Cottrell area will require significant infrastructure to service the developments as they occur and the new substation MTC is in a central location between four existing substations, Werribee (WBE), Laverton (LV), Truganina (TNA) and Melton (MLN). MLN and TNA are currently supplied by DPTS, whereas WBE and LV are supplied by Altona terminal station west (ATS west).

A map showing the area and relevant substations is shown in Figure 1.

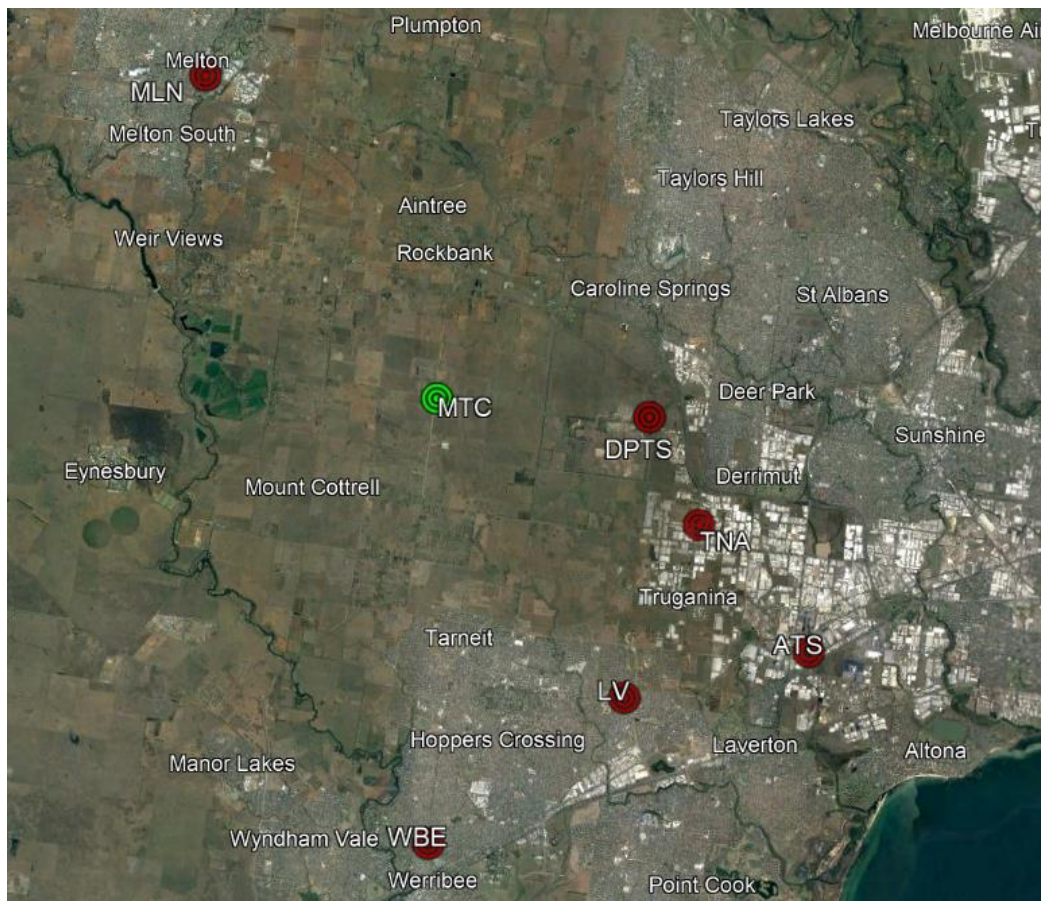


Figure 1 Mount Cottrell, western Melbourne

New infrastructure will be required to reticulate new commercial and residential developments around Mt Cottrell. The three substations, WBE, LV and MLN are all facing load constraints in the near future preventing them from being able to supply the forecast additional load in the areas supplied by them, and, unable to accept transfer requests from

each other for operational needs. The terminal station ATS West is also approaching load constraints, creating load at risk at all four sites.

The new substation at Mount Cottrell (MTC) being built to supply known commercial loads will not have adequate capacity to accept additional load transferred from the surrounding existing substations which in turn would aid in alleviating the approaching constraint at ATS.

We have initiated a Regulatory Investment Test for Distribution (RIT-D) to investigate and consult on the provision of supply to new customer connections in the Mount Cottrell and surrounding areas.

In accordance with NER clause 5.17.4(c), this document represents the first formal stage of the RIT-D process in assessing how to provide supply most efficiently to the Mount Cottrell and surrounding areas.

1.1 Identified need

Under Chapter 5 of the National Electricity Rules (NER), we are required to connect customers and in doing so, we must achieve the specified performance standards. Customers must be connected such that it will not adversely affect other registered participants.

We therefore consider the identified need for this investment to be ‘providing adequate customer supply’ under the RIT-D, as the investment is required to comply with the above NER obligations.

Key factors driving the need for a solution includes emerging no prior outage (‘N’) hours at risk at WBE, as well as significant levels of single outage (‘N-1’) hours at risk at TNA and ATS West.

Timing is discussed in section 2 and the first critical date is likely to occur in 2026.

1.2 Possible network solutions

There are obvious network solutions to address the emerging load constraints in this area. They include:

1. Upgrade all sites:
 - Upgrade of all four existing substations, TNA, WBE, LV and MLN to alleviate emerging load constraints.
 - Upgrade of ATS West.
 - Upgrade new MTC to a larger capacity to accept local load growth.

Cost and physical site limitations of this option suggest it is not a credible solution. It may be referenced further in reports but no effort will be put into detailed analysis given the impracticalities of turning it into a credible option.
2. Create a new substation
 - Build a new substation at the load centre and connect it to the Deer Park Terminal Station (DPTS)
 - Transfer load from other four substations to this new site, alleviating constraints from four existing substations and extending constraint timing at Altona Terminal Station West (ATS West)
3. Upgrade MTC to become a two-transformer station and transfer other substation loads to it
 - Increase capacity of MTC with a second 25 MVA transformer.
 - Transfer load from other four substations to this central site which is supplied by Deer Park Terminal Station (DPTS), alleviating constraints from four existing substations and extending constraint timing at Altona Terminal Station West (ATS West).

Our network studies show that to provide for adequate short and long term growth by a network solution, an upgrade of MTC will allow transfer of loads from other sites and provide capacity for continued local development of commercial and residential connections in the Mount Cottrell area. This is discussed further in section 2.4.

1.3 Submissions

We welcome queries and or submissions on this report. Details for all communications are listed in section 5.

2 Quantification of identified need

2.1 Network Overview

Figure 2 shows the 22kV distribution network in Blue and the 66kV in Red. The proposed Mount Cottrell substation (MTC) is shown adjacent to the input 66kV circuit.

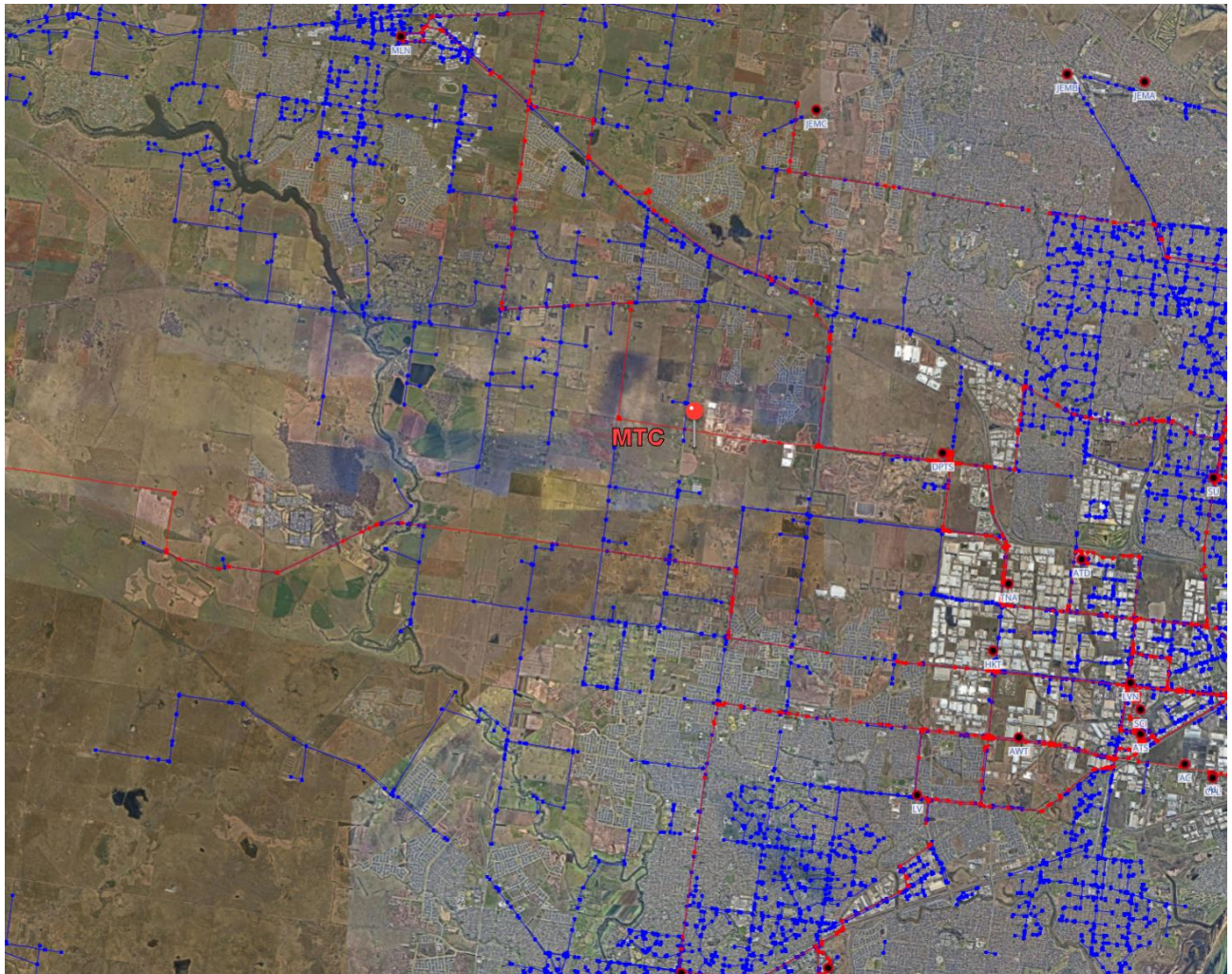


Figure 2 Sub transmission and distribution networks in the greater Mount Cottrell area

The location of MTC balances access to the transmission network with proximity to the customer loads that it is being built for. The distribution network in the rural areas around MTC would require upgrading to transport energy to, from or through the local region.

2.2 Load Characteristics and Demand Forecasts

Each substation site has:

- a Nameplate and cyclic rating for when all components are in service in a normal operating configuration (N)
- a Nameplate and cyclic rating for when the operating configuration of a substation is such that if no more primary equipment can be taken out of service, intentionally or otherwise, without causing an interruption of supply to connected customers (N-1).

The allowed demand cyclic ratings are higher than nameplate ratings by implementing managed periods of overloading (cycling), allowing more energy to be delivered at a rate higher than full time loading limitations. This situation cannot be implemented permanently without damaging the equipment.

The forecast charts will show two probabilities of load growth (Probability of Exceedance or POE):

- 10% POE is the highest forecast result with a probability of 10% of this scenario being exceeded (less likely but possible), and,
- 50% POE, a more likely outcome of load forecasting which forms the basis of assessment in this report.

Table 1 provides a summary of exceedances of the N and N-1 ratings for each substation in this western growth area.

Table 1 Summary of rating exceedance timing (50% PoE)

Substation	Exceed N-1 rating	Exceed N rating
MLN	now	2031
LV	now	2031
TNA	now	Post 2033
WBE	now	2026

Load forecasts and typical consumption profiles are shown in the next sections, with baseline trends sourced from our 2023 Distribution Annual Planning Report (DAPR). A 'Central' load forecast was formulated for zone substations where there were high confidence customers looking to connect. The 'Central' load forecast is based on the 'High DER' load forecast as per the 2023 DAPR, with the addition of these diversified high confidence loads.

i. Mount Cottrell Substation (MTC) (to be commissioned in 2025)

Mount Cottrell is a substation that will be built and commissioned in 2025. It is the subject of a separate determination as it is a solution for customer funded load expansions and will be sized accordingly with one 25MVA transformer for that need and required level of supply security.

The forecast for MTC is flat over the next 10 years with an anticipated demand of 18 MVA. This is a result of the dedicated function to supply a small number of large customers.

ii. Melton Substation (MLN)

MLN services domestic and commercial loads situated to the north of Mount Cottrell area. As shown in Figure 3, the N-1 cyclic rating is now exceeded, and the 50% POE “N” rating is forecast to be exceeded by 2031.

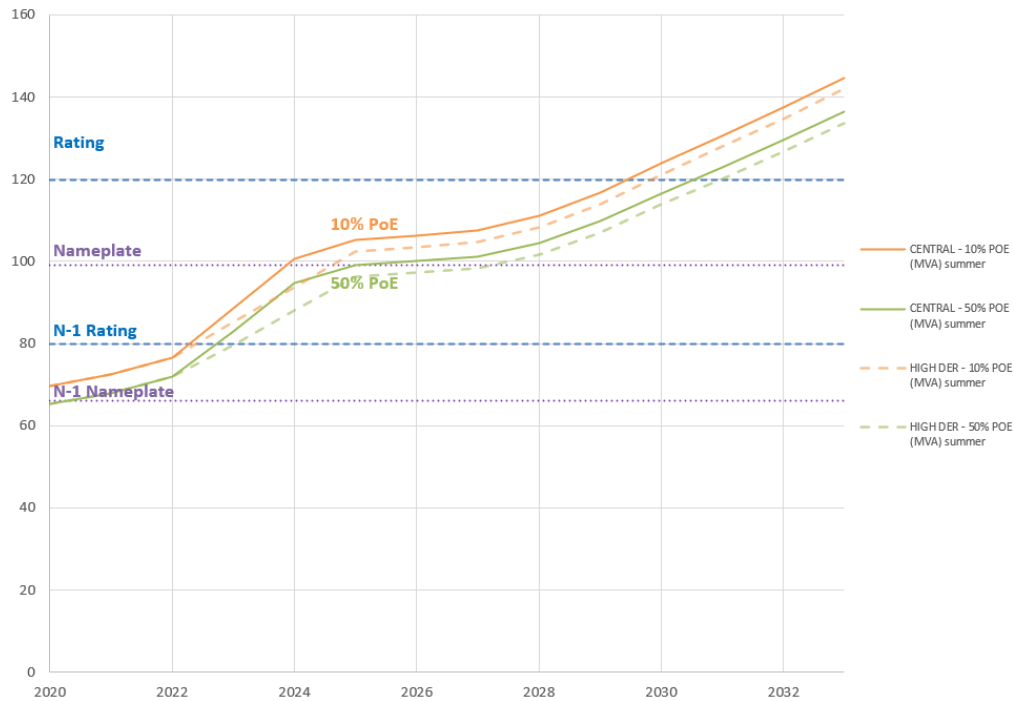


Figure 3 Melton Substation (MLN) Summer loading Forecast (MVA)

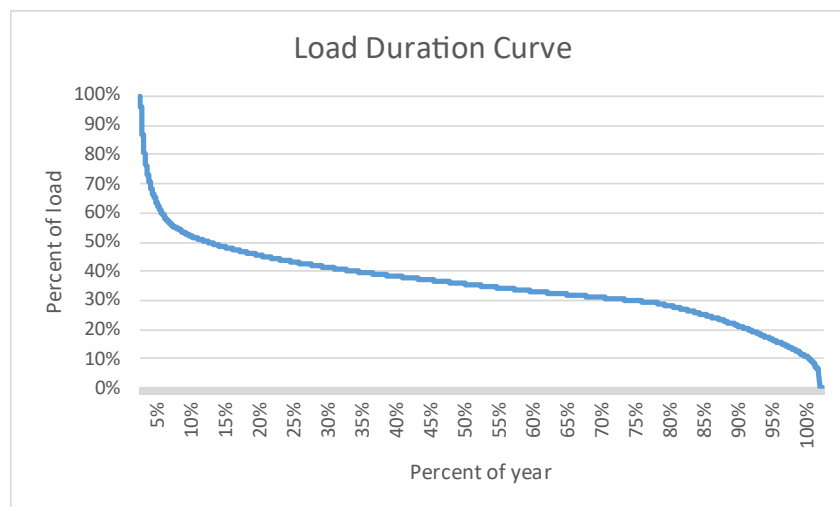


Figure 4 MVA Load Duration Curve for Melton Substation (MLN)

iii. Laverton Substation (LV)

LV supports a growing number of commercial and residential loads in the Tarneit region southeast of Mount Cottrell. As shown in Figure 5, this substation currently exceeds its N-1 rating and the load forecast is that it will reach its station 50% PoE “N” cyclic rating by 2031.

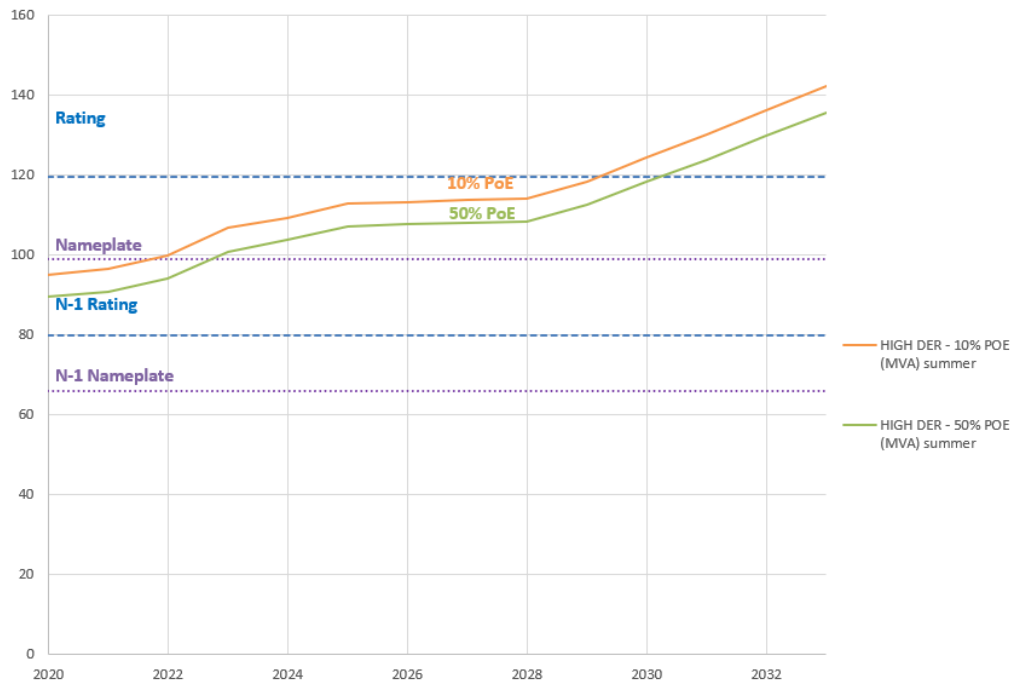


Figure 5 Laverton Substation (LV) Summer Loading Forecast (MVA)

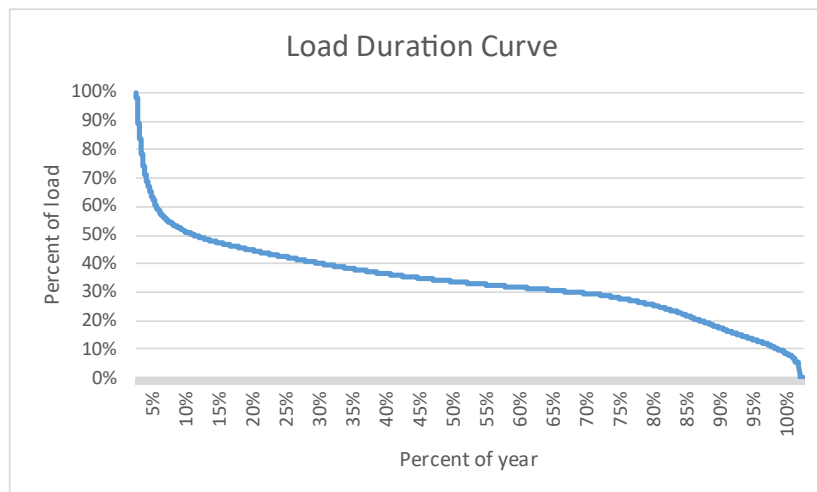


Figure 6 MVA Load Duration Curve for Laverton Substation (LV)

iv. Truganina Substation (TNA)

TNA supplies domestic and commercial loads southeast of the Mount Cottrell area. As shown in Figure 7, this substation currently exceeds its N-1 rating and the load forecast is that it will reach its station 50% PoE “N” cyclic rating beyond 2033.

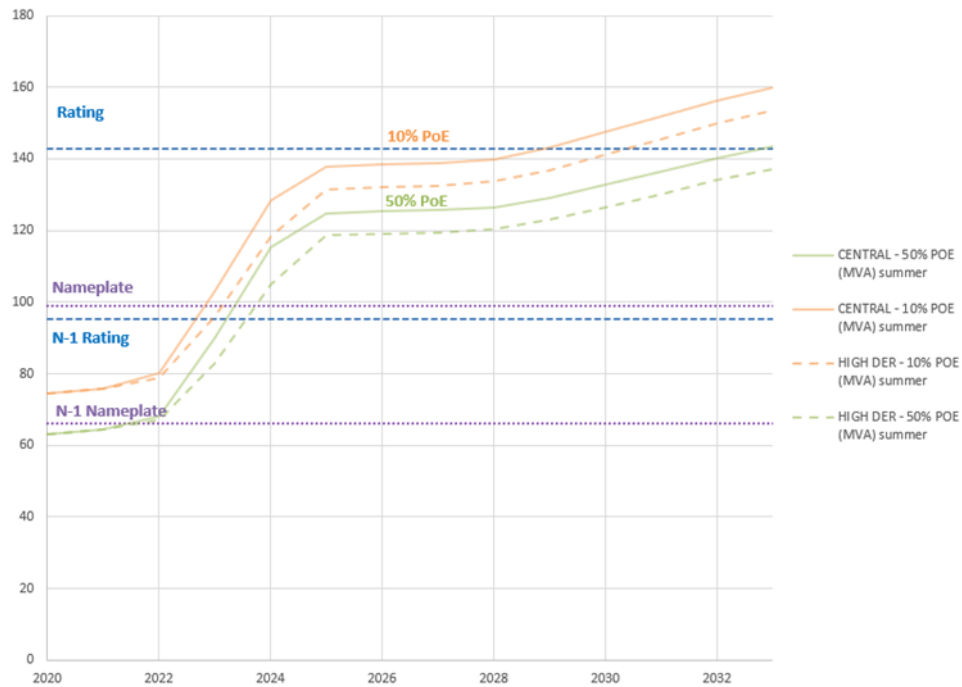


Figure 7 Truganina Substation (TNA) Summer Load Forecasting (MVA)

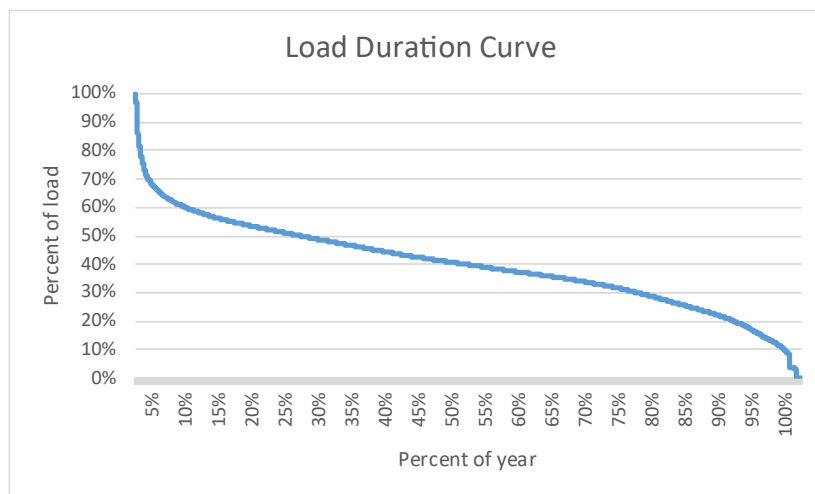


Figure 8 MVA Load Duration Curve for Truganina Substation (TNA)

v. Werribee Substation (WBE)

WBE supports a rapidly growing number of commercial and residential loads in the region south of Mount Cottrell. As shown in Figure 9, this substation currently exceeds its 50% POE N-1 cyclic rating and the load forecast shows that it will likely reach its station 50% PoE “N” cyclic rating somewhere around 2026.

WBE has little to no peak transfer capacity available beyond 2023 to support other substations in this western growth corridor.

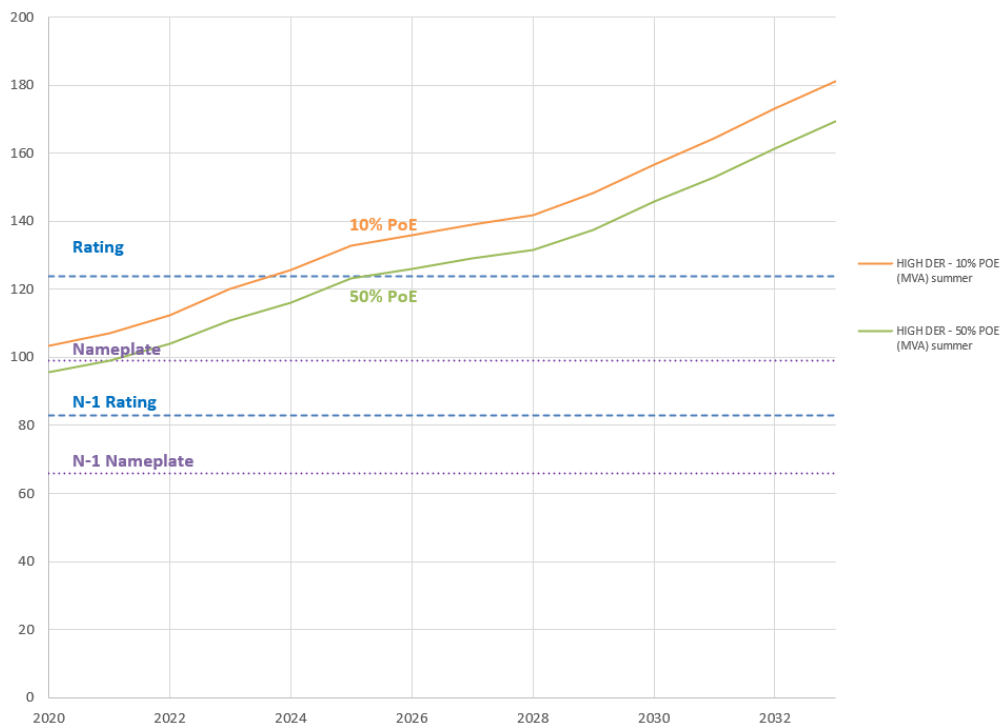


Figure 9 Werribee Substation (WBE) Summer Loading Forecast (MVA)

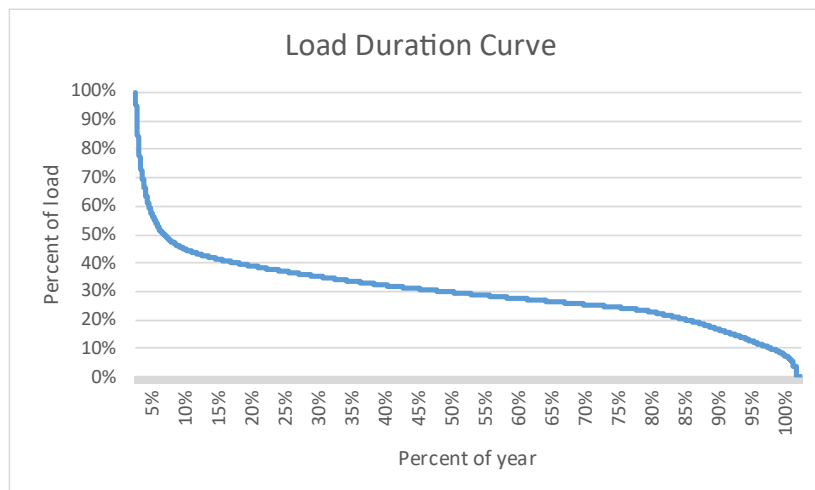


Figure 10 MVA Load Duration Curve Werribee Substation (WBE)

2.3 Network Risk

As shown above in the peak demand forecasts, electrical demand growth in the western growth corridor area is expected to continue in the short to medium term (and beyond). Each exceedance of N-1 capacity can result in failure to meet the required level of supply during contingency events in addition to limiting maintenance and inspection tasks. This is an immediate issue for TNA, WBE, LV and MLN.

As peak demands increase, the N cyclic thermal ratings of all substations surrounding MTC will be exceeded, with a major concern in the Werribee area where overloading is likely to occur within the next 2 to 3 years. Unaddressed overloads beyond the cyclic N ratings are likely to see interruptions to customer supply occur, either unplanned or on a rotating load shedding arrangement.

Table 2 details the combined NNO energy support required at WBE, LV, MLN and TNA substations. This is forecast as 15.9 MWh in 2025/26 and increases to 58.8 MWh by 2030/31 based on a probabilistic estimate of energy at risk (50% POE, N-1 forecast).

Table 2 Forecast duration of load at risk under system normal conditions (WBE+LV+MLN+TNA, 50% POE Central, N-1)

Combined Cyclic Capacity (MVA)	Year	Forecast (MVA)	Load at Risk (MVA)	Hours above limit pa	MWh above limit pa
337.6	2025/26	454.2	116.6	311.0	15.9
	2026/27	459.1	121.5	327.5	17.4
	2027/28	464.1	126.5	354.5	19.3
	2028/29	470.7	133.1	454.3	23.4
	2029/30	488.9	151.3	683.5	35.5
	2030/31	513.3	175.7	1061.8	58.8

2.4 Credible Network Options

The network risk in section 2.3 must be addressed. To not do so will compromise our ability to both provide supply to existing customers and connect new customers to the system, as required by chapter 5 of the NER.

Table 3 is a summary of the network options that can credibly address the identified need.

Table 3 Credible Network Options

Option	Description	Comments	Capex Value
1	Upgrade MTC	1 zone substation to be upgraded to add a second transformer bay and feeder circuit bays - Distribution network ties to be added (noting this brings forward distribution feeders into new developments) - Transfer load from TNA, WBE, LV and MLN to MTC. This creates load transfers from ATS West to DPTS, deferring TS upgrades	\$15.9m - \$19.5m ¹
2	New Tarneit Zone Substation	- Two transformer zone substation to be established - Distribution feeders constructed - Land purchase required	\$27.0m - \$33.0m ¹
3	New Rockbank East Zone Substation	- Two transformer zone substation to be established - Distribution feeders constructed - Land purchase required	\$34.2m - \$41.8m ¹

Utilising the about-to-be constructed MTC by implementing a second transformer bay and additional associated feeder bays will give a more efficient and prudent result that will provide capacity for new customer connections and supply quality required by the connection base.

Therefore, in the event of no non-network solutions that would be a more efficient solution, option 2 would be the preferred option. We note that the RIT-D process exists to further test this early finding.

¹ Direct cost Capex for these options does not include costs associated with the construction of terminal station line exits, which are recovered through AEMO's Transmission Use of System (TUOS) payment structure. This is because these costs are common to all credible options considered and therefore will not change the preferred option that maximises net economic benefits.

3 Assumptions and Methodologies

3.1 Demand Forecasts

The demand forecasts are sourced from our 2023 DAPR with consideration of highly likely customer connection enquiries.

3.2 Financial model inputs

In preparing our costs we have assumed:

- That the costs for works estimated by Powercor will be within an accuracy of $\pm 25\%$. They are prepared by our internal estimators from standard component estimates.
- The models are evaluated over a period of 15 years.
- Calculations for annual deferral values of projects are based on our regulated pre-tax real Weighted Average Cost of Capital (WACC) as prescribed by the AER for a specific regulatory period. The identified need described in this Non-Network Options Report occurs in the 2021-2026 regulatory reset period, where a WACC of 2.75% has been used to demonstrate an approximate WACC-driven deferral value below.

4 Potential Deferred Augmentation

4.1 Potential deferred augmentation charges

We have estimated the capital cost of the credible network options to within $\pm 25\%$ of estimation accuracy.

Using this basis as a guide, a deferral of the preferred network option will represent a saving of approximately \$0.33m – 0.67m per annum, assuming the same reliability outcomes are maintained as with the preferred network option.

Please note that we do not represent this to be a precise deferral cost available to a non-network proponent, but it is adequate to guide interested parties in determining the viability of their proposal.

Timing required for any non-network options to defer the network solution is detailed in Table 1, Table 2 and section 2.4 commentary.

4.2 Minimum requirements that will form part of our assessment

We understand that submissions may be varied, each with their own benefits and limitations. Offers that may defer expenditure may be acceptable. We will work with non-network proponents based on the specifics of what the proponents offer and any necessary further works that we may have to undertake to ensure the reliability, security and safety of the network are maintained.

For information to proponents and interested parties, we offer some guidance as to minimum standards expected of any option:

- Operational flexibility must not be compromised.
- Power Quality must see voltages remain within limits and fluctuations controlled.
- Current reliability performance must be maintained unless some form of contractual basis for each affected customer is presented.
- Solutions must have local generation and or curtailment – the identified need is within the networks of this greater Mount Cottrell area and cannot be solved by offsets in a different geographic area.
- Any solutions that are centralised will need to have augmented networks from that central site to other substations. It is estimated that approximately \$10m of the preferred network option is required for this purpose. This in turn reduces the potential deferred augmentation charges by around 50%.
- Solutions must be implementable within the timeframes of the identified need.

We also note that the Victorian Government has commenced the journey to reduce gas consumption to expedite the lowering of greenhouse gas emissions.

5 Lodging a Submission

We invite written submissions for non-network and or SAPS solutions to address the identified need in this report from any interested parties. Our aim is to develop the distribution network in a manner that maximises net economic benefits to all those who produce, consume and transport electricity in the National Electricity Market. We welcome submissions that may assist in this regard.

All submissions should include sufficient technical and financial information to enable us to undertake comparative analysis of the proposed solutions against alternative options. The proposals should include, but are not limited to, the following:

- Submissions must demonstrate response times, likelihood of success and any limitations that will be part of a proposed solution.
- Full costs of completed works including delivery and installation where applicable.
- Whole of life costs include operational costs.
- Project execution strategy including design, testing and commissioning plans.
- Engineering network system studies and study reports.

Powercor will not be legally bound or otherwise obligated to any person who may receive this non-network options report or to any person who may submit a proposal. At no time will Powercor be liable for any costs incurred by a proponent in the assessment of this non-network options report, any site visits, obtainment of further information from us or the preparation by a proponent of a proposal to address the identified need specified in this non-network options report.

Submissions can be provided electronically to the email address provided below:

Attention: Mount Cottrell Stage 2
ritdenquiries@powercor.com.au

Alternatively, submissions may be lodged by mail to the following address:

Attention: Mount Cottrell Stage 2
Powercor Australia Limited
Locked Bag 14090 Melbourne Vic 8001.

Submissions may be published on our website. If you do not want your submission to be published, please state this at the time of lodgement.

All submissions are due on or before 17:00 on 31 December 2024.

Following our review of any submissions made, any option chosen to address the identified need will be set out in the draft project assessment report required by the RIT-D assessment process.

We intend to complete our review of submissions and the selection of the final project assessment report by 31 January 2025.

6 References

AEMC. (2024, September 5). *National Electricity Rules - Chapter 5*. <https://energy-rules.aemc.gov.au/ner/609/499010#5>

Australian Energy Regulator. (2022). *Application guidelines - Regulatory investment test for distribution*. AER. <https://www.aer.gov.au/documents/aer-rit-d-application-guidelines-august-2022>

CitiPower and Powercor. (2023). *Distribution Annual Planning Report*. <https://www.powercor.com.au/network-planning-and-projects/network-planning/>

7 Definitions

Term	Definition
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
ATS	Altona Terminal Station
DNSPs	Distribution Network Service Providers
DPTS	Deer Park Terminal Station
LV	Laverton zone substation
MLN	Melton zone substation
N rating	Capacity available with network operating with all elements in service
N-1 rating	Capacity available with network operating with one element unavailable for service – removal of an element in this configuration will likely interrupt supply to customers
NER	National Electricity Rules (Version 216)
PoE 50	The 50% PoE demand forecast relates to maximum demand corresponding to an average maximum temperature that will be exceeded, on average, once every two years
RIT-D	Regulatory Investment Test for Distribution
TNA	Truganina zone substation
VCR	Value of customer reliability
WBE	Werribee zone substation