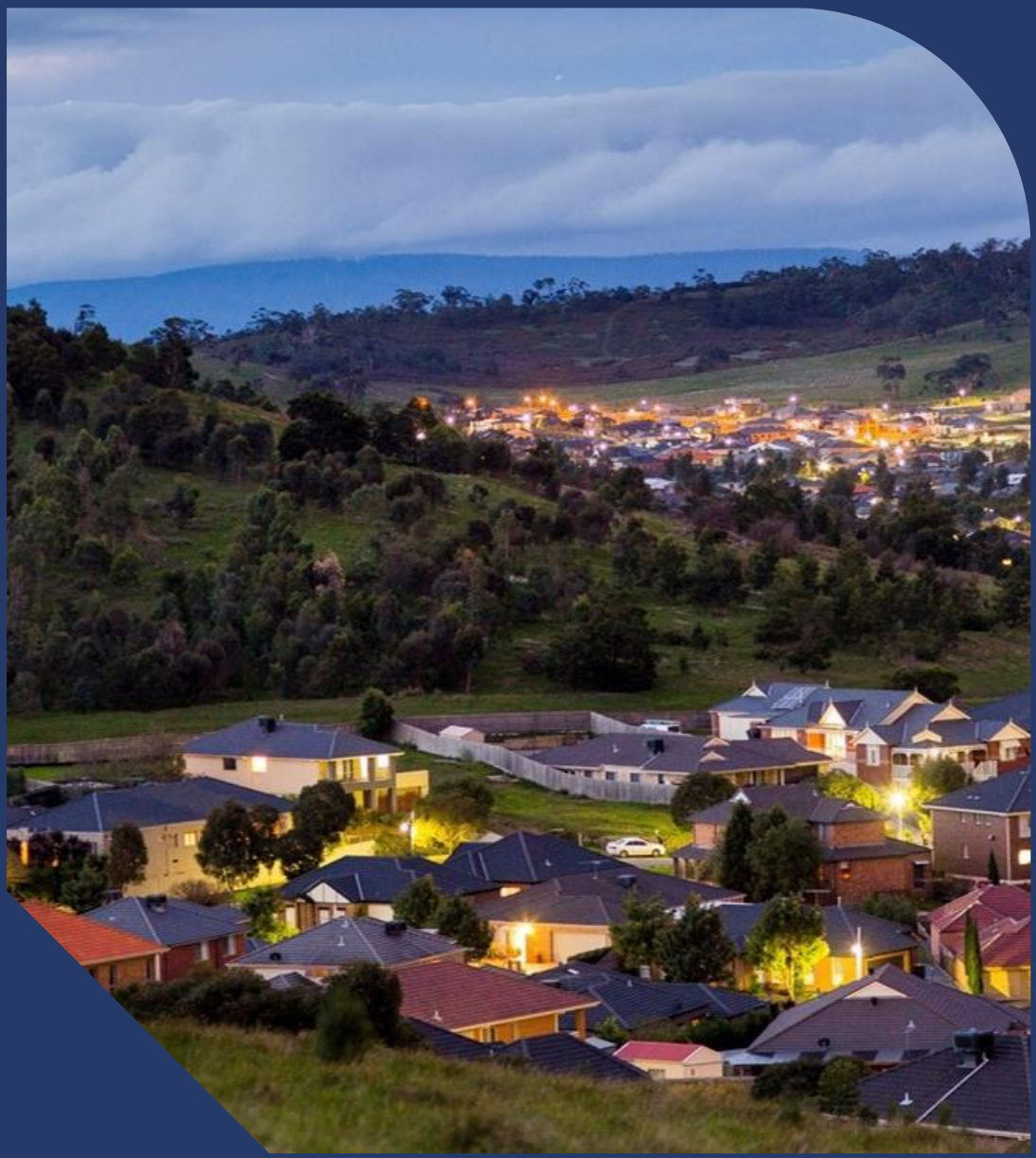
AusNet

# Secure supply and enable connections: East Cranbourne

## Regulatory Investment Test for Distribution (RIT-D)

## Options Screening report

Friday, 14 February 2025



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# 1. Executive summary

AusNet is a regulated Victorian Distribution Network Service Provider (DNSP) that supplies electrical distribution services to more than 809,000 customers. Our electricity distribution network covers eastern rural Victoria and the fringe of the northern and eastern Melbourne metropolitan area.

As expected by our customers and required by the various regulatory instruments under which we operate, AusNet aims to maintain service levels at the lowest possible cost to our customers. To achieve this, we develop plans that aim to maximise the present value of economic benefit to all those who produce, consume and transport electricity in the National Electricity Market (NEM).

The Eastern Cranbourne 66kV network loop, supplying over 114,000 customers, is powered by the Cranbourne Terminal Station (CBTS) and consists of seven zone substations—Lysterfield (LYD), Narre Warren (NRN), Pakenham (PHM), Officer (OFR), Berwick North (BWN), Lang Lang (LLG), and Clyde North (CLN). A new Pakenham South ZSS is expected to be integrated by 2029. AusNet has identified increasing energy at risk in this network due to rapid demand growth in the South-East Growth Corridor. Forecasts indicate that maximum demand will exceed capacity by 2026 under summer 10% Probability of Exceedance (PoE) conditions and by 2028 under summer 50% PoE. The network's thermal constraints are expected to escalate, with demand reaching 332 MVA in 2026 and 390 MVA in 2028 under PoE10 conditions, exceeding the loop's firm capacity (N-1) of 255 MVA, which was exceeded in 2023.

The most critical constraint is associated with the CBTS-BWN and CBTS-LYD 66kV segments, with the worst-case scenario being the loss of the CBTS-LYD 66kV line, leading to an overload of the CBTS-BWN segment under peak demand conditions. The network's N rating is 322 MVA in summer, after accounting for all possible transfers, but projected demand growth (153 MW by 2038) will further exacerbate the situation. The expected unserved energy resulting from these capacity constraints has an estimated present value of $280.28 million over the assessment period, underscoring the urgency of network reinforcements to mitigate supply risks. AusNet is initiating this RIT-D to investigate and evaluate options to address the constraints in the Eastern Cranbourne 66kV sub-transmission loop, which are limiting the reliability of supply to existing customers served by the loop and limiting the potential for new connections.

The Regulatory Investment Test for Distribution (RIT-D) is an economic cost-benefit assessment designed to identify the most credible option that addresses an identified need while maximizing net economic benefits for stakeholders in the National Electricity Market (NEM). This involves a probabilistic planning methodology to account for rare but possible scenarios, such as extreme demand or outages, ensuring all credible options are considered.

This Options Screening Report (OSR) marks the first step in the RIT-D process, in line with clause 5.17 of the National Electricity Rules (NER) and section 4.2 of the RIT-D Application Guidelines, published by the Australian Energy Regulator (AER).

AusNet is committed to supporting the achievement of Victoria Planning Authority's economic growth plans for the South-East Growth Corridor by ensuring plan and design AusNet network to accommodate the growing needs of customers, communities, industry, and businesses.

AusNet has undertaken a probabilistic planning approach to assess the energy at risk (load not being supplied) if no mitigation action is undertaken and whether it is economic to invest in risk mitigation action to reduce the forecast service level risk. Sub-transmission network planning has identified that to avoid network augmentation, approximately 105MW additional capacity or reduction of 105MW is required through alternative non-network approaches such as demand management to enable the ongoing reliable supply of electricity to load served by the loop.

AusNet proposes to investigate and evaluate the following network options to address the identified need:

1. Install a new Cranbourne Terminal Station to Officer (CBTS-OFR) 66kV line
2. Install a new Cranbourne Terminal Station to Pakenham (CBTS-PHM) 66kV line
3. Install a new Cranbourne Terminal Station to Pakenham South (CBTS-PSH) and new PSH-PHM 66kV lines
4. Install a new Cranbourne Terminal Station to Lang Lang (CBTS-LLG) 66kV line
5. Install a new 25MW/100MWh battery at OFR zone substation

AusNet welcomes written submissions on the credible options presented in this OSR and invites proposals from proponents of potential non-network or Standalone Power System (SAPS) options (stand-alone or in conjunction with a network solution) that meet the identified need. Any credible non-network options will be assessed alongside the network options at the next stage of the RIT-D.

Submissions should be emailed to ritdconsultations@ausnetservices.com.au on or before 16 May 2025. In the subject field, please reference 'RIT-D OSR LD East Cranbourne'. AusNet's preference is that these submissions would be published on its website and AEMO's website. If you do not want your submission to be made public, please clearly stipulate this at the time of lodgement.

Assessments of the options and responses to this OSR will be presented in the Draft Project Assessment Report (DPAR), which we expect to publish before mid-June 2025.

# 2. Introduction

The RIT-D is an economic cost-benefit test used to assess and rank potential investments capable of meeting the identified need. The purpose of the RIT-D is to identify the credible option that maximises the present value of net economic benefit to all those who produce, consume and transport electricity in the NEM (the preferred option).

The publication of this OSR represents the first step in the RIT-D process in accordance with clause 5.17 of the NER and section 4.2 of the AER's RIT-D Application Guidelines[1]. In accordance with those requirements, this document sets out:

- the identified need that AusNet is seeking to address, together with the assumptions used in identifying this need;
- a description of the potential credible network options that may address the identified need;
- the technical characteristics of each potential credible option;
- the estimated construction timetable and commissioning date;
- the total indicative capital and maintenance costs for each potential credible option;
- the technical characteristics of the identified need that a non-network or SAPS option would be required to provide;
- information to assist non-network providers wishing to present alternative potential credible options including details of how to submit a proposal for consideration by the RIT-D proponent.

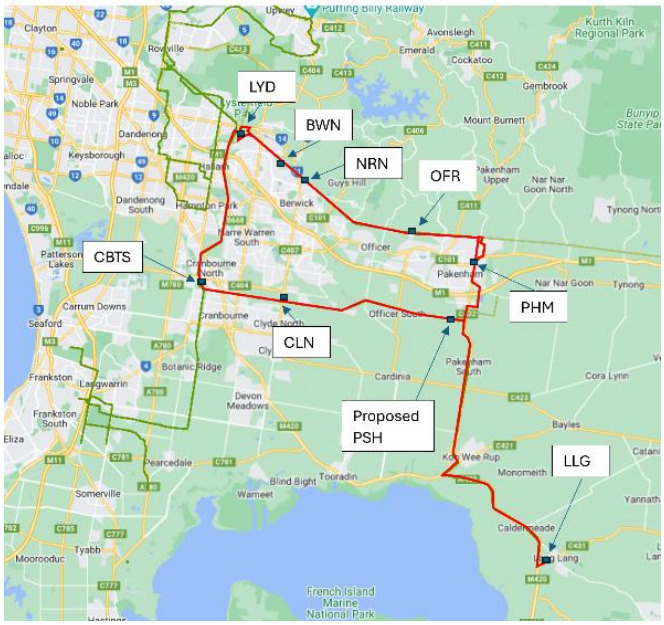
The appendix provides an overview of the RIT-D assessment and consultation process.

[1] Australian Energy Regulator, "*Regulatory investment test for distribution, Application guidelines*", November 2024.

# 3. Background

This Options Screening Report (OSR) relates to the Eastern Cranbourne 66 kV network loop. This loop is supplied by the Cranbourne terminal station (CBTS) and is comprised of seven zone substations, including, Lysterfield (LYD), Narre Warren (NRN), Pakenham (PHM), Officer (OFR), Berwick North (BWN), Lang Lang (LLG), Clyde North (CLN) and the proposed Pakenham South (PSH), as shown by Figure 1.

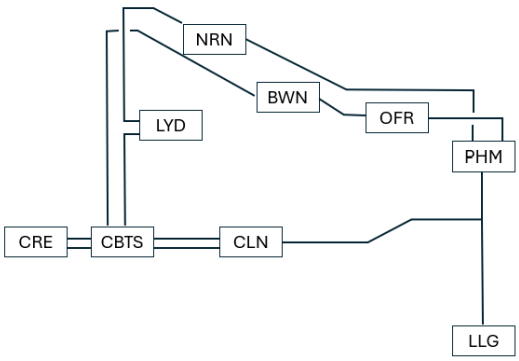
**Figure 1 - Eastern Cranbourne 66kV network loop**



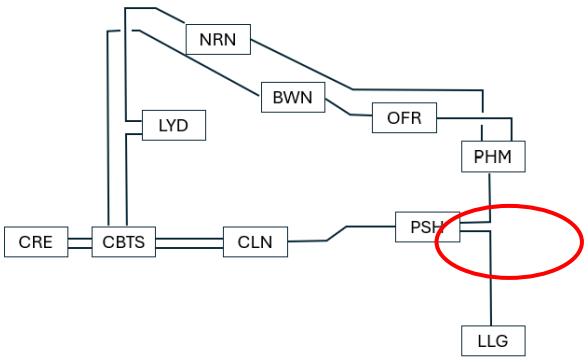

The Eastern Cranbourne 66kV network loop supplies over 114,000 customers, including residential (49.9%), commercial (42.9%), industrial (4.9%), and agricultural (2.3%) users. Demand growth, driven by residential expansions and commercial/industrial developments, is significant in Clyde North, Officer South, and Pakenham, which also host the region's major shopping centre at Fountain Gate. To address capacity constraints, AusNet has already proposed a new Pakenham South zone substation (PSH), which is expected to be operational by summer 2028/29.

**Figure 2 - Comparison of Eastern Cranbourne 66kV network loop after installation of PSH zone substation**

Before:




After:




As shown in

Figure 2, with current configuration of CBTS loop, Lang Lang (LLG) is a single transformer zone substation connected radially to the main loop and relies heavily on the availability of 22kV transfers under single contingency conditions. One of the major transfers available to PHM is via the same pole line as the connecting 66kV line. This poses the risk that significant damage to a single 66kV pole along the route will also significantly reduce the availability of transfers back into the loop in the event that the 22kV tie to PHM also failed.

The Eastern Cranbourne 66kV loop has:

- a maximum (N) capacity of 322MVA and firm capacity of 255MVA under (N-1) conditions; and
- transfer capacity and demand management of 63.7 MVA, however the majority of the transferable load can only be transferred from Clyde North and as a result, the transfer does not provide sufficient benefits to the northern section of the loop (LYD, BWN, NRN or OFR).

A summary of transfer capacity on the Eastern Cranbourne network loop is provided in Table 1 below.

**Table 1 Summary of transfer capacity of zone substations**

| FROM ZONE SUBSTATION | TO ZONE SUBSTATION | TRANSFER AMOUNT (MW) |
|---|---|---|
| Berwick North | Belgrave | 3.01 |
| Berwick North | Narre Warren | 2.2 |
| Berwick North | Officer | 3.5 |
| Clyde North | Cranbourne | 16.13 |
| Clyde North | Hampton Park | 5.46 |
| Clyde North | Demand Management Reduction | 1.65 |
| Clyde North | Officer | 2.31 |
| Officer | Belgrave | 3.3 |
| Officer | Pakenham | 1.7 |
| Lang Lang | Leongatha | 1 |
| Lang Lang | Wonthaggi | 1.5 |
| Narre Warren | Lysterfield | 13 |
| Pakenham | Lang Lang | 9 |

NOTE: transfer amount based on 2025 summer contingency

# 4. Identified need

## 4.1. Description

The Eastern Cranbourne 66kV network loop is experiencing significant demand growth driven by the Melbourne South-East Growth Corridor, one of four metropolitan growth corridors defined by the Victoria Planning Authority. This loop, shown in Figure 3 - South-East Growth Corridor services key growth towns, including Cranbourne, Berwick, Clyde, Clyde North, Pakenham, and Officer. The corridor is expected to generate 86,000–110,000 new jobs across various sectors, with Clyde and Clyde North as major town centres and an industrial business corridor at Officer-Pakenham.[2]

**Figure 3 - South-East Growth Corridor[3]**

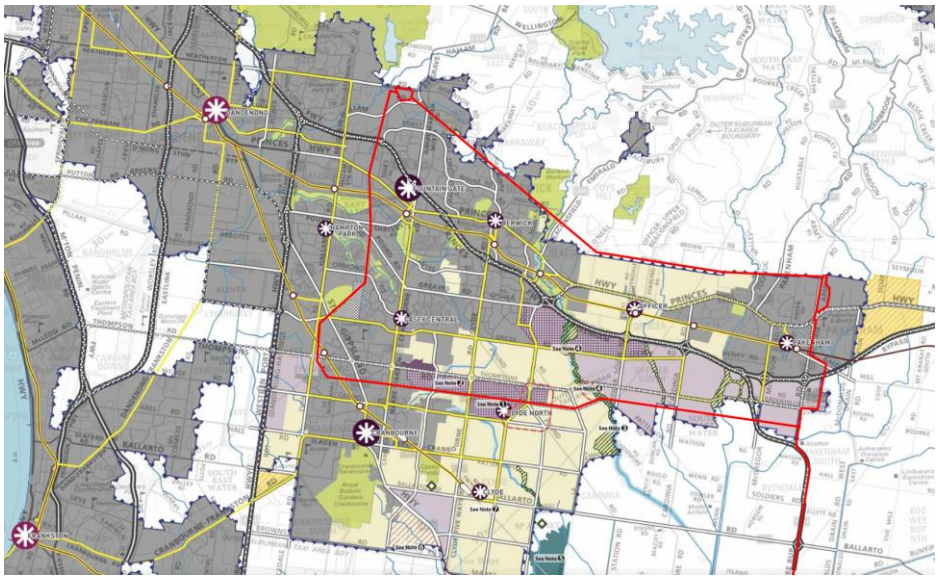
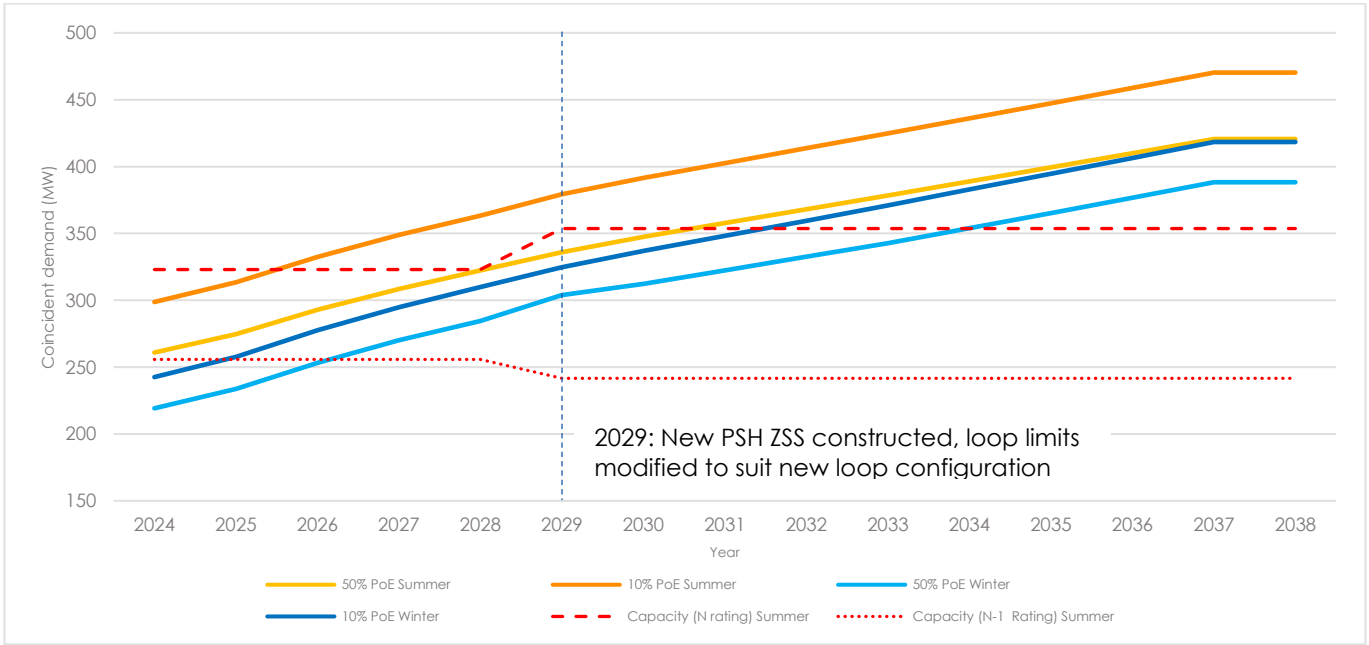


Figure 4 shows that N-1 capacity will be exceeded by 2026 in all scenarios and the N capacity will be exceeded by 2030 in all scenarios during summer at 50% POE.

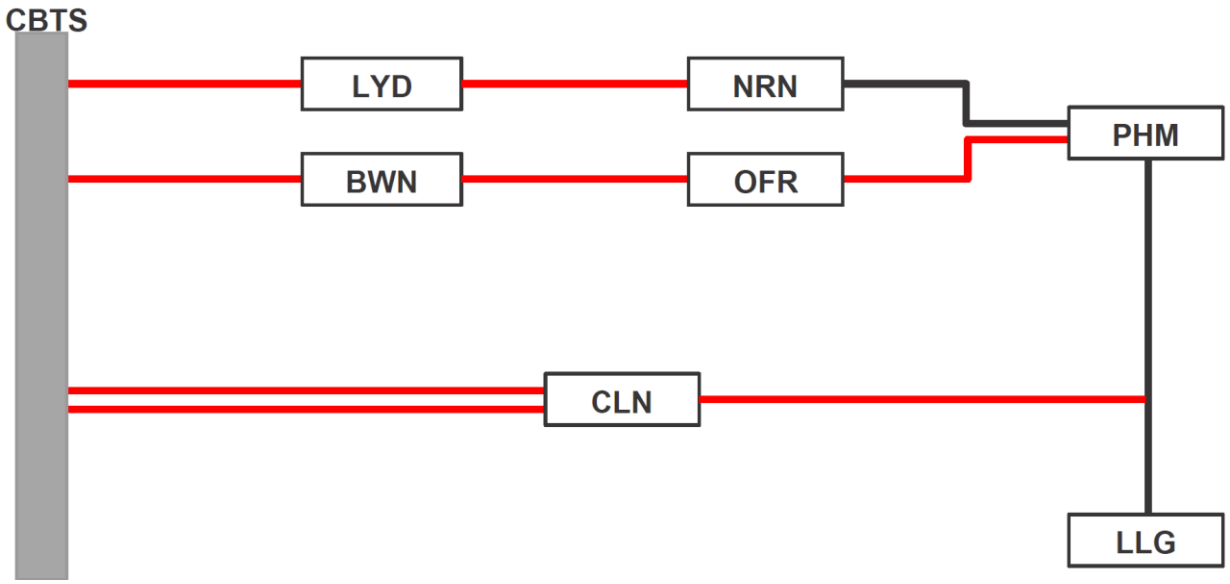
**Figure 4 - Load capacity of the Eastern Cranbourne 66kV network loop**




[2] See, https://vpa.vic.gov.au/wp-content/Assets/Files/GCP%20-%20Chapter%205%20North%20Corridor%20Plan.pdf
[3] Victoria Planning Authority, The South-East Growth Corridor Plan Map, https://vpa.vic.gov.au/metropolitan/growth-corridor-plans/

The establishment of the South-East Growth Corridor will create capacity constraints on the Eastern Cranbourne 66kV network loop, with maximum demand exceeding capacity by 2025 under the summer POE10 scenario and by 2031 under POE50. Driven by thermal limitations, demand is expected to increase by 153MW by 2038, surpassing the loop's N rating of 322MVA and its firm (N-1) capacity of 255MVA, which was already exceeded under POE50 conditions in 2023. Demand is projected to reach 332MVA in 2026 and 363MVA in 2028. The worst-case outage is the loss of the CBTS-LYD 66kV line, leading to overloading of the CBTS-BWN segment. These segments are the primary capacity risk points, and the projected overloads exceed the transfer capacity to adjacent 66kV loops, as depicted in Figure 5.

**Figure 5 - Constrained segments of the Eastern Cranbourne 66kV network loop under single order contingency events**




Our Distribution Annual Planning Report (DAPR) 2024-2028, has identified energy at risk on the Eastern Cranbourne 66kV network loop over the summer period from December to March. Economic modelling shows these conditions result in a material expected cost to customers from energy not supplied and material risk to network reliability risk.

# 4.2. Thermal Capacity Limitations

The Eastern Cranbourne 66kV network should not exceed its secure summer planning limit of 255MVA, as overloading risks pushing 66kV lines above 120% of their normal rating after an outage. Due to conductor thermal inertia, such overloading limits the time available for network controllers to restore safe load levels, potentially causing irreversible conductor damage and cascading failures. Additionally, supply to the region is constrained by the thermal capacity of key 66kV lines under outage condition as highlighted in Table 2.

**Table 2- Exceedance of thermal ratings on key 66kV lines on the Eastern Cranbourne network loop**

| EASTERN CRANBOURNE 66KV LINE | CONDITIONS IN WHICH THERMAL RATINGS WILL BE EXCEEDED |
|---|---|
| CBTS-BWN 66kV line | When all lines are in service and net load in the East Cranbourne loop exceeds 322MVA. |
| CBTS-BWN 66kV line | When the CBTS-LYD 66 kV line is out of service and net load in the East Cranbourne region exceeds 293 MVA. |
| CBTS-CLN No.2 66 kV line | When the CBTS-CLN No.1 66 kV line is out of service and net load in the East Cranbourne region exceeds 274 MVA |
| CBTS-CLN No.1 66 kV line | When the CBTS-CLN No.2 66 kV line is out of service and net load in the East Cranbourne region exceeds 274 MVA. |

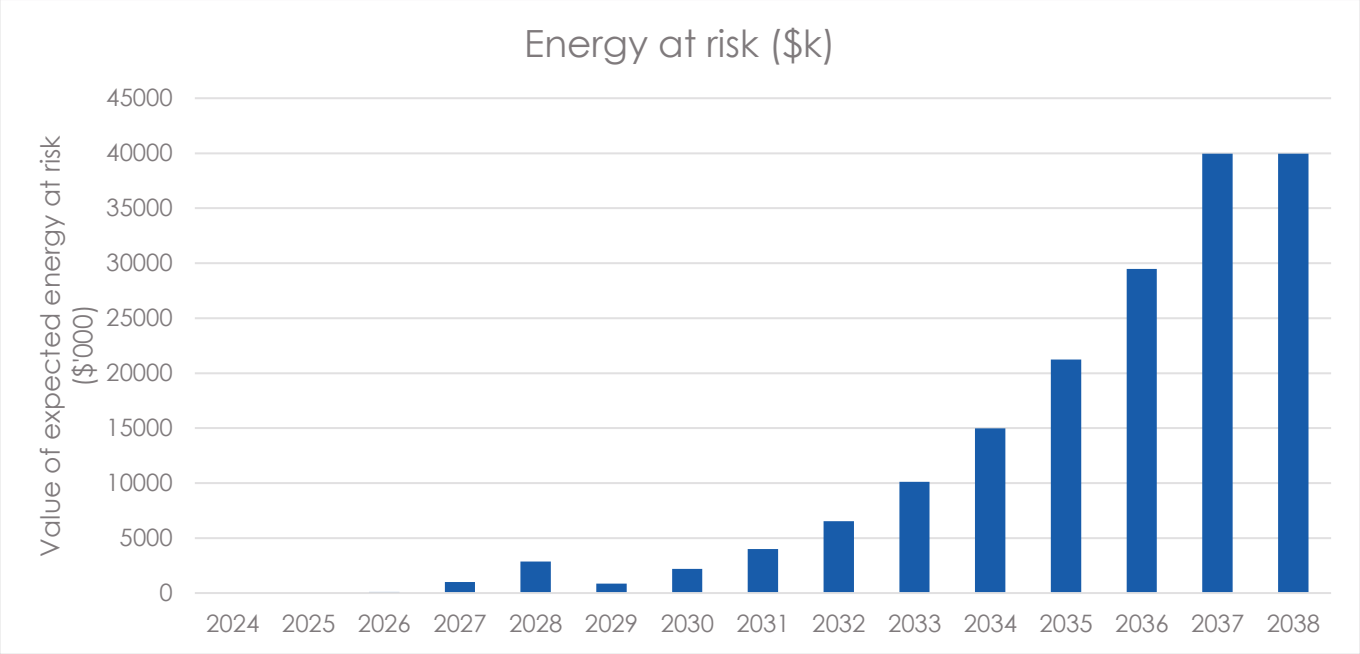
| | |
|---|---|
| CBTS-BWN 66 kV line | When the CLN-PHM-LLG 66 kV line is out of service and net load in the East Cranbourne region exceeds 255 MVA. |

# 4.3. Risk assessment

The forecast expected unserved energy on the Eastern Cranbourne 66kV network has an estimated cost of $280.28 million in present value terms, based on the AER's Value of Customer Reliability (VCR). AusNet is committed to supporting Victoria Planning Authority's South-East Growth Corridor by ensuring the network can meet growing demand. Using a probabilistic planning approach, AusNet has assessed the energy at risk and the economic viability of mitigation measures. Analysis indicates that energy at risk will rise from 2027, exceeding $30 million by 2036 and surpassing $40 million by 2037–2038. This is shown in

Figure 6.

**Figure 6 – Energy at risk on Eastern Cranbourne 66kV network loop**




The Pakenham South (PSH) ZSS project, which will install a new zone substation connected to the East Cranbourne 66kV network loop, will support the 22kV distribution system within this region by increasing the 22kV distribution capacity in the Pakenham and Clyde North areas. While this will assist in addressing 22kV capacity constraints in the region, it will not adequately address the forecast peak demand growth and overloading issues on the 66kV network loop. Our analysis indicates that to avoid network augmentation, approximately 105MW additional capacity or a reduction of 105MW is required to mitigate energy at risk on the Eastern Cranbourne network loop.

The PSH project will address 22kV of capacity constraints in the region by creating additional 66/22kV transformation and 22kV feeders, additionally, it will shift some load away from the northern segment of the loop to the higher capacity lines on the south, which reduces a portion of energy at risk in 2029 (as reflected by the drop in energy at risk in Figure 6 (in 2029), however this alone is not sufficient to completely address the anticipated loading increase expected on the loop.

AusNet's analysis of forecast demand coupled with existing thermal limits indicate that mitigation actions are required to address the increasing risk to the provision of reliable electricity supply to our customers.

# 4.4. Summary of identified network need

Our network planning indicates that to avoid network augmentation, approximately 105MW additional capacity or a reduction of 105MW through non-network approaches are required to enable AusNet to maintain reliable supply to

customers served by the Eastern Cranbourne 66kV network. Addressing this identified capacity constraint will help to ensure that AusNet is able to prudently and efficiently meet forecast load growth from the South-East Growth Corridor to:

- support economic growth anticipated for this region;
- support the electrification of homes, businesses and transport[4]; and
- meet our customers' expectations that AusNet should provide a reliable electricity supply and take prudent and efficient actions to minimise unplanned outages.

Feedback from our customer engagement has underscored the importance of ensuring that we provide a reliable electricity supply, with minimal unplanned disruptions. Customers have expressed concern regarding the impacts of poor reliability given customers' increasing reliance on electricity to meet a range of different needs such as transport, telecommunications, working from home, maintaining comfort during extreme weather conditions, and to meet health needs.

# 4.5. Assumptions underpinning the identified need

Key factors underpinning the identified need include:

- Demand forecast – the POE10 demand is forecast to exceed the thermal capacity of the line and the POE50 is already exceeded under N-1 conditions. The demand forecast is based on AusNet's standard forecasting methodology and accounts for organic growth and spot loads.
- Asset data used in the network modelling to identify capacity constraints.
- Pakenham South ZSS is installed by summer 2028/29.
- Unavailability rates of sub transmission line segments is calculated based on 5 years of historic unplanned outage data from internal outage logs for the Eastern Cranbourne Loop.
- Average unplanned outage time for this sub transmission loop is calculated based on 5 years of historic unplanned outage data from internal outage logs for the Eastern Cranbourne Loop.
- All available HV transfers are exhausted in the determination of loop limits.
- Availability of HV transfers diminish over time as loading at transferring zone substations increases.
- In the case of an N-1 event on the loop, where the loading is above the limit for voltage collapse, all load on the loop is assumed to be lost for a duration of 1 hour.
- Rooftop solar has been considered as a demand reducer at the time of maximum demand and is incorporated in the demand forecasts for each individual zone substation on the Eastern Cranbourne 66kV network loop.

In addition to the assumptions set out above that underpin the identified need, further assumptions will be required to quantify the costs and benefits of credible options that would address the identified need. These further assumptions will be provided in the DPAR, which will set out the cost-benefit analysis for each of the credible options.

[4] Refer to Victoria State Government, 'Gas Substitution Roadmap – Update: Victoria's Electrification Pathway.'

# 5. Potential Credible Options

This section describes the potential credible options that have been considered to address the identified need, including:

- the technical characteristics of each option;
- the estimated construction timetable and commissioning date; and
- the total indicative capital and operating and maintenance costs.

The purpose of this RIT-D is to identify the credible option for addressing the identified need that maximises the net market benefit. An important aspect of this task is to consider non-network and network options on an equal footing, so that the optimal solution can be identified.

## 5.1. Option 0: Do Nothing

The Do Nothing or business as usual (BAU) option assumes that AusNet would not undertake any investment, outside of normal operational and planning processes for managing peak demand and thermal overloading. This option is the counterfactual to the other options considered and establishes the base level of risk (base case) and basis for comparing other credible options.

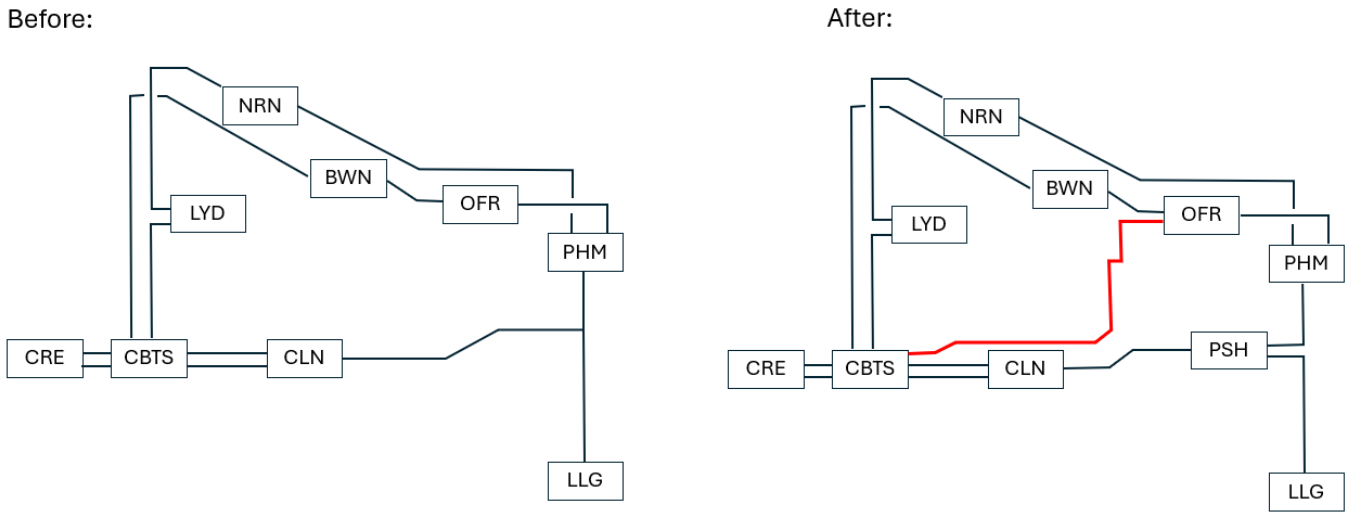
While this option does not entail any upfront capital costs, it exposes customers to the continuing risk of network outages as it does not address the identified need, which is the risk of unserved energy as a result of the available capacity being exceeded . AusNet has quantified the expected value of unserved energy to be $280.28 million in present value terms over the evaluation period.

This option does not meet our customers' expectations of a reliable electricity supply, which requires investment to avoid unplanned network outages. Furthermore, this option does not align with AusNet's asset management objectives of being future ready and meeting customer needs by maintaining the long-term reliability of our distribution network.

## 5.2. Option 1: Establish a new CBTS-OFR 66kV line

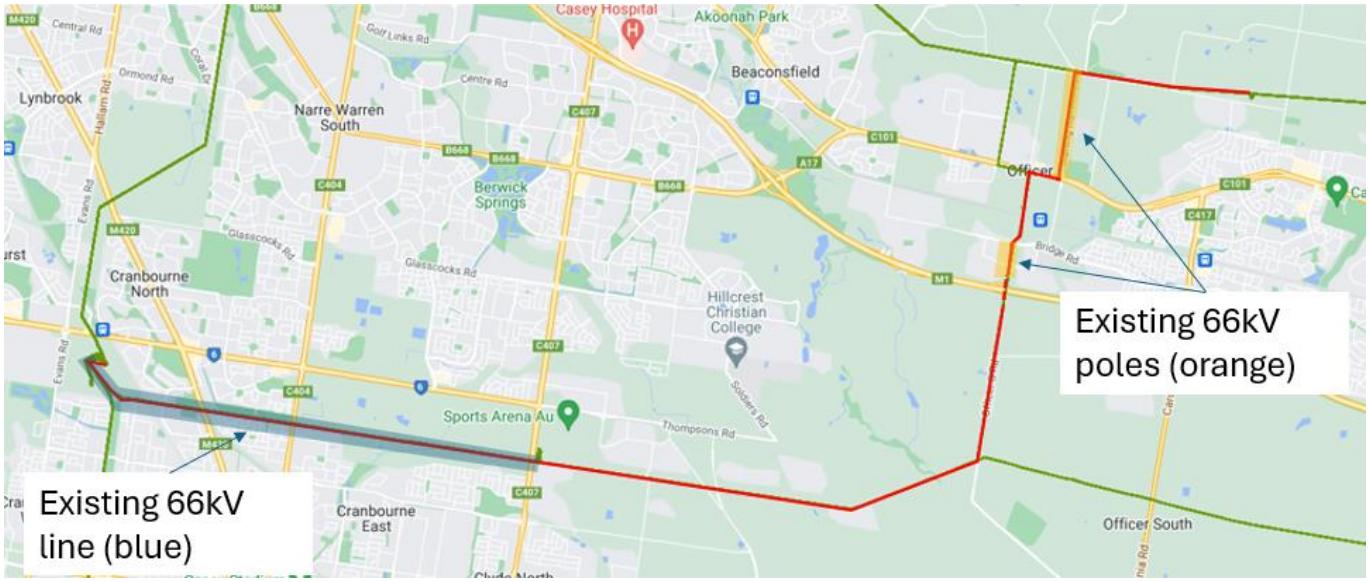
This option involves installing a new 66kV line from CBTS to OFR (as indicated by the red line in Figure 7 below) to provide additional capacity to the northern section of the Eastern Cranbourne network loop.

**Figure 7 – Comparison of Eastern Cranbourne 66kV loop after the installation of the new CBTS-OFR line**



The installation of the new line will require 22km of new 37/3.75 AAC line thermally designed to 100 degrees Celsius and enabling works to the Cranbourne Terminal Station and Officer zone substation to accommodate the new 66kV line. Under this option 7.1km of existing 66kV conductor will be utilised to achieve a minimum summer cyclic rating of 117.17 MVA (shown in blue in Figure 8 below) and 66kV poles along the Officer South Road and Starling Road (shown in orange in Figure 8).

**Figure 8 – Map indicating new CBTS-OFR 66kV line route**




The following benefits are associated with establishing a new CBTS-OFR 66kV line:

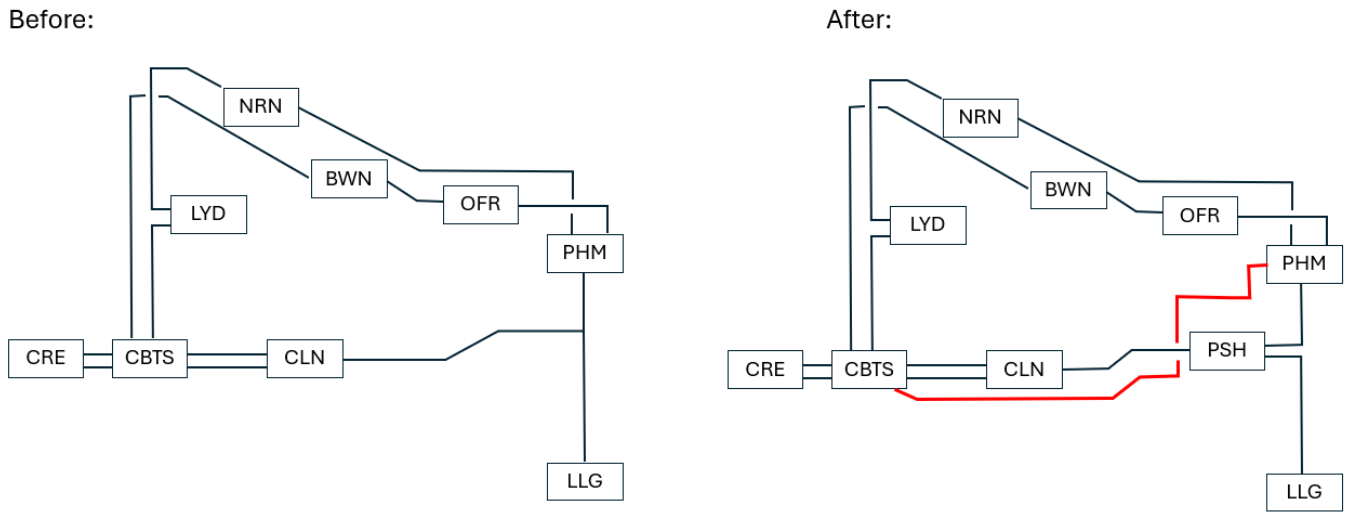
- It will significantly increase thermal capacity of the Eastern Cranbourne network loop.
- It provides additional support to the Northern portion (CBTS-LYD and CBTS -BWN), which have older and lower capacity conductors.
- It utilises existing infrastructure (66kV conductor route to Officer and spare 66kV conductors between CBTS-CLN) to minimise costs.
- Is the shortest line route for installing an additional 66kV line on the Eastern Cranbourne network loop to alleviate constrained parts of the network.
- The addition of this line will assist in supporting future growth at Officer South associated with the new industrial corridor between Officer and Pakenham under the South-East Growth Corridor.

The construction would commence in August 2026, with project completion expected by December 2029. The estimated capital cost of this option is $33.8 million. In relation to O&M expenditure, annual routine maintenance expenditure would be $0.3 million.

# 5.3. Option 2: Install a new CBTS-PHM line

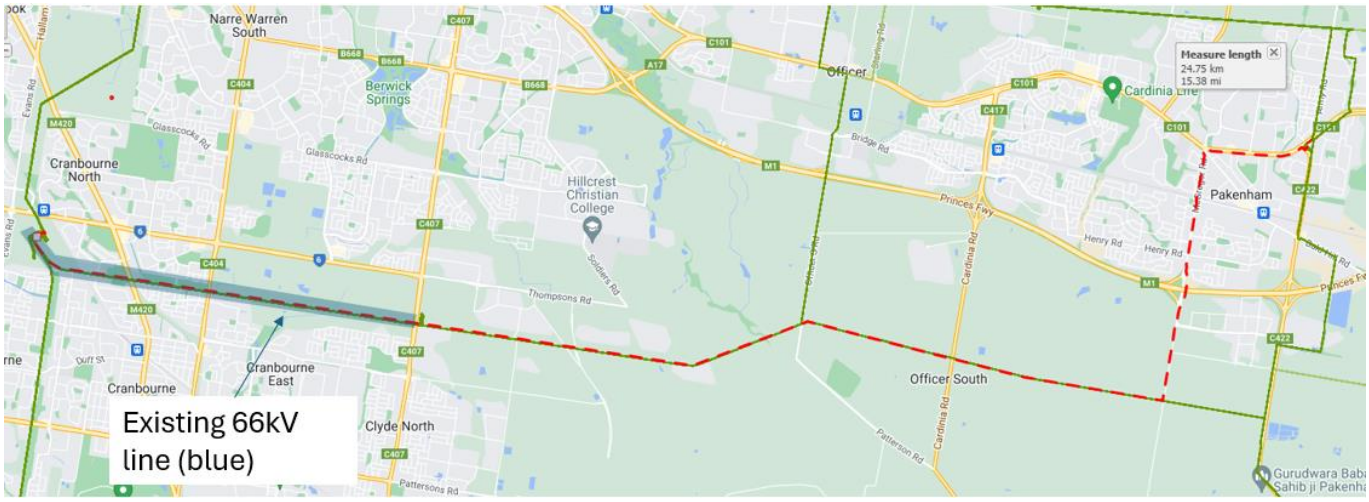
This option involves installing a new 66kV line from CBTS to PHM (as indicated by the red line in Figure 9 below) to provide additional capacity to the Pakenham area of the Eastern Cranbourne network loop, which is experiencing rapid growth.

**Figure 9 - Comparison of Eastern Cranbourne 66kV loop after the installation of the new CBTS-OFR line**




The installation of the new line will require 25.5km of new 37/3.75 AAC line thermally designed to 100 degrees Celsius and enabling works to the Cranbourne Terminal Station and Pakenham zone substation to accommodate an additional 66kV feeder. Under this option 7.1km of existing 66kV conductor will be utilised to achieve a minimum summer cyclic rating of 117.17 MVA (shown in blue in Figure 10 below).

**Figure 10 – Map indicating new CBTS-PHM 66kV line**




Key benefits associated with this option include:

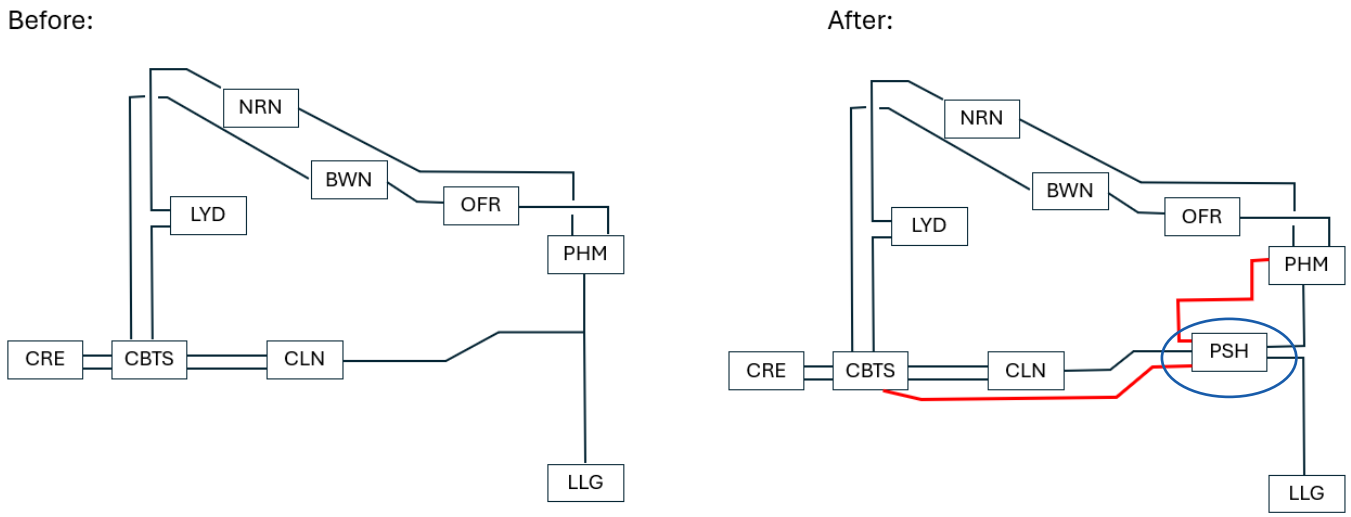
- It significantly increases thermal capacity of the Eastern Cranbourne network loop.
- It provides additional support to the furthest major load centre on the network loop (PHM and OFR).
- It utilises existing spare 66kV conductors between CBTS-CLN to minimise costs.
- It provides additional optionality for managing constraints in the future, as it can be easily configured to enable a tie into Pakenham South should a tie become required (1km of additional line).
- The line route is mostly within existing transmission easement, which helps in reducing implementation time and costs, and also minimises impact on the nearby community.

The construction would commence in August 2026, with project completion expected by December 2029. The estimated capital cost of this option is $40.1 million. In relation to O&M expenditure, annual routine maintenance expenditure would be $0.4 million.

# 5.4. Option 3: Establish a new CBTS-PSH and PSH-PHM 66Kv line

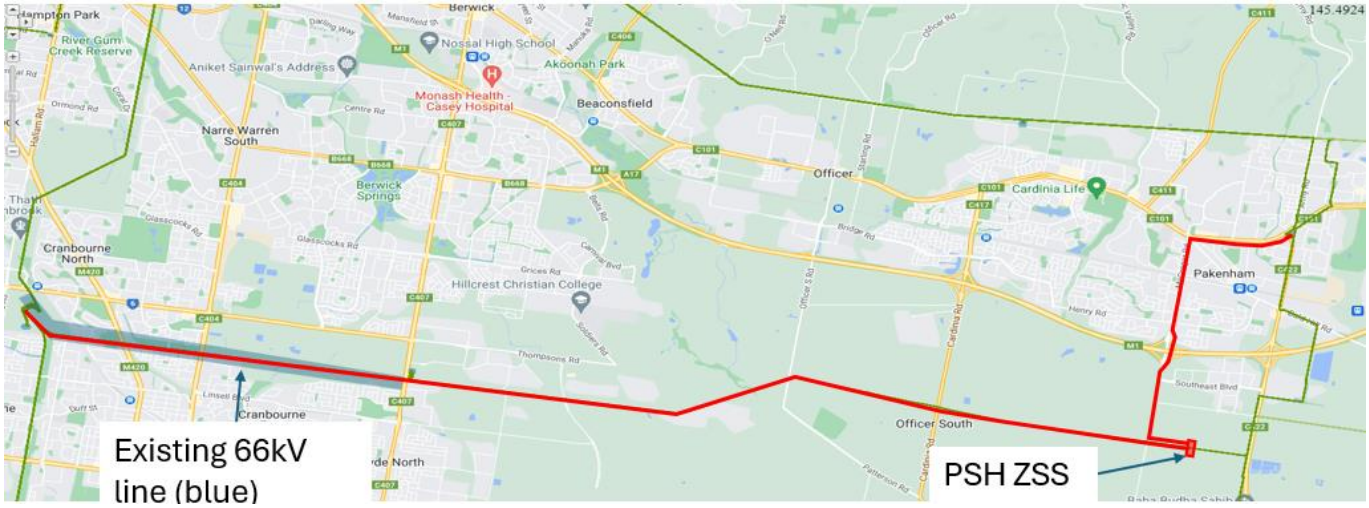
This option involves installing a new 66kV line from CBTS to PSH and a new 66kV line from PSH-PHM (as indicated by the red line in Figure 11 below. This will help to provide additional support to the Pakenham area, which is the furthest major load centre on the loop and is set to be part of a new industrial corridor under the South-East Growth Corridor.

**Figure 11 - Comparison of Eastern Cranbourne loop after the installation of the new CBTS-PSH and PSH-PHM 66kV line**




The installation of the new line will require 26.5km of new 37/3.75 AAC line thermally designed to 100 degrees Celsius and enabling works to the Cranbourne Terminal Station and Pakenham South zone substation to connect the new CBTS-PSH and PSH-PHM lines. Under this option 7.1km of existing 66kV conductor will be utilised to achieve a minimum summer cyclic rating of 117.17 MVA (shown in blue in Figure 12 below). This option is a variation to Option 2, with the key difference between the two options is that Option 3 includes a tie into the Pakenham South zone substation, as circled in Figure 11 above), which entails approximately 1km of additional conductor and associated switchgear at PSH zone substation.

**Figure 12 - Map indicating new CBTS-PSH and PSH-PHM 66kV line**




Key benefits associated with this option include:

- It significantly increases thermal capacity of the Eastern Cranbourne network loop.
- It provides additional support to the highest growth part of the loop and supports the furthest major load centre.
- It utilises existing spare 66kV conductors between CBTS-CLN to minimise costs and deliver greater affordability to customers.

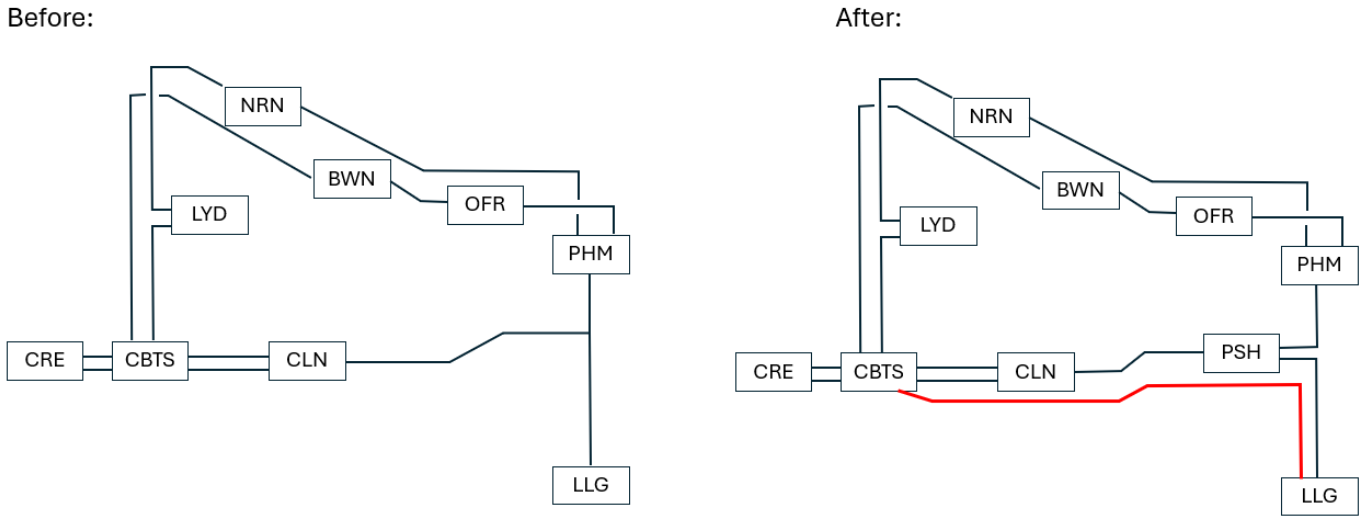
- The line route is mostly within existing transmission easement, which helps in reducing implementation time and costs, and minimises impact on the nearby community.

The construction would commence in August 2026, with project completion expected by December 2029. The estimated capital cost of this option is $44.3 million. In relation to O&M expenditure, annual routine maintenance expenditure would be $0.4 million.

# 5.5. Option 4: Install a new CBTS-LLG 66kV line

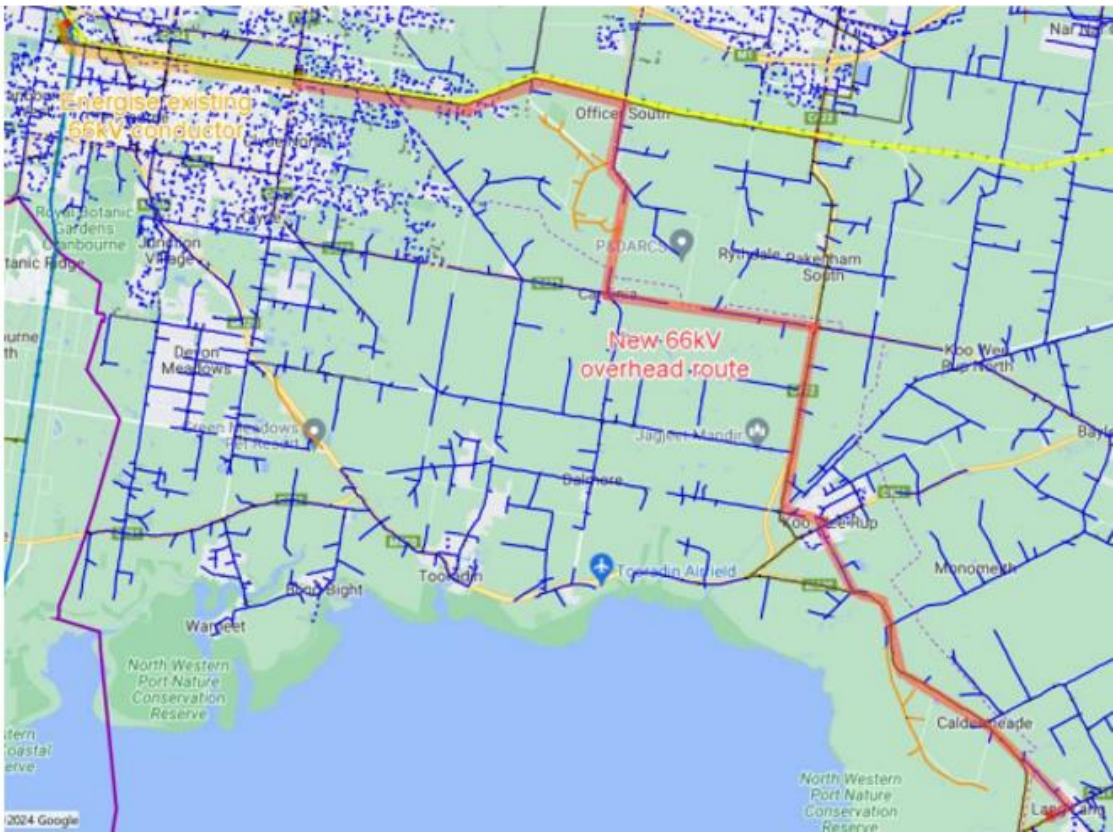
This option involves installing a new 66kV line between CBTS to LLG (as indicated by the red line in Figure 13 below) to provide additional capacity on the Eastern Cranbourne network loop.

**Figure 13- Comparison of Eastern Cranbourne loop after the installation of the new CBTS-LLG 66kV line**




The installation of the new line will require 43.5km of new 37/3.75 AAC line thermally designed to 100 degrees Celsius and enabling works to the Cranbourne Terminal Station and Lang Lang zone substation to connect the new CBTS-LLG line. Under this option 7.1km of existing 66kV conductor between CBTS-CLN will be utilised to achieve a minimum summer cyclic rating of 117.17 MVA. Figure 14 below shows the existing 66kV conductor marked in orange, while the red line indicates the route of the new overhead 66kV line.

**Figure 14 - Map indicating new CBTS-LLG 66kV line**




The key benefits associated with this option is that it increases thermal capacity of the Eastern Cranbourne network loop. It also significantly increases reliability to customers in Lang Lang, which are currently radially supplied, by bringing them into the Eastern Cranbourne network loop.

While Option 4 utilises existing 66kV conductors between Cranbourne Terminal Station and Clyde North, which helps in reducing costs, it requires significantly more 66kV line to be installed than Options 1 and 2 and as a result is the second most expensive option for addressing the identified network need.

The construction would commence in August 2026, with project completion expected by December 2029. The estimated capital cost of this option is $50.3 million. In relation to O&M expenditure, annual routine maintenance expenditure would be $0.5 million.

# 5.6. Option 5: Install a new 25MW/100MWh battery at Officer zone substation

This option involves installing a new 25MW/100MWh battery at Officer zone substation to support the Eastern Cranbourne network loop during peak loading. Whilst this option is technically feasible it is the most expensive option to implement at $150 million and an annual routine maintenance expenditure of $0.5 million. The construction would commence in August 2033, with project completion expected by December 2036. This option is considered the least preferred option for addressing the identified need and has been assessed as only partially addressing customer expectations and AusNet's asset management objectives.

# 5.7. Options considered and not progressed

## 5.7.1. Demand management

There is limited ability for demand reductions to reduce peak demand on the Eastern Cranbourne 66kV network loop as demand growth in the region far outweighs any demand management opportunities identified to date. Most notably, there are no connected 66kV customers or generators on this network. Further, while there are three customers which have active support agreements that are connected to Clyde North, these agreements only deliver a reduction of 1.65MW which is insufficient to meet the identified need and do not assist in addressing the two lines (CBTS-BWN and CBTS-LYD) which are the major source of N risk on the Eastern Cranbourne network loop.

## 5.7.2. Reconductor the CBTS-BWN with 37/3.75AAC

An initial assessment was completed to determine the feasibility of reconductoring aged conductor on the existing CBTS-BWN 66kV line, with modern high capacity 37/3.75AAC with a projected capital cost of $15 million for the construction material and labour. Whilst this would be a technically feasible option to increase some capacity within the Eastern Cranbourne 66kV loop, it was found to be not credible due to the very significant costs and constructability issues associated with the full reconstruction of the existing tower assets within the transmission easement and scheduling interruptions. Additionally, this option only would have partially assisted in addressing the anticipated line overloads after PSH is established, leaving a large residual risk unaddressed.

## 5.7.3. Adding a second circuit to the existing CBTS-BWN with 37/3.75AAC

An initial assessment was completed to determine the feasibility of reconductoring aged conductor on the existing CBTS-BWN 66kV line, with modern high capacity 37/3.75AAC with a projected capital cost of $16 million for the construction materials and labour. Whilst this would be a technically feasible option to increase some capacity within the Eastern Cranbourne 66kV loop, it was found to be not credible due to the very significant costs and constructability issues associated with the full reconstruction of the existing tower assets within the transmission easement and scheduling interruptions. Additionally, this option only would again have only partially assisted in addressing the anticipated line overloads after PSH is established, leaving a large residual risk unaddressed.

## 5.7.4. Reconductor the CBTS-BWN & BWN-OFR with 37/3.75AAC

The option of augmenting the entire line section from CBTS - OFR with 19/4.75 AAC or 37/3.75 AAC was considered but was not progressed further. In the absence of augmenting the lines to the northern part of the loop, this option would not provide any additional benefits as these line sections are operating in parallel. Under this option, the existing line ratings of 77.7MVA would be the constraining factor.

# 6. Non-network or SAPS options

This section provides information regarding the non-network or SAPS services that would be required to address the identified need, including::

- The technical characteristics that a non-network or SAPS option would be required to deliver;
- The estimated maximum deferred augmentation charge that would be available to pay for the non-network service; and
- The information that a non-network proponent should provide to AusNet to explore the potential provision of a non-network service.

## 6.1. Required technical characteristics of a non-network option

Table 3 below sets out the load that a non-network or SAPS option, placed preferably in the vicinity of any Zone Substations in the loop would be required to deliver. The objective would be to mitigate the risks associated with the unserved load in the Eastern Cranbourne loop. The information presented provides an indication of the required operating profile, noting that prospective non-network service providers may not be able to exactly match these requirements.

**Table 3 Load and respective duration to be catered by the non-network solution**

| SUMMER YEAR | MAXIMUM TOTAL LOOP LOAD AT RISK (MVA) | HOURS AT RISK (H) |
|---|---|---|
| 2026/2027 | 5 | 2 |
| 2027/2028 | 79 | 3 |
| 2028/2029 | 222 | 6 |
| 2029/2030 | 444 | 11 |
| 2030/2031 | 872 | 19 |
| 2031/2032 | 1,456 | 35 |
| 2032/2033 | 2,489 | 70 |
| 2033/2-34 | 4,344 | 121 |
| 2034/2035 | 7,306 | 184 |
| 2035/2036 | 11,774 | 263 |
| 2036/2037 | 17,718 | 349 |
| 2037/2038 | 25,469 | 454 |
| 2038/2039 | 35,147 | 557 |

# 6.2. Power system security, reliability and fault levels

A non-network option must be capable of reliably curtailing load under a range of conditions and scenarios. The non-network solution will contribute to system security and reliability to the extent that it addresses the risks arising from the identified need. The non-network option is not required to address any existing issues in relation to fault levels.

If the non-network option is an inverter-based generator operating in parallel with AusNet's network, the generator must comply with the requirements set out in document SOP 33-05 and other connection requirements which are set out in AusNet Services' embedded generator connections page.

# 6.3. Guidance on potentially feasible options

The following non-network solutions are likely to be potentially feasible options to address the identified need:

- New embedded energy storage systems or load connections;
- Modifications to existing customer generation to include embedded energy storage systems; and
- Modifications to existing load connections to reduce load capacity.

Without limiting the potential for non-network solutions, the following types of non-network options are unlikely to be feasible:

- Renewable generation not coupled with storage or dispatchable generation; and
- Unproven, experimental or undemonstrated technologies.

# 6.4. Information to be included in non-network solution proposals

Non-network service providers interested in alleviating the network constraints outlined above are advised to begin engagement with AusNet as soon as possible. A detailed proposal including the information listed below should be submitted by the requested date.

Details required include:

- Name, address and contact details of the person making the submission.
- Name, address and contact details of the person responsible for non-network support (if different to above).
- A detailed description of the services to be provided, including:
  - Size and capacity (MW/MVA/MWh).
  - Location(s).
  - Frequency and duration.
  - Type of action or technology proposed, including response / ramp rate information, where applicable.
  - Proposed dispatching arrangement (e.g. telephone, web-based trigger, automated means via RTU).
  - Availability and reliability performance details.
  - Period of notice required to enable dispatch of non-network support (e.g. to allow time for charging of energy storage solutions or market-based limitations).

  - Proposed contract period and staging (if applicable).
  - Proposed timing for delivery (including timeline to plan and implement the proposal).
- High-level electrical layout of the proposed site (if applicable).
- Evidence and track record proving capability and previous experience in implementing and completing projects of the same type as the proposal.
- Preliminary assessment of the proposal's impact on the network.
- Breakdown of the lifecycle costs for providing the service, including:
  - Capital costs (if applicable).
  - Annual operating (i.e. set up and dispatch fees) and maintenance costs.
  - Other costs (e.g. availability, project establishment, etc.).
  - Tariff assumptions.
  - Expected annual payment for providing the non-network solution.
- A method outlining measurement and quantification of the agreed service, including integration of the proposed solution with the network.
- A statement outlining that the non-network service provider is prepared to enter into a Network Support Agreement (NSA) (subject to agreeing terms and conditions).
- Letters of support from partner organisations.
- Any special conditions to be included in an NSA.

All proposals must satisfy the requirements of any applicable laws, rules, and the requirements of any relevant regulatory authority, including following the normal network connection processes where applicable. Any network reinforcement costs required to accommodate the non-network solution will typically be borne by the proponent of the non-network solution.

For further details on AusNet's process for engaging and consulting with non-network service providers, and for investigating, developing, assessing and reporting on non-network options as alternatives to network augmentation, please refer to the Non-Network Solutions and Demand Management webpages, which contain the Demand Side Engagement Strategy and other relevant demand management documentation:

https://www.ausnetservices.com.au/Electricity

# 6.5. Potential payments to non-network proponents

At this stage, the preferred network option has not yet been determined. However, the total annualised capital expenditure that could be deferred by engaging a non-network solution is $1.5 million, assuming AusNet proceeds with Option 1. In addition, it should be noted that the payment for a non-network solution may vary according to availability, capacity, dispatch duration and firmness of the non-network service, and the responses received from other non-network proponents. The actual payment to a non-network proponent will also be subject to negotiation.

AusNet welcomes the submission of non-network option proposals for review of the potential payment amount on a case-by-case basis. For more information or enquiries regarding non-network solutions to address the identified need, please ritdconsultations@ausnetservices.com.au. In the subject field, please reference 'RIT-D OSR LD East Cranbourne'.

# 7. Compliance with NER

In accordance with clause 5.17.4 of the NER, we certify that the screening for non-network options satisfy the first stage of regulatory investment test for distribution. Table 4 shows how each of these requirements have been met by the relevant section of this report.

**Table 4: Compliance with regulatory requirements**

| REQUIREMENT | SECTION |
|---|---|
| Clause 5.17.4 of the NER, Non-network options report must include the following: | Noted. See details below. |
| (1) a description of the identified need; | Section 4. |
| (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); | Section 4.5. |
| (3) if available, the relevant annual deferred augmentation charge associated with the identified need; | Section 6.5. |
| (4) the technical characteristics of the identified need that a non-network option or (in relation to a SAPS enabled network) a SAPS option would be required to deliver, such as: | Section 6. |
| (i) the size of load reduction or additional supply; | Section 6.1. |
| (ii) location; | Section 6.1. |
| (iii) contribution to power system security or reliability; | Sections 6.2. |
| (iv) contribution to power system fault levels as determined under clause 4.6.1; and | Section 6.2. |
| (v) the operating profile; | Section 6.2. |
| (5) a summary of potential credible options to address the identified need, as identified by the RIT-D proponent, including network options, non-network options and (in relation to a SAPS enabled network) SAPS options. | Section 5. |
| (6) for each potential credible option, the RIT-D proponent must provide information, to the extent practicable, on: | Section 5.1 – Section 5.6. |
| (i) a technical definition or characteristics of the option; | Section 5.1 – Section 5.6 |
| (ii) the estimated construction timetable and commissioning date (where relevant); and | Section 5.1 – Section 5.6 |
| (iii) the total indicative cost (including capital and operating costs); and | Section 5.1 – Section 5.6 |
| (7) information to assist non-network providers wishing to present alternative potential credible options including details of how to submit a non-network proposal for consideration by the RIT-D proponent. | Section 8. |

# 8. Information to assist non-network and SAPS options providers during consultation period

## 8.1. Request for submissions

AusNet invites written submissions and any queries, on the matters set out in this OSR, from Registered Participants, AEMO, interested parties, non-network providers and persons registered on our demand-side engagement register. As explained in section 6.4, prospective non-network service providers interested in alleviating the network constraints outlined in this OSR are advised to begin engagement with AusNet as soon as possible.

All submissions and enquiries should be directed to:

Email: ritdconsultations@ausnetservices.com.au

Submissions are due on or before 16 May 2025 and should refer to 'RIT-D OSR East Cranbourne Capacity Enhancement' in the subject heading.

Submissions will be published on AusNet's and AEMO's websites. If you do not wish to have your submission published, please clearly stipulate this at the time of lodging your submission.

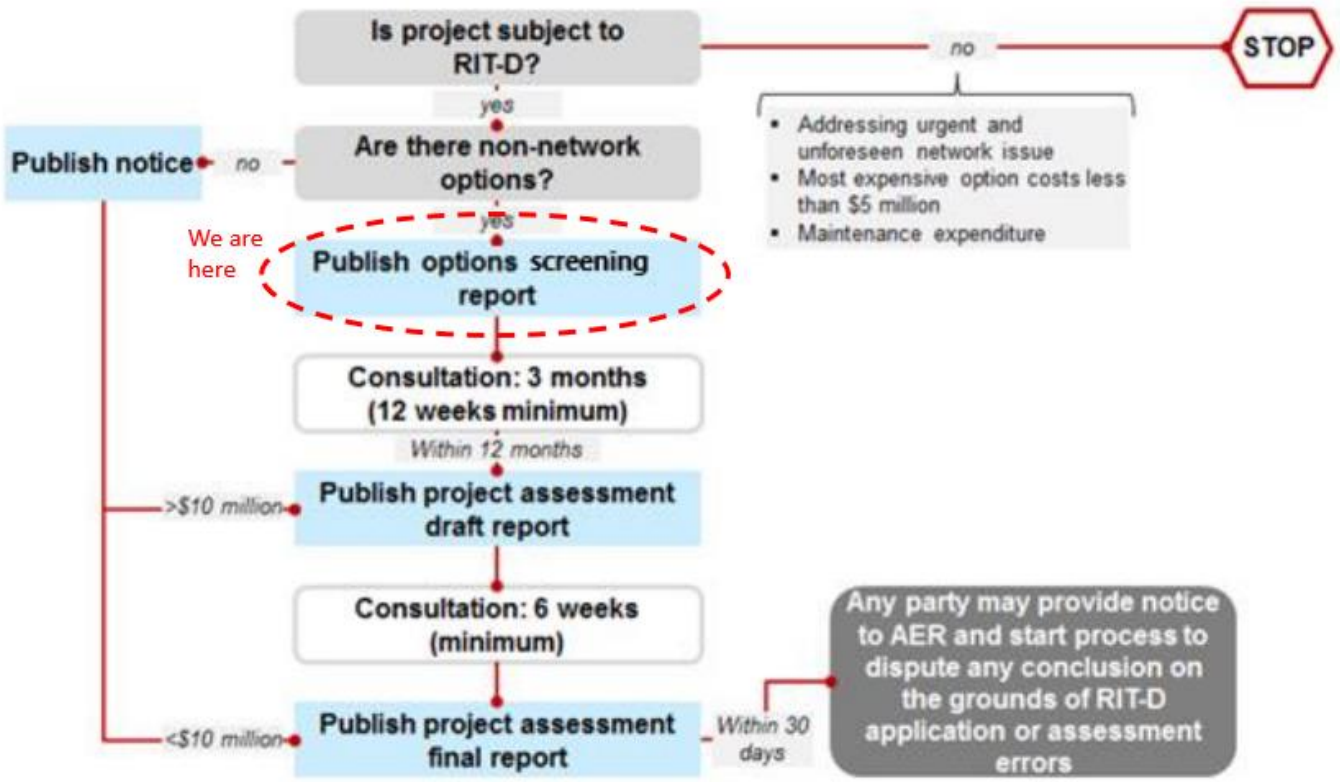
## 8.2. Next stage of RIT-D process

Following the conclusion of the consultation period for this report, AusNet will, having regard to any submissions received, prepare and publish the DPAR which will include:

- A summary of, and commentary on, any submissions on this OSR.
- A detailed market benefit assessment of the proposed credible options to address the identified need.
- Identification of the proposed preferred option to meet the identified need.

AusNet expects to publish the DPAR by mid-June 2025.

# Appendix – RIT-D assessment and consultation process[5]




[5] Australian Energy Regulator, *"Regulatory investment test for distribution, Application guidelines", Section 4,* November 2024.

## AusNet Services

Level 31
2 Southbank Boulevard
Southbank VIC 3006
T +613 9695 6000
F +613 9695 6666
Locked Bag 14051 Melbourne City Mail Centre Melbourne VIC 8001
www.AusNetservices.com.au

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