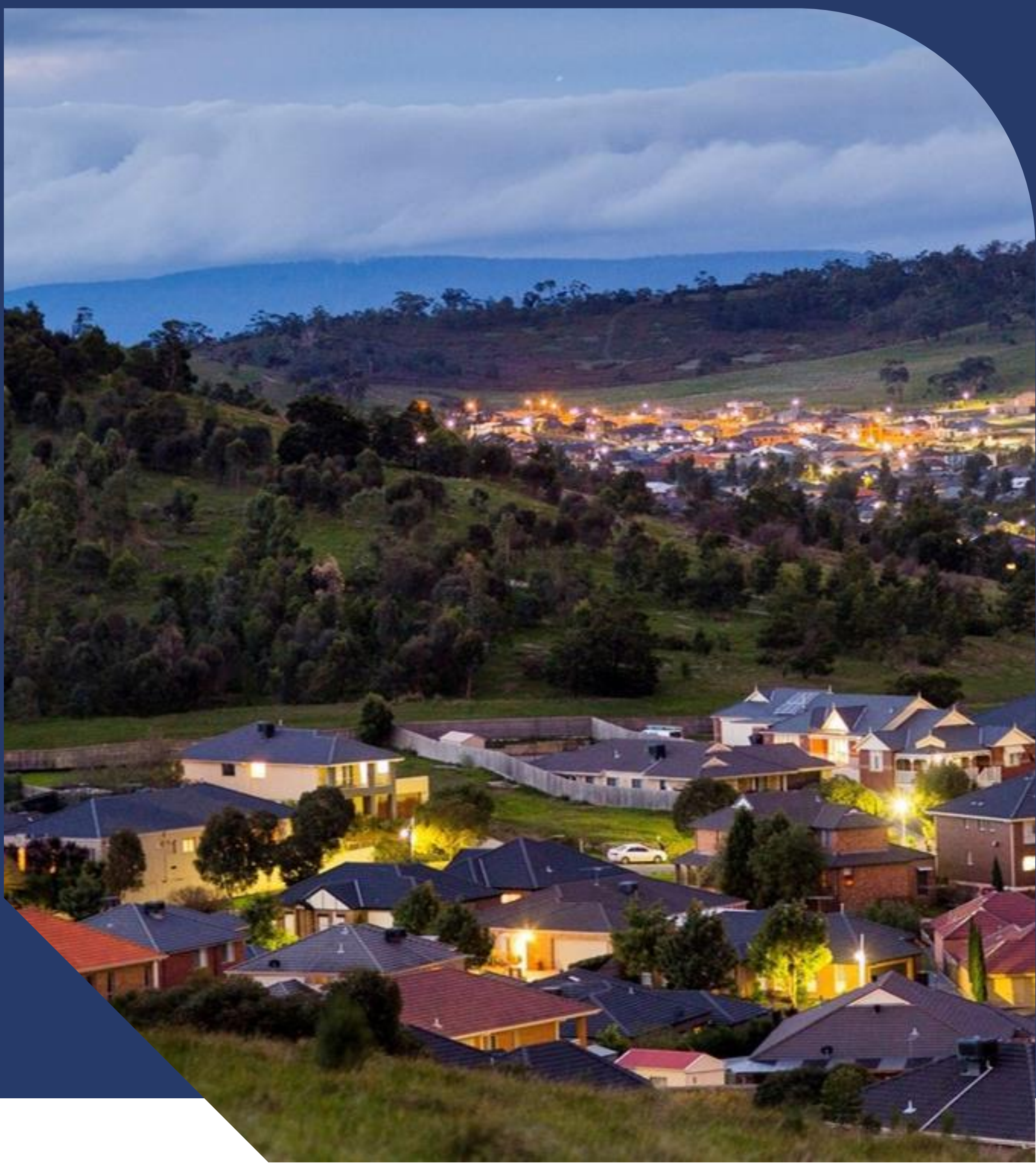
Planning Report – Watsonia (WT) Zone Substation

AMS 20-257 – Electricity Distribution Network

Tuesday, 31 December 2024



AusNet

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1. Executive summary

AusNetis a regulated Victorian Distribution Network Service Provider (DNSP) that supplies electrical distribution services to more than 800,500 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 that we operate under, AusNet aims to maintain service levels at the lowest possible cost to our customers. To achieve this, we develop forward looking 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).

This report presents our forward looking investment plans to manage the existing and emerging service level constraints in the Watsonia (WT) Zone Substation supply area to ensure that we maintain service levels to our customers over the short and long term. The report outlines how we quantify service level risk, identifies and assesses the costs and benefits of potential options to mitigate the identified risks, and provides forward looking plans outlining the optimal service level risk mitigation solutions, and timing of those solutions, to maintain service levels.

1.1. Identified Need

Watsonia Zone Substation (WT) commenced operation in the late 1950s with two 66/22kV power transformers. A third transformer was installed in 2010 and the station now includes two 66kV bus-tie circuit breakers and is supplied by two incoming 66kV lines. The outdoor 22kV switchyard consists of eleven 22kV feeders and a 10MVAr capacitor bank.

To manage short circuit current levels within asset capabilities and rules requirements, only two of the power transformers operate in parallel, with the third operating as a hot spare under normal conditions via normally open 22kV transformer circuit breakers connected to each of the 22kV buses. This arrangement allows quick restoration to near system normal capacity following outage of either of the two normally loaded transformers.

There are fifteen 22kV bulk-oil circuit breakers at the station which were installed in the 1950s and 1960s.

The physical and electrical condition of these assets has deteriorated and they are now presenting an increasing risk of failure. The station configuration includes three 66kV buses and two 22kV buses.

The emerging service constraints at WT are:

- Security of supply risks presented by the increased likelihood of failure due to the deteriorating condition of the assets;
- Health and safety risks presented by a possible explosive failure of the bushings on a number of the assets ;
- Plant collateral damage risks presented by a possible explosive failure of a number of the assets;
- Environmental risks associated with insulating oil spill or fire; and
- Reactive asset replacement risks presented by the increasing likelihood of asset failure due to the deteriorating condition of the assets.

1.2. Proposed Preferred Option

The options analysis identifies that the preferred option, being the one that maximises the net economic benefit to all those that produce, consume and transport electricity in the NEM, is to:

- Replace No.1 and No.2 transformers
- Replace the 22kV circuit breakers by 2031, at an estimated capital cost of [CIC] million (Real $2024).

Applying a discount rate of 5.56% per annum, this proposed preferred option has a net economic benefit of [CIC] million, relative to the Do Nothing Different option, over the forty-five-year assessment period.

While the optimal timing of the proposed preferred option is by 2029, to allow sufficient time to complete the regulatory investment test for distribution (RIT-D), and to smooth the overall network capital expenditure, AusNet plans to begin implementing the proposed preferred option by 2027

1.3. Next Steps

This planning report outlines the service level risk mitigation investment that AusNet Services has assessed as prudent, efficient and providing the optimal balance of supply reliability and cost.

While this report outlines AusNet's plans for maintaining service levels, and serves to support AusNet' revenue request for the 2026-31 regulatory period, the proposed investment is subject to the regulatory investment test for distribution (RIT-D).

As such, the proposed investment will be confirmed via the formal RIT-D process, which includes publication of three reports at the various RIT-D stages, and includes a formal consultation process where interested parties can make submissions that help identify the optimal solution.

2. Introduction

2.1. Purpose

This planning report outlines asset condition, asset failure risks and network development plans relevant to Watsonia (WT) Zone Substation for the period 2026 - 2031. It provides an analysis of viable options to address the identified risks and maintain the efficient delivery of electrical energy from WT, consistent with the National Electricity Rules (NER) and stakeholder's requirements. It also summarizes the scope, delivery schedule and expenditure associated with the most economical solution to emerging constraints.

2.2. Scope

The scope of this planning report is limited to the equipment within Watsonia (WT) Zone Substation.

It excludes sub-transmission and distribution feeders entering and exiting the zone substation.

2.3. Asset Management Objectives

The high-level asset management objectives are outlined in AMS 01-01 Asset Management System Overview.

The electricity distribution network objectives are stated in AMS 20-01 Electricity Distribution Network Asset Management Strategy.

3. Background

3.1. Substation Description

Watsonia (WT) Zone Substation is located in the northern suburbs of metropolitan Melbourne approximately 20km north of Melbourne (Melway map reference 20 E4) and is the main source of supply for the suburbs of Watsonia, Greensborough, Montmorency, Lower Plenty, Macleod and Bundoora.

WT supplies approximately 24,500AusNet customers and 145 Jemena customers. The load at WT includes mostly residential and commercial urban load with some industrial loads and a few farm loads.

The WT Zone Substation area is in the northern suburbs of Melbourne at an elevation of 56m above sea level. WT has typical Melbourne climate with summer average maximum temperatures of 26°C, winter average minimum temperatures of 6°C with extreme temperatures reaching 46°C in summer and -3°C in winter. The average rainfall is 658 mm in this area.

WT is supplied at 66kV via two 66kV circuits that originate from Thomastown Terminal Station (TTS) and Jemena's North Heidelberg Zone Substation (NH).

The location of WT within the AusNet Services distribution network is as shown below in Figure 1.

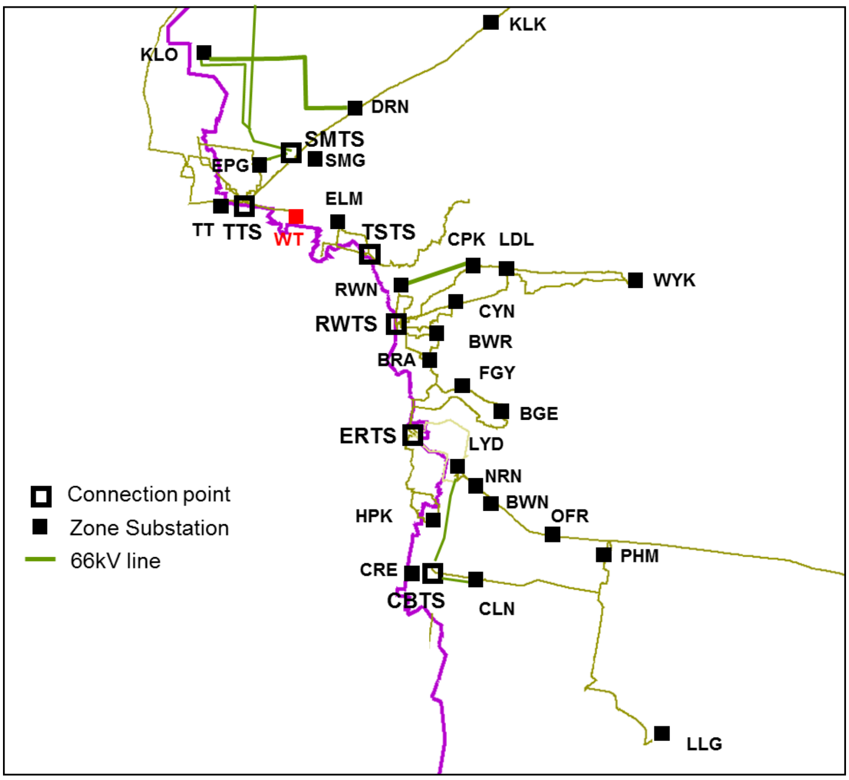

Figure 1: WT location within AusNet distribution network

The configuration of primary electrical circuits within WT is as shown in the following single line diagram Figure 2.

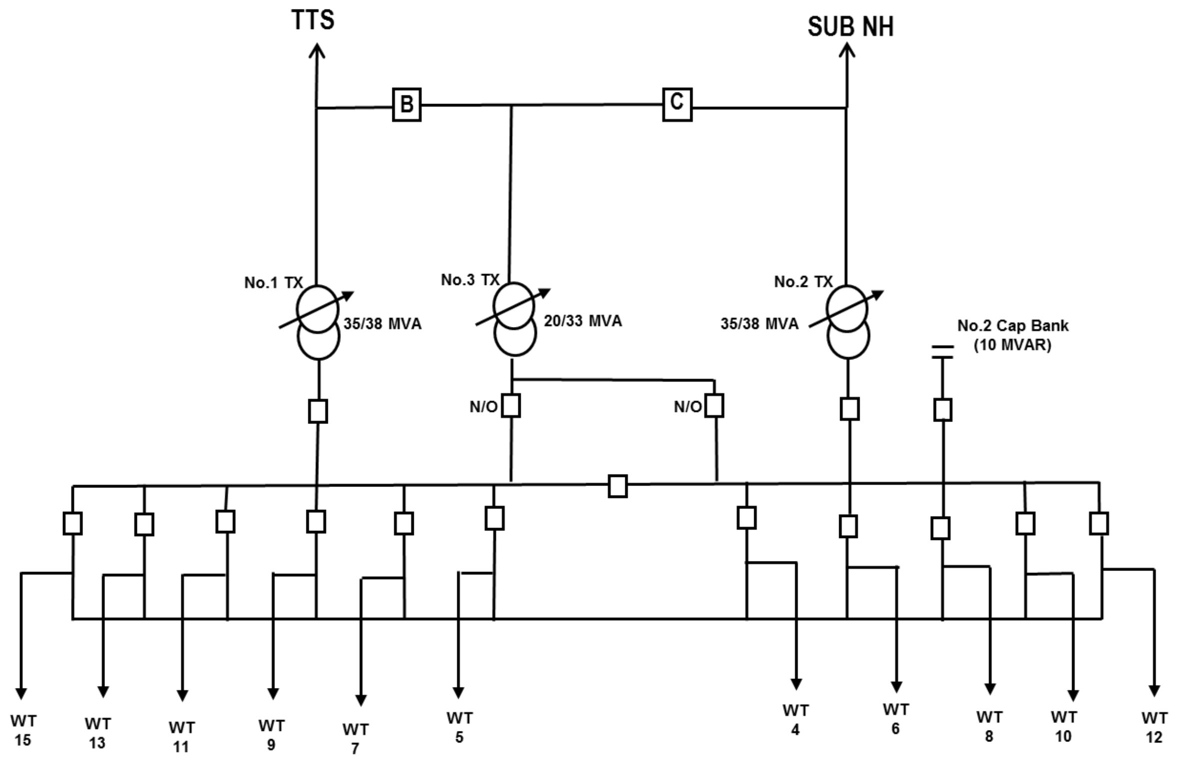

Figure 2: WT Single Line Diagram

3.2. Customer Composition

WT has eleven 22kV feeders of which ten supply into the AusNet supply area and one supplies into the Jemena electricity network area. Table 1 provides details of the 22kV supply feeders.

Table 1: WT feeder information

Feeder	Feeder Length (km)	Feeder Description	Number of Customers	Customer Type
WT15	8.2	Summer peaking, urban feeder	1,982	98.6% Residential 1.2% Commercial 0.2% Farming
WT13	24.3	Summer peaking urban	3,765	86.2% Residential 13% Commercial 0.7% Industrial 0.1% Farming customers.
WT11	11.1	Summer peaking urban	2,353	94.0% Residential 5.9% Commercial 0.1% Industrial
WT9	14.0	Summer peaking urban	3,013	95.6% Residential 4.2% Commercial 0.2% Industrial
WT7	11.0	Summer peaking urban	2,514	91.6% Residential 7.4% Commercial 1.0% Industrial
WT5	7.3	Summer peaking urban	1,455	91.6% Residential 8.2% Commercial 0.1% Industrial 0.1% Farming

Feeder	Feeder Length (km)	Feeder Description	Number of Customers	Customer Type
WT4	-	Jemena feeder	145	93.0% Residential 5.0% Commercial 2.0% Industrial
WT6	20.5	Summer peaking urban	3,589	96.1% Residential 3.9% Commercial
WT8	10.7	Summer peaking urban	1,928	95.7% Residential 4.0% Commercial 0.3% Industrial
WT10	5.3	Summer peaking urban	1,017	83.7% Residential 16.2% Commercial 0.1% Industrial
WT12	14.7	Summer peaking urban	2,884	88.7% Residential 8.6% Commercial 2.7% Industrial

The WT 22kV feeders interconnect with 22 kV feeders from Eltham (ELM) and Thomastown (TT) zone substations, providing a load transfer capability away from WT of 16.5MVA.

3.3. Zone Substation Equipment

3.3.1. Primary Equipment

WT includes an air-insulated 66kV switchyard with three 66kV buses separated by bus-tie circuit breakers connected to two incoming 66kV lines from TTS and NH.

There are two 22kV air insulated busbars connected to one another with a bus tie circuit breaker and connected to the three 66/22kV transformers via four transformer circuit breakers (No.3 transformer is double switched). Eleven 22kV feeders and one 10MVAR capacitor bank are connected to these 22kV busbars.

Circuit breaker "B" was replaced in 2016. Circuit breaker "C" is a modern unit installed in the last 5 years.

The 22kV switchyard currently has seventeen 22kV circuit breakers including fifteen bulk-oil circuit breakers installed when the station was established in the 1950s and 1960s.

Transformation comprises two 35/38MVA 66/22kV transformers located in the No.1 and No.2 positions, both of which were installed in the 1950s. A third 66/22kV transformer, rated 20/33MVA, was installed in the No.3 position in 2010. This third 66/22 kV transformer operates as a hot spare with a normally open 22kV circuit breaker connection to each of the two 22kV buses. This hot spare arrangement provides the ability to quickly restore the station to near system normal capacity following an outage either the No.1 or No.2 transformer, while maintaining short circuit levels within asset capabilities and rules requirements.

The station has one 100kVA station service transformer.

3.3.2. Secondary Equipment

The two incoming 66kV lines and buses are protected by current differential and remote trip send and directional overcurrent protection using modern numeric relays.

The No.1 and No.2 66/22kV transformer differential protection is provided by older electronic relays whilst the newer No.3 transformer differential protection is provided by modern numeric relays.

The 22kV bus protection consists of low impedance bus protection and bus distance protection using modern numeric relays.

The 22kV feeder circuit breakers have master earth fault and back up earth fault protection using older electronic relays.

The 22kV capacitor bank protection has overcurrent, earth fault and voltage balance schemes using a modern numeric relay.

The station has duplicated 240V AC systems and battery chargers that supply a 250V DC system for the protection relays and trip coils.

3.4. Asset Condition

AusNet maintains a risk management system designed in accordance with AS ISO 31000 Risk Management – Guidelines to ensure risks are effectively managed to provide greater certainty for the owners, employees, customers, suppliers, and the communities in which we operate.

The risk of each asset is calculated as the multiplication of probably of failure (PoF) of the asset and the consequence of failure (CoF). The risk is then extrapolated into the future accounting for forecast changes in PoF and CoF.

In the distribution network, AusNet aims to maintain risk. Risk treatments required to achieve this over time include replacement, refurbishment, and maintenance activities, and are developed based on current risk and extrapolated risk.

The overall approach to quantified asset risk management is detailed in AMS -01-09. However, Table 2 of this document show the AMS documents describing the considerations and methodologies to determine PoF, Cof, and risk treatments that are unique to assets driving ZSS rebuilds.

Table 2: Asset AMS reference

Asset Class	AMS Document
Transformers	AMS 20-71
Circuit Breakers	AMS 20-54
Instrument Transformers	AMS 20-63

The PoF ranges of key assets at WT is listed in Table 3

Table 3: Station Assets PoF

Asset	0-0.5%	0.5-2%	2-5%	5%+
Transformers	1			2
66kV Circuit Breakers			2	
22kV Circuit breakers	1	4	6	6
66kV Voltage Transformers				
22kV Voltage Transformers	3			2
66kV Current Transformers				
22kV Current Transformers	4		1	1

3.5. Zone Substation Supply Capacity

WT is a summer peaking station and the peak electrical demand reached 69MVA in the summer of 2023/24. The recorded peak demand in winter 2024 was 52.5MVA.

The demand at WT is forecast to increase slowly at a growth rate of less than 1% per annum.

Figure 3 shows the forecast maximum demand and supply capacities (cyclic ratings) for WT.

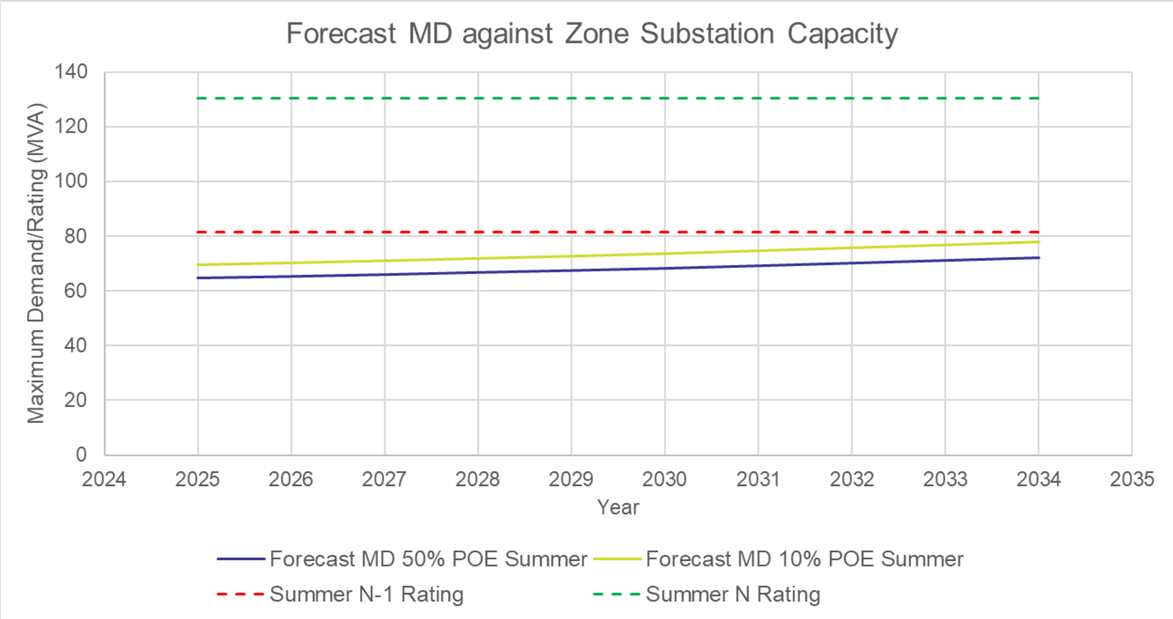

Figure 3: WT Forecast Maximum Demand against Zone Substation Capacity

3.6. Load Duration Curves

The zone substation load duration curves that feed into the risk-cost assessment model are derived from historical actual demands between:

- 1 October 2023 and 31 March 2024 for the summer 50% probability of exceedance (POE) curves;
- 1 April 2023 and 30 September 2023 for the winter 50% POE curves;
- 1 October 2023 and 31 March 2024 for the summer 10% POE curves; and
- 1 April 2023 and 30 September 2023 for the winter 10% POE curves.

The historical hourly demands are separated by season and unitised based on the recorded maximum demand within that season (summer and winter) and time period, which allows the load duration curve to be scaled according to the seasonal forecast maximum demand for each year of the assessment period.

The 50% POE unitised load duration for WT zone substation is presented in

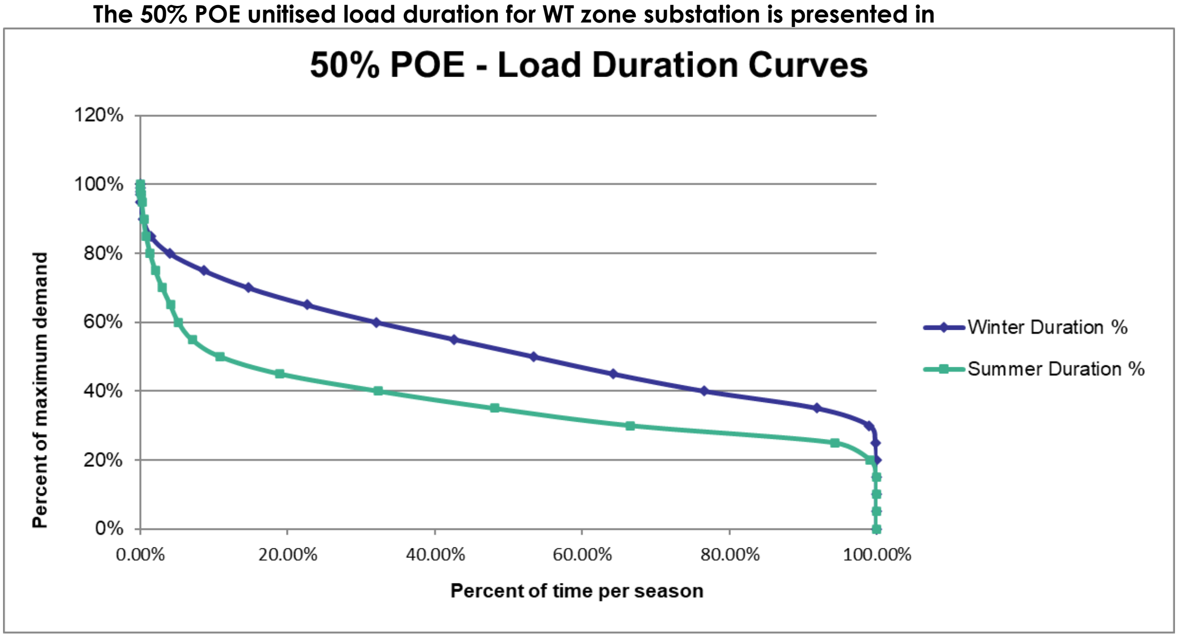

Figure 4, and the 10% POE unitised load duration for WT zone substation is presented in Figure 5.

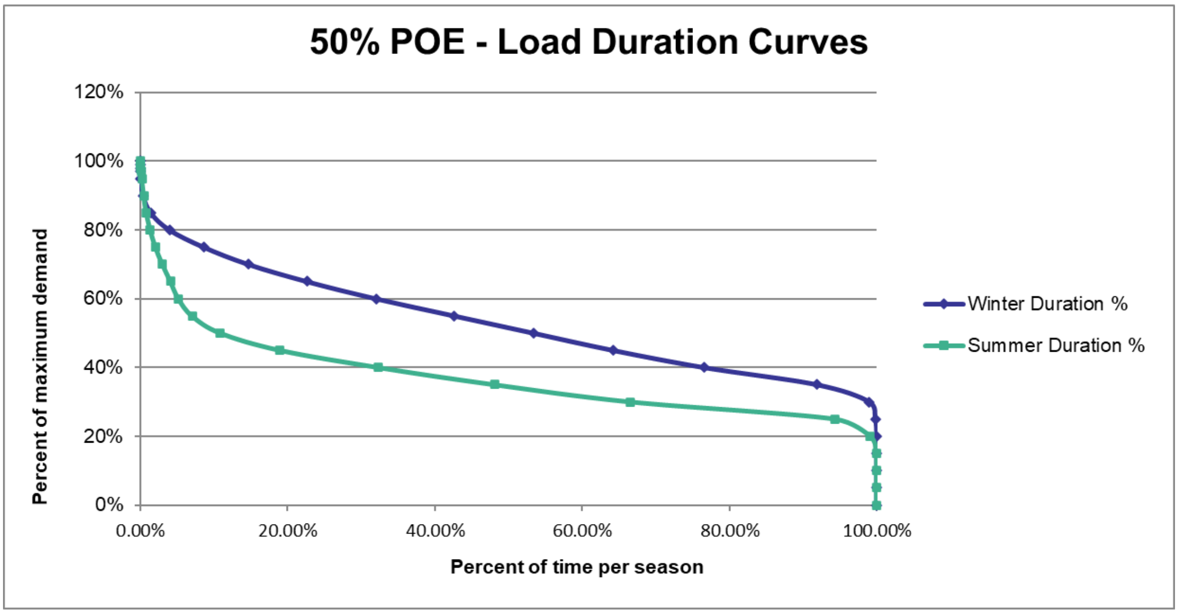

Figure 4: WT 50% Load Duration Curves

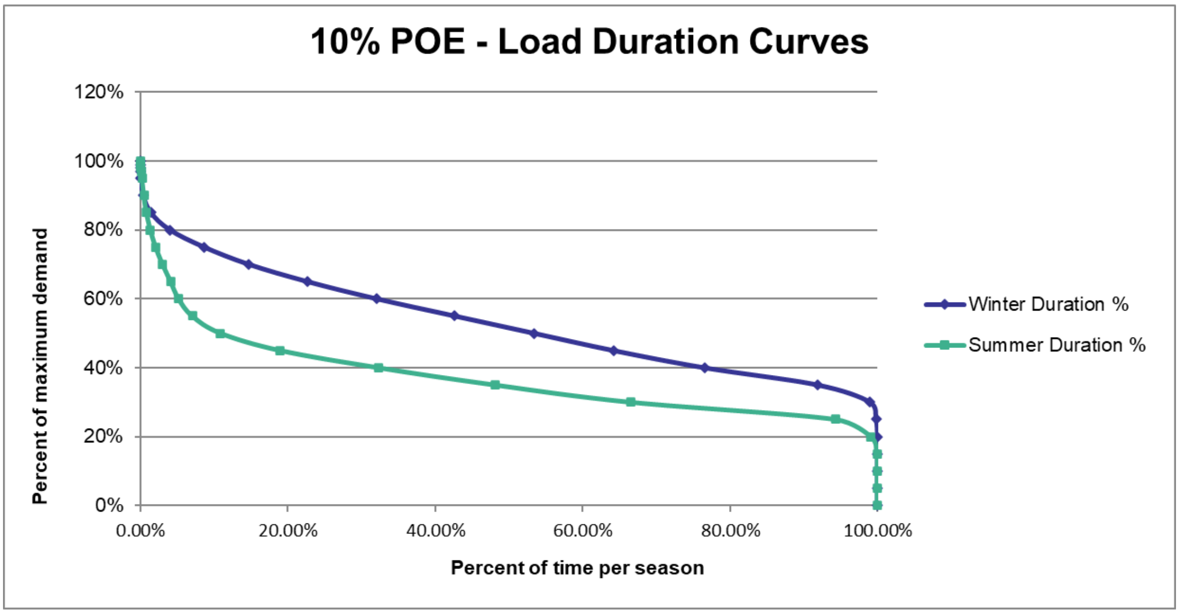

Figure 5: WT 10% POE Load Duration Curves

3.7. Feeder Circuit Supply Capacity

There is currently no requirement for additional feeders at WT due to the low load growth in the area.

3.8. Load Transfer Capability

The Distribution Annual Planning Report (DAPR) provides the load transfer capability (in MW) of the feeder interconnections between WT and its neighbouring zone substations.

This is then forecast forward in line with the forecast demand growth to give the forecast load transfer capability in Table 4.

Table 4: WT Load Transfer Capability

	2025	2026	2027	2028	2029	2030	2031	2032	2033	2024
Load Transfer Capability (MW)	16.5	16.3	16.1	15.9	15.7	15.5	15.3	15.1	14.9	14.8

4. Other Issues

4.1. Regulatory Obligations

This planning report acknowledges AusNet obligations as a Distribution Network Service Provider under the National Electricity Rules with particular emphasis on:

Clause 6.5.7 of the National Electricity Rules requires AusNet Services to only propose capital expenditure required in order to achieve each of the following:

(1) meet or manage the expected demand for standard control services over that period;

(2) comply with all applicable regulatory obligations or requirements associated with the provision of standard control services;

(3) to the extent that there is no applicable regulatory obligation or requirement in relation to:

(i) quality, reliability or security of supply of standard control services; or

(ii) the reliability or security of the distribution system through the supply of standard control services

to the relevant extent:

(iii) maintain the quality, reliability and security of supply of standard control services, and

(iv) maintain the reliability and security of the distribution system through the supply of standard control services; and

(4) maintain the safety of the distribution system through the supply of standard control services.

Section 98(a) of the Electricity Safety Act requires AusNet to:

1. design, construct, operate, maintain and decommission its supply network to minimise as far as practicable –

(a) the hazards and risks to the safety of any person arising from the supply network; and

(b) the hazards and risks of damage to the property of any person arising from the supply network; and

(c) the bushfire danger arising from the supply network.

The Electricity Safety act defines 'practicable' to mean having regard to –

(a) severity of the hazard or risk in question; and

(b) state of knowledge about the hazard or risk and any ways of removing or mitigating the hazard or risk; and

(c) availability and suitability of ways to remove or mitigate the hazard or risk; and

(d) cost of removing or mitigating the hazard or risk.

Clause 3.1 of the Electricity Distribution Code requires AusNet to:

2. (b) develop and implement plans for the acquisition, creation, maintenance, operation, refurbishment, repair and disposal of its distribution system assets and plans for the establishment and augmentation of transmission connections:

(i) to comply with the laws and other performance obligations which apply to the provision of distribution services including those contained in this Code;

(ii) to minimise the risks associated with the failure or reduced performance of assets; and

(iii) in a way which minimises costs to customers taking into account distribution losses.

4.2. Station Configuration Risk

Failure of some 66kV and 22kV equipment will result in supply outages to customers as backup circuit breakers operate to isolate the failed equipment.

This would be for an estimated duration of two hours, which is the typical time it takes operators to travel to site and manually re-configure circuits to isolate the failed equipment and sequentially restore supply to as many customers as possible.

Error! Not a valid bookmark self-reference. lists the estimated bus outage consequence factors for a failure of each major type of equipment based on the substation layout.

Table 5: TT Bus Outage Consequence Factors

Failed Equipment	Estimated Bus Outage Consequence
Transformer	0%
22kV circuit breaker	53%
66kV circuit breaker	50%
22kV current transformer	50%
66kV current transformer	50%
22kV voltage transformer	25%
66kV voltage transformer	25%

5. Identified Need

Watsonia Zone Substation (WT) commenced operation as a 66/22kV transformation station in the late 1950s with two power transformers. The third transformer was installed in 2010 and the station now includes two 66kV bus-tie circuit breakers, is supplied from two incoming 66kV lines and supplies an outdoor 22kV switchyard with eleven 22kV feeders. There are fifteen 22kV bulk-oil circuit breakers at the station which were installed when the station was established in the 1950s and 1960s.

The physical and electrical condition of these assets has deteriorated and they are now presenting an increasing failure risk. The station configuration includes three 66kV buses and two 22kV buses.

The emerging service constraints at WT are:

- Security of supply risks presented by the increased likelihood of failure due to the deteriorating condition of the assets;
- Health and safety risks presented by a possible explosive failure of the bushings on a number of the assets;
- Plant collateral damage risks presented by a possible explosive failure of a number of the assets;
- Environmental risks associated with insulating oil spill or fire; and
- Reactive asset replacement risks presented by the increasing likelihood of asset failure due to the deteriorating condition of the assets.

6. Risk and Options Analysis

6.1. Risk-Cost Model Overview

AusNet's risk-cost model quantifies the benefits of potential investment options by comparing the service level risk of the Do Nothing (Counterfactual) option with the reduced service level risk assuming the credible option is place.

The investment cost to implement the credible option is then subtracted from the monetised benefit to compare credible options and identify the option that maximises the net economic benefit (the proposed preferred option).

The areas of service level risk costs, and risk cost reduction benefits, that AusNet considers include:

- Supply risk;
- Safety risk;
- Collateral damage risk;
- Reactive replacement risk;
- Environment risk;
- Operations and maintenance costs; and
- Losses.

Further details on the model can be found in AusNet' Risk-Cost Assessment Model Methodology paper.

6.2. Risk Mitigation Options Considered

The following options have been identified to address the risk at WT:

(1) Do Nothing

(2) Retire one transformer

(3) Retire one transformer and sure up supply capacity via network support

(4) Use network support to defer retirement and replacement

(5) Replace outdoor 22kV switchgear with three new indoor switchboards and associated secondary equipment

(6) Replace one transformer and 22kV switchgear

(7) Replace two transformers and 22kV switchgear

An economic cost-benefit assessment is used to assess and rank the economic efficiency of each option.

The following sections provide a brief summary of each of these options.

6.2.1. Option 1: Do Nothing Different

The Do Nothing Different (counterfactual) option assumes that AusNet would not undertake any investment, outside of the normal operational and maintenance processes.

Under this option, increasing supply risk would be managed by increased levels of involuntary load reduction.

Increased non-supply risks, such as those associated with safety, collateral damage, reactive replacement and environmental impacts, would be accepted as unmanaged rising risk costs.

The Do Nothing Different (counterfactual) option establishes the base level of risk, and provides a basis for comparing potential options.

Since this option assumes no investment outside of the normal operational and maintenance processes, this is a zero investment cost option.

6.2.2. Option 2: Retire one transformer

This options tests whether the current installed capacity of the substation is still required to meet customer demand and whether equipment could be retired rather than replaced.

The capital cost for this option is [CIC], for associated decommissioning works.

6.2.3. Option 3: Retire one transformer and sure up supply capacity via network support

This option tests whether the current installed capacity of the substation is still required to meet customer demand and whether equipment could be retired and network support used rather than replacing poor condition assets.

The capital cost for this option is [CIC], for associated decommissioning works and establishing a 20MW network support agreement.

In addition to the capital cost, there is ongoing operational costs associated with this option that represent the network support availability and activation costs, and which vary year-by-year based on the network support expected under this option, as outlined in Table 6.

Table 6: Network support services annualised costs ($ million)

2025	2026	2027	2028	2029
		[CIC]		

6.2.4. Option 4: Use network support to defer retirement and replacement

This options tests whether network support can be used to defer the replacement of poor condition assets. This option addresses the supply risks associated with poor condition assets, but does not address the safety, environmental or collateral damage risks as the assets remain in service.

The capital cost of this option is [CIC], for setup of a 20MW network support agreement.

In addition to the capital cost, there is ongoing operational costs associated with this option that represent the network support availability and activation costs, and which vary year-by-year based on the network support expected under this option, as outlined in **Error! Not a valid bookmark self-reference.**.

Table 7: Network support services annualised costs ($ million)

2025	2026	2027	2028	2029
		[CIC]		

6.2.5. Option 5: Replace outdoor 22kV switchgear with four new indoor switchboards, replace transformers in a second stage

This option involves replacing the 22kV outdoor bulk-oil circuit breakers with three new indoor 22kV modular switchboards.

This option does not address the risks associated with the No.1 and No.2 66/22kV transformers or the control building condition until 2029.

This option has a capital cost of [CIC] million

6.2.6. Option 6: Replace one transformer and 22kV switchgear, replace the second transformer in a second stage

This option replaces the existing deteriorated outdoor 22kV No.1 and No.2 bus and 22kV circuit breakers with four new indoor switchboards and associated secondary equipment in Stage 1. It also proposes to replace the No.1 transformer with a 35/38MVA unit and associated secondary equipment.

The No.2 35/38MVA 66/22kV transformer with ageing secondary equipment are replaced with a new 20/33MVA units and secondary equipment in Stage 2, which is scheduled for completion around 3 years after Stage 1.

This option does not address the risk associated with the control building.

This option has a capital cost of [CIC] million.

6.2.7. Option 7: Replace two transformers and 22kV switchgear (preferred)

This option replaces the existing transformers with two new 20/33MVA units, replaces the two existing outdoor 22kV buses and circuit breakers with four new indoor switchboards. It also includes replacing associated secondary equipment.

Under this option those assets with high failure risks, including transformers, current transformers and circuit breakers and the 22kV busses, are replaced as an integrated project.

The capital cost of this option is [CIC] million.

6.3. Risk-Cost Model Results

6.3.1. Existing service level risk

Figure 6 shows the existing service level risk. The risk costs are dominated by supply risk but also have a significant amount of non-supply risks (safety, environment, collateral damage and reactive replacement). The escalation in the risk costs over time is driven by deterioration in the condition of the assets.

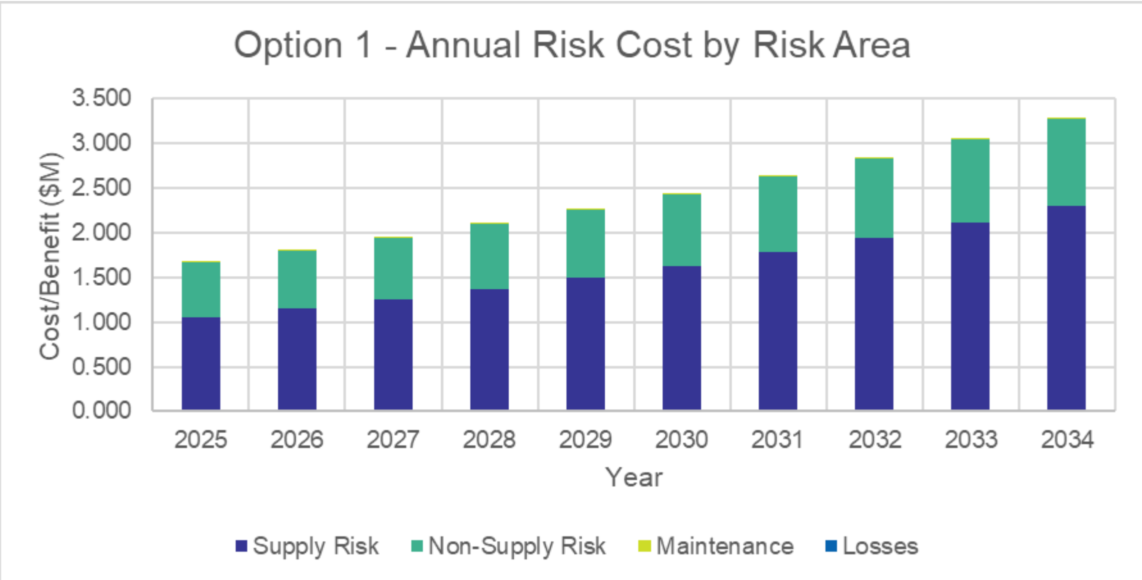

Figure 6: Do Nothing Different – Service Level Risk Cost

6.3.2. Economic Cost Benefit analysis

The economic analysis allows comparison of the economic cost and benefits of each option to rank the options and to determine the economic timing of the preferred option.

It quantifies the capital, operational and maintenance costs along with service level risk reduction benefits for each option.

Table 8lists the annualised net economic benefit of each option for each year, with the option that maximises this benefit highlighted.

Table 8: Annualized net economic benefit ($m)

<table>
<tr><th></th><th>2025</th><th>2026</th><th>2027</th><th>2028</th><th>2029</th><th>2030</th><th>2031</th><th>2032</th><th>2033</th><th>2034</th></tr>
<tr><td>Option 1</td><td colspan="10" rowspan="4">[CIC]</td></tr>
<tr><td>Option 2</td></tr>
<tr><td>Option 3</td></tr>
<tr><td>Option 4</td></tr>
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Option 5	
Option 6	
Option 7	

This indicates that Option 7 is the most economic option.

6.3.3. Sensitivity Analysis

Error! Reference source not found. presents the net present value of net economic benefits under a variety of sensitivities. The net economic benefit assessment takes account of each option's total capital, operating and maintenance costs, compared to the reduction in service level risk cost that option is expected to deliver.

The robustness of the economic assessment is tested for the following sensitivities:

- Asset failure rates, varied at ±25% of the base failure rate;
- Maximum demand forecasts, varied to ±5% of the base forecast;
- Value of customer reliability (VCR), varied to ±25% of the base VCR;
- Proposed option costs, varied to ±15% of the base option cost;
- Discount rate of 5.56%, varied to ±2% per annum of the base discount rate.

The preferred option under each sensitivity is highlighted, and the option that maximises net benefits under the majority of sensitivities is considered the proposed preferred option.

Options with a negative NPV are shown as zero and the preferred option is filled in grey.

Table 9: NPV of Net Economic Benefit Analysis

	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8
High asset failure	[CIC]							
Low asset failure								
High demand								
Low demand								
High option cost								
Low option cost								
High discount rate								
Low discount rate								
High VCR								
Low VCR								

The sensitivity analysis indicates the preferred option is Option 7, as it has the highest net benefit under eight of sensitivities tested.

6.3.4. Economic timing of preferred option

The annual benefit of implementing a credible alternative option to the Do Nothing Different (counterfactual) option is the difference between the total service level risk cost with a credible option in place, and the total service level risk cost of the Do Nothing Different option.

The optimal economic timing of the proposed option is the point in time when the annual benefit of implementing the proposed option outweighs the annualised cost to implement that option.

The optimal economic timing to implement the proposed preferred option is by 2031, as presented in Figure 7.

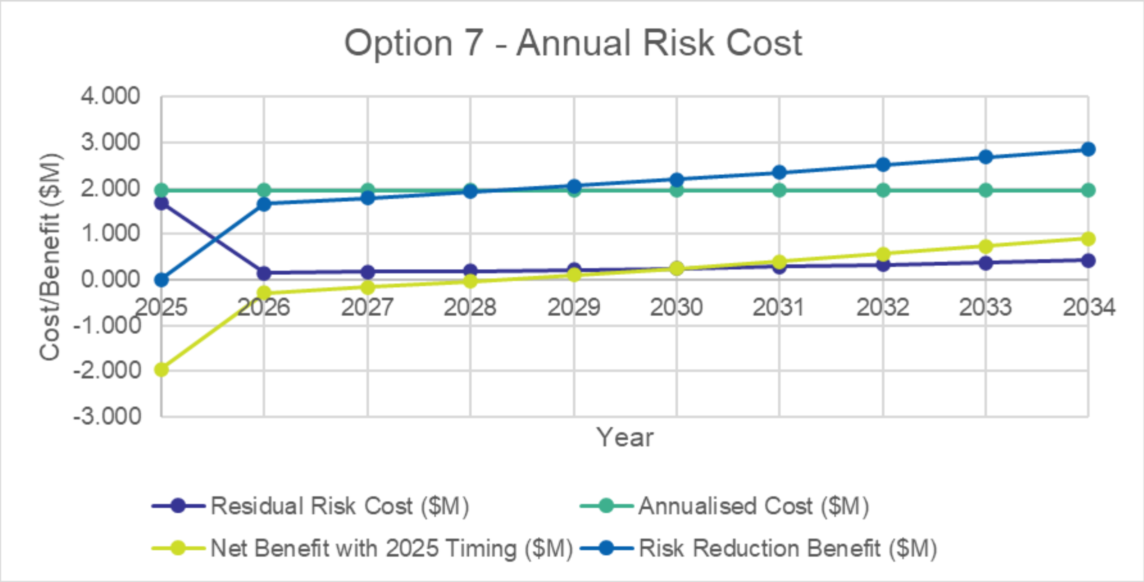

Figure 7: Economic timing of the proposed preferred option

7. Conclusion and Next Steps

The assessment outlined in this report shows that the service level risk to customers supplied from Watsonia (WT) Zone Substation is forecast to grow to unacceptable levels within the 2026-31 regulatory period.

The forecast increase in service level risk is driven by increasing supply and non-supply (safety, environmental, collateral damage and reactive replacement) risk driven by deterioration in the condition of the assets resulting in an increasing likelihood of asset failure.

7.1. Proposed Preferred Option

The options analysis identifies that the preferred option, being the one that maximises the net economic benefit to all those that produce, consume and transport electricity in the NEM, is to:

- Replace No.1 and No.2 transformers
- Replace the 22kV circuit breakers by 2031, at an estimated capital cost of [CIC] million (Real $2024).

Applying a discount rate of 5.56% per annum, this proposed preferred option has a net economic benefit of [CIC] million, relative to the Do Nothing Different option, over the forty-five-year assessment period.

While the optimal timing of the proposed preferred option is by 2029, to allow sufficient time to complete the regulatory investment test for distribution (RIT-D), and to smooth the overall network capital expenditure, AusNet plans to begin implementing the proposed preferred option by 2027

7.2. Next steps

This planning report outlines the service level risk mitigation investment that AusNet has assessed as prudent, efficient and providing the optimal balance of supply reliability and cost.

While this report outlines AusNet' plans for maintaining service levels, and serves to support AusNet' revenue request for the 2026-31 regulatory period, the proposed investment is subject to the regulatory investment test for distribution (RIT-D).

As such, the proposed investment will be confirmed via the formal RIT-D process, which includes publication of up to three reports at the various RIT-D stages, and includes a formal consultation process where interested parties can make submissions that help identify the optimal solution.

A. Appendix

A.1. Preferred Option Details

The high level scope of work for the proposed preferred option includes:

- Replace No. 1 and No. 2 Transformers with 20/33MVA units.
- Install three new indoor 22kV modular switchboards with integral feeder protection, bus protection and capacitor protection and control configured as three 22kV buses with one transformer incomer, four 22kV feeders, one capacitor bank and two bus ties;
- Reconnect all eleven 22kV feeders and a new capacitor bank to new indoor switchboards;
- Demolish and remove the existing outdoor 22kV switchgear;
- Replace the existing No.2 22kV capacitor bank with new 12MVAr capacitor bank;
- Replace/establish associated protection works; and
- Upgrade station fencing, switchyard lighting, surfaces, drainage, trenches to current standards.

A.2. Project Cost Summary

Watsonia Refurbishment			
	Unit Rate	Qty	Total
Install 1 new modular 22kV switch room including the removal of the existing switchgear (Using the Rev B KMS estimate and comments as a base cost) Includes: AusNet internal Engineering/PM costs + external design Civil work and extend earth grid Re-route and reconnect three 22KV feeders Security Upgrade - Station fencing, CCTV, lighting etc Surfaces, drainage, trench improvements		1	[CIC]
Install additional 3 modular switch rooms	[CIC]	3	
Civil work and extend earth grid		3	
Re-route and reconnect additional 8 x 22KV feeders		1	
Replacement of 2x 20MVA transformers		2	
Bund upgrade and contaminated soil disposal		2	
Noise/Sound walls		2	
Replace existing No. 2 22kV capacitor bank		1	
		TOTAL DIRECT COSTS	**[CIC]**

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