

Service constraints at Watsonia (WT) Zone Substation

Regulatory Investment Test for Distribution
**Notice of Determination under clause
5.17.4(d) of the National Electricity Rules**



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1 Introduction

AusNet Services is a regulated Victorian Distribution Network Service Provider (DNSP) that supplies electrical distribution services to more than 745,000 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 that we operate under, AusNet Services aims to maintain service levels at the lowest possible cost to our customers. To achieve this outcome, 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).

Our approach is to consider network and non-network options on their merits, so that we meet our customers' needs and our compliance obligations at the lowest total cost. Where applicable, we also prepare, publish, and consult on a regulatory investment test for distribution (RIT-D), which further helps ensure all credible options are identified and considered, and the best option is selected.

In relation to required works at Watsonia Zone Substation (WT), we have concluded that there are no credible non-network options that are capable of addressing the risks at that zone substation, which are asset-related. In accordance with clause 5.17.4(d) of the National Electricity Rules (NER), therefore, this document is the notification of our determination that there are no credible non-network options in relation to the identified need at WT. Consequently, AusNet Services will not publish a non-network options report as part of the RIT-D for works at WT.

The next stage of the RIT-D process will be the publication of the Draft Project Assessment Report (DPAR), which AusNet Services intends to publish in May 2021.

This notice provides contextual background and outlines the reasons for AusNet Services making its determination, along with any methodologies and assumptions used in making that determination.

2 About Watsonia Zone Substation

2.1 Location, Supply Area and Configuration

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 23,460 AusNet Services 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).

Service constraints at WT – RIT-D

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

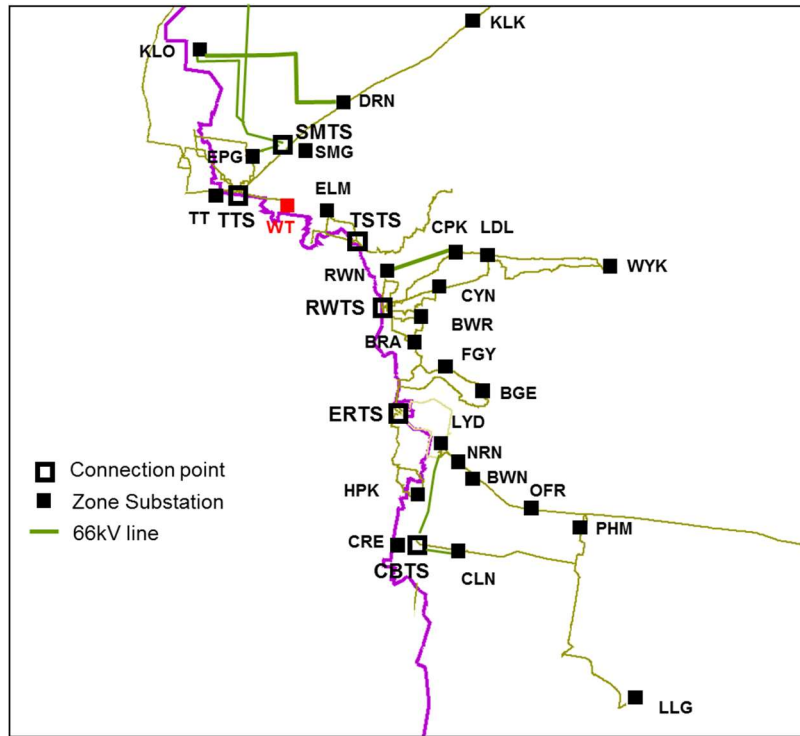


Figure 1: WT location within AusNet Services distribution network

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

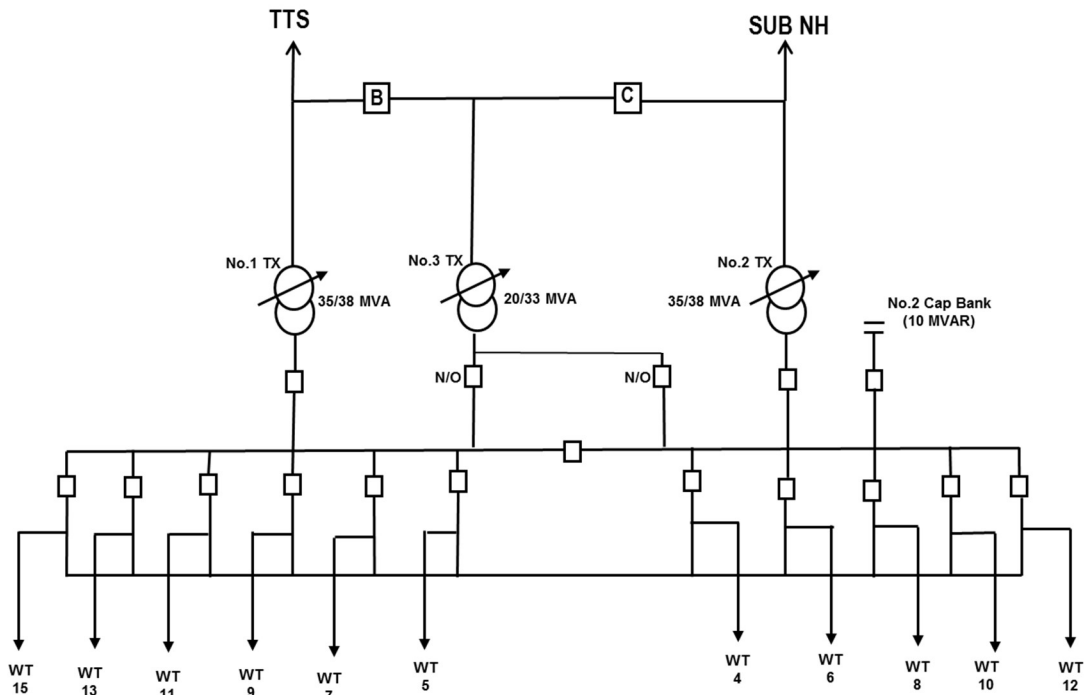


Figure 2: WT Single Line Diagram

2.2 Zone Substation Equipment

2.2.1 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 10MVA 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.

2.2.2 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 Identified Need

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.

Service constraints at WT – RIT-D

The physical and electrical condition of these assets have deteriorated and 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:

- 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.

Our planning report for WT also highlighted the security of supply risks that arise from the asset failure. Our updated load forecasts, however, indicate that these supply risks no longer arise under n-1 conditions.

4 Regulatory Obligations

In addressing the identified need, we must satisfy our regulatory obligations, which we summarise below.

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 Services to:

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.*

Service constraints at WT – RIT-D

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 Services to:

- (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.*

Under clause 5.2 of the Electricity Distribution Code, AusNet Services:

must use best endeavours to meet targets required by the Price Determination and targets published under clause 5.1 and otherwise meet reasonable customer expectations of reliability of supply.

The condition of the assets at WT is discussed in the Asset Health Reports for the key asset classes such as power transformers, instrument transformers and switchgear with information on asset condition rankings, recommended risk mitigation options and replacement timeframes. In light of our Asset Health Report for WT, our assessment is that works are required to address the asset-related risks in accordance with our obligations set out above.

5 Screening for Non-network Options

As detailed in section 4, the identified need in relation to WT comprises a number of different elements, which can be grouped together in the following broad categories:

- Health and safety risks;
- Plant collateral damage risks;
- Environmental risks; and
- Reactive asset replacement risks.

The nature of the above risks is asset-related and cannot be mitigated by a non-network option. For asbestos related risks associated with WT, for example, these risks cannot be mitigated by a non-network option, as the risk relates to the fabric of the building. As already noted, our assessment is that the identified need described in section 4 must be addressed in order to comply with our obligations.

For the reasons set out above, our view is that there are no credible non-network options to address the identified need at WT. In accordance with the NER requirements, we note that our conclusion is not dependent on any particular assumptions or methodologies.

6 Next Steps

For the reasons set out in Section 3, AusNet Services has determined that there will not be a non-network option that is a credible option, or a non-network component that forms a significant part of a potential credible option at WT. In accordance with clause 5.17.4(c) of the NER, therefore, AusNet Services will not be publishing a non-network options report as part of the RIT-D for works at WT.

Any questions on the matters of this determination notice should be submitted by email to ritdconsultations@ausnetservices.com.au.

The next stage of the RIT-D process is the publication of the DPAR, which is required to provide the information set out in clause 5.17.4(j) of the NER, including:

- A description of the identified need for investment.
- The assumptions used in identifying the need for investment, including the reasons why AusNet Services considers the subject of this RIT D requires reliability corrective action.
- A description of each credible option assessed, and their costs, that AusNet Services considers could potentially address the identified need.
- The results of our net present value analysis and accompanying explanatory statements regarding the results.
- Identification of the proposed preferred option that meets the identified need and the RIT-D requirements.

AusNet Services intends to publish the DPAR in May 2021.