Revised Regulatory Proposal

Kingston Zone Substation

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1. Background

The Kingborough Municipality is situated to the south of, and shares a common municipal boundary with, the city of Hobart. The municipality acts as a residential satellite suburb for Hobart, with many people choosing to enjoy the relaxed suburban and semi-rural lifestyle and commute daily to Hobart. As a result the area sees high residential sub-division creation rates and commensurately high population and electrical demand growth. The town of Kingston is the administrative centre of the Municipality, and the commercial district of Kingston town is one of the five areas classified as High Density Commercial in the jurisdictional reliability standards, the only one of the five that is not part of a city in Tasmania.

As a result of Transend-Aurora joint planning it was recognised that there would be supply constraints in the area that could only be addressed by the construction of major transmission and distribution infrastructure. In consequence, a consultation process as required by the *Rules* was initiated. The consultation process was finalised in May 2010 with the joint publication of the *Final Report: Proposed New Small Transmission Network Asset and Proposed Large Distribution Network Assets, Development of the Electricity Supply Network in the Kingston Area* (the Kingston Area Development Final Report).

The preferred option in the Kingston Area Development Final Report, Option 4, requires Transend to establish a new 110/33 kV connection point at their existing Kingston Terminal Substation so that Aurora can supply a new zone substation in the Kingston area (the Browns Road Zone Substation), the latter also being part of Option 4.

Transend has commenced construction of the connection point, with commissioning expected in April, 2012.[1]

Aurora had originally intended to construct the Browns Road Zone Substation, two 33 kV sub-transmission feeders and six 11 kV the 2011/12 year, as per Option 4. This work was not commenced because Aurora considered that non-network solutions would be sufficient to defer the necessity to beyond the end of the *Forthcoming Regulatory Control Period.*[2] In consequence, capex was not forecast for the construction of the Browns Road Zone Substation in the *Regulatory Proposal* submitted to the AER for the *Forthcoming Regulatory Control Period*, because Aurora considered that it was inappropriate to include forecast capex for a project that may not be necessary.

Aurora's 2011 Load Forecast, however, indicated that the requirement for the Browns Road Zone Substation cannot be deferred for such a length of time, and will be required in the *Forthcoming Regulatory Control Period.*[3]

This document describes Aurora's capex forecast for the Browns Road Zone Substation.

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[1] Transend *Annual Planning Report 2011*, page 58
[2] See section 2.2 for more details.
[3] See section 2.2 for more details.

2. Browns Road Zone Substation

2.1. Joint Planning Preferred Option

The distribution component of the preferred option from the consultation process, Option 4, for construction during the *Forthcoming Regulatory Control Period* was made up of the elements shown in Table 1.[4]

Table 1. Components of Option 4 Relevant to the *Forthcoming Regulatory Control Period*

Year	Proposed Work	Estimated Cost ($ million, 2008-09)
2011-12	Construct Browns Road Zone Substation, with two 25 MVA 33/11 kV transformers	15.98
	Construct two 33 kV sub-transmission feeders from Kingston Terminal Substation to Browns Road Zone Substation	
	Construct six new 11 kV feeders from Browns Road Zone Substation	
2013-14	Construct three 11 kV feeders from Browns Road Zone Substation	3.55
Source: Kingston Area Development Final Report, page 36		

2.2. Non-network Alternatives

Non-network alternatives were considered as part of the consultation process, but it was concluded that there were no viable non-network solutions available at the time,[5] so Aurora intended to commence construction such that the Browns Road Zone Substation would be available by 2012. In consequence, both Futura and Aurecon based their assessments on the premise that the Browns Road Zone Substation would be built in 2012.[6]

Aurora is keenly aware of the effect of rising electricity prices on its customers. To this end, Aurora has implemented a business-wide strategy to ensure that it provides its services to its customers at the lowest sustainable price. In line with this strategy, before committing to incurring $16 million capex, Aurora again investigated the possibility of employing hot-water load control, embedded generation and greater asset utilisation to reduce peak demand. In addition to the forecast reduction in consumption in 2011, these initiatives were hoped to be sufficient to defer the requirement for the Browns Road Zone Substation.

[4] The full suite of works associated with preferred option can be seen in section 4.3.4 of the Kingston Area Development Final Report.
[5] Kingston Area Development Final Report, section 4.2
[6] Futura Report, page 54; and Aurecon Report, page 36

Aurora's 2011 demand forecast for its transmission connections, however, indicates that Kingston Terminal Substation is already operating at above firm rating and that there is 50 percent POE likelihood that there will be an excursion above the emergency rating in 2014 (see section 5 for more details).

Aurora considers that the load on the Terminal Substation is already beyond that which can be addressed by demand-side solutions, which have take-up rate that can not address the immediate problem.[7]

While mobile generation can provide an immediate solution to address peaking demand, the loading on Kingston Terminal Substation is such that long-term use of mobile generation is not economically feasible.

It is also evident from Figure 2 in section 5 that the demand growth on the Electrona Terminal Substation is such that load transfer to this station is not a viable solution. If sufficient load were transferred from Kingston Terminal Substation to bring it below firm rating, Electrona would exceed firm rating by 2014.

In light of the above, Aurora considers that there is no viable non-network solution to address the immediate and on-going loading issues on Kingston Terminal Substation.

2.3. Network Solution

In accordance with its strategy to minimise the effects of its activities on its customers, Aurora plans to stage the implementation of Option 4. That is, Aurora plans to build only the infrastructure necessary to address the loading problem in the *Forthcoming Regulatory Control Period,* but intends to design the first stage to minimise the incremental cost of constructing additional sub-transmission and 11 kV feeders in the future to address future load growth in the area.

In particular, Aurora plans to construct the first stage of the Browns Road Zone Substation with:

- one 33/11 kV 25 MVA transformer;
- one 33 kV sub-transmission link from the Kingston Terminal Substation;
- one modular switching station; and
- three 11 kV feeders into the Kingston precinct.

The estimated cost of this solution is approximately $5.0 million ($2009-10, excluding overheads)[8]. Aurora considers that this cost compares favourably with the estimated cost of Option 4 for the *Forthcoming Regulatory Control Period*, which would be approximately $20 million ($2009-10, excluding overheads).

Further stages will be constructed as required. Aurora expects, however, that these stages will not be required until beyond the end of the *Forthcoming Regulatory Control Period.*

[7] Futura Report, page 74
[8] A more complete estimate of the cost of this solution is presented within section 6.

3. References

- *South Area Strategic Plan, System Strategic Planning Capacity Report*, produced by Aurecon for Aurora, which was attachment AE052 to Aurora's *Regulatory Proposal* (the Aurecon Report)
- *Identification of Non-network Initiatives for the 2012-17 EDPR* produced for Aurora by Futura Consulting in July 2010, which was attachment AE055 to Aurora's *Regulatory Proposal* (the Futura Report)
- Transend Annual Planning Report 2011
- *Final Report: Proposed New Small Transmission Network Asset and Proposed Large Distribution Network Assets, Development of the Electricity Supply Network in the Kingston Area*, jointly published by Transend and Aurora in May 2010

4. Confidentiality

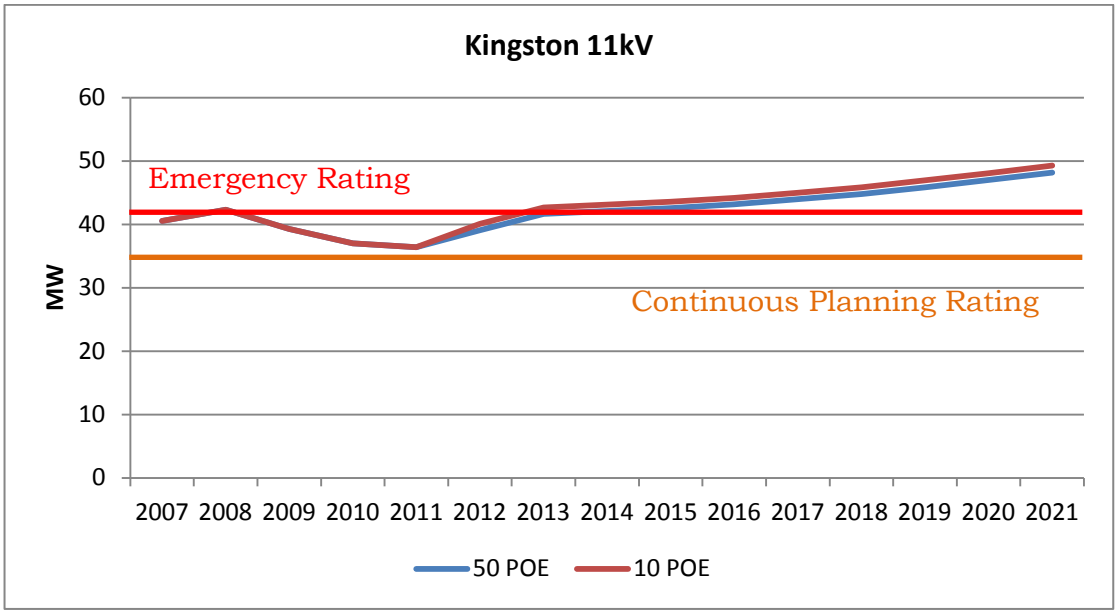
Aurora does not consider any information contained within this document to be confidential.

5. Appendix: 2011 Load Forecast

Aurora's 2011 Load Forecast for its transmission connection points has not yet been finalised, requiring still to be reconciled against the Transend load forecasts. The reconciliation with the Transend forecast is not expected to have a material impact upon forecasts. Please note, also, the 2010 load forecast results were closely comparable to the 2011 draft load forecast.

Based upon this unreconciled data, analysis suggests that there is a 10 percent POE of exceeding the emergency firm rating at Kingston Terminal Substation in 2013, increasing to 50 percent POE in 2014. To illustrate this, the historical and forecast demand profiles for Kingston Terminal Substation is presented in Figure 1. The continuous planning (firm) rating on this Terminal Substation is 35 MVA, and the emergency cyclic rating is 42 MVA: these ratings are shown in the figure.

Figure 1. Historical and Forecast Load on the Kingston Terminal Substation.

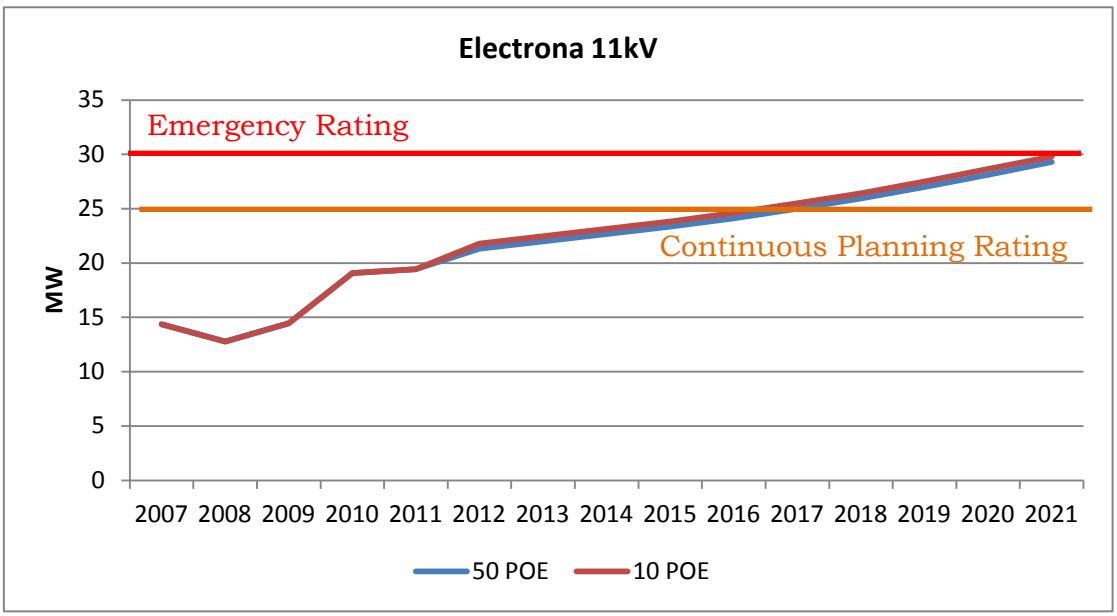


For reference, the historical and forecast demand on the Electrona Terminal Substation is presented in Figure 2. The continuous planning (firm) rating on this Terminal Substation is 25 MVA, and the emergency cyclic rating is 30 MVA. These ratings are shown in the figure.

In 2009/10 load was transferred from Kingston Terminal Substation to Electrona Terminal Substation; this can be seen in the step changes in the demand curves that year in Figure 1 and Figure 2.

Aurora planned that further load transfer from Kingston Terminal Substation to Electrona Terminal Substation, in conjunction with non-network solutions, would permit deferral of the construction of the Browns Road Zone Substation.

Figure 2. Historic and Forecast Load on the Electrona Terminal Substation



6. Appendix: Stage 1 Cost Estimate

A breakdown of the forecast of the capex required to construct Stage 1 of the Browns Road Zone Substation is provided in Table 2. For reference, the Work Category Code is also included in this table.

The forecast capex is for:

- CAHVF is Standard Control Services, System Capex, Demand Related, Reinforcements, HV Feeders;
- CAZNC is Standard Control Services, System Capex, Demand Related, Reinforcements, Zone Substations; and
- LANDZ is Standard Control Services, System Capex, Demand Related, Reinforcements, Zone Substations.

The development methodology for these costs is the same as that used for other projects in the Reinforcements RIN category.

Table 2. Costs Associated with Stage 1 of the Browns Road Zone Substation

Item	Work Category Code	Total ($2010, excluding overheads)
Single 33/11 kV 25 MVA transformer	CAZNC	823,900
Single sub-transmission link between Kingston Terminal and Kingston Zone	CAZNC	2,500,000
11 kV modular switching station	CAZNC	600,000
11 kV feeder tails from Kingston Zone Substation	CAHVF	480,000
Land parcel	LANDZ	400,000
Civil works and site establishment	CAZNC	111,935
Design	CAZNC	151,350
TOTAL		**5,067,185**

7. Glossary of Terms Used in This Document

Aurecon Report	*South Area Strategic Plan, System Strategic Planning Capacity Report*, produced by Aurecon for Aurora, which was attachment AE052 to Aurora's Regulatory Proposal
Forthcoming Regulatory Control Period	*Regulatory Control Period commencing 1 July 2012 and ending 30 June 2017*
Futura Report	*Identification of Non-network Initiatives for the 2012-17 EDPR* produced for Aurora by Futura Consulting in July 2010, attachment AE055 to Aurora's *Regulatory Proposal*
Kingston Area Development Final Report	*Final Report: Proposed New Small Transmission Network Asset and Proposed Large Distribution Network Assets, Development of the Electricity Supply Network in the Kingston Area*
kV	KiloVolt
MVA	MegaVolt-Amps
POE	Probability of Exceedence
Rules	National Electricity Rules