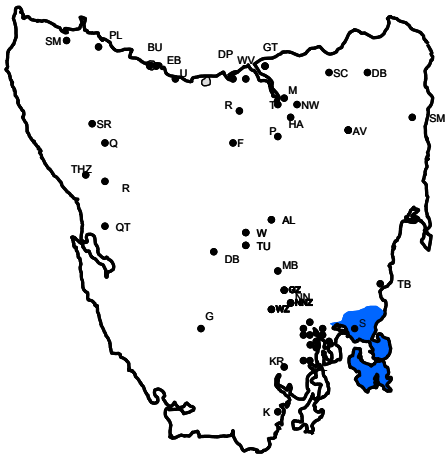
ABN 85 082 464 622



SORELL - PENINSULA

DEVELOPMENT PLAN

REV NO.	DATE	REVISION DESCRIPTION	APPROVALS	
0		Working Draft	Prepared by	
			Reviewed by	
			Approved by	

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1. EXECUTIVE SUMMARY

The Sorell-Peninsula (SP) planning area covers the South-East of Tasmania, including the Dodges Ferry, Forestier Peninsula, Midway Point, Sorell, and Tasman Peninsula areas.

Sorell-Peninsula is considered a medium growth area, with a growth rate of 2-3% pa. In particular, significant urban development has taken place in the southern beaches around Frederick Henry bay, and growth is expected to continue. Areas of the Forestier and Tasman peninsulas have strong tourism and fishing industries.

The remainder of the planning area consists predominantly of rural-residential load.

To facilitate the current and forecast load, the SP planning area maintains a 22kV distribution network, supplied from the Sorell terminal substation. There is very limited transfer capacity to the adjacent substations, Meadowbank and Triabunna in the 22kV network. The SP network supplies 12,237 connected customers supplied by a single 22kV substation and 1,250 km of OH and UG circuit.[1]

The identified or known large constraints are as follows:

-

To address the above constraints the following is being proposed:

-

[1] Data available in NW-#30146137-Feeder Data for Development Plans.

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2. EXISTING SYSTEM

2.1 Substations

The substations supplying this area are listed below.

Note: hyperlinks in the section below will display the power circuit one line diagram from Transend's Operational Diagram System.

Transend owned substations

- Sorell (click here to see the 110/22kV single line diagram)

Aurora owned substations

- There are no Aurora owned zone substations in the SP Planning Area.

2.2 Supply Network

Sorell terminal substation is the only substation within the Sorell-Peninsula planning area. Distribution within this planning area is at 22 kV. This differs from the neighbouring Hobart-East planning area whose distribution voltage is 11 kV, which prevents load transfer between substations in the Sorell-Peninsula and Hobart-East areas.

Sorell also supplies the Richmond 22/11 kV zone substation (part of the Hobart East planning area)

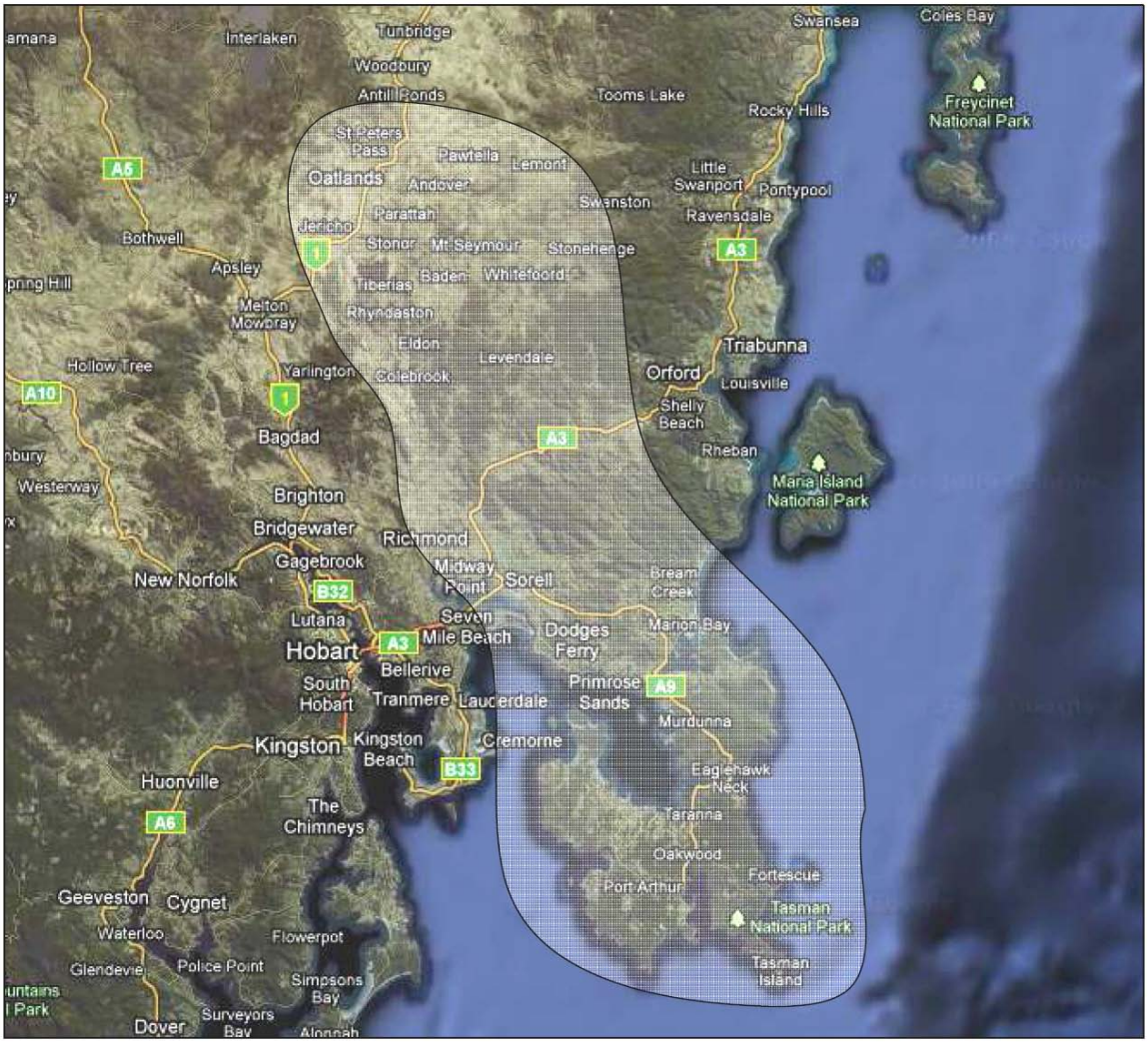
2.3 Network Statistics

SP area network statistics [2]

22kV circuit length	1,250	km
Connected customers	12,237	
Connected transformer capacity	125,784	kVA
Customer density	10	per 22kV circuit km
Transformer capacity density	101	kVA per 22kV circuit km

[2] Data sourced from Gtech, query DISTFDR. See NW-#30146137-Feeder Data for Development Plans.

The maps below show the area referred to as the Sorell – Peninsula planning area.


Interlaken
Tunbridge
Woodbury
Antill Ponds
Tooms Lake
Swansea
Coles Bay
Freycinet National Park
Rocky Hills
St Peters Pass
Pawtella
Lemont
Little Swanport
Pontypool
Catlands
Andover
Swanston
Ravensdale
Parattah
Jericho
Stonor
Mt Seymour
Stonehenge
Bothwell
Apsley
Tiberias
Baden
Whitefoord
Melton Mowbray
Rhyndaston
Eldon
Levendale
Triabunna
Hollow Tree
Yarlington
Colebrook
Orford
Louisville
Shelly Beach
Bagdad
Rheban
Maria Island National Park
Westerway
Brighton
Bridgewater
Richmond
Gagebrook
Midway Point
Sorell
Bream Creek
New Norfolk
Lutana
Seven Mile Beach
Marion Bay
Hobart
Dodges Ferry
Bellerive
South Hobart
Tranmere
Lauderdale
Primrose Sands
Murdunna
Kingston
Kingston Beach
Cremorne
Huonville
Eaglehawk Neck
The Chimneys
Taranna
Oakwood
Fortescue
Port Arthur
Geeveston
Cygnet
Tasman National Park
Waterloo
Flowerpot
Glendevie
Police Point
Simpsons Bay
Tasman Island
Dover
Surveyors Bay
A5
A10
A3
B32
B33
A6
A9

3. LOCAL PLANNING ISSUES

3.1 Long Term System Strategy

SP will continue the development of a radial 22 kV distribution network for the foreseeable future.

In the Sorell urban area, interconnected Low Voltage reticulation will continue to develop at 433V. In rural areas use of low voltage reticulation will be minimised.

Embedded Generation options will be encouraged at the 22 kV and 433V connection points.

Demand Side Management solutions will be encouraged to reduce system peaks and defer large system upgrades where possible.

3.2 Local Government Authorities

For planning purposes, Aurora consults closely with the following local government authorities in the SP planning area:

- Sorell Council
- Tasman Council

Other relevant authorities include:

- Department of Infrastructure, Energy and Resources (DIER); and
- Southern Water Tasmania.

3.3 Existing Critical Loads

SP planning area has a number of existing critical loads requiring a higher level of supply security or a limit to operational flexibility. Table 1 below details critical loads in the area:

Load Type	Description	Substation(s)	Feeder(s)	Asset Connection Point(s) - if applicable
Commercial / Major Retail	Port Arthur			

Load Type	Description	Substation(s)	Feeder(s)	Asset Connection Point(s) - if applicable
Medical				
Rehabilitation Services				
Industrial				
Sewerage Treatment Plants				
Education				

Table 1 – Sorell - Peninsula Planning Area - Critical Loads

Improvements to supply security for the above connections and supply areas are encouraged.

3.4 Future Developments and Restrictions

- Council planning schemes

Sorell Council

The Sorell Council strategic plan indicates that the Sorell Council intends to manage residential and commercial growth within existing land use zones. The Vision East Consultation Report 2009 lists the town of Dunalley as an area appropriate for future growth and development.

Tasman Council

The strategic plan 2004-2014 indicates that the Tasman Council is focussed on maintaining and preserving the heritage of the area, and protection and regulation of the environment. The Vision East Consultation Report 2009 lists the towns of Nubeena, Port Arthur, Murdunna and Taranna as areas appropriate for future growth and development.

3.5 Reliability for the area

The Sorell – Peninsula Area includes the following Reliability communities:

- Urban - Lewisham – Dodges Ferry, Midway Point, Sorell
- High Density Rural - Copping – Dunalley, Forcett – Dodges Ferry, Forestier Peninsula, Penna, Pirates Bay – Nubeena – Port Arthur, Primrose Sands
- Low Density Rural - Sorell – Dunalley, Tasman Peninsula Rural

Details of actual reliability performance in the 09/10 financial year are available in here. (DM ref# 30061377)

On figures for the 9 months to March 2010 the following communities appear likely to have reliability performance worse than target in 2010:

- Pirates Bay – Nubeena – Port Arthur (High Density Rural)
- Tasman Peninsula Rural (Low Density Rural)

The remaining reliability communities in the Sorell Planning area have shown adequate reliability performance in 2009/10 up to March 2010.

3.6 Asset issues

There are no existing Aurora owned zone substation transformers in the Sorrel – Peninsula Area.

Further information is detailed in the following Asset Management Plans relevant to the SP planning area:

NW30084385 - Management Plan 2010: Ground Mounted Substations

NW30070052 - Management Plan 2010: High Voltage Regulators

NW30084411 - Management Plan 2010: Overhead System and Structures

NW30043361 - Management Plan 2010: Underground System

3.7 Links

LAM Area Management Plans relevant to the Sorell planning area are:

- Sorell Peninsula NW-#183866-Area Management Plan Sorell Peninsula

In addition Transend's Annual Planning Report contains relevant information. It can be found on their website www.transend.com.au.

4. LOAD FORECAST

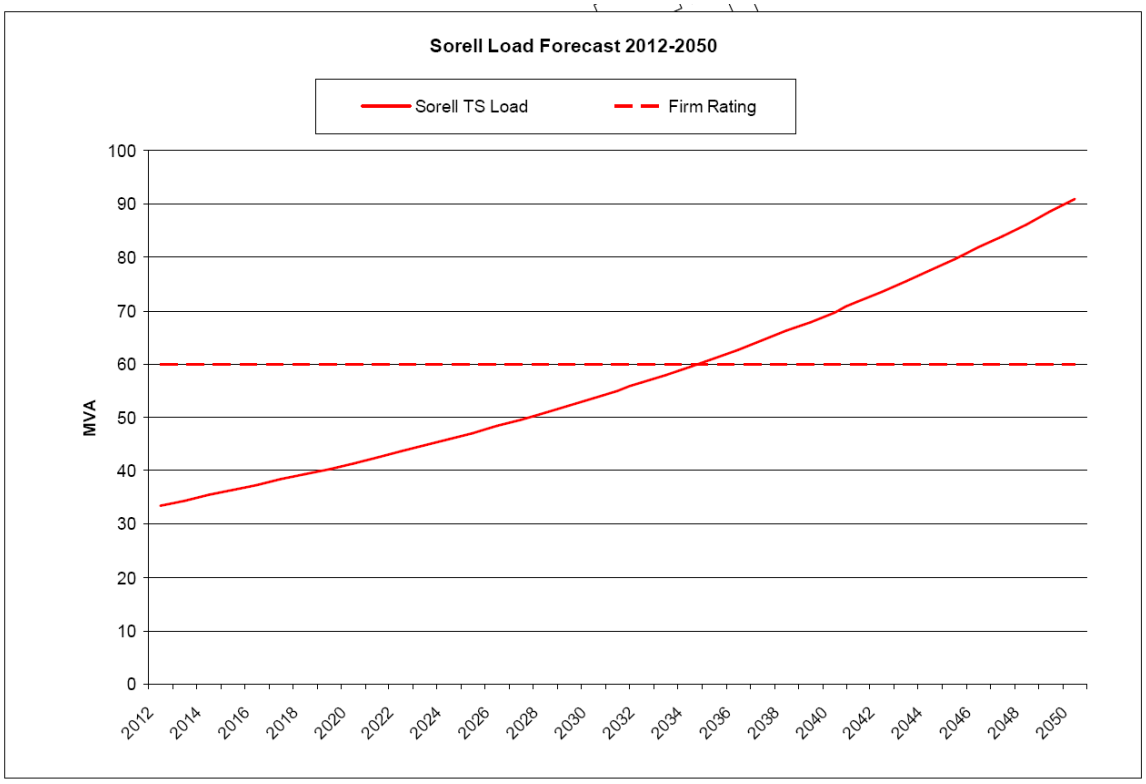
Sorell terminal substation has experienced 2-3% growth per year over the last several years, and the Sorell region is considered one of the growth hotspots in the state.

The majority of the load growth is due to residential development at the southern beaches townships of Lewisham, Dodges Ferry, Carlton and Primrose Sands. This is expected to continue as infrastructure investment continues in the region.

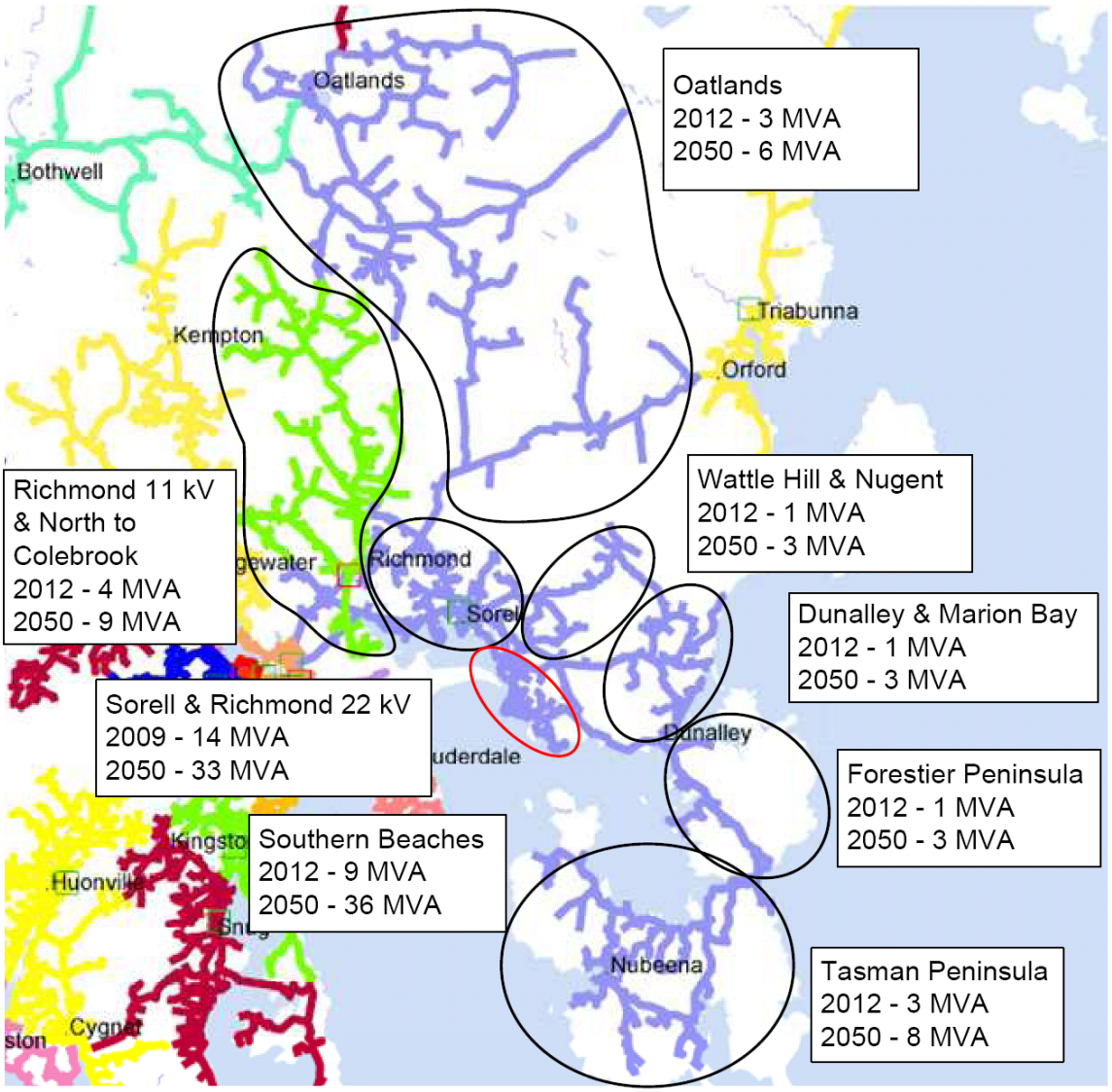
Sorell terminal substation also supplies to the urban areas of Sorell and Midway point, and rural areas to the east and north of Sorell and on the Forestier and Tasman peninsulas to the south. It also supplies Richmond zone substation, which in turn supplies the Richmond township and rural load north up to Colebrook. Load growth above the long term average at Sorell substation is considered unlikely in these areas.

As a result, to produce a conservative load forecast high growth has been applied at the southern beaches, while median growth rate has been applied at the remainder of the Sorell substation supply area.

The resulting 38 year load forecast and firm ratings for Sorell terminal substation is provided below.



The following figure provides a geographic view of the resulting load distribution in 2012 and 2050.

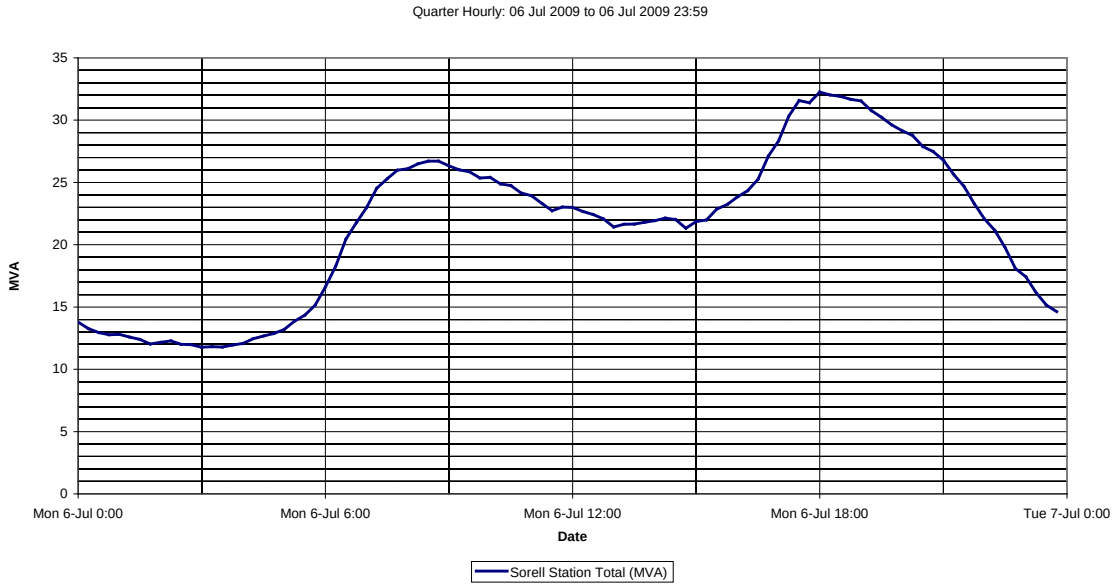


The 2009 10 year load forecast report by UES is used as the basis for this plan. NW30089965 - Aurora 2009 Maximum Demand & Consumption 10 year Forecast Report

Forecast load growth tables are stored in the spreadsheet NW-#30040697-Zone and Area MD and consumption tables 2009

	Planning Area	Connection Point Substation	Forecast Growth pa
	Sorell / Peninsula	Sorell	2.80%

The Sorell station total load in MVA on the day of peak load is shown in the figure below. Peak Load on Sorrell substation in 2009/10 occurred on Monday 6 July 2009.



4.1 Future committed point loads (> 1 MVA)

- None identified

4.2 Possible point loads (> 1 MVA)

- Major Subdivisions (>200 lots)
  - None identified

4.3 Possible point loads to be removed (> 1 MVA)

- None identified

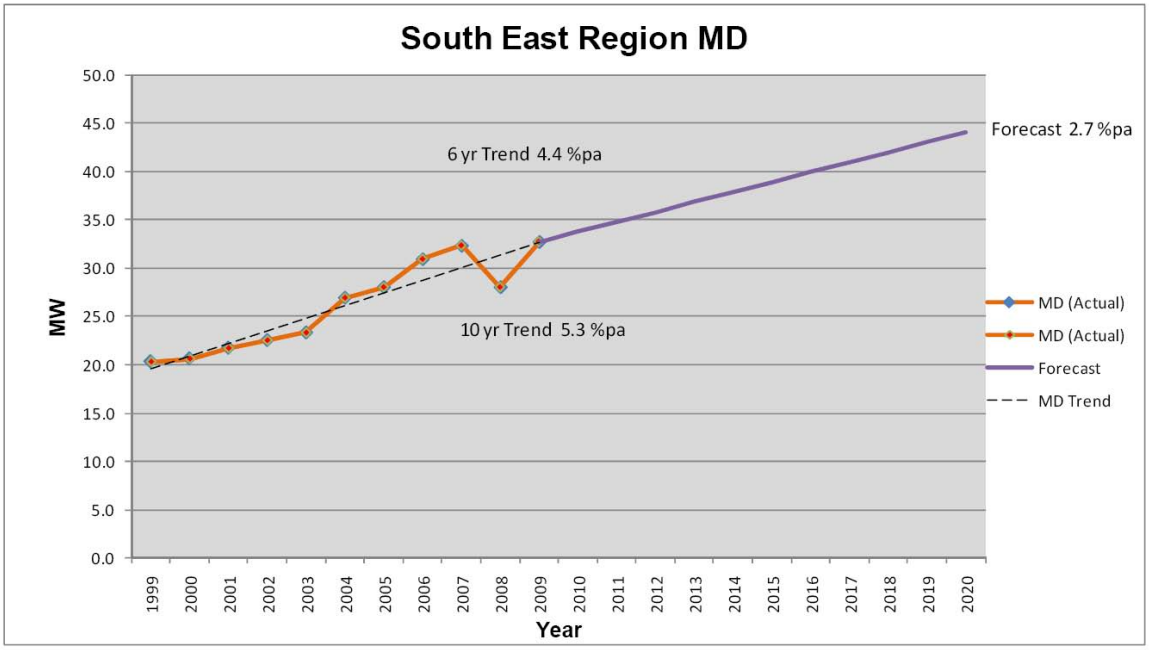
4.4 Possible future embedded generation (> 1 MVA)

- None identified

4.5 Analysis of Load Forecast

Detailed load forecast data is available in the following documents:

- Load model NW-#30067978-Sorell area load model (2009)
- UES 10 year load forecast document NW-#30083791-(pdf version) Aurora 2009 10year Load forecast - Draft


South East Region MD
MW
Year
6 yr Trend 4.4 %pa
10 yr Trend 5.3 %pa
Forecast 2.7 %pa
MD (Actual)
MD (Actual)
Forecast
MD Trend
50.0
45.0
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
1999
2000
2001
2002
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2006
2007
2008
2009
2010
2011
2012
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2018
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2020

5. PLANNING CRITERIA

Aurora's Distribution Network Planning Manual issued in May 1999 is available in DM, ref NW10250570.

More up to date information is included in this document in Appendix E on page 30.

6. CONSTRAINTS (LIMITATIONS)

Constraints in the SP planning area are classified under the following management groups:

Constraint	Description	Definition
Capacity	Substation Firm Capacity	Substation Maximum Demand > Substation Firm Capacity (N-1)
	Feeder Tail Capacity	Feeder Maximum Demand > 5 MVA for 11 kV OR 10 MVA for 22 kV
	Feeder Section Capacity	Load through conductor >conductor continuous rating
	Feeder Tie Capacity	Transfer Capacity limited due to undersized conductor/equipment
Fault Level	Substation Bus Fault Level	Maximum 3-phase fault level > 13.1 kA OR Maximum 1-phase > XX.X kA
	Equipment Rating Fault Level	Maximum 3-phase OR 1-phase fault level > equipment rating
Voltage	Normal load Voltage Drop	Voltage drop exceeds ± 6%
	Emergency load Voltage Drop	Voltage drop exceeds ± 10%
Reliability	SAIDI	Reliability community SAIDI performance has or is likely to exceed target
	SAIFI	Reliability community SAIFI performance has or is likely to exceed target

Table 2 - Constraint Definitions

Constraints are managed at the following levels

- Zone Substation
- Subtransmission Feeder
- Distribution Feeder
- Distribution Substation
- LV Systems

Since the SP planning area does not contain zone substation or subtransmission assets, this document details constraints at Distribution Feeder levels only. Refer to NW-#30141356-Distribution Network Planning Manual DRAFT 2010 for State wide management plans for the Distribution Substation and LV System planning levels.

6.1 Summary of Constraints

6.1.1 Terminal Substation Constraints

Capacity Constraints				
Substation	**Firm Capacity (MVA)**	**Current Load (MVA)**	**Forecast to exceed (year)**	**Comments**
Sorell			Already exceeded	Firm capacity currently exceeded at Sorell but proposed works by Transend in 2011 will address this limitation until 2035.

Fault Level Constraints			
Substation	**Fault Level Description**	**Forecast replacement (year)**	**Comments**
			None identified

6.1.2 Zone Substation Constraints

The SP planning area does not include any zone substation assets.

6.1.3 Subtransmission Constraints

The SP planning area does not include any subtransmission assets.

6.1.4 Distribution Feeder Constraints

Capacity Constraints				
Substation	**Feeder**	**Capacity constraint type**	**Forecast to exceed (year)**	**Comments**
		Feeder Tail		
		Feeder Section		
		Feeder Tie		

Voltage Constraints			
Substation	**Feeder**	**Forecast to exceed (year)**	**Comments**
			None identified

Reliability Constraints			
Substation	**Feeder**	**Forecast to exceed (year)**	**Comments**
			None identified

6.2 Security

Aurora's zone substations are typically run in N-1 secure mode. This means that in the event of any single outage of a network element all load can still be supplied.

Since there are no Aurora zone substations in the SP area this level of security is not considered. When Transend installs the new transformers at Sorrell N-1 security will be restored for a transformer outage at Sorell.

6.3 Transfer and Operational Capability

The table below shows the rating, peak load and transfer capacity. The peak load figures are those forecast for winter 2010. Since Aurora's substations are subject to winter peaks, these are the most onerous.

	MVA				
Substation	**Rating**	**N-1 Rating**	**Peak Load**	**Transfer Capacity (2010)**	**Transfer Substation**
Sorell				1.3	Meadowbank
				1.6	Triabunna

The table shows that very limited transfer capacity to adjacent substations is available.

Details of the analysis carried out on load transfers in the SP area are available in NW-#30067979-Sorell area load transfer (2009).

6.4 Power Factor

- Customer power factor correction
- Network power factor correction

6.5 LV issues

There are no locations in the SP Planning area where widespread LV network issues have been identified.

The table below shows the count of transformers in the planning area and the count of those that are at risk of overloading. This is determined by the count of connected customers indicated a load greater than 130% of nameplate rating. It should be noted that the actual load on a transformer may be much different to its value calculated in this way.

	Total		>130% of rating[3]	
Tx size	**Count**	**Customer Count**	**Count**	**Customer Count**
< 50 kVA	1,373	2,640	42	327
>= 50 kVA	764	9,464	47	1,784

7. SHORT TERM PLAN (<5YR)

The Sorell Area Strategic Plan provides the background to much of the planning information in this document. It can be found at: NW-#30103848-Sorell strategic plan Rev_3.

A summary of the proposed works from 2010 to 2015 in the Sorell planning area is outlined in the following table.

Year	Proposed Project	Proposed Outcomes
2012-2035	22 kV feeder reinforcement to the peninsula (potentially built at 66 kV)	Address voltage and reliability issues at the peninsula

Details of the constraints, options and possible solutions analysed to arrive at these proposed projects are included in Appendix A on page 24.

8. MEDIUM TERM PLAN (5 TO 10YR)

The Sorell Area Strategic Plan provides the background to much of the planning information in this document. It can be found at: NW-#30103848-Sorell strategic plan Rev_3.

There are no projects in the medium term for the Sorell/Peninsula area. The upgrade of Richmond substation and the 22kV reinforcement to Oatlands are discussed in the Hobart-East report in the ten year plan.

9. LONG TERM PLAN (10YR+)

The Sorell Area Strategic Plan provides the background to much of the planning information in this document. It can be found at: NW-#30103848-Sorell strategic plan Rev_3.

[3] Data sourced from NW-#30075639-Statewide Distribution Transformers Customer Count Nov 09. Transformer data extracted from Gtech in November 2009.

A summary of the proposed works from 2021 to 2050 in the Sorell planning area is outlined in the following table.

Year	Proposed Project	Proposed Outcomes
2025	Establish Lindisfarne-Sorell 110 kV circuit	Address ESI 3000MWh rule for loss of Lindisfarne-Sorell double circuit 110 kV line
2035	Establish Dunalley substation	Deload Sorell and address peninsula feeder voltage drop and reliability
2045	Establish Dodges Ferry substation	Deload Sorell and 22 kV feeders to the southern beaches

Details of the constraints, options and possible solutions analysed to arrive at these proposed projects are included in Appendix C on page 24.

10. PROGRAM OF WORK DRAFT

Project	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
Install UG HV - 6 feeder tails New Norfolk Zone		$ 173,000				
(Project BW 006] Install 0.2 km HV UG Huntingtier Rd PID 221007 to Hardwicks Rd Bagdad PID 390836	$ 80,000					
Augment OH HV - 14 Mile Rd, Tarraleah					$ 210,000	
Augment OH HV - Fdr 37002 stage 1 Gretna Zone associated with Zone replacement					$ 411,000	
Augment OH HV - Fdr 37002 stage 2 Gretna Zone associated with Zone replacement					$ 411,000	
Augment OH HV - Fdr 37002 stage 3 Gretna Zone associated with Zone replacement					$ 206,000	
Derwent Bridge - Install 3rd wire Lyell Hwy (generator stability) 2 kms	$ 40,000					
Derwent Bridge - Install permanent connection point generator	$ 25,000					
Install 1 x 6.6/ 22 kV step up stations at todds corner						$ -
Install 19/3.25 AA OH link Hamilton - F45003 2 kms	$ 130,000					
Install OH HV - Auburn Rd to Macquarie Rd						
Install OH HV - Derwent Bridge to Bronte Link					$ 630,000	
Install OH HV - link Meadowbank 45003 to Wayatinah 49412 to Tunagtinah 49305						$ 420,000
Install OH HV - link to Lake Cresent 3 ph (to assist in removal of SWER)				$ 630,000		
Install OH HV - link Victoria Valley SWER to Tungatinah fdr 49303, Dee Lagoon					$ 124,000	
Install OH HV - new Feeder, Elderside						$ -
Install OH HV - Upgrade SWER, Dee Lagoon Link, Victoria Valley Rd				$ 294,000		
Project BW 004 Reinsulate7.6 k & 8 tx Bridgewater F48 190 to 22 kV and supply from Meadowbank TS	$ 300,000					
Project BW 005 Reinsulate 10.0 k &11 tx Bridgewater F 48 190 to 22 kV and supply from Meadowbank TS		$ 352,000				
Project MB 001 - Westerway 38002 OH conversion to 22 kV (10 km OH and 15 tx's)		$ 400,000				
Project MB 002 - Westerway 38002 OH conversion to 22 kV (12 km OH and 22 tx's)			$ 460,000			
Project MB 003 - Westerway 38002 OH conversion to 22 kV (11 km OH and 15 tx's)					$ 360,000	
Tods corner - Convert 6.6 kv line to 22 kv						$ -
Augment pole sub 300 kVA First Avenue New Norfolk	$ 40,000					
Augment pole sub Fairfax Terrace New Norfolk	$ 40,000					
Install new pole sub George Street New Norfolk	$ 40,000					
Install Substation - new or augment pole type 300 kVA				$ 30,000	$ 30,000	$ 30,000
Augment OH LV - overloaded LV ccts Highlands stage 2		$ 14,000				
Augment OH LV - overloaded LV ccts Midlands South stage 2		$ 14,000				
Augment OH LV - overloaded LV ccts Midlands South stage 3		$ 14,000				
Augment OH LV - overloaded LV ccts Midlands South stage 4				$ 14,000		
	$ 695,000	$ 967,000	$ 460,000	$ 968,000	$ 2,382,000	$ 450,000

11. OPERATIONAL PLANS

- Contingency plans (not at operational level)

Operations Group have developed a number of contingency plans to define operational actions to be taken in the event of substation, busbar and feeder outages. The document NW-#30126392-Contingency Plan Register provides links to contingency plan documents as they are produced.

12. REFERENCE DOCUMENTS

Self explanatory but listed documents for system studies, council plans etc

- Listing of DINIS personal files
- Links to other work documents

13. NOTES

- System development plans identified for the area should link to other plans. Consultation with other work groups, in particular System Performance, Distribution Operations, Area Managers and key external stakeholders e.g. Councils and Government Departments, is essential to ensure optimum outcomes.
- It would be useful to include any details of reference documents and schematic diagrams indicating current substation layout and HV feeder arrangements.

Appendix A. Short Term Plan (<5 years) – Constraints Options and Solutions

A.1 22 kV reinforcement to the peninsula

As discussed below, the establishment of Dunalley substation (either 110/22 kV or 66/22 kV) is proposed to address the peninsula feeder limitations in 2035. It is expected that the existing feeders are sufficient to supply to the peninsula until this time, with the aid of reliability programs and the installation of regulators or PMRs as required.

However, should it be determined that feeder reliability needs to be addressed prior to this date, the most cost effective way to address these limitations would be to run a new 22 kV feeder from Sorell to deload the beginning of feeder 41514. If the 66 kV development path is chosen, this feeder could be built at 66 kV to facilitate the future construction of the Sorell to Dunalley double circuit.

Appendix B. Medium Term Plan (5 to 10 years) – Constraints Options and Solutions

The are no projects in the medium term plan for the SP planning area.

Appendix C. Long Term Plan (>10 years) – Constraints Options and Solutions

C.1 Establish Lindisfarne-Sorell 110 kV circuit

The load at Sorell and Triabunna is forecast to exceed the ESI 3000MWh limitation in 2025 for a failure of the Lindisfarne to Sorell double circuit. It is assumed that Transend will address this limitation by establishing a new 110 kV feeder from Lindisfarne to Sorell around this time.

It is expected that this project will have no impact on the development option chosen in the Sorell planning area and vice versa, so it will not be considered any further.

C.2 Establish Dunalley substation

To address the firm capacity limitation at Sorell terminal substation in 2035 and the expected reliability limitation on the peninsula feeders, it is proposed that a new substation be established in the vicinity of the township of Dunalley, supplied from Sorell terminal substation.

Dunalley substation would cut into existing 22 kV feeders 41514 and 41515 from Sorell to supply the peninsula (7.5 MVA), the Dunalley, Boomer Bay,

Copping and Marion Bay area (2 MVA), and partially supply to the southern beaches (5 MVA). The resulting substation would be loaded approximately 15 MVA in 2035.

Following the establishment of Dunalley substation the peninsula feeders would be shortened by 30 km (resulting in approximately 50 km of backbone) and be loaded at less than 4 MVA each.

These works are expected to defer reliability limitations on the peninsula for the scope of the study.

Should further reliability issues arise the most cost effective way of addressing this would be to run a new 22 kV feeder from Dunalley to deload the beginning of the two peninsula feeders and extending this feeder as reliability requirements dictate. It should be noted that this feeder may be difficult to construct as the two existing feeders already follow the only main road onto the peninsula. There is the option of an undersea 22 kV cable from Primrose Sands across the bay to the peninsula (4 km), however it is likely that reinforcement via overhead from Dunalley is cheaper.

66 kV option

Under the 66kV development path Dunalley would be established as a 66/22 kV substation, supplied by a new 66 kV double circuit from Sorell. The 66 kV circuit would be run in the vicinity of the southern beaches to facilitate the future establishment of a zone substation in the area. A new 110/66 kV substation would also be established at Sorell at this time.

110 kV option

Under the 110 kV development path, Dunalley would be established as a 110/22 kV substation, supplied by a new 110 kV double circuit from Sorell (potentially teed off the existing Lindisfarne-Sorell circuits). The 110 kV circuit would be run in the vicinity of the southern beaches to facilitate the future establishment of a terminal substation in the area.

C.3 Establish Dodges Ferry substation

Sorell terminal substation is forecast to exceed firm capacity again in 2045. It is expected that the 22 kV network into the area from Sorell and Dunalley substations will also be heavily loaded at this time.

This limitation may be addressed by running additional feeders from Dunalley to the southern beaches, however it is expected that with the length of feeders and the density of load in the southern beaches, a substation in the area would be the preferred solution.

Therefore it is proposed to establish a new substation at Dodges Ferry in 2045. For both the 110 kV and 66 kV development options, the substation

would consist of two transformers and be supplied by teeing off the Sorell to Dunalley circuits installed as part of the Dunalley project.

It should be noted that this project is heavily dependent on the load growth in the southern beaches area. Should the forecast load growth fail to eventuate then this project may be deferred beyond 2050.

Appendix D. Technical Data

D.1 Substation loading

Westerway			Capacity with all elements in service (N)		Capacity with one element out of service (N-1)		Maxium Demand 2008		Maxium Demand predicted summer 2009		Maximum Demand predicted for winter 2009	
Elements	No	Emergency Rating MVA	Summer MVA	Winter MVA	Summer MVA	Winter MVA	Summer MVA	Winter MVA	Summer MVA	N-1 Load at Risk	Summer MVA	N-1 Load at Risk
Transfomers	2	1	45	45	22.5	22.5			14.6	0	30	7.5
Distributed Subtransmission Feeder NNxxx												

Reference master document # 30006462

D.2 Aurora Zone Substation data sheet

None in the Sorell planning area

D.3 Transend Station data sheet

Planning Area	Connect Point Substation	Connection Company	Connection Voltage kV	No. Of Connection Points	Type
Sorell / Peninsula	Sorell	Transend Networks	22	8	Distribution

Reference master document #30040697

D.4 High Voltage feeder loading

2008/09

Planning Area	Station	Feeder Number	Voltage	Sum of MD (MVA)	Planning Std (MVA)	Load in 5 years (MVA)
Central	Fisher	3 (C252)	11	0.9	5	1.0
		4 (D252)	11	0.0	5	0.1
	Meadowbank	45001	22	1.6	10	1.9
		45002	22	2.1	10	2.4
		45003	22	3.2	10	3.6
	New Norfolk (Terminal)	39563	22	7.5	10	8.3
		39565	22	6.2	10	6.9
		39568	22	2.3	10	2.6
		39569	22	0.1	10	0.2
		39570	22	6.1	10	6.8
		39571	22	3.6	10	4.0
	New Norfolk (Zone)	35010	11	2.9	5	3.2
		35011	11	2.3	5	2.7
		35012	11	2.3	5	2.6
	Tungatinah	T8&T9	22	1.4	10	1.6
	Waddamana	202	22	0.6	10	0.7
	Wayatinah	1	0	0.0	0	0.1
		2	0	0.0	0	0.1
		3	0	0.0	0	0.1

Reference master document #30040697

D.5 Transfer Capacity

- MD transfer capacity with other stations (order of)
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- Brief outline of transmission and subtransmission feeder arrangements, ratings and capabilities

Note it would be useful to include any details of reference documents and schematic diagrams

- HV feeder ratings, current summer and winter loads. MD's
- Provide high and low load forecasts i.e. +/- 10% of base load as above for each HV feeder for the next 10 years
- Indicate anticipated summer and winter load growths for each of the existing HV feeders in the area including ratings of the feeder.
- As above for major zones
- Reference Transend Annual Planning Report.

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Appendix E. Planning Criteria and Guidelines

E.1 Transmission Planning Criteria

Transend's planning criteria are fundamentally based on:

- the National Electricity Rules (NER);
- the Electricity Supply Industry (Network Performance Requirements) Regulations 2007; and
- good electricity industry practice

The following criteria are used when planning for the transmission system.

Transmission and transformer loading

- Transmission lines and autotransformer loadings for an intact system or for a contingency (N–1) should not exceed their continuous ratings in planning studies. For supply transformers four-hour emergency ratings can be used to defer augmentations depending on the peak duration of the load duration curve.
- Transmission line loading on circuits covered by NCSPS should not exceed 95 per cent of their rating for an intact system when Basslink is exporting. When Basslink is not in service or importing, standard N–1 criteria applies.

Load interruptions

For an intact system, i.e. where no elements are out of service for maintenance the following should apply as per Network Performance Requirements:

- no credible single contingency event will interrupt more than 25 MW load;
- no single asset failure will interrupt more than 850 MW or, in any event cause a system black;
- the unserved energy to loads interrupted as a result of damage to a network element related to a credible contingency event must not exceed 300 MWh; and
- the unserved energy to loads interrupted as a result of a single asset failure must not exceed 3,000 MWh

Single asset failure that would cause large load interruptions is the loss of a double circuit line, a bus section fault or a bus coupler fault. In calculating unserved energy, the ability to transfer load and the time required for load restoration should be taken into account.

Exposure due to maintenance outage

- Where a network element has been withdrawn from service for maintenance, replacement or repair, the energy exposed to interruption by a credible contingency event must not exceed 18,000 MWh.

In calculating unserved energy, the ability to transfer load should be taken into account.

Maximum repair / replacement time

Minimum Performance Requirements state that for the purpose of calculating unserved energy, any replacements or repairs undertaken, should not exceed the following:

- Transmission line repair – 48 hours
- Transformer replacement – 8 days
- Auto transformer replacement – 18 days

E.2 Distribution Planning Criteria

Key planning standards include: -

System Performance

- Voltage regulation range of + 6% and – 6% of the nominal HV voltage and a LV voltage range of 230/400 V +10% and –2%;
- Power quality standards are recognised in accordance with the TEC, NER and applicable Australian Standards; and
- Tasmanian Reliability Performance Standards

Table Appendix E -1 Tasmanian Reliability Performance Standards

Community category	Frequency standard (Maximum average number of supply interruptions per year)		Duration standard (Maximum total time without electricity in a year measured in minutes)	
	For the category	For each community	For the category	For each community
Critical infrastructure	0.2	0.2	30	30
High density commercial	1	2	60	120
Urban and regional centres	2	4	120	240
Higher density rural	4	6	480	600
Lower density rural	6	8	600	720

Source: Tasmanian Electricity Code

Capacity

Maximum average loading considerations for distribution feeders facilitating HV feeder interconnectivity;

- 22 kV – 10 MVA continuous and 15 MVA (typically one hour) emergency;
- 11 kV - 5 MVA continuous and 7.5 MVA (typically one hour) emergency.

Security of supply

Group firm philosophy or a deterministic planning standard, e.g. “N-1”, dependent on elements of security, load and exposure to risk

Schedule 5.1.2.2 (a) of the NER states:

> *“In the satisfactory operating state, the power system must be capable of providing the highest reasonably expected requirement for power transfer (with appropriate recognition of diversity between individual peak requirements and the necessity to withstand credible contingency events) at any time.”*