REQUEST FOR INFORMATION

(ETSA UTILITIES REFERENCE: REQUEST FOR PROPOSALS RFP 002/06)

PROJECTED NETWORK LIMITATIONS

ADELAIDE CENTRAL REGION

SOUTH AUSTRALIA

ElectraNet - ETSA Utilities
October 2006

Disclaimer

The purposes of this document are to provide information regarding forecast limitations on the electrical power system that supplies the Adelaide Central region and to seek proposals from customers, interested parties and solution providers to address those projected limitations. This document is not intended to be used for other purposes, such as making decisions to invest in generation, transmission or distribution capacity. This document has been prepared by ElectraNet and ETSA Utilities using information provided by, and reports prepared by, a number of third parties.

While care was taken in the preparation of the information in this paper, and it is provided in good faith, neither ElectraNet nor ETSA Utilities accepts any responsibility or liability for any loss or damage that may be incurred by any person acting in reliance on this information or assumptions drawn from it.

This document has been prepared in accordance with Section 5.6 of the National Electricity Rules and section 3 of ESCOSA Guideline 12 for the purpose of consulting with Registered Participants, interested parties and customers regarding a potential New Large Network Asset.

The document has been prepared with consideration for pertinent information provided by a number of third parties. It contains assumptions regarding, among other things, economic growth and load forecasts that, by their nature, may or may not prove to be correct. ElectraNet and ETSA Utilities advise anyone proposing to use this information to verify its reliability, accuracy and completeness before committing to any course of action. ElectraNet and ETSA Utilities and their consultants and advisors make no warranties or representations as to its reliability, accuracy and completeness, and specifically disclaim any liability or responsibility for any errors or omissions or not.

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Electricity transmission supply to the Adelaide Central and adjacent North Eastern suburbs is presently provided by the ElectraNet 275 kV transmission system at Magill, East Terrace, and Northfield 275/66 kV substations. That supply is in turn reticulated to electricity users via the ETSA Utilities sub-transmission and distribution systems which operate at voltages of 66 kV, 33 kV, 11 kV and 415 V.

Both ElectraNet and ETSA Utilities are required to ensure that their electricity supply networks are operated with sufficient capacity to provide network services to customers in accordance with the provisions of the National Electricity Rules (Rules), the South Australian Electricity Transmission Code (ETC), and the South Australian Electricity Distribution Code (EDC) as applicable[1].

As a consequence of a revision to the ETC that will come into effect on 1 July 2008, a new load category; Category 6 - Adelaide Central; has been created. An examination of the ETC service standards applicable to Adelaide Central has identified a limitation in the ability of the existing power system to meet those future standards.

ElectraNet and ETSA Utilities have undertaken joint planning to address the future projected network limitation in the Adelaide Central supply area which has resulted in the preparation and issue of this Request for Information/Request for Proposals document.

1.1. Request for Information

ElectraNet is the principal transmission network service provider in South Australia. It is a privately owned company that has a 200 year lease for the operation, maintenance, and development of the South Australian transmission system which comprises plant and equipment mainly operating at voltages of 132 kV and above.

ElectraNet is registered with NEMMCO as a Transmission Network Service Provider (TNSP) and is licensed as a transmission entity in South Australia. Consequently, ElectraNet is bound by the Rules and the service and reliability standards contained within the ETC.

If the technical limits or reliability requirements of its transmission system are forecast to be exceeded, ElectraNet is required to notify Market Participants within the time required for corrective action. Prior to construction of any major network augmentation, ElectraNet must also meet the following regulatory requirements[2:]

- Consult with Market Participants and interested parties regarding alternative solutions, including those which may be provided by solution providers other than ElectraNet such as local generation, market network services, distribution services and demand side initiatives;
- Demonstrate proper consideration of various market development scenarios, including variations in electricity demand growth rates, and the ability of new or proposed demand-side responses and/or new or proposed generation capacity to satisfy projected network limitations, and;
- Ensure that the recommended solution meets reliability requirements at the lowest total net present value cost when compared with other feasible

[1] *SA Electricity Transmission Code and SA Electricity Distribution Code available on ESCOSA website (www.escosa.sa.gov.au)*

[2] *As set by the AER and contained in Chapter 5 of the National Electricity Rules.*

solutions, in accordance with the Regulatory Test promulgated by the Australian Energy Regulator (AER).

As the first step in meeting its obligations in relation to identified potential transmission network limitations a “Request for Information” is issued by ElectraNet to Registered Participants and interested parties seeking proposals, comment and input on alternative solutions.

Because of the interaction between the transmission system operated by ElectraNet and the 66 kV sub-transmission systems operated by ETSA Utilities that supplies Adelaide Central and the North Eastern suburbs, projected network limitations on one system can reflect on the other system and vice-versa. Similarly a solution to a limitation on one network can assist or detract from the performance of the other network.

For the above reason the development of the Adelaide Central and North Eastern Suburbs electricity supply system is being jointly addressed by ElectraNet and ETSA Utilities to ensure that the optimum and most cost effective augmentation that meets the overall needs of all parties is implemented, ultimately resulting in the lowest practical infrastructure costs to electricity consumers.

The development of the Adelaide Central transmission supply system will also require works to be undertaken on the ETSA Utilities sub-transmission and distribution systems. The cost of those associated works is expected to be in excess of $2M. In such cases ETSA Utilities is required to undertake consultation in accordance with ESCOSA Guideline 12 and this documentation forms the initial part of that consultation process, a Request for Proposals (RFP) for those works.

This document provides information about the nature of the demand profile in the area and the reasons solutions are being sought.

1.2. RFI Summary

ElectraNet, as the principal TNSP in South Australia, is required to plan, construct and maintain its transmission system to meet the service obligations of the Rules and the ETC.

As a consequence of the changes to the ETC to take effect on 1 July 2008, ElectraNet has identified the need for a New Large Network Asset (as defined in the Rules) to upgrade the electricity supply system to the newly created Adelaide Central region immediately, with a second stage of augmentation required by 31 December 2011. ElectraNet is required to undertake the consultation process outlined in clause 5.6.6 for any New Large Network Asset it wishes to construct.

This document outlines the consultation process being undertaken and details the projected network limitations applying to the Adelaide Central and North Eastern Suburbs electricity supply system. It seeks submissions from Registered Participants, interested parties and solution providers for possible solutions that can economically and reliably meet future electricity needs in Adelaide Central in accordance with the requirements of the Rules and the revised ETC.

ElectraNet has undertaken preliminary analysis which indicates that any transmission solution that would be implemented to address the projected network limitations in Adelaide Central is likely to constitute a New Large Network Asset as defined in the Rules.

This Adelaide Central RFI is available on ElectraNet’s web site at *http://www.electranet.com.au/consultation_metro.html*

1.3. RFP Summary

ETSA Utilities is registered with NEMMCO as a Distribution Network Service Provider (DNSP) and is licensed as a distribution entity in South Australia. ETSA Utilities is bound by the Rules and the service and reliability standards contained in the EDC.

Changes to the ETC that are to come into effect on 1 July 2008 require ElectraNet to construct a new large network asset within the Adelaide Central supply area. In order for that new large network asset to function and provide services to electricity users in the Adelaide Central electricity supply area it will be necessary to connect the new transmission asset to the existing ETSA Utilities 66 kV supply system.

A preliminary review of the assets required indicates that the associated cost will be in excess of $2M. As a consequence ETSA Utilities is issuing this RFP for those associated works in accordance with the requirements of ESCOSA Guideline 12.

The Adelaide Central RFP is available on ETSA Utilities' web site at:
http://www.etsautilities.com.au/default.jsp?xcid=184

The solution to the Adelaide Central supply area may impact on the next augmentation to the supply system to the Southern Inner Metropolitan region. The Evaluation Report RFP-ER 003/04 on reinforcement options to address projected network constraints described in RFP 003/04 Electricity Supply to the Southern Inner Metropolitan Region of Adelaide, South Australia recommended the first stage solution for the Southern Inner Metropolitan region. That Evaluation Report can be found on ETSA Utilities' web site at:
http://www.etsautilities.com.au/default.jsp?xcid=873

The above Evaluation Report stated that:

"ETSA Utilities and ElectraNet will continue to undertake ongoing joint planning to upgrade supply to the Southern Inner Metropolitan region to ensure that the optimum (lowest possible cost to consumers) long-term plan for development of the electricity network supplying the Southern Inner Metropolitan region is identified and implemented".

Although no submissions were received to the original RFP 003/04, it is deemed prudent to again call for submissions on the Southern Inner Metropolitan region network constraint in light of the ETC changes. The original RFP is available on ETSA Utilities' web site at http://www.etsautilities.com.au/default.jsp?xcid=184 and updated constraint information is provided in Appendix 1 of this RFI/RFP.

2. Introduction

This Request for Information (RFI)/Request for Proposals (RFP) document is provided to Registered Participants, interested parties, and the public to make available information regarding the forecast adequacy of the electricity supply system that services Adelaide Central and the adjacent North-Eastern Suburbs of Adelaide. Additional information concerning that part of the adjacent southern suburbs power system that may be influenced by developments in the Adelaide Central area is available at: http://www.etsautilities.com.au/default.jsp?xcid=184 and in Appendix 1 of this document.

This RFI/RFP seeks comment and information from Registered Participants, interested parties, and potential solution providers, regarding possible means of addressing the projected network limitations forecast to occur in the Adelaide Central transmission supply system that are described in detail within section 7.2 of this document.

Corrective action will be required by the dates provided in this document if ETC reliability standards are to be met for the newly created Adelaide Central load category.

Because of the interaction between the transmission and distribution networks in the Adelaide Central and North Eastern Suburbs transmission supply region it is possible that development or augmentation of the ETSA Utilities sub-transmission system would provide one plausible means of meeting the new July 2008 ETC service standards. As a consequence this RFI/RFP has been prepared jointly by ElectraNet and ETSA Utilities in accordance with the consultation requirements of the National Electricity Rules (Rules) and ESCOSA Guideline 12.

This RFI/RFP also seeks updated proposals, if any, to address previously advised projected network limitations in the Southern Suburbs.

This paper is an integral part of ElectraNet's and ETSA Utilities approach to meeting its obligations under ESCOSA Guideline 12 and Clause 5.6.6 of the Rules that ensures the adoption and implementation of the most cost-effective solution(s) to future network limitations on the system.

2.1. Projected Network Limitations – Adelaide Central and North-Eastern Suburbs of Adelaide.

As a result of the revision of the ETC by ESCOSA, effective as of 1 July 2008, a new load category; Category 6 – Adelaide Central, has been created amongst other changes. ElectraNet and ETSA Utilities routinely undertake Joint Planning of the electricity transmission and sub-transmission systems that supply Adelaide Central and the adjacent North-Eastern Suburbs electrical loads. This has identified a new projected network limitation on the Adelaide Central transmission supply system that will require remedy by 31 December 2011 at the latest. Additionally, the changes to the ETC have resulted in a potential connection point transformer capacity limitation that must be addressed by 1 July 2008.

The electrical load in Adelaide Central and the North Eastern suburbs is supplied by the ElectraNet transmission system which provides high capacity supplies at 275/66 kV substations at Magill, Northfield, and East Terrace. This is in turn reticulated to numerous distribution substations via an interconnected 66 kV system that is operated by ETSA Utilities.

Because the 66 kV network operates in parallel with the transmission system in Adelaide Central and the North Eastern suburbs the 275 kV and 66 kV electricity

systems interact and provide support to each other in the event of a contingency on one power system.

Adelaide Central and the North Eastern Suburbs transmission connection points are presently grouped as a single connection point and classified as a Category 5 load under the ETC, which means that there is a requirement for ElectraNet to install sufficient transmission line and transformer capacity to continuously supply the total forecast load of both regions with any single item of transmission plant out of service (N-1) and to supply a given percentage of the total load with two independent items of transmission plant out of service (N-2).

Under the ETC service standards applying up until 1 July 2008 ElectraNet has sufficient transmission infrastructure installed to meet its obligations beyond July 2008. However, it should be recognised that the existing configuration and design of the overall electricity system and limitations imposed on the further development of this network may make it impractical to fully utilise the installed transmission capacity under all contingency operating conditions without causing overload situations.

The changes to the ETC that will come into effect on 1 July 2008 will result in the creation of a new Adelaide Central load category with its own specific service standards. As a consequence of those service standards ElectraNet is required to;

- Provide increased “equivalent transformer capacity” by I July 2008
- Provide increased 275/66 kV installed transformer capacity by 31 December 2011,
- Construct and commission a new 275/66 kV substation to the west of King William Street (City West) to service the Adelaide Central load by 31 December 2011, and,
- Install additional line and transformer capacity in order to provide an independent and diverse continuous supply of transmission capacity under single contingency operating conditions (i.e. with any single transmission line or 275/66 kV transformer out of service)

In association with these works on the transmission system it will be necessary to undertake additional works to connect the new City West 275/66 kV substation into the existing ETSA Utilities 66 kV system within the Adelaide Central region with consultation for this requirement being addressed in accordance with ESCOSA Guideline 12 as well as the Rules.

Interested Parties and solution providers are requested to be cognisant of the potential interaction of the above items with the North Eastern and Southern Suburbs supply systems that abut the Adelaide Central supply area when seeking further information from both ETSA Utilities and ElectraNet and when formulating their submissions and proposals.

Information regarding projected network limitations in the Southern Suburbs transmission region of metropolitan Adelaide can be obtained from the ElectraNet website at : http://www.electranet.com.au/ consultation_metro.html or at the ETSA Utilities web site at http://www.etsautilities.com.au/default.jsp?xcid=184 Updated technical information regarding the Southern Suburbs distribution supply system is attached to this document as Appendix 1.

The requirement to construct a new City West substation to the west of King William Street has the potential to significantly impact on the type and form of the most cost effective network augmentation required to meet service standards in the Southern

Suburbs region. This aspect will be dealt with in detail in the consultation processes that will be followed prior to implementing any such augmentation or development.

The changes to the ETC, while providing for an N-2 contingency service obligation in the North Eastern Suburbs area supplied by Magill and Northfield substations, have not resulted in an immediate need to undertake augmentation or development of that transmission supply region within the next 10 year period.

2.2. Purposes of the Discussion Paper

The purposes of this discussion paper are to:

- Provide information about the existing electricity transmission and distribution systems that supplies Adelaide Central and the North-Eastern and Southern Suburbs regions of Adelaide;
- Provide information about projected network limitations and the expected time at which action must be taken to meet service standards and maintain system reliability under normal operating conditions and following a credible single contingency event;
- Seek information on possible non-network solutions to the projected limitations in the Adelaide Central region that may be able to be provided by solution providers other than ETSA Utilities and ElectraNet;
- Seek updated information on solutions from solution providers, other than ETSA Utilities and ElectraNet, to the projected limitations in the Southern Inner Metropolitan (SIM) being cognisant of the revised constraint information associated with that system provided in Appendix 1 and the ETC service standards applicable to the new Adelaide Central region, and;
- Explain the process being used to obtain and evaluate alternative solutions.

2.3. Consultation Requirements

ETSA Utilities is required to undertake consultation in accordance with ESCOSA Guideline 12 and the Rules for new distribution assets with an estimated cost of $2 M or more. The consultation process that is being followed by ETSA Utilities has been developed to meet the joint requirements of the Rules and ESCOSA Guideline 12. It involves the annual issue of an Electricity System Development Plan (ESDP), undertaking a Reasonableness Test, and if the Reasonableness Test is met, issuing a Request for Proposals (RFP) seeking alternative solutions to the projected distribution network limitation.

All complying submissions that are received as a result of the RFP are evaluated against the network alternatives using the Regulatory Test that has been promulgated by the AER under the Rules. The results of the Regulatory Test and the RFP evaluation are used to determine the project that is implemented and the cost to Registered Participants and ultimately electricity consumers for doing this.

The Reasonableness Test is used to determine if it is appropriate to issue an RFP in respect of a projected network limitation. The Reasonableness Test takes into consideration estimated capital cost and also possible alternative system support options to address the network limitation. In most cases a RFP is issued for projects with an estimated cost in excess of $2M, and for lesser value projects where demand management alternatives (as that term is defined in ESCOSA Guideline 12) could reduce the total cost of overcoming the projected network limitation. ETSA Utilities must consider any information submitted by Interested Parties when applying the

“Reasonableness Test” to decide whether to issue a Request for Proposals for electricity system support.

Unless previously published in the ESDP, ETSA Utilities will advise Registered Interested Parties of the outcome of its application of the Reasonableness Test at least 12 months prior to the forecast date by which system support investment decisions must be made. In general the above-mentioned advice will be in the form of the relevant RFP.

ETSA Utilities will summarise all projects which have had the Reasonableness Test applied in its annual DM Compliance Report.

For New Large Network Assets, ElectraNet must undertake the consultation process outlined in Clause 5.6.6 of the Rules. That process is shown diagrammatically in the following Figure 1.

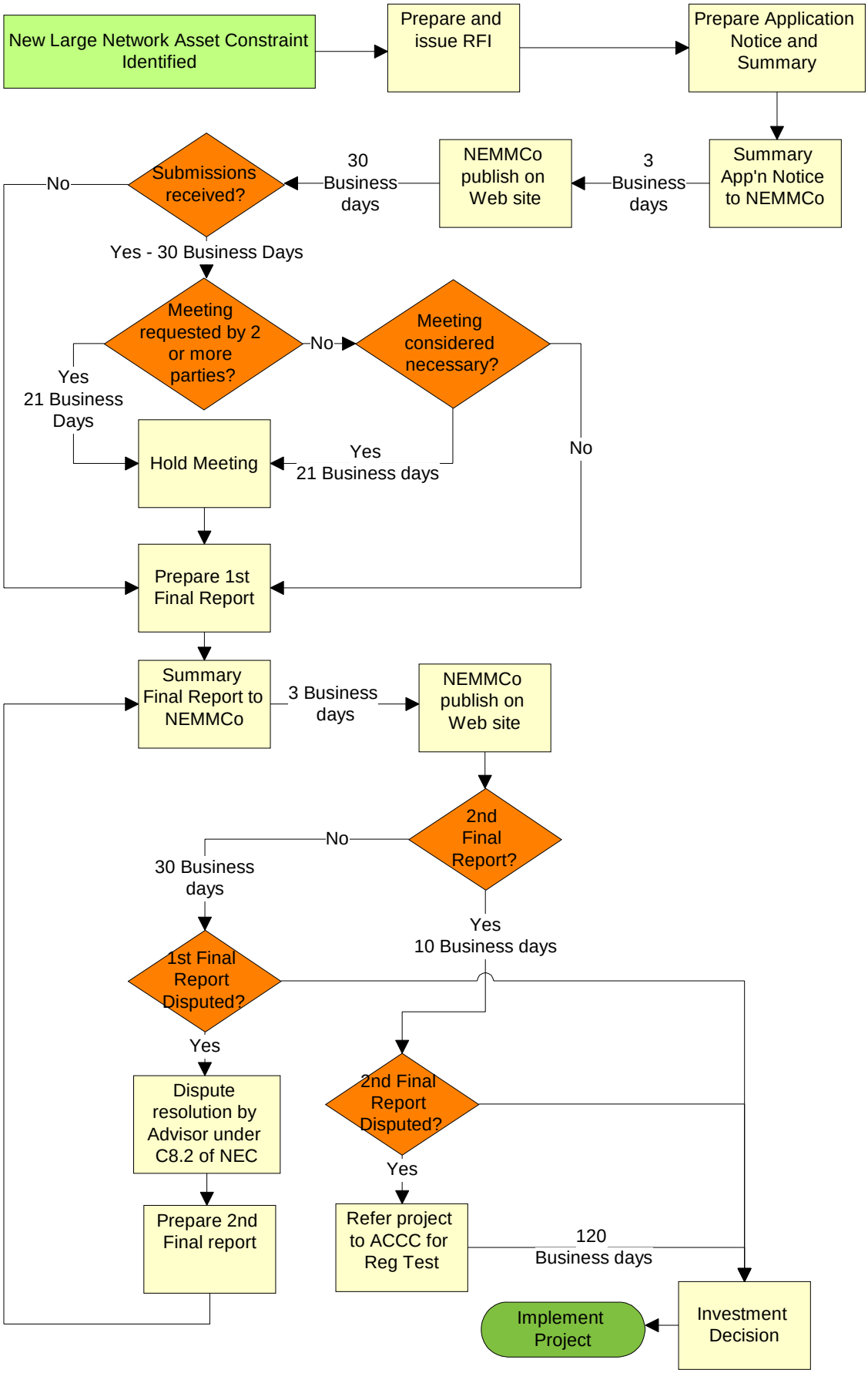

Figure 1: Large Network Asset Consultation Process

2.4. General Terms and Conditions

By issuing this RFI/RFP, neither ElectraNet nor ETSA Utilities is under any obligation whatsoever to select any particular proposal, to negotiate with any particular proponent, or to enter into any agreement with a proponent.

ElectraNet and ETSA Utilities will not be legally bound in any way or otherwise obligated to any person who may receive this RFI/RFP or to any person who may submit a proposal. At no time will ElectraNet or ETSA Utilities be liable for any costs incurred by a proponent in the assessment of this RFI/RFP, any site visits, obtainment of further information from ElectraNet or ETSA Utilities or the preparation by a proponent of a proposal to this RFI/RFP.

In addition to evaluating proposals or options separately, ElectraNet and ETSA Utilities may combine separate proposals or options for the purposes of evaluation where this may lead to a more efficient outcome than the separate proposals or options. Proponents should indicate in their proposal if they do not wish to have their proposals or options considered in combination with other proposals.

ElectraNet will publish the outcomes of its evaluation of proposals as part of the consultation process undertaken for New Large Network Assets in accordance with Clause 5.6.6 of the Rules. ETSA Utilities will publish the outcomes of its evaluation in accordance with the requirements of ESCOSA Guideline 12.

As part of any contractual arrangement or service agreement ElectraNet or ETSA Utilities enters into for the provision of network support services, ElectraNet and ETSA Utilities will require the contracting party to indemnify ElectraNet or ETSA Utilities against any and all liabilities, including claims, losses, actions or proceedings it or a third party may suffer should the contracting party fail to deliver the support services in accordance with ElectraNet's or ETSA Utilities requirements and any applicable laws, including those governing the timeliness and the standard of services. This will also apply for any claims or losses that would apply during an interim period for example when customers have lost supply when a generator is running up prior to supplying load, or when switching is being undertaken on the distribution network.

2.4.1. ElectraNet's Request for Information (RFI)

Requests for additional information or clarification regarding this RFI should be directed to Mr Hugh Westphalen, Network Customer Manager, ElectraNet using the following contact information.

E-mail: Westphalen.Hugh@electranet.com.au
Telephone: (08) 8404 7221

2.4.2. ETSA Utilities Request for Proposals (RFP)

Requests to ETSA Utilities for additional information or clarification regarding this RFP should be directed to:

E-mail: requestforproposals@etsautilities.com.au

Note: ETSA Utilities will reply to all enquiries raised during the Request for Proposals process in writing, with a copy of questions and replies being forwarded to all registered Interested Parties.

2.5. Closing Date

2.5.1. ElectraNet's Request for Information (RFI)

The closing date for submissions to this RFI is close of business (COB) 16 November 2006.

Proposals may be sent by mail, facsimile, or e-mail. All proposals must arrive at ElectraNet before the closing time.

RFI submissions to ElectraNet must be lodged with Mr Hugh Westphalen, Network Customer Manager, using the following contact details by the RFI closing date and time.

Postal	ElectraNet, PO Box 7096 Hutt Street Post Office, Adelaide, South Australia, 5000
Email	Westphalen.Hugh@electranet.com.au
Telephone	(08) 8404 7221
Facsimile	(08) 8404 7447

2.5.2. ETSA Utilities Request for Proposals (RFP)

The following milestones and dates are applicable to this RFP

Milestone	**Date**
Issue of RFP	20 October 2006
Latest date for Draft Submissions from Interested Parties (OPTIONAL)	19 January 2007
Latest date for response by ETSA Utilities to Draft Submissions	2 March 2007
Latest date for Final Proposal Submissions to this RFP	13 April 2007
Latest date for evaluation of submissions completed and evaluation outcomes published and provided to Interested Parties	13 July 2007

The draft and final proposal submissions in response to the Request for Proposals (RFP) must be lodged at:

ETSA Utilities Tender Box,
No. 1 Anzac Highway, Keswick, SA 5035

between 9.00am to 4.00pm, Monday to Friday or mailed to ETSA Utilities at the above address. 3 Copies of the proposal must be submitted in a sealed bag, marked as follows:

RFP 002/06: Projected Network Limitations Adelaide Central Region

Proposals sent by mail must arrive before the closing time. Proposals will not be accepted via facsimile or e-mail.

3. Existing Supply System to the Adelaide Central and North-Eastern Suburbs

3.1. Geographic Region

The specific region of the Adelaide Metropolitan area under consideration is shown in Figure 2.

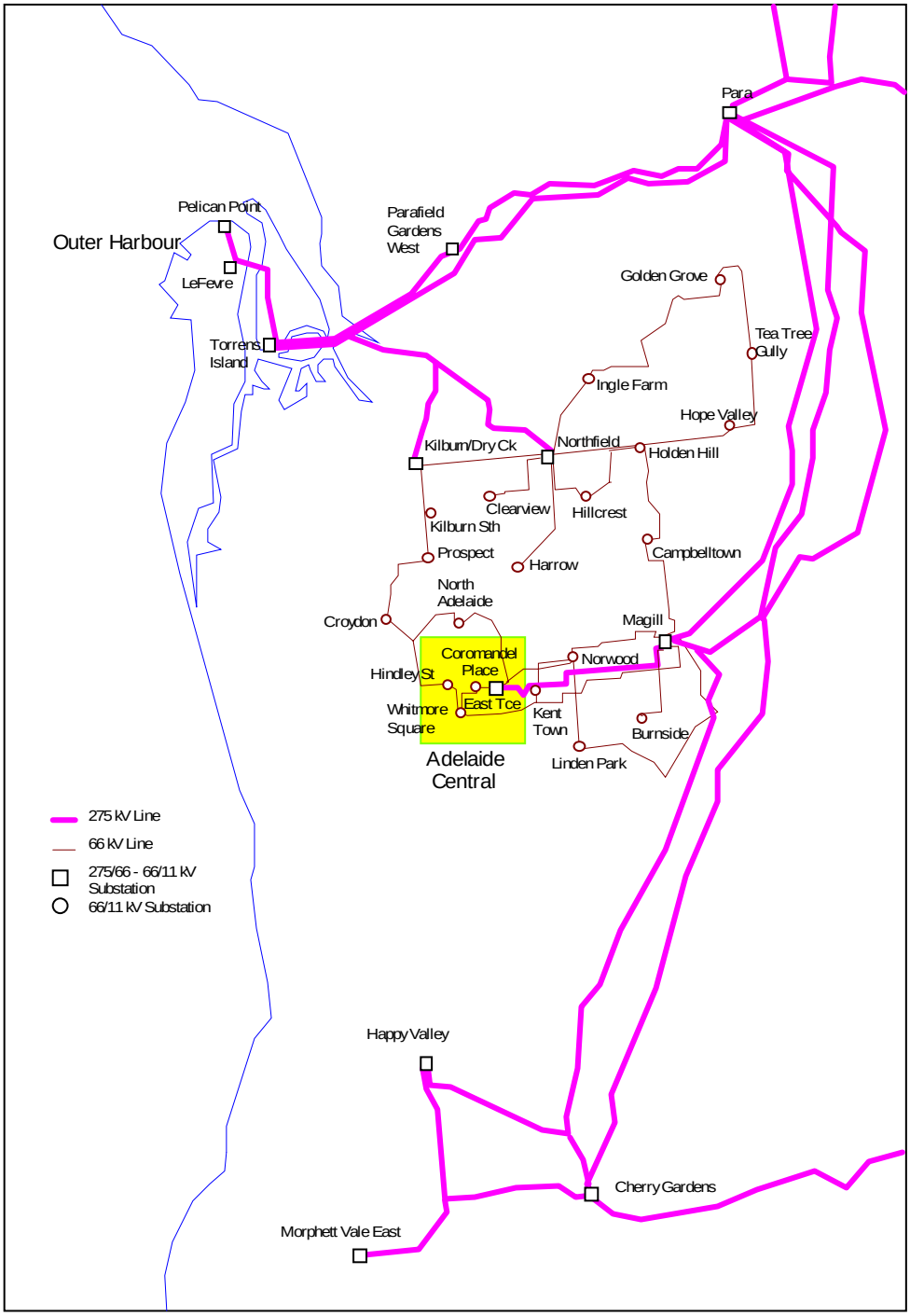

Figure 2: Adelaide Central and North Eastern Suburbs Electrical Supply System

3.2. Existing Electricity System

The Adelaide Central area is presently supplied by the 66 kV meshed sub-transmission network operated by ETSA Utilities that in turn derives its supply from the 275 kV transmission system operated by ElectraNet. The overall arrangement of the near Metropolitan 275 kV transmission system is shown in Figure 3.

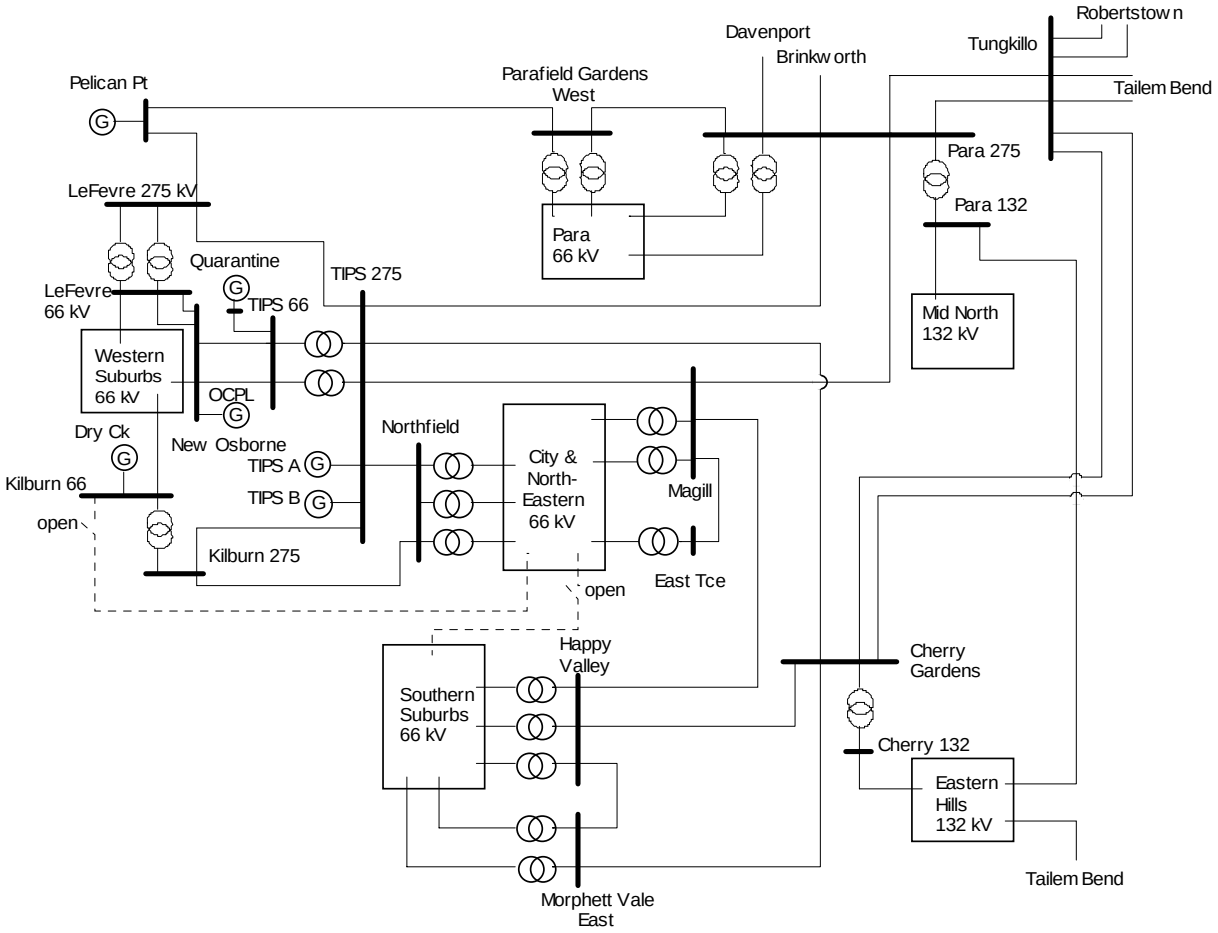

Figure 3: Near Metropolitan 275 kV Supply System

3.2.1. The Adelaide Central and North-Eastern Suburbs Transmission System

The 275 kV power system operated by ElectraNet that supplies the Adelaide Central and North-Eastern Suburbs of Adelaide is shown in Figure 2 and Figure 3. Primary supply to the region is provided by ElectraNet's East Terrace, Magill, and Northfield 275/66 kV substations. These substations are presently grouped together to form a single connection point under the ETC service standards.

East Terrace substation is the only transmission substation located within the Adelaide Central area. It presently contains a single 225 MV.A 275/66 kV transformer and derives its 275 kV supply via a single 275 kV underground cable that connects to Magill 275/66 substation, some 8 km to the east. Magill substation comprises two 225 MV.A 275/66 kV transformers and is connected to the main 275 kV system via three separate overhead circuits. These circuits connect to Torrens Island, Para and Happy Valley substations respectively.

Northfield 275/66 kV substation comprises three 225 MV.A 275/66 transformers and ultimately connects to the Torrens Island 275 kV system via a double circuit 275 kV transmission line. One of these circuits connects to an intermediate 275/66 kV substation at Kilburn that services the Western Suburbs region.

In addition to obtaining power from South Australian and interstate power stations via the 275/66 kV substations the Adelaide Central and North Eastern Suburbs can also obtain electricity from the Dry Creek Power Station at Kilburn.

Dry Creek Power Station can inject up to nominally 104 MW of generating capacity into Adelaide Central and the North Eastern Suburbs supply area via the 66 kV sub-transmission system. The Dry Creek Power Station is operated by Synergen Power in accordance with the requirements of the National Electricity Market and is generally dispatched in response to market situations.

3.2.2. The Adelaide Central and North-Eastern Suburbs Sub-Transmission and Distribution System

Adelaide Central and the North-Eastern Suburbs region generally includes all electrical loads in an area bounded by Glen Osmond Road, Greenhill Road, West Terrace, Port Road, South Road, North-East Road, Black Top Road and the Hills Face Zone to the east as shown in Figure 4.

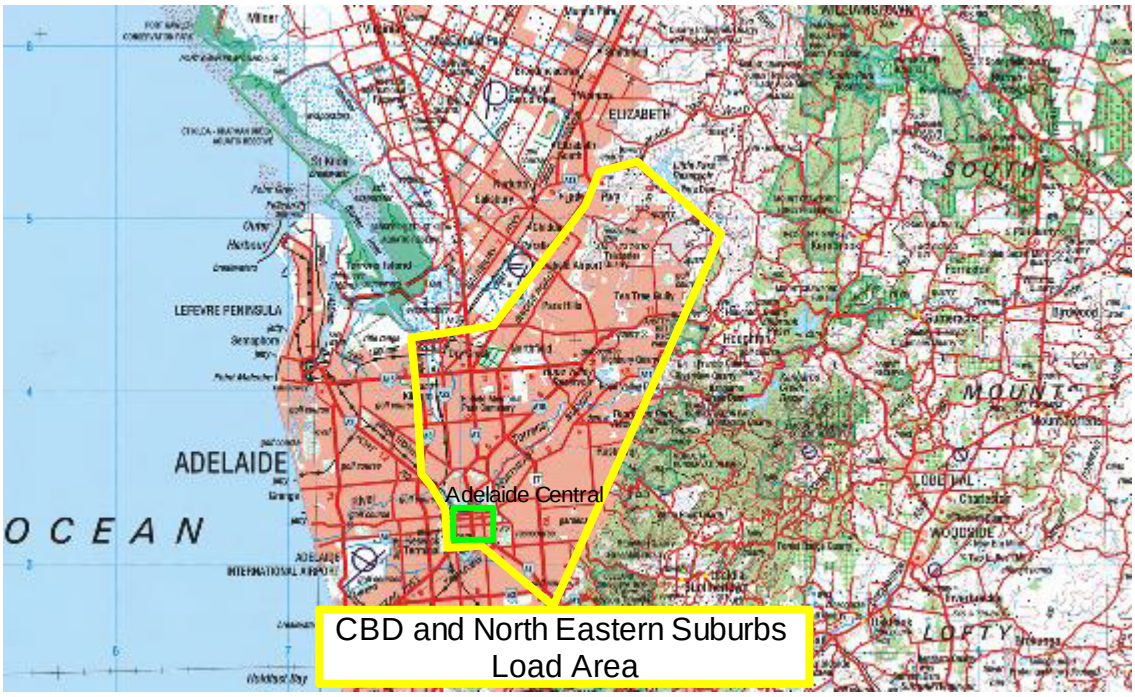

Figure 4: Adelaide Central and North Eastern Suburbs Load Area

The Adelaide Central and North Eastern Suburbs load area includes the Adelaide CBD, North Adelaide, and the suburbs of Linden Park, Burnside, Kent Town, Norwood, Magill, Campbelltown, Prospect, Northfield, Ingle Farm, Modbury, Golden Grove, Tea Tree Gully, and Holden Hill amongst others.

The Adelaide Central and North-Eastern Suburbs 66 kV sub-transmission system operated by ETSA Utilities comprises an interconnected 66 kV system that derives its supply from ElectraNet's East Terrace, Magill, and Northfield 275/66 kV substations and reticulates electricity throughout the region via numerous ETSA Utilities 66/11 kV and 66/33 kV substations.

The configuration of the ETSA Utilities 66 kV and 33 kV distribution networks is shown in Figure 5.

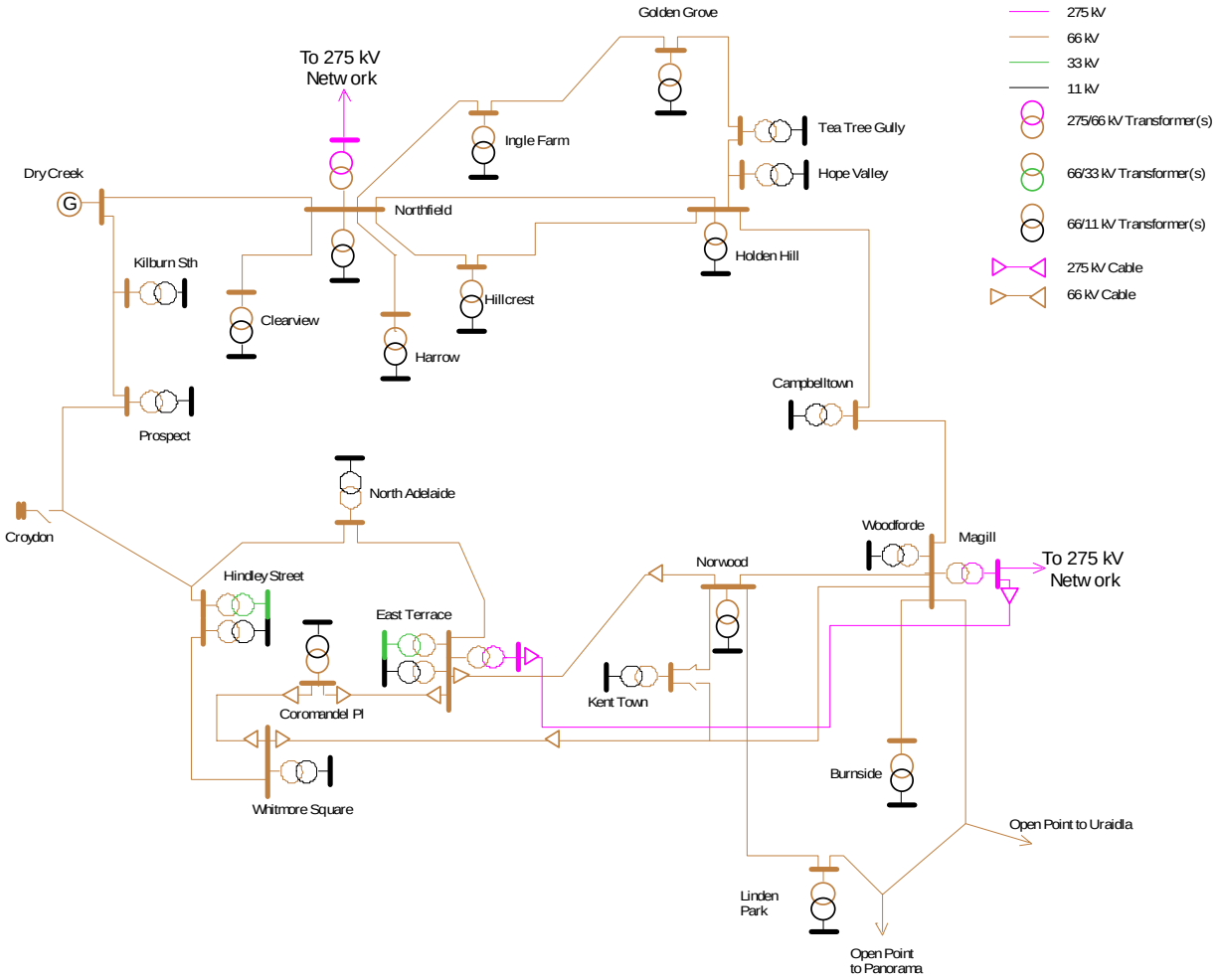

Figure 5: General Arrangement of ETSA Utilities 66 kV System

Adelaide Central and the North Eastern Suburbs 66 kV system essentially comprises two interconnected 66 kV networks that are linked via two 66 kV circuits. The first of these systems is predominantly supplied via Northfield 275/66 kV substation and comprises a loop that runs from Northfield to Holden Hill, Hope Valley, Tea Tree Gully, Golden Grove, Ingle Farm, and back to Northfield. Single (radial) 66 kV lines emanating from Northfield substation supply 66/11 kV substations at Clearview and Harrow (Klemzig).

The second 66 kV system comprises a double loop arrangement, with a loop between Magill, Norwood, Linden Park and then back to Magill with a second loop between Norwood, East Terrace, North Adelaide, Hindley Street, Whitmore Square, with an intermediate tie between East Terrace and Whitmore Square via Coromandel Place, and then back to Magill. Kent Town 66/11 kV substation is configured so that it can be supplied from either Norwood 66 kV substation or the Magill – Whitmore Square 66 kV line. This system is predominately supplied by the East Terrace and Magill 275/66 kV substations.

Interconnections are provided between the two main 66 kV systems via two 66 kV circuits. The first of these connects Hindley Street to Northfield via the Dry Creek Power Station and 66/11 kV substations at Kilburn South, and Prospect. The second circuit connects Holden Hill to Magill via a 66/11 kV substation at Campbelltown.

4. Technical Information – Transmission

Connection Point	Basic composition
Adelaide Central comprising…	
East Terrace substation	1x225 MV.A 275/66 kV transformer
New “City West” Substation	To be established by 31 Dec 2011 with ETC compliant T/F and line capacity installed
Magill, Northfield, Dry Creek combined connection point, comprising...	
Magill Substation	2x225 MV.A 275/66 kV transformers
Northfield Substation	3x225 MV.A 275/66 kV transformers
Dry Creek Power Station	2 (max) 52 MW (nominal) generating units @ 66 kV

Table 1: CBD and NE Suburbs Connection Point Configuration

Transmission Lines	Summer rating (MV.A)	Winter rating (MV.A)
Magill – East Terrace 275 kV (Cable)	450	450
Magill – Torrens Island 275 kV	458	543
Magill – Para 275 kV	458	543
Magill - Happy Valley 275 kV	916	1086
Happy Valley-Magill 275 kV	916	1086

Table 2: CBD and NE Suburbs Transmission Network Ratings

Adelaide CBD 66kV Loop Distribution Lines		Emergency rating (MVA)
COROMANDEL PL	WHITMORE SQ	171
CROY/PROSP TEE	HINDLEY ST TEE	158
EAST TCE	COROMANDEL PLACE	171
EAST TCE	NORTH ADELAIDE	98
HINDLEY ST	WHITMORE SQ	139
HINDLEY ST TEE	HINDLEY ST	98
NORTH ADELAIDE	HINDLEY ST TEE	100
NORWOOD	EAST TCE	110
WHITMORE SQ	KENT TOWN TEE	90

Table 3: CBD and NE Suburbs 66 kV Line Ratings

4.1. Committed Transmission Augmentations

There are presently no committed transmission system developments being undertaken that will impact on the projected network limitations forecast to occur in the Adelaide Central supply area.

4.2. Committed Distribution Augmentations

Any ETSA Utilities committed minor distribution augmentations that materially impact on the 66 kV or 33 kV distribution networks that service Adelaide Central and the North-Eastern Suburbs have been included in the analysis undertaken by ElectraNet.

4.3. Existing and Committed Generation

At present there are two existing sources of generation capable of supplying into the Adelaide Central and North-Eastern Suburbs load area. These are the Dry Creek gas turbine plant and a number of small embedded generating units installed at a number of locations on the distribution system.

The Dry Creek generating plant comprises three individual natural gas fuelled gas turbine driven generating units each with a nominal rating of 52 MW. This power station has the ability to simultaneously connect two out of the three generating units to supply into the Adelaide Central and North Eastern Suburbs load areas. This power station is dispatched in accordance with NEM processes.

There are three embedded generating plants in the North-Eastern Suburbs electricity network. The total installed capacity of these plants is less than 10 MW and is injected at various locations on the ETSA Utilities 11 kV distribution system. Approximately 1.8MW of embedded generation is located at North Adelaide 66/11kV substation, 4.4MW located at Prospect 66/11kV substation and 3.3MW located at Hope Valley 66/11kV substation. The impact of this embedded generation is included in the load forecasts provided by ETSA Utilities to the extent that it would impact on the AMD of the supply region.

The two existing sources of generation discussed above are not connected to the power system at a location where they could assist in meeting the revised ETC service obligations applicable to the Adelaide Central area; however, they are capable of reducing the Agreed Maximum Demand (AMD) associated with the NE Suburbs.

Neither ElectraNet nor ETSA Utilities are aware of any committed or probable generation installations that will potentially impact on the projected network limitations that will occur in the Adelaide Central electricity supply region. However, generation based proponents are invited to submit proposals that they consider can meet the electricity supply requirements of the Adelaide Central region.

5. Service Standards

As a Network Service Provider (NSP) within the National Electricity Market, ElectraNet must comply with technical standards in the National Electricity Rules. In particular, requirements relating to reliability and system security contained in Chapter 4 and Schedule 5.1 of the Rules are relevant to planning for future electricity needs. In addition, as a licensed electricity entity in South Australia, ElectraNet is required to comply with the service obligations imposed by the ETC.

The ETC allocates reliability standards for each connection (exit) point or group of connection points within the transmission network and thereby imposes specific requirements on ElectraNet for planning its transmission network. Examples of the specified levels of reliability include:

- 'N' or 'System Normal': Defined as the ability to supply all load with all elements of the electricity system intact (i.e. supply cannot be maintained during a single fault or contingency without loss of load).
- 'N-1': means the ability of the *transmission system* to continue to supply the contracted amount of *agreed maximum demand* connected to the *transmission system* without interruption should any one *element* fail (typically an outage of a *transmission line* or *transformer*)
- 'N-2': means the ability of the *transmission system* to continue to supply the amount of *agreed maximum demand* connected to the *transmission system* without interruption following the failure of any two single independent and diverse (i.e. located at or servicing different sites) transmission *elements* (typically an outage of a *transmission line* in combination with a *transformer*, an outage of two independent *transformers* located at different sites).

The following table based on the July 2008 ETC summarises the revised service obligations for the six supply categories.

Load Category	**1**	**2**	**3**	**4**	**5**	**6**
Generally Applies to...	**Small Loads, Country Radials**	**Significant Country Radials**	**Medium sized loads excluding country radials**	**Large Loads**	**Large Loads with in-feed to Adelaide Central**	**Adelaide Central**
Transmission Line Capacity…						
N	100% of Agreed MD, 120% of Agreed MD with appropriate Network Support			100% of Agreed MD		100 % of Agreed MD
N-1 Line Capacity						100 % of Agreed MD after 31 December 2011
N-1 Equivalent[3] Line Capacity	Nil	100% within 1 hour	100% un-interrupted Supply			
N-2 Equivalent Line Capacity					At least x% of Cat 5 + Adelaide Central Load	
Restoration Time to N Standard	MUST restore within 2 days	2 days - best endeavours				
Restoration Time to N-1 Standard			2 days - best endeavours	12 hours - best endeavours	4 hours - best endeavours	4 hours - best endeavours
Restoration Time to N-2 Standard					4 hours - best endeavours	
Transformer Capacity…						
N	100% of Agreed MD, 120% of Agreed MD with appropriate Network Support			100% of Agreed MD		100 % of Agreed MD[4]
N-1 T/F Capacity	Nil					100 % of Agreed MD after 31 December 2011
N-1 Equivalent T/F Capacity	Nil	100% un-interrupted Supply				100 % of Agreed MD after 1 July 2008 and before 31 December 2011
N-2 Equivalent T/F Capacity					At least x% of Cat 5 + Adelaide Central Load	

[3] "Equivalent" means it can be a provided by installed capacity, distribution system support, generation, or DSM either singularly or in combination.

[4] "Equivalent" N transformer capacity required up until 31 December 2011

Load Category	1	2	3	4	5	6
Generally Applies to...	**Small Loads, Country Radials**	**Significant Country Radials**	**Medium sized loads excluding country radials**	**Large Loads**	**Large Loads with in-feed to Adelaide Central**	**Adelaide Central**
Restoration Time to N Standard	MUST restore as soon as possible					
Restoration Time to N-1 Standard		As soon as possible - best endeavours				
Restoration Time to N-2 Standard					As soon as possible - best endeavours	
Permitted period to achieve compliance	None Stated	12 months best endeavours, maximum -3 years				

Table 4: Revised ETC Service Standards

5.1. Category 5 loads

The Dry Creek East, Magill, and Northfield grouped connection point that supplies the North-Eastern Suburbs of Adelaide is designated as Category 5 load under the ETC. For this category of load, the following specific reliability standards must be met:

For transmission line capacity, a transmission entity must:

(a) not contract for an amount of agreed maximum demand greater than 100% of installed transmission line capacity;

(b) provide N-1 equivalent line capacity of at least 100% of agreed maximum demand;

(c) provide N-2 equivalent line capacity of at least X% of Z, where:[5]

Z = the sum of the agreed maximum demand for all connection points within Category 5 and Category 6;

X% = Y%+(10=(AMD_{CBD}/Z)x100; and

(d) AMD_{CBD} = the agreed maximum demand for Adelaide Central;

(e) use its best endeavours to restore contracted transmission line capacity within 4 hours of an interruption.

For transformer capacity, a transmission entity must:

(a) not contract for an amount of agreed maximum demand greater than 100% of installed transformer capacity;

(b) provide N-1 equivalent transformer capacity of at least 100% of agreed maximum demand;

(c) provide N-2 equivalent transformer capacity of at least Z, where the term X% and Z have the meaning given previously;

(d) in the event of a transformer failure, use its best endeavours to repair the installed transformer or install a replacement transformer as soon as possible so as to minimise the likelihood of an interruption as a result of the failure of any other transformer installed at the relevant connection point.

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[5] *A worked example of the requirements of clause (c) is set out below. This example is provided for information only and does not affect the operation of the ETC.*

If the agreed maximum demand for Adelaide Central (Category 6) is 250MW and the agreed maximum demand for Dry Creek East, Magill and Northfield (Category 5) and Category 6 (excluding the Adelaide Central area) is 500MW, then:

Z = 250MW + 500MW = 750MW

Y% = $\left(\frac{250}{750}\right) \times 100$ = 33.3%

X% = $33.3\% + \left(\frac{100\% - 33.3\%}{2}\right)$ = 66.6%

Therefore, the N-2 equivalent line capacity required in this case would be 66.6% of 750MW = 500MW.

In the event that agreed maximum demand at a connection point or group of connection points exceeds the equivalent line capacity or equivalent transformer capacity standards required, as stated above, a transmission entity must:

(a) use its best endeavours to ensure that the equivalent line capacity or equivalent transformer capacity at the connection point or group of connection points meets the required standard within 12 months; and

(b) ensure that the equivalent line capacity or equivalent transformer capacity at the connection point or group of connection points meets the required standard within 3 years.

5.2. Category 6 Loads

The Adelaide Central area will be classified as Category 6 under the ETC. It is presently supplied by a single 225 MV.A 275/66 kV transformer installed at East Terrace. East Terrace is in turn supplied via a single 275 kV cable with a nominal capacity of 450 MV.A that is connected to Magill 275/66 kV substation. The applicable ETC service standards for this category of load are;

*For **transmission line** capacity, a **transmission entity** must:*

*(a) not contract for an amount of **agreed maximum demand** greater than 100% of installed **transmission line** capacity;*

*(b) until 31 December 2011, provide **transmission line capacity** for at least 100% of **agreed maximum demand**;*

(c) after 31 December 2011:

*(i) provide **N-1 transmission line capacity** into **Adelaide Central** for at least 100% of **agreed maximum demand**; and*

*(ii) provide the **transmission line** capacity referred to in clause (c) (i) on a continuous basis by means of independent and diverse **transmission** substations (which must be commissioned and commercially available), one of which must be located west of King William Street;*

*(d) use its **best endeavours** to restore contracted **transmission line** capacity within 4 hours of an interruption.*

*For **transformer** capacity, a **transmission entity** must:*

*(a) not contract for an amount of **agreed maximum demand** greater than 100% of **equivalent transformer capacity**;*

*(b) until 31 December 2011, provide **equivalent transformer capacity** for at least 100% of **agreed maximum demand**;*

(c) after 31 December 2011:

*(i) provide **N-1 transformer capacity** into **Adelaide Central** for at least 100% of **agreed maximum demand**;*

*(ii) provide the **transformer** capacity referred to in clause (c)(1) on a continuous basis by means of independent and diverse transmission substations (which must be commissioned and commercially available), one of which must be located west of King William Street*

(d) *in the event of a **transformer** failure, use its **best endeavours** to repair the installed **transformer** or install a replacement **transformer** as soon as possible so as to minimise the likelihood of an interruption as a result of the failure of any other **transformer** installed at the relevant **connection point**.*

*After 1 January 2012, in the event that **agreed maximum demand** at a **connection point** or group of **connection points** exceeds the **line capacity** or **transformer capacity** standards required by this clause a **transmission entity** must:*

(a) *use its **best endeavours** to ensure that the **line capacity** or **transformer capacity** at the **connection point** or group of **connection points** meets the required standard within 12 months; and*

(b) *ensure that the **line capacity** or **transformer capacity** at the **connection point** or group of **connection points** meets the required standard within 3 years.*

Any assessment of projected network limitations must address the capability of the power system to have contracted line and transformer capacity reinstated to agreed levels in line with the restoration requirements stipulated by the ETC for Category 5 and Category 6 loads, following the loss of any single element and any two independent elements.

6. Load Characteristics

6.1. Strategic Significance

The Adelaide Central region contains South Australia's major centres of commerce and Government and has been accorded the highest service level under the ETC.

6.2. Load Growth Overview

ElectraNet obtains electricity demand forecasts over a ten-year horizon from ETSA Utilities. ETSA Utilities advises that these forecasts take account of any known demand management programmes in-place or committed, and includes any embedded generation that may reduce the forecast of demand supplied via each transmission connection point, provided these load reduction solutions are continuously available at times of peak load.

Demand forecasts issued by ETSA Utilities for the Adelaide Central and North Eastern Suburbs region suggest that the overall load growth in the area will continue at an average rate of about 2.7% per annum for the foreseeable future, as indicated in Table 5, (2.3% in the Adelaide Central and 2.9% in the remainder of the system). This growth in electricity usage is largely attributable to continuing commercial, light industrial and residential development within the region.

The growth in electrical load in a region is dependent upon many variables including economic growth, housing and commercial development, industrial growth, spot load increases that occur in response to local requirements, and environmental conditions (predominately weather conditions). The forecasting of electrical load is based upon econometric analysis coupled with knowledge of localised developments and historical information and trends. Load forecasts are reviewed on a regular basis (typically annually), and "as needed" when significant changes in circumstances occur. The load forecast provided in this section is subject to review and may alter as a consequence within the time frames associated with this consultation process. It is based on a 10% probability of exceedence and medium economic growth.

AMD Forecast - Adelaide Central[6]											
Year	05/06	06/07	07/08	08/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16
MW	216	221	226	231	236	242	247	253	259	264	271
MV.A[7]	218	223	228	233	238	244	249	256	262	267	274
AMD Forecast	North Eastern Suburbs										
MW	527	542	557	574	591	608	626	644	662	683	702
Assessed N-2[8]	480	492	505	518	532	546	560	575	590	606	622
Total AMD	743	763	783	805	827	850	873	897	921	947	973

Table 5: Forecast AMDs for Adelaide Central and the North Eastern Suburbs

Table 6 below shows the installed capability of the ElectraNet connection points servicing the revised Category 5 North Eastern Suburbs load.

Connection Point	Transformers		
	Number	Rating	Total
Northfield 275/66 kV	3	225	675
Magill 275/66 kV	2	225	450
Total (N capability)			1125
Largest Unit		225	
N-1 Capability MV.A			**900**
Required pf	0.95		
ETC Capacity - MW	855		
N-2 Capability MV.A			**675**
Required pf	0.95		
ETC Capacity - MW	641.3		

Table 6: North Eastern Suburbs Transmission Connection Point Capability

[6] Numerical sum of forecast loads at Coromandel Place, East Terrace, Hindley Street, and Whitmore Square 66/11 and 66/33 kV substations.

[7] Adelaide Central region has a forecast power factor of 0.99. This includes effect of neighbouring installed capacitor banks, namely 60Mvar on the Hindley Street to North Adelaide 66kV line.

[8] Using the procedure outlined in section 5.1

A comparison of the load forecast provided in Table 5 with the transmission system capability provided in Table 6 indicates that the combined total capacity of the ElectraNet connection points servicing the North Eastern Suburbs load will be adequate to meet the revised ETC standards for the loads forecast for the next 10 year period.

However, as the various 275/66kV transmission connection points and the 66kV network operate meshed to maximise the efficiency and reliability of the combined networks the 275/66 kV transformers do not share load equally, and cannot be made to share load equally under all contingency operating conditions with one transformer out of service. As a consequence it is presently not possible to fully utilise all of the existing transmission connection point capacity.

6.3. Pattern of Use

The peak electricity demand in the combined Adelaide Central and North-Eastern Suburbs supply area occurs during the summer months of the year predominately as a result of air-conditioning loads. As the rating of electrical plant typically decreases with increasing temperature it can be expected that the most onerous operating conditions for this network will occur during the summer periods. This will therefore represent the most critical period relevant to ensuring that the transmission and sub-transmission networks supplying this region of South Australia remain adequate to maintain a reliable supply.

The following graphs show the combined annual load duration curve for Adelaide Central and the North-Eastern Suburbs supply areas and the recorded daily load curves for the summer and winter peak load day.

Figure 6: Adelaide Central and North Eastern Suburbs Annual Load Duration Curve

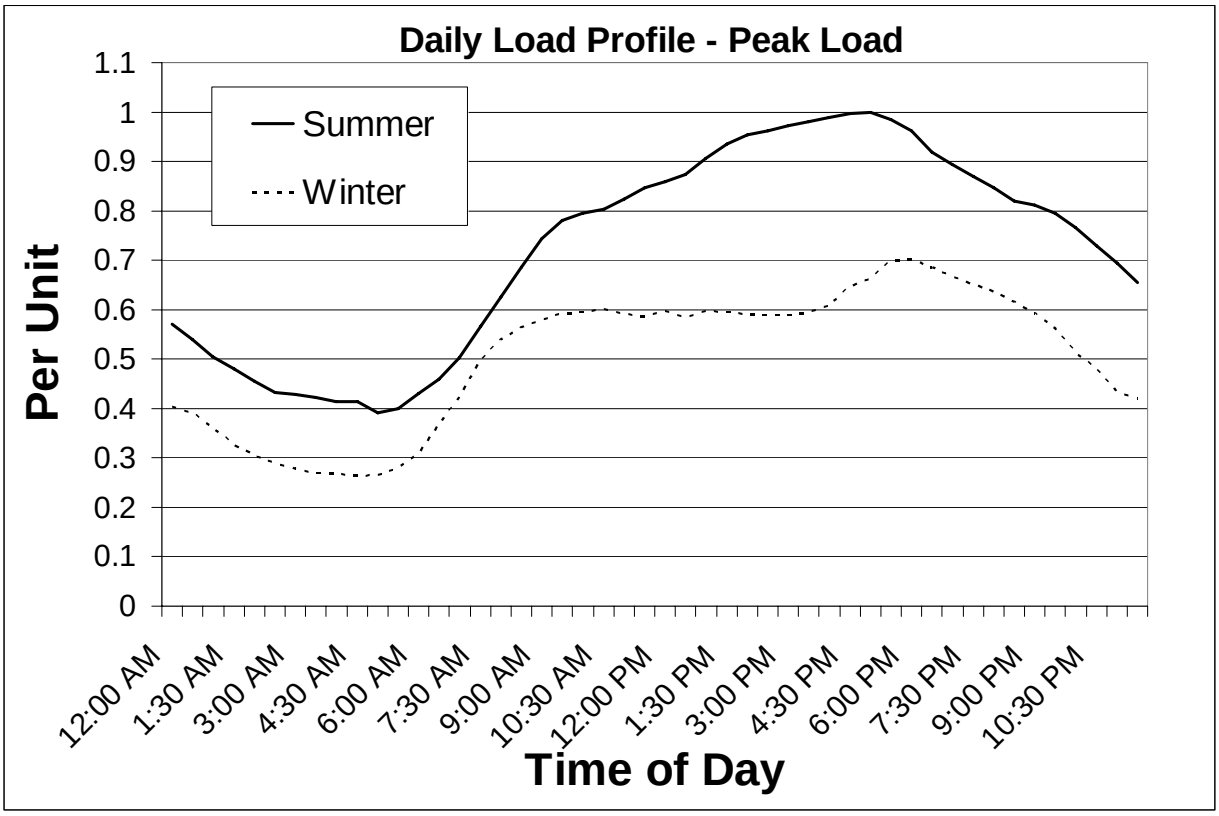

Figure 7: Adelaide Central and North Eastern Suburbs Summer & Winter High Load Day

The load duration curve for Adelaide Central and the North Eastern Suburbs indicates that high loads occur for relatively short periods of time and that the load only exceeds 70 % of the peak value for about 5% of the time. The average load in the Adelaide Central and North Eastern Suburbs is approximately 40% of peak which is indicative of the commercial nature of the load supplied in the region which is based on the normal business day.

The daily summer load curve for the Adelaide Central and North Eastern Suburbs displays a significant peak between the hours of 2:00 pm and 7:00 pm which is indicative of commercial air conditioning loads during the summer months. The winter daily load curve displays a relatively steady load during business hours with a significant peak towards the end of the business day. This is symptomatic of commercial heating loads on a cold winter day which would commence at the start of the business day (around 8:00 am) and continue to close of business at around 5:30 pm. At that stage domestic electric heating and cooking would become prominent. The “winter” daily load curve shows a rapid increase in load in the morning over a 3 hour period which is again indicative of electric heating load.

7. Projected Network Limitations

7.1. Reliability Standards and Service Obligations

The July 2008 revision of the ETC has allocated Load Category 5 status to the Magill, Northfield grouped connection point and a Category 6 status to the Adelaide Central connection point which will comprise East Terrace and a new City West 275 kV substation after 31 December 2011. This ETC determination has the effect of allocating the specific reliability standards contained in section 5 to those connection points and thereby imposes legal requirements that ElectraNet, as a licensed transmission entity, must comply with when planning system augmentations that will impact on those connection points.

7.2. Projected Network Limitations in Adelaide Central Region

ElectraNet and ETSA Utilities have undertaken Joint Planning of the electricity transmission and sub-transmission system that supplies the Adelaide Central and North-Eastern Suburbs electricity loads to determine the impacts of the revised service standards in the ETC. The results of these joint-planning studies have identified a number of projected network limitations on the electricity supply system, the first of which will require remedy as soon as the revised ETC takes effect on 1 July 2008. The revision to the ETC will also require the establishment of a new 275/66 kV substation to the west of King William Street (City West Substation) by 31 December 2011.

Additionally, the ETC imposes obligations regarding the restoration of contracted line and transformer capacity to the Adelaide Central region which will require special consideration if restoration standards are to be met.

7.2.1. Transmission System Transformer Capacity

The 1 July 2008 version of the ETC requires that a transmission entity must … “not contract for an amount of agreed maximum demand greater than 100% of **equivalent transformer capacity**”. There is presently only one 225 MV.A 275/66 kV transformer installed within the new Adelaide Central ETC region at East Terrace substation. The capacity of this transformer is approximately 214 MW at the automatic access standard power factor applicable to customer connections under the Rules (0.95 lag to unity). This corresponds to 223 MW at the ETSA Utilities forecast power factor of 0.99 lag.

From Table 5 it can be seen that the forecast load, which is equivalent to the AMD, will exceed the transmission transformer capacity requirements of the new ETC for the Adelaide Central beyond 2007/08.

Under the requirements of the revised ETC ElectraNet must meet the required standard in regard to the provision of N equivalent transformer capacity immediately when the ETC takes effect. The following table indicates the level of additional equivalent transformer capacity required prior to January 2012.

Year	08/09	09/10	10/11
Load – MW	231	236	242
Load - MVA[9]	233	238	244
Installed T/F Capacity - MV.A	225	225	225
Additional Capacity Needed - MV.A	8	13	19

Table 7: Network Support Requirements 2008 – 2011

7.2.2. "City West" Substation

The July 2008 version of the ETC requires ElectraNet to establish a new 275/66 kV substation to the west of King William Street to supply the Adelaide Central region (referred to as City West substation in this document) by 31 December 2011. The ETC requires that this substation is independent from East Terrace 275/66 kV substation.

In combination the new City West and East Terrace 275/66 kV substations must have sufficient line and transformer capacity **installed** to meet 100% of the Adelaide Central load or AMD without interruption following an outage of a single transmission line or installed transformer.

There is no specific obligation to install capacity within the Adelaide Central region to supply the load following a second contingency.

Additional work will be needed to interface the City West substation with the ETSA Utilities 66 kV system that reticulates electricity throughout the Adelaide Central area. Due consideration will need to be given to this aspect when choosing the actual location of the City West site.

7.2.3. Restoration Times

The ETC requires that a transmission entity use its best endeavours to restore contracted transmission line capacity within 4 hours of an interruption. The existing 275 kV line to the Adelaide Central region comprises underground cable. It is also expected that the 275 kV supply to the City West substation will utilise underground cable.

Proponents and solution providers need to be cognisant of the requirement to use best endeavours to restore contracted line capacity within 4 hours noting that it can take several weeks or even months to locate and repair faults on 275 kV transmission cables due to the specialist nature of the plant and resources required.

[9] Adelaide Central region has a forecasted power factor of 0.99. This includes effect of neighbouring installed capacitor banks, namely 60MVAr on the Hindley Street to North Adelaide 66kV line.

Proponents and solution providers should also be aware of the ETC requirement that contracted transmission line capacity to the Adelaide Central area must be provided by means of “independent and diverse” transmission substations.

8. Factors Impacting Timing of Required Corrective Action

8.1. Assumed Electricity Demand

Section 7.2 identified that, without corrective action, the existing Adelaide Central transmission supply system will be unable to meet the revised service standards in the July 2008 ETC by 1 July 2008.

The primary drivers of these projected network limitations are the changes to the ETC and the forecast growth in electricity demand in the area. Sensitivity analysis has shown that the need for augmentation is insensitive to annual load growth assumptions and this would not alter the required timing for corrective action.

8.2. Assumed Generation Pattern

ElectraNet and ETSA Utilities have, under close consultation, carried out analyses examining the power flows and voltage levels on the 275 kV and 66 kV lines, and loadings on the 275/66 kV transformers, in the Adelaide Central and North-Eastern Suburbs transmission and sub-transmission systems, using a variety of assumptions about plausible generation patterns from existing generating plant. These studies show that due to the location of the existing generation plant, which is outside the Adelaide Central supply region, the need and timing for transmission system development is insensitive to these factors.

8.3. Other Factors

ElectraNet and ETSA Utilities have not identified any other factors that would influence the timing of projected network limitations in the Adelaide Central region.

8.4. Conclusion

Any timing recommendation requires a balance of the risks associated with variations in electricity demand, temperature, and other assumptions. ElectraNet and ETSA Utilities conclude that in order to meet the revised service standards in the ETC,

- Additional equivalent 275/66 kV transformer capacity is required immediately when the revised ETC takes effect on 1 July 2008
- A new, independent 275/66 kV substation needs to be established to the west of King William Street to supply the Adelaide Central region by 31 December 2011
- The configuration of the relevant augmentation or the provision of equivalent transformer capacity must be such that there is a very high probability that contracted transmission line capacity can be restored within a 4 hour period, noting that contracted transmission line capacity is independent and diverse and will be provided by underground 275 kV cable, and,
- Additional work will be needed to facilitate the connection of the City West 275/66 kV substation to the ETSA Utilities 66 kV system that services Adelaide Central.

9. Market and Other Network Impacts

The projected network limitations on the 275 kV transmission network and 66 kV sub-transmission networks supplying the Adelaide Central region of Adelaide are not sensitive to market operations or generation dispatch scenarios. The need for augmentation is driven primarily by alterations to the creation of new service obligations within the ETC.

Market participants may wish to consider the following when developing possible alternative solutions:

- Any new local generation option will be required to operate at certain times under contract with ElectraNet. This will be essential for reliability purposes, and such operation will be required regardless of the pool price at the time noting that the National Electricity Rules prevents a generator that is providing grid support from setting the market price.
- Because of the service obligations imposed by the ETC for Category 6 loads, stipulating an instantaneous, firm N-1 supply, it will be necessary to pre-dispatch generation at load levels above the N-1 capability of the existing transmission and distribution infrastructure to ensure that no customer load (other that that which has been contracted as interruptible) is lost as the result of a credible contingency event occurring.
- A demand side management initiative (eg programme to reduce electricity usage during the relevant peak period) must provide positive proof that it is capable of reducing flows on the relevant network elements to below emergency ratings during single network contingencies within the required time. If this reduction is not achieved, the consequence is likely to be forced and extensive customer load-shedding of prolonged duration during single contingencies, which is not an allowable outcome under the applicable service standards.

10. Assessment of Alternative Solutions

10.1. Identifying Solutions

This RFI/RFP paper, and subsequent consultation, provides an opportunity for non-network solution providers other than ElectraNet and ETSA Utilities to submit details of their proposals for consideration. The information provided in this document on projected network limitations in the Adelaide Central region of metropolitan Adelaide is intended to enable interested parties to formulate and propose feasible and definitive local generation, demand side management, and distribution system alternatives.

10.2. Criteria for Solutions

As outlined in section 7.2, it is essential that action be undertaken no later than 1 July 2008 to meet ETC service requirements for the Adelaide Central area. Further action is needed to meet the 31 December 2011 ETC service requirements.

To assist solution providers in understanding the technical and other requirements, the following criteria that must be satisfied if solutions are to meet the underlying need for augmentation of supply to the Adelaide Central region:

- **Size**: Feasible options must be large enough, individually or collectively, to meet the annual increase in demand for the entire Adelaide Central region of metropolitan Adelaide for a 10 year period commencing 1 July 2008 at a minimum
- **Time of year**: Options must, at a minimum, be capable of meeting this demand growth during the peak summer months. The existing system is most in need of reinforcement during the summer peak, so options that do not reliably relieve load during this period do not represent viable options. All viable options must able to support the peak summer and winter loads under any credible single contingency operating condition.
- **Location**: To be a viable 'stand-alone' non-transmission solution, an option must reduce the contracted electricity demand (AMD) that has to be supplied via the East Terrace, and City West grouped connection point transformers. Any generation or demand management option proposed must be suitably located to achieve this outcome. Transmission or sub-transmission system augmentation combined with generation outside the relevant area may be a viable solution and generation proponents interested in this approach are requested to provide a preliminary proposal to ElectraNet.
- **Timeframe**: All options should be operational before 1 July 2008 at the latest in terms of equivalent transformer capacity and by 31 December 2011 in the case of the new City West Substation.
- **Reliability**: Options must be capable of reliably delivering electricity under a range of conditions and, meet the relevant service standards under the ETC and if a generator must meet all relevant Rules requirements related to grid connection.
- **Certainty**: Options must be committed using proven technology and have funding and project management to deliver within the required timeframe. Corrective action is critical to meeting the service standards applicable to the Adelaide Central region – it is not considered appropriate to rely on uncommitted developments that may or may not proceed.

- **Longevity**: Options can either be capable of providing feasible long-term solutions or provide a series of short-term deferrals to overcome the projected limitations in the Adelaide Central. The economic effectiveness of short-term deferrals will be assessed over the full 15-year period commencing 1 July 2008.
- **Evaluation**: The evaluation period for this RFI is driven by the need to obtain the most cost effective development(s) over a reasonable time frame, allowing for uncertainties associated with future network developments and load and generation patterns. In the case of the Adelaide Central region the need for network supplementation is driven by ETC requirements and future network development or the implementation of permissible alternative solutions will be dependent on these requirements. A 15 year evaluation period will be used.
- **Liability**: If ElectraNet or ETSA Utilities decides to enter into a contractual arrangement for the provision of network services, ElectraNet and ETSA Utilities may require the contracting party to indemnify ElectraNet and ETSA Utilities against any and all liabilities, including claims, losses, actions or proceedings it or a third party may suffer should the contracting party fail to deliver the support services in accordance with ElectraNet's and ETSA Utilities requirements and any applicable laws, including those governing the timeliness and standards of service. This indemnity will also apply for any claims or losses that would apply during an interim period; for example, when customers have lost supply when a generator is running up prior to supplying load, or when switching is being undertaken on the distribution network.

10.3. Information to be provided

ElectraNet and ETSA Utilities request that the following information be provided by proponents and solution providers at a minimum:

- the name, address and contact details of the party making the proposal;
- the name, address and contact details of the party responsible for the system support option (if different to above);
- a explanation of the relevance of the proposal and/ or options presented;
- if applicable to the solution being offered;
    - the size, type and location of load(s) that can be reduced, shifted, substituted or interrupted;
    - the size, type and location of generators that can be installed or utilised if required;
    - the type and location of action or technology proposed to reduce peak demand/provide electricity system support;
    - the time required to implement the proposal, and any period of notice required before loads can be interrupted or generators started;
    - an estimate of the expected reliability of the option offered. This could be expressed in terms of the availability factor for that portion of the required period for which the option is offered (i.e. the probability that the option will be available if called upon);
    - any other relevant information, and a summary of the likely impact on consumers, e.g. in relation to power quality and reliability, etc;
- the level and availability of electricity system support from this proposal;

- the level of initial payment required ($ and/or $/kV.A);
- the level of availability payment required ($ and/or $/kV.A);
- the level of dispatch payment required; and
- any other issues considered relevant.

10.4. Assessment of Solutions

The Regulatory Test, and Chapter 5 of the Rules requires ElectraNet and ETSA Utilities to consider local generation, demand side management, and network options on an equal footing.

As the Adelaide Central augmentation is required to meet ETC reliability standards, ElectraNet and ETSA Utilities are required to carry out and economic cost-effectiveness analysis. In accordance with the requirements of the AER's Regulatory Test, the recommended option must "minimise the present value of costs, compared with a number of alternative options in a majority of reasonable scenarios" to satisfy the Test, where costs means "the total cost of an option (or an alternative option) to all those who produce, distribute or consume electricity in the NEM".

A proposed augmentation must pass the regulatory test irrespective of whether it is a network option or a non-network solution. This requires public consultation including appropriate disclosure of project costs.

If non-transmission options are selected it will be necessary for ElectraNet and/or ETSA Utilities to enter into a "grid support contract" with the successful service provider, generator, retailer or customer (in the case of load shedding or demand side management) for the provision of the required services.

11. Request for Information/Proposals

ElectraNet and ETSA Utilities invite submissions and comments in response to this discussion paper from National Electricity Market participants, solution providers, and any other interested parties.

Submissions should be presented in a written form and contain at a minimum the information listed in section 10.3 including contact details for subsequent follow-up if required. If parties prefer, they may request to meet with ElectraNet and/or ETSA Utilities prior to providing a written response.

11.1. Submissions from Solution Providers

This is not a tender process – submissions are requested so that ElectraNet and ETSA Utilities can fulfil their regulatory obligations to compare the present value cost of suitable alternatives to the option of augmenting the transmission system to maintain supply reliability.

As submissions may be made public, any commercially sensitive material, or material that the party making the submission does not want to be made public, should be clearly identified. It should be noted that ElectraNet and ETSA Utilities are required to publish the outcomes of the Regulatory Test analysis. Both ElectraNet and ETSA Utilities have an obligation to undertake the Regulatory Test in a thorough and understandable manner. If ElectraNet and/or ETSA Utilities is unable to undertake the Regulatory Test for a particular proposal due to insufficient information provided by the proponent (including specific project cost data which may be withheld for commercial-in-confidence reasons), then that proposal will, by necessity, be discarded.

11.2. Timetable for Submissions

11.2.1. ElectraNet's Request for Information (RFI)

The closing date for submissions to this RFI is close of business (COB) 16 November 2006.

Proposals may be sent by mail, facsimile, or e-mail. All proposals must arrive at ElectraNet before the closing time.

RFI submissions to ElectraNet must be lodged with Mr Hugh Westphalen, Network Customer Manager, using the following contact details by the RFI closing date and time.

Postal	ElectraNet, PO Box 7096 Hutt Street Post Office, Adelaide, South Australia, 5000
Email	Westphalen.Hugh@electranet.com.au
Telephone	(08) 8404 7221
Facsimile	(08) 8404 7447

11.2.2. ETSA Utilities Request for Proposals (RFP)

The following milestones and dates are applicable to this RFP

Milestone	**Date**
Issue of RFP	20 October 2006
Latest date for Draft Submissions from Interested Parties (OPTIONAL)	19 January 2007
Latest date for response by ETSA Utilities to Draft Submissions	2 March 2007
Latest date for Final Proposal Submissions to this RFP	13 April 2007
Latest date for evaluation of submissions completed and evaluation outcomes published and provided to Interested Parties	13 July 2007
Implementation	To co-ordinate with ElectraNet work

The draft and final proposal submissions in response to the Request for Proposals (RFP) must be lodged at:

ETSA Utilities Tender Box,
No. 1 Anzac Highway, Keswick, SA 5035

between 9.00am to 4.00pm, Monday to Friday or mailed to ETSA Utilities at the above address. 3 Copies of the proposal must be submitted in a sealed bag, marked as follows:

RFP 002/06: Projected Network Limitations Adelaide Central Region

Proposals sent by mail must arrive before the closing time. Proposals will not be accepted via facsimile or e-mail.

12. Assessment and Decision Process

The following indicative program is proposed by ElectraNet for the augmentation of the Adelaide Central electricity transmission supply system,

Milestone	Date
Issue RFI	20 October 2006
Prepare Application Notice and lodge with NEMMCO	8 December 2006
Prepare Final Report	9 February 2007
Project Approval	December 2007 (proposed)
Implementation Date	31 December 2011 for City West 275/66 kV Substation

Refer to section 11.2.2 for the ETSA Utilities indicative program noting that implementation dates will be integrated with the establishment of City West 275/66 kV substation.

Whilst ElectraNet and ETSA Utilities will endeavour to work within the above time frames, circumstances beyond the reasonable control of ElectraNet and ETSA Utilities may alter these time frames. ElectraNet and ETSA Utilities will advise interested parties of any significant alteration should this occur.

13. Definitions

ACCC	Australian Competition and Consumer Commission
Adelaide Central	That area of Adelaide which is located east of West Terrace, north of South Terrace, west of East Terrace, and south of the River Torrens.
Act	Electricity Act 1996
AER	Australian Energy Regulator
AEMC	Australian Energy Market Commission
AMD	Agreed Maximum Demand – for a connection point or a group of connection points, it is the demand specified as such in the *connection agreement* between ElectraNet and the relevant *transmission customers* or *ETSA Utilities*.
Application Notice	A notice made available to Registered Participants and Interested Parties pursuant to clause 5.6.6 of the Rules
Distribution Code – EDC	South Australian Electricity Distribution Code – as issued by ESCOSA
DNSP	Distribution Network Service Provider
DM, DMS	Demand Management or Demand Side Management
ElectraNet	ElectraNet is the principle transmission network service provider in South Australia. It is a privately owned company that has a long term lease for the operation, maintenance, and development of the South Australian transmission system which comprises plant and equipment mainly operating at voltages of 132 kV and above. ElectraNet is registered with NEMMCO as a Transmission Network Service Provider (TNSP)
Equivalent Transformer Capacity	Capacity to transform energy to meet demand using means including, but not limited to: (a) transmission system capability; (b) network support arrangements. As defined in the ESCOSA Electricity Transmission Code
ESCOSA	Essential Services Commission of South Australia established under the Essential Services Commission Act 2002
ESDP	Electricity System Development Plan (ESDP) developed annually by ETSA Utilities and published by 30 June. The ESDP includes details of projected limitations on the ETSA Utilities Distribution system for at least the next three year period and provides the information needed for a party to register as an Interested Party as defined within ESCOSA Guideline 12
ETC	South Australian Electricity Transmission Code issued by ESCOSA

ETSA Utilities	ETSA Utilities is South Australia's principal Distribution Network Service Provider (DNSP), and is responsible for the distribution of electricity to all distribution grid connected customers within the State under a regulatory framework. ETSA Utilities is a partnership of Cheung Kong Infrastructure Holdings Ltd (CKI), Hong Kong Electric International Ltd (HEI), and Spark Infrastructure
Guideline 12 (GL 12)	ESCOSA Electricity Industry Guideline 12 – Demand Management for Electricity Distribution Networks
Market Participant	A person who has registered with NEMMCO as a Market Generator, Market Customer or Market Network Service Provider under Chapter 2
NEM	National Electricity Market
NEMMCO	National Electricity Market Management Company Limited
NPV	Net Present Value
O&M	Operating and Maintenance
OLTC	On Load Tap Changer – a device used to control the output voltage of a transformer
QOS	Quality of Supply
RDP	Regional Development Plan
Registered Participant	A person who is registered with NEMMCO as a Network Service Provider, a System Operator, a Network Operator, a Special Participant, a Generator, a Customer or a Market Participant
Regulatory Test	The test promulgated by the AER, which all major regulated network augmentation investment must comply with
RFP	Request for Proposals
ROA	Return on Asset
Rules	National Electricity Rules (Rules) formerly the National Electricity Code (NEC)
TNSP	Transmission Network Service Provider
TUOS	Transmission Use of System charges applicable to Registered Participants in the NEM
VoLL	Value of Lost Load as measured in the NEM
WACC	Weighted Average Cost of Capital

14. APPENDIX 1: Updated RFP Information on the Southern Inner Metropolitan (SIM) Region

The following updated information relevant to the Southern Suburbs RFP is provided to assist interested parties to assess and develop combined solutions that have the potential to address both the projected limitations in the Adelaide Central area and projected limitations in the Southern Suburbs distribution network.

In April 2004, ETSA Utilities and ElectraNet published a joint RFI/RFP titled *Projected Transmission and Distribution Network and 275/66 kV Connection Point Limitations: Electricity Supply to the Southern Suburbs of Metropolitan Adelaide*. This document described four projected constraints relating to the Southern Suburbs of Metropolitan Adelaide, and one projected constraint relating to the CBD and Eastern Suburbs. This RFI/RFP is available on ETSA Utilities' website at http://www.etsautilities.com.au/default.jsp?xcid=184 Proponents should refer to this RFI/RFP for details of the transmission and distribution system that supplies the Southern Suburbs.

To address Items 2, 3, and 4 of the above-mentioned RFI/RFP, ETSA Utilities published an Evaluation Report RFP-ER 003/04 on reinforcement options to address projected network constraints described in RFP 003/04 Electricity Supply to the Southern Inner Metropolitan Region of Adelaide, South Australia which recommended the first stage solution for the Southern Inner Metropolitan region. This Evaluation Report is available on ETSA Utilities' web site at http://www.etsautilities.com.au/default.jsp?xcid=873

As a result, ETSA Utilities and ElectraNet plan to implement the following project which will provide adequate capacity for the Southern Inner Metropolitan region of the Southern Suburbs of Adelaide until 2011/12:

- ElectraNet to install a 275/66 kV at Magill that will be dedicated to the Southern Suburbs in 2007, and ETSA Utilities to re-configure the Magill-Uraidla-Linden Park-Panorama 66 kV line in 2007 (normally disconnected at Uraidla and Panorama end). In the new configuration, this line will be supplied by the new dedicated transformer at Magill and connected at the Panorama end and disconnected at the Linden Park and Uraidla ends.

Emerging Constraints in 2011/12: Happy Valley to Panorama

Studies indicate that, by summer 2011/12, load growth in the Southern Suburbs will result in overloads on the Happy Valley – Panorama No: 1 circuit if the No: 2 circuit is out of service and vice-versa. The injection at Panorama that is gained by the connection of the dedicated Magill to Panorama 66kV line and associated 275/66kV transformer at Magill (refer above) will no longer be sufficient to avoid these overloads.

Solution providers and responders should note that the loading in the above circuits is primarily due to the electrical load being drawn from the 66 kV system by customers located in the northern part of the Southern Suburbs supply region. Any proposals aimed at addressing this projected distribution network limitation will need to effectively reduce these loads to acceptable levels.

The following table provides an indication of the peak level of load reduction required and the number of hours for which load reduction is needed per year.

Year	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
Load at risk (MW)	64	79	95	110	127	143	160	176	194	211	230
Duration at risk (hrs)	28	32	36	52	65	83	105	141	178	233	304

In addition to this projected limitation on the Happy Valley to Panorama 66kV circuits, the Happy Valley Transformer No. 2 is forecast to be overloaded from 2012/13 onwards if either of Happy Valley Transformer No. 3 or No. 4 is out of service.

It is estimated that the cost of the network solution that would overcome this projected limitation would be in excess of $2M. Therefore, this RFP includes updated constraint information on the Southern Inner Metropolitan region and again calls for submissions for non-network solutions to the Southern Inner Metropolitan region network constraint.