DRAFT REPORT
PROPOSED NEW LARGE NETWORK ASSET INVESTMENT

AUGMENTATION of ELECTRICITY SUPPLY to the QUIRINDI AREA of NSW

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1 PROJECT CONSULTATION & SUBMISSIONS

1.1 INVITATION FOR CONSULTED PARTY SUBMISSIONS

Essential Energy invites written submissions from registered participants and interested parties on this Draft Report in relation to a proposed new large network asset investment to augment the electricity supply to the Quirindi area of NSW.

Submissions are due by Friday 6th July 2012, this being not less than 10 business days from the nominated publication date of this Draft Report.

Submissions or other enquiries should be directed by email to:

nerconsultation@essentialenergy.com.au

1.2 PROJECT CONSULTATION

The publication of this Draft Report is the second stage of the consultation process being undertaken by Essential Energy in respect of the requirement to correct network constraints identified in relation to the electricity supply to the Quirindi area of New South Wales.

Consultation is being undertaken by Essential Energy in accordance with Section 5.6.2 (Network Development) and Section 8.9 (Rules Consultation Procedures) of the National Electricity Rules given that:

(i) The identified workable network options to address the distribution network limitations results in the augmentation and enlargement of the network, and

(ii) The proposed network development will be a new large network asset.

The initial stage of the consultation involved the publication of a Consultation Notice and associated Consultation Information Report. This stage has been completed with no written submissions having been received by Essential Energy in response to the Consultation Notice.

The third (and final) stage of the consultation process will be the publication of a Final Report following the completion of the Draft Report submission and consideration process. The Final Report will set out the conclusions reached in respect of the matter under consultation, the reasons for the conclusion and a summary of the consultation procedures and responses.

2 PROJECT DRAFT REPORT

2.1 REPORT PURPOSE AND SCOPE

Essential Energy owns the sub-transmission and distribution network in the Quirindi area and is responsible for planning and developing its network to meet the requirements of customers within its region.

Essential Energy has responsibilities under the National Electricity Rules (the Rules) to carry out planning to facilitate the optimal development of Essential Energy's distribution network.

A security of supply (N-1 supply) constraint has been identified on the Essential Energy network supplying the Quirindi area of NSW. Essential Energy is required to address the constraint in order to comply with its licence conditions and service standards as outlined in Section 3.3.1.

Essential Energy has considered the workable options available to address the identified constraint and assessed their economic cost effectiveness in terms of satisfying the regulatory test. Information in respect of these options and the economic cost assessment was presented in the project Consultation Information Report published in conjunction with the project Consultation Notice. This information is represented in this project Draft Report to assist consulted parties who may wish to further consider making a written submission in response to the invitation to do so.

The Project Draft Report also provides information on the existing network, recorded and forecast peak load demands and the identified network limitations which are relevant to defining and assessing the workable options available to correct the limitations.

The information provided in the Draft Report is indicated in the Contents Page (see page 2 of this document).

2.2 PROJECT CONSULTATION SUBMISSIONS, ISSUES AND CONCLUSIONS

Essential Energy received one response to the project Consultation Notice via a telephone call suggesting the possibility of using battery storage to reduce the peak load below the nominated 15MVA N-1 security of supply limit to avoid the indicated N-1 network supply need

Essential Energy provided an explanation of the licence compliance N-1, one minute security of supply requirements as indicated in Section 3.3.1 below. No written submission was subsequently received prior to the conclusion of the initial consultation period.

3 BACKGROUND

3.1 SUPPLY TO THE AREA

The Liverpool Plains Shire Council is south of Tamworth with an area of 5,000 sq km and a population of 8,000. The Liverpool Plains contain highly productive farming land and hence is a rich agricultural area which produces much of Australia's wheat, corn, and canola, and has considerable cattle and sheep farming. In recent years the region has become the focus for a burgeoning coal mining industry, with two new mines proposed in the areas north of Caroona.
The Liverpool Plains area stretches from Currabubula just south of Tamworth to Murrindindi in the east and Colly Blue in the west.

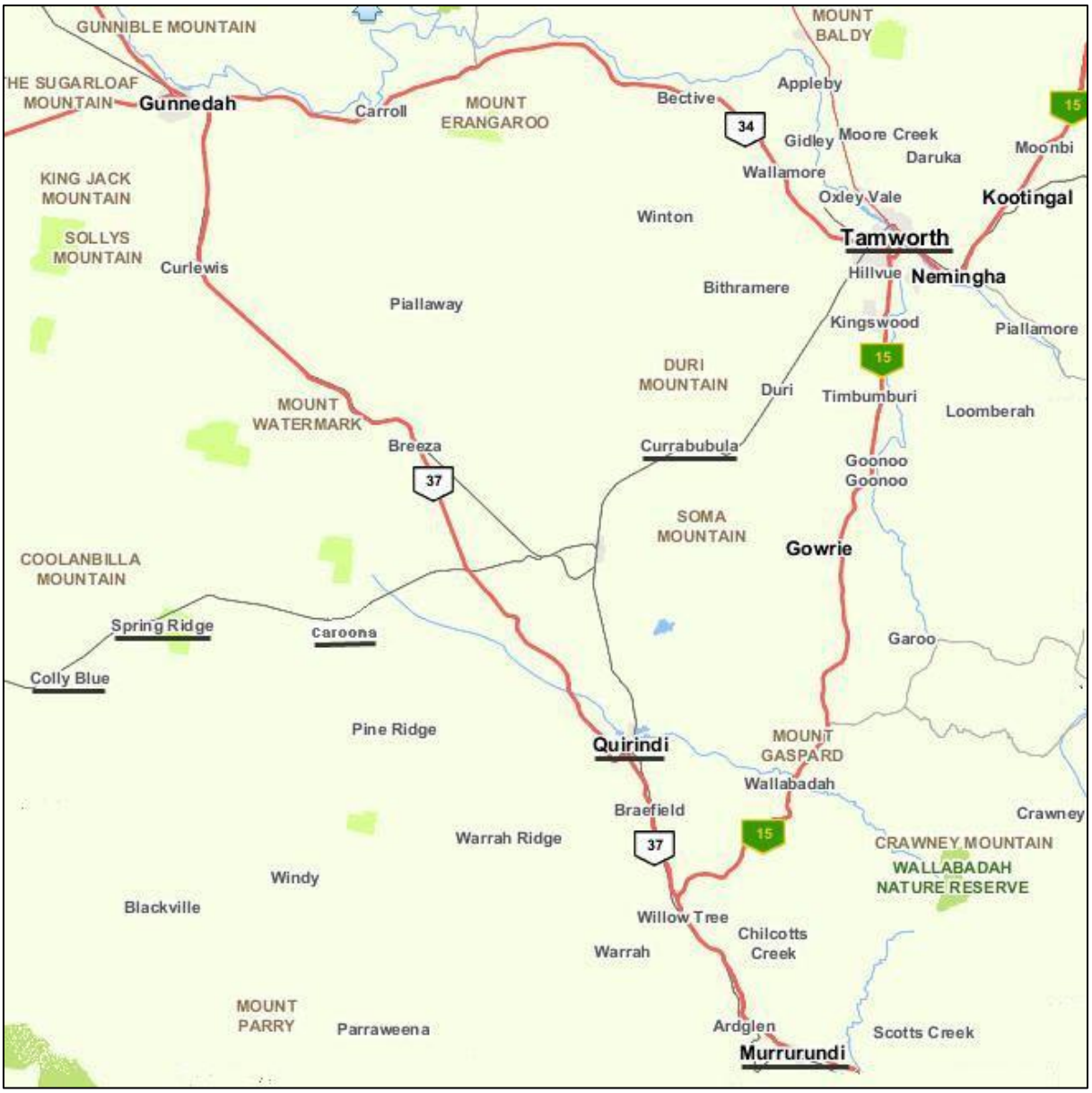

Figure 1 – Location map of the investigation area

Quirindi is the hub of the Liverpool Plains Shire Council, located a short distance off the New England Highway, 350 km north of Sydney and 60 km south of Tamworth. Werris Creek, north of Quirindi is a key railway town that links the main north rail line from Sydney to the northern rail line to Tamworth/Armidale and north western rail line to Gunnedah/Moree.

The area is supplied by a radial 66kV powerline (#813, 57km) that emanates from TransGrid's Tamworth 132/66kV bulk supply point substation and supplies three zone substations at Currabubula, Quirindi and Werris Creek as shown below in Figure 2. Two radial 33kV powerlines (#798 31km, #799 58km) from Quirindi zone substation supply a further four zone substations at Caroona, Colly Blue, Murrurundi and Spring Ridge and a private substation at Ardglen (Road and Maritime Services).

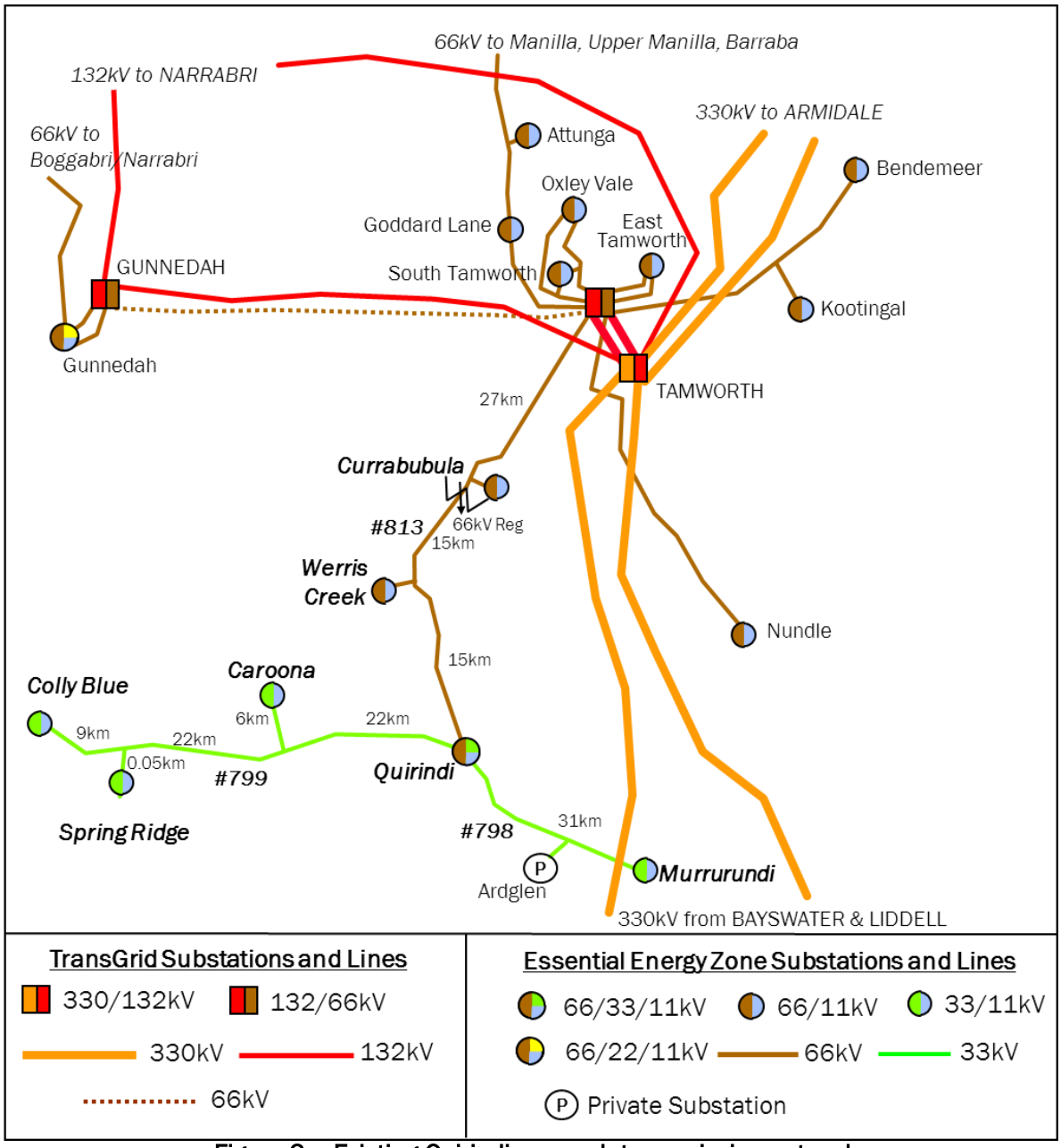

Figure 2 – Existing Quirindi area sub-transmission network

3.2 NETWORK DEMAND

The load in the Liverpool Plains area is mainly residential and commercial/industrial in the larger townships of Quirindi and Murrurundi and rural/agricultural in the surrounding rural areas and small towns of Caroona, Colly Blue, Currabubula and Werris Creek.

Demand information for the load is available from a combination of time based statistical meters, substation scada, zone substation reclosers and zone substation maximum demand indicators. The area is summer peaking, as high daytime ambient temperatures increase the demand for air-conditioning and cooling type loads.

Summer peaks are more onerous as they occur when the thermal ratings of subtransmission equipment are at their lowest point and the peaks are longer in duration. Figure 3 below shows the profile on the #813 66kV powerline for a recent summer day.

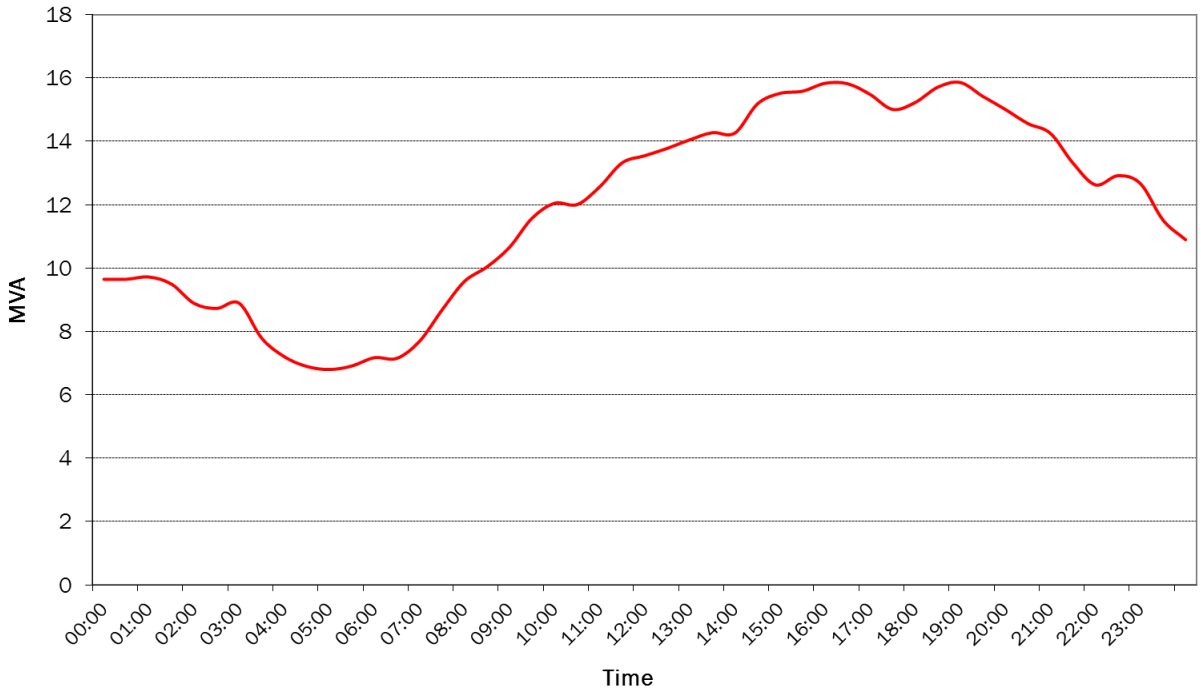

Figure 3 – #813 66kV powerline MVA profile (2/2/11)

Forecast demand on the Tamworth to Quirindi #813 66kV powerline is based on trends of historical demands at each of the zone substations. Summer load growth on the #813 66kV powerline is forecast to be 1.0% per annum or 100-200kVA per annum, based on trends of historical peak demands. The peak demand is influenced by a number of variables including ambient temperature, economic conditions, spot loads, price elasticity and responses to incentives such as the solar bonus scheme to install embedded generation.

Future peak demands in this region could be significantly affected by the development of coal mining in the area to the north west of Quirindi between Gunnedah and Caroona where there are several active coal exploration licences.

In addition to the site specific spot loads, new mine developments would result in increased electricity demand from associated residential, commercial and light industrial load growth, in the surrounding towns, particularly Quirindi.

Although the peak demand may reduce from one year to another it is expected over time the demand on this network will increase. Essential Energy will continue to monitor and forecast the peak demand on this network and to assess its impact on the needed network augmentations.

The historical and forecast summer peak demand on the #813 66kV powerline, excluding any allowances for potential new coal mining development, is shown in Figure 4 below.

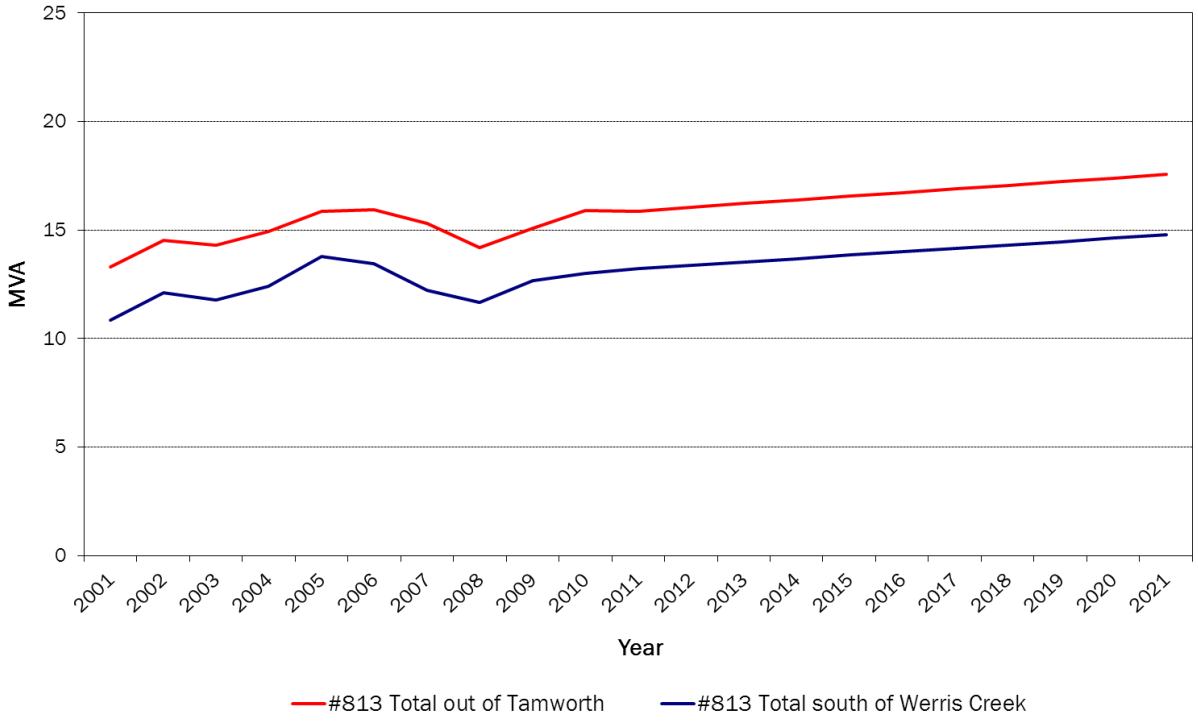

Figure 4 – Historical and forecast summer load on #813 powerline

3.3 NETWORK LIMITATIONS

3.3.1 Service Standards

Essential Energy's Network Planning Standards are underpinned by mandatory licence conditions for Distribution Network Service Providers (DNSP's) which, inter alia, set out reliability standards for sub-transmission and distribution networks. The licence conditions for Essential Energy specify N-1, one minute reliability levels for sub-transmission supply to loads equal to or greater than 15 MVA.

This condition in effect requires duplicate primary supply capability to enable supply to be either maintained or restored to the full load within one minute following the occurrence of any single credible contingency event at any time. The licence condition recognises that loads which have reached a maximum demand of 15MVA are sufficiently large to warrant full alternate supply. Reducing the load to below the nominated 15MVA limit is not an acceptable action.

Where a limited capacity alternate supply exists and subject to meeting various network operation and power quality requirements, it is acceptable to top up the shortfall in secure supply capacity for the risk period.

3.3.2 System Limitations

The Essential Energy network supplying the Quirindi area of NSW is subject to an N-1 security of supply constraint which requires consideration as outlined below.

The existing Tamworth to Quirindi supply is provided by a single (radial) 66kV line with a present load in excess of 15MVA which is expected to increase further over time. Essential Energy is required to provide a full capacity alternate supply to comply with its distribution licence conditions.

4 OPTIONS ANALYSIS

4.1 NETWORK OPTIONS

Essential Energy has sought to identify a range of technically feasible network and non-network options that could satisfy the network requirements.

When developing options to overcome actual or potential network constraints, Essential Energy initially assesses possible options against the requirements and then applies the regulatory test to those which satisfy them.

The network solution to provide the needed N-1 security of supply to the Quirindi area loads presently serviced by the #813 66kV feeder requires the construction of a second supply circuit. Options to achieve this are described in more detail below.

4.2 OPTION 1 – STAGED 66KV DUPLICATION (CONSTRUCT A SECOND TAMWORTH TO WERRIS CREEK THEN WERRIS CREEK TO QUIRINDI 66KV POWERLINE)

This option involves the initial construction of a second 66kV powerline (43km) between the TransGrid Tamworth 132/66kV bulk supply point substation and the Essential Energy Werris Creek 66/11kV zone substation. A new 66kV easement would be acquired which would likely be in proximity to the existing powerline. A new 66kV powerline would be built on the new easement. See Figure 5 below (Stage 1)

The existing Werris Creek 66/11kV zone substation has a tee connection to the #813 66kV powerline with only one 66kV circuit breaker and two 66/11kV transformers. To cater for a new 66kV powerline from Tamworth, the substation would have to be significantly upgraded with the installation of a 66kV busbar and circuit breakers to allow either a ring feed supply or restoration of supply within one minute on loss of either the existing or added 66kV powerline from Tamworth.

Construction of the new 66kV powerline from Tamworth to Werris Creek zone substation would be Stage 1 of a two stage project to provide the needed N-1 security of supply. It would relieve the existing N-1>15MVA reliability constraint on the #813 66kV powerline in the section between Tamworth and Werris Creek.

Stage 2 would be the construction of a second 66kV powerline (15km) between Essential Energy Werris Creek and Quirindi zone substations which would be required once the peak demand on this section of the #813 powerline reaches 15MVA. The Stage 2 works would be required around 2020/21 at historical growth rates, or sooner if new coal mining developments stimulate other new load developments. The 2020/21 date has been used in the calculation of the Present Value of Costs of this option.

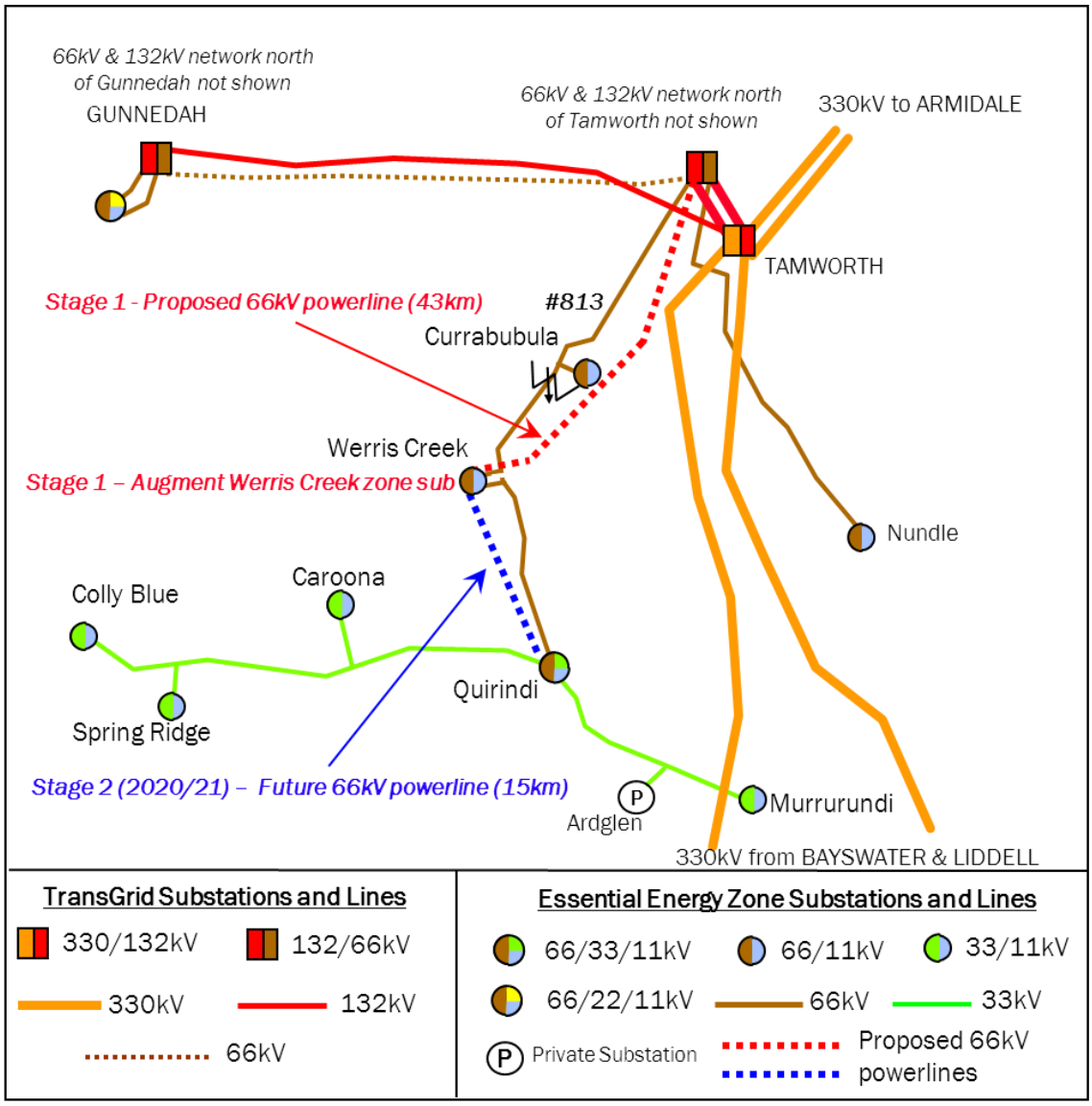

Figure 5 – Option 1: Staged 66kV duplication

As indicated in Section 5, the present value cost of this option has been assessed to be $21.2M.

4.3 OPTION 2 - TAMWORTH/QUIRINDI 66KV RING (CONSTRUCT A SECOND TAMWORTH TO QUIRINDI POWERLINE)

This option involves construction of a second 66kV powerline (58km) between the TransGrid Tamworth 132/66kV bulk supply point substation and the Essential Energy Quirindi 66/33/11kV zone substation to form a 66kV ring supply with the existing #813 powerline. A new 66kV easement would be acquired which most likely would be in proximity to the existing powerline. A new 66kV powerline would be built on the new easement (See Figure 6).

A new 66kV powerline circuit breaker and a bus section circuit breaker would be installed at Quirindi zone substation to give full redundancy at Quirindi with no loss of supply for either of the existing or proposed 66kV powerlines or a 66kV bus section fault.

As the majority of the peak load on the #816 66kV powerline is supplied from the Quirindi 66/33/11kV zone substation, construction of a new 66kV powerline from Tamworth to Quirindi will

fully address the N-1>15MVA security of supply constraint and no future subtransmission augmentation will be required in long term.

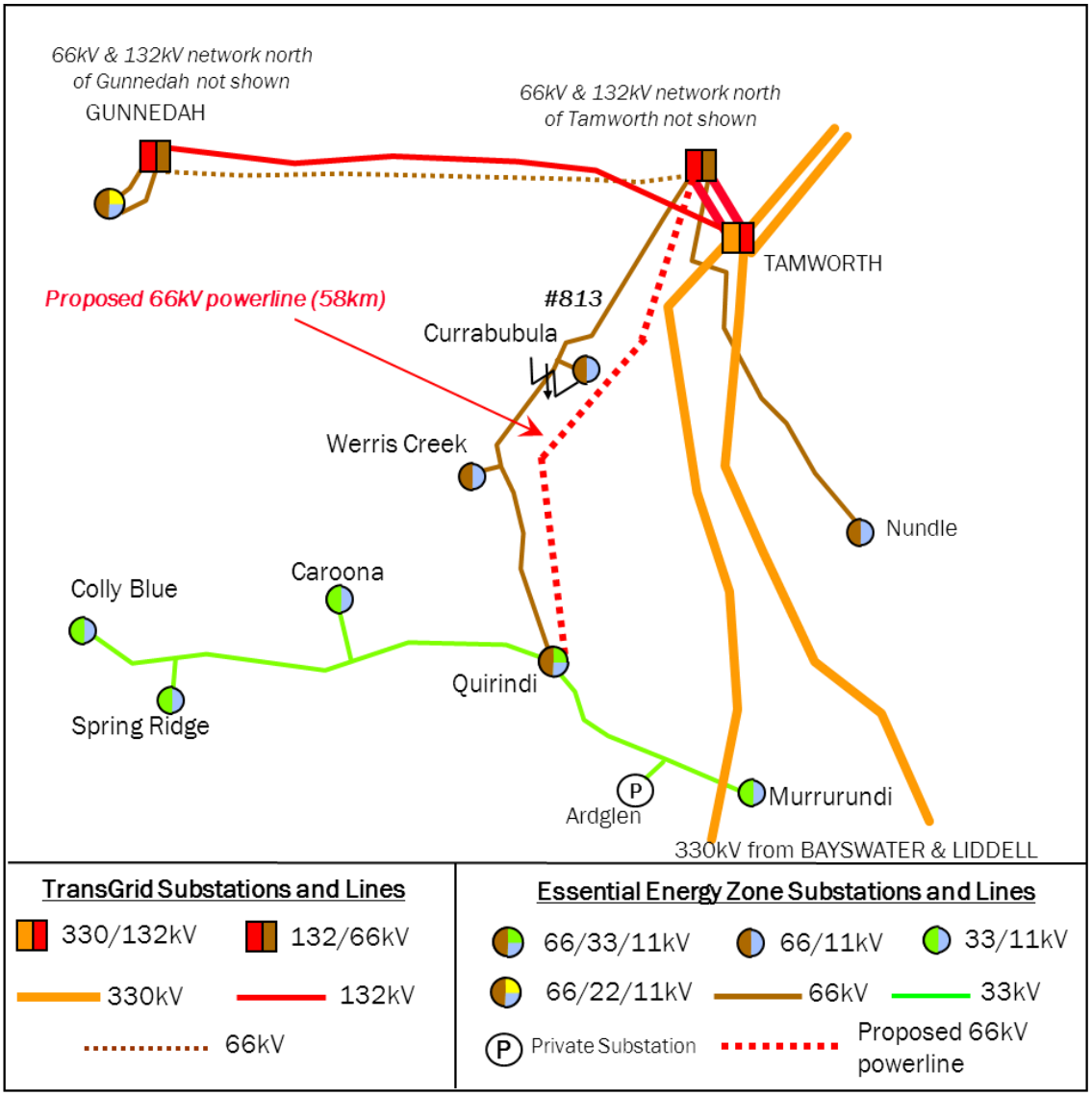

Figure 6 – Option 2 : Quirindi 66kV Ring

As indicated in Section 5, the present value cost of this option has been assessed to be $20.7M.

4.4 OTHER NETWORK OPTIONS CONSIDERED

Other supply side options were considered but not included in the final assessments as summarised below. These were rejected mainly on the basis of substantially higher costs with some also subject to network load supply and project delivery constraints.

a) Provision of a 66kV supply from Gunnedah

This option would require acquisition of a new easement and construction of a new 66kV powerline from the TransGrid Gunnedah 132/66kV substation with connection either directly to the Essential Energy Quirindi 66/33/11kV zone substation or via a reconstructed Caroona 33/11kV zone substation, utilising the Quirindi/Caroona line section which is constructed at 66kV but currently operating at 33kV and requiring conductor replacement to provide the needed load supply capacity.

Joint planning discussions with TransGrid have indicated that this option would be technically feasible in terms of the supply capacity available at Gunnedah to meet the potential (contingent) demand increase of 15+MVA and the "closed" operation of a Gunnedah/Quirindi/Tamworth 66kV tie. However, in comparison to the supply options ex Tamworth, this network arrangement would result in:

- an extra line construction cost of at least $4 - 5 Million (approx 25%) because of the additional 15km of route length (73km versus 58km to Quirindi) or substation and line reconstruction costs (Caroona/Quirindi)
- more complex network protection and operating requirements
- earlier future constraints on the Tamworth to Gunnedah 132kV transmission supply

b) Construction of a dual circuit Tamworth to Quirindi 66kV powerline (58km)

This option would involve the widening of the existing #813 66kV powerline easement and the construction of a dual circuit 66kV powerline adjacent to the existing line which would be dismantled on its completion. The dual circuit construction would add some $5 - 6Million (30%) to the single circuit construction costs. Further increases would result from the existing line dismantling requirements. A full length dual circuit construction would also result in some increased security of supply risk compared to supply from two single circuits.

c) Establish a 330/66kV substation at Murrurundi

This option would require the establishment of a 330/66kV substation at Murrurundi on the TransGrid Liddell –Tamworth 330kV powerline. The existing 33kV powerline from Quirindi to Murrurundi would be rebuilt at 66kV and the Murrurundi 33/11kV zone substation would be reconstructed to a 66/11kV substation. The supply capacity provided by this option would far exceed the present load supply needs whilst the cost would be some 50% greater than the 66kV upgrades from the existing Tamworth supply point.

4.5 NON-NETWORK OPTIONS

Assessment under the Demand Management Code of Practice (2004) and the National Electricity Rules have been undertaken. This assessment includes a 'Reasonableness' test to determine whether it would be considered 'reasonable' to expect that a non-network measure could be cost effectively employed to defer or avoid the network investment.

The Essential Energy 'Reasonableness' test includes an assessment of the nature and level of load at risk together with the potential financial payments available to support a non-network alternative to a network augmentation.

The proposed network project work to construct a second 66kV supply from Tamworth to Quirindi would address the N-1 reliability constraint by providing two sources of supply, either of which could be selected to supply the load within the allowed one minute change over interval.

The assessed present value cost of this option is $20.7M which equates to an annualised cost of approximately $2.07M or approximately $130/kVA for the 16+MVA which would be available to

provide a non-network solution able to support the total load demand on the existing Tamworth to Quirindi #813 66kV powerline.

Based on the above, Essential Energy considers that it is not reasonable to expect that a non-network solution could either technically or cost effectively avoid or defer the identified network option. This assessment is further supported by the limited responses received to the consultation notice and associated consultation report.

5 PRELIMINARY APPLICATION OF THE REGULATORY TEST

The regulatory test has been applied to the nominated network option with the result summarised in the following sections.

5.1 FORM OF THE REGULATORY TEST

The option covered by this Application Notice is a reliability augmentation and the regulatory test is to be applied in accordance with clause 1(a) of the test:

(a) in the event the option is necessitated solely by the inability to meet the minimum network performance requirements set out in schedule 5.1 of the Rules or in relevant legislation, regulations or any statutory instrument of a participating jurisdiction - the option minimises the present value of costs, compared with a number of alternative options in a majority of reasonable scenarios;

The values used as the basis for the evaluation are shown below in Table 1.

Parameter	Base Case Value	Sensitivity Checks at
Real Discount Rate	9%	6% and 12%
Marginal Annual O&M Cost	2% of Capital Cost	1% and 3% of Capital Cost
Capital Costs	Nominal Value	±25% variation

Table 1 – Values Used in Financial Analysis

5.2 BASE CASE ANALYSIS

The Present Value of Costs for Options 1 and 2 is shown below in Table 2.

Option	Description	PVC ($M)	Rank
1	Staged 66kV duplication (Construct Tamworth to Werris Creek and Werris Creek to Quirindi 66kV powerline)	21.2	2
2	Tamworth/Quirindi 66kV ring (Construct Tamworth to Quirindi 66kV powerline)	20.7	1

Table 2 – Comparison of Options for the Base Case

5.3 SENSITIVITY ANALYSIS

The results of the sensitivity analysis performed over a range of cases are shown below in Table 3. The sensitivity analyses cover the parameters shown in Table 1.

Sensitivity Case	Option 1	Rank	Option 2	Rank
Base Case	21.2	2	20.7	1
12% Discount Rate	18.8	1	19.0	2
6% Discount Rate	24.6	2	23.3	1
25% Increase in Costs	26.5	2	25.9	1
25% Decrease in Costs	15.9	2	15.6	1
1% Decrease O&M Costs	19.3	2	18.9	1
1% Increase O&M Costs	23.1	2	22.6	1

Table 3 – Results of Sensitivity Analysis

6 CONCLUSION

No written submissions were received in response to the published project Consultation Notice and project Consultation Information Report. This supports Essential Energy conclusion that it is not reasonable to expect that a non-network option could provide either a technically or financially competitive alternative to a network option.

As such, subject to the consideration of any valid written submissions received in response to the invitation included in Section 1.1 of this Draft Report, Essential Energy propose to proceed with the construction of a second Tamworth to Quirindi 66kV line as the most workable and least cost option to correct the constraints identified in relation to the electricity supply to the Quirindi area of NSW. This option will also provide scope to facilitate the connection of new spot loads if or as they are confirmed.

7 APPENDIX A

Base Case Present Value of Costs: The figures shown are real 2012 dollars.

7.1 OPTION 1 – STAGED 66KV DUPLICATION (CONSTRUCT A SECOND TAMWORTH TO WERRIS CREEK THEN WERRIS CREEK TO QUIRINDI 66KV POWERLINE)

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Capital Expenditure	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2050/51
Acquire Tamworth-Werris Ck easement(43km)	3.23									
Construct Tamworth-Werris Ck 66kV powerline(43km)		11.05								
Augment Werris Ck zone substation		2.80								
Acquire Werris Ck-Quirindi easement(15km)								1.13		
Construct Werris Ck-Quirindi 66kV powerline(15km)									4.05	
Feeder bay & bus sectionalisation at Quirindi									0.76	
Feeder bay at Werris Ck (CB & panel only)									0.19	
Increase in O&M	0.00	0.06	0.34	0.34	0.34	0.34	0.34	0.34	0.36	0.46
Avoided O&M	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Expenditure	3.23	13.91	0.34	0.34	0.34	0.34	0.34	1.47	5.36	0.46
PRESENT VALUE COST ($Million)	**21.20**									

7.2 OPTION 2 - TAMWORTH/QUIRINDI 66KV RING (CONSTRUCT A SECOND TAMWORTH TO QUIRINDI POWERLINE)

Capital Expenditure	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2050/51
Acquire Tamworth to Quirindi easement (58km)	4.35									
Construct Tamworth-Quirindi 66kV powerline(58km)		14.80								
Feeder bay & bus sectionalisation at Quirindi		0.76								
Increase in O&M	0.00	0.09	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
Avoided O&M	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Expenditure	4.35	15.65	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
PRESENT VALUE COST ($Million)	**20.74**									