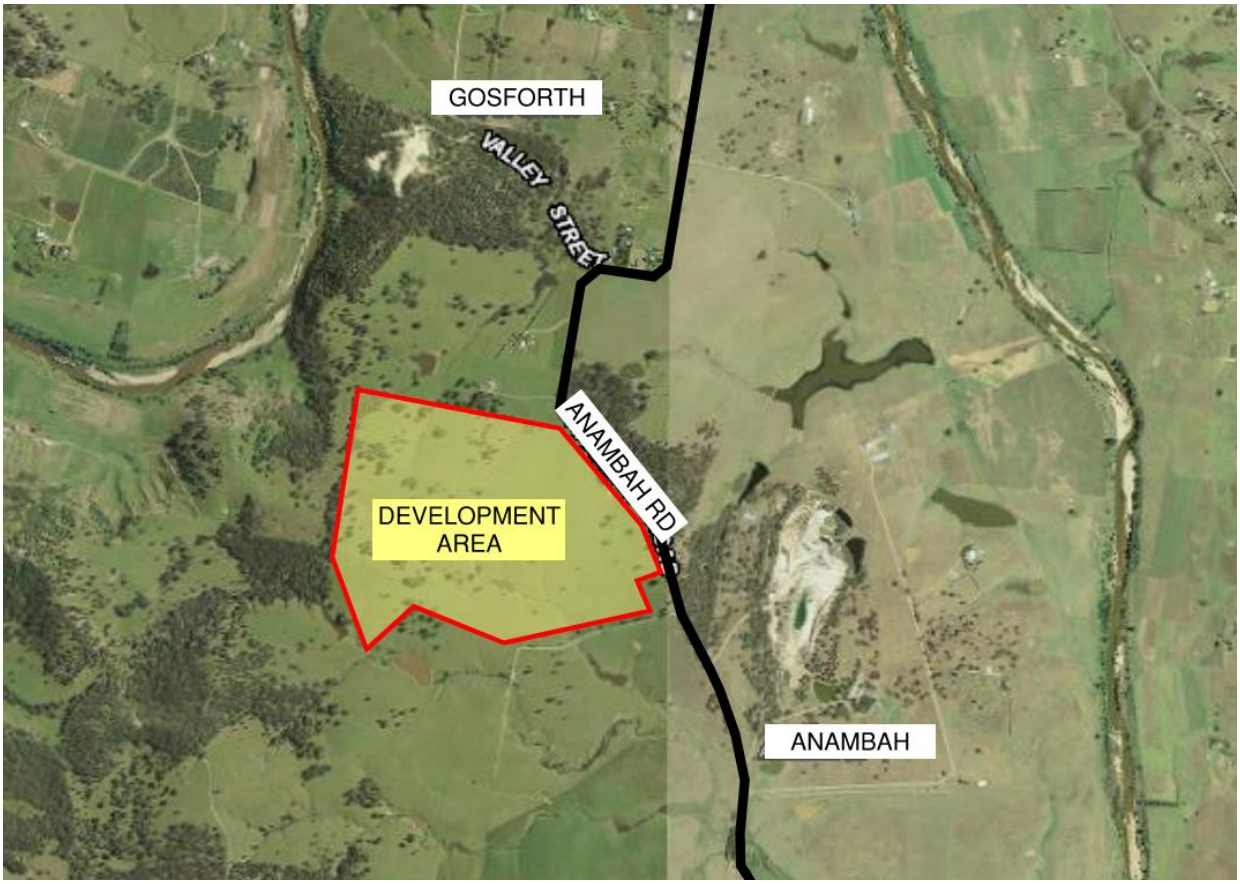
Electrical Supply Investigation for "The Vision"

559 Anambah Rd Gosforth

March 2024



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DOCUMENT CONTROL

Version	Date	Author	Reviewer	Revision Details
1	25/03/2024	Ben Dennis	Steve Goman	Initial Issue
2	22/08/2024	Ben Dennis	Steve Goman	Updated for Preliminary Enquiry Submission

CONTENTS

1) EXECUTIVE SUMMARY

Power Solutions were engaged to investigate supply options for the development of 559 Anambah Rd, Gosforth. Following a review of the existing network it was determined there is limited spare capacity on the HV network in the area and there is a strong possibility of requiring significant upgrades if the capacity is not secured soon. Capacity can be secured by negotiating a contract with Ausgrid.

Four supply options were identified, depending on the amount of available capacity and the timeline of the development:

1. Upgrade existing feeders (approx. 1 year and $1.5M)
2. Install a new feeder from Rutherford Zone Sub to the site (approx. 1.5 years and $5M)
3. Upgrade Rutherford Zone Sub (approx. 5 years and $25M)
4. Wait for Ausgrid's new zone sub and install new feeder (approx. 12 years and $8M). Zone sub timing and location unconfirmed. Cost and time may differ greatly from the estimates provided.

Power Solutions is lodging a Preliminary Enquiry to Ausgrid to confirm how much capacity is available and which option/s will be realistic. Ausgrid will provide an official response within 4 weeks.

2) BACKGROUND

The site is to be redeveloped as a residential subdivision of approximately 1000 lots. To facilitate this development, it will be necessary to determine if the existing electrical distribution network in the area can be augmented to allow for the additional load or if significant High Voltage upgrades will be required.

From preliminary discussions with regarding many new development projects around the Lochinvar area, Ausgrid are aware of the limited spare capacity of Rutherford Zone Substation.

Ausgrid have advised in the past 6-12 months that Rutherford Zone Substation is approaching full capacity, and they are planning to install a new Zone Substation somewhere between Rutherford and Branxton. The planning, design and construction of a Zone Substation may around 10 years.

A Preliminary Enquiry to Ausgrid will provide an up-to-date confirmation of the capacity available and feeder loading. Lodging a connection application and negotiating a contract with Ausgrid will allow the developer to secure some of the spare capacity to supply at least some of the development.

It needs to be noted here that other developers in the area will be subject to the same limitations and Ausgrid traditionally allocate capacity in a "first come first served" order. Any delays before submitting an application and negotiating a contract with Ausgrid could dramatically impact the capacity available.

3) SCOPE

Power Solutions Pty Ltd have been engaged by Northrop Pty Ltd to complete the following:

- Assess the current site infrastructure and services (electrical)
- Provide a summary of likely connection and infrastructure augmentation requirements to support the development (including spatial allowances that should be made if any)
- Submit a Preliminary Enquiry to Ausgrid to confirm the available capacity and necessary upgrades

This report presents the findings for this scope of works.

4) ASSESSMENT OF EXISTING ELECTRICAL INFRASTRUCTURE

After a review of the existing infrastructure via WebGIS, the following assessment was determined.

Gosforth and Anambah are currently serviced by 11kV feeder 29878 that originates at Rutherford Zone Substation and runs via Lochinvar and Windermere. This feeder crosses the Hunter River twice to come into Gosforth and feed south to Anambah where it terminates. This is a very long feeder that tees off multiple times and services a large area. It reaches as far as Lovedale and Lamb's Valley.

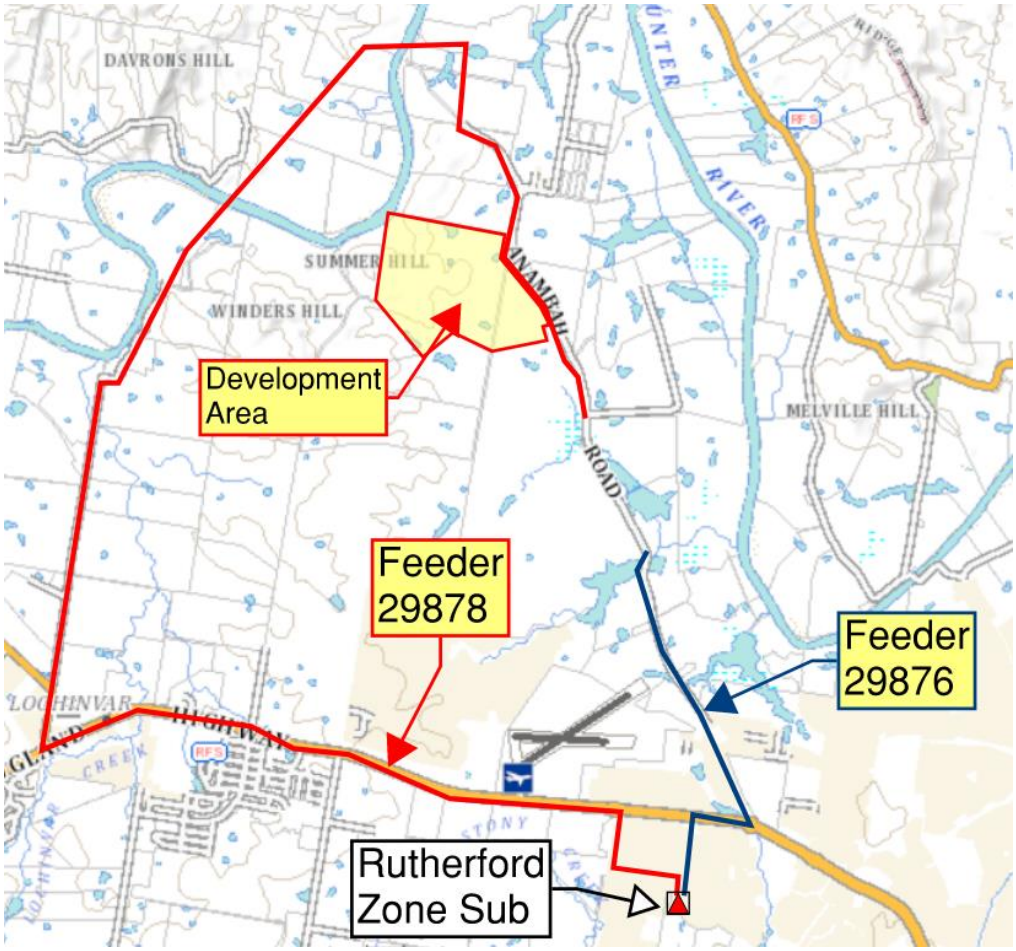
There is a second feeder (29876) that runs from Rutherford Zone Substation and turns up Anambah Road from the New England Highway. There is approximately 1.5-2.0km of Anambah Rd without HV powerlines between the ends of the two feeders. Spare capacity on these two feeders appears to be limited.

Note that a development of 1000 residential lots will need approximately 3.5 MVA of power, which equates to approximately 184 amps at 11kV. Adding commercial lots will increase this load.

For a new development like this, Ausgrid will require two alternative supplies in the area so that customer supply can be maintained during feeder maintenance and unplanned outages.

Rutherford Zone Substation is a 33/11kV substation with two 30MVA transformers and 11kV switchgear with spaces for 12 feeders, of which only one is spare (feeder 29881). The substation yard appears to have space to allow a third transformer and additional 33kV bus if required. The two existing 33kV feeders supplying Rutherford Zone Substation are overhead lines from Kurri Kurri Sub-Transmission Substation.

Simplified feeder routes sketch is shown in the figure below. This sketch shows indictive routes from Rutherford Zone Sub to the investigation area only and does not include tee-offs servicing other areas.



5) ELECTRICAL SUPPLY OPTIONS

5.1 OPTION 1 – Upgrade existing 11kV Feeders

If there is sufficient capacity available on the existing 11kV feeders 29878 and 29876, these can be utilised to service the development. This will likely mean upgrading overhead conductors along sections of both feeders as well as extending feeder 29876 along Anambah Rd to connect to 29878. This will provide the alternative supply for maintenance.

Note that Ausgrid need to confirm capacity on both feeders before this option can be confirmed.

5.2 OPTION 2 – Install New 11kV Feeder

If there is insufficient capacity on the existing feeders, Ausgrid may determine the development needs a new feeder to be installed from Rutherford Zone Substation. This will likely involve installing approximately 5.5km of underground cable to the site, following a similar route to feeder 29876. There will likely be some smaller upgrades required to one or both existing feeders in the area to allow interconnection.

Note that Ausgrid need to confirm capacity on existing feeders and Rutherford Zone Substation before this option can be confirmed.

5.3 OPTION 3 – Zone Substation Upgrades

If Ausgrid determine there is insufficient spare capacity on the feeders and the zone sub, the next option will be to upgrade the Rutherford Zone Substation. This will involve installing a new 33kV feeder from Kurri Kurri Sub-Transmission Substation to Rutherford Zone Substation, adding a transformer and associated switchgear. This will add capacity to allow connection of a new 11kV feeder per Option 2 above.

This option will come at significant cost to the developer and will have a long lead time for design and construction. The implications for this option should be closely considered before progressing. If some capacity can be secured using either of the first two options above, it may be beneficial to wait for Ausgrid to complete construction of their new Zone Substation. This will depend on things like development staging timeline, amount of existing capacity available etc.

5.4 OPTION 4 – Wait for New Zone Substation

This option will best suit a development timeline that is in the infancy of planning that can wait 10 years for Stage 1 to be energised, or when the cost implications of the other options make the development unfeasible.

This option will still come with some 11kV network installation/augmentation work, but at a significantly reduced scope from Option 3.

Some risks of this is option are:

- New Zone Substation timeline is currently unconfirmed. Expecting approximately 2035
- New Zone Substation location unconfirmed. There may still be large costs in running a new feeder from Lochinvar, Harpers Hill, or Greta if required.

6) OPTIONS COST AND TIME ESTIMATES

Note that the costs below are based on market data and are only estimates. The fees listed below are combined estimates of design fess, Ausgrid fees, construction fees. For budgeting purposes, it is advisable to add 50% to these figures.

COST AND LEAD TIME ESTIMATES		
Description	**Years**	**Cost**
Option 1 – Upgrade existing feeders	1	$1,500,000
Option 2 – Install new feeder	1.5	$5,000,000
Option 3 – Zone Substation upgrades	5	$25,000,000
Option 4 – Wait for new zone substation (incl new 11kV feeder)	12	$8,000,000

7) CONCLUSIONS

There is limited spare capacity on the 11kV feeders coming from Rutherford Zone Sub. The two existing feeders in the area can be upgraded to use all remaining capacity, which may or may not be enough to supply the development.

If more power is needed, Rutherford Zone Sub has one spare circuit breaker for connection of a new feeder. This would involve installing approximately 5.5km of 11kV cable from Rutherford to the development site. This will be dependent on the maximum capacity of the substation.

A preliminary enquiry has been submitted to Ausgrid to determine the capacity of the network and the upgrades required.