Regulatory Test – Request for Information - Addendum

Emerging Distribution Network Limitations in the Gracemere Area

9 September 2014

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Purpose of Addendum

In December 2013, Ergon Energy Corporation Limited (Ergon Energy) published a Request for Information for the Gracemere area in Central Queensland. Since that time, Ergon Energy's Distribution Authority has been amended, changing the Security of Supply Criteria under which network investment planning is undertaken. The new Security of Supply Criteria, are underpinned by an economic, probabilistic, customer value based approach to reliability and are aimed at increasing asset utilisation in a controlled manner that balances network expenditure and performance. It is intended that the new Criteria will improve customer value by reducing the growth and cost of network assets.

In line with these changes, Ergon Energy has revisited the network investment requirements for the Gracemere area, and has identified a material change in those requirements. As a consequence, Ergon Energy has decided to publish this Addendum to the Request for Information, detailing the new conditions and requirements.

This Addendum is intended to be read in conjunction with the original Request for Information[1], as it does not contain all relevant information (such as, for example, the criteria that proposed solutions must meet).

[1] https://www.ergon.com.au/__data/assets/pdf_file/0005/181832/Gracemere_RFI.pdf

Executive Summary

Ergon Energy is responsible (under its Distribution Authority) for electricity supply to the Gracemere area in Central Queensland. We have identified emerging limitations in the electricity distribution network supplying the area. The loads on Ergon Energy's Malchi 66/11kV Zone Substation (which supplies the entire Gracemere area) and 11kV network have progressively increased to the point that meeting the minimum standards for reliability of supply will not be possible beyond 2016/17, if no action is taken.

The load on Malchi substation is already in excess of its N-1 capacity and as such, any transformer contingency may result in customer load shedding. The load is also approaching the N capacity of the substation, and is anticipated to exceed this during the summer of 2020/21 under "normal" summer conditions (POE50) or as early as 2017/18 under extreme summer conditions (POE10). As such, failure to act will result in unserved customer energy during "system normal" conditions.

If no action is taken, the Gracemere network will not be compliant with the requirements under the recently mandated "Safety Net" component of the Security Criteria from the summer of 2016/17. This non-compliance is forecast to grow in line with network demand growth from 1.0MVA to 8.5MVA during the summer of 2024/25. The medium voltage distribution network is also expected to exceed the Security Criteria loading levels during the summer of 2021/22.

Initial modelling indicates that a significant network augmentation is likely to be justified during the study period; the timing of which, however, is heavily dependent upon the cost the preferred internal option(s), the cost of any alternatives available and the benefits delivered from each.

Note that is all cases, changes in forecast network demand, increases in local load under control, changes to network transfer capability and/or other factors, will result in changes to the forecast non-compliance and thus the level of response required to address it.

A decision is required by January 2015 if the initial stage of any option involving significant construction is to be completed by 1 November 2016.

This Addendum is a further Request for Information where Ergon Energy is seeking updated/new information about possible solutions to the (adjusted) emerging limitations, which may be able to be provided by parties other than Ergon Energy.

Submissions in writing (electronic preferably) are due by 4 November 2014 and should be lodged to:

Attention: Network Development

Email: regulatory.tests@ergon.com.au

Updated information will be provided on our web site:

https://www.ergon.com.au/network/network-management/network-infrastructure/regulatory-test-consultations

For further information and inquiries please submit to the email address above.

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Tables and Figures

1. Changes to Reliability Standards

Ergon Energy was notified in March 2014 that the Queensland Government had made a decision to implement reforms to the electricity network reliability standards, consistent with the recommendations of the Inter-Departmental Committee on Electricity Sector Reform and the Independent Review Panel on Network Costs.

Specifically, from 1 July 2014, these reforms:

1) Remove the requirement to comply with N-1 planning standards; and,
2) Require that Distributors take an economic, probabilistic and customer value-based approach to building network for reliability purposes; and,
3) Retain the Minimum Service Standards (i.e. a set of target reliability performance indicators), while adding an additional set of "Safety Net" measures which place caps on the maximum size and duration of customer supply interruptions.

Along with changes to transmission system requirements, these changes are forecast to save Queensland in the order of $2 Billion over the next 15 years, applying downward pressure on electricity network charges[2].

1.1 Safety Net

Under the mandated Safety Net measures, Gracemere is classified as an "Urban" location and as such, following an "N-1" contingency event, the load not supplied must be:

- Less than 20 MVA after 1 hour;
- Less than 15 MVA after 6 hours;
- Less than 5 MVA after 12 hours; and
- Fully restored within 24 hours

There are four important factors to note under Safety Net:

a) For network planning purposes, response targets are based upon the maximum demand for a POE50[3] forecast
b) The magnitudes and timelines use a sliding scale: for example, for an outage of 25 MVA, 5 MVA must be restored within 1 hour, a further 5 MVA by hour 6, another 10 MVA by hour 12 and the final 5 MVA before hour 24.
c) During an actual outage, Ergon Energy will always endeavour to restore supply as early as can be safely achieved. The timelines above are "planned for" upper limits and as such, during a typical outage, actual customer interruption magnitude and duration will typically be less than the upper limit (in many cases, no loss of supply would occur at all). For example, while 5 MVA can be "unsupplied" for 24 hours, due to the cyclic nature of network loading, in most locations supply to all customers would typically be restored during the evening/night (noting that the item of plant may have not yet been repaired/replaced). Note however, occasionally, further loss of supply may occur during the high demand period on the following day, while the failed item of plant is still being repaired/replaced, however full supply is to be restored within 24 hours.
d) Large customers with an authorised demand above 1.5MVA, who have not paid for an N-1 supply, may be shed during an outage and do not count against the Safety Net targets.

[2] http://www.dews.qld.gov.au/policies-initiatives/electricity-sector-reform/supply/electricity-network-reliability-standards

[3] Probability of Exceedance 50%: a forecast that has a 50% chance of being exceeded in any one year; i.e. an "average" year.

1.2 Value of Customer Reliability

The Value of Customer Reliability (VCR) is a "*measure, or index, [that] indicates what different types of customers (residential, commercial and industrial) are prepared to pay to maintain reliable electricity supplies.*"[4]

VCR forms the basis of the "economic" approach to planning for network reliability. Project costs for proposed network augmentation are compared against the improvement in network reliability they create; at the point where the benefit (i.e. the customer's willingness to pay for that reliability) exceeds the annualised cost of the augmentation, then the project is justified under this approach.

The significant difference between this approach and the previous "N-1" prescriptive standards is that there is no level of loading on a network element that automatically triggers an augmentation; the timing and form of a network reliability improvement is highly dependent of the price of the project and the benefits generated.

[4] FACT SHEET: Having Your Say on Power Reliability, Australian Energy Market Operator (AEMO), March 2014, http://www.aemo.com.au/Consultations/National-Electricity-Market/Open/~/media/Files/Other/consultations/nem/VCR_FACT_SHEET_NOVEMBER_20132_ELEC.ashx

2. Updated Emerging Distribution Network Limitations

In addition to updating the parts of the Request for Information that have changed since publication, Ergon Energy also deemed it prudent to add more information about the exact nature of the existing network load and the identified emerging constraints. It is hoped that this will enhance the ability of potential respondents to offer solutions that address the specific network constraints, at the lowest cost.

2.1 Network Capability and Configuration

The study area discussed in this Addendum is supplied by the Malchi 66/11kV Zone Substation (see Figure 1, below) which in turn is supplied from Egans Hill Bulk Supply substation (EGHI) via a single 66kV feeder (“From Ehbs to Gass” and “From Gass to Mass T”) through Gavial Switching Station (GAVI).

The “N-1” rating of Malchi Zone Substation is 13.1MVA and the “N” rating of the substation is 22.6MVA. Note that the N-1 rating has been revised up from 12.0MVA since publication of the Request for Information.

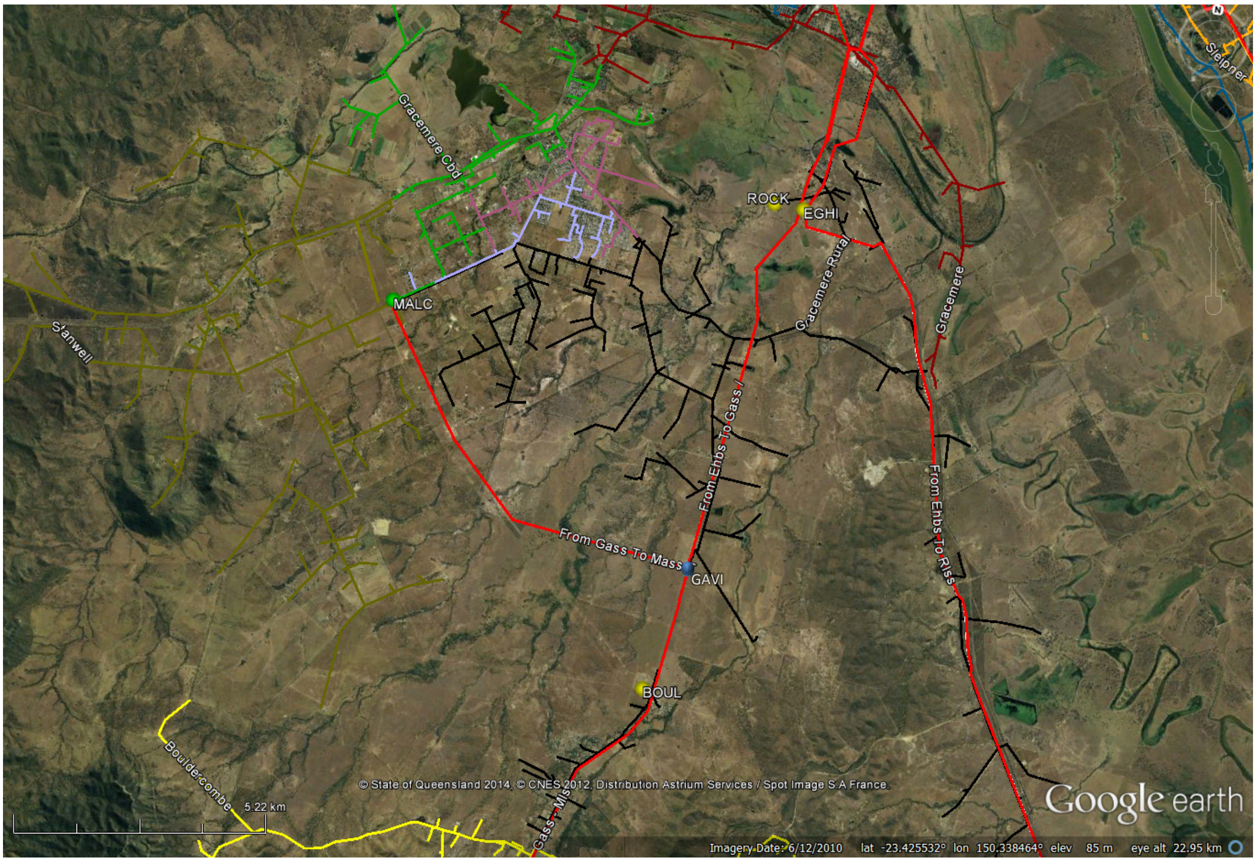

Figure 1 - Gracemere Distribution and Subtransmission Network

Figure 1 also shows the configuration of the distribution feeders (and subtransmission feeders in bright red) in the area and the location of back up supply. Table 1, below shows the names/colours of the feeders shown and where those feeders are supplied from.

Note specifically that the “Gracemere 11kV” feeder is supplied from Rockhampton South Zone Substation and can currently provide approximately 1.0MVA of backup on the Gracemere CBD feeder. Some backup may be available from Bouldercombe feeder, however the distances are significant and the network is already stretched in that direction.

Feeder	Supplied from
Gracemere 11kV	Rockhampton South ZS
Gracemere CBD 11kV	Malchi ZS
Gracemere North 11kV	Malchi ZS
Gracemere Town 11kV	Malchi ZS
Gracemere Rural 11kV	Malchi ZS
Stanwell 11kV	Malchi ZS
Bouldercombe 11kV	Mount Morgan ZS
Various 66kV feeders	

Table 1 - Feeder Colours/Names and Point of Supply

2.2 Network Load, Makeup and Forecast

The load at Gracemere is predominantly composed of residential customers, with some commercial load, as seen in Table 2, below.

Sector	Customers[5]	
	Count	Percentage
Domestic	4984	92.5%
Commercial	339	6.3%
Industrial	6	0.1%
Rural	59	1.1%
Total	**5388**	

Table 2 - Customer Mix

The daily load curve is summer peaking, driven most strongly by residential air conditioning during the late afternoon and evening, and shows a reduction in daytime demand due to a relatively high penetration of photovoltaic (PV) systems (Figure 2and Figure 3).

[5] A "customer" in this context refers to a connection point, not an individual person.

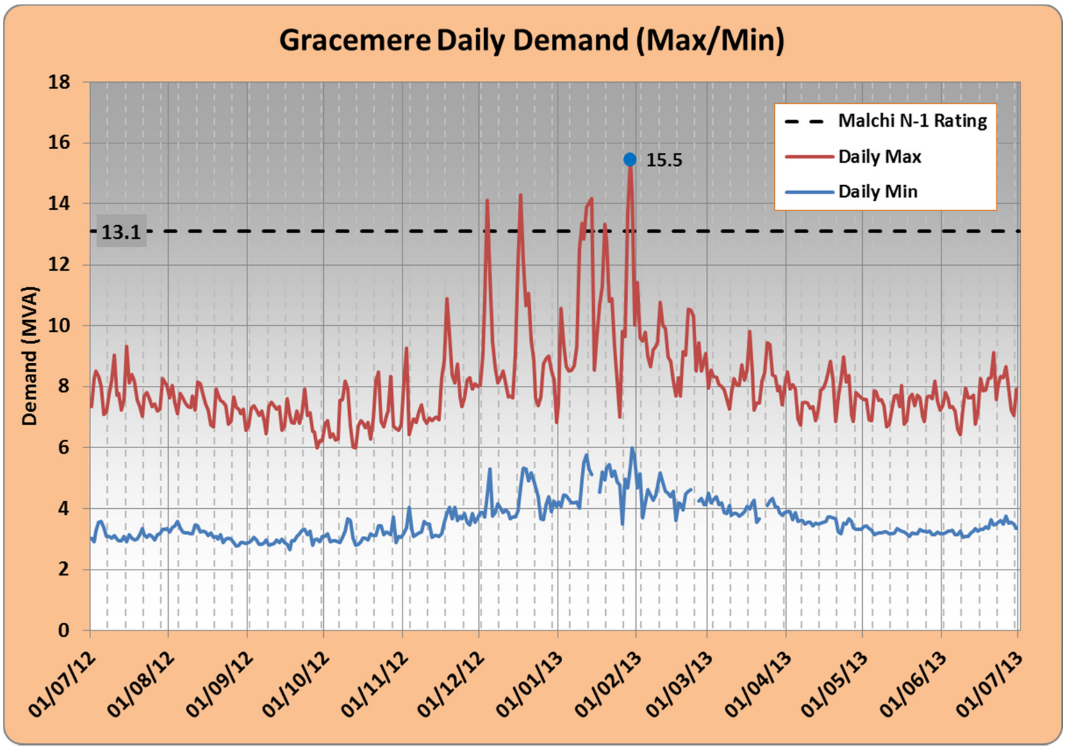

Figure 2 - Gracemere Daily Demand (Max/Min)

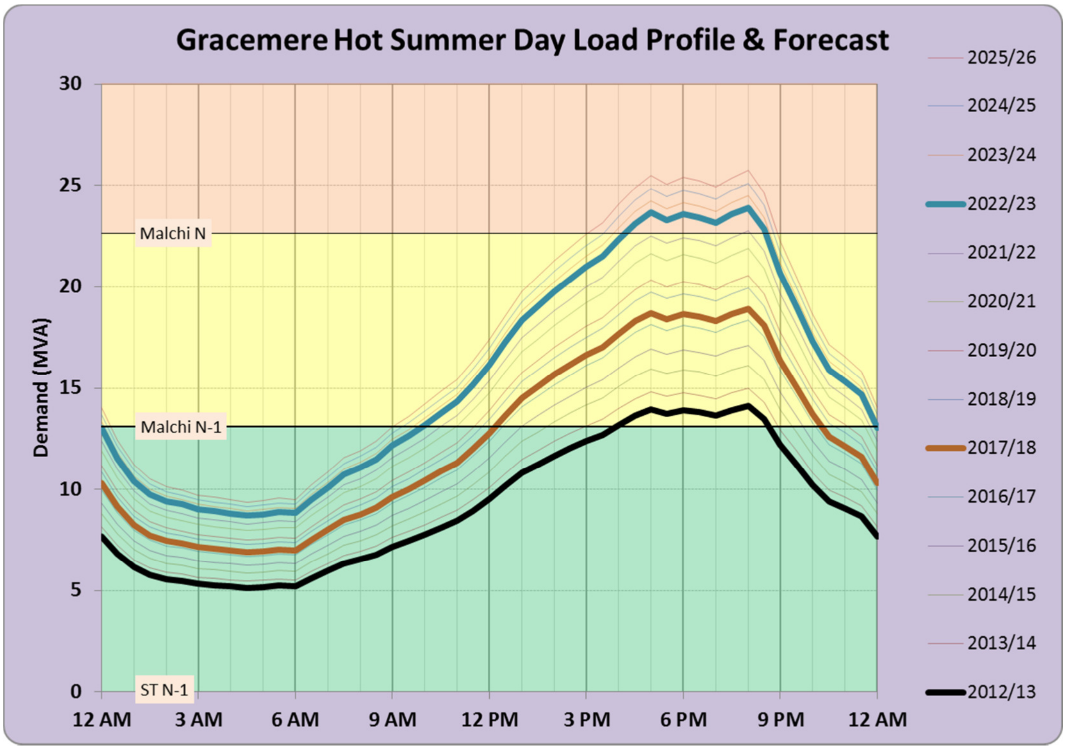

Figure 3 –Gracemere Hot Summer Day Load Profile & Forecast (POE50)

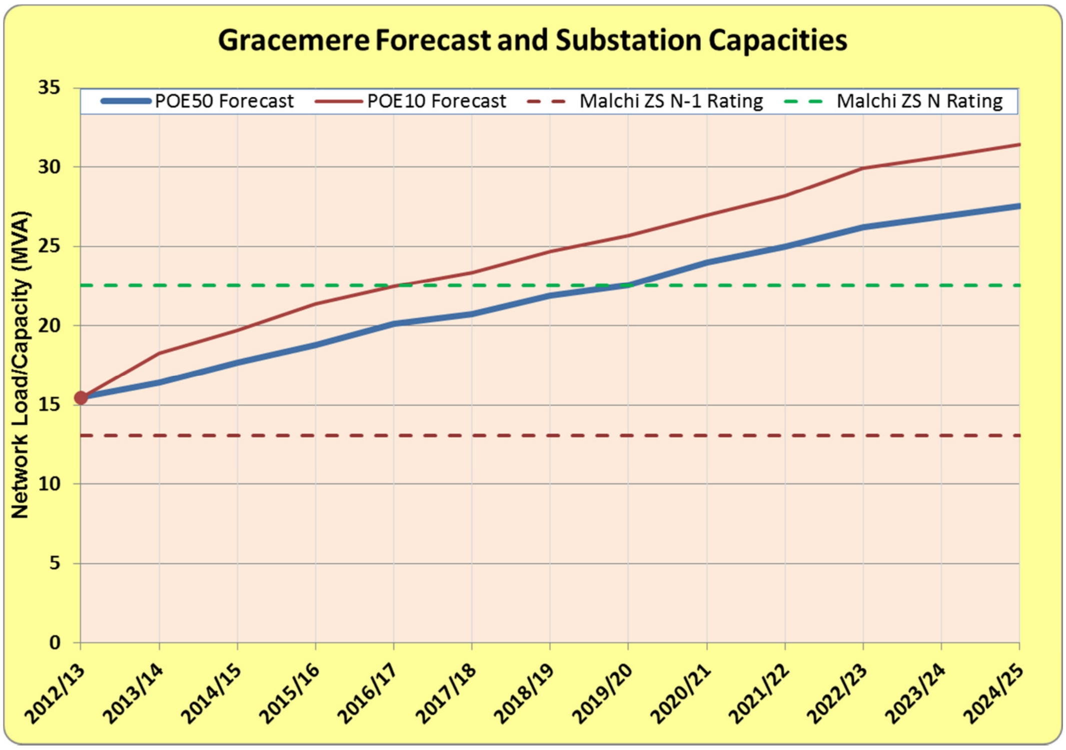

Figure 4 - Gracemere Forecast and Substation Capacity

It can be seen in Figure 4, above, that Malchi Zone Substation is already in excess of the N-1 rating during the summer peak period and is forecast to exceed the "N" rating by the summer of 2020/21, during a POE50 peak day. During extreme (POE10[6]) conditions, the substation capability could be exceeded as early as 2017/18.

2.3 Load Duration and Capacity Exceedance

Figure 5 shows the load duration curve for Gracemere (the black line), together with the "N" and "N-1" ratings of the Malchi Zone Substation. It also shows the load duration forecast, assuming that the forecast growth rates apply equally across all times of the year and that the make up of demand and localised generation remains fixed.

As already discussed, the load curve for Gracemere is already affected by the high penetration of PV systems and this would be likely to continue to grow. Additionally, new commercial or industrial load, or other changes in residential energy consumption patterns will also change this. However, as the peak demand period in Gracemere occurs during the early evening, these are expected to have limited impact.

[6] Probability of Exceedance 10%: a forecast that has a 10% chance of being exceeded in any one year; i.e. an "extreme" year.

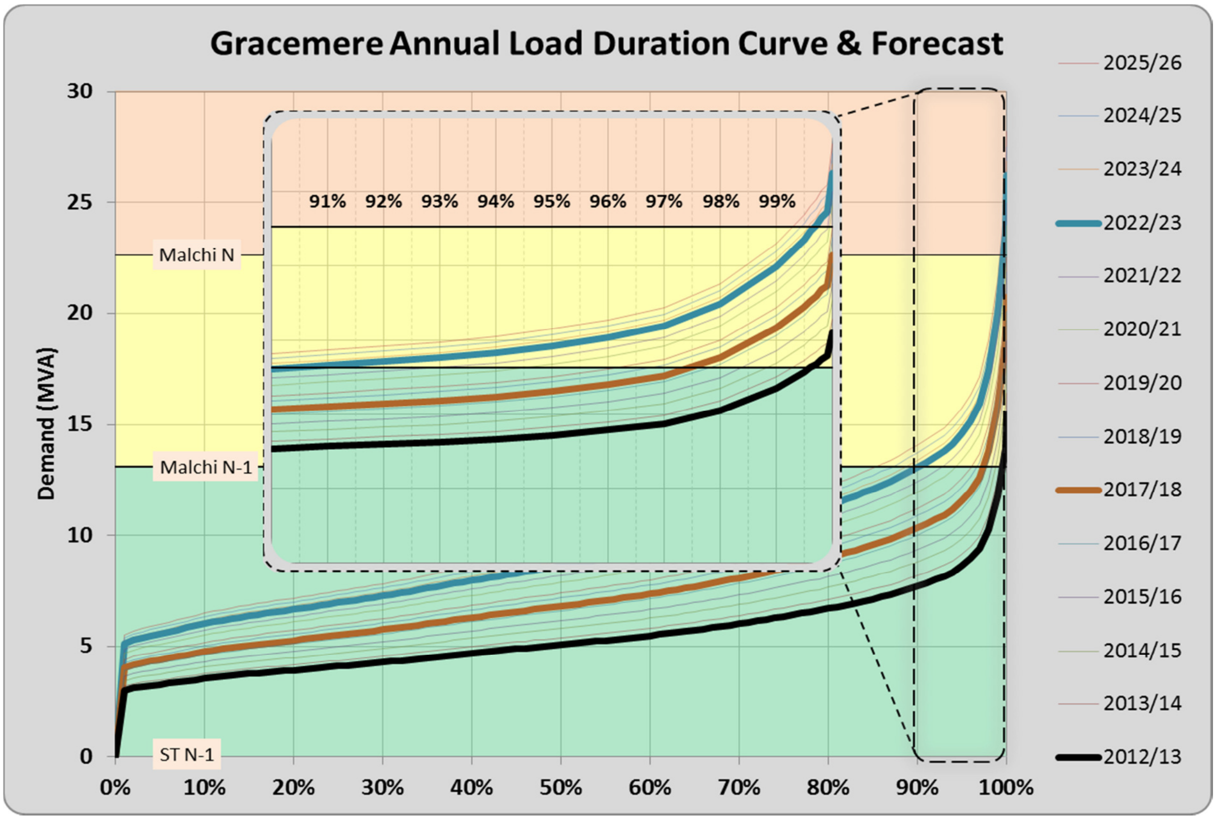

Figure 5 - Gracemere Annual Load Duration Curve & Forecast

POE50	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
Exceedance (MVA)	-	-	-	-	-	-	1.4	2.3	3.6	4.2	4.9
Min. Energy (MWh)	-	-	-	-	-	-	1	3	23	42	66
Duration (hrs)	-	-	-	-	-	-	1	6	29	39	49
Days of Exceedance	-	-	-	-	-	-	1	5	9	10	12

Table 3 - POE50 Forecast Exceedance Figures

Table 3, above tabulates the dimensions of the area between the “Malchi N” line and the load duration curve for each year in Figure 5. It should be noted however that the calculations are made assuming that the existing 1.0MVA transfer capability to Rockhampton is utilised during high load periods (this is not shown in Figure 5). That is, there a difference of 1.0MVA between the tabulated value of exceedance and the amount shown in Figure 5. This difference also extends to the other rows in Table 3, and is similarly applied in Table 4, below.

POE10	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
Exceedance (MVA)	-	-	-	-	1.1	2.0	3.3	4.5	6.3	7.0	7.8
Min. Energy (MWh)	-	-	-	-	1	2	15	47	125	171	225
Duration (hrs)	-	-	-	-	1	4	24	39	70	82	95
Days of Exceedance	-	-	-	-	1	3	8	10	13	15	16

Table 4 - POE10 Forecast Exceedance Figures

In addition to taking into account the available network transfer capability, Table 4, above differs from the similar table published previously in the Request for Information as it is also based upon the discreet forecast, rather than average growth rates.

It should be noted that predictions of the future given in Figure 5, Table 3 and Table 4 are indicative only. They are derived from recorded half hour load data, escalated such that the peak demand matches the forecast for the year of interest. Factors such as longer/shorter high temperature periods during the year, hotter/cooler temperatures generally, the timing of hot days (weekdays vs. weekend/holidays), changes in electrical consumption patterns, etc., as well as changes in forecast demand will result in different outcomes.

2.4 Distribution Network

As with Table 4, above, Table 5 differs from the originally published table in that the feeder loads have been reconciled to the discrete forecast (as shown in Figure 4), feeder ratings have been updated against the new standard and has some slightly different probable network transfers have been included. Additionally, for clarity, the colour legend has been updated and is shown.

Note that, for example, the “Town” feeder is shown as exceeding it 100% utilisation level (i.e. in excess of the capability) in 2020/21. This exceedance will not actually occur when that time comes; even assuming the forecast turns out to be exactly correct. This is due to the highly variable nature of the loading of the medium voltage (MV) distribution network and the much shorter timeframes in which changes can be made; load transfers other feeders may be undertaken closer to the time.

Configuration									Reconciled Feeder Loads														
			Growth Rates		Constraints				Current	Forecast													
Code	Name	Feeder Types	yr 1-5	yr 6-10	Element	Rating (A)	Target Loading Level (A)	OH/UG /PR	2012/ 13	2013/ 14	2014/ 15	2015/ 16	2016/ 17	2017/ 18	2018/ 19	2019/ 20	2020/ 21	2021/ 22	2022/ 23	2023/ 24	2024/ 25	2025/ 26
MA105	**Town**	Urban	12.79%	5.18%	UG	-	260	OH	171	179	188	294	304	312	330	342	365	381	402	413	424	436
					OH	347																
MA108	**Rural**	Rural/ Urban	2.11%	11.10%	UG	-	260	OH	174	201	228	151	173	193	219	241	272	297	327	348	370	392
					OH	347																
MA111	**Stanwell**	Rural	20.93%	1.20%	UG	-	260	OH	61	60	119	137	148	157	159	158	162	163	166	165	165	164
					OH	347																
MA119	**CBD**	Urban	-0.01%	1.65%	UG	320	240	UG	194	192	191	199	197	194	197	197	203	205	210	210	210	210
					OH	551																
MA123	**North**	Urban	1.88%	3.05%	UG	320	240	UG	213	230	202	230	233	233	242	245	256	262	271	274	277	280
					OH	347																
Total Utilisation			6.05%	4.80%		1,681	1,261		812	861	928	1,012	1,055	1,089	1,148	1,183	1,259	1,310	1,376	1,410	1,446	1,482

Feeder Legend				
Utilisation	>66.67%	>75.0%	>90.0%	>100.0%

Table 5 - Distribution Network Loading

2.5 Identified Non-Compliances

Based upon the forecasts and capabilities shown above, Ergon Energy has identified that if no action is taken, a number of non-compliance with various obligations will occur over the forecast period.

2.5.1 Safety Net

SUBSTATION

As has been noted, the network load at Gracemere is already in excess of the “N-1” rating of the Malchi Zone Substation. As such, under a contingency involving the inability to supply load through either transformer, some loss of customer supply would occur if this (unlikely) event occurred on one of the hottest days of summer. As the load grows, the size of the outage and the number of days during which the risk exists will grow.

Figure 6 below, summarises the size of the shortfall in capability should such an event occur in the future. Note that this is based upon the POE50 forecast, as per the requirements of Ergon Energy’s Distribution Authority.

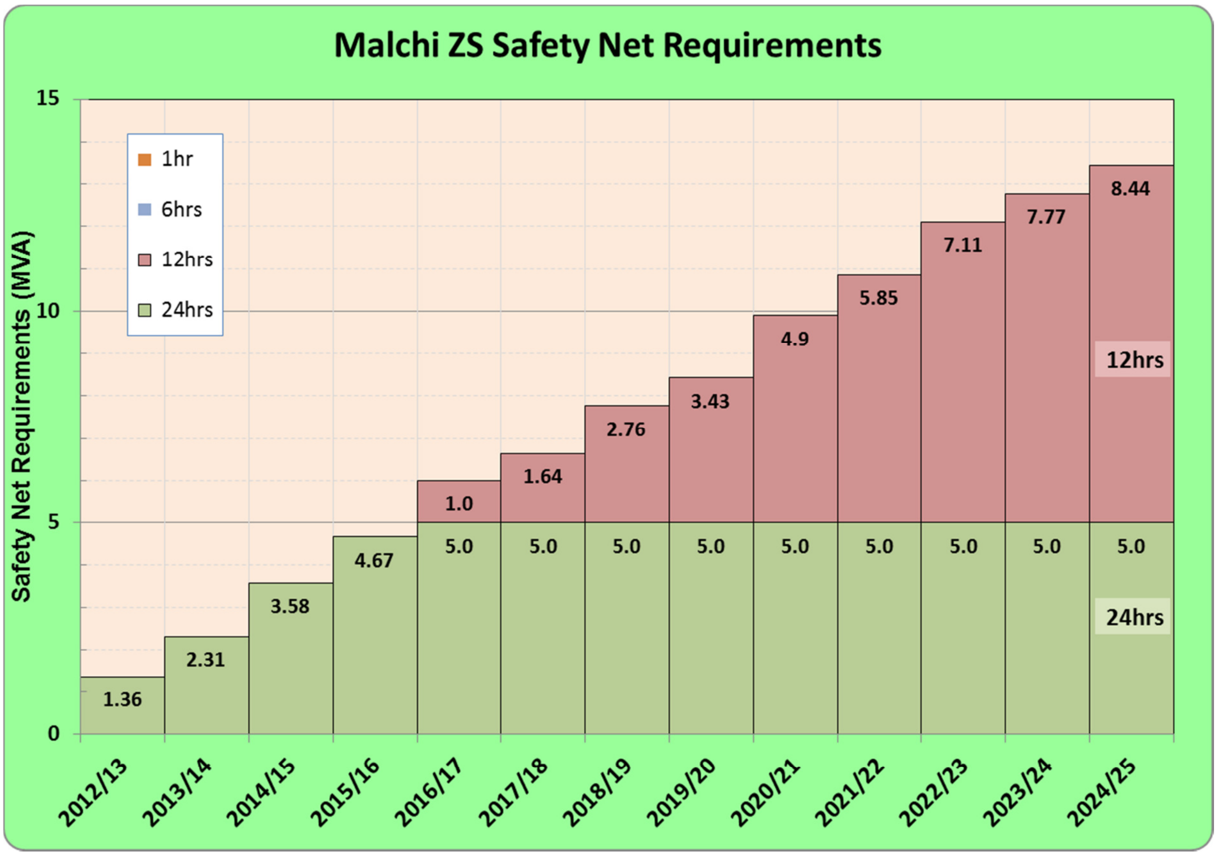

Figure 6 – Malchi Zone Substation Transformer Safety Net Requirements

It should be noted while considering Figure 6, that Ergon Energy already has in place the ability to respond to outages up to 5MVA within the required 24 hour period using the “Nomad” transportable substations. Outages with a peak magnitude greater than this represent a potential non-compliance with Ergon Energy’s Reliability Standards and require addressing at the first instance.

Note also that a network option to increase network transfer from Rockhampton to Gracemere by up to 1.4MVA has been identified. Work to obtain an estimate of the cost of this option will occur while this Addendum is out for comment and after the period of consultation has ended, the cost of this option will be compared against any alternatives that respondents may provide.

SUBTRANSMISSION

As was discussed in the Request for Information, Malchi is supplied via a single 66kV subtransmission feeder from Gavial Switching Station. This feeder is approximately 9km in length and has not had any outages in excess of 6 hours in the past 10 years.

Note that there is currently 1.0MVA transfer available to Rockhampton via the 11kV distribution (already incorporated into Figure 7, below), with the potential to increase this to 2.4MVA, should this prove cost effective compared to other options.

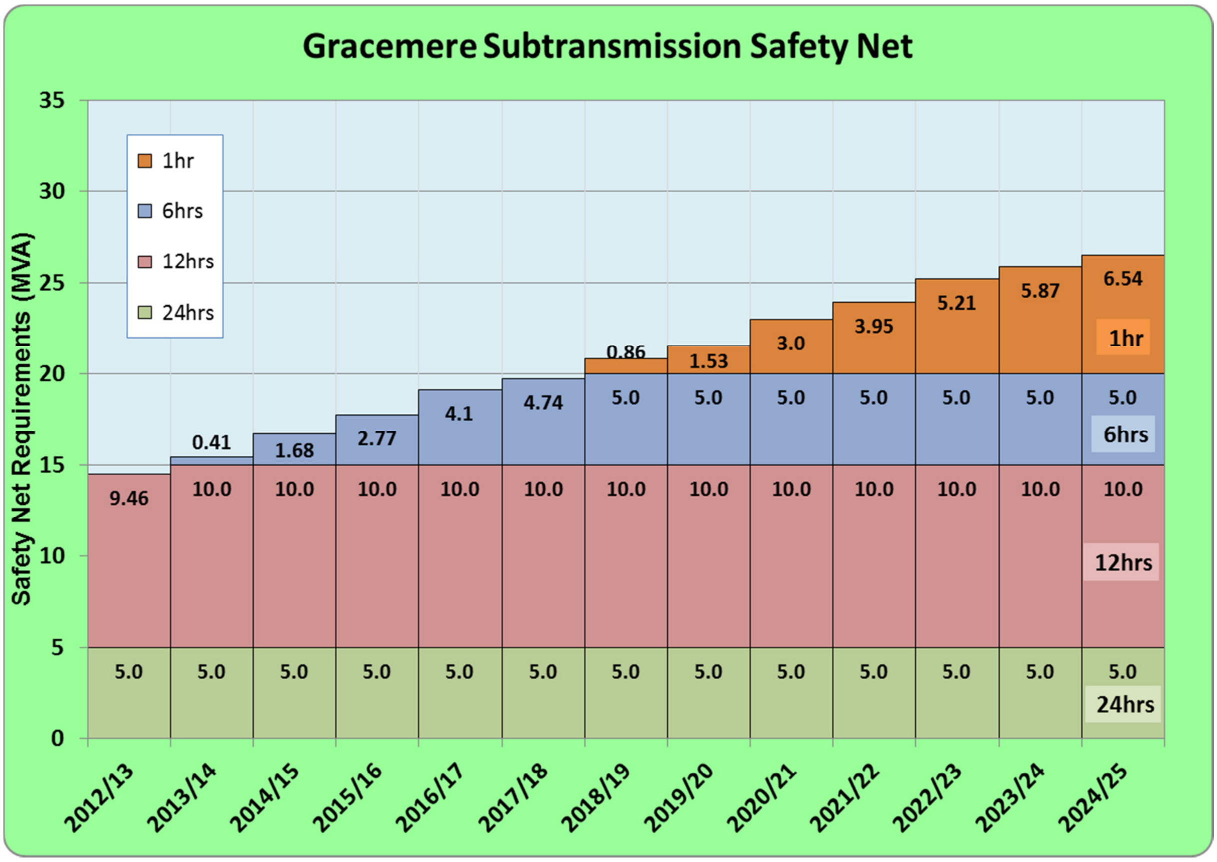

Figure 7 - Gracemere Subtransmission Safety Net Requirements

Figure 7, shows the required level of load against the Safety Net response times, looking out in to the future. As opposed to loss of transformer capacity, there is no opportunity to utilise a Nomad to recover from a failure of the subtransmission line, however as noted, this is generally achieved within 6 hours. Enhanced operational plans are being developed to ensure coverage for less likely (but still credible) contingencies, however the scope of these will be dependent upon the full range of mitigation opportunities available, some of which may be proposed by respondents to this Addendum.

Without action, non-compliance with the Safety Net is forecast to occur by 2018/19.

2.5.2 Distribution Feeder Utilisation Levels

With reference to Table 5 - Distribution Network Loading, it can be seen that by 2021/22, under the current forecast, the average loading of the distribution feeders supplying Gracemere will exceed the 75% target utilisation level. This does not represent a statutory non-compliance, but does breach Ergon Energy's internal Planning Criteria. These targets have been published[7] and agreed to by the Queensland Government and other regulating bodies. As such, distribution network loading levels require addressing as part of the overall plan for the Gracemere area.

2.6 Value of Customer Reliability

Initial planning studies have identified that a significant augmentation may be justified on the basis of the VCR improvement it creates, somewhere between 2019 and 2021. This augmentation could involve construction of a new zone substation at Gracemere or an upgrade of the existing Malchi Zone Substation.

Due to the nature of the cost/benefit relationship present in the VCR methodology, the exact timing and form of any future augmentation will be heavily influenced by future network forecasts, costs for mitigation options provided by respondents to this Addendum (and/or internally generated mitigation options), network operability and safety, and the cost of that augmentation itself.

[7] https://www.ergon.com.au/__data/assets/pdf_file/0006/167559/EE.DAPR.2013.PartA-Final-v1.1.pdf, p51.

3. Corrective Action

3.1 Timelines

The earliest identified non-compliance within the Gracemere network is forecast to occur during the summer of 2016/17. In order to provide sufficient time to undertake necessary reliability corrective action(s)[8] a decision about the selected option(s) is required by January 2015 if any option involving significant construction is to be completed by November 2016.

3.2 Known Future Network and Generation Development

(i.e. projects that have been approved and are firm to proceed)

Ergon Energy is not aware of any other network augmentations or generation developments in the Gracemere area that could relieve the emerging non-compliances described above.

3.3 Summary of Identified Need

Ergon Energy is seeking network and/or non-network solutions (either alone or in combination with one or more other elements) to address the forecast non-compliance. This process is being undertaken internally (for both types of solutions), but this Addendum (and the previous Request for Information) provides external proponents an opportunity to offer solutions (or even suggestions) to address the identified need.

In summary, by the summer of 2016/17, during a contingency involving loss of supply through one transformer at Malchi Zone Substation, Ergon Energy would not be able to meet the full set of minimum required performance standards as set down in the Safety Net. The size of the non-compliance will then continue to grow beyond this point, in step with growth in customer electrical demand. Additionally, by 2017/18, during an extremely hot day, the Malchi Zone Substation may not be able to supply the full customer demand during “system normal” conditions. There are also growing constraints on the 11kV distribution network and Safety Net constraints on the 66kV supply, all of which need addressing.

The load in Gracemere has been growing strongly for approximately the last 10 years, however should demand growth taper off, the timing of any non-compliance will push further into the future. This will actually improve the value of non-network options as deferral of large network expenditure can be achieved with smaller increments of targeted load reduction or capacity increases.

3.4 Internal Options that Address the Identified Need

Ergon Energy had identified opportunities to address the forecast non-compliances and in the absence of more suitable external options (or combinations of options), will further develop the internally identified options through to construction/deployment at the appropriate time.

As discussed, an opportunity exists to increase network load transfer by at least 1.4MVA at what is likely to be a fairly modest cost. Should this be implemented, the first forecast non-compliance

[8] As defined in the National Electricity Rules, Section 5.10.2 - Definitions.

would then occur in 2017/18. Further minor network transfer opportunities may be possible, but are likely to be either smaller in total capability and/or more expensive to implement.

Additionally, Ergon Energy already owns a site in Gracemere on the corner of Lawrie, Platen, James and John streets for a future zone substation. Construction of a substation on this site will address the entirety of the forecast non-compliance for many years; however it will come at a cost that is likely to be more than $10 million (exclusive of overheads). Other lower cost network options are also being explored.

Internal, non-network options, including temporary embedded generation (supplied by Ergon Energy) and demand management have also been proposed; however a final decision will only be made once all opportunities are considered and compared.

3.5 Alternative and Non-Network Solutions

Ergon Energy has a very strong focus on keeping our customers' electricity costs as low as possible, while delivering electricity to the appropriate standards. It is our understanding that this can best be achieved by working with our customers to better understand their needs and by working collaboratively with external proponents to identify opportunities to achieve those goals more cost effectively.

As a result, where additional information (beyond that provided in the Request for Information, this Addendum or our annual network plans and reports[9]) can assist a potential proponent to optimise their proposed solution, Ergon Energy will endeavour to provide the appropriate data. It should be noted however that privacy laws prevent disclosure of some information.

Without attempting to limit the options available to potential respondents to this Addendum, Ergon Energy also believes that significant value can be gained by providing some direction on the types of alternative solutions that can address the issues raised and the format for responses that enable easier comparison of options.

3.6 Minimum Requirements for All Options

Either alone or in combination with other network and/or non-network options, all proposed solutions, as a minimum, must be:

- Able to address the identified need
- Commercially feasible
- Technically feasible
- Able to be implemented in sufficient time to meet the identified need

3.7 Internally identified non-network solutions

The forecast non-compliances identified above are driven predominantly by erosion of spare network capacity due to growth in electrical demand. As such, non-network solutions that cost effectively address either the increasing demand, or the forecast lack of network capacity are likely to represent a reasonable alternative option.

[9] https://www.ergon.com.au/network/network-management/network-plans-and-reports

A non-exhaustive list of potential non-network options includes:

1) New embedded network generation (peaking, or small base load)
2) Existing customer generation
3) Load curtailment or “Call-off-load” opportunities
4) Customer demand management and/or energy efficiency programs
5) Embedded energy storage systems

3.7.1 Discussion

Potential respondents should give careful consideration to the shape of the demand curve and the thermally-driven nature of the peak. The main demand period occurs on hot days (so generally in summer) and typically begins during the late afternoon and continues through to around 9pm at night.

All proponents should consider public acceptance of the technology/system and if it requires a site within the network to operate. For example, proposing to site one or more diesel generators in the middle of a residential neighbourhood is unlikely to be acceptable to our customers or to us.

Finally, potential proponents should note that Ergon Energy does not expect that a single proposal/technology/opportunity would necessarily provide a 100% solution. Consider where synergies could be gained with other technologies to enhance operability, reduce cost, etc. Ergon Energy will also consider how different proposals could work together (even if the proponents have not identified the synergy themselves) or with smaller network solutions to find an optimum hybrid solution.

3.7.2 Embedded Generation

Proponents for embedded network generation need to consider the operability and safety of their systems during operation.

Generally, generating units that are capable of operating in “island mode” represent a more difficult (and thus costly) technical challenge to operate safely and within the requirements of the National Electricity Rules (as described in the Request for Information). However, with care they can generally be located anywhere within the target network (except on the fringes where conductor sizes would limit usefulness).

Generating units that are to be operated synchronised to the network, are limited to those parts of the network that can be backed up from adjacent networks, but provide additional usefulness enhancing the “reach” of those backup paths. Figure 1 - Gracemere Distribution and Subtransmission Network shows where these interconnections occur.

Existing (or proposed) customer generation is limited to the customer’s site and depending on the size of the unit(s) are often not economical to connect and synchronise to the network. These can provide assistance by removing the customer’s load from the network during contingencies. Due to the generator not being connected to the network, these are the simplest (and thus usually cheapest) type of embedded generator.

3.7.3 Curtailment/Call Off Load

The availability of customers who can either be entirely or partially curtailed when called upon is effectively equivalent to customer generation, without the need to have a generator on site. This can be applied to customers of all sizes, however potential proponents should consider that Ergon Energy will require a minimum block size of 100kVA. This can be achieved by aggregating sufficient smaller blocks of load, however Ergon Energy would then deal with the aggregator, not directly with the sub blocks.

Note carefully the discussion in Section 1.1 Safety Net (d) – *customers above 1.5MVA who do not have an existing N-1 supply agreement with Ergon Energy may be shed during a contingency for the purposes of Safety Net.*

Consideration also needs to be given to alignment between the proposed Call Off Load opportunity's load profile and the peak demand period in the early evening. For example, a hypothetical bakery may have a peak demand of, say, 100kVA, but as they do not operate at all during the peak anyway, they do not represent an opportunity.

3.7.4 Customer Demand Management and Energy Efficiency Programs

As the forecast non-compliances in the Gracemere area are due to increasing demand, programs that directly address this load growth present an opportunity for long term benefit. As per Section 3.7.3 , Ergon Energy requires a minimum 100kVA block of reduction (when measured at the Zone Substation), not total customer load. If, for example, the proponent proposes a program that can achieve a 10% reduction in demand during the evening peak period, then at least 1MVA of customer load would need to be aggregated to achieve the minimum block size. Again, it would be the aggregator's responsibility to deal directly with any sub-blocks within group.

3.7.5 Embedded Energy Storage

The forecast non-compliances in the Gracemere network are related to a lack of capability during a contingency, not generally during "system normal". As such, it is possible that years can pass without the backup being "triggered" by a contingency occurring during a high load period. Battery (or other) storage used in this manner is unlikely to be technically or financially feasible.

Where battery storage is used to shave off the evening peak, this would have a direct effect upon the size of load at risk, and thus during a contingency. Proponents of battery storage systems should, as a minimum, consider how their system could be cost effective when compared against embedded generation systems that only operate post contingency.

Energy storage is also not simply limited to storage of electricity; thermal energy in the form of chilled water storage for air conditioning is a proven cost-effective technology in the correct location. Potential proponents should give consideration to how such a system could be usefully and cost-effectively implemented in Gracemere.

3.8 Options that are unlikely to be feasible

Again, without attempting to limit a potential proponent's ability to innovate when considering opportunities, some technologies/approaches are unlikely to represent a technically or financially feasible solution.

3.8.1 Solar Generation

Gracemere has experienced a high growth in solar photovoltaic (PV) system connections which has tended to depress the daytime load, shortening the duration of the evening peak. This may assist in reducing how long other technologies have to operate before the demand naturally reduces into the late evening.

However as the high demand period continues until after dark, solar generation (either PV or thermal) without some form of energy storage is unlikely to represent a useful option.

3.8.2 Wind Generation

The Central Queensland area is not known for being particularly windy and when combined with the intermittent nature of the supply, wind generation (by itself) is unlikely to be feasible.

3.8.3 Unproven, Experimental or Undemonstrated Technologies

Ergon Energy strongly supports innovation; however, we are also required to carefully manage our network, including (but not limited to) safety, reliability and financial risks.

The Gracemere area is a real location with real customers and real risks, where we are required to maintain a level of network reliability, while managing cost. It is not intended to be a "test bed" location for unproven technologies. Other opportunities for this type of innovation may be offered by Ergon Energy from time to time and proponents are encouraged to seek these out when they arise.

Where insufficient information is available on a proposed opportunity/technology to allow us to evaluate risk against other better understood technologies, Ergon Energy would be very unlikely to seek to progress these opportunities.

3.9 Evaluating Proposals

3.9.1 Section 5 of the Request for Information

Any proposal must, at a minimum, be able to meet the technical requirement in Schedule 5.1 of the National Electricity Rules (as discussed in Section 5 of the Request for Information), where those requirements are applicable to the proposed solution.

With the exception of Section 5.4 Quality, the remainder of Section 5 of the Request for Information is no longer applicable (Size, Timing, Location, Reliability and Longevity) – respondents should carefully consider the detailed discussion of the timing, size, location and form of forecast non-compliance included in this Addendum and are encouraged to develop innovative solutions that address these issues.

3.9.2 Information to Assist the Evaluation Process

In order to assist Ergon Energy to evaluate any proposals or identified opportunities, respondents to this Addendum are asked to carefully consider the structure of their response. In addition to any other information discussed in the Request for Information, where possible/applicable, the following information should be included:

- Information about the proponent, including business structure
- Year by year costs to Ergon Energy
- Any commissioning or decommissioning costs
- The structure of “availability” and “operating” costs, if applicable
- Site information (if appropriate) including proposed ownership/lease arrangements
- Connection requirements between proposed solution and Ergon Energy’s network, if any.
- Any identified/claimed material National Electricity Market impacts (both positive and negative see National Electricity Rules) and the basis for any claims thus made.
- Any known applicable risks (financial, company, operability, chemical, electrical, other safety related risks).
- Responsibility/obligations of all parties to the opportunity
- How the proponent propose to deliver the proposal should it prove feasible (or if it would be Ergon Energy’s partial or whole responsibility)
- Who is proposed to build, own and operate the solution (can be different answers for each)
- Proposed timeline, including earliest delivery date
- Limitations of the proposed solution (for example, maximum or minimum size, availability, reliability)
- Period of any proposed contractual agreement and the structure of any early termination or contract extension clauses proposed to be included

Proposals that have a high level of “deployment readiness” will be considered favourably, however Ergon Energy does not require proponents to have a fully designed, financed and/or ready to be deployed solution prior to responding to this Addendum.

4. Submissions and Next Steps

4.1 Timetable for Submissions

Submissions in writing are due by 4 November 2014 and should be lodged to:

Attention: Network Development

Email: regulatory.tests@ergon.com.au

4.2 Assessment and Decision Timetable

Ergon Energy intends to carry out the following process to assess what action should be taken to address the identified distribution network limitations:

Step 1	Request for (initial) Information	Date Released: **19/12/2013**
Step 2	Submissions in response to the Request for Information.	Closed: **20/02/2014**
Step 2a	***Addendum to Request for Information (this document)***	***Date Released: 09/09/2014***
Step 3	Submissions in response to the Addendum to the Request for Information	Due Date: **04/11/2014**
Step 3	Review and analysis by Ergon Energy. This is likely to involve further consultation with proponents and additional data may be requested.	Anticipated to be completed by: **18/11/2014**
Step 4	Release of Ergon Energy's Consultation Paper and Draft Recommendation of solution which satisfies the Regulatory Test.	Anticipated to be released by: **02/12/2014**
Step 5	Submissions in response to the Consultation Paper & Draft Recommendation.	Due Date: **30/12/2014**
Step 6	Release of Final Recommendation (including summary of submissions received).	Anticipated to be released by: **13/01/2015**
Ergon Energy reserves the right to revise this timetable at any time. The revised timetable will be made available on the Ergon Energy website.		

Table 6 - Assessment & Decision Timetable

Ergon Energy will use its reasonable endeavours to maintain the consultation program listed above. However this program may alter due to changing power system conditions or other circumstances beyond the control of Ergon Energy. Updated information will be made available on our website:

https://www.ergon.com.au/network/network-management/network-infrastructure/regulatory-test-consultations

The consultation timetable is driven by the need to make a decision by January 2015 if any option involving significant construction is to be in place by November 2016.

At the conclusion of the consultation process, Ergon Energy intends to take steps to progress the recommended solution(s) to ensure any statutory non-compliance is addressed and undertake appropriately justified network reliability improvement(s), as necessary.