



# Summer Preparedness Plan

2019-20

2 December 2019



Part of the Energy Queensland Group

## ABOUT ERGON ENERGY NETWORK

Ergon Energy Network Corporation Limited (Ergon Energy Network) is part of the Energy Queensland Limited (EQL) Group and manages an electricity distribution network which supplies electricity to more than 760,000 customers. The vast operating area covers over one million square kilometres – around 97% of the state of Queensland – from the expanding coastal and rural population centres to the remote communities of outback Queensland and the Torres Strait.

The electricity network consists of approximately 160,000 kilometres of powerlines and one million power poles, along with associated infrastructure such as major substations and power transformers.

Ergon Energy Network also own and operate 33 stand-alone power stations that provide supply to isolated communities across Queensland which are not connected to the main electricity grid.

## ABOUT ENERGEX

Energex Limited (Energex) is part of the EQL Group and manages an electricity distribution network delivering world-class energy products and services to one of Australia's fastest growing communities – the South-East Queensland region.

Energex have been supplying electricity to Queenslanders for more than 100 years and today provide distribution services to almost 1.5 million domestic and business connections, delivering electricity to a population base of around 3.5 million people via 54,000km of overhead and underground network.

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## EXECUTIVE SUMMARY

Ergon Energy Network and Energex as part of the Energy Queensland group have undertaken detailed preparation and planning for the 2019-20 summer season in Queensland. This Summer Preparedness Plan (SPP) has been developed on behalf of both Ergon Energy Network and Energex. This plan provides details of preparations that are carried out for summer 2019-20 to provide Queensland with a reliable network to minimise interruptions during extreme weather conditions, and where disruptions do occur, to ensure we keep the community fully informed and respond as quickly as possible to restore supply safely.

Last summer we experienced a total of 15 significant weather events impacting our networks across Queensland. The Energex and Ergon Energy distribution networks were exposed to multiple severe storms impacting the network and subsequently requiring an increased level of response from field and support groups. This also included bushfires and heatwave conditions.

In November 2018, severe bushfires were experienced across the state. From December 2018 to May 2019 a total of five tropical cyclones formed and threatened to impact the Queensland coast. Three of these tropical cyclones resulted in a coastal crossing in the Far North with subsequent damage to the Ergon Energy infrastructure.

The most significant event on the Ergon Energy network occurred between January and February 2019 when a monsoon trough caused major flooding in North Queensland from the Daintree River through to Herbert, Flinders and Burdekin Rivers and Bluewater Creek in Townsville interrupting supply to over 17,000 customers. This resulted in the largest mobilisation of staff for the season.

The Energex network experienced the most significant storm event in March 2019 where 237,286 customers were impacted by a severe storm across South East Queensland.

In total, more than 512,000 customers were impacted by severe weather events and a combined response effort of 3,300 staff mobilised to respond.

**Image 1 - EQL Storm Season 2018-19 Summary**



In 2018-19, reliability of supply in our regions outperformed the Distribution Authority's Minimum Service Standard (MSS) limits for 11 out of 12 measures with average outage duration (SAIDI) for Ergon Energy's Long Rural network remaining unfavourable to the MSS limit. In addition to the impacts from adverse weather conditions, long rural network's reliability performance was also influenced by a significant increase in the frequency and duration of planned supply interruptions primarily required to accommodate high priority defect repairs and maintenance works on lines and substation across regional Queensland.

Both Ergon Energy and Energex Network's overall reliability performance have improved considerably since the inception of MSS in 2005 with both the duration and frequency of outages showing downward trends for both the networks.

The performance results are a reflection of the targeted investment made during the last two regulatory control periods towards achieving the regulated MSS standards.

The weekday 2018-19 system peak demand on the Energex network was 5,086 MW, whereas the previous summer peak demand was 4,920 MW. The summer of 2018-19 had extended hot periods in January and February and had the highest recorded peak demand. Summer maximum demand was on average 4,813MW over the last five years and an average growth of 3.08% pa. Analysis indicates that the continued growth of solar PV will reduce loads during daylight hours, causing system peak demands to occur at or around 7:30pm.

In Regional Queensland the network peak demand and energy delivered this year featured fluctuations from previous years. In 2018-19 there was low level overall demand growth. The system-wide 2018-19 peak was 2,612 MW at 6.00pm on 20 February 2019 an amount of 15 MW more than last year's peak as a result of the very hot summer.

Energy usage patterns are changing due to changes in customer behaviour, price, energy efficiency initiatives and the continued rapid deployment of distributed generation such as solar photovoltaic (PV). Solar PV presents a number of technical challenges such as power quality and voltage management. We have progressed a range of innovative solutions such as changing operating times for hot water systems to ensure the network is able to cost effectively manage these challenges. Our focus is also on how to maximise value from its existing assets to the benefit of its customers. This will be achieved by optimising life cycle costs, engaging with stakeholders and customers to further develop appropriate and sustainable demand side management solutions.

We continue to apply a high level of rigour to planning and managing the network in the event of higher than anticipated peak demand in 2019-20.

Preparations for summer 19-20 are well advanced with key operational expenditure (OPEX) and capital expenditure (CAPEX) programs underway. The network CAPEX program for 2019-20 is in line with the Distribution Annual Planning Report (DAPR) recommendations and security standards. Of significance, the focus has moved from network capacity activity to maintaining a secure and reliable network.

This plan has been developed as part of a long-term continuous improvement approach. It provides details of the capital and operating programs as well as operational responses, system preparations and planned communication activities.

As part of our ongoing commitment to our communities, a dedicated team leads our Emergency Planning and Response and disaster preparedness activities across Queensland. This team will focus on preparation, planning, resilience, response and recovery improvement opportunities to ensure we minimise the impact of significant events on our network, our communities and our customers.

# Summer Preparedness Plan 2019-20

Preparation for summer 2019-20 has four major areas of focus:

- Pre-summer Network Preparations
- Network Resilience
- Emergency Planning and Response
- Communication.

Finally, but most importantly, we are committed to providing all staff with a safe workplace and the knowledge and skills to work safely, particularly during emergency conditions.



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## 1. PURPOSE AND SCOPE

In the lead up to the summer storm season each year this Summer Preparedness Plan (SPP) is developed in conjunction with significant preparation activities aligned to four major focus areas:

- Pre-Summer Network Preparations - preparing the network to ensure the capacity and security of supply will meet summer energy and peak demand
- Network Resilience - maintaining the network to minimise the impact of extreme weather events on customers' electricity supply
- Emergency Planning and Response - planning for, identifying and responding to disruptions, natural disasters and emergencies that impact on customers' electricity supply
- Communication - continuing to provide timely and accurate communication with Ergon Energy Network and Energex's stakeholders, customers and the media, in relation to network disruptions.

The SPP addresses these focus areas in several ways. It describes specific activities, including capital expenditure programs and operational or maintenance expenditure programs that have been undertaken before the start of summer. Furthermore, the SPP details our capacity to manage and respond to extreme weather events and emergencies through appropriate emergency response programs, customer information systems, public communications strategies and resourcing levels.

The combined EQL electricity network distributes electricity to 3.5 million South East Queenslanders and more than 760,000 regional Queenslanders. More than 70% of the network is located in rural areas with vast distances between many communities. The regional network includes a higher proportion of sub-transmission compared to the South East Queensland network and one of the largest Single Wire Earth Return (SWER) networks in the world. The radial design of the network constrains supply restoration options when responding to disruptions.

The network is impacted each summer by a range of variable weather conditions including severe electrical and wind storms, cyclones, floods and bushfires through to periods of high temperature and humidity. In preparation for this, an extensive pre-summer program is carried out to prepare the network and minimise disruptions to customers' electricity supply. Customer communications processes are also reviewed to continually improve fault call response times and keep customers informed when such extreme events occur.



## 2. DEFINITIONS, ABBREVIATIONS AND ACRONYMS

Term	Definition
<b>AIIMS</b>	Australasian Inter-Service Incident Management System. AIIMS is based on the principles of management by objectives, functional management and span of control. It is a nationally recognised system of incident management for fire and emergency service agencies.
<b>AO</b>	Area of Operations - An AO is a geographical area under the control of one Operations Lead in the response and recovery effort following a disruptive event. An AO might be a relatively small geographic area if the event has resulted in significant asset damage or it might be a large geographic area if the damage is lesser but more widespread. The determination of AOs and boundaries will be made by the Emergency Manager and will consider the staff required to recover assets and services.
<b>BAU</b>	Business As Usual – resources and effort are focused on the planned and budgeted work required to operate and maintain electricity infrastructure, its operational functions and capabilities.
<b>CAPEX</b>	Capital Expenditure
<b>Damage Assessment</b>	Field activity whereby crews visually inspect network and record defects needing rectification.
<b>DDMG</b>	District Disaster Management Group
<b>Disaster</b>	A disaster is a serious disruption in a community, caused by the impact of an event, that requires a significant coordinated response by the State and other entities to help the community recover from the disruption ( <i>definition: Disaster Management Act 2003, Section 13</i> ). NOTE: a disaster can only be declared by a Disaster District or the State Government with the specific approval of the responsible Minister.
<b>Disaster Management</b>	Disaster management means arrangements about managing the potential adverse effects of an event, including, for example, arrangements for mitigating, preventing, preparing for, responding to and recovering from a disaster ( <i>definition: Disaster Management Act 2003</i> ).
<b>Disruption Events</b>	Events that disrupt the normal functions of businesses, the economy and/or communities and include those that are man-made (e.g. terrorist attack, bomb threat) and natural (e.g. storm, cyclone, fire, flood, network or non-network asset failure, influenza pandemic).
<b>Emergency</b>	A sudden and unexpected event that disrupts the normal operating functions, capabilities, resource and/or people of the organisation and requires an immediate response to prevent escalation of its scale or severity. For example, but not restricted to: <ul style="list-style-type: none"><li>• Localised electricity network damage, or potential damage, due to fire, flood, storm or accident etc.</li></ul>

- Loss of operating facilities and/ or resources
- Loss of ICT operating systems.

<b>Hazard</b>	An event, object or scenario that has the potential to cause harm to people and/or cause damage to property or assets.
<b>LDMG</b>	Local Disaster Management Group
<b>Level 1 Event</b>	Events are routine incidents that are managed as part of normal business operations and are not managed through emergency, crisis or business continuity management arrangements.
<b>Level 2 Event</b>	These events are the first level of non-routine events. They are more complex either in size, resources or risk; and are events that are beyond the capability of normal business operations and require specific command and control arrangements. For example, impacts to EQL's normal operations may be substantial but may be relatively foreseeable and contained.
<b>Level 3 Event</b>	These events are the most significant. They require substantial effort and resources across different regions/areas of EQL and have the potential to substantially disrupt business operations or significantly harm EQL's reputation. These emergencies require specific command and control arrangements and resourcing to a much greater degree than level 2 events.
<b>LiDAR</b>	Light Detection and Ranging, is a remote sensing method that uses light in the form of a pulsed laser to measure ranges.
<b>Flooding-Major</b>	In addition to the criteria for moderate flooding, extensive rural areas and/or urban areas are inundated. Properties and towns are likely to be isolated and major traffic routes likely to be closed. Evacuation of people from flood affected areas may be required
<b>Flooding-Minor</b>	Causes inconvenience. Low-lying areas next to watercourses are inundated which may require the removal of stock and equipment. Minor roads may be closed and low-level bridges submerged.
<b>Flooding-Moderate</b>	In addition to the criteria for minor flooding, the evacuation of some houses may be required. Main traffic routes may be covered. The area of inundation is substantial in rural areas requiring the removal of stock.
<b>Flooding-Q100</b>	Refers to a flood level or peak that has a one in a hundred, or 1%, chance of being equaled or exceeded in any year (also referred to as annual exceedance probability)
<b>MSS</b>	Minimum Service Standards
<b>NOMAD</b>	Mobile substation capable of injecting high voltage to large areas of the network.
<b>OPEX</b>	Operational Expenditure

<b>Pegasus</b>	Mobile generator capable of injecting high voltage into a select area of the network
<b>PowerOn</b>	The South East (Energex) network monitoring system/database
<b>Resources</b>	Includes staff, food, any vehicle, vessel, aircraft, plant, apparatus, implement, earthmoving, construction or other equipment of any kind or any means of supplying want or need.
<b>Restoration plan</b>	Prioritised feeder section plan to restore the network.
<b>Risk</b>	Potential impact on objectives (either losses or opportunities) due to a particular event, hazard or scenario. Risk is the product of likelihood and consequence.
<b>SDCC</b>	State Disaster Coordination Centre
<b>SDMG</b>	State Disaster Management Group
<b>Significant Incident</b>	Any occurrence affecting an EQL response and the community – including severe injury or loss of life involving EQL staff or the public, loss or damage affecting EQL or community property, and related matters involving EQL which are likely to attract media or public response.
<b>Single Wire Earth Return (SWER)</b>	SWER is a single-wire transmission line which supplies single-phase to remote areas. Its distinguishing feature is that the earth is used as the return path for the current, to avoid the need for a second wire (or neutral wire) to act as a return path.

## 3. REFERENCES

EQL Organisational Resilience Strategy and Framework  
Energy Queensland Natural Disaster Working Arrangements  
Energy Queensland Union Collective Agreement 2017  
Energy Queensland Crisis and Emergency Leadership Team Charter  
AS/NZS ISO 31000:2009 Risk management - Principles and guidelines  
Electricity Act 1994 (Qld)  
Electricity Regulation 2006 (Qld)  
Electrical Safety Act 2002 (Qld)  
Electrical Safety Regulation 2013 (Qld)  
Disaster Management Act 2003 (Qld)  
Emergency Management Assurance Framework (QLD)  
Queensland Disaster Management Arrangements  
Queensland State Disaster Management Plan 2016



## 4. PRE-SUMMER NETWORK PREPARATIONS

During 2018-19, network performance has been evaluated and additional planning undertaken to identify parts of the network that warrant augmentation and refurbishment to keep pace with forecast demand increases or improve system reliability, security and resilience. This analysis has resulted in prudent operating and capital programs being established to minimise the impact of summer weather conditions on customers' electricity supply. The separately published Distribution Annual Planning Reports (DAPR) for both the Energex and Ergon Energy networks provides a five year view of network management strategies.

We are committed to the achievement of best practice asset management strategies to ensure the safe and reliable operation of our network. We manage our assets in a manner that minimises the associated network risk as well as ensuring customer supply reliability during times of severe storms, major flood, bushfires and other weather events.

## 5. CAPITAL INVESTMENT PROGRAM

We are required to ensure adequate system capacity and maintain an acceptable customer service level under the respective Distribution Authority. Capital investment programs have been developed and implemented to achieve the outcomes end users of electricity seek with regard to the quality and reliability of electricity services. The capital investment programs are based on the following four key criteria:

- Safety Net Targets for restoration of supply following a summer (N-1) event
- Minimum Service Standards (MSS) that set a level of required reliability
- Feeder improvement programs to improve reliability on constrained 11kV feeders and
- Other regulatory requirements as per the National Electricity Rules (NER).

## 6. NETWORK CONTINGENCY PLANNING

The specific activities undertaken to prepare the network and improve reliability for the 2019-20 summer season include network capacity and security improvement programs, safety net requirements, plant emergency rating information, strategic spare components, peak load monitoring, temporary load support and demand management.

Contingency plans are developed to ensure security and encompass a number of aspects:

- Network contingency and load transfer plans to cater for single contingencies (e.g. loss of a single major item of plant)
- Strategies for spares and replacement of major plant such as power transformers
- Availability of mobile generators for deployment to provide an emergency supply in situations where practicable
- Availability of two 33/11kV mobile substations in the South East, two 10MVA 66/33/22/11kV mobile substations (NOMADs) in the Southern region and one NOMAD in the Northern region for deployment to provide an emergency supply where practicable noting that they can be moved across regions and
- Application of available demand management options.

### 6.1. Contingency Plans for Summer (System Normal Conditions)

Each year, the entire network is reviewed to ensure that all substations and feeders can supply a 10 PoE (10% Probability of Exceedance) load for the following summer under system normal conditions i.e. Normal Cyclic Capacity (NCC) ratings.

A process has been implemented to monitor loads during the summer period so that as hot weather develops, emerging "hot spots" where demand growth may have exceeded the previous annual forecasts are identified. In these cases, corrective action to avoid an overload is taken well before a capacity constraint occurs.

## 6.2. Automatic Under-Frequency Load Shedding (UFLS)

UFLS is an automatic load shedding process that happens almost instantaneously to protect the power system if there is a major unplanned outage in the National Electricity Market. An event such as the sudden failure of a major generator or transmission line resulting in available electricity supply falling below customer demand results in a drop in system frequency and potential instability.

To prevent this, the electricity grid is equipped with strategically located Under Frequency relays. Each relay is programmed to monitor a certain system frequency, from 49 Hz down to 47.9 Hz. In an emergency, as the system frequency gets slower and slower, the Under-Frequency relays will progressively trip load until the balance between supply and demand is restored. The relays are grouped into blocks of varying customer types to minimise impact. Like rotational load shedding, critical loads are avoided.

The Australian Energy Market Operator (AEMO) requires Energy Queensland to have 60% of its loads available for Under Frequency Load Shedding. We work closely with Powerlink to review the UFLS blocks. The initial load shedding blocks for our networks include larger industrial and commercial loads.

The increasing level of roof top solar generation is also changing the load on distribution feeders available for shedding if it is required during the day. The feeders included in the load shedding schedules are reviewed to ensure the load shedding blocks remain effective. We have also confirmed a continuous review of load shedding schedules to better understand where significant rooftop solar generation is connected on the distribution network.

Each event which initiates load shedding is quite different and the amount and type of load shed depends on system loading (day of the week, the time of day and season), system synchronous capacity available and the event causing the disturbance. For example, a large industrial load such as a mine may not be operating at the time of the disturbance, and this may require other blocks to be shed. The time required to re-energise and restore electricity supply after UFLS is also variable.

## 6.3. Contingency Plans for Summer (N-1 Conditions)

Network contingency plans detail the load transfer and load management options available to restore supply following a single contingency event affecting bulk supply substations, zone substations and sub-transmission feeders.

In cases where existing capacity or load transfer capability is not sufficient to enable supply to be restored following a single contingency, more comprehensive plans are developed depending on the tolerability of the risk level identified. Restoration targets are defined in Schedule 4 of Energex and Ergon Energy Network's Distribution Authorities "...to the extent reasonably practicable".

This acknowledges that regardless of level of preparation, there will always be circumstances where it is impossible to meet the restoration targets at the time of an event (for example, if it is unsafe to work on a line due to ongoing storm activity), though these should be rare.

Efficient investments under the Safety Net provisions will provide mitigation for credible contingencies that could otherwise result in outages longer than the Safety Net targets. Safety Net is defined as effective mitigation of the risk of any low probability/high consequence network outages to avoid unexpected customer hardship and/or significant community or economic disruption. Safety Net targets for power restoration times are prescribed for different locations and energy loads at risk.

We continue to review the changing state of the network for Safety Net compliance as part of the normal network planning process, ensuring that care is taken to understand our customers' needs when considering the competing goals of service quality and reliability against cost of network.

## 6.4. Strategic Spares

As part of our strategic planning, strategic spares are defined as major items of plant held in stock that may be required to be used to replace, permanently or temporarily, a critical network or system element that has incurred damage due to a system fault or failure. The strategic spare would only be used where supply to customers cannot be maintained without its use, or if network security would be unacceptably compromised. An appropriate level of strategic spares is maintained throughout the storm season.

The identification and allocation of spare power transformers for contingency events is now addressed within the Joint Strategic Spares Strategy and necessary strategic spare transformers have been identified and held in stock.

## 6.5. Mobile Generators for Emergency Response

Mobile standby generators are used to provide emergency response to sub-transmission and distribution network faults that cannot be rectified by switching or immediate fault restoration. This assists in restoration of supply in a manner that minimises customer disruption. The fleet of mobile generators also provide flexibility for feeder support during extreme temperature/load events where existing network assets need to be supplemented.

These generators are also pre-emptively deployed to locations likely to be isolated during significant flooding or storm damage.

Our Ergon Energy Network mobile generator fleet is approximately 14.3MVA in total capacity available. The current fleet includes 32 low voltage generators ranging in size from 33kVA to 625kVA, with an additional six containerised low voltage mobile 1250kVA units and five Pegasus 1250kVA HV injection units. These HV injection units comprising of a 1250kVA generator and 1250kVA Pegasus unit, are capable of being directly connected to either the underground or overhead 11kV or 22kV networks. There are several generators currently committed to remote areas of the network.

The Energex mobile generator fleet is 23.3 MVA in total capacity. The current fleet includes 45 low voltage generators ranging in size from 60kVA to 500 kVA and five high voltage mobile 1250kVA units. There are currently 3.25 MVA (4 x 500kVA generators and 1 X 1250kVA generator) committed to network support. A list of mobile generation is included at Appendix 2.

In addition to our own generation equipment, arrangements are in place to hire low voltage generators to ensure adequate feeder support.

## 6.6. Demand Management Network Support

Energex and Ergon Energy have a Demand Management (DM) Program, which involves working with our customers and industry partners to reduce demand to maintain system reliability in the short term and over the longer term defer capital projects.

Each year load at risk areas on the network are identified through the Distribution Annual Planning Report (DAPR). This includes the identification of load at risk areas for the 2019-20 summer. These areas are analysed for suitability for DM solutions. Where deemed suitable, Target Areas are established and incentives offered to customers for DM solutions. Contracts are established with customers to provide permanent or point in time (e.g. at certain times in summer) load reduction. DM solutions can include energy efficiency, power factor correction, load curtailment, load shifting and customer embedded generation. Details of Target area locations and constraint are found on the Energex and Ergon Energy websites. A number of non-network alternative generation contracts exist which provide network support, if needed, over the summer period.

Broad based DM is also incentivised across the State. It delivers demand reductions across the whole network, rather than just in a local load at risk area. These demand reductions achieved from appliances connected to control load and PeakSmart air conditioners, which can be called upon during emergency or extreme peak demand summer events.

The DM Plan 2019-20 highlights the DM capability that can be called upon during times of peak network demand or as part of emergency response. This capability is called up through this Summer Preparedness Plan to minimise interruptions during 2019-20 summer season extreme weather conditions. This same capability can also be called upon to provide demand response to the Australian Energy Market Operator (AEMO). For example, it has been used in response to lack or reserve events.

## 7. NETWORK RESILIENCE

With a large overhead electricity network, traversing long distances in some instances and through dense vegetated areas in rural Queensland, there is a high exposure to the elements and severe weather events have a significant impact on supply reliability. In order to minimise these effects, we have identified and implemented critical maintenance activities, including a vegetation management program and an intense focus on pre-summer inspection and maintenance.

### 7.1. Vegetation Management

Vegetation encroaching within minimum clearances of overhead powerlines presents safety hazards for the public, our employees and contract workers. Vegetation in the proximity of overhead powerlines is also a major causal factor in network outages during storms and high winds.

A comprehensive vegetation management program is maintained to minimise community and field staff safety risk and provide the required network reliability. To manage this risk, we employ the following strategies:

- Energex and Ergon Energy Network cyclic programs to cut vegetation on all overhead line routes. Vegetation contractors deliver a cutting program that ensures cycle times are met
- Reactive activities to address localised instances where vegetation is found to be within clearance requirements or has been reported for action by customers

We continue to work cooperatively with local councils to reduce future risk of vegetation contacting powerlines.

### 7.2. Inspection and Maintenance Initiatives

In an effort to make further improvements to the performance of our overhead network, particularly during storm seasons, we continue to implement resilience initiatives as detailed below:

- Conducting inspections of the condition of overhead plant and equipment every five years in the Energex areas and on a risk based four, six or eight year cycle in Ergon Energy Network areas. Included as part of this inspection program is the:
  - Testing of overhead high voltage earthing systems to ensure their effectiveness in the protection of plant and equipment and public and staff safety
  - Visual inspection of water way crossings
  - Visual inspection of underground pillars
  - Visual inspection of a range of other network assets
  - Identification of immediate vegetation hazards
- In the high rainfall areas in Far North Queensland, detailed pole top inspections are also carried out on selected feeders on a four year cycle (mid cycle from the main asset inspection program)
- Thermal surveying inspections of bulk, zone and distribution substation sites and plant
- Routine inspections of substation equipment are completed dependant on equipment types, classification and condition



- Aerial LiDAR inspections are conducted over the entire network. With this capability 3D geo-spatial representations of network assets are displayed in a geo-spatial visualisation application to assist with vegetation management and asset maintenance. This provides information about defects and is contributing to reduced maintenance and planning costs, and increased safety and reliability of supply for our customers and communities. The data captured is processed to enable measurement of the network and surrounding objects such as buildings, terrain and vegetation
- A pre-summer program of targeted helicopter patrols on high risk feeders is completed each year. These patrols are used as a proactive measure to identify potential maintenance requirements and potentially undetected threats to the network. Energex also conduct aerial patrols using high resolution photography in urban areas throughout the year however are limited in scope by imposed flight restrictions and safety aspects. Some vehicle patrols may be required in special circumstances
- Helicopter patrols are utilised to locate faults after storm events where required
- In addition to these specific activities, our aim is to provide a resilient network in preparation for the summer storm season through a detailed annual program of work to improve, develop, maintain and operate the network

### 7.3. Installation of LV Fuses

To improve network reliability and safety during storm season we have a progressive capital investment program to install LV fuses on distribution transformers. This program involves the installation of low voltage high rupturing fuses on pole mounted transformers. The objectives for the LV fusing program are to:

- Provide optimum safety to employees and community in the event of a LV fault and aligned to industry standards
- Provide adequate protection for LV faults and ensure safe outcomes to the community
- Comply with the Energy Networks Australia (ENA) National Low Voltage Protection Guidelines, and
- Reduce the safety risk for a low voltage fault incident to “as low as reasonably practicable” (ALARP).

### 7.4. Worst Performing Feeder Improvement Program

Ergon Energy Network and Energex are ensuring that the investment in the Worst Performing Feeder Improvement program is prudently spread across different feeders and regions.

Ergon Energy Network distribution feeders are ranked (status assigned) according to their three year average System Average Interruption Duration Index (SAIDI) performance over that time against the Minimum Service Standards (MSS). Feeder rankings are defined below:

- Green feeders have a three years' average SAIDI  $\leq$  MSS
- Yellow feeders have a three years' average SAIDI  $>$  MSS  $<$  150% MSS
- Amber feeders have a three years' average SAIDI  $>$  150% MSS  $<$  200% MSS
- Red feeders have a three years' average SAIDI  $>$  200% MSS.

During the regulatory period the highest ranked 50 feeders are included as part of the feeder improvement program. The reliability improvement solutions identified from the feeder reviews conducted in this regulatory period for Ergon Energy have mainly included low to moderate capital investment options. The low cost quick win solutions mainly included network protection setting changes, installation of Line Fault Indicators with and without communication and Fuse Savers. The moderate investment options included installation of new Automatic Circuit Reclosers, Sectionalisers Remote Controlled Gas Switches and also relocation and/or replacement of switching devices.

The program aims to deliver tailored solutions based on an assessment and understanding of the drivers for inadequate performance on the distribution feeder.

The Energex network is required to improve 11kV feeders where their performance meets the following criteria:

- The 11kV feeder is in the highest 10% of the network's 11kV feeders based on its three year average SAIDI/SAIFI performance, and
- The 11kV feeder's three year SAIDI/SAIFI outcome is 150% or more of the MSS SAIDI/SAIFI limit applicable to that category of 11kV feeder.

The Worst Performing Feeder Improvement Program for Energex is expected to yield improved feeder performance by cost effectively adopting one or more of the following options:

- Remote controlled protection devices and switches
- Covered conductor
- Fuses and fault indicators on the feeder, and
- New ties to adjacent 11kV feeders.

The identified solutions are well progressed and will continue to be reviewed during 2019-20.

## 7.5. Bushfire Risk Mitigation

Bushfires are an inherent part of the Queensland environment. The vastness of the land, community centres and the resulting electricity network increases the risk of potential impact to the network. Failure of components of an overhead electricity reticulation system may also present a potential source of ignition and combined with unfavourable environmental conditions may increase the risk of a bushfire.

We are committed to best practice asset management strategies, and whilst ever evolving and changing, we will continue to adapt both strategically and operationally to ensure the safe and reliable operation of our network.

This includes the establishment of a Bushfire Planning Committee and the development and application of a Bushfire Risk Management Plan to target issues and initiatives relating specifically to bushfires.

A key component of the plan is to outline how assets are managed to minimise the risk of bushfires to the network, maintain customer supply reliability and ensure a high level of safety for the community during times of bushfire.

The Bushfire Risk Management Plan is published each year and contains a list of programs and specific bushfire initiatives for the next bushfire season. Programs include replacement of aged conductors, use of gas insulated switches in lieu of air break switches, replacement of sub optimal pole top constructions and utilises sparkless fuses in high bushfire risk areas. Pre-summer inspections are conducted in bushfire risk areas and high priority defects identified on the patrols are identified for rectification. The plan also identifies the requirement to report and investigate suspected asset related bushfires.

Geographical spatial systems and publicly available mapping layers are made available to the response staff to identify high risk bushfire zones to assist in planning and mitigation strategies as well as response activities.

Collaboration with Queensland Fire and Emergency Service (QFES) at both Local and District Disaster Management Groups in regional Queensland assists to identify and reduce bushfire threats. We have a responsibility to manage any risks associated with our network to ensure the safety of our customers, the general community and the security of electricity supply.

Energex has active participation with QFES on the Regional Inter-Departmental Committees for the North Coast Region (incorporating Sunshine Coast and Gympie) and South East Brisbane Region (incorporating Brisbane, Redlands and Gold Coast).

Our regional teams engage with Rural Fire Brigades and the public to raise awareness of the importance of protecting the electrical network assets when conducting planned burns, as well as general electrical safety during firefighting activities. Additional mitigation measures, introduced in higher risk areas, include creation of firebreaks around poles, trials of fire-retardant painting of wood poles and replacement of specific Expulsion Drop-Out (EDO) fuses and fuse carriers with current standard components that meet Spark Production Class A requirements as defined in AS1033.1.

An aerial monitoring program is conducted using LiDAR technology which is contributing to understanding and identifying bushfire risk through capturing the condition of clearances between the overhead network and vegetation, ground and structures and capturing major defects that have potential to ignite fires.

## 7.6. Flood Risk Mitigation

Many Queensland towns and cities are located within catchment areas, along major waterways and the east coast areas.

Queensland has many climatic zones across the state and as such experiences a range of storms, tropical lows and cyclones. The increase in rainfall and run off from these systems may have an immediate or delayed flood impact on population centres or electrical assets.

The Flood Risk Management Plan details information available to assist in the mitigation, planning and response to potential flood events. The plan includes the communication of safety related information for employees and the community to ensure a high level of safety for the community in the event of damage. A consolidated mapping system utilising internal collated data relating to asset impact in previous events and externally sourced information from government organisations assists to improve our knowledge, planning and response activities.

The Flood Risk Management Plan is reviewed by 31st October and details the approach and key activities to manage flood events and improve flood resilience to the network assets. This plan incorporates learnings from major flood events across Queensland which have the greatest impact on the electricity network and continuity of electricity supply to customers including ex-TC Debbie flooding in April 2017 and North Queensland and Townsville Monsoon Flooding in March 2019.

Additionally, flood mitigation works have previously been implemented in regional Queensland to minimise impacts for flood areas in cities such as Rockhampton, Mackay and Bundaberg following several major flood events.

These works include HV and LV isolation points to assist in isolating impacted areas as flood waters rise or where rising flood waters breach regulated line clearances. Sufficient isolation points were created so the isolation areas were kept to a minimum. Our regions have flood levels available in our geospatial systems to identify plant that needs to be de-energised at specific flood heights.

In some circumstances, supply is required to be isolated to areas which are not inundated but flood waters impact neighbouring areas supplied by the same system. This has caused considerable concerns for these customers. For these areas, where feasible, alternate supplies have been constructed to maintain supply.

Liaison officers work with the Local and/or District Disaster Management Group to implement any proactive or reactive isolation required.

## 8. EMERGENCY PLANNING AND RESPONSE

In the lead up to the 2019-20 summer storm season preparations have been undertaken to ensure our ability to respond to short notice and escalated severe events in a safe, efficient and effective manner. These include:

- Embedding the implementation of a best practice emergency response framework
- Preparing comprehensive contingency plans for improving how we prioritise and schedule work during major or widespread outages
- Implementing emergency response procedures covering management of major network incidents
- Development of a detailed Emergency Management Plan
- Ensuring appropriate resources and skills are available to respond to an emergency or disruption event
- Development of a mobilisation and resourcing strategy for maximum response efficiency
- Enhancing our use of technology to gather, analyse and disseminate critical information
- Completion of accredited training in Australasian Interservice Incident Management System (AIIMS) for all Emergency Managers and key emergency response roles.
- Annual scenario planning and conducting simulation exercises to test the effectiveness of the response during different conditions
- Proactive monitoring of weather patterns and forecasting, and
- Establishing and maintaining relationships with Disaster Management Groups at Local, District and State level.

### 8.1. Emergency Management

A comprehensive approach to emergency management has been adopted incorporating the Queensland Disaster Management guidelines emergency management phases of Prevention, Preparedness, Response and Recovery.

Our approach is documented through a hierarchical process with an overarching resilience strategy, primary Emergency Management Plan, regional Emergency Response Plans and business unit Emergency Support Plans.

These plans align with the Queensland Disaster Management Arrangements framework and are enacted for major events when required to enable us to respond efficiently and effectively in order to minimise electricity supply disruption across our service area.

We use an emergency framework that can be utilised for all hazards and emergencies. The framework is based on the Australasian Inter-service Incident Management System (AIIMS) that is commonly used by emergency services agencies and other large organisations. It also meets the good practice attributes of the Queensland Emergency Assurance framework. The framework provides a structured, yet flexible and adaptable approach, able to be scaled to suit an event and provide effective and efficient control of incidents. It ensures an improved inter-agency cooperation and use of common terminology.

The emergency framework has been tailored for our business and integrated into a wider resilience framework to ensure there are clear triggers to escalate from routine incidents and events through to large scale emergencies.

### 8.2. Prevention

Our response planning is based on an all-hazards risk assessment of potential events and associated business impacts. Where practicable, we endeavour to design, construct and maintain the electricity distribution system to mitigate loss of supply resulting from a disaster or other event and conduct regular analysis of the network to identify requirements. Additionally, post-event reviews are undertaken at all levels to analyse our response and identify improvement opportunities.



## 8.3. Preparedness

Disasters or emergencies may occur at any time, with little or no warning from major storms or advance warning from larger events (e.g. bushfire, cyclones and floods) and the response framework is structured to be flexible to able to attend to all.

A Summer Preparedness Steering Committee and a Summer Preparedness Working group have been established to ensure our business units have conducted sufficient preparations in the lead up to the summer storm season, providing a safe and robust network, sound emergency response procedures and safety awareness to the community. This includes outworking a detailed action plan to prepare the business for the Summer Storm Season and has representation from across the business.

To further enable us to manage disaster events, an annual review of response plans and processes, training and exercising key staff is undertaken. These are required for completion by 30th September each year. In addition, an independent organisation has reviewed the adequacy of the plans, its implementation and summer preparations.

## 8.4. Response

Response to any major disruption event will be tailored to the location and severity of the situation. The structure adopted recognises different levels of response depending on the seriousness of the incident's real or potential impact, and the level of resources and expertise required to manage the event.

We have three levels of response with a structured escalation process to ensure an appropriate and measured approach occurs.

For level one and two events we follow an escalated fault response model for small scale or short notice events. This model allows for flexibility in command and control structures, as well as the ability to escalate for additional resource support when required.

When an emergency escalates to, or a predicted emergency is identified for a level three event, a common framework is activated under the Emergency Management Plan.

For predicted level three events with lead times, the business will advise of its response status utilising phases aligned with Queensland Disaster Management Arrangements (Alert, Lean Forward, Stand Up and Stand Down). When any event is sudden or unexpected, the response may move rapidly through the relevant phases, while still ensuring that all actions to establish response teams, response centres, mobilise resources and communicate to all stakeholders are completed. The phases allow for the timely and coordinated effort to establish an appropriate response.

The main priorities immediately following the impact of an event is safety of employees and the community, identifying the number of customers affected, extent of damage, types of customers and availability of staff in terms of repair and network switching work. This information allows review and refinement of resourcing and restoration strategies and plans. Initially making the network safe for staff and the public occurs before restoration activities commence. Prioritisation of our restoration work is managed within the context of the relevant business operational plans. Where there are multiple interruptions to the network, the priority for restoration is to emergency services including as essential services, hospitals and emergency services.

We continue to enhance our mobile and digital technology platforms to assist in improving our ability to respond, analyse damage and perform repairs including the capture of near real time intelligence through our Field Force mobility, LiDAR and geospatial mapping systems.

## 8.5. Recovery

Recovery is the coordinated process to permanently restore the operational capability, the network infrastructure or electricity supply to the community. This is usually conducted in parallel with the emergency response and these activities may occur in the Stand Up and Stand Down stages. Follow on recovery activities can also be triggered when further permanent works have been identified to be completed after the emergency event during planned programs of work.

## 8.6. Resourcing Levels to Support Contingency Plans

A diverse range of skilled resources are available to be engaged both internally and externally:

- A field workforce of approximately 4,400 (including design, construction, maintenance, inspection and vegetation workers)
- Access to a significant external resource base for construction and maintenance, and vegetation management activities,
- Staff resources to provide safety advice, stakeholder and community engagement and logistics including accommodation coordination, field catering, supply and fleet support, and
- Leave rosters that are managed to ensure adequate availability of field resource for the summer period.

The geographic spread of our depots and resources assists in our response to network events. We are able to mobilise our resource capability across the state to meet the demands of any particular event.

## 8.7. Other Distribution Network Service Providers Assistance

At times, additional resources may be required to assist with a large scale response. Memorandums of Understanding (MoU) have been developed with Essential Energy, Endeavour Energy, Ausgrid and NT Power outlining the key principles and arrangements between the companies. As part of the annual preparation, a review of the MoU's is conducted. We also have arrangements in place for assistance from approved contractors.

## 8.8. Powerlink Joint Response

A MoU is maintained with Powerlink and includes protocols for the joint response to disasters or significant incidents where the assets of each organisation are impacted. During a significant network emergency, each emergency management team may need to consider common issues and priorities to determine the optimum overall response.

## 8.9. Queensland Fire and Emergency Services

MoU's have been developed with the QFES State Incident Management Team outlining agreed approaches relating to bushfires, confirming contacts, communication protocols and also relating to the sharing of data. These are reviewed annually as part of the bushfire mitigation management actions.

## 8.10. Liaison with Disaster Management Groups

Outside of disaster situations, our representatives liaise with and attend periodic meetings scheduled by the State Disaster Coordination Group (SDCG), District and Local Disaster Management Groups (DDMGs/LDMGs), providing input and advice on key issues such as emergency response, critical infrastructure, business continuity and the impact of planned disconnection of supply.

During disaster situations, our representatives liaise and co-ordinate responses with the SDCG, DDMGs and LDMGs, whilst independently maintaining a focus on restoration and safety of the electricity network. A Distribution Network representative and the Community, Customer and Corporate Affairs group will liaise with government departments and the SDCG.

## 8.11. Forecasting of Extreme Weather Events

Specialist weather forecasting arrangements are in place to provide a range of services to assist in preparation for severe weather events. The data is provided on a specific internet website and includes:

- Current wind speed, wind direction, temperature and humidity conditions
- Historical observations of this weather data
- Comments on observed data and weather patterns specific to our network areas
- A five day high resolution forecast of temperature and wind speed
- General forecasts and weather warnings
- Links to satellite and radar information and displays, and
- Longer term climate outlook forecast.

Access to this type of information, particularly days in advance or short notice for a pending severe weather event, enables us to make informed decisions on the potential impact of the threat, and prepare the necessary organisational response.

Annual pre-storm season briefings are also provided to key staff to assist in understanding the driving factors and potential impacts of the impending season.

## 9. COMMUNICATIONS

We are committed to keeping customers and stakeholders informed and engaged in the preparations for the summer storm season and during emergency events.

### 9.1. Customer Operations Planning and Improvements

In preparation for the 2019-20 storm season Customer Operations has continued to improve how we support, advise and respond to customers during these potentially difficult times.

This will be facilitated through a number of initiatives including improved Interactive Voice Response (IVR) responses, additional information on the web-based outage finder and for the Ergon Energy Network, the proposed implementation of a call back function on our General Enquiry line in regional Queensland.

A Disaster Assistance Program (DAP) provides contingency arrangements between our Contact Centres to provide assistance in a major event where capability is impacted.

### 9.2. Marketing and Customer Communications

For over 20 years, both Energex and Ergon Energy Network have built strong brand recognition as the public face of the electricity network to our customers and the primary information broker for electricity supply outage and restoration information. We have a strong and proven reputation of providing effective, timely, and accurate information during significant disruption events such as cyclones, floods, storms, bushfires, and peak demand (heatwaves) events.

Both Energex and Ergon use advertising to communicate with customers about how to prepare for storm and cyclone season, and how to be safe around fallen powerlines. The 'Take Care. Stay Line Aware' media campaign will be used this summer across both Ergon Energy Network and Energex areas to promote important safety messages, educate customers about the dangers of fallen powerlines, to be prepared for storms and cyclones, and where to find outage information and updates.

Safety advertising is placed in various channels including television, digital, cinema advertising, press and social media. It helps reinforce awareness of the dangers of fallen powerlines during storms, staying clear of fallen powerlines and contacting emergency services, Energex or Ergon Energy Network to report the danger.

The primary communication channels with our customers include direct contact via our National Contact Centres (including IVR messages), traditional media (print, radio and television), online (Ergon Energy Network and Energex websites, including Outage Finder tools) and social media (Facebook and Twitter). We also utilise State Government media channels, via the Crisis Communication Network, and through the partnership of Queensland Government Departments and Agencies.

### 9.3. Media, Community Relations and Digital Platforms

The media and community engagement teams deliver timely, accurate, and targeted communications to internal and external stakeholders before, during, and after major weather events. We utilise our local and state-wide media and community stakeholder relationships to keep the important storm season messages 'top-of-mind' throughout the storm season. Key messages are delivered through media releases and targeted stakeholder engagement to raise community awareness of weather-related issues, such as cyclone preparation and electrical safety.

These communications focus on delivering key safety messages, setting customer expectations regarding network restoration, and directs customers to the online Outage Finder for updates for to the National Contact Centre to report damage and faults.

During significant events, our Community Outreach teams are deployed within impacted communities to provide face-to-face customer engagement focusing on safety messages, restoration updates, the re-connection process (following inundation/structural damage), as well as referrals to Ergon Energy Retail for account services and assistance.

We also engage and inform customers on social media and the online Outage Finder to provide relevant and timely updates. These digital platforms have now become the more popular information and communication channels for customers.

Our event-activated online Storm Centre directs customers visiting our websites to important information on preparations, what to do during major storms and cyclones, and the general process we follow to restore supply to its customers in impacted areas. During major events the site is updated regularly with the latest information regarding the response and restoration efforts.

## 10. OUR SAFETY COMMITMENT

We continue to be committed to ensuring the health and safety of our people and the community and on being a leader in safety – to take performance into the top quartile of industry-recognised benchmarks.

This has meant placing a priority on developing a sustainable safety culture across the business, a culture where safety is inherent in everything we do.

Our Summer Preparedness Plan has included scenario planning and reviewing all emergency response aspects and continued refinement of safety systems, such as fatigue management and driving plans.

Our commitment to safety is also demonstrated by our determination to get our safety messages heard through our Community Electrical Safety Awareness Plan (CESAP). Underpinned by a detailed analysis of annual incident data, CESAP has evolved each year to address known community electrical incident problem areas using awareness campaigns targeted at industry sectors or extreme risk activities. This has seen a continued decline in community electrical safety incidents. These engagement efforts, and the specific communication activities discussed in this plan, are about ensuring that the risks associated with electricity are well understood.



## APPENDIX A. OPEX AND NETWORK CAPACITY AND SECURITY PROGRAM

Table 1 – Energex Network Capacity & Security Program, Pre-Summer 2019/20

Project Number	Project Name
C0607553	SSSMF Replace 11kV switchgear

Table 2 – Ergon Energy Network Capacity & Security Program, Pre-Summer 2019/20

Project Number	Major works
1177749	Safety Net Central COME CM-T1
1050191	GLSO - Briffney 11kV FDR 6021 - CH Energise 6021 at 11kV
1475727, 1475728, 1475730	CBD Cable Replacements
168194	Garbutt Powerlink Tx Replacement – EECL works

## APPENDIX B. MOBILE GENERATION

The following mobile generation is located across Queensland and may be available for use in an emergency event (if not in use for planned events).

Additional mobile generation assets may be hired from external providers using pre-arranged agreements for emergencies. These will be subject to availability.

**Table 3 – Mobile Generation - Ergon Energy Network**

Genset_ID	Generator Size ( kVA)	Location	Additional Details (generator controller)
MG-33-001	33	Cairns	Skid mounted, Black changeover
MG-60-001	60	Cairns	Trailer mounted, InteliGen
MG-60-002	60	Townsville	Trailer mounted, InteliGen
MG-60-003	60	Mackay	Trailer mounted, InteliGen
MG-60-004	60	Bundaberg	Trailer mounted, InteliGen
MG-60-005	60	Rockhampton	Trailer mounted, InteliGen
MG-60-006	60	Toowoomba	Trailer mounted, InteliGen
MG-150-001	150	Cairns	Skid mounted, InteliGen
MG-150-002	150	Cairns	Skid mounted, InteliGen
MG-150-003	150	Townsville	Trailer mounted, InteliGen
MG-150-004	150	Townsville	Trailer mounted, InteliGen
MG-150-005	150	Mackay	Trailer mounted, InteliGen
MG-150-006	150	Rockhampton	Trailer mounted, InteliGen
MG-150-007	150	Maryborough	Trailer mounted, InteliGen
MG-150-008	150	Toowoomba	Trailer mounted, InteliGen
MG-300-001	300	Maryborough	Trailer mounted, InteliGen
MG-300-002	300	Townsville	Trailer mounted, InteliGen
MG-300-003	300	Mackay	Trailer mounted, InteliGen
MG-300-004	300	Cairns	Trailer mounted, InteliGen
MG-300-005	300	Townsville	Trailer mounted, InteliGen
MG-300-006	300	Rockhampton	Trailer mounted, InteliGen
MG-300-007	300	Gladstone	Trailer mounted, InteliGen
MG-300-008	300	Bundaberg	Trailer mounted, InteliGen
MG-300-009	300	Toowoomba	Trailer mounted, InteliGen
MG-500-001	500	Cairns	Trailer mounted, InteliGen
MG-500-003	500	Townsville	Trailer mounted, InteliGen
MG-500-004	500	Rockhampton	Trailer mounted, InteliGen
MG-500-005	500	Toowoomba	Trailer mounted, InteliGen
MG-500-006	500	Mackay	Trailer Mounted, InteliGen
MG-625-001	625	Cairns	Container, InteliGen
MG-625-002	625	Cairns	Container, InteliGen
MG-1250-001	1250	Thursday Island	Container, InteliSys
MG-1250-002	1250	Thursday Island	Container, InteliSys
MG-1250-003	1250	Thursday Island	Container, InteliSys

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MG-1250-004	1250	Townsville	Container, InteliSys
MG-1250-005	1250	Mackay	Container, InteliSys
MG-1250-006	1250	Toowoomba	Container, InteliSys
MG-1250-007	1250	Mt Isa	Container, InteliSys
MG-1250-008	1250	Alpha	Container, InteliSys
MG-1250-009	1250	Cairns	CAT container
MG-1250-010	1250	Cairns	Cummins Container, InteliGen
MG-1250-011	1250	Cairns	Cummins Container, InteliGen
PEG-1500-001	1500	Cairns	HV Injection Skid
PEG-1500-002	1500	Toowoomba	HV Injection Skid
PEG-1500-003	1500	Mackay	HV Injection Skid
PEG-1500-004	1500	Cairns	HV Injection Skid
PEG-1500-005	1500	Cairns	HV Injection Skid

Table 4 – Mobile Generation – Energex Network

Genset_ID	Generator Size kVA (all trailer mounted)	Location	Additional Details (generator controller)
604	60	Geebung Depot	Comap InteliVision 5
606	60	Caboolture Depot	Comap InteliVision 5
607	60	Boonah Depot	Comap InteliVision 5
608	60	Southport Depot	Comap InteliVision 5
609	60	Gympie Depot	Comap InteliVision 5
610	60	Gatton Depot	Comap InteliVision 5
611	60	Maroochydore Depot	Comap InteliVSION 5
612	60	Greenslopes Depot	Comap InteliVision 5
613	60	Beaudesert Depot	Comap InteliVision 5
614	60	Greenslopes Depot	Comap InteliVision 5
1501	150	Geebung Depot	Comap InteliGen
1502	150	Geebung Depot	Comap InteliGen
1503	150	Geebung Depot	Comap InteliGen
5006	500	Kilcoy Sub	Comap InteliGen
5009	500	Kilcoy Sub	Comap InteliGen
5011	500	Esk Depot	Comap InteliGen
5014	500	Kilcoy Sub	Comap InteliGen
5015	500	Geebung Depot	Comap InteliGen
5016	500	Kilcoy Sub	Comap InteliGen
5017	500	Slacks Creek -Service provider \yard	Comap InteliGen
5018	500	Virginia – Service providers yard	Comap InteliGen
5020	500	Geebung Depot	Comap InteliGen
5022	500	Geebung Depot	Comap InteliGen
5025	500	Geebung Depot	Comap InteliGen

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5026	500	Mt Cotton- Service providers yard	Comap IntelliGen
5027	500	Mt Cotton- Service providers yard	Comap IntelliVision 5
5028	500	Geebung Depot	Comap IntelliVision 5
5029	500	Mt Cotton- Service providers yard	Comap IntelliVision 5
5030	500	Mt Cotton- Service providers yard	Comap IntelliVision 5
5031	500	Mt Cotton- Service providers yard	Comap IntelliVSION 5
5032	500	Slacks Creek -Service provider yard	Comap IntelliVision 5
5033	500	Rocklea – Service providers yard	Comap IntelliVision 5
5034	500	Slacks Creek -Service provider yard	Comap IntelliVision 5
5035	500	Southport Depot	Comap IntelliVision 5
5036	500	Bli Bli (North Coast)- Service providers yard	Comap IntelliVSION 5
5037	500	Bli Bli (North Coast)- Service providers yard	Comap IntelliVision 5
5038	500	Southport Depot	Comap IntelliVision 5
5039	500	Slacks Creek -Service provider yard	Comap IntelliVision 5
5040	500	Bli Bli (North Coast) – Service provider yard	Comap IntelliVision 5
5041	500	Slacks Creek -Service provider yard	Comap IntelliVSION 5
5042	500	Geebung Depot	Comap IntelliVision 5
5043	500	Geebung Depot	Comap IntelliVision 5
5044	500	Geebung Depot	Comap IntelliVision 5
5045	500	Geebung Depot	Comap IntelliVision 5
5046	500	Mt Cotton- Service providers yard	Comap IntelliVision 5
MG1	1250	Kilcoy Sub	Heinzmann Sitech
MG2	1250	Carole Park Sub	Heinzmann Sitech
MG3	1250	Kilcoy Sub	Heinzmann Sitech
MG4	1250	Bethania Sub	Heinemann Sitech
MG5	1250	Nudgee Sub	Heinemann Sitech