



Waipa Networks Limited

Asset Management Plan

1 April 2011 to 31 March 2021



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Waipa Networks Limited Asset Management Plan was

Certified by:	The Board	Directors, Waipa Networks Limited
Authorised by:	Ray Milner	Chief Executive Officer, Waipa Networks Limited
Prepared by:	Lee Goddard	Network Asset Manager, Waipa Networks Limited

Certification Date

This Asset Management Plan was certified by The Board that it describes actual processes and practices on 22 March 2011.

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1.0 Abbreviations

A, kA	Ampere, kilo-Ampere
ABS	Air Break Switch
AMP	Asset Management Plan
CAIDI	Consumer Average Interruption Duration Index
CAD	Computer Aided Design
CBG GXP	Transpower New Zealand Cambridge GXP
CIC	Transpower New Zealand Customer Investment Contract
DCDB	Digital Cadastral Database
DSD	Transpower New Zealand Detailed Solution Development
EDB	Electricity Distribution Business
GPS	Global positioning system
GXP	Grid Exit Point
ICP	Installation Control Point
IT	Information Technology
LINZ	Land Information New Zealand
MD	Maximum Demand
MVA	Mega-Volt-Ampere
MW	Megawatt
NCP	Network Connection Point
NCS	Napier Computer System
NIC	New Investment Contract
ODAF	Oil Directed Air Forced
ODV	Optimised Deprival Value
PILC	Paper Insulated Lead Cover
POS	Point of Supply
RMU	Ring Main Unit
RTU	Remote Terminal Unit
SAIDI	System Average Interruption Duration Index
SAIFI	System Average Interruption Frequency Index
SCADA	Supervisory Control and Data Acquisition
SCI	Statement of Corporate Intent
SSR	Transpower New Zealand Solution Study Report
TMU GXP	Transpower New Zealand Te Awamutu GXP
Transpower	Transpower New Zealand Ltd
V, kV	Volt, kilo-Volt
Waipa	Waipa Networks Ltd
XLPE	Cross Linked Polyethylene

2.0 Summary of Asset Management Plan

This summary provides an overview of the content of Waipa Networks Ltd AMP.

Waipa Networks Limited (Waipa) is the EDB that owns and operates the distribution assets in Cambridge and Te Awamutu and their surrounding rural areas in the Waikato region. Waipa's distribution system covers 1,865 square kilometres. The Company is owned by the Waipa Networks Trust (the shareholder who represents all connected consumers).

Waipa conveys electricity on behalf of 9 Energy Retailers from Transpower's Cambridge and Te Awamutu GXPs via 24 radial 11kV feeders, 11kV/400V transformers and associated 400V/230V reticulation to 23,161 ICPs as at 31 March 2010.

The AMP is a key document that provides a systematic governance and management framework for managing Waipa's assets and informs Waipa's stakeholders of the Company's policies for investment, maintenance and retirement of assets, operating the network in a prudent manner, ensuring security of supply and setting network reliability targets for different consumer groups. The AMP also meets the Commerce Commission's Electricity Distribution (Information Disclosure) Requirements 2008.

The document describes the Company's business planning cycle, its relationship and interaction with Waipa's Purpose, annual business plan, capital and operational budgets and Statement of Corporate Intent (SCI).

The AMP was approved by Waipa's Board of Directors on 22 March 2011. It discusses new investments with Transpower and all network capital and maintenance works together with their associated budgets that are reasonably expected to be undertaken over the next 10 years.

The document identifies Waipa's stakeholders and their interests in the Company. It discusses the Company's priorities for managing stakeholder conflicts to ensure that; public and employee safety is not compromised, solutions are financially and operationally viable and compliant with best EDB practice, and quality of supply is not compromised.

The Waipa Network Trust and the Company business aspirations are aligned through the SCI and as a consequence there have been no material conflicts of interest between the Company and shareholder.

The AMP describes who is responsible and accountable for asset management from governance, executive management and operational perspectives.

The document describes the Company's asset management process, systems and quality of information. Waipa believes it has developed three robust asset management information systems (SCADA system, geographical information system, and an integrated data warehouse system) that are appropriate for the size of the network, number and type of distribution assets, its financial and administrative business needs, consumer needs, and other stakeholder requirements.

The AMP describes the network configuration and the location, numbers and types of distribution assets owned by the Company. Waipa has gathered comprehensive information on the physical attributes and condition of its assets through routine visual and thermal surveys, and, specific partial discharge and corona surveys as required. Based on Waipa's asset age profiles the Company doesn't expect any "wall-of-wire" issues over the next 10 years.

The document specifies Waipa's service level targets for various segments of the network and other business performance targets. These targets have been set through analysis of customers' satisfaction surveys and consultation with stakeholders and as outcomes of the Company's Purpose statement. Waipa believes that its customers are satisfied with the current reliability of the network, as a result of independent surveys, and notes the fact that the Company has some of the lowest line charges in New Zealand.

Te Awamutu is supplied by only one Transpower 110kV transmission line from Karapiro. The Company believes this is unacceptable.

Waipa has had protracted discussions with Transpower over many years to provide a reasonably priced technically robust second supply to Te Awamutu that meets the regulatory criteria. The Company engaged an independent consultant in 2010 to progress this project. The Company would prefer a second line to be built from Hangatiki to Te Awamutu because it will also offer improved reliability and a permanent reticulation solution for all the western feeders.

Transpower acknowledges that the Karapiro to Te Awamutu transmission line is statistically one of their most unreliable supplies. The poor performance of this line coupled with the need to regularly maintain equipment at the Karapiro and Te Awamutu GXPs every 4 years requiring planned outages has driven Waipa to execute a DSD with Transpower for the provision of 'super n' construction at Te Awamutu and Karapiro.

Through a Transpower CIC in 2001 the transformer capacity constraint at Cambridge GXP was removed. However, there remains a capacity constraint on Transpower's aged 11kV switchboard at Cambridge GXP. Waipa has executed a DSD with Transpower to install a new switchboard to remove the constraint and provide additional switches for improved reliability through feeder splitting. This new switchboard will be commissioned in 2011/2012. Through a Transpower CIC in 2006 Waipa has removed all transformer and switchboard capacity constraints at Te Awamutu GXP.

The AMP discusses the Company's asset management criteria (quality, capacity, reliability and security of supply) and the planning assumptions (rate of GXP and Company feeder load growth) and the methods adopted to prioritise projects.

Subject to actual load growth aligning with predictions the only constraint likely to occur within the next 10 years is a voltage constraint on the Company's longest feeder supplying Kawhia. Waipa propose to commission a diesel generator in 2015/2016 for voltage support. Waipa's preferred reticulation solution for all the western feeders is to install a 110kV/11kV point of supply at Ngutunui. The Ngutunui point of supply would be fed from a spur line off the proposed Te Awamutu – Hangatiki 110kV line.

Waipa will continue its strategies of splitting feeders, installing reclosers to segment feeders and installing DDOs on spur lines where improvement of reliability can be achieved.

Transit NZ has indicated that the Cambridge Bypass is likely to commence in September 2012. It is expected that this work will be completed by July 2015. The project will impact on all the Company's Cambridge feeders.

The document describes Waipa's life-cycle maintenance criteria (is the asset safe and "fit for purpose") and physical condition asset surveys which drive the Company's maintenance works. The first condition survey completed in January 2006 revealed 2479 asset defects the last of which was eliminated during 2010. A second asset condition survey commenced in 2010 and has identified 365 defects as at 31 January 2011. Any defects identified will be eliminated on a prioritised basis. The Company has a vegetation management programme that will maintain current reliability and an earth testing and repairs programme which will ensure system safety. Waipa employs an external service provider to carry out an annual thermal survey. Any thermal defects identified will be eliminated as a matter of priority.

The Company employs external service providers for partial discharge and corona surveys when required.

Waipa intends replacing all remaining oil-filled RMUs with SF₆ RMUs over the next 2 years. Waipa also has a number of “spa pool” pad mounted substations that no longer comply with modern industry standards. These will be replaced with modern pad mount substations over the next 3 years. The Company has a number of aged two pole hardwood platform transformer structures that will be replaced by either a single pole transformer substation or a pad mounted substation over the next 5 years. The Company has a number of aged ABSs on its 11kV feeders whose operation is becoming unreliable. These ABSs will be progressively replaced by either SF₆ gas switches or modern ABSs according to the fault duty rating required.

Where Waipa identifies, through surveys, significant portions of deteriorated 11kV or/and 400V lines The Company evaluates the option of replacing these with under ground reticulation for compliance and public safety on a case by case basis.

Waipa has assessed the risk from physical threats to its network posed by naturally occurring hazards (wind, lightning, flood, land erosion, earthquake, volcanic eruption, geothermal activity and adverse weather) and concludes the risk is minimal and any damage to assets can be dealt with using Company and contracted resources. Waipa has a simple radial network and it is confident that it can restore power safely and in an orderly manner after a major event. Waipa has back-up systems for its business systems and SCADA system to continue operating the business in the event of a major incident.

In 2010 part of Transpower’s new switchboard at Te Awamutu failed in service. As a consequence of this significant incident the Company has prepared comprehensive contingency feeder switching plans and is supporting a Transpower initiative to procure a mobile substation that can be transported to any GXP site for any similar future event.

The Company has prepared Participant Outage Plans for immediate and developing system events as required by the Electricity Authority.

Waipa welcomes distributed generation on its network: to date the Company has received few enquiries.

The Company believes its asset management process, predictions on load growth, procedures to identify future network constraints, routine network asset surveys and commitment to improve network reliability, enable Waipa to make informed asset management decisions regarding existing assets, non-asset solutions, procuring new assets and retiring assets. Waipa believes that any “incompleteness” of asset data will not be material when making asset management decisions.

While the Company continually seeks to improve its existing information systems no radical changes of systems is contemplated.

Waipa is confident its proposed capital enhancements of the network and asset maintenance regimes over the next 10 years will provide adequate capacity for growth, improve security, quality and reliability of supply, and will ensure aged assets are replaced, preserving the value of the network and its ability to convey electricity safely.

3.0 Background and Objectives

3.1 Purpose of the Plan

The primary purpose of this AMP is to provide a governance and management framework that ensures Waipa:

- sets service levels for its electricity network that reflect safety, customer, community and regulatory requirements.
- based on expected service levels, it understands what network capacity, reliability and security of supply will be required both now and in the future and what issues drive these requirements.
- has a robust and transparent process for managing all phases of the network life cycle from concept to disposal.
- has adequately considered the classes of risk implicit in all lifecycle activities and that it has systematic processes in place to mitigate identified risks.
- has made adequate provision for funding and resourcing all phases of the network development.
- makes decisions within systematic and structured frameworks at each level within the business and that it specifically does not make ad-hoc decisions.
- has an ever increasing knowledge of its asset locations, ages, conditions and the networks likely future behaviour as it ages and may be required to perform at different levels.

A secondary purpose of the AMP is to inform Waipa's stakeholders of the Company's:

- policies for investment, maintenance and retirement of assets,
- policies for operating the network in a prudent manner,
- security of supply and network reliability targets for different consumer segments,
- major network developments and enhancements over the next 10 years, and
- annual capital and maintenance budgets.

This AMP meets the legislative requirements of Requirement 7 of the Commerce Commission's Electricity Distribution (Information Disclosure) Requirements 2008 issued 31 October 2008 and Chapter 4 of the Electricity Information Disclosure Handbook issued 31 March 2004 (the AMP Requirements).

This AMP endeavours to meet the needs of external users and addresses information gaps to enhance the transparency of disclosure by identifying deficiencies and promoting improvements.

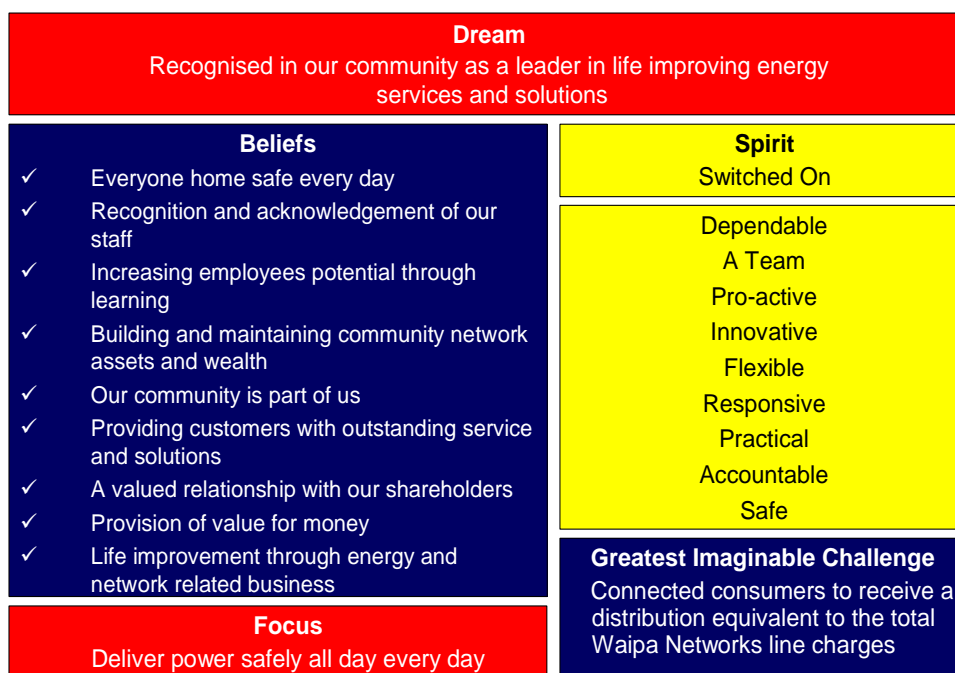
3.2 Interaction with Corporate Goals, Business Planning Process and Plans

Waipa's Business Planning Process is outlined as follows.

Waipa Networks Purpose

At the annual Strategic Planning Meeting (held each September) Company Directors and Executive Management establish Waipa's Purpose statement which is summarised in the following chart.

Waipa Networks Purpose



Asset Management Plan

At an annual Strategic Planning Meeting held in September 2008 Company Directors and the Executive Management reviewed the AMP taking into account past network physical and financial performance, the current SCI and information affecting future network performance and expenditure.

This AMP is predicated on Waipa's Focus:

Deliver power safely all day and every day

This AMP maintains a high level focus on Waipa's Beliefs:

Building and maintaining community network assets and wealth

Our community is part of us

Provision of value for money

Life improvement through energy and network related business

This AMP focuses on network asset management related matters. It does not discuss business or financial matters related to the non-network asset management aspects of Company.

Annual Business Plan and Budgets

The Annual Business Plan and Budgets are based on the AMP and provide implementation details and the financial ability to achieve the outcomes of the AMP. The Annual Business Plan, Network Capital and Operational Budgets are approved by Directors at Waipa's March Board meeting each year.

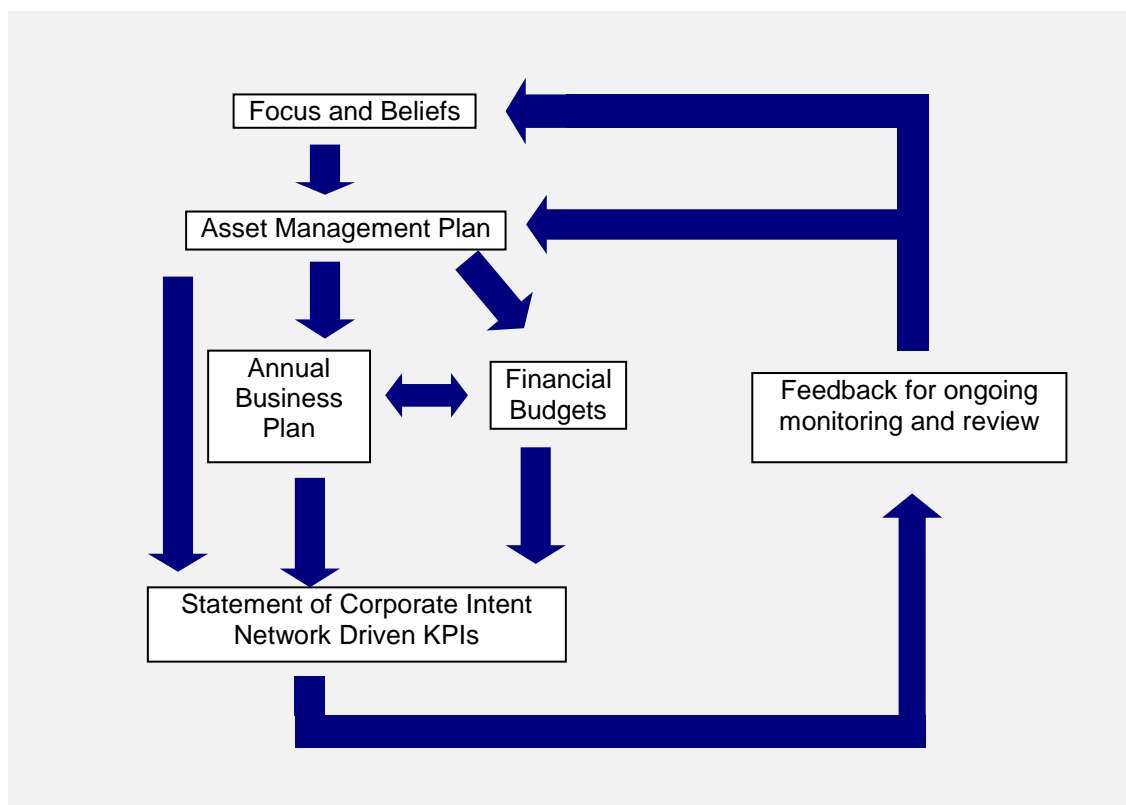
Statement of Corporate Intent

The SCI is derived from the AMP, Annual Plan, and full financial budgets. The SCI sets agreed KPIs for the Company's physical and financial performance for 3 financial years. The SCI is approved and adopted by the Waipa Networks Trust (Waipa's shareholder) by 31 May each year.

Company Directors report to Waipa Networks Trust in June and December on Waipa's actual physical and financial performance against the SCI targets. A gap analysis on significant variances provides an important input for Directors and Executive Management at their annual Strategic Planning Meeting.

This feedback closes the Business Planning Process cycle shown below.

Business Planning Process Cycle



3.3 Period Covered by Plan and Date Certified

This AMP identifies all new investments with Transpower, and capital and maintenance works on the network that are reasonably expected to be undertaken over the next 10 years between 1 April 2011 to 31 March 2021.

This AMP was certified by Waipa's Board of Directors that it describes the Company's actual processes and practices on 22 March 2011.

3.4 Stakeholder Interests

The following table identifies Waipa's stakeholders, how they relate to Company and their reasons for doing so.

Stakeholders	Relationship / Interface	Nature of Interest
Electricity consumers	Beneficiaries of Waipa Networks Trust Independent surveys Consultation meetings Daily direct and indirect feedback and interactions	Network reliability Quality of supply Controlled supply Bi-annual discount New connections Service requests Safety Charges
Fonterra	Conveyance agreement Ad-hoc meetings	Network capacity Network reliability Quality of supply Charges
Land owners	Building or maintaining assets on private land	Liaison for work Access agreements Compensation for loss or damage
Property owners	Vegetation control	Maintaining trees clear of electricity lines
Waipa Networks Trust	Shareholder Bi-annual meetings	Return on investment Bi-annual discount Sustainable business Responsible corporate behaviour SCI and KPIs
Electricity Retailers	Interposed use-of-system agreements Ad-hoc meetings	Line charges and methodology Line losses Billing accuracy and timeliness Retailer services Quality of supply Customer concerns
Waipa, Otorohanga, Waikato, Waitomo District Councils, Environment Waikato	Utility service provider Road requirements Regular meetings RMA / Planning	District & Regional planning requirements Traffic Management Utility services locations Co-ordinated street openings Street lighting
Transit NZ	Road user requirements Ad-hoc meetings	Traffic management Street lighting
Other utility operators	Road user requirements Ad-hoc meetings	Utilities services locations
Transpower	Transmission Agreement New investment contracts Monthly meetings	Capacity of grid and connection assets Reliability of grid and connection assets Security of transmission lines
Government / Regulatory Electricity Authority Commerce Commission Ministry Economic Development Auditor General Inland Revenue	Electricity Distribution Business legal operating framework Ad-hoc meetings, discussions and correspondence	Changes to Industry Environment Submissions on proposed changes Information Disclosure compliance Compliant business practices Electricity Complaints Commission
Industry Suppliers	Goods & services provider	Products and services
Waipa Employees	In house Company work force	Zero injuries Healthy employment environment Individual training plans Personal growth opportunities/etc
Electricity & Gas Complaints Commission	Customer complaints	Customer complaints

Waipa is an EDB owned by Waipa Networks Trust whose beneficiaries are the electricity consumers connected to the Company's network.

Consumer interests are ascertained by independent surveys, consultation meetings, direct and indirect feedback on the Company's plans, performance, and service delivery.

Other stakeholders include Energy Retailers, by virtue of interposed use-of-system agreements, Waipa, Otorohanga, Waikato and Waitomo District Councils with district planning issues, Environment Waikato, Transit NZ and other utility operators with common reticulation concerns, and various government agencies with monopoly business and information disclosure requirements.

Waipa's commercial, energy efficiency, customer service, security and reliability of supply, compliance, staff, and social and community objectives are outlined in the SCI, the essence of which is expressed in the Company's Purpose and Focus:

Recognised in our community as a leader in life improving energy services and solutions

Deliver power safely all day every day

The interests of stakeholders are recognised and conveyed to the Company by Waipa Networks Trust, Waipa Networks Board of Directors, and by the Company's customers, connected consumers and employees.

From an asset management perspective the interests of Waipa's stakeholders are addressed by ensuring:

- Creation and maintenance of a safe and reliable distribution network,
- Quality of supply performance meeting consumers needs,
- Optimisation of capital and operational expenditure,
- Maintaining a sustainable business that caters for consumers growth requirements,
- Comprehensive risk management strategies and planning for contingencies,
- Due consideration to the environmental impact of Waipa's operations,
- Regulatory and legal compliance,
- Economically efficient pricing methodologies,
- Security standards reflecting consumers needs,
- Robust network growth and development plans are prepared, and
- Comprehensive asset replacement strategies are developed.

No material conflicts of interest have arisen between the Company and the Waipa Networks Trust who represent the consumer /owners of the Company.

However, where conflicts arise between other Stakeholders defined in the above table Waipa's priorities for managing these conflicts are to ensure that:

- public and employee safety is not compromised,
- the solution is financially and operationally viable,
- the quality of supply is not compromised,
- the solution is in compliance with best EDB practice, and
- customers' reasonable expectations are met.

3.5 Accountabilities and Responsibilities for Asset Management

Waipa's Network Management team determines the network enhancement and asset maintenance programmes, the various security of supply levels, and the standards for automation and system operations that will improve network reliability and technical and economic efficiency.

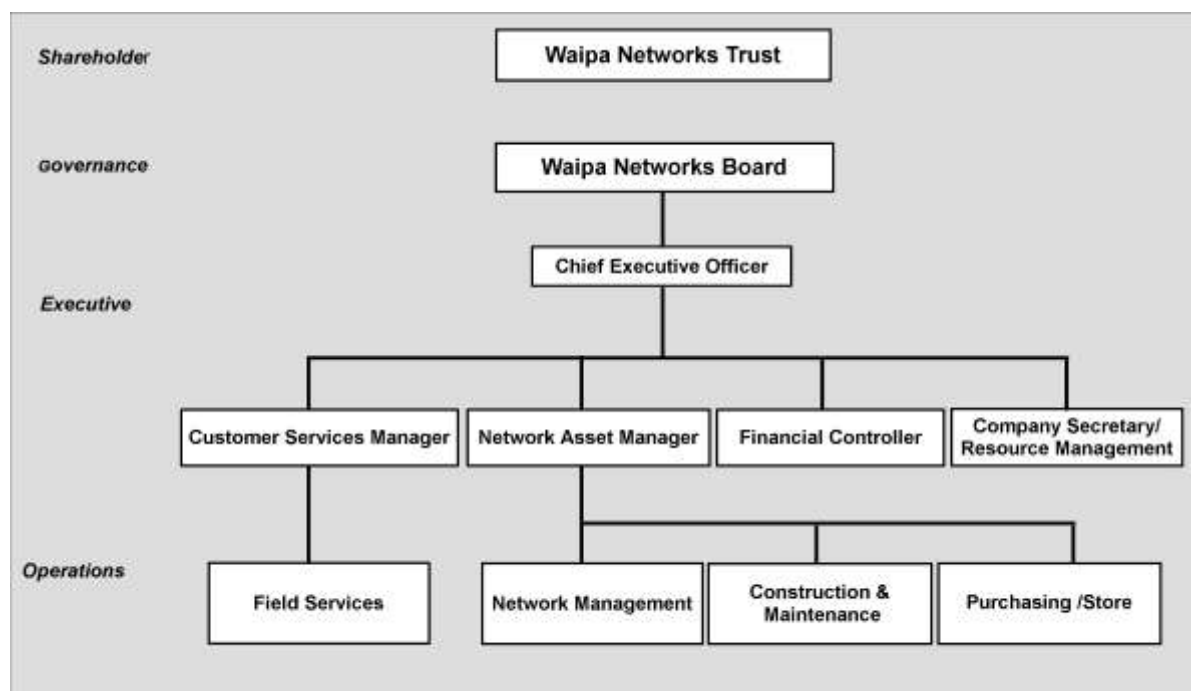
All network capital and operational works and associated budgets identified by the Network Management team are tabled at the Company's September Strategic Planning meeting for Directors' information, evaluation and appropriate approval.

The AMP is prepared by the Network Asset Manager, authorised by the Chief Executive and certified by the Company's Directors the following March.

Waipa's Chief Executive provides monthly reports to the Company's Directors on progress against targets of the annual capital and maintenance plans, system reliability and performance targets.

Waipa's Board reports to Waipa Networks Trust bi-annually on progress against the targets and plans agreed in the SCI.

An organisation chart depicting Waipa Networks Trust, Waipa's Board of Directors, Executive Management and Operational positions responsible for asset management planning and disclosure is shown below.



The Network Asset Manager holds the prime responsibility for preparing the AMP and the Company's Financial Controller has a significant input.

The Network Asset Manager's direct reports: Customer Connections Supervisor, Design & Projects Engineer, Construction & Maintenance Supervisor, Planning Officers, and Network Information Officer have significant input by identifying the required capital and operational works. The Customer Services Manager and his direct report, the Field Services Supervisor, also have significant input into the AMP. Most of the information used in the preparation of this AMP was determined by the Waipa's Network Management team.

The Company currently has the ability to carry out the majority of all planned and unplanned cable, pole line work and vegetation management. However, the Company elects to use both internal and external contracting resources as appropriate to ensure construction and maintenance costs remain competitive.

Waipa has used independent contractors to GPS, attribute and condition assess the pole line assets, carry out thermal surveys, partial discharge surveys, and perform load flow studies. This information is used by the Company's Network Management team for condition-based maintenance and replacement of electricity assets and network enhancements.

The Company has contracted out Control Room and Call Centre services, SCADA and communication work, and traffic management on State Highways.

Waipa continually reviews the performance and cost effectiveness of services that are currently contracted out.

3.6 Asset Management Systems, Processes and Information

Asset Management Systems

Waipa operates three asset management systems to manage its existing assets, plan network development and measure network performance. These systems comprise an Abbey SCADA system for network supervisory control and data acquisition, an AutoCAD system for geographic asset information, and a Napier Computer System which provides an integrated data warehouse.

The Company's uses of these asset management systems are shown in the following table.

Asset Management System	Uses
Abbey SCADA Supervisory Control & Data Acquisition	<ul style="list-style-type: none"> • System control • Load control • Operational status • Load flow data • Voltage data • Alarm and fault data • Reliability data
AutoCAD Geographic Asset Information	<ul style="list-style-type: none"> • Asset geographical location data • System schematics and reticulation plans • System operations • Construction plans • Design standards • Network design • Owner, road and property boundary data
Napier Computer System Integrated Data Warehouse	<ul style="list-style-type: none"> • Installation Control Point data • Complete consumer data base including call and fault history • Call centre enquiries • Planned outage notification • Outage (planned and unplanned) data • Asset data (type, number /length, age, value, ODV) • Network condition assessment and vegetation data • Financial Applications (General Ledger, Creditors Ledger, Debtors Ledger, Banking Transaction processing, Payroll, Human Resources, Stores, Purchase Orders, Asset Register (Financial and taxation)) • Disclosure

Supervisory Control and Data Acquisition System

The prime function of SCADA is to provide a real time interface with the network which enables the safe operation and management of: network assets, reliability of supply and system peaks.

Data and alarms acquired from field assets are brought back via Waipa's radio communication system to the Control Centre and displayed for the System Operators to remotely monitor and control equipment for optimal network performance.

The data collected includes feeder currents, voltages, real and reactive power, power factor and asset operational status. Relevant data is archived in the Integrated Data Warehouse. This information is used to establish network asset maintenance programs, plan network developments and measure and disclose network performance.

The SCADA system manages ripple injection plants at both Te Awamutu and Cambridge to control the load over peak times at GXP and/or feeder level.

Geographic Information System

The prime function of the Geographic Information System is to provide the physical location and electrical connectivity of all Waipa's network assets so that they are safely operated by the System Operators and field crews and effectively managed by the Network Information Officer and Planners.

The Company's assets have been surveyed (completed January 2006). The data collected included asset locations, their physical and electrical attributes and condition. The spatial information has been overlaid with property boundaries within the geographic information system. The electrical connectivity from each ICP through to the Transpower GXP has been proven. The asset physical and electrical attributes and condition status is archived in the Integrated Data Warehouse.

The on-going focus of the Network Information Officer is to ensure that network asset information is updated in a timely manner in the Geographic Information System and Integrated Data Warehouse System.

Asset geographical, physical and electrical attribute data is used for network development, design and consumer connections. The asset condition information is used to establish prioritised network asset maintenance programs.

Integrated Data Warehouse System

The key function of the Integrated Data Warehouse System is to provide a single repository for all data which is held in specific data bases and all the necessary applications for Waipa to operate and manage its EDB. All the data bases and applications can be accessed through a web browser.

The salient data bases are:

- ICP
- Call Centre Enquiry
- Outage
- Asset Equipment
- Substation
- Site
- Condition, and
- Financials

ICP Database

The ICP database is used by the Call Centre for their daily operations and to provide information to the Outage database for the calculation of network reliability performance. The ICP database contains a complete history of all outages and recorded customer comments.

ICP data comes from the customer, retailers and electrical inspectors and Waipa itself. Some of the data transferred between these parties relies on manual processes and routine checks are in place to ensure data integrity. The ICP database is continually updated with new and disconnected customers.

Call Centre Database

Waipa has contracted its call answering and dispatch activities to a remotely located Call Centre. The Call Centre logs all incoming and outgoing dispatch calls in the Call Centre database. The Call Centre relies on the ICP Database information for its operation.

SCADA information is used in an Interactive Voice Response system which updates customers with known outage information and expected restoration times.

Outage Database

Waipa operates a manual planned and unplanned Outage database.

For planned outages switching instruction sheets are prepared identifying areas of network affected. These are used to prepare shutdown advertising sheets to notify Retailers and customers of the planned outage. The details of the intended shutdown are recorded in the Outage database. Actual switching times on the actioned switching instruction sheets are used to update the Outage database.

For unplanned outages the details are recorded on an emergency switching instruction sheet by the System Operator. This information is used to compile an unplanned outage report. These reports are checked by the Network Asset Manager before the details are entered into the Outage database.

Customer numbers for both planned and unplanned outages are sourced from the ICP database. Customer numbers can be obtained by feeder, module (section of network between 11kV switching points) or individual transformer level. The ICP database is continually updated with new and disconnected customers.

This data enables the calculation of SAIDI and SAIFI for each outage. The impact of each outage is summed to generate the outage statistics for measuring network performance for disclosure purposes. This information is also used to identify potential problems on the network and is used in the planning process.

Asset Equipment Database

Waipa's Asset Equipment database comprises a number of subset databases which contain comprehensive physical, electrical, location, and valuation information on substations, transformers, switchgear, voltage regulators and sites.

This Asset information is used for network design, ODV and disclosure.

Asset Condition Database

The asset condition survey information is linked to the Asset databases and is used to prioritise Waipa's preventive maintenance program.

Financial Systems

Waipa has the following interlinked financial applications within the Integrated Data Warehouse essential for the operation of an EDB:

- General Ledger,
- Creditors Ledger,
- Debtors Ledger,
- Banking Transaction processing,
- Payroll,
- Human Resources,
- Stores,
- Purchase Orders, and
- Asset Register (Financial and Taxation).

Asset Management Process

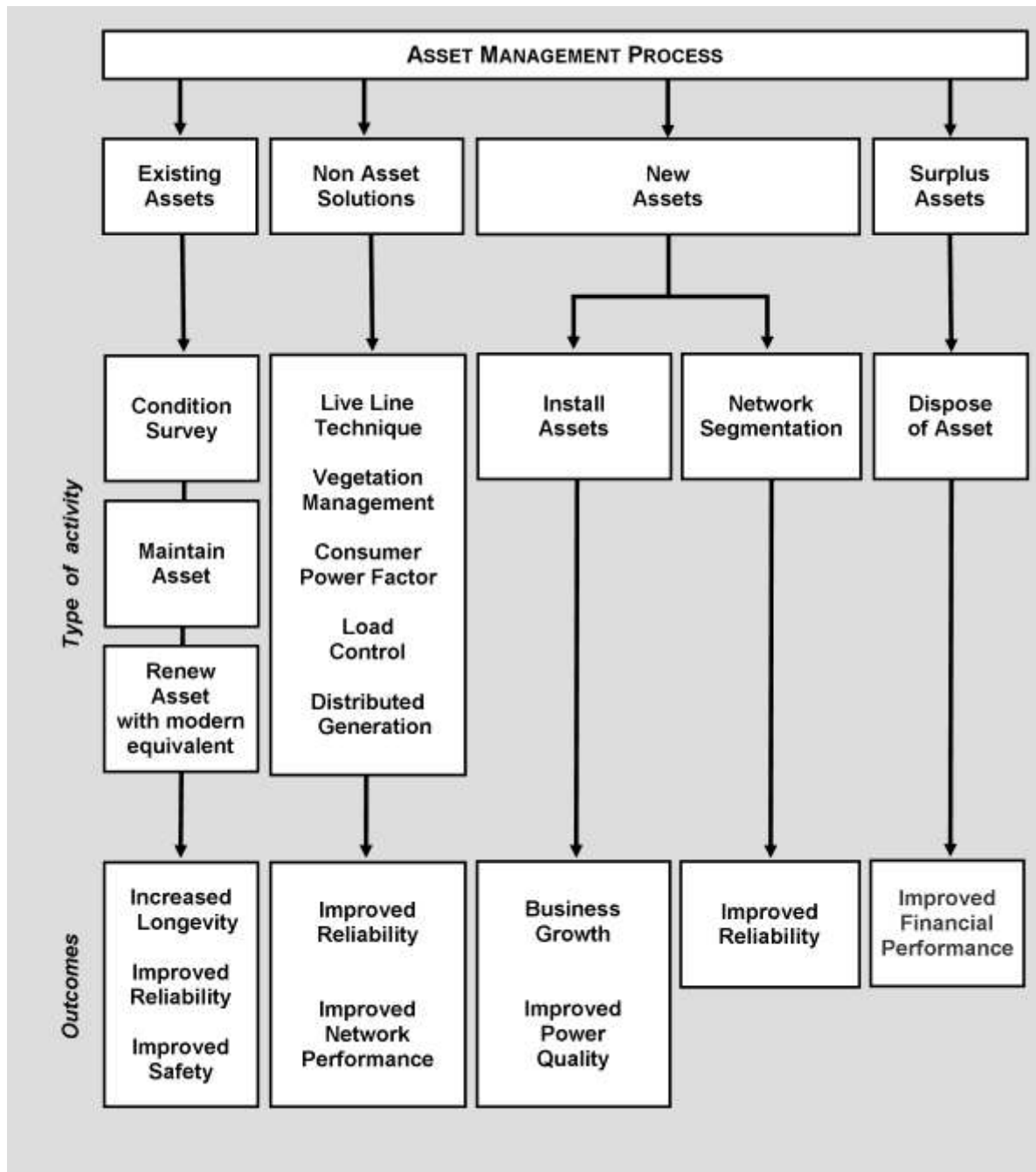
Waipa's asset management process covers the activity associated with the management of:

- existing assets through their life cycle,
- non-asset solutions to address network issues,
- the creation of new assets, and
- the disposal of surplus assets.

The Company's desired outcomes of the various asset management activities:

- increased asset longevity,
- improved network reliability,
- improved network safety,
- improved power quality,
- improved financial performance, and
- business growth

are shown in the following diagram.



Asset Management Information

Waipa's network survey which was completed in January 2006 provided the Company with comprehensive information on all assets their location, physical and electrical attributes and condition at the time of survey.

Electrical connectivity has been proven from each ICP through to their respective Transpower GXP.

The on-going focus of the Network Information Officer is ensuring that network asset information is updated in a timely manner in the Geographic Information System and Integrated Data Warehouse System; this enables Waipa to have a high degree of confidence in the accuracy of its asset management information.

Waipa has developed and operates robust asset management information systems appropriate for:

- the size of the network and number and type of distribution assets,
- the Company's financial and administrative business needs,
- consumer needs, and
- other stakeholders' requirements.

4.0 Assets Covered

4.1 Distribution Area

Waipa is the EDB that owns and manages electricity distribution assets in Cambridge, Te Awamutu and surrounding areas, which are predominately in the local authority areas of Waipa and Otorohanga Districts, with minor reticulation in part of the Waikato District south of Hamilton, and Waitomo District south of Kawhia.

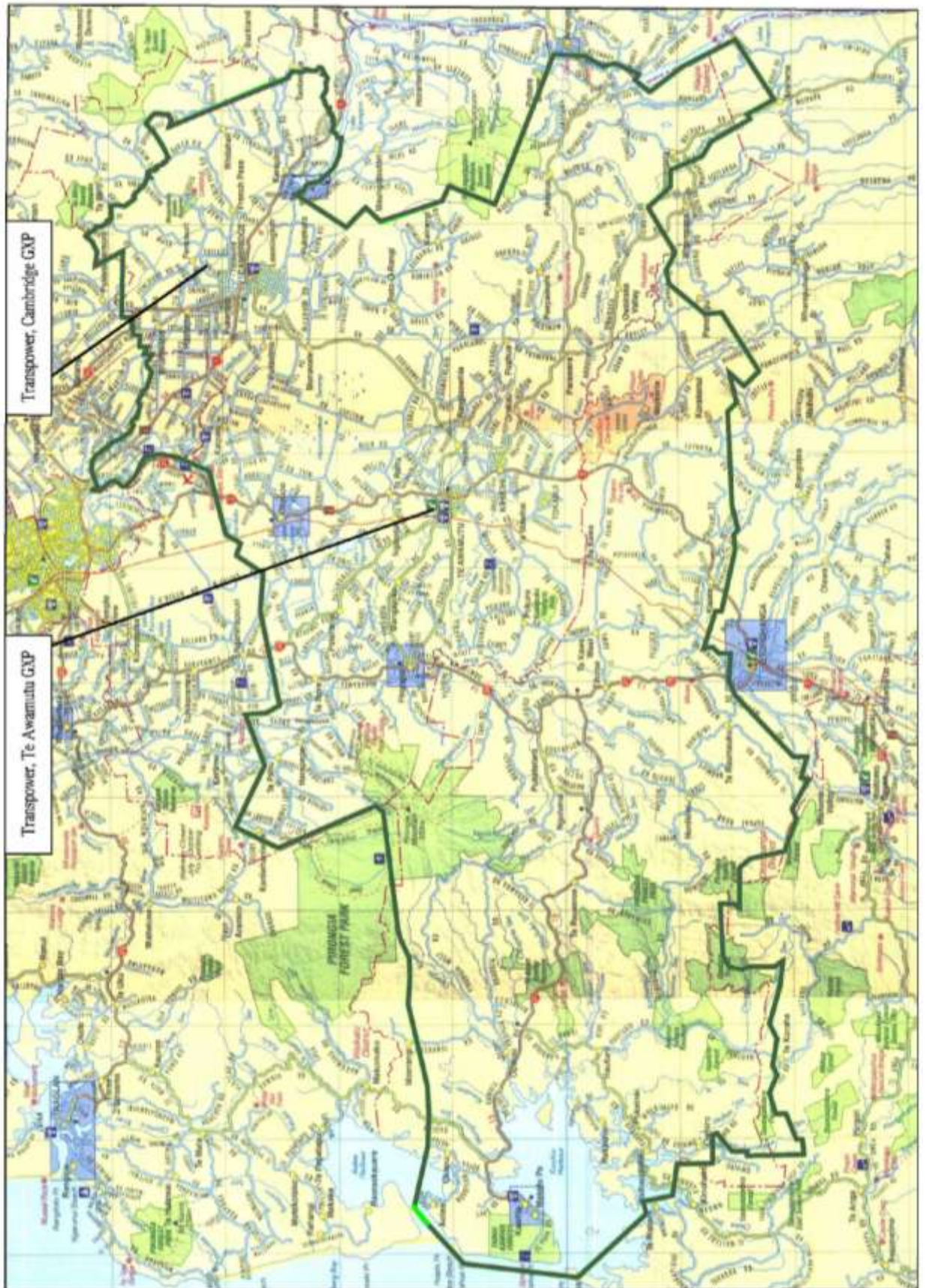
In the urban and suburban areas of Cambridge, Leamington, Te Awamutu, Hairini, Kihikihi, Ohaupo, Pirongia and Kawhia the Company's distribution assets are generally located within road reserve.

In the rural areas of Tamahere, French Pass, Roto-O-Rangi and Kaipaki that surround Cambridge, and in Paterangi, Pirongia, Pokuru, Kiokio, Waikeria, Pukeatua, and Mystery Creek that surround Te Awamutu, the Company's distribution assets are generally located within road reserve, however there are areas where these assets traverse private property as the most economic way to reticulate the area.

In the remote rural areas of Kawhia and Hauturu with low population densities there are significant areas where the Company's assets traverse private property.

Waipa conveys electricity on behalf of 9 Retailers from Transpower's Cambridge and Te Awamutu GXP's via 24 radial 11kV circuits, 11kV/400V transformers and associated 400V/230V reticulation to 23,161 consumer installations (as at 31 March 2010).

Waipa's distribution system covers 1,865 square kilometres. The area reticulated is shown on the following map.



Larger Consumers

Waipa supplies two large Fonterra dairy factories located at Hautapu and Te Awamutu. The Hautapu factory is 3.5 km from Cambridge GXP and is supplied via two dedicated 11kV service mains. The Te Awamutu factory is located 1km from Te Awamutu GXP and is supplied via two dedicated 11kV service mains. Fonterra contracts every year with Waipa for each factory's MD requirement. Currently, Hautapu MD requirement is 10MW and Te Awamutu MD requirement is 4.5MW.

Fonterra's MD requirements have a significant impact on Waipa's system peak load control regime and available capacity at Transpower's Cambridge and Te Awamutu GXPs.

There are no other large consumers that have a significant impact on Waipa's network operations or asset management priorities.

Load Characteristics

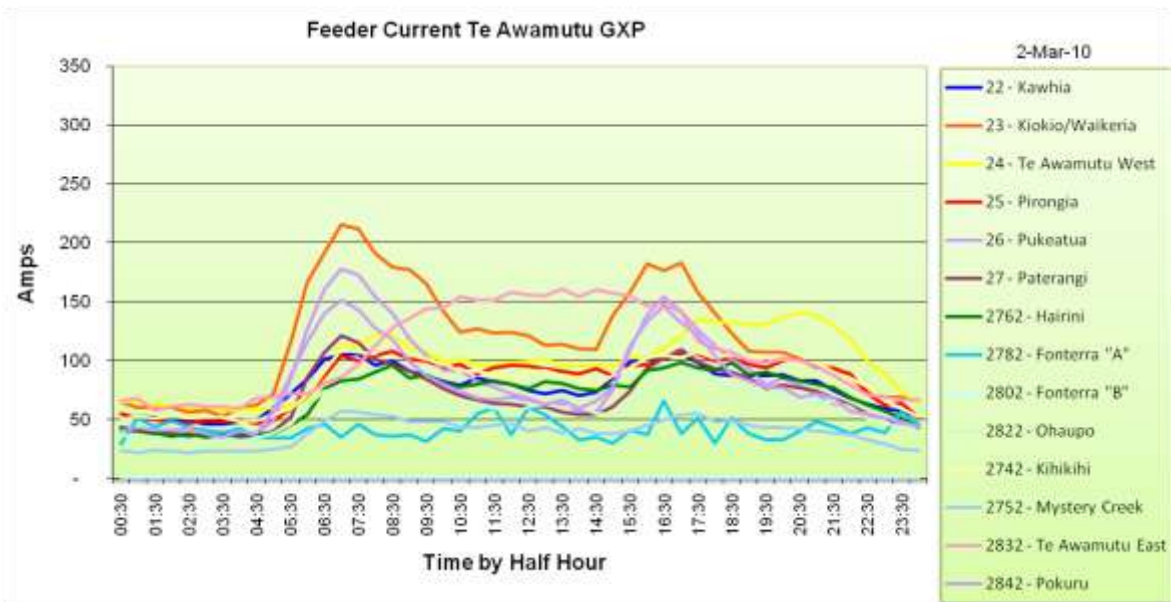
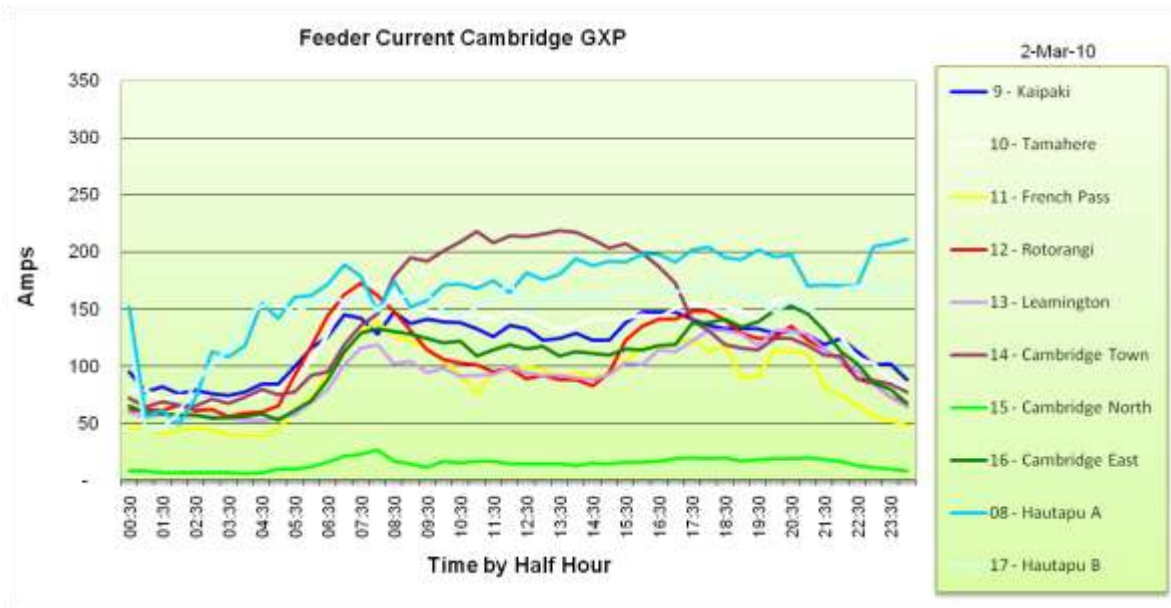
Waipa's urban and suburban feeders exhibit typical EBD load profiles where there are morning and evening peaks caused by residential demand superimposed on commercial demand through the normal business day.

Waipa's rural feeders exhibit the same residential characteristics but with much higher early morning and afternoon demands during the dairy milking season.

The Fonterra loads are characterised by high demand throughout the day over the dairy season.

Transpower's GXPs and Waipa's 11kV feeder load profiles for a typical week day in March 2010 are shown in the following graphs.





Peak Demand and Energy Delivered

The historical peak demands and total energy conveyed through Transpower's Cambridge and Te Awamutu GXPs are shown in the following table. Prior to 2010 the peak demands were incurred with full load control operating. During 2010 Waipa's peak demands were incurred with out exercising load control in periods that were not affected by Transpower's Lower North Island 100 average peak demand charges.

Cambridge GXP			Te Awamutu GXP		
Year	Units (kWh)	MD (MW)	Year	Units (kWh)	MD (MW)
1995	129,835,090	25,105	1995	124,729,310	29,115
1996	129,543,203	26,537	1996	143,477,389	28,197
1997	139,742,516	25,425	1997	144,369,441	29,262
1998	144,743,967	29,050	1998	145,116,050	29,964
1999	146,322,063	27,842	1999	142,734,374	25,962
2000	154,095,403	30,068	2000	141,435,801	26,834
2001	159,942,281	30,486	2001	142,337,330	26,208
2002	170,428,577	29,302	2002	149,946,322	27,376
2003	170,920,235	28,102	2003	152,079,931	27,378
2004	169,953,151	27,930	2004	153,399,618	28,112
2005	178,858,670	30,938	2005	155,851,860	30,014
2006	180,610,404	31,842	2006	155,772,430	28,480
2007	186,489,039	30,064	2007	156,541,457	28,872
2008	183,332,147	32,672	2008	158,883,194	28,698
2009	183,139,815	33,196	2009	158,767,196	29,400
2010	195,076,504	38,984	2010	166,399,952	37,300

4.2 Network Configuration

Waipa's radial 11kV distribution network receives power at 11kV from two Transpower's GXPs located at Cambridge and Te Awamutu. The Company does not have any 66kV, 33kV or 22kV commissioned substation or reticulation assets.

On occasions a small amount of electricity is imported at 11kV from the embedded generator at Fonterra dairy factory in Te Awamutu.

The 11kV supplies from Cambridge and Te Awamutu GXPs are not configured to be interconnected. There is one legacy switched connection that could offer limited backup supply to Mystery Creek.

Waipa's legacy distribution substations are predominately pole mounted transformers (up to 75kVA) and there are several aged metal clad pad-mount substations (up to in 500kVA) in the urban and suburban areas. The Company does not have any kiosk substations.

Newly commissioned substations are either metal clad pad-mounted (typically 50kVA up to 300kVA) or pole mounted up to 75kVA as permitted by the respective District Council Plan requirements.

Waipa's legacy 400V reticulation is predominately overhead except for urban areas. New 400V reticulation is generally underground as required by the respective District Council Plans with the exception of rural and remote rural areas where overhead reticulation is permitted on economic grounds.

Waipa's distribution system comprises (as at 31 March 2010):

Cambridge Area

- 10 11kV feeder circuits connected to Cambridge GXP,
- 405km 11kV circuit (340km overhead line, 65km underground cable),
- 273km of 400V circuit (150km overhead line, 123km underground cable),
- 1,262 11kV/400V transformers (96,970kVA capacity), and
- 10,387 ICPs.

Te Awamutu Area

- 14 11kV feeder circuits connected to Te Awamutu GXP,
- 924km 11kV circuit (883km overhead line, 41km underground cable),
- 470km 400V circuit (359km overhead line, 111km underground cable),
- 1,943 11kV/400V transformers (108,747kVA capacity), and
- 12,774 ICPs.

System switching, isolation and protection are achieved via Transpower's GXP circuit breakers, and Waipa's ring main units, line auto reclosers and sectionalisers, line disconnectors, 11kV dropout fuses and 400V fuses.

A SCADA system and radio communication system enables remote monitoring and control of distribution switchgear and voltage regulators, and remote monitoring and control of GXP feeder circuit breakers.

Two 11kV ripple injection plants and receiving relays at consumers' installations enable implementation of energy tariffs, control of street lighting and management of feeder loads and GXP maximum demands.

Cambridge Network Configuration

Transpower owns the 110kV line assets, the 110kV/11kV transformers and 11kV switchboard to which Waipa's 11kV feeders are connected.

Cambridge GXP is supplied via a double 110kV line from Karapiro to Hamilton and has an n-1 security of supply.

There are two 40MVA ODAF transformers at Cambridge giving a total installed capacity of 80MVA and a firm capacity of 40MVA. These transformers operate in parallel and supply an 11kV busbar via two incoming circuit breakers. However, the 11kV incomers and busbar are only rated at 2000A which is 38MVA.

The peak load MD with full load control exercised in 2010 on this GXP was 32,268MW.

There are eight 400A rated 11kV circuit breakers supplying radial urban and rural feeders and two 1250A rated 11kV circuit breakers supplying a Fonterra dairy factory at Hautapu.

The eight 11kV radial urban and rural feeders are predominately concrete pole lines. These lines, in conjunction with their associated 400V reticulation, supply Cambridge, its suburbs and rural areas adjacent to the Waikato River from Lake Karapiro to Tamahere on the outskirts of Hamilton.

In the urban and suburban areas there is a moderate amount of underground reticulation with pad-mounted transformers and ground mounted switchgear.

Te Awamutu Network Configuration

Transpower owns the 110kV line assets, the 110kV/11kV transformers and 11kV switchboards to which Waipa Networks 11kV feeders are connected.

Te Awamutu GXP is supplied via a single 110kV transmission line from Karapiro.

Te Awamutu also has 7.5MVA of embedded generation at the Fonterra dairy factory site which is connected to the Transpower's Te Awamutu GXP via 11kV supply cables.

There are two 40MVA ODAF transformers at Te Awamutu giving a total installed capacity of 80MVA and a firm capacity of 40MVA. These transformers operate in parallel and supply two 11kV busbars via four incoming circuit breakers.

The peak load MD with full load control exercised in 2010 on this GXP was 33.170MW.

There are twelve 630A rated 11kV circuit breakers supplying radial urban and rural feeders and two 1250A rated 11kV circuit breakers supplying Fonterra dairy factory site in Te Awamutu.

The twelve 11kV radial urban and rural feeders are predominately concrete pole lines. These lines, in conjunction with their associated 400V reticulation, supply Te Awamutu's urban, suburban and rural areas north to Mystery Creek, south-east to Arapuni, south towards Otorohanga, and west to Paterangi, Pirongia, Pokuru and Kawhia.

Two underground cable circuits supply the Fonterra dairy factory.

In the urban and suburban areas there is a moderate amount of underground reticulation with pad-mounted transformers and ground mounted switchgear.

4.3 Network Assets, Age and Condition

Network Feeder Assets

Waipa's primary assets are the 11kV feeders supplying town, rural and remote rural consumer ICPs.

The 11kV feeder attributes as at 31 March 2010 are shown in the following table on page 28.

Network Feeder Asset Attributes

Transpower GXP	TPNZ CB	Waipa Feeder Assets	Feeder type	Total 11kV km	Overhead 11kV km	Underground 11kV km	Total 400V km	Overhead 400V km	Underground 400V km	Number concrete poles	Number wooden poles	Number transformers	Transformer capacity kVA	Number ICPS
Cambridge	8	Hautapu A	urban	7.4	6.3	1.1	-	-	-	41	-	2	130	1
Cambridge	9	Kaipaki	rural	55.5	46.6	8.8	20.0	14.5	5.5	743	67	172	14,530	662
Cambridge	10	Tamahere	rural	93.7	79.7	14.0	61.4	36.6	24.8	1,359	297	343	18,250	1,623
Cambridge	11	French Pass	rural	94.2	89.6	4.6	36.0	29.2	6.8	1,213	305	309	13,613	1,008
Cambridge	12	Roto-O-Rangi	rural	90.8	82.3	8.5	42.7	26.3	14.4	1,189	364	266	13,697	1,581
Cambridge	13	Leamington	urban	20.3	13.8	6.5	41.4	14.7	26.7	408	123	59	10,070	2,060
Cambridge	14	Cambridge Town	urban	10.6	3.9	6.6	19.9	5.9	14.0	173	55	45	12,550	1,037
Cambridge	15	Cambridge North	urban	6.7	2.2	4.5	8.6	1.4	7.2	55	4	19	2,530	284
Cambridge	16	Cambridge East	urban	18.9	10.7	8.2	42.7	19.2	23.5	460	192	47	11,600	2,131
Cambridge	17	Hautapu B	urban	7.1	4.9	2.2	-	-	-	39	-	-	-	-
		Subtotal		405.2	340.2	65.0	272.8	149.9	122.9	5,680	1,407	1,262	96,970	10,387
Te Awamutu	22	Kawhia	rural	202.7	199.7	3.0	51.3	42.6	8.7	2,394	213	307	11,314	1,281
Te Awamutu	23	Kio Kio / Waikeria	rural	111.2	108.1	3.1	41.6	38.0	3.6	1,720	28	220	12,080	826
Te Awamutu	24	Te Awamutu West	urban	22.0	16.7	5.2	48.6	20.8	27.8	495	117	68	10,150	2,276
Te Awamutu	25	Pirongia	rural	64.4	59.6	4.8	44.6	29.0	15.6	958	56	159	9,430	1,284
Te Awamutu	26	Pukeatua	rural	136.3	135.1	1.2	45.9	44.3	1.6	2,163	49	292	11,123	873
Te Awamutu	27	Paterangi	rural	100.9	99.6	1.2	54.1	51.3	2.8	1,670	47	244	9,402	796
Te Awamutu	2742	Kihikihi	rural	37.5	36.2	1.3	37.4	31.0	6.4	912	118	103	8,698	1,527
Te Awamutu	2752	Mystery Creek	rural	47.3	40.8	6.5	20.5	18.6	1.9	686	35	89	4,868	450
Te Awamutu	2762	Hairini	urban	27.7	22.2	5.5	35.2	15.8	19.4	462	52	78	8,765	1,247
Te Awamutu	2782	Fonterra A	urban	2.0	-	2.0	-	-	-	-	-	-	-	1
Te Awamutu	2802	Fonterra B	urban	2.0	-	2.0	-	-	-	-	-	-	-	-
Te Awamutu	2822	Ohaupo	rural	43.7	41.3	2.4	37.2	23.0	14.2	830	35	99	6,590	754
Te Awamutu	2832	Te Awamutu East	urban	4.1	2.0	2.1	10.4	2.9	7.6	59	24	21	6,500	636
Te Awamutu	2842	Pokuru	rural	122.7	122.2	0.4	43.3	41.4	1.9	1,858	39	263	9,828	823
		Subtotal		924.4	883.5	40.9	470.1	358.7	111.4	14,207	813	1,943	108,747	12,774
		Total		1,329.6	1,223.7	105.9	742.9	508.7	234.2	19,887	2,220	3,205	205,717	23,161

Supervisory Control and Data Acquisition System Assets

Waipa owns a SCADA system to operate its feeder network and control load, street lighting and metering tariffs. SCADA system remote terminal units are fitted to Transpower's circuit breakers at Cambridge GXP and Te Awamutu GXP, Waipa's ripple injection plants and various voltage regulators, 11kV line auto reclosers and automated air break switches on the distribution network.

Ripple Injection Plants Assets

Waipa owns and operates two ripple injection plants located at Cambridge GXP and Te Awamutu GXP respectively. Ripple injection signals are initiated by the SCADA system via these plants to control load, street lighting and metering tariffs. The Company also owns the receiving relays in consumers' installations.

Radio Communication Network Assets

Waipa owns separate VHF SCADA system and voice communication networks comprising;

- 3 radio repeater sites located at Pukekura in Cambridge, Te Rauamo on the south western slope of Mt Pirongia, and Mount Oue near Kawhia,
- 8 base stations located at the Harrison Drive depot in Te Awamutu and at the premises of the Company's Control Room service provider,
- 29 vehicle mounted radios and six hand held units used by the Company's field crews, and
- 88 radios in remote terminal units on automated voltage regulators, auto reclosers, and disconnecter switches.

Network Asset Age

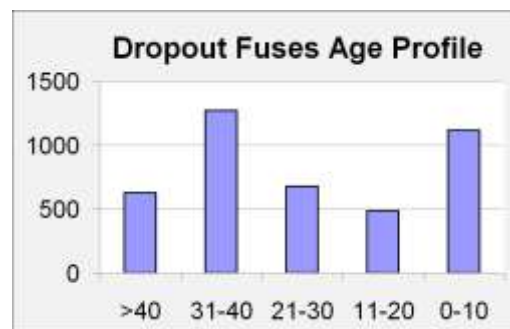
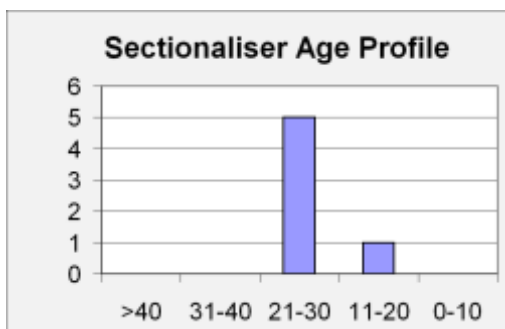
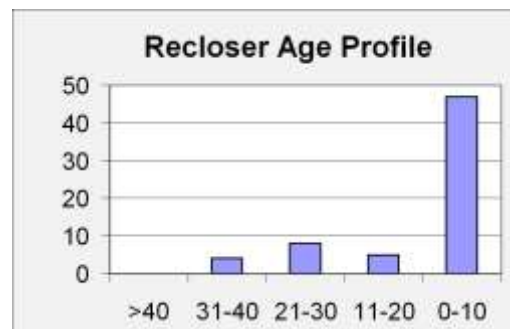
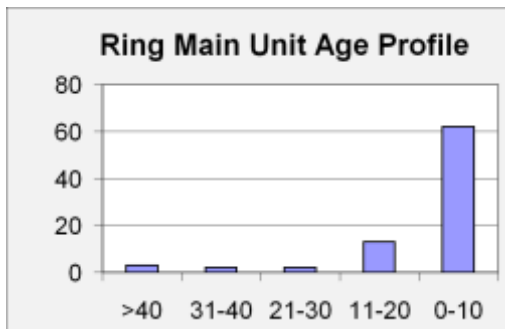
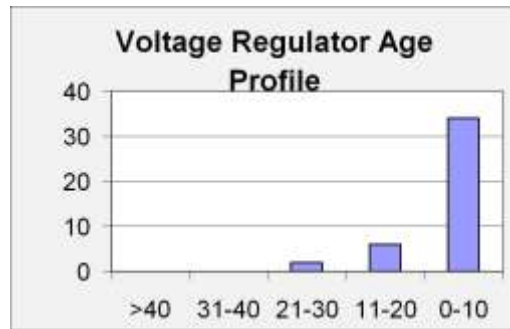
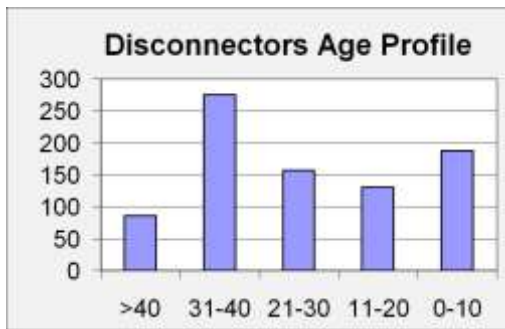
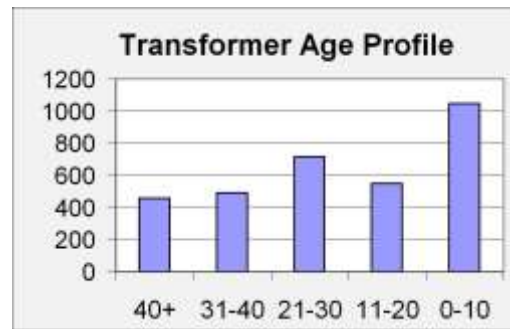
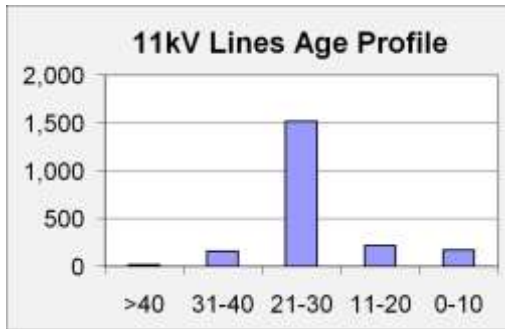
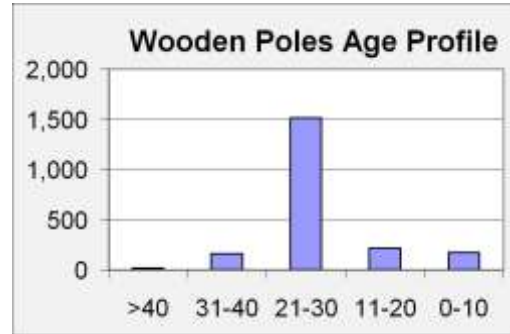
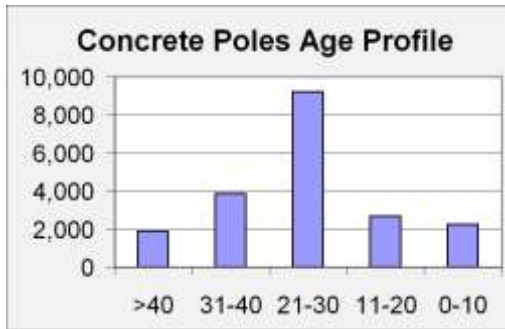
Waipa's distribution asset types and age profiles (as at 31 March 2010) are shown in the following graphs on page 30.

The Company uses the weighted average age of the poles to determine the age of its primary pole line assets because there is no other reliable information on the age of conductors and crossarms available.

The 11kV Line Age Profile indicates that the Company rebuilt the majority of its network during the 1980s. Hardwood poles were changed for concrete poles and it is assumed that the pole hardware was renewed in the majority of cases. In most cases the existing overhead copper conductor was re-used.

From the asset condition survey completed in January 2006 the general condition of hardware suggests that the Company doesn't expect to be confronted with an unmanageable "wall-of-wire" issue within the 10 year horizon of this AMP.

Asset Age Profiles



Network Asset Valuation

Waipa's distribution asset valuations as determined by the ODV process in March 2004 are shown in the following table. The valuation excludes the value of the ripple relays installed at customers ICPs.

Asset Valuation

Asset Type	RC \$	ORC \$	DRC \$	ODRC \$
Distribution Lines	44,828,523	44,828,523	28,476,692	28,476,692
Distribution Cables	11,670,793	11,670,793	7,515,079	7,515,079
Distribution Substations & Transformers	23,196,200	23,196,200	12,337,510	12,337,510
Distribution Switchgear	14,230,500	14,230,500	5,551,082	5,551,082
Other System Fixed Assets	4,440,300	4,440,300	2,660,456	2,660,456
Total	98,366,316	98,366,316	56,540,820	56,540,820

Asset Condition

Feeder Assets

Waipa engaged an independent contractor in 2001 to visually inspect the condition of all the Company's feeder assets. This survey was completed in January 2006. The independent contractor assessed the condition of feeder assets and prioritised defects into the following categories for remedial work:

- Urgent (3 months);
- 1 year;
- 2 years; and
- 5 years.

An urgent priority was assigned to asset defects that presented a safety hazard to the public, field crews, livestock or property. The 1, 2 and 5 year priorities were assigned to asset defects on a diminishing probability of causing loss of supply.

This asset condition survey identified 2,479 11kV and 400V defects. The last of the asset defects were eliminated during 2009/2010.

The Company's second visual asset condition survey commenced in 2010/2011 using internal resources. The asset types surveyed include; conductors, poles, staywires, crossarms, insulators, armbraces, binders, deadends, conductors, transformers, reclosers, disconnectors, cable terminations and earthing.

The total number of 11kV and 400V defects identified, repaired and awaiting repair (as at 31 January 2011) are shown in the following table.

	Totals
Defects Identified	365
Total repaired	43
Balance	322
11kV remaining	307
400V remaining	15

The second survey is expected to take 8 years to complete and feeders will be surveyed in the same order as the first survey. The programme is based on an even spread of kilometres of line being surveyed each year.

Waipa gains further asset condition information from:

- A vegetation management programme,
- An earth testing and repair programme,
- Asset thermal surveys,
- Partial discharge surveys, and
- Corona surveys.

The vegetation programme is based on even spread of kilometres of line being surveyed each year modified by known growth trends on specific feeders. The programme results in each feeder being systematically cleared every 4 to 8 years. Tree “hot-spots” are dealt with as required.

The earth testing and repair programme is based on an even spread of earth banks requiring testing each year. The programme results each system earth being checked every 8 years.

Waipa engages an external service provider to carry out an annual thermal survey of arterial feeder disconnectors, line and transformer, dropout fuses, cable pothead terminations and line connections during high load periods. Thermal defects are treated as urgent and are repaired as soon as possible.

In 2005/2006 Waipa engaged an external service provider to carry out partial discharge surveys of all RMU equipment after two RMU units failed in service. All switchgear partial discharge defects were treated as urgent and were repaired soon after. The survey led to Magnefix, Andelect and ABB Series 1 RMUs, being replaced by 2009/2010 as the safe and most cost effective solution.

No further partial discharge surveys are contemplated in this AMP. This doesn't preclude future partial discharge surveys if the need arises.

The Company is cognisant of the industry's concern about oil-filled switchgear. Waipa intends replacing all 10 (as at 31 March 2010) remaining oil-filled RMUs with SF₆ RMUs over the next 2 years.

Waipa also has a 57 (as at 31 March 2010) of “spa pool” pad mounted substations which no longer comply with modern industry standards. These will be replaced with modern pad mount substations over the next 3 years.

The Company has a 173 (as at 31 March 2010) of two pole hardwood platform transformer structures that are over 40 years old, deteriorating and do not comply with modern industry standards. These will be replaced by either a single pole transformer substation or a pad mounted substation over the next 5 years.

The Company has a growing number of aged ABSs on its 11kV feeders these will be progressively replaced by either SF₆ gas switches or modern ABSs according to the fault duty rating required.

In 2005/2006 Waipa engaged an external service provider to carry out a corona survey by helicopter of Kawhia feeder which was plagued by persistent insulator faults. This resulted in 33 tension polymer insulators being replaced at the time. There has been no recurrence of the problem on Kawhia feeder or any other feeder to date. No further corona surveys are contemplated in this AMP. This does not exclude future corona surveys if the need arises.

Supervisory Control and Data Acquisition

A new central SCADA system for Waipa's feeder network, load management system, street lighting and metering tariffs was commissioned in Alexandra Street Depot in Te Awamutu in 2005.

In 2006/2007 the Company replaced Transpower's aged SCADA system remote terminal units located at Cambridge GXP and Te Awamutu GXP with modern equivalent assets to obtain additional data.

In 2007/2008 the Company replaced its aged SCADA system remote terminal units for Waipa's ripple injection plant, located at Cambridge GXP, with modern equivalent assets to ensure reliability of load management system.

The central SCADA system was relocated to Waipa's new depot in Harrison Drive, Te Awamutu in 2010/2011.

The SCADA system remote terminal units fitted to various voltage regulators, 11kV auto reclosers and automated air break switches on the distribution network will be replaced as required.

Cambridge Ripple Injection Plant

Cambridge had a legacy 492Hz ripple injection frequency. Waipa installed a new 283Hz Enermet static ripple injection plant in 1999/2000 to avoid propagation problems when the Cambridge GXP transformers were upgraded from two 20MVA to two 40MVA in July 2002.

All 7000 492Hz relays in consumers' premises were replaced over the period 2002-2004.

Te Awamutu Ripple Injection Plant

Te Awamutu has a legacy 297Hz ripple injection frequency. With the Te Awamutu GXP transformers upgraded from two 20MVA to two 40MVA transformers in June 2004 the 297Hz signal propagation is expected to progressively deteriorate as the Te Awamutu load increases.

Waipa installed a new Enermet static ripple injection transmitter at Te Awamutu GXP after the catastrophic failure of an aged Landis & Gyr transmitter in 2001. The new Enermet transmitter can drive a 297Hz coupling cell and a 283Hz (the Company's adopted frequency) coupling cell.

In 2007/2008 Waipa installed a new 283Hz Enermet coupling cell for the relay change programme and a new 297Hz Enermet coupling cell to replace the old 297Hz Landis and Gyr coupling cell.

This will allow the existing 297Hz relays in the field to be progressively changed to new 283Hz ripple relays over the period 2008-2013 with minimum risk of failure of the old injection plant and confidence that sufficient signal strength is available for correct relay operation.

Radio Communication Assets

Waipa's VHF Supervisory Control and Data Acquisition system and voice communication network comprises:

- 3 four channel Motorola radio repeater sites located at Pukekura in Cambridge, Te Rauamo on the south western slope of Mt Pirongia, and Mount Oue near Kawhia, with separate channels for voice and data;
- 8 base stations located at the Alexandra Street depot (4) in Te Awamutu and at the premises of the Company's Control Room (4) service provider;
- 29 vehicle-mounted Motorola GM300 radios and six hand held units used by Company's field crews; and
- 88 data radios in remote terminal units on automated voltage regulators, auto reclosers, and disconnecter switches.

The Company enhanced its communication network by separating out the voice and SCADA data radio channels in 2005/2006 to ensure the integrity of operational commands and voice traffic, and the safety of field crews.

Waipa's increased use of automated switches and voltage regulators in the network requires an additional radio repeater station installed on the Rangitoto Ranges to provide coverage of the Pukeatua feeder area out to Arapuni Dam.

The Company intended installing this facility in 2009/2010 and the cost of establishing this new radio repeater station was incorporated in the capital development expenditure for 2009/2010. However, to date Waipa has not been able to locate a reasonably priced acceptable site. The new radio repeater station is now likely to be established in 2010/2011.

4.4 Justification for Assets

Waipa does not have any 66kV or 33kV sub-transmission line or zone substation assets supplying its Cambridge or Te Awamutu distribution networks. The Company believes that directly transforming a transmission voltage of 110kV to a distribution voltage of 11kV is inherently more efficient than introducing sub-transmission voltages such as 66kV or 33kV for Waipa's geographical area.

Feeder Assets

All the Company's 11kV and 400V feeders are constructed from commonly manufactured industry proven components that are essential for effective and efficient conveyance of electricity from Transpower's GXP's to the NCPs connecting consumer owned assets.

The distribution asset types that comprise the Company's 11kV and 400V feeders are:

- 11kV lines on concrete or wooden poles,
- 11kV cables either XLPE or PILC,
- 400V lines on concrete or wooden poles,
- 400V cables either XLPE or PILC,
- street lighting lines and cables,
- ring main units, oil switches, and fuse switches,
- auto reclosers, and sectionalisers,
- disconnectors,
- dropout fuses,
- transformers (pole or ground mounted ranging from 10kVA to 1500kVA),
- substations (pole or ground mounted or on customers premises),
- voltage regulators, and
- consumer service connections, either underground pillars or overhead cutout fuses.

SCADA, Ripple Injection Plants, and Radio Communication Equipment

Other system fixed assets used by the Company to control and operate its 11kV feeders effectively and efficiently are:

- SCADA system,
- radio voice and data communication network and equipment, and
- ripple injection plants and receivers.

Asset Selection Policy

Waipa owns and operates a basic radial 11kV pole line network that has satisfactorily delivered power safely and efficiently to consumers over a number of years.

The Company is confident that the type of network assets installed will continue to provide a safe and reliable service to consumers over the 10 year horizon of this AMP.

Waipa's asset selection policy is to use only tried and proven products. The Company adopts a position of being "leading edge not bleeding edge". When new modern equivalent assets are considered, their performance and life-cycle cost are evaluated by Waipa's Operations Committee before they are installed on the network.

Redundant assets

No assets were found to be redundant as part of the 31 March 2004 ODV process. In contrast, more automation of 11kV switching points and feeder segmentation by line auto reclosers and sectionalisers, line disconnectors and dropout fuses will be required to enable reliability targets to be achieved or bettered.

5.0 Service Levels

5.1 Consumer Oriented Performance Targets

Customer Satisfaction Targets

Waipa uses two types of customer consultation:

Customer-initiated and Company-initiated.

Customer-Initiated

Customer-initiated consultation usually occurs due to a specific need of a customer, or after a Network event affecting one or more customers. This is summarised in the following table.

Customer Need or Event	Method of Consultation
New connection to Network or upgrade of existing connection	Network Connection Application and capital contribution processes
Vegetation management	Processes under the Electricity (Hazards From Trees) Regulations 2003
Faults	Customer faults number, call centre, and field service
Complaints	Use of the company's customer Disputes Resolution Process

Examples of recent customer-initiated consultation include:

Critical customers – we notify electricity retailers of planned shutdowns who then notify their customers. Occasionally a customer may not receive notification due to administration issues. In one such instance we attended a site to begin the shutdown, as the number of customers affected was small we 'door knocked' to advise the power was about to go off. One property had a customer on an oxygen machine and staff were concerned that we did not have up to date information regarding which properties had critical customers. As a result, we now receive critical customer information monthly from Retailers for most of our ICPs and this is uploaded to our system so that critical customers can be identified wherever possible before scheduling a shutdown.

CBD cable fault – in March 2010 we experienced an underground cable fault in the Te Awamutu CBD. Power was restored later that day however customer feedback from the local chamber of commerce suggested that we had not communicated with them sufficiently during the process. As a result we sent staff to visit each of the affected customers and provide information regarding insurance claims and the outage itself, and liaised regularly with customers who had approached us with concerns. Our communication practices were modified so that in a similar future event we will put additional resources into personally keeping customers up to date with progress.

Consumer satisfaction targets were established based on feedback from customer groups identified in the 2010 consumer survey. The survey includes questions relating to satisfaction with the delivery of electricity overall, with specific reference to minimising power fluctuations/surges and number/length of power cuts. The targets below relate to the percentage of "satisfied" respondents.

Customer Satisfaction Survey

Performance Indices	Target 2011/2012	Target 2012/2013	Target 2013/2014	Target 2014/2015	Target 2015/2016	Target 2016/2017	Target 2017/2018	Target 2018/2019	Target 2019/2020	Target 2020/2021
Overall	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%
Number of Fluctuations	80%	80%	80%	80%	90%	90%	90%	90%	90%	90%
Length of Planned Shutdowns	85%	85%	85%	85%	90%	90%	90%	90%	90%	90%
Number of Planned Shutdowns	85%	85%	85%	85%	90%	90%	90%	90%	90%	90%
Length of Unplanned Shutdowns	85%	85%	85%	85%	90%	90%	90%	90%	90%	90%
Number of Unplanned Shutdowns	85%	85%	85%	85%	90%	90%	90%	90%	90%	90%

The August 2010 survey revealed the results shown in the following table.

Customer Satisfaction	Result
Overall	94%
Number of Fluctuations	85%
Length of Planned Shutdowns	91%
Number of Planned Shutdowns	94%
Length of Unplanned Shutdowns	79%
Number of Unplanned Shutdowns	80%

Note – for the purposes of this report, customers who responded as “No Opinion” or “Don’t Know” were considered “Satisfied”.

Company-Initiated

Waipa consults with the following groups regarding significant projects and medium/long term Network planning.

Customer Group	Method of Consultation
Large Customers	Individual meetings/correspondence as required.
Customer Advocacy / Interest Groups	Public meetings/individual meetings /correspondence as required.
Customer Groups (Residential/ Commercial / Urban / Rural)	Annual Customer Survey
Customer General	Customer Focus Group
Local & National Regulatory Bodies	Individual meetings / public meetings / correspondence as required.

Examples of recent Company-initiated consultation include:

Second Transpower Line For TMU0111 – the Company has consulted with all customer groups through meetings and the Customer survey to determine the support for the line, and where relevant the funding and timing of the project.

Customer Focus Group – the Company established a Customer Focus Group in 2009 consisting of randomly selected customers. The meetings continued into 2010 with a variety of issues discussed including the environment, the customer complaints process, and the Waipa Networks brand.

Waipa Networks concludes from the Customer and Company initiated surveys and customer and other stakeholder consultations that the majority of its customers are satisfied with the levels of network service they experience. The Company charges are amongst the lowest in NZ.

Waipa Networks Purpose

The Company intends to build upon its good relationship with its customers and other stakeholders by continually improving the network performance cost effectively consistent with the Company's Purpose:

Deliver power safely all day every day

Provision of value for money

Provide customers with outstanding service and solutions

Security Targets

Security of supply is assessed by reference to a level of in-built asset flexibility.

An “n” security level implies no alternative means of supply - if a component fails then supply is lost. An “n-1” security level is one in which supply is not lost in the event of any single component failure. An “n-1 switched” security level is one in which supply is lost until the faulty asset is isolated. Power is restored by closing interconnecting switches between feeders. Waipa's system is not operated in a “closed ring” manner. Therefore, the best feeder security level offered is n-1 switched.

Waipa has adopted the deterministic rather than the probabilistic approach to specifying security of supply for Transpower's and the Company's distribution assets.

Waipa network security objective is to strive for the following security levels to be achieved for Transpower's Transmission Grid and GXP assets and specific parts of the Company's distribution network.

Transpower / Waipa Asset	Security Level
Transpower transmission lines	n-1
Transpower GXP transformers	n-1
11kV urban lines	n-1 switched
Other 11kV lines	n-1 switched where interconnection is economic
Remote rural 11kV lines	n
400V urban lines	n-1 switched
Other 400V lines	n

Reliability Targets

Network supply reliability is measured using:

- SAIDI – the system average interruption duration index (minutes), and
- SAIFI – the system average interruption frequency Index,

from which CAIDI the consumer average interruption duration index is calculated, where CAIDI = SAIDI / SAIFI.

Waipa's network reliability targets are to:

- consistently better the 5 year rolling average of 273 SAIDI minutes 3.23 SAIFI set by the Commerce Commission in 2003, and
- continually improve reliability performance over the horizon of this AMP,

Waipa has set the following reliability targets for the next 10 years.

Reliability Targets

Network Reliability Performance Indices	Target 2011/2012	Target 2012/2013	Target 2013/2014	Target 2014/2015	Target 2015/2016	Target 2016/2017	Target 2017/2018	Target 2018/2019	Target 2019/2020	Target 2020/2021
SAIDI total	173	172	171	170	169	168	167	166	165	164
SAIFI total	2.47	2.46	2.44	2.43	2.41	2.40	2.38	2.37	2.36	2.35

5.2 Targets for Asset and Electricity Distribution Business Performance

Asset Delivery Efficiency Targets

Waipa uses the performance indicators of Loss Ratio and Capacity Utilisation to measure network asset delivery efficiency.

Loss Ratio

Loss Ratio measures the ratio of kWh lost on the distribution network to kWh conveyed per annum. Lost units are the difference between metered sales to consumers and metered purchases at each Transpower GXP, and distributed generation supplied to the network.

Losses are composed of physical losses due to the heating of distribution assets, un-metered supply and theft. Losses are difficult to measure accurately because all unit sales through retailers' meters would need to be read instantaneously at year-end to calculate the difference between conveyed and sold energy. Currently only Time-of-Use meters in consumers' installations can supply the required accuracy for sales.

Capacity Utilisation

Capacity Utilisation measures the ratio of kW MD to installed transformer kVA capacity. Continuous improvement in Capacity Utilisation assumes stringent management of transformer installations. However with the new "Lower North Island 100 average coincident peaks" allowing MDs to occur which exceed fully controlled MDs this is no longer the case and Waipa's Capacity Utilisation is expected to increase as MDs rise without the need to install additional transformer capacity.

The following table shows the targets that have been set in the SCI for the next 3 years and extrapolated for the AMP horizon of 10 years for Asset Delivery Efficiency.

Asset Delivery Efficiency Targets

Asset Delivery Efficiency Performance %	Target 2011/2012	Target 2012/2013	Target 2013/2014	Target 2014/2015	Target 2015/2016	Target 2016/2017	Target 2017/2018	Target 2018/2019	Target 2019/2020	Target 2020/2021
Loss Ratio	<6.5	<6.5	<6.5	<6.5*	<6.5*	<6.5*	<6.5*	<6.5*	<6.5*	<6.5*
Capacity Utilisation	>25	>25	>25	>25*	>25*	>25*	>25*	>25*	>25*	>25*

*Not specified in SCI for year ending 31 March 2011

Business Efficiency Targets

Waipa uses the performance indicator Total Operational Expenditure per NCP to measure the Company's financial efficiency.

Business Efficiency Targets

Business Efficiency Performance \$	Target 2011/2012	Target 2012/2013	Target 2013/2014	Target 2014/2015	Target 2015/2016	Target 2016/2017	Target 2017/2018	Target 2018/2019	Target 2019/2020	Target 2020/2021
Total Operational Expenditure per NCP	235	235	235	235*	235*	235*	235*	235*	235*	235*

*Not specified in SCI for year ending 31 March 2011

Public Safety, Amenity Values and EDB Performance Goals

Waipa will take all steps to eliminate the risk of injury to people, animals and damage to property by ensuring that:

- all equipment earthing complies with industry standards,
- all network assets are maintained in good, safe working order,
- all faults are detected and disconnected from supply automatically and made safe.

These objectives are consistent with the first element of the Company's Focus of:

Deliver power safely all day every day

The Company will be cognisant of the requirements of the Resource Management Act, Environment Waikato, Waipa District Council Plans, Waikato District Council Plans, Otorohanga District Council Plans, Waitomo District Council Plans, Land Transport Safety Authority requirements and On Track requirements when constructing new lines.

Consideration of the requirements is consistent with the Company's belief:

Our community is part of us

Waipa will comply with the regulatory obligations applicable to EDBs. The following table identifies Waipa's corporate responsibilities.

Safety	Amenity Values	Consumer, Commercial and Employee	Electricity Distribution Industry
Health and Safety in Employment Act 1992	Resource Management Act 1991	Consumer Guarantee Act 1993	Electricity Act 1992
Hazardous Substances and New Organisms Act 1996	Waipa District Council Plans	Fair Trading Act 1986	Electricity (Safety) Regulations 2010
Fire Safety and Evacuation of Buildings Regulations 2006	Waikato District Council Plans	Privacy Act 1993	Electricity Industry Reform Act 1998
Building Act 2004	Otorohanga District Council Plans	Companies Act 1993	Energy Companies Act 1992
	Waitomo District Council Plans	Contract (Privity) Act 1982	Electricity (Hazards from Trees) Regulations 2003
	Land Transport Safety Authority requirements	Employment Relations Act 2000	Electricity Disclosure Requirements 2004
	On Track requirements		Commerce Act (Electricity Distribution Thresholds) Notice 2004
			Electricity Governance Regulations 2003
			Electricity Industry Act 2010

Quality of Supply Goals

Voltage

Waipa will endeavour to provide supply at each NCP to meet regulatory voltage requirements consistent with the Company's Focus:

Deliver power safely all day every day

Power Factor

Waipa will continue to work with electricity retailers and electrical contractors to ensure consumers' installations are maintained with a power factor of better than 0.95 at all times to maximise electricity conveyance through its assets by reducing network reactive load and losses consistent with the Company's Belief:

Provision of value for money

Interference

Waipa will continue to work with electricity retailers to ensure as far as possible that one consumer's installation does not cause interference for any other consumer, and that consumers' installations do not adversely impact on ripple injection signal strength or quality consistent with the Company's Belief:

Provision of value for money

Load Management Goals

Waipa will continue to operate its load management system to minimise the Lower North Island Maximum Demand interconnection charges from Transpower and to minimise capital investment on the distribution network.

Waipa will price load control services so that they are attractive for electricity retailers to implement with their customers. Both objectives are consistent with the Company's Belief:

Provision of value for money

Prudent Operator Goals

Waipa is committed to being a good employer and responsible EDB network operator consistent with the Company's Beliefs:

Everyone home safe everyday

Recognition and acknowledgement of our staff

Increasing employees potential through learning

Building and maintaining community assets and wealth

Our Community are a part of us

Providing customers with outstanding service and solutions

Life improvement through energy and network related business

Reliability Goals

Reliability will be improved and the risk of outage to consumers reduced by implementing the Company's segmentation programme and continuing a preventative maintenance programme based on asset condition surveys and vegetation management of trees menacing lines consistent with the Company's Focus:

Deliver power safely all day every day

Work Practice Goals

The risk of injury to employees or contractors will be reduced by ensuring that all contractors and employees are suitably trained, qualified, and meet acceptable auditable standards for health and safety procedures, design standards and operating standards before being permitted to work on the distribution network.

The Company encourages safe working practices, provides high quality tools, plant and personal protective equipment. Both of these initiatives are consistent with the Company's Spirit and Belief:

Safe

Increasing employees potential through learning

Environment Goals

The risk of Company operations adversely impacting on the environment will be reduced by ensuring the use and disposal of any hazardous materials such as transformer oil is in accordance with good industry practice. The Company holds Gold Enviro-Mark certification. Waipa's ongoing environmental initiatives are consistent with the Company's Belief:

Our community is part of us

Asset Record Goals

Waipa will maintain accurate records locating all overhead and underground plant and equipment in the field owned by the Company. Standard construction design drawings from Waipa's Design Manual will be used for most new construction and for maintenance requirements. Full construction drawings will be maintained for any non-standard installations operated by the Company in accordance with its following Beliefs:

Building and maintaining community network assets and wealth

Providing customers with outstanding service and solutions

5.3 Justification for Service Level, Asset and EDB Targets

Waipa Networks Purpose

Waipa intends to build upon its good relationship with its customers and other stakeholders by continually improving the network performance cost effectively consistent with the Company's Purpose:

Deliver power safely all day every day

Provision of value for money

Provide customers with outstanding service and solutions

Security

Waipa has set future security level targets for Transpower assets and its own distribution assets as a consequence of customer consultation.

The Company undertakes regular Customer Surveys conducted by the National Research Bureau and Key Research, and has held Public Consultation meetings in Cambridge, Te Awamutu and Kawhia to gain feedback on services provided, security and reliability of supply.

While consumers continue to be satisfied with Waipa's service and the reliability of the Cambridge and Te Awamutu networks (only 5% being willing to pay more to improve the service) they hold a strong opinion that n-1 security of supply should be provided to the Te Awamutu network by Transpower with almost 50% of all respondents be willing to pay additional charges to achieve this.

Waipa believes that it is unacceptable for Te Awamutu consumers to remain on n security of supply. Transpower records show that Te Awamutu GXP has the 5th worst security of supply of any North Island GXP. Waipa does not believe this is acceptable for a GXP of this size and importance (refer to Transpower "Quality Performance Report 07/08" page 19). The Company will continue to look for a technically robust and cost effective solution which includes the option of a second Transpower 110kV transmission line into Te Awamutu GXP substation.

Reliability

Supply reliability including response targets should be established by taking into account consumer needs and their willingness to pay for an improved service. Given the complexity of quantifying all of our customer requirements, and then relating them to network performance, targets are normally set on a qualitative basis.

From recent consumer surveys it is not evident that Waipa's customer base supports heightened (or reduced) levels of supply reliability, especially where these would involve increased (or decreased) line charges.

Waipa has set future reliability targets to continually improve. These targets have been established in light of the recent good network performance and reflect the Company's perception of growing expectations of our community. The future targets represent the upper limit of network performance.

Asset Delivery Efficiency Targets

Loss Ratio

Waipa intends to run its distribution network to its fully rated capacity without thermally damaging or prematurely aging the network assets. This will increase the network technical losses over time for existing assets. New assets will be sized to meet future load growth and have lower initial losses. It is expected that future total network losses will remain at current levels.

Capacity Utilisation

Waipa strives to match installed transformer capacity to stated or predicted load characteristics of every new consumer. However, the Company has no control over consumers' uncontrolled supply and currently does not routinely monitor all transformer MDs. Therefore, it is expected that future Capacity Utilisation will remain at current levels.

Business Efficiency Targets

The Business Efficiency Targets adopted by the Company (Executive Management, Directors and Trust) will ensure that Waipa can continue to offer low network line charges while continually striving to improve reliability of service.

Safety

Waipa has set its future asset energy delivery efficiency, reliability and safety performance targets after consultation with stakeholders and in accordance with the Company's Spirit, Focus and Beliefs.

To be safe

Deliver power safely all day every day

Provision of value for money

Provide customers with outstanding service and solutions

Waipa's health and safety goal is to achieve zero accidents in accordance with its Belief.

Everyone home safe every day

Environmental

Waipa's environmental goal is to fully comply with all reasonable requirements of the Waipa, Otorohanga, Waikato, and Waitomo District Councils and Environment Waikato, and to avoid incidents that would cause environmental harm in accordance with the Company's Belief.

Our community is part of us

Voltage

Waipa along with other EDBs has a regulatory obligation to provide supply within statutory voltage limits. The Company will continually strive to ensure that regulatory voltage standards are not breached.

Power Factor

Waipa has set future power factor limits to avoid Transpower kVAr penalty payments incurred if power factor is less than 0.95 and to reduce network reactive load and losses.

6.0 Network Development Plans

6.1 Planning Criteria and Assumptions

Waipa planning criteria for network development plans takes into consideration:

- the capacity of an asset to convey electricity,
- the quality of supply (voltage within regulatory limits),
- reliability (SAIDI, SAIFI, CAIDI), and
- security of supply (n-1 or n).

As the Company has a number of long radial rural feeders there is a need to provide conductors of adequate cross-sectional area to maintain satisfactory voltage levels along and at the extremities of these feeders. Typically, the front end of all feeders radiating out from Transpower's Cambridge and Te Awamutu GXP require 300mm² Al cables and heavy line for voltage support.

Waipa takes its 11kV supply directly from recently upgraded Transpower's 110kV/11kV 40MVA 15% impedance transformers at Cambridge and Te Awamutu. Transpower's 11kV fault duty is now such that Waipa feeder cables radiating out from these GXPs require a 500MVA or 26kA fault duty screen for the first few kilometres before the fault duty diminishes sufficiently for normal distribution switchgear with a fault duty rating of 250MVA or 13.1kA.

As the network comprises 11kV and 400V reticulation assets only, the Company need only buy a limited scope of assets. The assets chosen comply with the load requirements and fault duty of the network. The assets and their ratings are described in the following table.

Asset Ratings Distance from GXP	TPNZ Circuit Breaker	Waipa Cable	Waipa Line	Waipa Recloser	Waipa RMU	Waipa ABS	Waipa DDO
<3km	800A / 400A, 26kA CBG GXP 1250A / 630A 26kA TMU GXP	400A, 26kA 3c300mm ² Al XLPE Cu Screen	490A AAAC Krypton 158mm ²	630A 16kA 4sec	630A 20kA 3sec	630A 12kA 1sec	100A 12kA 1sec
3km-10km		400A, 13.1kA 3c300mm ² Al XLPE Cu Screen					
10km-25km		300A, 10.6kA 3c185mm ² Al XLPE Cu Screen	410A AAAC Hydrogen 111mm ² 333A AAAC Helium 77mm ²				
>25km		200A, 9.1kA 3c95mm ² Al XLPE Cu Screen	250A AAAC Fluorine 49mm ²				
spur		100A, 3.3kA 3c35mm ² Al XLPE Cu Screen	140A ACSR Squirrel 21mm ²				

Al: Aluminium
Cu: Copper

ACSR: Al Conductor, Steel Reinforced
AAAC: All Al Alloy Conductor

Waipa will evaluate the benefits of procuring network modelling software in 2011/2012 to improve the Company's ability to determine and select more accurately the capacity of new assets.

Other inputs to the Company's network develop plans come from the District Councils, Environment Waikato, property developers and Fonterra.

The District Councils in Waipa's reticulation area have adopted a 10 year planning horizon for local development. The Company regularly assesses the impact of these developments on the network.

The impact of developers subdividing existing properties is assessed from year to year.

The two Fonterra dairy factories, Waipa's largest consumers, keep the Company informed of their maximum demand (MD) requirements on an annual basis. Any significant increase in the long term capacity requirements are discussed as they arise and a solution agreed between the parties.

Waipa intends to continue to supply connected consumers' installations beyond April 2013 provided it remains economic for the Company to do so.

Waipa's forecast MDs using Transpower MD data for both CBG and TMU GXPs are shown in the 'Predicted Longevity of Transpower GXP Transformers and Waipa Feeders' chart, Section 6.3. We predict a 2% compounding increase in MD at each GXP, modified by Fonterra historical coincident MD. This gives a forecast of 1.5% compounding increase at CBG GXP, and, 1.9% compounding increase at TMU GXP over the 10 year planning horizon.

Maximum Demand Growth on Waipa Feeders

MD growth predictions for all Waipa's feeders were established using half hourly load data. The underlying MDs on Waipa's feeders were determined by analysing each half hour load and eliminating abnormal loads caused by total or partial switching of feeders for capital and maintenance works and for restoration of supply after a fault. The Company then predicted when its feeders would become capacity or voltage or security constrained as determined by the following criteria.

Capacity Constrained Feeders

Waipa deems that a feeder has reached its capacity constraint when its 10th consecutive MD exceeds its switchgear, cable or overhead line maximum thermal rating.

Voltage Constrained Feeders

Waipa deems that a feeder reaches its voltage constraint when the delivered voltage levels anywhere along the length of the feeder fall below the minimum prescribed regulatory voltage of 0.94pu (that is, 6% voltage drop).

Security of Supply Constrained Feeders

Waipa deems that a feeder has reached its security of supply constraint when its MDs exceed 66% of its maximum thermal rating for more than one-sixth (2,920 half hours of 17,520 half hours) of the year.

The Company's stated security of supply objective for 11kV urban and suburban areas and other 11kV lines where interconnection can be provided economically is n-1 switched. This objective can be met if all 11kV feeders are only loaded up to 66% of their rating so that there is the ability to switch load to two (or more) adjacent feeders in the event of a single fault.

Allowing feeder loads to exceed 66% of their maximum thermal rating for a specified period improves feeder utilisation but assumes that non-supply of power to a neighbouring faulted feeder, over peak loading periods, is an acceptable risk.

Maximum Demand Growth on Feeders

A growth rate of 3.5% per annum compounding has been applied to individual feeders reflecting actual experience on high growth feeders over the past 5 years. In addition allowance has been made for known or expected developments.

A growth rate of 3.5% per annum compounding, results in the MD doubling over a period of 20 years.

Using such a growth rate allows an adequate planning horizon when considering future reinforcement options and the inherently long life (60 years for concrete pole line) of distribution assets.

From the above information the Company has predicted, with a reasonable degree of confidence, the likely network asset enhancement, refurbishment, or replacement for the next 5 years, and with a lesser degree of certainty predict asset enhancement, refurbishment, or replacement for the next 10 years.

6.2 Prioritisation Methodology Adopted for Development Projects

Waipa prioritises Transpower new investments, and, the Company network development projects by a combination of the number of customers affected and predicting when Transpower transmission, GXP assets and the Company's feeder assets become constrained due to:

- low voltage,
- lack of capacity,
- poor reliability, and/or
- an unacceptable level of security of supply.

These predictions are made by analysing:

- Transpower's transmission line security level,
- Transpower's GXP underlying maximum demand growth,
- the Company's underlying feeder load trends,
- customer driven work,
- the Company's feeder reliability (SAIDI, SAIFI, CAIDI) performance, and
- the Company's feeder security level.

Transpower's new investments and, Waipa's network development projects are evaluated using the 'Predicted Longevity of Transpower GXP Transformers and Waipa Feeders' chart, Section 6.3 which identifies when an asset is predicted to become constrained. Waipa then prioritises and schedule projects so that the assets are not constrained and solutions are implemented in a timely manner.

Historically Waipa has been able to schedule and implement all the Company's development projects in time to avoid the assets becoming constrained, without incurring any conflicts of resources.

However, Waipa's experience is that some of the Transpower development projects at our GXPs have incurred delays and on one occasion the delay on a transformer upgrade resulted in a forced outage for Waipa consumers.

6.3 Demand Forecasting

Maximum Demand Growth at Transpower's GXPs

Cambridge GXP

Over the past 5 years the underlying average growth (less Fonterra dairy factory) in kWhs of electricity imported through Cambridge GXP was 2.53% per annum.

Over the same period the average growth in MD at Cambridge GXP (with full load control) has ranged between +0.52% and +3.77% per annum.

Te Awamutu GXP

Over the past 5 years the underlying average growth (less Fonterra dairy factory) in kWhs of electricity imported through Te Awamutu GXP was +1.68% per annum.

Over the same period the average growth in MD at Te Awamutu GXP (with full load control) has ranged between +0.92% and +2.37% per annum.

Maximum Demand Growth at Transpower GXPs

Waipa uses the historical trends identified above to forecast future MDs. The Company forecast MDs using Transpower MD data for both CBG and TMU GXPs are shown in the 'Predicted Longevity of Transpower GXP Transformers and Waipa Feeders' chart, Section 6.3. We predict a 2% compounding increase in MD at each GXP, modified by Fonterra historical coincident MD. This gives a forecast of 1.5% compounding increase at CBG GXP, and, 1.9% compounding increase at TMU GXP over the 10-year planning horizon.

Impact of Substantial Projects or Developments on Maximum Demand

Currently, the Company is not aware of any substantial project or development that will abnormally increase the MD at either GXP. Historical new developments comprise; subdivisions, dairy farms, and small retail outlets. Waipa has recently connected two fast moving consumable goods outlets which the Company considers large loads. However, it is predicted that this type of load can be connected to the network without dramatically increasing MD beyond forecast predictions because of load diversity on the respective GXP and the Company's ability to manage controlled load.

Impact of Distributed Generation on Maximum Demand

Waipa has assumed for the purpose of forecasting MD that any existing or future distributed generation will have minimal effect on MD. Distributed generation, by nature, is not available 100% of the time. This is caused by periods of low generation, faults or maintenance on distributed generation or lines connecting it to the Company's network.

Impact of Demand Management on the Maximum Demand

The Company has assumed for the purpose of forecasting MD that any form of Demand Side Management will not have any material affect on reducing the MD. Currently, there is no quantitative evidence Retailer Demand Side Management initiative have been adopted by their respective consumers.

Waipa has a ripple control load management system that is able to control 10MW of connected load in Cambridge and 12MW of connected load in Te Awamutu over peak periods. The Company has assumed for the purpose of forecasting MD that its load control system is fully functional and that full load control is being exercised over lower North Island peak load periods.

Security of Transpower's GXPs

Cambridge GXP Transformers and 11kV Switchboard Assets

Two 40MVA ODAF transformers were installed in July 2002 and provide a firm transformer capacity of 40MVA at Cambridge GXP. However, the 11kV incomers and busbar are only rated at 2000A constraining the power conveyed to 38MVA.

The highest MD on these transformers with full load control to date as at 31 March 2010 was 33,196kW. There is approximately 10MW of connected controllable load.

Eight 400A rated units of the 11kV switchboard were installed in 1982. Transpower have stated that these circuit breakers and the busbar are approaching the end of their economic life. Transpower intend replacing this switchboard in 2011/2012.

Two additional 1250A units were installed June 2001 to supply upgraded lines to the dairy factory at Hautapu.

The total number of outgoing feeders supplied from Cambridge GXP 11kV switchboard is ten.

In January 2007 the Fonterra Hautapu dairy factory contracted for 10MW for 2007/2008 and has given no further indication of future load growth.

Assuming the dairy factory requires no more than 10MW and there is a 2% per annum compounding growth in underlying MD at Cambridge GXP, the firm capacity of 40MVA will not be reached within the 10 year planning horizon of this AMP.

Cambridge GXP is deeply embedded in Transpower's Grid and has experienced only one unplanned outage during the past 10 years.

The Company's n-1 security level for Transpower's transmission lines and assets at Cambridge GXP has been met.

Te Awamutu GXP Transformers and 11kV Switchboard Assets

Two new 40MVA ODAF transformers installed in July 2004 provide a firm capacity of 40MVA at Te Awamutu GXP.

The highest MD on these transformers with full load control to date as at 31 March 2010 was 33,170kW. There is approximately 12MW of connected controllable load.

The transformers feed two 11kV switchboards in parallel. The first 11kV switchboard installed in 1997 is in good order and currently supplies six feeders. The switchboard incomers, bus-coupler and busbars are rated at 1250A, limiting the board to 24MVA under an n-1 contingency. The second 11kV switchboard rated at 48 MVA installed was installed in June 2004 to supply four existing feeders. A further four additional feeders were installed on this parallel switchboard in March 2007.

The total number of outgoing feeders supplied from Te Awamutu GXP 11kV switchboard is now fourteen.

In January 2007 the Fonterra Te Awamutu dairy factory contracted for 4.5MW for 2007/2008 and has given no further indication of future load growth.

Assuming this requires no more than 4.5MW and there is a 2% pa compounding growth in underlying MD at Te Awamutu GXP, the firm capacity of 40MVA will not be reached within the 10 year planning horizon of this AMP.

The Company's n-1 security level for Transpower's substation assets at Te Awamutu GXP has been met.

Transpower GXP Assets Longevity

Using the firm transformer capacity and n-1 security criteria the longevity of Transpower's GXP assets has been predicted assuming an MD growth of 2% pa compounding at both Cambridge and Te Awamutu GXPs.

Waipa predicts Transpower's transformer firm capacity at Cambridge GXP and Te Awamutu GXP will not be reached within the 10 year planning horizon of this AMP.

Te Awamutu GXP Transmission Line Issues and Risks

Te Awamutu does not have a secure Transpower transmission line supply. The following table records the number of unplanned Transpower outages on the Karapiro – Te Awamutu 110kV transmission line.

Transpower Unplanned Outages Te Awamutu

Year (1 April - 31 March)	Number of Unplanned Outages	Number of Planned Outages	Equivalent Waipa SAIDI	Equivalent Waipa SAIFI
1993/1994				
1994/1995	2		42.5	0.9423
1995/1996				
1996/1997	1		4.2	0.4691
1997/1998	1		1.4	0.4685
1998/1999				
1999/2000	2		5.9	0.9861
2000/2001	1		23.6	0.5121
2001/2002				
2002/2003	1		4.0	0.5026
2003/2004	1	1	203.9	1.0152
2004/2005	2		101.4	0.9934
2005/2006	2		3.1	1.0464
2006/2007	1	1	292.0	1.0586
2007/2008	5	1	377.3	3.2207
2008/2009	1		1.5	0.5111
2009/2010	2		131.1	1.1126
2010/2011	3*		84.1*	1.6605*

* Up to 10 February 2011

Reliability of Supply Te Awamutu

In 2003 and 2006 Transpower required forced outages of 9 hours to repair a decayed two pole structure and replace a decayed three pole structure. In 2008 a further forced 9 hour outage was required to remove birds' nests from the Te Awamutu GXP switchyard following a flashover fault.

Transpower acknowledge that Karapiro–Te Awamutu 110kV line is one of their most unreliable transmission lines. On 3 occasions the equivalent SAIDI for this line has exceeded Waipa's annual reliability performance.

The reliability of this transmission line is unacceptable to Waipa.

Super n Te Awamutu

In late 2008 Transpower suggested creating a super n reliability level of supply for the Karapiro–Te Awamutu line. A super n service is achieved by creating a second connection of the line at Karapiro switchyard, and, a second connection of the line at Te Awamutu GXP. The type of connections contemplated will enable live line techniques to connect and disconnect the line. This will enable all Karapiro switchyard and Te Awamutu GXP disconnectors to be maintained without requiring a routine forced outage every 4 years.

In 2010 Waipa signed a DSD with Transpower to produce a SSR for implementing super n at Te Awamutu GXP. The cost of establishing a super n reliability level of supply to Te Awamutu will be recovered by Transpower through a CIC.

Security of Supply Te Awamutu

Transpower claim that the longest contingency expected with the existing line allows for the replacement of a failed transmission structure by helicopter within 24 hours. The Company is not confident that Transpower could replace a failed transmission structure within 24 hours on all occasions. This level of security of supply is unacceptable to Waipa.

For many years Waipa has expressed its concern to Transpower about the lack of security of supply for Te Awamutu GXP. The Company over that period has endeavoured to negotiate with Transpower to provide a reasonably priced technically robust second 110kV line to Te Awamutu so that an n-1 security level can be achieved. Transpower claim these negotiations have been further complicated by industry reforms including the establishment of the Commerce Commission and its role of overseeing all new grid investments and future pricing methodology.

In 2007 the Company came close to accepting Transpower's proposal to design and seek consent for a second line from their Hangatiki GXP to Te Awamutu. However, in October 2007 Transpower advised Waipa that their transmission lines in the lower Waikato area were currently constrained 5% of the time and that future generation connected to these transmission lines would cause them to become constrained up to 30% of the time. Transpower further indicated that Waipa would be responsible for bearing all future costs to remove these constraints.

In 2009, Transpower reviewed their decision on a second line from Hangatiki GXP to Te Awamutu GXP and now claim that this solution is technically feasible with no known constraints that would affect the availability of the line except for faults and routine maintenance. This view was corroborated by an independent consultant retained by Waipa in 2010. The consultant has developed high level costs and a 4 year project timeline to install a second 110kV line from Te Awamutu to Hangatiki to improve security to n-1.

This reticulation proposal will:

- Provide a permanent (non-switched) n-1 supply to TMU,
- Provide physical diversity of line route,
- Provide diversity of generation source,
- Reduce existing transmission line constraints in the Waikato region,
- Enable the installation of a 110kV spur line to a new Ngutunui 110kV/11kV point of supply which will:
 - Improve western feeder reliability, and
 - Offer a reticulation solution for the extreme western feeders (both legs of Kawhia) when the load grows.

The Company will continue to work with the independent consultant and Transpower to establish that this solution will be the best investment option for "New Zealand Inc".

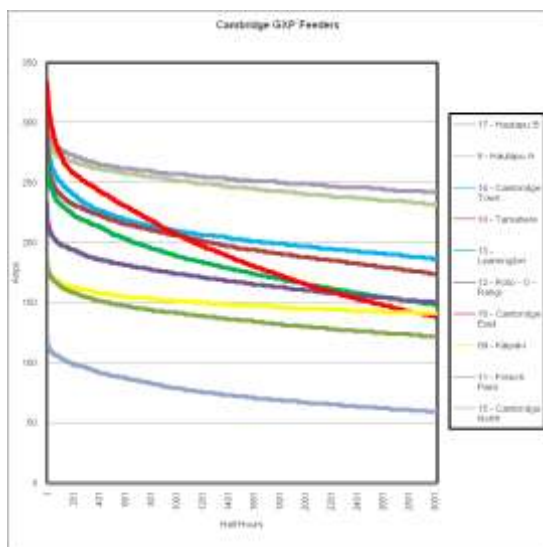
No costs associated with this solution are included in the Capital Expenditure Budget in Section 10 of this AMP.

Waipa Feeder Longevity

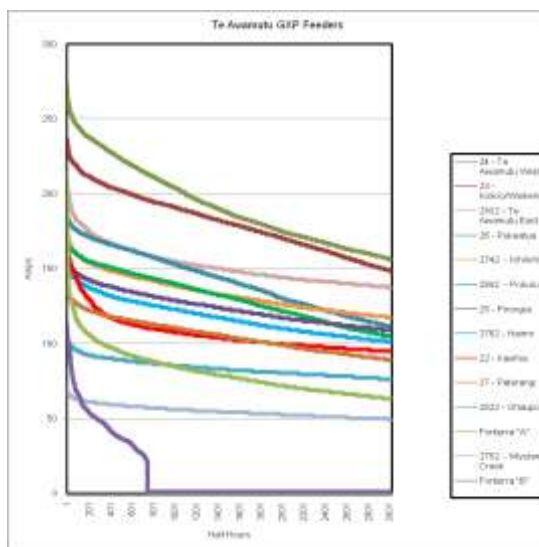
Using data collected over a period of 1 year between 1 December 2009 and 30 November 2010 the underlying MDs on all Waipa's feeders were determined by analysing each half hour load and eliminating abnormal loads caused by total or partial switching of feeders for capital and maintenance works and for restoration of supply after a fault.

The underlying feeder MDs frequencies are shown on the following load duration graphs.

Cambridge Feeders Load Duration Graph



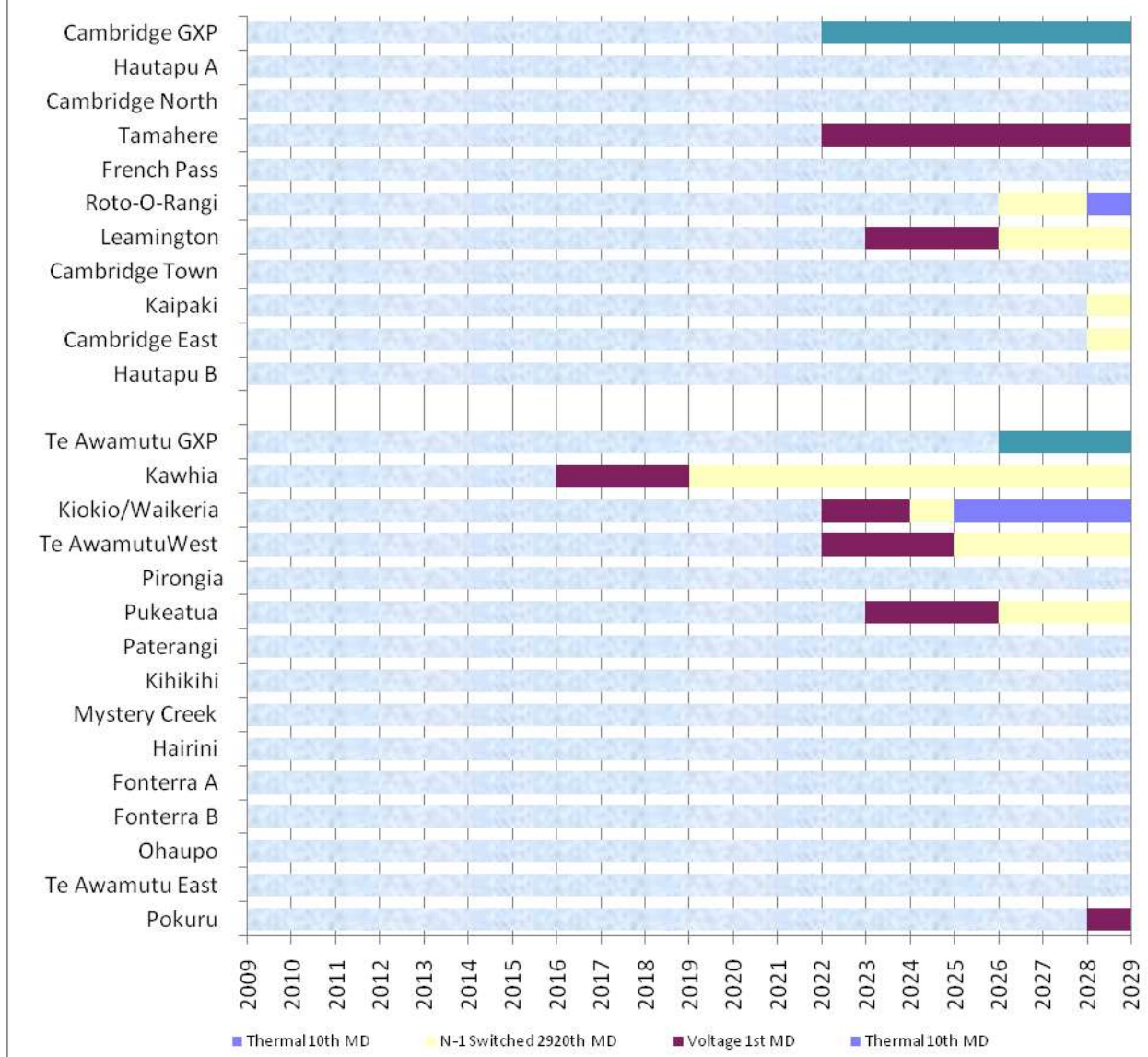
Te Awamutu Feeders Load Duration Graph



The Company then predicted when its feeders would become capacity, voltage or security constrained in accordance with the established criteria.

Waipa's 2011 longevity predictions for Transpower's GXP transformer capacity and the Company's feeders are shown in the following graph.

GXP Assets and WNL Feeders Longevity



The Company now predicts that only Kawhia feeder will become constrained during the planning horizon of this AMP. Kawhia feeder is now predicted to deliver unsatisfactory voltage from 2016/2017 onward if there is no intervention.

6.4 Policies on Distributed Generation

Waipa has welcomed all enquiries from consumers and other interested parties regarding the commercial and technical viability of a variety of distributed generation proposals.

Waipa's connection policy requires distributed generators to contribute to any network enhancements that are required to eliminate any input constraints caused by the distributed generator.

Applications and a description of the consenting process and associated legislation and technical requirements for distributed generation are available on the Company's web-site.

The Company's salient requirements for new generators are:

- Generator operators must ensure their generator operates safely and does not produce any adverse effects on the network or any other network customer.
- Generators must not produce any voltages or harmonics outside regulatory limits, interfere with network protection systems or inject fault currents above network capabilities.
- Generator owners must provide protection against over and under frequency, overcurrent, phase to phase faults and phase to earth faults.
- Generators must comply with all relevant regulations, standards and codes of practice.
- Applicants who reduce the net kVAr supplied to Waipa's network by Transpower will be encouraged, while those who require additional kVAr support will be declined.
- Generators must be tested fully before being connected.
- Connected generators will be disconnected: in emergency situations, if the generator has failed to pay any fees or charges, or if there is a change or increase in distributed generation without Waipa's prior consent.
- Standard fees apply for applications and inspections.

Most of the distributed generation installations have been downstream of the consumer's metering point and generally photovoltaic applications. This type of distributed generation has had little effect on the network.

The existing 7.5MVA co-generator at Fonterra Te Awamutu dairy factory is directly connected to the Te Awamutu GXP via two 11kV service mains. This generator while it has no effect on other Company network assets it does impact on Transpower's Te Awamutu GXP assets and MD.

To date Waipa's experience has been that no committed distributed generation projects have had any impact on the Company's reticulation assets or network development plans.

6.5 Policies on Non-network Solutions

Waipa encourages all forms of non-network solutions that are economically feasible and practical alternatives to conventional network augmentation to address network constraints such as energy efficient lamps and heat pumps for reducing network MD and kWh consumption by consumers within their installations.

The Company offers all Retailers controlled load, day/night, and 8 hour supply kWh line pricing to encourage consumers to reduce network MD.

Waipa will consider using non-network solutions such as diesel generation to reduce network MD to delay capital expenditure if it is economic.

The Company's web-site (Info for Customers/Energy Efficiency) contains suggestions for consumers to save power without adversely impacting on their lifestyle.

Waipa has developed an innovative website (www.virtualsmarthome.co.nz) to introduce smart technology available for domestic customers and to provide energy saving tips.

Waipa will continue to require consumers to install sufficient power factor correction at their installations to maintain a minimum power factor of 0.95 to reduce kVAr loading on the Company's feeders and avoid Transpower's kVAr penalty charges.

Transpower routinely advises the Company each year what the power factor at Cambridge GXP and Te Awamutu GXP has been during the previous year. To date Transpower has advised that power factor at both GXPs remain satisfactory. However, there will be an ongoing need to work with electricity retailers, electrical contractors and consumers to ensure existing power factor correction

capacitors are operating correctly and new commercial and industrial installations have appropriate power factor correction.

When potential non-network solutions are identified, they are reviewed by the Operations Committee, a group of Company representatives who meet monthly to discuss operational and technical matters that have arisen.

The Operations Committee assigns the potential non-network solution to the relevant staff member for further research on cost/benefits of the proposal. The findings are reported back to the Operations Committee and if they are endorsed onto Management for appropriate action.

6.6 Network Development Plan

Network Development Options Identified

As there is no significant Distributed Generation on Waipa's network, and, as there is no significant Demand Side Management initiatives driven by Electricity Retailers for consumers to take advantage of, the Company's pragmatic option is to pursue reticulation solutions.

11kV Feeder Reinforcement

The majority of Cambridge GXP and Te Awamutu GXP urban/suburban and rural feeders can be future proofed by normal 11kV reinforcement techniques.

Normal 11kV reinforcement techniques are economic and involve:

- upgrading all under sized feeder conductors to remove capacity constraints and improve delivered voltage;
- relocating, enhancing, adding or removing voltage regulators to ensure regulatory voltage is maintained at all times;
- establishing new 11kV feeders and reallocating load between the new and existing feeders; and
- relocating, adding or removing line auto reclosers, sectionalisers, disconnectors, and dropout fuses to satisfy system operating needs.

Normal 11kV reinforcement strategies can be applied to most of Waipa's 11kV feeders if required to meet future capacity and voltage constraints that arise from the assumed 3.5% pa compounding growth rate in MD.

Feeder Development

Cambridge GXP Switchboard Replacement

Transpower intend replacing the aged 11kV switchgear at Cambridge GXP in 2011/2012. This provides the opportunity to efficiently install additional feeder switchgear to split feeders for improved reliability and security.

Waipa intends creating:

- A new Pencarrow feeder to split Tamahere for improved reliability and security,
- A new Monavale feeder to split Kaipaki for improved reliability and security, and additional security for Leamington feeder,
- A new Kilda Waterways feeder that will supply a new subdivision development and improve security for French Pass feeder,
- A new direct feeder to the existing ripple plant for improved operational safety.

In 2010 Waipa executed a DSD with Transpower to install the additional four circuit breakers in their new Cambridge switchboard. The cost of establishing additional circuit breakers in Cambridge GXP will be recovered by Transpower through a CIC.

Pencarrow Feeder

Waipa intends laying a new Pencarrow feeder from the CBG GXP along Appleby Road and the new Cambridge Bypass alignment to Peake Road which will split the existing Tamahere feeder into a "Pickering Road leg" and a "Hautapu Road leg".

The cost associated with this development is identified as Reliability, Safety and Environment expenditure in the Capital Expenditure Budget in Section 10 of this AMP.

Monavale Feeder

Waipa intends laying an "express" cable directly to the Kaipaki load centre bypassing the load at the front end of the original Kaipaki feeder in Monavale.

The new express Kaipaki feeder will improve reliability in both Kaipaki and Monavale areas.

The front end of the existing Kaipaki feeder will be renamed Monavale. Monavale feeder with reduced loading will improve security to Leamington area through an existing inter-tie.

The cost associated with this development is identified as Reliability, Safety and Environment expenditure in the Capital Expenditure Budget in Section 10 of this AMP.

St Kilda Waterways Feeder

Waipa intends reticulating this new life style block 350 lot subdivision, which surrounds Cambridge GXP and lies between Cambridge North and French Pass feeders, when resource consent is granted for the development.

The new St Kilda feeder will also improve security for French Pass feeder.

The cost associated with this development is identified as Customer Connection expenditure in the Capital Expenditure Budget in Section 10 of this AMP.

Ripple Plant

Waipa intends directly supplying the existing Cambridge ripple plant via a new CB at Cambridge GXP. Currently the ripple plant is supplied from Cambridge Town feeder via a RMU with constrained capacitive switching rating.

The cost associated with this development is identified as Reliability, Safety and Environment expenditure in the Capital Expenditure Budget in Section 10 of this AMP.

Tranzit NZ Cambridge Bypass

Tranzit NZ intend to construct the Cambridge Bypass over the period 2012-2015. This project will impact on all of the Cambridge 11kV feeders which will need to be converted from overhead to underground reticulation. Transitz NZ hasn't as yet provided detailed construction details but their overall scheme plan indicates there are 11 sites where Waipa's lines intersect with new roading.

A provisional cost for Transitz's project has been included in Relocation expenditure in the Capital Expenditure Budget in Section 10 of this AMP.

Cambridge and Te Awamutu Subdivisions and other Developments

The quantity of subdivisions and other developments and the timing of their reticulation are driven by the developers of each site.

Over the past 2 years expenditure on reticulating subdivisions and new development has declined significantly. The reduction is believed to be due to the ongoing recession. Waipa has reflected the reduced activity in this AMP. The Company hasn't speculated on when the economy will pick up and activity will return to previous trends.

Investment in new switchgear (RMUs, dropout fuses, and disconnectors), new transformers and network extensions, driven by developer and consumer requirements will continue as required.

The cost associated with this activity is identified as Customer Connection expenditure in the Capital Expenditure Budget in Section 10 of this AMP.

Cambridge and Te Awamutu Feeder Growth and Constraints

Waipa's feeder longevity analysis which assumes 3.5% compounding growth per annum indicates that (with the exception of Kawhia) there are no other feeders that are expected to become constrained within the horizon of this AMP.

No costs associated with enhancing feeders are included in the System Growth expenditure in the Capital Expenditure Budget in Section 10 of this AMP.

Reliability Improvement

Waipa has a semi rural network with relatively high consumer density on rural feeders. As a result faults on rural feeders affect a larger numbers of consumers than other more typical rural and semi rural networks. At the same time travel times to these faults can be longer than for urban networks.

Analysis has shown the average number of consumers affected by a fault on Waipa's network is substantially higher than for most other networks.

Waipa's objective is to continually improve the reliability performance of its network feeder assets to meet the Company's belief of growing expectations of consumers.

In order to improve the level of service Waipa has decided to continue segmenting feeders when the opportunity arises and installing dropout isolation fuses and remote controlled auto reclosers.

The Company will also continue to use live line techniques.

Feeder Segmentation

From 2006 the Company has exploited opportunities often created by customer driven works to split feeders at minimal cost to improve SAIDI minutes and reduce SAIFI.

Waipa's proposal to have Transpower install four new 11kV circuit breakers out of Cambridge GXP to supply St Kilda Waterways, split Tamahere into Tamahere and Pencarrow, split Kaipaki into Kaipaki and Monavale and provide a dedicated supply to the ripple plant will improve reliability.

Remote Controlled Auto Reclosers

Continuing the installation of remote controlled 11kV auto reclosers will increase feeder segmentation which will reduce the number of consumers impacted by faults and enable quicker supply restoration thereby improving reliability performance.

Waipa's target over the next 6 years is to have no more than 200-300 consumers or 15-20km of 11kV line between remote controlled 11kV auto reclosers.

The Company proposes to install up to 12 additional NOJA pole mounted remote controlled 11kV auto reclosers each year for 6 years on the network. This is double the installation rate of previous years and is an indication that Waipa is keen to improve the network reliability as quickly as practicable for consumers.

Some of these auto reclosers will be installed to replace existing sectionalisers to reduce fault affected areas and improve fault isolation. The remainder of the auto reclosers will be installed to further segment each 11kV feeder to minimise the number of consumers affected by faults and improve fault isolation and restoration of supply times.

The costs associated with installing remote controlled auto recloser are identified as Reliability, Safety & Environment expenditure in the Capital Expenditure Budget in Section 10 of this AMP.

The table on page 61 shows the proposed remote controlled auto recloser installation programme.

Dropout Isolation Fuses

Waipa's Cambridge and Te Awamutu pole lines were historically constructed with a minimum of isolation points installed between the main 11kV distribution lines and either 11kV distribution network spur lines or consumers' 11kV service mains.

As a consequence when a fault occurs on an 11kV distribution network spur line or consumer 11kV service main all the distribution network up to the nearest isolation device is without power.

Continuing the installation of 11kV dropout fuse isolation points on network spurs and consumers' service mains will reduce the number of consumers impacted by phase to phase faults on these spur lines and provide easier disconnect points enabling quicker supply restoration to other consumers thereby improving reliability performance indices.

Approximately 50 additional 11kV dropout isolation fuses will be installed on network feeder spurs and 50 additional 11kV dropout isolation fuses will be installed on consumers' service mains each year to minimise the number of consumers affected by faults and improve fault isolation and restoration of supply times.

The costs associated with installing dropout fuses are identified as Reliability, Safety & Environment expenditure in the Capital Expenditure Budget in Section 10 of this AMP.

Reliability of Pukeatua, Hairini, Kihikihi and Te Awamutu East Feeders

Waipa has a multi-circuit pole line along Cambridge road comprising Pukeatua, Hairini and Kihikihi feeders that is located on the edge of high density motor vehicle carriageways of State Highway 3 and Te Awamutu – Cambridge district road and is vulnerable to traffic accidents.

Because each circuit occupies the same poles and cross-arms there are occasions when repairs and maintenance to one circuit cannot be safely carried out using live line techniques and outages must be planned affecting all circuits. What would be routine fault or maintenance work on a single circuit pole line causes maximum disruption to connected consumers across all these feeders.

The Company proposes building a new front end for Pukeatua feeder over the next 3 years to help improve the reliability for these feeders. The completed project will provide alternative supply options for Pukeatua, Hairini, Kihikihi and Te Awamutu East feeders achieved through inter-tie disconnectors.

The cost associated with this activity is identified as Reliability, Safety & Environment expenditure in the Capital Expenditure Budget in Section 10 of this AMP.

Reliability of Kawhia, Pirongia and Paterangi Feeders

Waipa has a multi-circuit pole line comprising Kawhia, Pirongia and Paterangi feeders that is located in Te Awamutu's industrial area where heavy vehicles are frequently driven. The multi-circuit pole line also crosses a rail corridor and has been damaged by a train derailment. Restoration of power was delayed for many hours while train wreckage was cleared.

Because each circuit occupies the same poles and cross-arms there are occasions when repairs and maintenance to one circuit cannot be safely carried out using live line techniques and outages must be planned affecting all circuits. What would be routine fault or maintenance work on a single circuit pole line causes maximum disruption to connected consumers across all these feeders.

The Company proposes replacing the multi-circuit pole line by underground cables in Factory Road in the vicinity of the rail bridge which will remove the risk associated with traffic and trains and the need to de-energise the circuits for routine maintenance.

The cost associated with this activity is identified as Reliability, Safety & Environment expenditure in the Capital Expenditure Budget in Section 10 of this AMP.

State Highway 1 High Load Route Improvement

State Highway 1 is the main route for extra-ordinary high loads travelling from Hamilton to Port Tauranga. Waipa has been escorting these loads (around 20 per year) late at night removing and reinstating power lines. These planned shutdowns contribute to Waipa's SAIDI.

There remain 49 overhead aerial crossings required to be undergrounded to eliminate power disconnections for high loads that we have escorted to date. They require extensive traffic management provided by an external contractor and the New Zealand Transport Authority requires all underground crossings to be thrust.

In view of Transit NZ proceeding with the Cambridge Bypass over the period 2012-2015 we are investigating if work in the vicinity of the Bypass needs to be done. We have not received construction details from Transit NZ. If Transit's standard clearance height is insufficient we will need to proceed with undergrounding the 24 overhead lines along SH1 that run parallel with the Bypass. There are 25 overhead crossings to the south of the Cambridge Bypass that will still need to be undergrounded.

The 2011/2012 AMP contains a budget for the remaining 49 crossing assuming that Cambridge Bypass overpass designs do not eliminate the need to underground 24 crossings.

The cost associated with this activity is identified as Reliability, Safety & Environment expenditure in the Capital Expenditure Budget in Section 10 of this AMP.

Live-Line Techniques

There will be an increase in live-line construction and refurbishment activity, subject to cost effectiveness, to minimise the number of planned outages.

Remote Controlled Auto Recloser Installation Programme

TPNZ GXP	TPNZ CB	Feeder	Feeder type	Proposed 2011/2012	Proposed 2012/2013	Proposed 2013/2014	Proposed 2014/2015	Proposed 2015/2016	Proposed 2016/2017	Proposed 2017/2018	Proposed 2018/2019	Proposed 2019/2020	Proposed 2020/2021
Cambridge	8	Hautapu A	urban										
Cambridge	9	Kaipaki	rural			5							
Cambridge	10	Tamahere	rural					2	4				
Cambridge	11	French Pass	rural	4									
Cambridge	12	Roto-O-Rangi	rural										
Cambridge	13	Leamington	urban										
Cambridge	14	Cambridge Town	urban										
Cambridge	15	Cambridge North	urban						6				
Cambridge	16	Cambridge East	urban	2									
Cambridge	17	Hautapu B	urban										
Te Awamutu	22	Kawhia	rural			1							
Te Awamutu	23	Kio Kio / Waikeria	rural	3									
Te Awamutu	24	Te Awamutu West	urban	5									
Te Awamutu	25	Pirongia	rural				3						
Te Awamutu	26	Pukeatua	rural				8						
Te Awamutu	27	Paterangi	rural			3							
Te Awamutu	2742	Kihikihi	rural			3							
Te Awamutu	2752	Mystery Creek	rural	1									
Te Awamutu	2762	Hairini	urban				1	1					
Te Awamutu	2782	Fonterra A	urban										
Te Awamutu	2802	Fonterra B	urban										
Te Awamutu	2822	Ohaupo	rural	2									
Te Awamutu	2832	Te Awamutu East	urban										
Te Awamutu	2842	Pokuru	rural	3	4								

Regulatory Voltage

Waipa has a regulatory obligation to supply consumers' NCP within specified voltage limits not withstanding momentary fluctuations.

The Company's load profile is typical of most EDBs' with morning and evening peaks which occur for 6-8 hours each day.

For the remaining 16 to 18 hours the Company's urban and suburban pole line feeders operate well within their current rating capacity and deliver statutory voltage.

However during peak loading periods the Company's rural pole line feeders without enhancement cannot deliver regulatory voltage. The cost effective solution is to install voltage regulators on these rural lines so that regulatory voltage is maintained at NCP over peak periods.

Waipa has established a programme for:

- enhancing (adding third phase) to two phase 200A 32 step 0.625% per step type installations, and
- installing additional new voltage regulators, as shown in the following table.

An additional set of three 200A Cooper voltage regulators on four pole structures will be installed each year on rural feeders and existing voltage regulators will be enhanced to ensure statutory voltage is maintained.

The need for voltage regulator installations proposed from 2012/2013 onward will be reviewed closer to the time.

The cost associated with voltage regulator installations is identified as System Growth expenditure in the Capital Expenditure Budget in Section 10 of this AMP.

The voltage regulator installation programme is shown in the table on page 64.

Western Feeder Voltages

In 2001 a Power System Studies for Utilities analysis of the Kawhia feeder, the Company's longest feeder with an arterial length of 81kms, revealed that normal 11kV and 22kV reinforcement techniques are inappropriate for the longer rural feeders heading west of Te Awamutu GXP.

The Power System Studies for Utilities analysis assumed;

- a 3.5% pa compounding growth in MD (on 2 occasions over the past 7 years the MD has increased by this amount),
- a point load of 250kVA would be established at Aotea Harbour before 2008 (a new subdivision had been proposed), and
- load management operating at a level that provides adequate service.

The results based on the highest MD at the time predicted that Kawhia feeder would reach its voltage constraint in 2008.

One of the options considered in the study titled "Future Network Voltage(s)" dated 26 March 2002 for voltage support of Kawhia feeder in 2008 was to install a diesel generator in the vicinity of Kawhia town.

This is not the Company's preferred solution because it is not seen as a long-term solution for Kawhia feeder or a comprehensive solution for the other western area feeders that will suffer poor voltage at some point in the future.

Waipa's preferred solution recommended in the Company study titled "Future Network Voltage(s)" to future-proof Te Awamutu's long rural lines was to establish an 110kV POS at Ngutunui by 2008 and connect into the existing Kawhia feeder, a new Hauturu feeder (southern branch of Kawhia feeder), part of Pokuru feeder and part of Paterangi/Pirongia feeder.

Discussions with Transpower concerning the second 110kV line to Te Awamutu GXP from Hangatiki included an option for Waipa to connect a new 110kV spur line to supply a new 110kV POS to be established at Ngutunui.

The Company will need to install a diesel generator at Kawhia to ensure regulatory voltage is maintained at peak times if Transpower's second 110kV line to Te Awamutu GXP from Hangatiki does not proceed in a timely manner,

The underlying MD predictions for Kawhia feeder have been reviewed. The load growth has not occurred and the current indication is that Kawhia feeder will not become voltage constrained until 2016/2017. Kawhia is a holiday resort and the Company has monitored feeder load and voltages over the Christmas and New Year summer period and Anniversary and Waitangi weekends of 2009/2010 to corroborate the latest MD predictions.

Based on current MD load growth predictions a "firm" 500kVA diesel generator will need to be commissioned on the Kawhia feeder by 2015/2016.

The cost associated with installing generation at Kawhia is identified as System Growth expenditure in the Capital Expenditure Budget in Section 10 of this AMP.

The cost associated with the permanent reticulation solution (installing a new 110kV spur line to a new POS at Ngutunui) is identified as System Growth expenditure in the Capital Expenditure Budget in Section 10 of this AMP

Voltage Regulators Programme

TPNZ GXP	TPNZ CB	Feeder	Feeder type	Proposed 2011/2012	Proposed 2012/2013	Proposed 2013/2014	Proposed 2014/2015	Proposed 2015/2016	Proposed 2016/2017	Proposed 2017/2018	Proposed 2018/2019	Proposed 2019/2020	Proposed 2020/2021
Cambridge	8	Hautapu A	urban										
Cambridge	9	Kaipaki	rural										
Cambridge	10	Tamahere	rural		4								
Cambridge	11	French Pass	rural				3						
Cambridge	12	Roto-O-Rangi	rural					6					
Cambridge	13	Leamington	urban										
Cambridge	14	Cambridge Town	urban										
Cambridge	15	Cambridge North	urban										
Cambridge	16	Cambridge East	urban										
Cambridge	17	Hautapu B	urban										
Te Awamutu	22	Kawhia	rural										
Te Awamutu	23	Kio Kio / Waikeria	rural										
Te Awamutu	24	Te Awamutu West	urban										
Te Awamutu	25	Pirongia	rural							3			
Te Awamutu	26	Pukeatua	rural		6								
Te Awamutu	27	Paterangi	rural								3		
Te Awamutu	2742	Kihikihii	rural									3	
Te Awamutu	2752	Mystery Creek	rural										
Te Awamutu	2762	Hairini	urban										
Te Awamutu	2782	Fonterra A	urban										
Te Awamutu	2802	Fonterra B	urban										
Te Awamutu	2822	Ohaupo	rural										3
Te Awamutu	2832	Te Awamutu East	urban										
Te Awamutu	2842	Pokuru	rural										

Ripple Relay Replacement

The Company uses ripple relays for load control as a cost effective alternative to increasing feeder capacity to handle MD load, as well as minimising Transpower transmission charges.

In Te Awamutu the aged 297Hz ripple relays are being replaced with new 283Hz Enermet RO3 ripple relays over the next 4 years. It is estimated there are a total of 9301 ripple relays to replace. Up to 31 January 2011 there are 2965 relays replaced in the programme. Waipa aims to replace approximately 1500 relays each year until the programme is completed.

In Cambridge and Te Awamutu new ripple relays will be installed to meet existing load control and new ICP requirements.

The cost associated with this activity is identified as Asset Replacement & Renewal expenditure in the Capital Expenditure Budget in Section 10 of this AMP.

Ripple Relays Additions

Historically Waipa has installed approximately 200 additional ripple control relays per annum for new customers.

The cost associated with this activity is identified as Customer Connections expenditure in the Capital Expenditure Budget in Section 10 of this AMP.

Supervisory Control and Data Acquisition Remote Terminal Units

The SCADA system remote terminal units fitted to various voltage regulators, 11kV auto reclosers and automated air break switches on the distribution network will be installed as required.

The cost associated with this activity is part of establishing the new asset and is identified as System Growth and Reliability, Safety & Environment expenditure in the Capital Expenditure Budget in Section 10 of this AMP.

7.0 Life Cycle Asset Management Planning

Whilst standard asset lives prescribed in the fourth edition Handbook for Optimised Deprival Valuation of System Fixed Assets of Electricity Lines Businesses March 2004 (ODV) range between 15 years for SCADA systems and 70 years for PILC cable, Waipa's experience is that in most cases a specific asset's "fitness for purpose" is reviewed several times during the course of its life.

Generally asset enhancement or replacement is driven by increased load demand, the need to deliver electricity within statutory voltage limits, or physical deterioration.

7.1 Maintenance Planning Criteria and Assumptions

Waipa manages its distribution assets through their various lifecycles to ensure that the network:

- will be "fit for purpose" during the next 10 year planning period,
- will deliver voltage within statutory limits,
- will meet the security levels as determined by the Company in consultation with the shareholder and consumers,
- are maintained in accordance with the Company's investment and maintenance policies,
- will continually improve on targets for SAIDI and SAIFI and
- are operated in a prudent manner.

The Company's main non-asset solutions to improve network SAIDI and SAIFI reliability performance are to:

- continue to use live-line techniques, and
- encourage tree owners to manage vegetation menacing power lines.

Waipa will continue to drive distribution network maintenance from asset condition surveys and by the eliminating or mitigating the causes of faults.

The Company Waipa will ensure that its staff, contractors and the public are safe from "step and touch" potential rise by complying with earthing standards.

7.2 Routine and Preventative Inspection and Maintenance

Maintenance programmes are driven by the Company's objective to provide a reliable and safe supply.

Identifying and completing preventative maintenance works on the network will also preserve the value of Waipa's distribution lines.

Waipa will continue to maintain all its voltage regulators, line auto reclosers, line sectionalisers, SF₆ ring main units, line disconnectors, distribution transformers and substation structures in accordance with good industry practice.

Asset Condition Surveys

Waipa believes that an asset condition approach to maintenance can be used to prioritise preventative maintenance expenditure.

Visual Survey

An independent contractor completed a visual survey of Waipa's pole line assets in January 2006. The assessment of network pole lines included:

- adequacy of pole structure,
- condition of crossarms and all line hardware,
- conductor tension, sagging and attachments,
- regulatory clearances, and
- menacing vegetation.

The external condition of voltage regulators, line auto reclosers and sectionalisers, line disconnectors, 11kV dropout fuses, 400V fuse links, lightning arrestors and cable terminations has also been assessed.

This information was used by the Company to prioritise maintenance works to ensure:

- safety of staff, contractors, the public, live stock and property,
- regulatory requirements are maintained, and
- important supplies are ranked accordingly.

Waipa has monitored the causes of system faults over the past 5 years and has found that very few asset defects have caused unplanned outages. For this reason the Company decided to suspend further surveys until all the defects have been eliminated. The last of these defects was eliminated in 2009/2010.

Waipa commenced the second visual asset condition survey in 2010/2011 using internal resources. The second survey is expected to take 8 years to complete and feeders will be surveyed in the same order as the first survey. The programme is based on an even spread of kilometres of line being surveyed each year.

Waipa gains further asset condition information from:

- A vegetation management programme,
- An earth testing and repair programme,
- Asset thermal surveys,
- Partial discharge surveys, and
- Corona discharge.

The cost associated with this activity is identified as System Management & Operations expenditure in the Maintenance Expenditure Budget in Section 10 of this AMP.

The programme for visual asset condition surveys is shown in the table on page 68.

Asset Condition Survey Programme

TPNZ GXP	TPNZ CB	Feeder	Feeder type	Proposed 2011/2012	Proposed 2012/2013	Proposed 2013/2014	Proposed 2014/2015	Proposed 2015/2016	Proposed 2016/2017	Proposed 2017/2018	Proposed 2018/2019	Proposed 2019/2020	Proposed 2020/2021
Cambridge	8	Hautapu A	urban				2nd						
Cambridge	9	Kaipaki	rural			2nd							
Cambridge	10	Tamahere	rural								3rd		
Cambridge	11	French Pass	rural								3rd		
Cambridge	12	Roto-O-Rangi	rural		2nd							3rd	
Cambridge	13	Leanington	urban					2nd					
Cambridge	14	Cambridge Town	urban					2nd					
Cambridge	15	Cambridge North	urban				1st						
Cambridge	16	Cambridge East	urban					2nd					
Cambridge	17	Hautapu B	urban				2nd						
Te Awamutu	22	Kawhia	rural	2nd								3rd	
Te Awamutu	23	Kio Kio / Waikeria	rural		2nd								3rd
Te Awamutu	24	Te Awamutu West	urban							2nd			
Te Awamutu	25	Pirongia	rural							2nd			
Te Awamutu	26	Pukeatua	rural										
Te Awamutu	27	Paterangi	rural					2nd					
Te Awamutu	2742	Kihikihii	rural			2nd							
Te Awamutu	2752	Mystery Creek	rural						2nd				
Te Awamutu	2762	Hairini	urban							2nd			
Te Awamutu	2782	Fonterra A	urban										
Te Awamutu	2802	Fonterra B	urban										
Te Awamutu	2822	Ohaupo	rural										
Te Awamutu	2832	Te Awamutu East	urban										
Te Awamutu	2842	Pokuru	rural				2nd						

Thermal Surveys

Waipa will continue to engage an external service provider to carry out an annual thermal survey at times of high load of arterial feeder line disconnectors, lines, transformers, dropout fuses, cable pothead terminations and line connections. Thermal “hot spots” are treated as urgent and are repaired as soon as possible.

Partial Discharge Surveys

In 2005/2006 Waipa engaged an external service provider to carry out partial discharge surveys of all RMU equipment after two RMU units failed in service. The survey revealed that a number of RMUs have varying degrees of partial discharge originating from heat shrink cable terminations. All switchgear partial discharge defects were treated as urgent and were repaired soon after.

The survey also led to Magnefix, Andelect and ABB Series 1 RMUs being replaced as the safe and most cost effective solution. These RMUs were no longer supported by their manufacturers.

No further partial discharge surveys are contemplated in this AMP. This doesn't preclude future partial discharge surveys if the need arises.

Corona Discharge

In 2005/2006 Waipa engaged an external service provider to carry out a corona survey by helicopter of Kawhia feeder which was plagued by several persistent faults. This resulted in 33 contaminated polymer resin strain insulators being replaced at the time. There has been no recurrence of the problem on Kawhia feeder or any other feeder to date.

No further corona surveys are contemplated in this AMP. This doesn't exclude future corona surveys if the need arises.

Voltage Regulators

Waipa does not have 66kV, 33kV sub-transmission lines or zone substations. To maintain regulatory 11kV voltage on its feeders Waipa has a significant number of voltage regulator units in service on the distribution network.

Because of their significant impact on network operations if they malfunction voltage regulators will be inspected for external corrosion and damage every year in addition to the asset condition survey of pole lines.

Repairs and maintenance on existing voltage regulator installations will be completed in a timely manner.

The cost associated with this activity is identified as Refurbishment & Renewal expenditure in the Maintenance Expenditure Budget in Section 10 of this AMP.

Auto Reclosers

Waipa has a number of older KF and KFE type vacuum auto reclosers in service on the distribution network. These auto reclosers are beyond their economic life and will be retired and replaced with modern equipment with increased functionality.

Because auto reclosers have a significant impact on network operations they will be inspected for external corrosion and damage every year in addition to the asset condition survey of pole lines. Repairs and maintenance on existing auto reclosers will be completed in a timely manner in accordance with the manufacturer's recommendations.

The cost associated with this activity is identified as Reliability, Safety and Environment expenditure in the Maintenance Expenditure Budget in Section 10 of this AMP.

Line Sectionalisers

Waipa has a number of older GN3E sectionalisers in service on the distribution network.

These sectionalisers are beyond their economic life and will be retired and replaced with modern auto reclosers with increased functionality.

The cost associated with this activity is identified as Reliability, Safety & Environment expenditure in the Capital Expenditure Budget in Section 10 of this AMP.

Ring Main Units

Oil-Filled Switchgear

Waipa has 10 11kV outdoor oil-filled ring main units in service on the distribution network as at 31 March 2011.

Waipa has decided to replace all oil filled RMUs within the next 2 years.

The Company intends to install only SF₆ switchgear (or vacuum RMUs or solid dielectric RMUs if cost effective) in the future.

Waipa has replaced all Andelect and ABB Series 1 oil filled RMU that are no longer supported by their manufacturers.

Magnefix Switchgear

These RMUs had reached the end of their life and were suffering from partial discharge.

Waipa's has replaced all Magnefix RMUs that were no longer supported by their manufacturer, with modern SF₆ switchgear.

SF₆ Switchgear

Waipa is now purchasing ABB Safelink SF₆ RMUs and the Company expects that these RMUs will not require major maintenance over their useful lives.

Line Disconnectors

Waipa has a significant number of air break switches in service on the distribution network. Previously these air break switches were removed from service and refurbished. Their most common mode of failure is to "freeze up" through infrequent use or their contacts weld together when they pass fault current.

It is intended to replace deteriorated air break switches at the time the pole line is reconstructed or when they fail in service.

The Company has successfully trialled G&W SF₆ line disconnectors on the network over the past 5 years. These types of disconnectors will be installed at switching sites that are frequently operated while heavily loaded.

While SF₆ line disconnectors function well they remain relatively expensive compared to the traditional disconnector. The Company has elected to continue to use Electropar EPS1 disconnectors for other applications.

Transformers

Waipa has a significant number of pad-mount, pole-platform and pole-hanger type 11kV/400V transformers in service on the distribution network.

Transformers are not routinely inspected or serviced. However, their external condition will be assessed at the time of the asset condition survey. Subsequent repair and maintenance will be undertaken in a timely manner.

The pad-mount transformers in urban areas are subject to vandalism. The Company will repair vandalism and remove graffiti as required.

Spa Pool Transformer Substation Structures

Waipa has 57 “spa pool” transformer substations on the network as at 31 March 2010. These substation structures no longer comply with modern industry standards.

The Company propose to remove all “spa pool” transformer substations and replace them with a ground mount substation. The Company intends to replace all “spa pool” transformer substations over the next 3 years.

In the interim the Company has imposed access constraints for operation and maintenance staff..

The cost associated with this activity is identified as Reliability, Safety & Environment expenditure in the Capital Expenditure Budget in Section 10 of this AMP.

Two Pole Transformer Substation Structures

Waipa has 173 aged hardwood platform or RSJ steel beam platform two pole transformer structures on the network as at 31 March 2010. The aged hardwood wooden platforms, together with the operating constrained inherent with the steel beam platforms and the exposed low voltage bus wiring fixed to hardwood hand rails present an operating and maintenance risk for staff and contractors.

The Company propose to remove all two pole transformer substations and replace them with one pole transformer substation structures or a ground mount substation if appropriate.

Two pole transformer structures are removed when other work arises in the area supplied by these substations. The Company intends to replace all two pole transformer structures over the next 5 years.

In the interim the Company has imposed access constraints for operation and maintenance staff and all urgent problems identified by staff or contractors are fixed immediately.

When replacement structures are built the seismic restraints will comply with modern earthquake design (Code of Practice NZS4203:1984 and ER66).

The cost associated with this activity is identified as Reliability, Safety & Environment expenditure in the Capital Expenditure Budget in Section 10 of this AMP.

Single Pole Transformer Substation Structures

Waipa has over 2000 single pole transformer structures on the network. The Company does not have routine replacement or maintenance programmes for this type of asset. Remedial work is carried out when a defect arises or the asset is upgraded.

The cost associated with this activity is identified as Asset Replacement & Renewal expenditure in the Capital Expenditure Budget in Section 10 of this AMP.

Oil Leak Containment

All ground-mounted transformers with capacity in excess of 750kVA will be constructed with bunding for oil containment as required by the Resource Management Act 1991.

Waipa's fault crews carry emergency oil containment and clean up kits. Larger kits and replacement materials are located at Waipa's Te Awamutu depot and at Transpower's Cambridge GXP and are available 24 hours per day.

Buildings, Fences and Grounds

Waipa owns buildings and grounds in or on which a variety of distribution network assets are installed. These buildings and grounds will be kept secure from inadvertent public entry, safe for Waipa's staff and contractors, and neat and tidy as an expression of our good citizenship. Repair and maintenance work will be undertaken as required.

Earthing Testing and Repair

Waipa will ensure that all its system earthing and bonding comply with AS/NZS 3000:2007 earthing standards and NZECP 35 New Zealand Electrical Code of Practice for Power System Earthing to ensure that Company personnel, contractors and the public are safe from "step and touch" potential rise.

The earth testing and repair programme is based on an even spread of earth banks requiring testing each year. The programme results each system earth being checked every 8 years.

The Company has experienced a growing number of copper earth theft consistent with recent industry trends. Stolen copper earths will be replaced immediately once they are known. Waipa is investigating alternative materials for earthing that will have a lower scrap value.

The cost associated with this activity is identified as Routine & Preventative expenditure in the Maintenance Expenditure Budget in Section 10 of this AMP.

The proposed earth testing and repair programme is shown in the following table on page 73.

Earth Testing and Repair Programme

TPNZ GXP	TPNZ CB	Feeder	Feeder type	Proposed 2011/2012	Proposed 2012/2013	Proposed 2013/2014	Proposed 2014/2015	Proposed 2015/2016	Proposed 2016/2017	Proposed 2017/2018	Proposed 2018/2019	Proposed 2019/2020	Proposed 2020/2021
Cambridge	8	Hautapu A	urban						T&R2				
Cambridge	9	Kaipaki	rural			T&R2							
Cambridge	10	Tamahere	rural								T&R3		
Cambridge	11	French Pass	rural	T&R2								T&R3	
Cambridge	12	Roto-O-Rangi	rural		T&R2								T&R3
Cambridge	13	Leamington	urban							T&R2			
Cambridge	14	Cambridge Town	urban						T&R2				
Cambridge	15	Cambridge North	urban						T&R2				
Cambridge	16	Cambridge East	urban						T&R2				
Cambridge	17	Hautapu B	urban						T&R2				
Te Awamutu	22	Kawhia	rural	T&R2	T&R2							T&R3	T&R3
Te Awamutu	23	Kio Kio / Waikeria	rural				T&R2						
Te Awamutu	24	Te Awamutu West	urban							T&R2			
Te Awamutu	25	Pirongia	rural			T&R2							
Te Awamutu	26	Pukeatua	rural						T&R2				
Te Awamutu	27	Paterangi	rural			T&R2							
Te Awamutu	2742	Kihikihiki	rural					T&R2					
Te Awamutu	2752	Mystery Creek	rural								T&R3		
Te Awamutu	2762	Hairini	urban							T&R2			
Te Awamutu	2782	Fonterra A	urban										
Te Awamutu	2802	Fonterra B	urban										
Te Awamutu	2822	Ohaupo	rural										
Te Awamutu	2832	Te Awamutu East	urban							T&R2			
Te Awamutu	2842	Pokuru	rural									T&R2	

T&R = Test and Repair

Live-Line Techniques

Every opportunity will be taken to use live-line techniques where it is safe and cost effective. An ongoing target to constrain planned outages to 20 SAIDI minutes per year has been set which is proving a significant challenge.

Vegetation Management

Waipa has had an active vegetation management programme in place since 2001 whereby an entire feeder is surveyed and all trees menacing the distribution lines are either removed or trimmed depending on consultation with their owner.

The Company established an internal vegetation management crew in 2007 to bring an added focus on clearing vegetation from its 11kV pole lines.

Waipa offers tree owners an initial free cut/trim but insist that if the tree owner engages another contractor that this type of work is undertaken by an approved contractor.

Waipa's experience is that the new Electricity (Hazard from Trees) Regulations 2003 has resulted in the Company incurring additional compliance costs and the maintenance budget reflects the expected increase in cost.

The clearing of trees menacing service mains remains the responsibility of the tree owner. The Company offers free temporary disconnection of a service main for the tree owner to clear the vegetation safely.

Waipa will either remove or attempt to trim trees so that they will not grow back into the Notice Zone (2.6m) for a minimum period ranging from 6 to 8 year depending on growth rates and tree species.

The vegetation programme shown below is based on even spread of kilometres of line being surveyed and historical incidents of tree interference each year modified by known growth trends on specific feeders. The programme results in each feeder being systematically cleared every 6 to 8 years. Tree "hot-spots" are dealt with as required.

The cost associated with this activity is identified as Routine & Preventative expenditure in the Maintenance Expenditure Budget in Section 10 of this AMP.

The proposed vegetation management programme is shown in the following table on page 75.

Vegetation Management Programme

TPNZ GXP	TPNZ CB	Feeder	Feeder type	Proposed 2011/2012	Proposed 2012/2013	Proposed 2013/2014	Proposed 2014/2015	Proposed 2015/2016	Proposed 2016/2017	Proposed 2017/2018	Proposed 2018/2019	Proposed 2019/2020	Proposed 2020/2021
Cambridge	8	Hautapu A	urban			Cut 2							
Cambridge	9	Kaipaki	rural		Cut 2								Cut 3
Cambridge	10	Tamahere	rural			Cut 4						Cut 5	
Cambridge	11	French Pass	rural	Cut 3						Cut 4			
Cambridge	12	Roto-O-Rangi	rural	Cut 2								Cut 3	
Cambridge	13	Leamington	urban				Cut 2						
Cambridge	14	Cambridge Town	urban				Cut 2						
Cambridge	15	Cambridge North	urban			Cut 1							
Cambridge	16	Cambridge East	urban				Cut 2						
Cambridge	17	Hautapu B	urban			Cut 2							
Te Awamutu	22	Kawhia	rural								Cut 3		
Te Awamutu	23	Kio Kio / Waikeria	rural					Cut 3					
Te Awamutu	24	Te Awamutu West	urban						Cut 2				
Te Awamutu	25	Pirongia	rural						Cut 2				
Te Awamutu	26	Pukeatua	rural							Cut 3			
Te Awamutu	27	Paterangi	rural				Cut 2						
Te Awamutu	2742	Kihikihi	rural		Cut 2								Cut 2
Te Awamutu	2752	Mystery Creek	rural					Cut 2					
Te Awamutu	2762	Hairini	urban						Cut 2				
Te Awamutu	2782	Fonterra A	urban										
Te Awamutu	2802	Fonterra B	urban										
Te Awamutu	2822	Ohaupo	rural		Cut 2								Cut 3
Te Awamutu	2832	Te Awamutu East	urban						Cut 2				
Te Awamutu	2842	Pokuru	rural								Cut 3		

7.3 Asset Renewal and Refurbishment Policies

Waipa has established the following policies for asset renewal and refurbishment.

Acquisition of New Assets

Equipment will be purchased on the basis of its potential impact on public safety and its life-cycle costs including the capitalisation of electricity losses.

Conductor upgrading to reduce distribution losses will be based on an individual feeder cost/benefit analysis over 30 years (half of ODV specified life).

Waipa generally acquires all assets through a competitive tender process. Suppliers' offers are assessed on asset functionality, technical attributes, safety compliance, delivery times, product support and product price.

Adoption of New Technology

Waipa will employ new technology once it has become proven and provides an economic solution to a distribution problem or will improve the reliability of the distribution system.

New technology will be employed where it can economically increase productivity, improve safety or demonstrate other tangible benefits.

Disposal of Existing Assets

Waipa disposes of old assets in compliance with all environmental requirements.

Critical Spares and Surplus Assets

Waipa has established an inventory of critical distribution system spares. The inventory comprises stock with long delivery lead times, stock no longer manufactured and minimum level of stock required to re-establish supply. No significant assets were found to be redundant as part of the March 2004 ODV process or March 2010 stock take.

Redeployment and Upgrade of Existing Assets

Pole Line Hardware

Waipa will continue its policy of not reinstalling recovered pole line hardware on the network. The Company's experience has been that reused crossarms, pin and strain insulators and line disconnectors fail within a relatively short period of time compared to the 60 years useful life of a concrete pole line.

Other Distribution Assets

Voltage regulators, auto reclosers, sectionalisers, and transformers requiring minimal repairs are generally refurbished and re-deployed on the network where the cost is significantly less than purchasing a new asset.

Concrete Pole Policy

Waipa will continue installing only pre-stressed concrete poles on the network unless site access is extremely difficult and installation costs are considered excessive. The Company's 11kV and 400V feeders are predominately pole lines and the ratio of concrete to wooden poles is 9:1.

7.4 Asset Renewal and Refurbishment Programmes and Expenditure

The following proposed renewal and refurbishment projects on the network over the next 10 years will ensure that aged and defective assets are replaced preserving the utility of the network.

Pole line Reconstruction

Waipa intends to reconstruct sections of 11kV and 400V pole lines identified by the 2011/2012 visual survey as being not fit for purpose and expected to potentially fail before the next survey.

The cost associated with this activity is identified as Routine & Preventative expenditure in the Maintenance Expenditure Budget in Section 10 of this AMP.

Disconnecter Replacement

The Company intends to replace approximately 12 defective disconnectors per year that have “hot spot” connections, frozen contacts or misaligned contacts.

The cost associated with this activity is identified as Refurbishment & Renewal expenditure in the Maintenance Expenditure Budget in Section 10 of this AMP.

Te Awamutu Ripple Relay Replacement

In Te Awamutu Waipa intends to replace the aged 297Hz ripple relays with new 283Hz Enermet RO3 ripple relays. It is estimated there are a total of 9,301 ripple relays to replace. Up to 31 January 2011 2,965 relays have been replaced as part of this programme. The Company aims to replace the remaining aged relays at the rate of 1,500 relays each year over the next 4 years.

The cost associated with this activity is identified as Asset Replacement & Renewal expenditure in the Capital Expenditure Budget in Section 10 of this AMP.

Wooden Pole Replacement

The Company intends to replace defective (rotten, split) hardwood and larch poles identified by the visual surveys as being not fit for purpose and expected to potentially fail before the next scheduled survey, preferably with concrete poles if access permits.

The cost associated with this activity is identified as Routine & Preventative expenditure in the Maintenance Expenditure Budget in Section 10 of this AMP.

Crossarm Replacement

Waipa intends to replace defective wooden crossarms and pole hardware identified by the visual surveys as being not fit for purpose and expected to fail before the next scheduled survey.

The cost associated with this activity is identified as Routine & Preventative expenditure in the Maintenance Expenditure Budget in Section 10 of this AMP.

Two Pole Transformer Substation Replacement

The Company intends to replace 29 two pole transformer substation structures per year that the Company has identified as being unsafe to work on or alter, with the intention of replacing the remaining 173 on the network (as at 31 March 2010) within 5 years.

The cost associated with this activity is identified as Reliability, Safety & Environment expenditure in the Capital Expenditure Budget in Section 10 of this AMP.

Low Voltage Busbar Replacement

Waipa intends to replace non-compliant low voltage bus bars with exposed live components so that they can be operated and worked on safely.

The cost associated with this activity is identified as Asset Replacement & Renewal expenditure in the Capital Expenditure Budget in Section 10 of this AMP.

8.0 Risk Management

8.1 Risk Management Methodology

Waipa is an active participant in the Waikato Engineering Life Line Group and through consultation with other member on the group the Company has assessed the potential physical threats to its network assets posed by naturally occurring hazards of wind, lightning, floods, land erosion, earthquakes, volcanic eruptions and geothermal activity and adverse weather. The methods used to assess the risk of each natural hazard are listed in their respective sections.

Wind

Waipa's reticulation is in an area of New Zealand that has one of the lowest recorded average wind speeds. However, there are seasonal storms with winds that blow debris into the 11kV pole lines from time to time. The Company's vegetation management programme is intended to reduce the number of the incidents caused by wind blown vegetation. The Company concludes that wind presents a minimal threat to network assets and that any damage caused by wind borne debris is easily fixed.

Lightning

Waipa's reticulation assets are regularly subjected to lightning strike. The majority of network assets affected by lightning are rural 11kV pole lines on which normal 11kV lightning protection devices are used to localise and minimise lightning damage. The Company considers lightning is not a major threat to the network.

Floods and Land Erosion

Waipa's reticulation area is subjected to frequent and often heavy rainfalls. There are numerous streams and rivers whose flow-paths change over time. The effect of such erosion on network assets is minimal affecting only one or two poles at any time which are relatively easy to reinstate. The Company is a member of the Waikato Engineering Lifelines Group and through participating in the group's risk assessment exercise considers floods and land erosion are not major threats to the network.

Earthquakes

Transpower have assessed the probability and consequences of earthquakes damaging their assets for all areas in New Zealand. Transpower have defined three seismic risk zones: Zone A (high risk), Zone B (medium risk) and Zone C (low risk).

Transpower have developed the following range of seismic risk factors that reflect the financial loading on construction works that will ensure the integrity of their equipment:

- the seismic risk factor for Zone C (low risk) is 1.00;
- the seismic risk factor range for Zone B (medium risk) is 1.01 to 1.06, and;
- the seismic risk factor range for Zone A (high risk) is 1.02 to 1.14, depending on the equipment type.

Waipa's distribution networks are located entirely within a Zone B (medium risk) area. The Company's network assets are predominantly long rural 11kV pole lines. Waipa considers these assets fall into the category defined by Transpower as "Other Plant" and as such have a seismic risk factor of 1.01. There has never been a recorded incident of network asset damage caused by an earthquake.

The Company considers this is an acceptable risk to manage because rural 11kV pole lines are relatively easy and an inexpensive network asset to repair if damaged by an earthquake.

Volcanic Eruption

There are no known active volcanoes in Waipa distribution area. The Mount Ruapehu eruption in 1995 had no adverse impact on the Company assets. If volcanic ash had been deposited over the rural 11kV pole lines then the Company would have continued to operate the distribution networks until there was clear evidence of insulation failure.

Geothermal

There is no significant geothermal activity in Waipa's reticulation area other than a hot water beach at Kawhia. Therefore, there is no corrosive atmosphere to contaminate the overhead lines or hot ground, gases or liquids constraining cable ratings or corrosive liquids damaging cable insulation and conductors. The Company concludes that there is minimal risk to the network from geothermal activity.

8.2 Details of Emergency Response and Contingency Plans

Network Operation

Waipa operates two relatively simple radial 11kV, predominately pole line, distribution systems extending out from Transpower's Cambridge and Te Awamutu GXP's.

Under normal conditions network operations are initiated through a control room and work is dispatched through a call centre. System switch status is recorded on a single-line computer mimic diagram.

Under extraordinary conditions the Company expects the control room and call centre functions may be disrupted. During these emergencies network operations and fault dispatch functions will need to be performed by the Company's own administrative staff and field crews.

In circumstances where the Company's Supervisory and Data Acquisition system and computer system also fail, the Company is confident that there is sufficient network information held in printed form for the Company's Faultmen and Field Supervisors to isolate, repair and operate the networks safely. During these emergencies the Company expects normal telephone services will be disrupted and direct communications with consumers will be reduced due to the abnormal nature of the operation. Power restoration will be inherently slow under these circumstances. The majority of repairs required on the networks will be identified by physically patrolling the pole line feeders.

The Company is a participant in the Waikato Engineering Lifelines Group and the Hamilton City Council Emergency Management Group and expects that Civil Defence in conjunction with other utility owners and local authorities will prioritise Installation Control Points for power restoration.

Emergency Response Capability

Waipa hasn't experienced storms of significance since Cyclone Drena 1997 and the "weather bomb" June 2002. During both these events the Company contracted external resources to help repair the network. Since that time Waipa has built up its internal field crews and successfully reinstated the network during the February 2004 storms. The Company has also formed a liaison with five other local Electricity Distribution Businesses to make use of their field resources if required.

The Company carries sufficient spares in its store to construct several kilometres of pole line and is confident that it can assemble sufficient internal and external resources to repair and continue to operate its network in emergency situations.

Security of Supply Participant Outage Plan

The Electricity Governance (Security of Supply) Regulations 2008 require the Electricity Authority to produce a Security of Supply Outage Plan, including requesting all participants (EDB's and direct connected consumers drawing in excess of 80GWh directly from the Transpower Grid), to produce their own Security of Supply Participant Outage Plan.

Waipa has submitted its Security of Supply Participant Outage Plan to the Electricity Authority for their approval. Once approved, this will be publicly available on the Company's internet web site.

Busbar Failure Contingency Plans

In January 2010, Waipa experienced an outage caused by a busbar fault at Transpower's Te Awamutu GXP simultaneously occurring while maintenance was being carried out on one of the GXP's transformers. This outage affected half of the Te Awamutu feeders.

Power was restored by emergency switching, with the network being placed at risk of damage or overloading by operators needing to make "on the spot" decisions during such a large switching operation.

The Company has subsequently formulated detailed switching plans for any section of busbar at Te Awamutu GXP, should there be a similar busbar event in future.

Waipa is also supporting Transpower in designing and building a "mobile substation". Such a substation would be capable of delivering half our peak load at either substation. The Company will endeavour to ensure the new Cambridge GXP 11kV switchboard is designed with the ability to "plug and play" to make installation of the mobile substation a fast operation.

Business Systems Contingency

Waipa's runs its financial and business systems (NCS Integrated Data Warehouse) on one server and runs its Windows based programs including AutoCAD (Geographic Asset Information) on another server.

Waipa holds sufficient spare IT hardware in its Te Awamutu Depot to reinstate financial and business systems and windows based programs including AutoCAD in the event of a catastrophic event.

The financial and business systems and geographic asset information data is copied across from the main servers onto the backup servers each day. A daily back up tape of financial and business information and Windows based AutoCAD information is held off site. The Company can recreate the information databases and business functionality after a catastrophic event.

Instructions to reinstate Waipa's computer system are available to any staff member on the Company's intranet under Computer Systems/ Computer Room Disaster Recovery.

Supervisory Control and Data Acquisition System Contingency

Waipa's SCADA system comprises a master station and a "hot standby" backup station. The Company can readily purchase all of the component parts of the SCADA system. The SCADA system information is routinely backed up by the suppliers and the network configuration information is held in Wellington. Waipa can purchase new SCADA hardware and retrieve the SCADA information from Wellington and recommission a part or all of the SCADA system after a catastrophic event within a few days.

9.0 Evaluation of Performance

9.1 Financial and Physical Progress

Physical Progress Network Development

The following network enhancements, replacements and refurbishments proposed in AMP 2009 to be completed during 2009/2010 were completed:

- A new 32 step voltage regulator was installed on Paterangi feeder at Te Pahu Road to maintain regulatory voltage. This replaced the aged (30 year plus) integral voltage regulator at Te Pahu which failed in service.
- Additional 11kV dropout isolation fuses were installed on feeder spurs and consumers' service mains to minimise the number of consumers affected by faults and improve fault isolation and restoration of supply times.
- Six additional remote controlled 11kV auto reclosers were installed to further segment 11kV feeders to minimise the number of consumers affected by faults and improve fault isolation and restoration of supply times.
- Transpower's and Waipa's SCADA system for control and load management was upgraded at Cambridge GXP and Te Awamutu GXP to ensure operational integrity.
- The western leg of Kaipaki feeder along Racecourse Road was extended to supply lifestyle blocks on the northern side of the Waikato River and to off load Tamahere feeder.
- Relays were installed at consumers' installations to ensure that load management and tariff switching remains effective.
- New transformers, substation structures and switchgear were installed to meet consumers' requirements, and
- New network extensions were installed to meet developers' requirements.

The following network improvements proposed in AMP 2009 to be completed during 2009/2010 were not achieved:

- Execute an agreement with Transpower to provide Te Awamutu GXP with n-1 security of supply.

The following network enhancements and refurbishments proposed in AMP 2009 to be completed in 2009/2010 were deferred:

- The diesel generator installation on the Kawhia feeder was deferred because the predicted load growth did not eventuate and satisfactory voltage has been maintained on this feeder. The voltage at the extremities of this feeder at Kawhia, Hauturu and Aotea Harbour have been monitored over the high load periods being the Christmas and New Year summer holidays, the Auckland Anniversary and Waitangi holiday weekends. The indications are that using a feeder MD load growth of 3.5% per annum compounding line voltages at the Kawhia feeder voltage will not be constrained until 2016/2017. Therefore, the commissioning of a diesel generator installation can be deferred until 2015/2016.
- The enhancement of the voltage regulator located at bypass switch ABS 909 on Kaipaki feeder proposed for 2009/2010 was deferred until 2010/2011. Voltage levels on Kaipaki feeder remained within statutory limits.

The following network enhancements proposed in the AMP 2009 are ongoing:

- install new Cambridge and Te Awamutu ripple relays (2010-2021),
- replace Te Awamutu ripple relays (2010 – 2015),
- install 11kV fuses on network spur lines (2010-2021),
- install 11kV fuses on consumers' service mains (2010-2021),
- install remote control 11kV auto reclosers (2010 - 2017),
- install new voltage regulators as required (2010 - 2021),
- install additional 11kV switchgear as required (2010 - 2021),
- install new transformers and substation structures as required (2010 - 2021), and
- install general network extensions as required(2010 - 2021).

Physical Progress Network Maintenance

Vegetation Management Programme

Progress against targets for Waipa's vegetation programme is shown in the following table. The tree legislation requiring EDBs to offer tree owners a 1st free cut has resulted in an increasing number of trees being completely removed rather than trimmed.

Removal has proven to be more costly and time consuming than trimming and the programme timeline has not been achieved. However, the Company believes vegetation removal is a better long term solution for improving network reliability.

Vegetation Management Programme	Proposed 2007/2008	Proposed 2008/2009	Proposed 2009/2010	Actual 2007-2011
Tamahere			Cut3	100%
Kawhia		Cut 2		0%
Kio Kio Waikeria	Cut 2			100%
Te Awamutu West	Cut 1			100%
Pukeatua	Cut 2			100%
Hairini	Cut 1			100%
Te Awamutu East	Cut 1			100%
Pokuru		Cut 2		100%

Earth Testing and Repair Programme

Progress against targets for Waipa's 2009/2010 earth testing and repair programme is shown in the following table.

Earth Testing and Repair Programme	Proposed 2009/2010	Actual 2009/2010
Leamington	T&R1	100%
Te Awamutu West	T&R1	100%
Mystery Creek	T&R2	100%
Hairini	T&R1	100%
Ohaupo	T&R2	100%
Te Awamutu East	T&R1	100%

Asset Defect Programme

The following table shows the number of repairs and outstanding 11kV and 400V defects of distribution assets as at 31 March 2010.

The Company eliminated the remaining 114 asset defects during 2009/2010. The second asset condition survey commenced in 2010/2011.

	Totals
Defects Identified	2,479
Total repaired	2,479
Balance	0
11kV remaining	0
400V remaining	0

Financial Progress

The following table shows actual financial performance since 2007/2008 compared to Statement of Corporate Intent targets set for 2009/2010.

Business Efficiency Performance \$	Actual 2007/2008	Actual 2008/2009	Actual 2009/2010	Target 2009/2010
Total Operational Expenditure per ICP	174	203	218	225

Waipa's financial business efficiency performance in 2009/2010 was achieved.

9.2 Service Level and Asset Performance

Customer Satisfaction Performance

The August 2009 consumer survey indicated an overall satisfaction rating of 97% (Target 95%). The results for Fluctuations/Surges and Power Cuts were 92% (Target 75%) and 95% (Target 85%) respectively.

These latter two results include those who responded with “No Impression”, which in the case of supply quality the Company believes to equate to satisfaction.

Reliability Performance

Waipa’s actual SAIDI and SAIFI performance over the past 8 years compared with the Commerce Commission reliability threshold levels of 273 SAIDI minutes and 3.23 SAIFI set in 2003 is shown in the following table.

Network Reliability Performance	Actual 2002/2003	Actual 2003/2004	Actual 2004/2005	Actual 2005/2006	Actual 2006/2007	Actual 2007/2008	Actual 2008/2009	Actual 2009/2010	Target 2009/2010
SAIDI	236	264	162	171	169	113	235	126	<273
SAIFI	3.55	4.39	3.09	2.75	2.24	1.88	2.53	1.91	<3.23
CAIDI	66	60	52	62	75	60	93	66	<85

Waipa achieved the reliability targets set in AMP 2009 for 2009/2010.

Asset Delivery Performance

The following table shows actual asset delivery performance since 2007/2008 compared to Statement of Corporate Intent targets set for 2009/2010.

Asset Delivery Efficiency Performance %	Actual 2007/2008	Actual 2008/2009	Actual 2009/2010	Target 2009/2010
Load Factor	64.29	63.84	62	>60
Loss Ratio	6.42	6.43	6.4	<6.5
Capacity Utilisation	24.7	24.4	26.3	>25*

*Capacity Utilisation has been adjusted to comply with new financial disclosure requirement (previously >30).

All asset delivery performance targets were achieved.

9.3 Gap Analysis and Identification of Improvement Initiatives

Security

The Company's objective of providing n-1 security of supply for Te Awamutu GXP hasn't been achieved. This AMP identifies this as a significant gap and recognises this issue needs to be progressed.

Constraints

Waipa's objective of removing predicted feeder constraints has been achieved by the timely implementation of network feeder enhancements identified in the network development projects of previous AMPs.

Quality of Supply

Waipa's obligation to ensure regulatory voltage can be delivered by has been achieved by the timely implementation of network feeder enhancements identified in the network development programme of previous AMPs and the timely installation of voltage regulators.

The voltage constraint on Kawhia feeder (the Company's longest feeder) assuming a 3.5% compounding MD load growth is now predicted to occur in 2016/2017. The commissioning of a diesel generator by 2015/2016 is still considered the cost effective interim solution.

Although Kaipaki voltage regulator was deferred to 2010/2011 because it was not needed, the Company had to install a new voltage regulator at Te Pahu to replace an aged (30+ year old) voltage regulator that failed in service.

Customer Satisfaction

Waipa's customer satisfaction performance in the August 2009 consumer survey was above targets set in the AMP 2009 AMP.

Reliability

Waipa achieved the reliability targets set in AMP 2009 for 2009/2010.

Vegetation Management

The tree legislation requiring EDBs to offer tree owners a 1st free cut has resulted in an increasing number of trees being completely removed rather than trimmed. Removal has proven to be more costly and time consuming than trimming and the programme timeline has not been achieved. However, the Company believes vegetation removal is a better long term solution for improving network reliability.

Earth Testing and Repair

Waipa's 2009/2010 earth testing and repair programme has been achieved.

Asset Defects

The Company eliminated the remaining 114 asset defects during 2009/2010. The second asset condition survey commenced in 2010/2011.

Financial Performance

Waipa's financial business efficiency performance in 2009/2010 was achieved.

AMP Improvements

Asset Management Process

Waipa believes that its:

- predictions on load growth,
- procedures to identify future network constraints,
- routine network assets surveys, and
- commitment to improve network reliability,

will provide the Company with adequate information to make appropriate asset management decisions regarding existing assets, non-asset solutions, additional asset and surplus assets. The Company believes that any "incompleteness" of asset data will not be material when making these asset management decisions.

Asset Management Systems

Waipa believes that its:

- Abbey SCADA system,
- AutoCAD Geographic Asset Information system, and
- Napier Computer Integrated Data Warehouse system,

are configured and used in a manner that provides the Company with robust information for managing network assets. Waipa believes its asset management process and systems are appropriate for:

- the size of the network,
- Company financial and administrative business needs,
- consumer needs, and
- other stakeholders requirements.

Stakeholders Input

Waipa welcomes any stakeholder feedback on the quality, clarity and completeness of its AMP. To date feedback has been received from Fonterra, engineering consultants and contractors who are interested in becoming involved in some of the projects and the Commerce Commission (or their agents).

10.0 Expenditure Forecasts Reconciliations and Assumptions

Expenditure Forecast

Waipa's proposed network capital projects and budgets are shown in the table on page 88.

The Company's proposed network maintenance activities and budgets are shown in the table on page 89.

Waipa's proposed Capital and Operational Expenditure over the next 10 years is summarised in the table shown on page 90.

Waipa Networks Capital Budget 2011-2021

Type Capital Expenditure	Proposed Network Capital Budget (\$,000)									
	2011/2012	2012/2013	2013/2014	2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021
Customer Connection	1039	1039	1039	1039	1039	1039	1039	1039	1039	1039
Customer Connection	636	636	636	636	636	636	636	636	636	636
Customer Connection	104	104	104	156	156	156	156	156	156	156
Customer Connection	78	78	78	78	78	78	78	78	78	78
Customer Connection	58	58	58	58	58	58	58	58	58	58
Customer Connection	32	32	32	32	32	32	32	32	32	32
System Growth	65	65	65	65	65	65	65	65	65	65
System Growth	0	260	195	0	260	130	130	130	130	130
System Growth	0	0	0	130	519	0	0	0	0	0
System Growth	0	0	0	0	0	1818	3636	0	0	0
System Growth	0	0	0	0	0	0	1779	0	0	0
System Growth	0	0	0	0	0	0	0	278	0	0
Reliability, Safety & Environment	78	78	78	78	78	78	78	78	78	78
Reliability, Safety & Environment	429	429	429	429	429	429	429	0	0	0
Reliability, Safety & Environment	117	117	117	117	117	117	117	0	0	0
Reliability, Safety & Environment	377	377	377	377	364	0	0	0	0	0
Reliability, Safety & Environment	260	260	0	0	0	0	0	0	0	0
Reliability, Safety & Environment	208	208	208	0	0	0	0	0	0	0
Reliability, Safety & Environment	203	203	187	171	0	0	0	0	0	0
Reliability, Safety & Environment	260	279	0	0	0	0	0	0	0	0
Reliability, Safety & Environment	0	0	0	0	0	292	0	0	0	0
Reliability, Safety & Environment	0	249	249	251	251	0	0	0	0	0
Reliability, Safety & Environment	0	227	227	227	227	0	0	0	0	0
Asset Replacement & Renewal	325	325	325	325	325	325	325	325	325	325
Asset Replacement & Renewal	117	117	117	117	117	117	117	117	117	117
Asset Replacement & Renewal	78	78	78	78	78	78	78	78	78	78
Asset Replacement & Renewal	78	78	78	78	78	78	78	78	78	78
Asset Replacement & Renewal	244	244	244	244	0	0	0	0	0	0
Asset Relocations	0	234	234	234	234	0	0	0	0	0
	4786	5775	5155	4920	5141	5526	8285	3148	2870	2870
	Total Capital Budget									

Waipa Networks Operational Budget 2011-2021

Type Operational Expenditure	Proposed Network Operational Budget (\$,000)										
	2011/2012	2012/2013	2013/2014	2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	2019/2020	2021/2022	
Routine & Preventative	233	233	233	233	233	233	233	233	233	233	
Routine & Preventative	28	28	28	28	28	28	28	28	28	28	
Routine & Preventative	225	225	225	225	225	225	225	225	225	225	
Routine & Preventative	133	133	133	133	133	133	133	133	133	133	
Routine & Preventative	501	501	501	501	501	501	501	501	501	501	
Routine & Preventative	322	322	322	322	322	322	322	322	322	322	
Routine & Preventative	125	125	125	125	125	125	125	125	125	125	
Fault & Emergency	179	179	179	179	179	179	179	179	179	179	
Fault & Emergency	194	194	194	194	194	194	194	194	194	194	
Fault & Emergency	11	11	11	11	11	11	11	11	11	11	
Fault & Emergency	11	11	11	11	11	11	11	11	11	11	
Fault & Emergency	32	32	32	32	32	32	32	32	32	32	
Refurbishment & Renewal	170	170	170	170	170	170	170	170	170	170	
	2,164	2,164	2,164	2,164	2,164	2,164	2,164	2,164	2,164	2,164	
	Total Maintenance Budget										

Waipa Networks Budget 2011-2021

	2011/2012	2012/2013	2013/2014	2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021
Proposed Capital & Operational Network Budget (\$,000)										
Capital Expenditure: Customer Connection	1,947	1,947	1,947	1,999	1,999	1,999	1,999	1,999	1,999	1,999
Capital Expenditure: System Growth	65	325	260	195	844	2,013	5,610	473	195	195
Capital Expenditure: Reliability, Safety & Environment	1,932	2,427	1,872	1,650	1,466	916	78	78	78	78
Capital Expenditure: Asset Replacement & Renewal	842	842	842	842	598	598	598	598	598	598
Capital Expenditure: Relocation	-	234	234	234	234	-	-	-	-	-
Total Capital Budget	4,786	5,775	5,155	4,920	5,141	5,526	8,285	3,148	2,870	2,870
Routine & Preventative Maintenance	1,567	1,567	1,567	1,567	1,567	1,567	1,567	1,567	1,567	1,567
Fault & Emergency Maintenance	451	451	451	451	451	451	451	451	451	451
Refurbishment & Renewal Maintenance	146	146	146	146	146	146	146	146	146	146
Total Maintenance Budget	2,164	2,164	2,164	2,164	2,164	2,164	2,164	2,164	2,164	2,164
Total Budget	6,950	7,939	7,319	7,084	7,305	7,690	10,449	5,312	5,034	5,034

Reconciliations and Assumptions

Factors Likely to Cause Material Differences Between Targets and Actual Performance

Waipa has identified the following factors that may cause material differences between targets set in the AMP and actual outcomes.

- Regulatory requirements could change, requiring the Company to achieve different service, design or security standards. Regulatory changes could also impact on the availability of funds for asset management.
- Waipa's ownership could change. New owners may have different service and financial objectives than those set out in this AMP.
- Connected consumers could change their demands for reliability or their willingness to pay for different levels of service.
- Waipa's network and/or Transpower's local Grid could experience a major natural disaster during the planning period.
- The predicted rate of growth in maximum demand could change significantly over the planning period which will affect the timing of network enhancements.
- Connected consumers load patterns could change by the use of heat-pumps for example resulting in a movement from traditional winter peaks to higher summer peaks. This will affect the timing of network enhancements.
- Significant embedded generation may be commissioned in Waipa's network. This would impact on network design and timing of network enhancements.
- The District Councils may implement significant land zoning changes which could have a positive or negative impact on new developments in the region.
- Significant new loads not yet identified may require supply within the planning period of this AMP. This will affect the timing of network enhancements.

Assumptions Made in Physical and Financial Forecasting

Waipa has made the following assumptions when setting targets and forecasting physical and financial performance.

- The existing external regulatory and legislative requirements are assumed to remain unchanged throughout the planning period. Thus the external drivers which influence reliability targets, design, environmental, health and safety standards and industry codes of practice are assumed not to change.
- All projections of expenditure are presented in real New Zealand dollar terms at 1 April 2011 values. In reality over time input costs (including those sourced from outside New Zealand) for asset management activities will change at rates greater or less than the rate of general inflation. As expenditure forecasts are updated annually, this approach is assumed acceptable and consistent with that prescribed.
- Transpower continues to provide sufficient capacity to meet Waipa's requirements at the existing GXPs and undertakes the additional investment required to meet future demand, reliability and security of supply, as specified in the Network Development Planning section of this AMP.
- The thrust of Waipa's Purpose, Beliefs, Focus and Greatest Imaginable Challenge continues over for the planning period.

- Future levels of customer satisfaction and willingness to pay for improved reliability are consistent with those identified by customer surveys since 1996.
- Neither Waipa's network nor Transpower's local Grid experiences a major natural disaster during the planning period.
- Demand at each GXP is predicted to continue throughout the planning period at a rate consistent with the historical rate of growth from 2004.
- Seasonal load profiles remain consistent with recent historical trends.
- No new significant embedded generation is commissioned during the planning period.
- District Council zoning land use remains consistent during the planning period.
- The number of new consumers connecting to Waipa's network continues at a similar level as at 2005 over the planning period.
- Forecasts for the remaining life of assets are correct and mass premature failure of similar assets does not occur.

Basis of Assumptions Made

The bases on which Waipa's assumptions have been made are described in detail throughout Sections 5 and 6 of this AMP. Principal sources of information from which the Company's assumptions have been derived are as follows.

- Waipa's strategic planning documents, including the 2011/2012 Statement of Corporate Intent and the 2011/2012 Annual Business Plan and Budgets.
- Waipa's 2009 Business Continuity Plan.
- Bi-annual Waipa Customer Surveys (1996–2007) and annual Waipa Customer Surveys (2009-2011).
- Half-hourly maximum electricity demand, at each GXP, since 2004.
- Population data and demographic forecasts from Statistics New Zealand.
- Waipa, Otorohanga and Waitomo District Councils and the Waikato Regional Council planning information.
- Interaction with customers and the community in relation to future developments within Waipa's network area.

Potential Effect of Uncertainties

Waipa's assessment of the potential risk of uncertainties surrounding the assumptions the Company has made are summarised in the following table.

Source of Uncertainty	Potential Effect of Uncertainty	Potential Risk of Uncertainty
Regulatory Requirements	It is unlikely that the Regulatory Requirements will reduce. The most likely impact is an increase in forecast expenditure to meet increased standards. It is not possible to quantify this potential impact.	Medium
Ownership	Different owners could have different service and expenditure objectives than those set out in the AMP, resulting in either higher or lower service targets and associated expenditures.	Low
Customer Demands	Customers could change their demands for service and willingness to pay resulting in either higher or lower service targets and associated expenditures.	Medium
Natural Disaster	Equipment repairs and replacements which are not provided for.	Low
Demand Growth	Higher demands require greater capacity across the system earlier than projected, requiring and an acceleration of forecast expenditure.	Low
Load Profile	Seasonal shifts in demand could require planned capacity upgrades to be accelerated.	Low
Embedded Generation	Significant embedded generation will impact on network design and timing of network enhancements.	Low
Land Use Zoning	Land use zoning changes will impact either positively or negatively on new developments and demand.	Low
New Connections	The rate of new connections will impact on demand growth. Specific new investments may also be required to meet large new loads.	Low
Equipment Failure	Equipment failure and major repairs and replacements required which are not currently financially provided for.	Low
Further Planning	Development and maintenance requirements differ from those currently practiced could impact on forecast expenditure.	Low

Changes Proposed where Information is not Based on Waipa's Existing Business

No changes are proposed to the existing business of Waipa, and thus all prospective information has been prepared consistent with the existing Waipa business ownership, structure and purpose.

Conclusion

Waipa believes that its asset management process, predictions on load growth, procedures to identify future network constraints, routine network assets surveys will enable the Company to make informed asset management decisions regarding existing assets, non-asset solutions, procuring new assets and retiring assets.

The Company believes that any "incompleteness" of asset data will not be material when making asset management decisions. Whilst Waipa continually improves its existing information systems no radical changes of these systems is contemplated.

Waipa is confident that its:

- proposed capital enhancements of the network,
- asset survey maintenance regimes, and
- commitment to improve network reliability,

over the next 10 years will provide adequate infrastructure capacity for growth, improve security, quality and reliability of supply, and will ensure that aged assets are replaced preserving the value of the network and its ability to convey electricity safely.