POWERCO | Gas Asset Management Plan 2018

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1 EXECUTIVE SUMMARY

1.1 PURPOSE OF THE DOCUMENT

Powerco's gas network provides an important service to many households and businesses across the North Island of New Zealand. As long-term stewards of the network assets, our aim is to manage the network to deliver a safe, high-quality and highly efficient gas supply. The gas team's objective is to deliver exceptional service to our customers and this influences our overall attitude, our priorities and day-to-day activities.

This Asset Management Plan (AMP) sets out the long-term strategy for the delivery of Powerco's gas distribution services. It describes, at a practical level, our asset management policies and processes, the performance we expect and receive from our network assets. It explains how we strive to efficiently utilise the resources required to balance the price and service quality trade-offs that our customers tell us they require.

This AMP covers the period from 1 October 2018 to 30 September 2028, with a particular focus on work programmes planned for the next three to five years, for which the forecasts of asset management drivers have a reasonable degree of accuracy. As it is a working document, the AMP describes the areas where we believe our asset management processes, systems and data can be improved. We call this process of continuous improvement our "Asset Management Journey".

Our goal is to position Powerco's asset management to achieve industry-leading practice, as referenced against ISO 55000, an internationally recognised asset management standard, and achieve certification alongside our Electricity business in 2020.

This AMP was approved by the Board of Directors on 20 September 2018.

1.2 OPERATIONAL FOCUS AND KEY CHALLENGES

Our operating environment has been stable in recent years. The Default Price-quality Price Path (DPP), the regulatory framework under which we currently operate, has allowed us to focus on achieving our Asset Management Objectives, increasing the level of service we offer to our customers, while maintaining the mandatory level of safety expected for a gas network of the importance of Powerco's.

However, there are a number of challenges and uncertainties facing the gas business over the AMP planning period. Work programmes are in place to maintain the current high level of safety performance, drive better operating efficiency, facilitate the uptake of gas as a preferred energy source across our network footprint and lift our asset management capability:

- **Managing the safety of our operations:** Maintaining high safety standards across the gas network is a primary objective for Powerco. In this regard our business practices and processes are mature and well executed and safety is considered paramount and built into everything we do. Our safety standards, along with changing legislative requirements, are a primary driver of investment decisions and operational expenditure. This is one reason why we have a put in place an extensive inspection programme across all parts of our network and why we have effective response times to faults and emergencies.

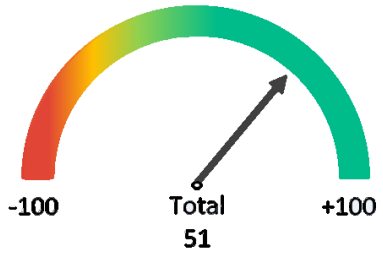
  We recognise the challenge of avoiding complacency and continually striving to improve our focus on ensuring public safety as well as providing a safe work environment for our workforce, including our contractors. Network safety designs that were acceptable when constructed are routinely reviewed against current best practice with the goal of reducing the risk of harm where practicable.

- **Stable prices and operating efficiency:** Powerco is a company that places a high level of importance on delivering stable prices to our customers and we have a strong history of delivering this outcome. Our challenge is to maintain stable price outcomes against a backdrop of generally rising input costs. As a business, we constantly challenge our cost base and operating efficiency.

  Powerco outsources its field services work and day-to-day network operations. We periodically retender our 5 regional field service agreements. This process establishes market-tested unit rates for specific work on the network, including high-volume work, scheduled maintenance, and emergency and fault response. This model enables greater efficiency in our operations, an increase in ownership of critical Asset Management tasks by our staff, including work planning, design, and scheduling, and stable prices. Such stability and efficiency are the foundation to deliver long-term value for our customers.

- **Customer service:** We regularly survey our customers to understand their satisfaction with our services. 56% of our newly connected customers would recommend our services, as reflected in our Net Promoter Score (NPS) of 51% (on a scale of -100 to +100) as shown on Figure 1.1.

Figure 1.1: Net Promoter Score



Every second year, we also carry specific asset-management-related market research to gauge if our customers are satisfied with the quality of their gas supply, and with Powerco's operational performance. The results from this

survey show that our current service levels are highly rated and is summarised in Section 3.2.

This does not mean that we should be complacent and reduce our focus or levels of investment. We recognise that gas is a discretionary fuel and we must maintain high levels of service and reliability to our customers.

The high level of customer satisfaction and stable (or improving) quality metrics demonstrates the effectiveness of the current quality standard. The performance metrics provided through this AMP and our annual Information Disclosures provide our stakeholders with clear measures of our performance and our commitment to deliver efficient, safe and high-quality service to our customers.

- **New connections and zero-carbon policies:** The Gas Hub, Powerco's natural gas brand, connects industry players with each other and consumers. The Gas Hub encourages consumers to switch to gas by marketing information about the benefits of gas as a fuel choice and providing cost calculators to allow consumers to make comparisons against other fuels sources such as electricity. Its success has lead us to connect more than 2,000 customers in our last financial year.

  Powerco believes that natural gas networks in New Zealand play, and will continue to play, an important part of our energy mix. It is an integral part of the country's energy security, is affordable, and has the potential to lower greenhouse gas emissions when displacing coal and other hydrocarbon fuels.

  The government's current undertaking to move towards a net zero-carbon economy will not affect the development of the gas networks in the short term. In line with our long-term approach to asset management, we are investigating and readying our assets for alternative uses, including conveying biomethane, and hydrogen. It might, however, reduce the economic life of our assets and we will consider if an adjustment is warranted during the planning period.

- **Scarcity of field resources**: With our long-term contract structure, we aim to encourage our service providers to invest in training and equipment to meet our future requirements. We are also heavily involved in promoting careers in the gas industry through our investment in the Gas Association of New Zealand (GANZ) and the Industry Training Organisation, MITO.

  Despite these efforts, the resourcing pool is still relatively limited, not only throughout our footprint, but also at a national level. Whilst unit prices have remained relatively stable, there is uncertainty that this will remain the case, as service providers start looking at importing workforce from Australia.

- **Asset investment drivers**: The average asset age of Powerco's gas distribution network, as at 30 September 2017, was 22 years, with a remaining useful average asset life of around 35 years. At a high level, this indicates that, for the foreseeable future, on the basis of asset age alone, there is no major driver for a step change in the annual level of maintenance or asset replacement and renewal. We have, however, identified some asset classes that are starting to fail.

  With most of our asset underground, a challenge for the business is seeking innovative ways to ascertain the condition of underground assets whilst assets remain *in situ*. We often have to adopt holistic approaches, based on previous failure data, to predict where failure is likely to happen. This asset management plan sets out various initiatives which are either being progressed or are at the planning stage.

- **Asset management maturity journey**: We have engaged an independent asset-management consultancy to undertake a gap assessment of our asset management practices with ISO 55000 and used the results to inform this year's AMMAT assessment. Whilst we show an improvement over all areas since our last assessment done in 2015, data management and asset information remain our weakest area.

  Our New Foundations project is underway to replace our core Enterprise Resource planning system, a key enabler to improve asset data quality.

- **Design and information standardisation:** Our gas network has developed over time through the acquisition of smaller, discrete networks. While these individual networks are fully integrated into the Powerco gas business, geographically they remain as discrete islanded networks which were built using different design philosophies and operated and maintained using different standards. As a result, we own and maintain a heterogeneous stock of assets and one of our strategic asset management challenges is to achieve greater efficiency through standardisation when it is cost effective to do so. Achieving greater standardisation is a key consideration when assessing options for replacement or enhancement of assets.

Non-withstanding the importance of some political and customer challenges, the above operational context remains broadly consistent with the one from our previous Asset Management Plans. The specific, forward-facing objectives (and targets) that will help us to measure our progress over the AMP planning period are similar to our previous plans. At the highest level the asset management objectives can be summarised as follows:

- **Safety** – Keep the public, our staff and our contractors safe from harm.
- **Delivery** – Ensure our networks have the capacity and resilience to meet the quality of supply expected by our customers.
- **Reliability** – Safe containment of gas and operational reliability to deliver gas to our customers at the right quality.
- **Efficiency** – Continuously seek out and deliver cost efficiencies.
- **Partnership** – Be a responsible partner for our customers and our other stakeholders.

1.3 OUR ASSETS AND CUSTOMERS

Our gas distribution system starts where Powerco takes custody of a retailer's gas from the Transmission System Operator (TSO) at a designated gate station handover point. It usually ends at the inlet of the Gas Measurement System (GMS) that supplies the end user (our customer). Powerco owns and operates ~60,000 GMS, which are not covered by this AMP. The gate station and assets upstream of the handover point belong to the TSO with Powerco owning the distribution assets downstream from the handover point.

Unlike the electricity network, our gas network is non-contiguous in nature and not interconnected, there being five separate regions serviced by Powerco. These regions can be further subdivided into 36 gate stations that feed 34 distribution segments. As shown on Figure 1.2, Powerco's five operating regions are:

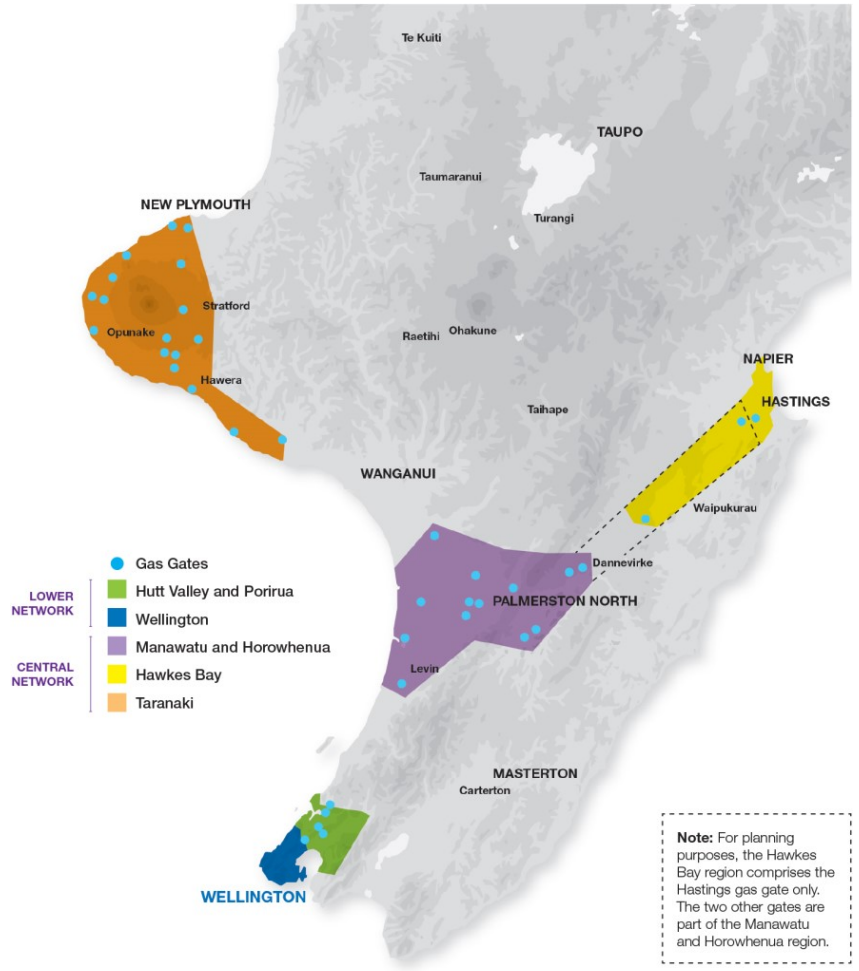
- Wellington
- The Hutt Valley and Porirua
- Taranaki
- Manawatu and Horowhenua
- Hawkes Bay

The gas network comprises:

- Mains, the underground pipes, operating at different pressures that are typically placed within the road corridor to move gas to individual service points.
- Services, the smaller underground pipes that branch off the mains and deliver gas to individual customers.
- Additional equipment providing:
  - Pressure regulation (District regulation stations – DRS)
  - Isolation (Line and service valves)
  - Corrosion protection (Cathodic protection systems)
  - Safety and protection
  - Communication of data (SCADA)

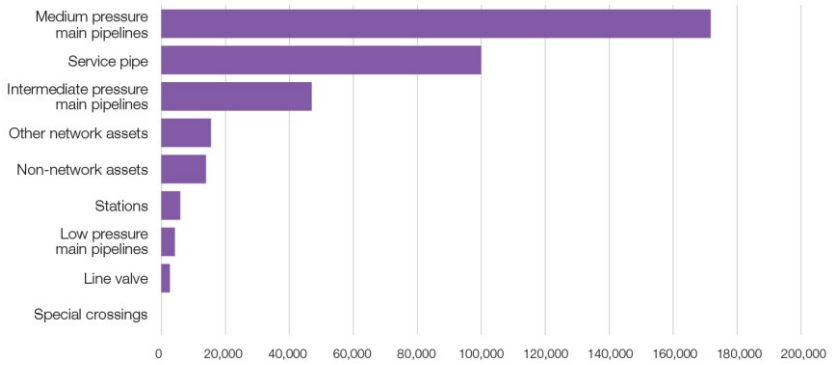
Together these assets supply around 108,000 customers (around 37% of total gas connections in New Zealand) in the North Island and comprise more than 6,300km of mains and service pipes. Our network is the second largest in New Zealand in terms of length and number of customers connected.

Figure 1.2: Powerco's Network shown by Region.



Powerco's gas network assets had a forecast regulatory asset base (RAB) value of $365m, as at 30 September 2017. Figure 1.3 below illustrates the breakdown of RAB value by assets class (based on an extrapolation of a breakdown of net book value).

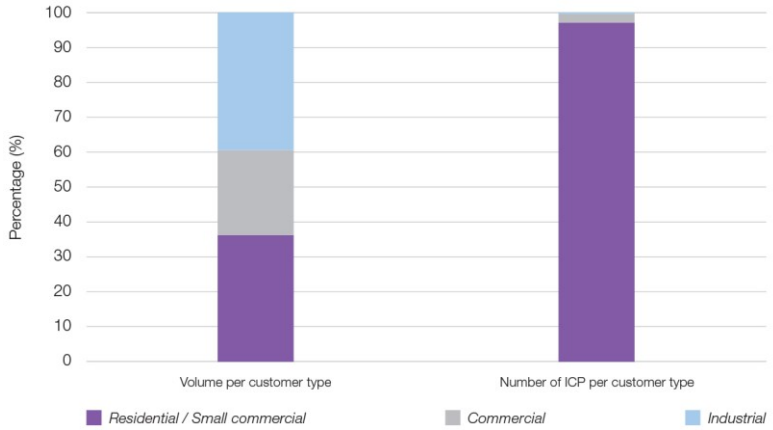
Figure 1.3: RAB Value by Gas Assets Type ($000) as of 30/09/2017.



Powerco's network assets serve residential, commercial and industrial customers. Network safety requirements dictate our approach to system condition and reliability and, as a result, we do not offer different levels of gas supply quality to different customers, i.e. all customers receive the same high level of service quality in terms of system reliability, system condition/integrity and gas quality.

However, we do maintain a classification of customers for capacity and commercial purposes. The majority of our customers, by number of connection points (or ICP - Installation Control Point), are residential consumers where gas is utilised for cooking, hot water heating and warming their homes. While there are comparatively few large industrial customers, this load classification consumes the highest volume of gas. This is illustrated in Figure 1.4 below.

Figure 1.4: Comparison of Network Customer Numbers with Gas Consumption (as of 30/09/2017).



The number of customers connected on our network has been growing faster than forecasted over the past six years, fuelled by New Zealand's strong economic activity. Looking ahead, it is difficult to ascertain whether this growth will be sustained.

Since our last AMP, we have revised our connection growth rate up to reflect what we believe is sustainable, long-term growth. Past a 5-year period, our forecast is more conservative, assuming a stable number of connections from RY 22 onwards.

1.4 OUR ASSET MANAGEMENT FRAMEWORK

Our overall asset management philosophy and approach to managing our assets and setting operational priorities, strongly reflects Powerco's corporate vision and mission statements.

The Powerco mission statement is:

Figure 1.5: Powerco's Mission Statement.

In profitable partnership with our stakeholders we are powering the future of New Zealand through the delivery of safe, reliable and efficient energy.

Asset management as a discipline continues to undergo progressive development internationally. Powerco has in place a programme of continuous asset management improvement, which underpins this AMP.

In early 2010, we established the foundations for the implementation of the internationally recognised asset management framework PAS 55 framework into the gas business. PAS 55 is the British Standards Institution's (BSI) Publicly Available Specification for the optimised management of physical assets. PAS 55 has now been superseded by the broader ISO 55000 standard. The principles are the same, and we are transitioning towards this new standard.

The Asset Management Maturity Assessment Tool (AMMAT), which the Commerce Commission has introduced as a component of company information disclosures, is based on PAS55 principles and requires gas distribution businesses (GDBs) to self-assess their maturity against this benchmark. This year, we employed an independent organisation to assess ourselves against ISO 55000, which helped informing our AMMAT assessment.

This year, our overall score is 2.8 out of 4, compared to a score of 2.1 when we did our first assessment in 2013.

Powerco believes improving our asset management capability will translate directly to improved outcomes (both cost and performance) for our customers. For this reason, we are continuing our programme of work aimed at making targeted improvements to our asset management processes, systems and documentation, aiming to get ISO 55000 certification alongside our Electricity business by 2020.

In Section 2 we summarise the key components of our asset management framework. Together these describe a whole of life approach to investment planning which is aimed at being able to show how investment plans contribute to the delivery of specific network outputs, our asset management objectives and Powerco's mission statement (i.e. a line of sight from dollars to outputs through to the delivery of objectives).

ISO 55000 describes asset management as the coordinated activities of an organization to realise value from assets. It involves balancing costs, risks, opportunities and performance benefits. The application of an asset management system provides assurance those objectives can be achieved consistently and sustainably over time.

Consistent with this definition, Powerco's asset management framework comprises a number of coordinated components which together describe our asset management planning approach. These are:

- Network asset management policy
- Governance arrangements
- Asset management objectives
- Strategies which translate our objectives into our approach
- Asset management plans based on the strategies and reflect the implementation of asset lifecycle management, network development and non-network projects

Each of these components is summarised below.

1.4.1 ASSET MANAGEMENT POLICY

Powerco's network asset management policy (AM Policy) establishes the overall governance for asset management within the gas business. It has been developed to ensure the business continually focuses on delivering exceptional service to our customers in a way that balances risk and long-term costs. The AM Policy establishes the core asset management principles that drive our planning framework and governance arrangements. It contains our objective for asset management which can be summarised as:

To ensure Powerco's asset management approach achieves optimal management of its network assets (i.e. maintenance and operation, renewal, development and disposal) in order to deliver optimal outcomes for all stakeholders, consistent with their needs and requirements.

The AM Policy has been widely disseminated and communicated within the Gas and wider Powerco team.

1.4.2 GOVERNANCE

For Powerco, asset management governance is about doing the right things, and doing the things right.

Section 3 of the AMP summarises Powerco's organisational structure, which provides the overarching governance across all asset management activities, including the processes for establishing objectives and managing risks, establishing the needs case / drivers for investment, project and expenditure approvals, approach to procurement and works delivery.

1.4.3 ASSET MANAGEMENT OBJECTIVES

As noted above, our aim is to deliver exceptional service to our customers, at a cost they can be confident represents value for money. This is reflected in Powerco's overall objective to "strive to be a be a reliable partner, delivering New Zealand's energy future". We have translated the delivery of this overarching objective into a number of specific asset management objectives relevant to the gas business, based around five key areas, of safety, delivery, reliability, efficiency and partnership.

Together these objectives, and associated measures and targets, which are set out in Section 4, form the basis for our strategies, which detail the approach we take to achieve targeted outcomes.

1.4.4 ASSET MANAGEMENT STRATEGY

Our asset management objectives are directly related to our strategies for network development and lifecycle management set out in Section 6. These strategies establish our approach to:

- Managing public and people safety

- Planning for network capacity and resilience
- Managing network integrity and operational reliability
- Optimising our investments and efficient service delivery
- Maintaining and further improving our environmental performance
- Provision of customer centric services through our Gas Hub
- Information provision and decision support processes

These strategies drive the specific lifecycle plans we have for managing the risks associated with each asset class and network plans we have for each region.

1.4.5 ASSET LIFECYCLE, NETWORK AND NON-NETWORK PLANS

Our planning framework consists of three aspects:

- **Asset lifecycle plans:** These comprise the operation, maintenance and renewal activities that will be carried out. A separate lifecycle plan has been established for each asset class. As the majority of our assets are located underground, understanding and monitoring the condition of these assets is a unique challenge. Our response to is to seek to develop innovative techniques to better understand these assets. The asset lifecycle plans are outlined in Section 7 of the AMP.
- **Network Plans:** Our network plans set out the current performance, major projects and forecast growth within each region of the network. Our network plans also discuss, at a high level, the options we looked at when considering the network development required in each region. The network plans are outlined in Section 8 of the AMP.
- **Non-network project Plans:** These set out our development of safety systems, information acquisition and investment in supporting information systems. The non-network plans are outlined in Section 8 of the AMP.

Together Sections 7 and 8 establish the specific asset related and operational expenditures set out in Section 9 of the AMP.

1.5 ASSET MANAGEMENT IMPROVEMENT

Asset management is not a static process. As circumstances affecting our assets change (e.g. standards, knowledge, performance and / or weather events, etc.) the expenditure interventions required in a given year are likely to change. The process of annual review, and the governance arrangements we have recently reviewed and are now in place, are designed to ensure that the AMP remains relevant in a dynamic environment.

In addition to the processes that are part of our day-to-day activities, we have an asset management improvement programme that includes a wide range of initiatives to achieve asset management excellence. It is our goal to fully align our asset management practices to gain certification against the international standard ISO 55000 within the next two years.

The independent review against ISO 55000 evaluated 24 aspects of our Asset Management System. 20 items described Powerco as an “Effective” organisation, whilst being “Competent” for the last four.

We are currently in the process of reviewing our improvement roadmap to align with the recommendations of the assessment. The new roadmap will include a number of initiatives:

- **Embedding our enterprise resource planning system**: This is a key initiative that will enable us to have the right repositories and systems to transform asset data into insightful information. Our new enterprise resource planning system will enable us to efficiently collect, store and analyse data from the field, to senior management level when commissioned at the end of 2018.
- **Continuously improving asset data:** The deployment of our ERP is an opportunity to expose and clean up erroneous or missing asset data. Maintaining high quality asset data will be a challenge and we will be implementing data governance processes.
- **Refining our asset management risk and assurance processes**: The ISO 55000 compliance assessment recognised that risk management was well embedded within our decision-making process. It highlighted however the need to tailor our assurance programme to ensure process consistency and application throughout the whole organisation.

1.6 KEY DRIVERS OF EXPENDITURE

The key expenditure drivers fall into three areas:

- System Growth and Network Development
- Renewal and Maintenance
- Non-Network

Each of these is summarised below.

1.6.1 SYSTEM GROWTH AND NETWORK DEVELOPMENT

The primary driver for system growth and network development expenditure is the need to augment current network capacity to meet forecast demand and / or to deliver enhanced security of supply on specific parts of the network to meet customer requirements. Our networks are designed and built to meet the needs of our current and future customers. The capacity of each network must be sufficient to cope with a 1-in-20-year peak load and we use modelling software to forecast network capacity and pressure performance to ensure security of supply and an ability to cater for future growth. In addition to peak load modelling forecasting, we also forecast the mean demand growth in our networks. The primary indicator we use to forecast growth is the number of ICP connected on our network. Over the

next ten years, we forecast a growth in the net numbers of ICP on our network and in Section 8 we set out details of the specific expenditure drivers across each part of our network.

In summary network development expenditure, over the AMP planning period, results from the need to increase network capacity specifically in Wellington CBD, the Hutt Valley, New Plymouth and Palmerston North to cater for forecast demand growth.

1.6.2 RENEWAL AND MAINTENANCE

In the case of renewal and maintenance expenditure, our estimates have been developed in response to the current and projected states of our assets as indicated by condition information, age profile and expected life, and against an assessment of current and predicted performance of our assets.

Renewal and maintenance expenditure is largely stable and relatively predictable. The primary drivers of expenditure include:

- Management of asset integrity – leakage surveys, pipe coating surveys
- Replacement of pipeline prone to leakage
- Protection of above ground assets
- Fault response

Looking past the first 3-5 years the potential for unforeseen expenditure increases. Areas where this may arise include increased safety and inspection requirements, increased construction compliance costs and the need to implement risk reduction programmes.

1.6.3 NON-NETWORK IMPROVEMENTS

The replacement of our enterprise resource planning system and associated business applications is the primary driver for non-network expenditure. The main initiatives as set out in Section 8 of the AMP, include:

- Renewal of our corporate IT systems (New Foundations project)
- Construction of a new Network Operation Centre facility
- Improved quality of information on assets
- Improved information available to network contractors and third parties
- Improved HSE management

1.7 FORECAST CAPITAL AND OPERATIONAL EXPENDITURE

The forecast expenditure over the planning period (1 October 2018 to 31 September 2028) is shown below. The basis of the expenditure profile can be summarised as follows:

- The capital investment profile over the next 10 years is aimed at maintaining adequate level of supply throughout the period, while continuing with our renewal programmes.
- Sustaining growth and connecting new customers remains a strong theme over the period, representing around 50% of our network capital expenditure. This includes bringing gas to new residential developments, at the outskirts of existing cities.
- Quality of supply expenditure is set to grow over the next seven years as we continue strengthening the resilience of our networks with the implementation of our Security of Supply Policy.
- Non-network capital expenditure has increased to take into account the implementation of the new Enterprise Resource Planning system.

The investment profile set out in the 2018 AMP is aimed at meeting long-term network capacity and growth and delivering efficient, but broadly stable, levels of asset renewal and maintenance. The AMP sets out the rationale for this expenditure profile in the context of specifically identified expenditure drivers.

1.7.1 CAPITAL EXPENDITURE

Figure 1.6 shows an annual breakdown of total capital expenditure (in real/constant terms) over the period RY18 to RY28. Expenditure is broken down into the following categories:

- Consumer connection
- System growth
- Asset replacement and renewal
- Asset relocations
- Reliability, safety and environment
- Non-network assets

Our overall capital expenditure is higher than our previous 2017 forecast. This is because customer connection activity is higher than forecasted. Not only do we connect more customers every year, we've also seen an increase in large, hard to forecast, one-off customer-initiated work go ahead. We have adjusted our connection forecasts to reflect these changes, however we will continue to approach the larger jobs on a reactive basis.

Figure 1.6: Capital Expenditure forecast (constant $).

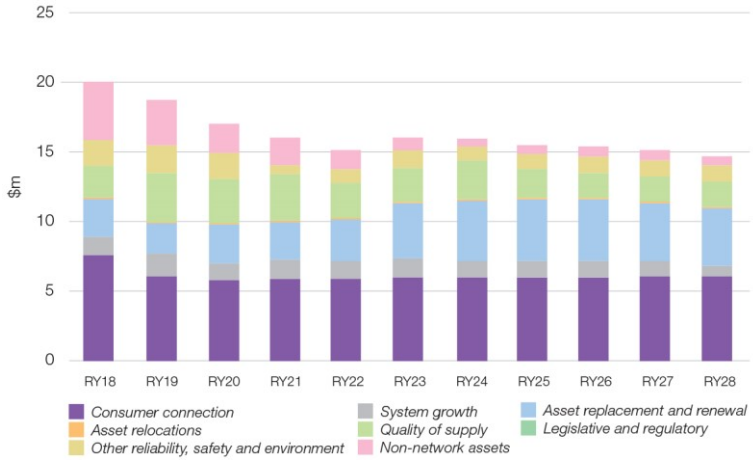
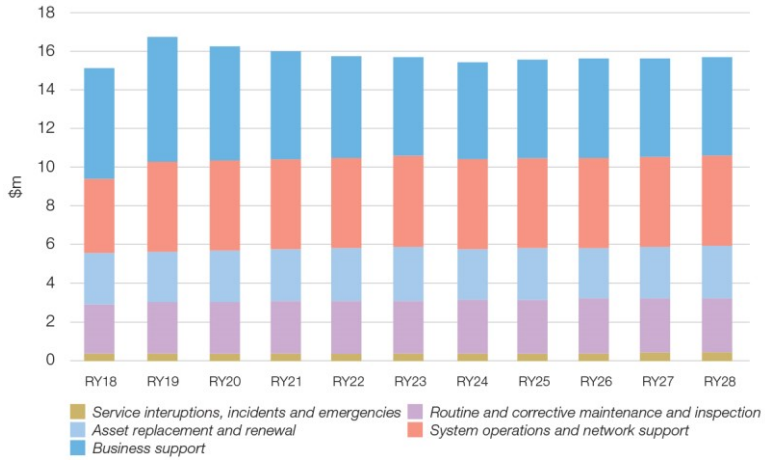


Figure 1.7: Operational Expenditure forecast (constant $).



1.7.2 NETWORK OPERATING EXPENDITURE

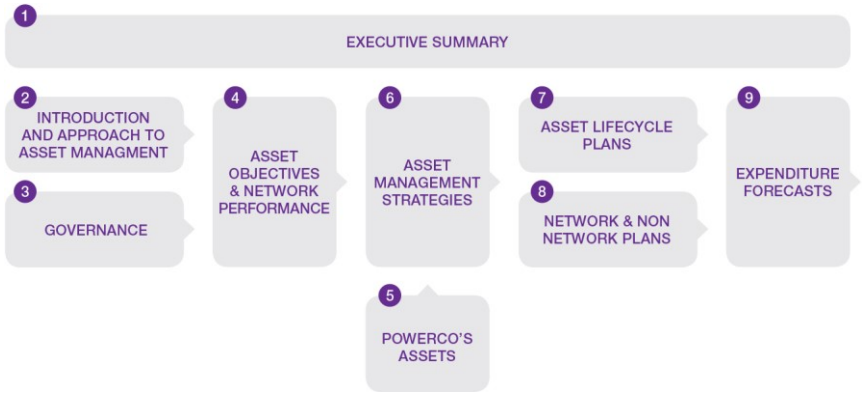
Figure 1.7 shows an annual breakdown of total operating expenditure (in constant terms) over the period RY18 to RY28. Network operating expenditure is the component of our total operating expenditure which is directly associated with running the gas distribution network. A large proportion of the network expenditure (in the order of 50%) is mandatory and is dictated by legislation or industry standards and codes of practice. Network operating expenditure is categorised as relating to either, a) maintenance work (i.e. routine maintenance/inspections, fault and emergency maintenance, and refurbishment and renewal maintenance) or b) expenditure associated with operating the system (i.e. control centre).

Our projections forecast that operating costs will remain relatively flat through the AMP planning period.

1.8 STRUCTURE OF THE 2018 AMP

Figure 1.8 sets out the structure of this AMP. We have designed the document to represent a logical progression from the high-level objectives and targets we have established need to be achieved to meet customer expectations. It will also include a description of Powerco's assets, the strategy and approaches we intend to employ to help us deliver our objectives (including key assumptions) through to the bottom up expenditure plans which are derived from an assessment of individual expenditure drivers. Powerco's proposed expenditure profile for the 10-year planning period is the summarised. Detailed supporting information, referenced in the AMP sections, is included in an Appendix to the AMP document.

Figure 1.8: Structure of the AMP.



1.9 CONCLUSION

The 2018 AMP is the third disclosed AMP for our gas business. It is an evolution from our 2013 and 2015 AMP as we progress on our Asset Management Journey. It describes our vision and plans for the long-term management of our gas assets. We are committed to providing a safe, high quality gas supply to our customers and we hope that you find this commitment reflected throughout the pages of the document.

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2 INTRODUCTION

For more than a century, Powerco (and its predecessors) has distributed electricity and gas to New Zealand homes and businesses, and, over the last 30 years, we have grown to become a significant part of New Zealand's economic infrastructure. We operate and maintain one of the largest networks of electricity lines and gas pipes in New Zealand. We are also the second largest energy distributor in New Zealand in terms of customer connections. Our network of assets is complex, and the scope of our operations is large. Today our gas network supplies consumers in Wellington, Hutt Valley, Porirua, Taranaki, Manawatu, Horowhenua and the Hawkes Bay.

The purpose of this AMP is to describe how we manage our assets at a practical level over the long-term. It is aligned with our asset management policy and strategy and reflects our overall objective of asset management: managing the gas network assets, throughout their entire lifecycle to continue growing gas as a leading energy choice for New Zealand, enabling us to provide excellent customer service, and a consistent safe, reliable and cost-effective service.

The AMP describes our strategy and processes, the performance we both expect and receive from our network, and how we efficiently utilise the resources required to achieve our long-term goals. It covers the period from 1 October 2018 to 30 September 2028, with a particular focus on the work programmes planned for the next three to five years.

This AMP is a working document that represents the status of our business at this point in time. Hence, as we develop and refine our practices, the application of what we describe in here will change. We call this continuing process of change our Asset Management Journey. This journey started in earnest in 2010 with the adoption of the PAS 55 framework and continues today towards alignment with the ISO 55000 standard, as we continually strive to improve.

We have two shareholders, QIC (58%) and AMP Capital (42%). We are interested in delivering long-term value to both our customers and shareholders; we recognise the place we hold in the supply of energy to New Zealanders. Our vision, mission and values are centred on these responsibilities.

2.1 POWERCO'S VISION, MISSION AND VALUES

Our **Vision**, "Your Reliable Partner Delivering New Zealand's Energy Future", requires us to effectively manage, maintain and improve our assets and to safely and reliably deliver the energy that our customers expect – today and into the future. The New Zealand electricity and gas distribution sectors are heavily regulated and, as such, our investment and pricing decisions must be made in consultation with our regulator. We have a responsibility to our stakeholders, shareholders and regulators to ensure that our business decisions are carefully considered so that the actions we take achieve the objectives that we have set in the most cost-effective manner, whilst ensuring the safety of those who work, play and live around our networks.

Figure 2.1: Powerco's Corporate Vision.

Powerco, your reliable partner, delivering New Zealand's energy future

This AMP describes our journey towards achieving this vision over the next 10 years.

Our **Mission** statement seeks to build further on our vision of reliable community partnership and focuses our people on the importance of our future energy needs. The Mission statement also highlights the essential requirement to operate safely and efficiently in delivering energy.

Figure 2.2: Powerco's Mission Statement.

"In profitable **partnership** with our stakeholders we are **powering the future** of New Zealand through the **delivery** of **safe, reliable** and **efficient energy**."

We distribute natural gas extracted locally in the Taranaki region. It is one of the cleanest source of non-renewable energy, and is plentiful to provide the energy that New Zealand homes need to stay dry, warm and healthy at an affordable cost. There is currently no other source of widely available energy that New Zealand businesses and organisations can use to produce industrial-grade heat that they need to operate, contributing to New Zealand's economy.

As New Zealand is transitioning towards a low-carbon economy, so are our networks. Everything we do as a business aims at meeting customer demand now and in the future. We are working on the improvements that will support the transition to a low-carbon future, by allowing other fuels to be transported through our pipes.

These themes are key to our business and are reflected through this AMP. Our Asset Management Objectives (described in Section 4) and our Asset Management Strategies (Section 6) show how we put our Mission into effect and what it means for our plans going forward. Our work with establishing The Gas Hub (described in Section 3) is also instrumental in building strong partnerships with our customers and stakeholders within the communities in which we operate.

Our **Values** define our identity, who we are, and what we stand for. We developed these Values by describing a set of observable behaviours that would be displayed by the typical Powerco employee. These behaviours define the way we go about our work and our relationships with others. By demonstrating these behaviours, we will be living our Values. The Values define our culture, inform our decisions and provide authority to our leadership. Our asset management framework and The Gas

Hub brand aim to embed these Values in our approach to all aspects of the investment cycle, from planning through to delivery to the end-consumer.

Figure 2.3: Powerco's Values.

VALUE	DESCRIPTION
Safe	We are committed to keeping people safe.
Trustworthy	We act with integrity. We are honest, consistent and ethical. We trust each other and our external partners and work to be trusted in return.
Collaborative	We work together with our partners, contribute our capabilities and provide timely support and consideration to achieve our collective goals.
Conscientious	We are proactive, hardworking, diligent and thoughtful. We are mindful of the needs of others and of the environment. We take ownership for our actions.
Intelligent	We make informed decisions for the best outcome. We continually seek improvement and innovative solutions from our suppliers and ourselves.
Accountable	We lead. We take ownership of our decisions and responsibility for our actions. We are proactive in identifying and resolving problems.

Like our Vision and Mission, you will see our Values reflected through this AMP in the approach we take to our business.

2.2 STAKEHOLDERS' INTERESTS

The environment in which we operate is complex and involves many stakeholders that sometimes have contradictory interests. To be a "reliable partner", it is our job to assess and balance these interests in our decisions to make sure we can offer the right service, with the right quality, at the right price. To do this, Stakeholders' interests are identified through various mechanisms. We regularly consult with many of our stakeholders and ensure that clear responsibilities are established inside the company to make sure we properly identify and manage stakeholders' expectations.

Stakeholder requirements don't always align or are sometimes mutually exclusive. For example, different customers may place greater or lesser emphasis on price or quality, or have an expectation that the level of service can continually be improved with minimal cost implications. In such instances, Powerco is required to exercise judgment, but in all cases, we strive to engage with stakeholders in a transparent manner to explain our decisions. The publication of this AMP, consumer questionnaires and market research through The Gas Hub and pricing consultation are examples of our engagement.

2.2.1 STAKEHOLDERS LIST AND MAIN INTERESTS

Our identified stakeholders, their interests and how we identified them, is summarised in the following table.

Table 2.1: Stakeholders and Main Interests

STAKEHOLDER	MAIN INTERESTS	HOW STAKEHOLDERS' INTERESTS ARE IDENTIFIED
Gas customers	Service quality and reliability Price Safety Information Environmental Seamless experience with their gas installation	Market research studies Engagement and consultation with retailers Dedicated client managers for major consumers Gas Hub website analysis Satisfaction surveys after connections through the Gas Hub Gas Hub presence at home shows
Retailers	Service quality and reliability Price Safety Efficient business-to-business processes	Regular meetings Network Service Agreements Retailer consultations Active participation with Gas Industry Company
Public, landowners, iwi	Public safety Land access and respect for traditional lands Environmental	Consultation and feedback Access and easement negotiations and agreements Acts, regulation and other requirements
Transmission	Technical performance and rules compliance	Involvement in the Gas Association of New Zealand
Other distribution companies	Standards setting Benchmarks	Involvement in industry bodies
Powerco's shareholders	Efficient and effective business management and planning Financial performance Governance Risk management	Corporate governance arrangements Formal reporting KPIs

STAKEHOLDER	MAIN INTERESTS	HOW STAKEHOLDERS' INTERESTS ARE IDENTIFIED
Commerce commission	Pricing levels Quality standards Effective governance	Meeting with commissioners and staff Quality response to consultations papers, decision paper and regulatory determination
State bodies and regulators	Safety via the Ministry of Business, Innovation and Employment Market operations and access via the Gas Industry Company Environmental performance via the Ministry for the Environment	Published acts, rules and determinations Formal reporting On-going consultation
Employees	Safe, productive working environment Training and development Continuous improvement, adoption of new technologies	Regular dialogue, internal communications and employee surveys Employment negotiations
Contractors	Safe, productive working environment Commitment in works volume	Contractor negotiations and dialogue Contract managers present in the regions
Other Powerco divisions	Expertise sharing Standardisation of tools and systems	Regular discussions across the business Tactical initiatives discussed and coordinated

2.2.2 ALIGNMENT BETWEEN STAKEHOLDERS AND ASSET MANAGEMENT

Most of our stakeholders have long-term interests which aligns with the long life of our assets. We translate these requirements into our governing policies, objectives and processes. For example, "service quality and reliability", required by gas customers, retailers, and the Commerce Commission, is directly reflected in the Delivery objective "Adequate network capacity".

We also work alongside our stakeholders to look pass our 10-year planning period, ensuring our assets are designed to serve them now, and in the future. In the recent years the role of gas in a low-carbon future has been questioned. As a response, we are engaging across the sector to explore what alternative fuels could be distributed through our network. Overseas, technology to produce hydrogen and synthetic natural gas are becoming viable alternatives to traditional natural gas extraction. This gives us assurance that the networks we are building and maintaining today, will have a purpose for their intended life.

2.3 APPROACH TO ASSET MANAGEMENT

We strive to demonstrate transparent and responsible asset management processes that align with demonstrated best practice. In this section, we describe how we have integrated these principles in our business as usual activities, utilising ISO 55000 as a framework.

2.3.1 PRINCIPLES OF ISO 55000

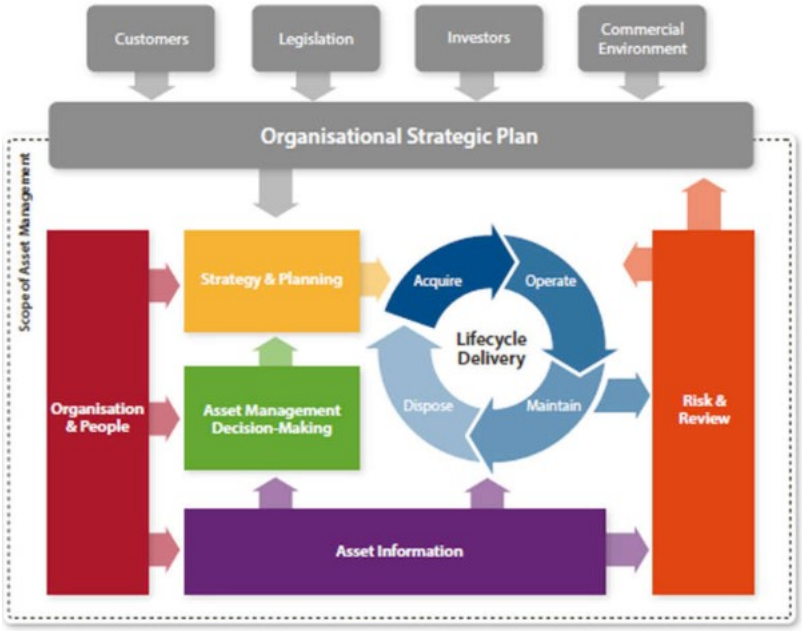
ISO 55000 is a set of requirements, principles and terminology defining best practices for the management of physical asset. It is used by a wide range of infrastructure companies, including rail operators, facility managers, as well as gas distribution networks.

As an international standard, it allows the benchmarking of Powerco against similar organisations, giving our stakeholders the guarantee that we are managing our assets adequately. It also closely aligns with the objectives stated by our economical regulator, including:

- Improved services and outputs to customers
- Managed risks
- Demonstrated compliance to legislative requirements
- Improved efficiency and effectiveness

Figure 2.3 below shows the element of ISO 55000 as prescribed by the Institute of Asset Management (IAM).

Figure 2.3: Elements of ISO 55000



2.3.2 CONMPLIANCE WITH NEW ZEALAND LEGISLATION AND STANDARDS

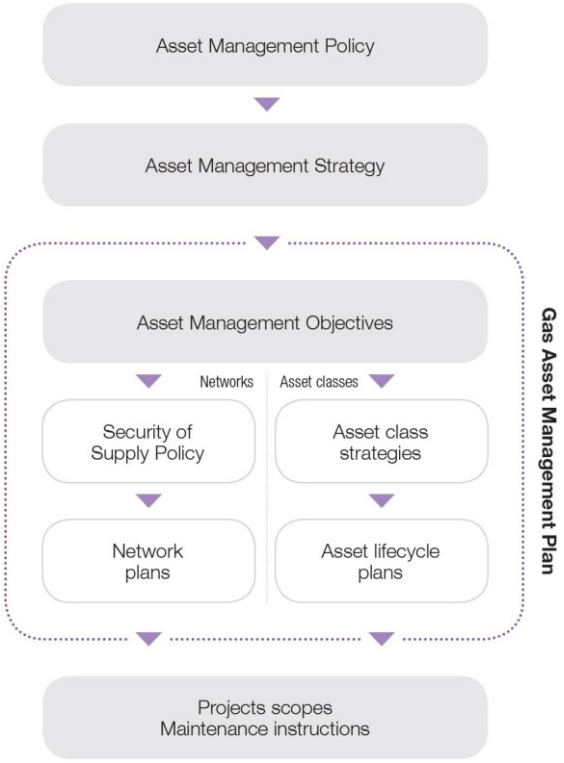
Powerco is accountable for complying with all the relevant Acts that will impact on our asset management approach, including the Gas Act 1992, the Gas Safety and Measurements Regulations 1992 and the Gas Default Quality Price Path established under Part 4 of the Commerce Act.

Our asset management framework and practices use these requirements as a foundation. Our Asset Management Policy, described in Section 2.3.3, clearly states our objective to meet all statutory and regulatory obligations. We have integrated standards and industry Codes of Practice to our objectives, processes and procedures, including AS/NZS 4645 for Gas distribution networks, and NZS 7901 – Safety Management System for Public Safety. The Executive Management Team (comprising the Chief Executive and his direct reports), is accountable for the organisation to fulfil compliance and issue an annual compliance statement. A full list of these legislative requirements can be found in Appendix 4.

As noted previously, a large portion of our operating expenditure costs in the gas business are driven by maintaining compliance with the legislation and standards.

Figure 2.4 below illustrates this “line-of-sight” concept.

Figure 2.4: Asset Management “Line-of-Sight”.



The guidance provided by ISO 55000 makes Powerco’s asset management framework a recognised, systemic, and fact-based framework.

2.3.3 ASSET MANAGEMENT POLICY

Our asset management policy presides over all our asset management activities. The policy provides alignment and linkages between the asset management activities, our corporate mission, vision and values. It represents our commitment to manage our assets in an efficient and structured way, so we can deliver optimal outcomes for all stakeholders.

In 2015, after having had a separate policy for the management of gas assets since 2011, we have adopted a Network Asset Management Policy that apply across both Electricity and Gas networks. The changes are minor in respects to our previous

policy, although it introduces the importance of asset-related data to achieve our vision. Section 5 of this AMP gives more details on how we consider data as an asset.

Specifically, it states that we will pursue the following objectives:

- Positioning the safety of the public, our staff and contractors as paramount
- Developing our networks in a way that reflects the evolving needs of our customers
- Delivering a cost-effective service by optimising asset cost and performance
- Be proactive, transparent, and authentic in our interactions with our stakeholders
- Meeting all statutory and regulatory obligations

We believe these elements are critical to being a good partner in delivering on New Zealand's future energy needs. A full version of this policy, authorised by our Chief Executive Officer, can be found in Appendix 3. A more detailed description of all the Governance arrangements, processes and document hierarchy is described in Section 3.

The asset management system we employ is designed to deliver the requirements set out in the asset management policy and the long-term organisation objectives set out in our Business Plan.

2.3.4 ROLE OF THE ASSET MANAGEMENT PLAN

The operation of our asset management system is what we do day-to-day. Each part has a different operational timeframe, ranging from daily operations management to less frequent but regular assessment of the effectiveness and performance of our asset strategies. Our longer-term asset management objectives and goals tend to be reviewed annually but are typically held constant over much longer timeframes.

All of these components form our approach to asset management. As illustrated earlier on Figure 2.4, this AMP summarises all these activities and flows from our governance documents. In this way it communicates our overall approach to asset management from our stakeholders, in accordance with our "line-of-sight" principle.

2.3.5 REPRESENTATION OF OUR ASSET MANAGEMENT SYSTEM

To facilitate a good understanding of how asset management fits into our activities, we have developed our own representation of our asset management system and its different functions. This is shown in Figure 2.5 below.

Our asset management system is split into three levels and represents the core elements within the ISO 55000 framework. The first function shows how our stakeholders' interests, from our customers to investors, flow through to our Organisational Strategic Plan.

The second illustrates how the Organisational Strategic Plan flows through to our asset management system itself and its core functions of strategy, whole-of-life asset management, planning for growth, and customer feedback and analysis. The third shows how these activities are supported by enabling functions including information systems, strong people systems and organisational governance (described in Section 3).

The three levels of our asset management system are summarised below.

Figure 2.5: Representation of Asset Management System.

2.3.6 ORGNISATIONAL STRATEGIC PLAN

The development of our Organisational Strategic Plan[1] is an annual process led by the Executive Management Team and agreed to by the Board of Directors. It describes our long-term organisational strategy to deliver the vision and mission. This is the starting point for our asset management system within the framework set by our asset management policy.

Fundamental to our asset management system is the translation of the organisational strategy into specific asset management objectives and targets. These objectives and targets establish a set of numerical measures by which we can assess our network performance. In summary, our five asset management objectives are:

- **Safety** – Keep the public, our staff and our contractors safe from harm.
- **Delivery** – Ensure our networks have the capacity and resilience to meet the quality of supply expected by our customers.
- **Reliability** – Safe containment of gas and operational reliability to deliver gas to our customers at the right quality.
- **Efficiency** – Continuously seek out and deliver cost efficiencies.
- **Partnership** – Be a responsible partner for our customers and our other stakeholders. These are described in more detail in Section 4.

2.3.7 THE CORE ASSET MANAGEMENT FUNCTIONS

The core asset management functions have a direct impact on the quality and capacity of our assets and the ability of our network to serve our customers. Underlying these functions are the processes that we follow to take the right decisions. Some are time-based while others are triggered by events, such as a new connection request from a customer. In Section 3, Governance, we will describe the main processes and how responsibilities are defined. The core functions we utilise in our asset management system, the key inputs and output documents are described below.

2.3.7.1 ASSET STRATEGY

Our asset management strategy is designed to translate our asset management objectives (Section 4) into the class and network plans we have for our assets. The asset management strategy takes a long-term, whole-of-life view on our asset deployment and establishes how it will be implemented.

It feeds from the Asset and Customer Analysis function to identify trends, risks and opportunities. Several documents are created under this function, including:

- The asset management strategy and security of supply policy
- The asset management objectives
- Asset class strategies

This is discussed in detail in Section 6.

2.3.7.2 ASSET PLANNING

This is where we make the planning decisions for our assets. Given our strategy and objectives, the question we ask is “What do we need to do and when do we need to do it in order optimise the performance and utilisation of our assets to reach our targets and objectives within each network area?” These plans drive the network-related costs that we face as a business.

To create the plans, we use the asset data and performance information collected from the field (including asset condition) and risk management methodologies to optimise our risk profile. We use asset criticality wherever possible to plan our projects at an asset level. This Asset Management Plan, and the annual Gas Works Plan are outputs of this function.

The detail of our asset planning for each of our network areas is described in Section 8.

2.3.7.3 ASSET LIFECYCLE

Our asset lifecycle planning drives our overall asset management functions (operations, maintenance and renewal or disposal) from a whole-of-life class management perspective. Founded on our asset management strategy, our asset class management is designed to ensure we efficiently manage our assets to deliver reliable service to our gas customers.

Using the strategies and plans designed in previous functions, this is where we create our technical standards, work instructions and maintenance and inspection plans.

Our practices around asset class management and what they mean for each asset class are described in Section 7.

2.3.7.4 ASSET AND CUSTOMER ANALYSIS

How did our assets perform? Did we manage to achieve what we wanted from the strategy and planning functions? Are our delivery processes working properly?

What was the impact of our activities on our consumers and customers? These are the questions we are answering in this function, on a short- (e.g. incident analysis), medium- (e.g. works plan delivery) and long-term (e.g. trends analysis). These are core components to the strategies (described in Section 6) that we employ to translate our asset management objectives to our asset lifecycle and network plans.

[1] This is formally documented in our annual Business Plan, but details our long-term strategy as an organisation.

Whilst no formal document comes out from this function, the analysis carried through this function form a key input to the other functions.

2.3.8 THE ENABLING FUNCTIONS

Surrounding the core functions are the three enabling functions. They act like the grease on the cogs and are essential.

2.3.8.1 ASSET INFORMATION

Asset information enables us to take efficient and cost-effective decisions on how to manage our assets. It is the foundation that enables our whole system to work. Our plans around these are discussed in Section 8.

2.3.8.2 ORGANISATION AND PEOPLE

Our system can work only if we have the right organisation and the right people with the right skills. In particular, it includes human resources management processes and competency frameworks. As noted previously, our governance arrangements and processes are described in Section 3.

2.3.8.3 RISKS AND HAZARDS

There are inherent hazards associated with gas delivery and this is reflected by the legislative requirements that require demonstrable management of the resultant safety risks. Much of our day-to-day operational expenditure is driven by the need to manage safety risks and comply with the legislation.

Our asset management decisions, whether driven by safety, capacity or reliability, are risk-based. This drives the need to have robust risk and hazard management processes.

This approach is based on our corporate risk management system. Our risk management system is described in detail within Section 3.

2.3.9 CONTINUOUS IMPROVEMENT OF OUR ASSET MANAGEMENT SYSTEM

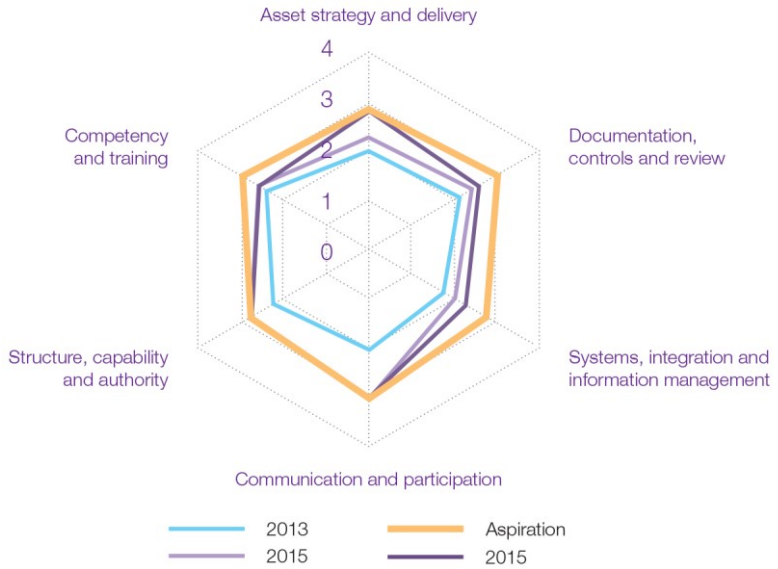
Each year, we step back and look at our performance and strive to improve our asset management capabilities. As noted earlier, we call this improvement process our asset management journey. This started in 2010 when we went through a formal PAS 55 audit and continues today with a sustained focus on improving our processes and systems. This leads to a periodic review of our key asset management documents – Policy and Strategy – and a review of our processes and organisation on a case-by-case basis. For example, in 2012 we restructured our service delivery arrangements to achieve better long-term asset management and value to our customers.

A useful tool to establish a measure of our maturity in the asset management journey is the AMMAT self-assessment established by the Commerce Commission in their Information Disclosure requirements for Gas Distribution Businesses (GDBs). In the last two iterations of our AMP, we have completed this in-house and had it peer-reviewed with other asset management specialists across the company.

This year, we have engaged an independent reviewer to carry out a gap analysis of our organisation with ISO 55000. We used the results of their assessment to inform the AMMAT self-assessment.

The results (shown in Figure 2.6) show that we are progressing towards a maturity level of 3 for most of the categories. This year's average level is 2.8, compared to 2.1 in 2013. Progress is still needed on information management due to the poor accuracy of historical data in some areas. Additionally, we are continuing to improve our asset management capabilities and processes. Our objective is to reach an average level of 3, leading to ISO 55000 certification in the next two years.

Figure 2.6: AMMAT Self-Assessment Score.



We also take the opportunity to improve our asset management system by leveraging off the different audits and industry relations we have. This includes the compliance audit with NZS 7901 in regards to public safety management systems and peer review with the Electricity business.

2.4 KEY ASSUMPTIONS OF THE AMP

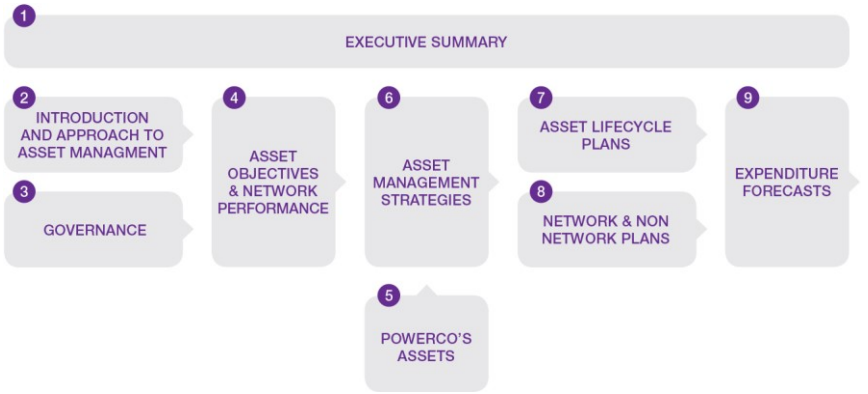
This AMP is based on some fundamental assumptions that underpin our long-term strategic direction and operating environment. These key assumptions are:

- The present gas structure broadly remains the same and Powerco continues to operate as a non-vertically integrated gas business.
- The gas transmission system continues to operate and develop in generally the same direction as currently and is maintained to an adequate level.
- Field services continue to be outsourced, and there are no major disruptive changes to the availability of contractors.
- Design services are provided in-house.
- Consumer demand and expectations regarding reliability of their energy supply continue to follow long-term trends.
- New Zealand will become a low-carbon economy by 2050. Powerco will continue to distribute energy through its network, moving from extracted natural gas to a renewable, similar gaseous fuel such as hydrogen or synthetic natural gas.
- Asset lives remain aligned with the standard lives prescribed in the Input Methodologies.
- There is no major change to the regulatory regime – for example, structural changes to the regulatory institutions or mechanisms currently in place.
- To the extent possible, all the assumptions made in developing this AMP have been quantified and described in the relevant sections. Where an assumption is based on information that is sourced from a third-party, we have clearly set this out.

2.5 STRUCTURE OF THIS DOCUMENT

This AMP has been structured to traverse the levels of our asset management system. It starts with the overall governance and process, and then explains our asset management objectives, and the historical and targeted performance measures (driven by our Organisational Strategic Plan and Asset Management Policy). It then describes our asset strategies developed to achieve our objectives, the asset lifecycle plans, and the network plans based on those strategies. The AMP then culminates in a summary of our capex and opex expenditures for the planning period. More detailed maps of our supply areas and required regulatory schedules are contained in the appendices. The structure of the document is outlined below.

Figure 2.7: Structure of the AMP.



3 GOVERNANCE

Asset management is the core of our business. Successful asset management requires clear and structured governance to ensure our processes, systems and data deliver a safe, reliable and sustainable network.

This section describes our asset management governance model and the processes through which we deliver the outcomes sought by our stakeholders and customers. The section covers:

- The governance responsibilities and organisation structure related to asset management
- Our asset management approach
- The delivery model we employ to deliver asset management activities
- The processes and functions supporting asset management
- How we manage outsourced activities
- Our expenditure governance principles

The final sections describe the communication processes and improvement processes we utilise to ensure continuous improvement in our day-to-day business.

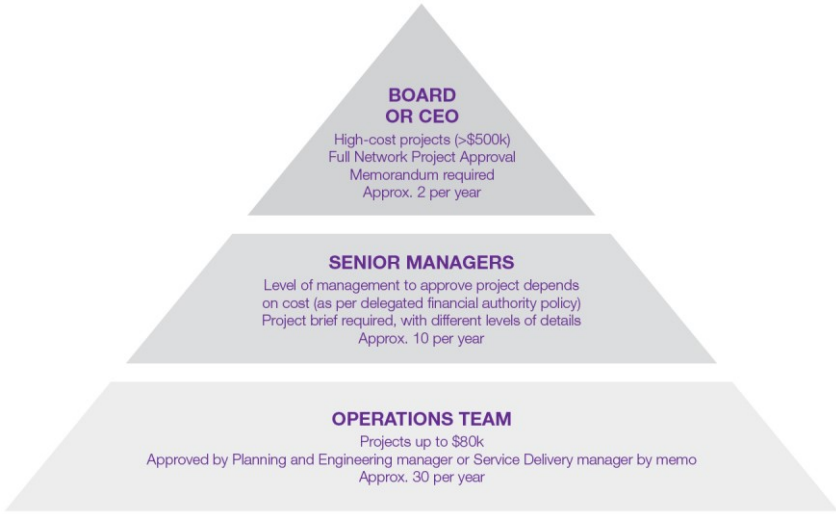
3.1 GOVERNANCE RESPONSIBILITIES

Our "line-of-sight" asset management framework (described in Section 2) starts at the highest level of the company and translates into our day-to day operations through a series of structured, efficient processes. We monitor the efficiency of our decisions by measuring, reporting and acting on several Key Performance Indicators at the different levels of the company.

Figure 3.1 and Figure 3.2 illustrate how decision-making and implementation responsibilities devolve from the Board and the Executive team to the various management and operational teams within Powerco and in the field, and how approval authorities are delegated based on the financial value of the projects.

Figure 3.1: Decision-making and Implementation Responsibilities.

Figure 3.2: Responsibility Tiers.



Powerco's Corporate Governance Charter and Group Delegations of Authority clearly document the levels of delegation. As a corporate standard this policy is reviewed annually. Because the delegations policy determines approval levels in the finance system and is externally audited.

The following section describes in more detail the parties involved in our asset management governance at a corporate level.

3.1.1 POWERCO'S BOARD

Powerco's Board comprises six directors nominated by its two shareholders – QIC and AMP Capital. It provides strategic guidance, monitors management's effectiveness and is accountable to shareholders for the company's performance. From an asset management perspective, it does this by endorsing key documentation, establishing our corporate vision, objectives and strategies for achieving those objectives.

The principal asset management responsibilities of the Board are listed below.

- The Board has overall accountability for maintaining Powerco as a safe working environment and ensuring public safety is not compromised by our assets and operations. It delegates day-to-day asset management responsibilities to the CEO and Senior Managers.

- The Board annually reviews and approves our AMP, which includes our medium-term (10-year) investment forecasts, and our shorter-term expenditure plans.
- The Board sanctions operational or capital projects involving expenditure greater than $2 million, and the divestment of any assets with a value greater than $250,000. One of the main factors the Board uses when considering projects is its alignment with the Asset Management Plan.
- The Board receives monthly reports that include performance reports regarding the status of key work programmes, key network performance metrics, updates on high-value and high-criticality projects, and the status of our top risks. It also receives audit reports against a prescribed audit schedule. It uses this information to provide guidance to management on improvements required, or changes in strategic direction.

In order to help it make informed decisions, the Board uses a structure that includes two additional committees:

- The Audit and Risk Committee, which is responsible for overseeing risk management practices. The Committee meets quarterly to review processes and controls and review and discuss issues reported by internal and external auditors. It reports back to the rest of the Board.
- The Regulatory and Asset Management Committee, which is responsible for ensuring that Powerco's AMP is appropriate, regulatory requirements are met, and asset-related risks is appropriately managed.

3.1.2 POWERCO'S EXECUTIVE MANAGEMENT TEAM AND CORPORATE STRUCTURE

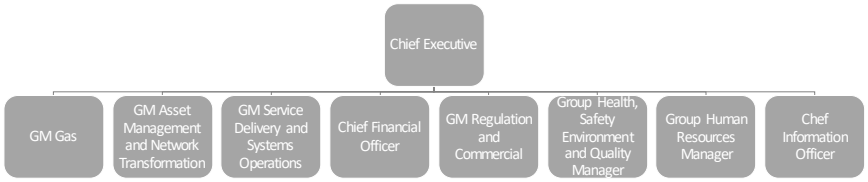
The structure of Powerco's Executive Management team helps facilitate the direction and leadership required to implement an integrated and holistic approach to asset management.

The gas business is a customer-focused unit, supported by five functional units (Finance, Regulation and Commercial, Information Services, Human Resources and Quality, Safety and Environment). This structure enables the gas division to focus on core activities and decisions and access specialist skills and advice as required.

The five functional units fulfil a variety of roles that support asset management. The Information Services unit manages non-network assets that are normally shared between the gas and electricity divisions – including asset information, IT infrastructure and telecommunications system assets.

There are two additional electricity-focused business units, independent from the gas business' operations: Asset Management and Network Transformation, and Service Delivery and System Operations. We leverage on their scale or skills to drive cross-business tactical initiatives when efficient to do so.

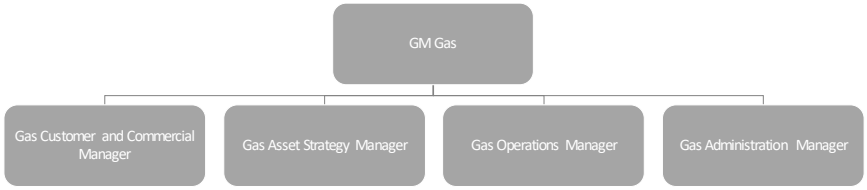
Figure 3.3: Powerco's Corporate Structure.



3.1.3 GAS DIVISION'S RESPONSIBILITIES AND STRUCTURE

The gas division delivers on the overall objectives and targets set by the Board and reports regularly on progress against them. The gas division's structure was refined in early 2015 to align it with the main asset management functions, as shown in Figure 3.4.

Figure 3.4: Gas Division Structure.



The gas division's responsibility includes ensuring that the network assets are developed, renewed, maintained, operated and used sustainably and efficiently to meet the needs of all stakeholders.

The following asset-focused groups report to the General Manager:

- **Asset Strategy:** This is the asset manager function, which involves overseeing long-term activities on the network, sponsoring the asset strategy, and developing, monitoring and analysing asset objectives, performance and reliability. The development of the AMP is part of this group.
- **Operations:** This group is responsible for the preparation and delivery of work on the networks. This includes developing technical standards, design, operation and maintenance, and the management of the contractors working on the network.
- **Commercial:** Despite not being a "technical" group, the commercial team is our direct link with our customers and end-consumers. Through customer surveys, and account management of major users on the network, the team helps us ensure network capacity is sufficient to cater for growth, and that our service is of quality.

3.1.4 OUTSOURCED ACTIVITIES

A number of activities core to asset management are carried out by external or internal parties to Powerco, reporting to the gas division through independent processes and systems. This includes all field work, processing of as-built, or the management of IT services.

Based on the criticality of the activity for the achievement of Powerco's objectives, different controls are in place to ensure any outsourced activity are delivered to an adequate level of quality, cost, and timeliness.

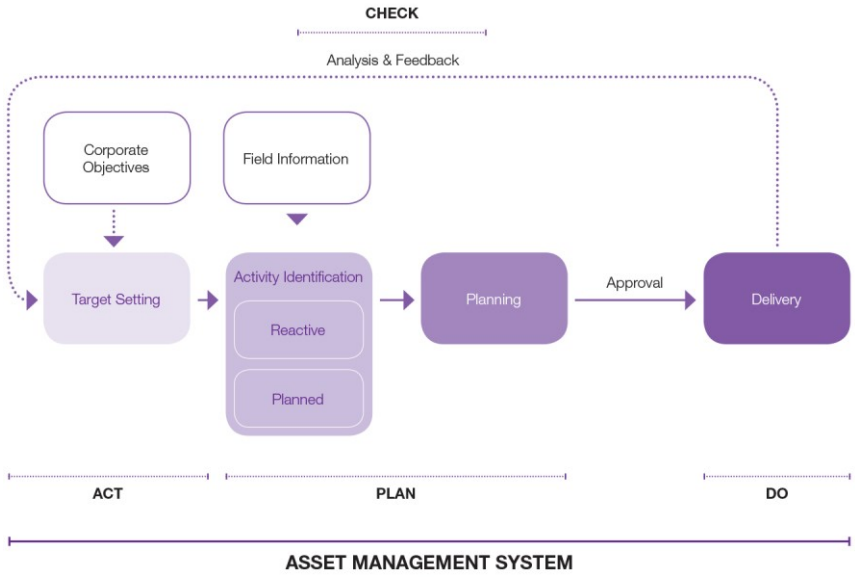
Our approach to managing external contractors for the delivery of field work is mature and in-line with industry best practice. It is described in more details in Section 3.5 below.

3.2 ASSET MANAGEMENT APPROACH

Our organisational structure allows us to assign responsibilities and accountabilities at the right level. However, we need robust processes to ensure the effective long-term, whole-of-life management of our assets, particularly in relation to planning, lifecycle activities, delivery and communication. This section also covers how non-network decisions are managed.

In Section 2, we described the core functions of our Asset Management System. Figure 3.5 describes the process we follow inside these functions when making our asset management decisions. A key part of the system is the feedback loop that supports continuous improvement.

Figure 3.5: Asset Management Core Processes.



Each step in this model has an approval step:

- Targets are reviewed and approved by the Gas General Manager
- Activities identified in a planned manner will progress to planning if approved through the Gas Works Plan process by the senior management team.
- Activities identified in a reactive manner will progress to planning if approved by the Operations manager
- Planned projects will progress to delivery if approved by holder of the Delegated Financial Authority (DFA). Our DFAs are described in Section 3.6.3 below.

With the upcoming change in our core enterprise systems, we are currently reviewing the processes and the documentation that is used across our asset management system, and the way we make them available. If the high-level principles remain the same, the processes described in this section are based on current practices at the time of writing.

3.2.1 SETTING TARGETS

To set the right targets, we assess performance and acceptable risk levels against the following:

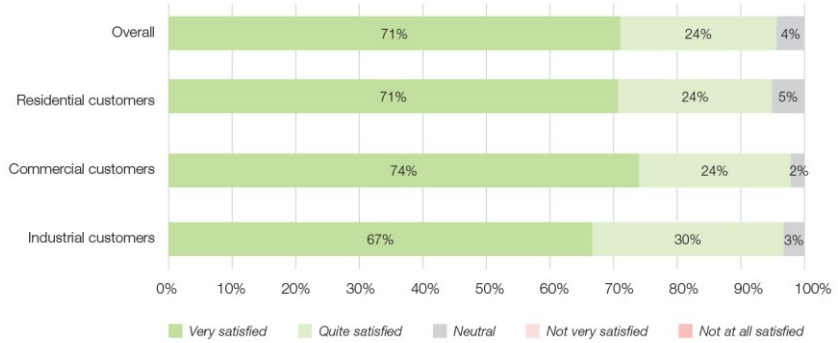
- A clear line of sight with our corporate strategic plan

- Legislative requirements
- Staff and contractor safety and the impact on the public
- Our consumers' and customers' expectations in terms of quality and price
- The competition from other energy sources (natural gas is a discretionary fuel)
- The trade-off between mitigation costs and the cost incurred should a risk be realised
- Industry standards and best practices
- Powerco's reputation as a professional and responsible organisation

Customers are central to Powerco's strategy and targets. We regularly survey them, and every two years, we conduct detailed and comprehensive market research that feeds into our asset management planning process.

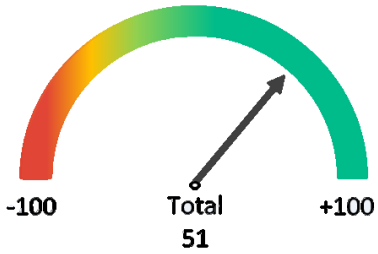
Our latest study, prepared in July 2017, showed that the level of satisfaction is very high and growing across all our customers categories: residential, commercial and industrial. Out of 400 randomly chosen respondents, none were dissatisfied by the reliability of the service offered by Powerco, as shown on the figure below.

Figure 3.6: Gas Customers' Ratings of Reliability.



We also carry Net Promoter Score (NPS) surveys. 56% of our newly connected customers would recommend our services, giving us a total score of 51% (on a scale from -100 to +100).

Figure 3.7: Net Promoter Score.



3.2.2 ENSURING ASSET MANAGEMENT IS REALISTIC AND OBJECTIVES ARE ACHIEVABLE

Deliverability is central to Powerco's asset management and our processes. This includes setting objectives, taking full account of the skills and competencies needed in the relevant roles and how best to meet our targets. We set our asset management goals, objectives and long-term investment profiles to ensure their delivery takes account of the following practical constraints:

- **Rates of Change:** As a general principle, we have designed our asset management strategies, objectives and work programmes to avoid step changes in the path of future investment. This has been done to help ensure we deliver work efficiently, our customers do not experience step changes in our service, and the prices we charge do not exhibit unexpected step changes.
- **Technical Complexity:** Powerco realises that the specialist resource base available is not generally sufficient to support high rates of technical change. Consequently, Powerco focuses on investments that are well understood by our engineers and field staff and are industry-proven. Where new technology can bring clear economic benefits (for example, network automation) our processes require proof of concept trials, standardisation, and workforce education to ensure changes can be delivered effectively.
- **Field Resource Availability:** The technical resource we utilise is specialist and finite. Achieving sustained augmentation of the long-term technical resource requires careful planning, open discussion with our service providers, appropriate contractual frameworks and support for industry training organisations. Our future strategies, contractual arrangements and investment profiles have been developed in a way that enables network services to be delivered within the practical constraints of the resource available in the New Zealand market.

Maintaining flexibility and the ability to work effectively with our services providers to scale and tailor their resources to match our specific requirements has enabled us to achieve reliable delivery of our work programmes in recent years.

Once set, targets are allocated as agreed among the gas management team and reported on monthly.

More detail on our objectives and targets for this AMP are set out in Section 4.

3.2.3 ACTIVITIES IDENTIFICATION

We have several processes that enable us to identify required activities on the network, which can be of two types: reactive (i.e. triggered as a result of an inspection or request from a customer) or planned (i.e. scheduled over the long-term). Reactive activities are recorded into a programme of works with a target delivery date that reflects the level of urgency.

As we improved our asset management maturity, the amount of reactive activities has been reducing year-on-year. This allows us to deliver better, safer and more efficient work on our assets, ultimately benefiting our customers.

3.2.3.1 REACTIVE ACTIVITIES

Reactive activities result from maintenance requirements, faults, customer or consumer requirements, or any unexpected event that requires immediate action on the network. Our responses to these problems often involve “ready to use” solutions, standards or work instructions. By their nature, reactive activities cannot be identified early enough to be individually forecast.

We analyse the need for reactive work using historical data, including:

- Consumer connections and consumer maintenance
- Corrective maintenance and defects remedied
- Fault responses and emergency activities

3.2.3.2 PLANNED ACTIVITIES

Planned activities are driven by our accepted risk levels and the targets established for each objective. If we consider that our current or future risk levels, in terms of safety, delivery or reliability, are outside acceptable limits, we will consider different options and include them in a new project with an indicative delivery date in an improvement register. Details on our risk management processes and practices are included in Section 3.23.

Managing Safety Risks: Formal Safety Assessment

Every five years, we perform a network Formal Safety Assessment, as required by AS/NZS 4645:2018 (Gas Distribution Networks) and NZS 7901:2014 (Safety Management System for Public Safety). This is a living document where we record and assess every hazard, threat and mode of failure that we have identified on our networks with our current controls.

If the risk is above an “Intermediate” level, we modify the controls to reduce it to a lower level. If the risk is “Intermediate” we conduct an ALARP (“as low as reasonably practical”) assessment. If the risk is lower than “Intermediate”, we accept the current controls.

We have identified ten hazards that directly relate to safety, divided into 65 generic assessed risks. These hazards are detailed below.

Table 3.1: Identified Safety Hazards.

HAZARDS	DETAILS
Gas release	Gas is released into the atmosphere (this is associated with the loss of structural integrity)
Gas release in an insufficient ventilated location	Gas is released and reaches a critical concentration that can cause asphyxiation or have the potential to be ignited if an energy source is present
Fire and explosion	Gas is released, reaches a critical concentration and additional energy source is present (i.e. ignition source)
Electricity	People are harmed due to the usage of electrical equipment (e.g. Scada cabinet) or the presence of stray currents on metallic pipes
Pneumatic energy	The gas conveyed through the network is pressurised
Third party interference	Assets are damaged or operated by an unauthorised person, including vandalism
Environmental conditions and natural disasters	Assets are damaged during earthquakes, volcanic eruptions, lahars, thunderstorms, flooding, tsunami or landslides
Heights	People are harmed by falling, slipping or tripping on the asset
Hazardous material	Assets are made of hazardous material
Confined spaces	Assets are located in a confined space

We have carried a detailed ALARP assessment of all the risks identified “Medium” or above. The assessment did not identify the requirement for additional controls. We are, however, building a programme of works to review the controls that we deemed as critical.

A process map describing this process is available in Appendix 6.

The various mitigation activities identified are then added to the relevant programme of work (operational or capital).

Managing Delivery Risks: Capacity and Growth Assessment, Security of Supply Assessment

In order to determine whether or not we need to expand the network we first carry out a capacity assessment that examines the pattern of peak demands on each pressure system, the ability of the District Regulation Stations (DRS – supply points on the network) to meet those peak demands, and the ability of the pipework to convey sufficient gas to meet the peaks. Over the network as a whole, we are finding that the increasing use of gas-fired hot water installations is tending to drive peak demands higher. Our analysis of the demand profiles gives us a first indication of the degree of risk we face on each network should we experience peak demands that exceed our forecasts or, alternatively, if we should experience reduced supply (due, for example, to a DRS component failure.)

In addition to peak demand growth, we analyse areas where general volume growth is occurring, as follows:

- Infill growth in areas where our mains already front the consumer
- Customer-specific volume growth, where consumers are using more gas (e.g. due to, the installation of additional appliances)
- External growth, where new consumers are driving the need to extend our network and build new mains (e.g. new subdivisions)

In the long-term, a certain degree of uncertainty applies to residential growth forecasts. We work with councils, developers and our account managers to identify areas of growth on our footprint.

We are improving our forecasts for commercial and industrial demand by working more closely with these consumers, but we generally do not have more than one year's visibility of their future activities and needs. To provide additional headroom for unexpected growth, we generally build our networks in industrial and commercial parks with higher pressure and capacity specifications on a case-by-case basis.

A process map describing this process is available in Appendix 7.

Infill and volume growth are provided for by setting a minimum network pressure that would maintain enough headroom to accommodate the identified growth at times of peak demand. To help ensure we achieve this goal we have stress-tested our growth assumptions using scenarios from our growth review and have evenly spread the expected volume increase across the relevant parts of the network.

Footprint growth is mainly driven by new subdivision activity. We have had strong demand for new builds on our footprint as the concept of gas as a fuel has become better received. Our relationship with developers, reinforced by local councils' plans, has helped us to understand where new subdivision activity is likely to occur on our footprint over the next three to five years.

For more information about our growth forecasts, refer to Section 6.

Since 2015, we have been implementing our security of supply policy across our networks. The policy aims to practically reduce the risk of large outages. This could happen where a DRS is not able to maintain supply into a pressure system, or when the flow through a pipe needs to be interrupted, for a leak repair for example. Specifically, it mentions the requirement for monitoring on critical stations, the establishment of trunk mains linking stations together, and the use of by-pass when the number of customers likely to be affected by an outage is greater than five. We have identified the projects required to align our current network configuration with the policy and we are assessing the impact.

Managing Reliability Risk: Reliability Assessment

We aim to operate a sound network. The reliability assessment is a process that helps us understand the risk of our assets failing. We use the data collected through our electronic field data system (SPA) and our Failure Mode and Effect Analysis (FMEA) for each of our asset classes. This helps us evaluate the risk that an asset will fail in the future.

A process map describing this process is available in Appendix 8.

This risk-based approach helped us identifying one specific reliability issue with polyethylene networks constructed before 1985 that have previously been squeezed-off, and installed in specific years. We have started a replacement programme on those assets that have experienced higher leakage rates than others, and we continue to gather more data on pipe and soil condition as we go.

We have not identified any other significant asset class with a specific reliability issue, apart from obsolescence.

3.2.4 PLANNING

In the previous section, we described how activities are identified and delivery dates determined. This is how we begin building our gas works plan and our maintenance programme, including identifying the right justification for each project to be executed.

3.2.4.1 GAS WORKS PLAN – CAPITAL AND PROJECT WORKS PROGRAMME

As part of our annual planning process, we review the improvement register and identify the works planned for that year.

Significant works are managed as discrete projects, as are programmes of work to address asset class works. For each project, we review the impact of the status quo on our short-term network KPIs and our long-term expenditure profiles. We endeavour to deliver a smooth work programme, without step changes in activity, provided we have the resources available to achieve this and our ability to efficiently deliver is maintained.

We also review the best way to deliver each project in terms of internal resourcing and cost efficiency in order to complete any investigations, project justifications or designs. Our contract structure allows us to use alternative contractors or seek competitive tenders for work if a project requires specialist work or the cost is expected to be more than $100,000.

Finally, we look at the delivery timeframe to plan the works during the year and revise our cost estimates.

3.2.4.2 GAS WORKS PLAN OPTIMISATION AND PRIOTISATION

Once we have established the work programme for the year, we rank projects in terms of risk reduction efficiency. From time to time, we find we cannot accommodate all the works identified for the year because of time, material, resources or budget constraints. The ranking helps us to focus on the most efficient projects.

The optimiser tool has been set up with weighting factors that are reflective of the company's risk profile acceptance and reinforced in the Asset Strategy, and our Asset Objectives. In general, the following order applies:

- Safety and compliance
- Financial performance
- Long-term asset performance (capacity and reliability)
- Customer value

3.2.4.3 PROJECTS APPROVAL

Before a project can be authorised for delivery (detailed design, physical execution) we produce a Gas Project Brief (GPB or Project Brief). The project brief is the last gate before expenditure is incurred – it describes how the project is aligned with our strategy and objectives, the scope of works and the option analysis and recommendations. The following are involved in the approval process:

- The asset strategy team, or commercial team as project sponsors
- The project delivery team to consider the option analysis and that the deliverability of the works has been properly considered
- The asset strategy manager (for critical projects) to ensure alignment with our asset management governance and structure
- The relevant holder of the financial authority needed for this project

If a project deviates from a standard design or practice, justification is needed at this step, before approval, in order to achieve process efficiency and maximise cost efficiency.

3.2.4.4 MAINTENANCE PROGRAMME

Our routine maintenance and inspection programme is planned at asset class and regional levels. Normal operational condition and maintenance activities are specified in the standards prepared by the operations team.

3.2.4.5 CUSTOMER-INITIATED WORKS AND MAINTENANCE

Residential requests come directly to the customer team from individuals or through their retailers. Most customer-initiated works have standard designs and procedures applied. Our customer contribution policy is used to identify the costs to be passed on to the consumer.

Other customer-initiated works (commercial, subdivision reticulation, etc.) go through the same process as capital works, with commercial oversight and justification provide by the Pricing and Revenue Manager.

3.2.4.6 RELOCATIONS

Pipe relocations or alterations are reactive activities driven by third-party requests (for example road realignments). They come directly to, and are dealt with, by the project delivery team. Most of these activities can have their costs recovered, as provided for by the Gas Act.

3.3 DELIVERY OF ASSET MANAGEMENT ACTIVITIES

Once a project or a programme is approved, the detailed design and delivery of activities begins and requires internal and external resources to ensure projects are delivered to the required quality, budget and deadline.

All of our field activities are delivered by external service providers, managed by Powerco's team as described below.

3.3.1 GAS WORKS PLAN DELIVERY

The Gas Works Plan, described in Section 3.2.4.1 above, comprises mostly capital works, with the addition of medium to high complexity, or one-off operational projects.

Project delivery nominates a project manager that will lead the project from the design phase to its completion. Approved projects must have a detailed design completed within the project delivery team, or using external consultants. While our preference is to use "ready to use" standard solutions, detailed individual designs are sometimes required.

Once this step is completed, the project manager coordinates the procurement and construction activities with the relevant service provider, using the appropriate standards and works instructions. The contract manager may be involved in this process when, for example, works are out for tender.

When physical works are completed and receipted by the project manager, we analyse performance against the relevant operational KPIs and assess the effectiveness of execution to assist future project planning.

The Operations Manager can also use the Maintenance and Minor Works stream to deliver low complexity, low cost capital works, in the same way we deliver corrective works.

3.3.2 CUSTOMER-INITIATED WORKS DELIVERY

Low-complexity customer-initiated works are managed through our Gas Hub customer team, supported by our regional Field Service Coordinators. The jobs are planned through our Customer Works Management System and issued to the service provider in charge of the region.

Higher-complexity jobs are considered as projects, and follow the same process as described in Section 3.4.1 above.

3.3.3 SCHEDULED AND CORRECTIVE MAINTENANCE PROGRAMME DELIVERY

Scheduled activities are automatically issued through our computerised maintenance management system. The Maintenance and Minor Works Manager, is responsible for ensuring that all activities are issued to, and carried out by, the service providers. Instructions are sent to, and results are collected by, the field staff electronically through the service provider application (SPA) provided via portable hand-held devices.

For corrective works or defects, field staff apply a “find and fix” delegated authority depending on the value and the safety risks of the defect. Other corrective works are reported back to the Maintenance and Minor Works Manager who will plan the defect’s resolution, with the assistance of the Defects and Minor Works Coordinators. Once a defect is fixed, the root cause is reported to us in SPA for further analysis.

The overall maintenance budget for the maintenance programme sits with Operations.

3.3.4 OTHER REACTIVE ACTIVITIES

For all other activities (including pipe location or stand-overs), operations is the entry point and these activities are managed through the use of standards and works instructions. If needed, issues can be escalated to project engineers or managers.

3.4 SUPPORTING FUNCTIONS AND ACTIVITIES

The Asset Management System representation (see Figure 2.4 in Section 2) described what is happening to the core functions. Non-network processes are part of the enabling functions.

3.4.1 PEOPLE AND ORGANISATION

The asset management activities can only be delivered by trained and competent people, with the right tools and systems to allow information collected on the field by our service providers to be used for analysis and decision-making.

3.4.1.1 ORGANISATIONAL COMPETENCIES AND TRAINING REQUIREMENTS

To ensure that people in particular roles have the required knowledge, experience and skills to perform those roles, each position description in Powerco details competency requirements. Powerco has an annual review and development process, during which managers work with employees to design personal development plans to help ensure that training is in place to continually improve competencies. Human Resources monitor these plans and ensure training and development is coordinated in the organisation.

Powerco’s competency certification policy governs the access, operation and type of work allowed by personnel on the network assets.

3.4.1.2 SYSTEMS TO RETAIN CORE ASSET KNOWLDEGE IN-HOUSE

Powerco’s systems and structures are designed to ensure we maintain an intimate knowledge of the configuration and condition of our assets. While our service providers are our eyes and ears on the network, key investment decisions are made by Powerco employees.

We also have a range of mechanisms to ensure the asset knowledge held by service providers is fed back to Powerco’s engineers, analysts and IS systems. For example, service providers have hand-held devices that can store information and photos of assets and these are fed into Powerco’s systems, such as the GIS.

3.4.2 ASSET INFORMATION

Best practice asset management requires the collection of relevant, quality and timely information that covers the whole of the lifecycles of assets. Powerco currently has a comprehensive suite of core systems that cover all asset management data requirements (see Section 5.8.1).

We are currently replacing our core Enterprise Resource Planning and Asset Management system with SAP. With a go-live date of November 2018, we expect a large amount of change in the way we can collect, retrieve and analyse the data to enable better decision-making.

In preparation for this exercise, we have refined our data requirements to achieve our objectives, and we are in the process of implementing a data governance framework.

The following sections provide an overview of the systems and information management data that support our asset management, as well as:

- The processes used to identify asset management data requirements
- The systems and controls that ensure the quality and accuracy of information
- Limitations in the availability or completeness of data
- Initiatives to improve the quality of data
- The governance framework we are aspiring to

3.4.2.1 PROCESSES TO IDENTIFY ASSET MANAGEMENT DATA REQUIREMENTS

Asset management data can be split into different categories:

- Asset, customer and operational data, including customer demand, asset characteristics, maintenance and inspection results, and pressure information
- Projects and transactional data, including project status, committed expenditure, and historical costs
- Asset, Customer and Operational Data

In 2017, we adopted a holistic approach to identifying our asset and operational data requirements. Based on our asset management objectives, we defined five outcomes aligned with our asset management objectives (described in Section 2) as shown in the table below.

Table 3.1: Relationships between Asset Management Outcomes and Objectives.

OUTCOME	ASSET MANAGEMENT OBJECTIVES
Meeting our legislative requirements	Safety, Partnership
Understanding network utilisation	Delivery
Knowing when to maintain our assets	Reliability, Efficiency
Estimating renewal dates	Reliability, Efficiency
Earning revenue from the assets	Partnership

We derived a list of data requirements for each of our asset classes from these 5 outcomes, where the data is originated from, and where it is currently captured. With the SAP implementation project, we supplemented this list with the information required to allow the system to operate.

These requirements vary from asset class to asset class. In general, they comprise:

- Asset type, size and material
- Location
- Installation date
- Operating pressure
- Maximum Allowable Operating Pressure (MAOP)
- Maintenance data
- Projects and transactional data

With the implementation of SAP, we have decided to implement “best practice” data structure, functionality and reporting. We will review the requirements after go-live.

3.4.2.2 LIMITATIONS OF DATA AND INITIATIVES TO IMPROVE DATA

Obtaining high-quality information to support asset management can be expensive. Powerco is continually assessing where new investments should be made to improve the data available.

There are a few areas where we are aware that the data is limited:

- **Age**: some asset installation dates have been assumed. The previous paper record system did not have all of this information available when it was entered in our GIS system. We used approximations, considering the installation date of the nearest available asset.
- **Location**: the location records can be based on physical features of the environment when the asset was installed (i.e. boundary lines, kerb, lamp post, etc.). When these features move, the location records can be altered. Tracer wires and local operative field knowledge allows us to accurately locate the pipe when needed and correct the data.
- **Material**: Not all older drawings recorded pipe material. We can assume the material by looking at the installation date and surrounding assets (e.g. fittings). On a case by case basis, we expose the pipes to verify our records.

We are continually working to improve the asset data we maintain in our enterprise systems. To date, we have done all we can to input available historical construction information into our GIS, as well as continuing to update any new information we receive from field work on existing assets.

3.4.2.3 DATA GOVERNANCE FRAMEWORK

Our Asset Management Policy clearly states our requirement to “Manag[e] data as an asset, via structured development over time”. To implement this policy, we are designing a data governance framework that will address:

- Ownership
- Custodianship
- Quality measurement and improvement
- Change management

We are leveraging our SAP implementation and resources to create and embed this framework and processes that will ultimately drive data improvement initiatives and projects.

3.4.3 RISK MANAGEMENT

Managing risk is a primary activity in Powerco. We have already explained how we apply risk management in our planning process. Here, we will explain the principles and processes we use to define the risk levels.

Powerco has a dedicated Risk and Assurance Team that helps ensure risk management is well applied throughout the hierarchy of the organisation. The Risk and Assurance Team is the custodian of our Risk and Compliance Management Policy, and Risk Management Framework, which are derived from the principles included in ISO 31000.

The objectives of the risk management policy are:

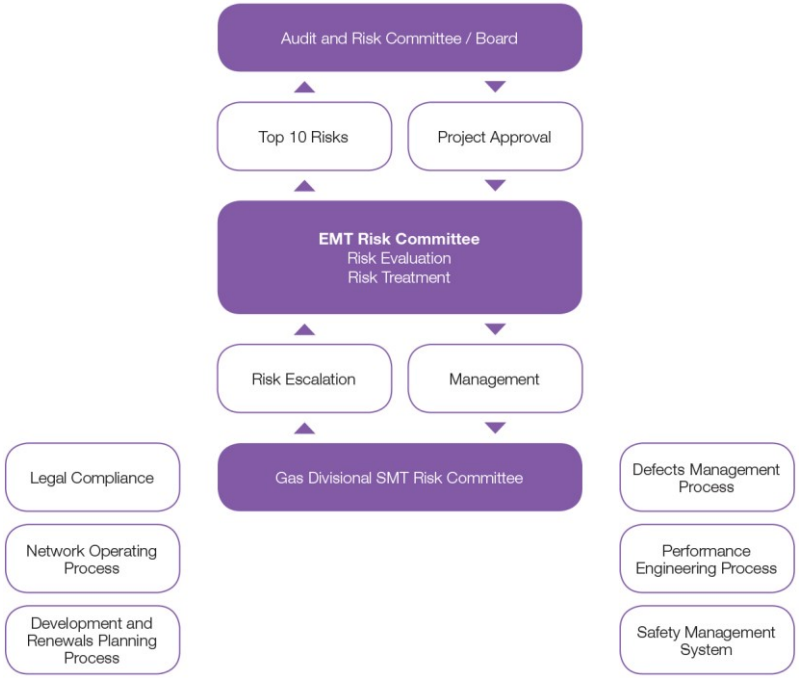
- To ensure adequate consideration is given to the balance of risk and reward in achieving Powerco's business objectives
- To enrich strategic, tactical and operational decision-making through the use of risk management practices
- To enable Powerco to better assess the risk relating to business opportunities in order to meet the stakeholders' expectations
- To embed the use of risk assessments into all decision-making

In the rest of the organisation, managers ensure their staff are aware of their risk management obligations through training and assessment. The Executive Management Team (EMT) reviews risk and audit issues on a monthly basis to determine possible changes to the strategic and operational environment. The Board has a governance role in risk policy development and has an Audit and Risk Committee that oversees risk management practices in Powerco. A high-level view of the structure is described in Figure 3.7.

A key aspect of risk management within the organisation is the recognition that:

- Risk management processes should be consistent across any risk management activity. We always follow the process explained in Section 3.4.3.1.
- Non-withstanding the risk escalation process, risk evaluation scales can be different depending on the domain they are being used for. The gas business uses a 10x7 risk matrix, derived from Powerco's 5x5 corporate matrix to reflect the more granular nature of our day-to-day operations.

Figure 3.7: Powerco's Risk Management Process.



3.4.3.1 RISK MANAGEMENT PROCESS

The risk management process consists in four steps:

- **Risk Identification** is undertaken throughout the business takes place via workshops. Newly identified risks are escalated when they become known.
- **Risk Analysis** involves developing an understanding of the causes and sources of the risk, their likelihood and consequences, and existing controls.
- **Risk Evaluation** and ranking is based on the results of the analysis phase. Based on our risk scales and risk appetite, decisions are made on risks that need treatment and the priority of the treatment action. Some risks may not require any further action if the current controls are deemed to be adequate.
- **Risk Treatment** options are deliberated by management and depend on severity and ranking. The options to treat risk include risk avoidance, reduction of likelihood or consequence, elimination, acceptance, or risk-sharing.

3.4.3.2 RISK REGISTERS, MONITORING AND REPORTING

Powerco uses different risk registers to record and monitor risks. Relevant corporate risks are recorded in a corporate risk register stored in Methodware, Powerco's risk management system.

The corporate risk register is regularly maintained, updated and audited, as well as being reviewed by senior management. Powerco's top risks are escalated to senior management and the Board at least quarterly.

Powerco's risk-monitoring process aims to achieve the following:

- Ensure that controls are effective and efficient
- Identify improvement opportunities from risk assessment and incidents
- Detect and facilitate responses to changes in the internal and external environments
- Identify emerging risks in a timely manner

3.4.3.3 KEY RISK AREAS

We have identified the following key risk areas from the above process.

Health, Safety and Environment – Due to the nature of operations, the health and safety of employees and third parties is recognised as a key risk to Powerco. Powerco is continually working to improve Health and Safety practices and is guided by a number of acts and industry standards, including the Health and Safety in Employment Act, NZS 7901, relative to public safety, and AS/NZS 4645 relative to network management. Appendix 5 lists the health, safety and environment risks as assessed to AS/NZS4645.

The risks of harm to the public and personnel are monitored through regular network inspections. During construction projects, these risks are monitored through a compliance process. For livening, a set of pre-commissioning tests and procedures is specified, and before commissioning may proceed, the tests need to be satisfactory.

Other factors affecting reliability and public safety, such as vehicle collisions, trees, and vandalism need to be monitored and controlled.

Operational security controls include maintenance and inspection regimes, operational procedures, including systems of locks, keys and alarms, and controlled access of personnel to network sites. High-risk sites are fenced to maintain public safety.

Natural disasters are considered a major risk given that Powerco serves a wide area of the North Island, including areas that are exposed to seismic and volcanic activity and land-slips. The review of pipeline design results from this risk profile.

The tactical response to these risks largely centres on contingency planning, with the Emergency Management Plan being the main guiding document. Powerco also maintains alliances with Civil Defence and regional councils, and takes part in Civil Defence exercises.

To better identify and manage environmental risks and associated impacts, Powerco has joined the Landcare Research managed Enviro-Mark NZ programme. This programme sets out independently audited steps for the development of an Environmental Management System to ISO 14001:2004 standards.

Powerco is actively working towards certification in this programme and has achieved gold level certification for the activities on the gas network, and platinum level for the Corporate Office in New Plymouth, and the regional offices in Tauranga and Wellington.

Regulatory, Legal and Compliance – Powerco must comply with a variety of legal and regulatory obligations, including the Gas Act, the Health and Safety in Employment Act, the Commerce Act and its obligations as a lifeline utility. Risks are identified relating to compliance with local government requirements, legislation, regulatory requirements and contractual obligations with service providers. These risks are managed by embedding compliance requirements into operational and maintenance processes. A network compliance programme is also in place to ensure that existing standards are fully compliant. All changes to standards are communicated to contractors and other employees through awareness and training programmes.

Asset Reliability (or asset integrity) – Because gas is inherently hazardous, measures need to be in place to prevent hazards from affecting the general public.

Many risk management techniques that help to achieve this goal are ingrained within the industry. Nevertheless, formal steps need to be in place to ensure that these risks are managed. Managing these risks is a central part of the Asset Lifecycle activities, which drive the update of maintenance standards and schedules and the asset inspection process.

From a standards perspective, our focus is on the development of new standards covering the design/construct, materials purchasing and asset disposal stages of the asset lifecycles.

Gas Delivery (operational continuity) – These relate to all risks that can cause a disruption of gas supply, including inadequate network capacity.

Adherence to network security criteria is a core part of the asset management process because it affects the network's ability to serve customers without outages. Particular design philosophies, defined in the security of supply policy, are applied to help ensure quality of supply criteria are met.

Live gas techniques can often be applied, so that outages are not needed.

Commercial – One of the key outcomes of the risk management programme is to ensure the financial sustainability of the business. Risk management in this area relates to the financial consequences of asset failure.

3.4.3.4 HIGH-IMPACT/LOW-PROBABILITY EVENTS (HILP)

Powerco's networks are designed to be resilient to low-probability, high-consequence events that are outside our control, such as upstream supply failure, natural disasters and critical equipment failures. The nature of our assets and the way we run our business limits the consequences should these events occur. These HILP events include:

- Loss of supply due to gas transmission pipeline failure
- Undetected gas escape into a building leading to fire or explosion
- Long-term loss of service due to a natural disaster (e.g. earthquake, volcanic activity or landslide).

In order to eliminate, isolate or reduce the impact of these events, we use the follow mitigations:

- **Geographically Diverse:** The geographically diverse nature of our networks increases the likelihood that natural disasters will affect only part of our networks.
- **Multiple Supply Points:** Our networks are designed with multiple supply points where practicable, to mitigate the impact of a supply point failure.
- **Standard Equipment:** Our networks utilise standard equipment where possible. Consequently, assets can be reallocated/rebuilt easily in the event of failure.
- **Earthquake Resilient:** Powerco's facilities have been progressively upgraded to ensure resilience to earthquakes and meet all related statutory requirements.
- **Scalable Response:** Powerco's scale and stable long-term capital programmes mean that it can scale and redeploy resources quickly to attend to localised, or regional natural disasters.
- **Proven Response Plans:** Powerco has thoroughly tested response plans and demonstrated capability to manage significant natural events and widespread damage to its networks.
- **Business Continuity Plans:** We have structured business continuity plans in place to ensure that the corporate aspects of our business are resilient and will support on-going operation of our networks.

3.4.3.5 CONTIGENCY PLANNING

As part of our risk mitigation strategies, we have different contingency plans in place that are regularly tested by exercises. The main strategies relevant to the gas activities are the Gas Event Management Standard, the Emergency Response Plan, the Business Continuity Plan and the Pandemic Contingency Plan.

Gas Event Management Standard – This standard describes the mechanisms, roles and responsibilities relative to fault and incident management. This includes reported smell of gas, supply interruption at a customer, or third-party damage on the network. It also prescribes the escalation criteria to trigger the Emergency Response Plan.

Emergency Response Plan – Our Emergency Response Plan (ERP) is regularly reviewed and continues to develop to improve its performance in emergency situations. The ERP is designed for emergencies, i.e. events that fall outside the ordinary operation of the network that routinely deals with incidents. The plan is supported by training, tests, equipment and support structures to ensure that the proper response can be delivered.

Business Continuity Plan – Powerco's Business Continuity Plan (BCP) is designed to manage and support a number of scenarios, including system failure, major infrastructure failure or loss of the network operations centre. The BCP is supported by a Business Impact Analysis, which is conducted on a regular basis by business units to identify and prioritise critical infrastructure, assets and processes for recovery action. The BCP is rehearsed by the appropriate teams on a regular basis and Powerco's IT infrastructure has been designed with built-in resilience to ensure continuity of operations.

Pandemic Contingency Plans – Powerco has developed a plan to prepare and respond to an influenza pandemic occurring in New Zealand. This plan provides a basis for establishing a common understanding of the specific roles, responsibilities, requirements and activities to be undertaken in response to the pandemic. It ensures the operational integrity and continuity of the electricity and gas networks to the fullest possible extent, even though this may be at a reduced level, both during and after the pandemic. Due to the unpredictable nature of pandemics, the plan also considers the wider implications for the company beyond "keeping the lights on and gas fires burning". These implications for Powerco therefore go beyond its obligations as a lifeline utility provider.

3.5 OUTSOURCED ACTIVITIES

The gas business outsources a number of activities. Field operations are outsourced to external contractors, and other asset management activities, such as the operation of a 24/7 emergency and fault call centre and despatch facility, information system management, or as-building recording within our GIS system are managed internally.

We have strong and tested controls in place to manage our external contractors. As part of the continuous improvement programme and our Asset Management Journey, we will formalise and strengthen our controls with internal parties in the upcoming planning period.

3.5.1 FIELD OPERATIONS MANAGEMENT

Powerco's field service operations are fully outsourced. Field service personnel undertake the network maintenance and capital work, gather asset condition information and provide rapid response to faults and incidents. The field service

personnel are the main operational eyes and ears that assist the development of our asset management processes.

Field service operations are managed by Powerco's Gas Operations Team.

In 2012, we changed our service provision contract model from a mix of alliance and network management models to a field service agreement for three reasons:

- To help regain knowledge of our assets, their performance and their condition
- To reduce costs by internalising the planning, design, project management and administrative functions and move to a rates-based contract
- To ensure that competitive pressure is maintained on the overall costs of operational and project delivery

3.5.1.1 DAY-TO-DAY MANAGEMENT

Five regional Field Service Coordinator (FSC) roles exist in the service delivery team. These roles are physically based with our service providers in the regions of their responsibility and ensure an operational link between Powerco and the service providers. The FSCs schedule the activities on the network, check work completion and quality and ensure day-to-day co-ordination with customers, local councils and regional authorities.

To increase efficiency in the field and ensure information is shared accurately and in a timely manner, service providers have direct access to these two key systems:

- The Service Provider Application (SPA), which delivers the scheduled maintenance programme on hand-held devices and allows reporting of both completed works and defects found on the network
- The Customer Works Management System (CWMS), which facilitates access to and completion of customer connection projects. This platform is also used by service providers to share resource availability information and schedule works

The implementation of SAP will replace these systems and provide more flexibility and capability to our service providers.

Maintenance activities are supervised by a Maintenance and Minor Works Manager, who is responsible for organising and delivering the scheduled maintenance programme, overseeing corrective maintenance activities and defining the guidelines that allow the services providers to immediately fix defects when discovered. This "find and fix" philosophy is closely monitored to ensure the intended efficiency is achieved by reducing travel and administrative costs.

3.5.1.2 FIELD WORKS INSTRUCTIONS

Works instructions are agreed with service providers. These instructions prescribe how Powerco expects works to be carried out on the networks and helps determine the rates used in our contracts.

3.5.1.3 PERFORMANCE MONITORING AND AUDITING

A Contracts Manager supervises the Field Service Coordinators, ensures that the contract is executed in accordance with the specification and monitors the service providers' Key Performance Indicators (KPIs). The Contracts Manager is also responsible for validating and benchmarking the various contractual rates and selecting other contractors when required.

A field audit programme is in place to help ensure service providers apply the works instructions. The audit programme provides additional assurance that our service providers construct and maintain the gas network to Powerco's required standards of quality and safety. The programme is implemented through independent auditors, who report all nonconformances. All nonconformances and required corrective actions are managed through Powerco's Operations team, which oversees the service provider or providers. The service providers' KPIs are strongly linked to the proper application of the work instructions.

3.5.2 RESPONSE TO FAULTS AND EMERGENCIES

Powerco's Electricity Network Operation Control (NOC) dispatch team has the capability to manage emergency calls and dispatch the on-call emergency teams. Service providers are contractually required to respond to emergencies in less than 60 minutes in all areas, except CBDs, which have 30-minute targets. This internal target has been defined to ensure we achieve our regulatory requirements and manage the risk to the public.

The NOC dispatch team applies the Emergency Management Plan and has a duty to escalate events according to the plan.

3.5.3 INFORMATION SYSTEMS MANAGEMENT

The Information Services group holds the overall responsibility for the good operation, maintenance and upgrade of information systems used for asset management.

During this planning period, we will formalise and review availability and service level requirements for these systems, taking into account the alignment with the data governance framework discussed earlier.

3.5.4 AS-BUILD INFORMATION RECORDING

An asset data entry team exists in the Information Services group. They process the entry of as-build and asset information into Powerco's Geographical Information System (GIS).

We monitor the as-build processing time and targets on a monthly basis based on historical data. In this space too, we will be working towards formalising our requirements by agreeing on a service level agreement.

3.6 EXPENDITURE GOVERNANCE

The processes, functions and activities described in sections 3.1 to 3.5 above have an additional level of governance in the form of financial approval of all capital and operational expenditure. This ensures our objectives are met and we make prudent and efficient decisions.

3.6.1 EXPENDITURE PLANNING

Powerco plans expenditure at different levels as shown in table 3.2 below. At each step, the level of details and expenditure certainty increases.

Table 3.2: Expenditure Planning.

PLAN	HORIZON	PURPOSE	REVIEW FREQUENCY	RESPONSIBLE	RELATED DOCUMENTATION
Corporate Strategy	Up to 10 years	Setting high-level objectives and target for the company	Yearly	CEO, Executive, with Board endorsement	Vision, Mission, Values, Corporate objectives, Asset Management Policy
Asset Manage-ment Plan	10 years	Describes our planned projects and expenditure forecasts, taking into account asset management objectives, and deliverability	Full review every 2 to 3 years, yearly update in between	Gas Asset Strategy Manager, with Executives and Board endorsement	Asset Management Strategy, Asset Management Plan
Business Plan	5 years	Sets out the tactical initiatives and expenditure forecasts to improve the delivery of the Asset Management Plans	Yearly	CEO, Executive, with Board endorsement	Business Units Tactical plans
Annual Budget	1 year	Enables the delivery of the yearly work programme	Yearly	Business unit managers, with Executive and Board endorsement	Gas Works Plan, Maintenance plan, Non-network plan(s)
Project plan	As required	Individual budget	Monthly	Project Manager with DFA holder	Annual budget, Gas Works Plan, Non-network plans, project brief

This structure allows to have clear accountability at each stage of the planning process.

3.6.2 NON-NETWORK EXPENDITURE GOVERNANCE

Non-network expenditure consists in:

- Operational costs as classified in the Business Support and System Operations and Network Support
- Capital costs such as facilities and fleet, or Information Systems

The planning horizons, and responsible management levels described in the table above is similar. However the responsibilities for the governance and delivery of non-network expenditure is scattered across the business.

3.6.2.1 NON-NETWORK OPERATIONAL EXPENDITURE

These costs are managed directly by business unit owners. It takes into account high level metrics such as number of employees, feasibility projects identified in the Gas Works Plan, or rates paid by Powerco to councils for having assets in their areas.

It is the responsibility of the Executive manager in charge of the budget holder to ensure the expenditure is in-line with the company's objective and plans.

3.6.2.2 NON-NETWORK CAPITAL EXPENDITURE

In 2017, we dismantled our Project Management Office and transferred the management of non-network projects to the different business units.

Expenditure planning related to Information Systems are managed through the Technology advisory group, who manages the projects pipeline and portfolio. Delivery is managed by project managers embedded in the information system group.

Facilities and fleet expenditure planning and project management is part of the Finance team.

3.6.3 DELEGATED FINANCIAL AUTHORITY

The Delegated Financial Authorities (DFA) are allocated in accordance with our corporate governance charter and group delegations of authority. They set out the limits to which managers are allowed to authorise expenditure. The DFA policy also sets out the process for approving payments, and the cross-checks built into this. Application of the DFA policy is externally audited on an annual basis.

Applicable limits reflect whether it is Capex or Opex, network or non-network, and budgeted or reactive. The typical DFAs for our Gas Division are as listed in table 3.3 below. The limits are set out within our sub delegation standard which is a controlled document approved by the CEO.

Table 3.3: Delegated Financial Authorities.

LEVEL	CAPEX LIMIT	OPEX LIMIT
Board	>$2m	>$2m
CEO	$2m	$2m
General Manager Gas	$500k	$500k
Senior Managers	$150k	$50k
Project Managers	$25k	$25k

3.7 ASSET MANAGEMENT COMMUNICATION PROCESS

Powerco has an established process for communicating the AMP and associated documents to relevant parties – this includes disclosing the current and historical AMPs on our website. Key aspects of this process are as follows:

- **Responsibility:** The GM Gas has responsibility for communication to the Gas Division. Powerco's Corporate Affairs Manager is responsible for distributing the plan to external stakeholders.
- **Powerco staff access to information:** All key strategy, policy, planning and standards documentation is managed via a central standards system, which provides central access to staff. Formal controls for document updates are in place.
- **Contractor access to information:** Aspects of Powerco's standards and policy framework that are relevant to the field are made available to our contractors through the Operations team. With our primary contractors, we use a collaborative online platform, the Gas Contractor Portal, to communicate work instructions, standards, contractual arrangements, key performance indicators, and annual works plans forecasts with our services providers.
- **Stakeholder meetings:** Powerco has structured programmes to communicate its policies and plans to stakeholders and other interested parties. Key stakeholder groups include councils, retailers and major consumers and the Commerce Commission.
- **Internal audit:** Powerco has a programme of internal audit, which tests internal compliance with, and understanding of, processes.

Powerco also actively involves its staff and stakeholders in its asset management processes. Identification of asset condition and potential works requirements are a particular focus. A range of processes also support staff involvement in the refinement of our asset management processes over time.

All key Asset Management documentation (Policy, Strategy and Asset Management Plan) are part of Powerco's document control process, managed by the Risk and Assurance team. They are stored in, and made available to Powerco's staff through, the Business Management System (BMS). When loaded into the BMS, a document owner and a review date are set. The BMS features a version control system and is set up to send a reminder to the document owner for review.

3.8 ASSET MANAGEMENT REPORTING AND IMPROVEMENT

3.8.1 MONTHLY KPI REPORTING

Monthly reports against a balanced scorecard of critical performance measures are actively reviewed by management teams, and reported to the Executive, CEO and Board. The scorecard covers financial, customer, process and network-related issues. Monthly KPIs include lost-time injuries, financial performance against budget, network project completion and connection rates. The status of key projects and performance against budget (including explanations of any variations) are reported monthly. Longer-term performance measures are reported annually as part of our information disclosure.

Additional detailed reporting is used in the business to ensure the status and effectiveness of key processes are understood. Monthly reports on the work programme and projects status are prepared and monitored.

3.8.2 YEARLY REVIEW OF THE ASSET MANAGEMENT SYSTEM

Every year, we review the KPIs coming out of the reporting process and analyse them as part of the asset and customer analysis function.

Standards and works instructions are also reviewed on a regular basis to improve delivery, safety and efficiency.

Asset management is not a static process. As circumstances affecting our assets change (e.g. standards, knowledge, etc.) the expenditure interventions required in a given year are likely to change. The process of annual review, and the governance arrangements that we have in place, are designed to ensure that the AMP remains relevant in a dynamic environment.

In addition to the processes that are part of our day-to-day activities, we have an asset management improvement programme that includes a wide range of initiatives to achieve asset management excellence, operational excellence and sustainable growth. We call these improvement initiatives. These are the result of the different audit or review mechanisms we use in our asset management system, such as:

- Annual management review of the asset management system performance
- Peer reviews of the system with the Electricity business
- NZS 7901 audit in regards to the Public Safety Management System

3.8.3 IMPROVEMENT INITIATIVES

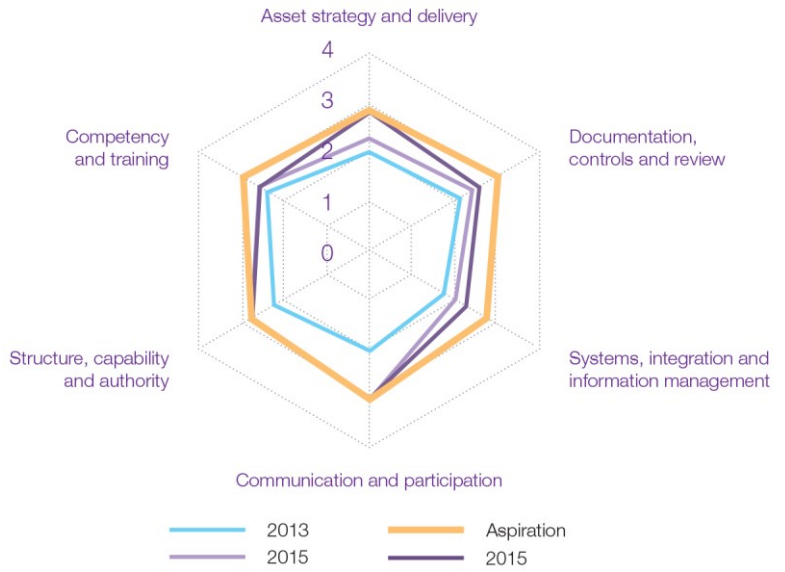
3.8.3.1 ASSET MANAGEMENT MATURITY

It is our goal to align our asset management practices with a recognised, international standard. In April 2018, we engaged an independent assessor to carry out a review against Asset Management standard ISO 55000.

We have used the results of this review to inform our 2018 Asset Management Maturity self-assessment

Figure 3.8 shows the overall scores split by category. More details of the assessment can be found in Appendix 2.

Figure 3.8: AMMAT Self-Assessment Score.



3.8.3.2 TACTICAL INITIATIVES

Every year, we review our progress against strategies, long-term plans, and changes in our operating environment. We build a list of tactical initiatives that support the achievement of our strategies, plans and goals.

For the next two years, the focus will be on obtaining ISO 55000 certification, and successfully transitioning to our new Enterprise Resource Planning System.

3.8.3.3 CONTINUOUS IMPROVEMENT

We achieve continuous improvement by regularly tracking our progress against targets and KPI's. This includes asset management objectives and targets, and other measurable targets, such as data completeness, or customer complaints. Any deviation in targets or KPI's lead to an investigation, and corrective actions are taken where required.

Powerco does not have a central group that tracks all actions or issues that have arisen from continuous improvement initiatives. It is up to management to identify and track actions and their completion.

4 ASSET OBJECTIVES AND SERVICE LEVELS

4.1 INTRODUCTION

At Powerco, we are committed to delivering exceptional service to our customers by providing a reliable and secure gas distribution service at a price that represents outstanding value for money. We strive to do this in the safest way possible, not only for our customers, but also for the public, contractors and staff that live, work and play around our networks. This allows us to actively support New Zealand's energy future. Delivering on these aspirations is at the heart of what we do and is set out in our corporate Vision, Mission, and Values. We care deeply about these. This section describes how our corporate Vision and Mission translates into our asset management objectives and it establishes measures by which we can judge our success.

The objectives set out in this section are used throughout our whole-of-life asset management practices, are embedded within our asset management policy and strategies, and utilised within our plans. We have framed these to reflect our commitment to further improving service levels to our customers in an environment of growing concerns in public safety, energy and infrastructure costs, and consistent and steady growth in connections and gas delivery.

4.2 FROM CORPORATE MISSION TO ASSET MANAGEMENT

Our asset management objectives translate directly from our corporate Vision and Mission. Our Mission states:

"In profitable **partnership** with our stakeholders we are powering the future of New Zealand through the **delivery** of **safe, reliable** and **efficient** energy."

The five core components of our mission statement are Safety, Delivery, Reliability, Efficiency and Partnership. Hence, the asset management objectives that establish the basis for our Gas Asset Strategy are:

- **Safety** – Keep the public, our staff and our contractors safe from harm.
- **Delivery** – Ensure our networks have the capacity and resilience to meet the quality of supply expected by our customers.
- **Reliability** – Safe containment of gas and operational reliability to deliver gas to our customers at the right quality.
- **Efficiency** – Continuously seek out and deliver cost efficiencies.
- **Partnership** – Be a responsible partner for our customers and our other stakeholders.

These objectives are forward-facing and supported by targets that will enable us to measure our progress towards delivering exceptional service to our customers. The targets associated with each measure over the AMP period are summarised in the table in Section 4.8, at the end of this section.

The targets are realistic and achievable and to ensure this we have considered what is possible and appropriate in our industry. Where practical, we compare our targets with other New Zealand distributors through publicly available information, or through our involvement with the Gas Association of New Zealand. All targets are set and committed to by the Gas Leadership Team and reported to the Board on a monthly or yearly basis.

A more specific outline of the process we have used to develop these is included in Section 3.2.1 (Governance – Setting targets). At the time of writing, we do not believe that the expenditure forecasts will materially affect performance against the targets described in this section.

4.3 SAFETY

Powerco is committed to preventing harm to the public, our staff, and contractors. For this reason we are committed to maintaining and improving the standard of safety management applied to our network.

4.3.1 PUBLIC SAFETY

Public safety objective:
Keep all assets and operations safe.

Powerco's assets are integrated within our communities. Accordingly, we place the highest possible priority on minimising the safety risks our assets and their operation may pose to the public. We also ensure that we construct, operate, and maintain our network assets in compliance with all applicable safety legislation.

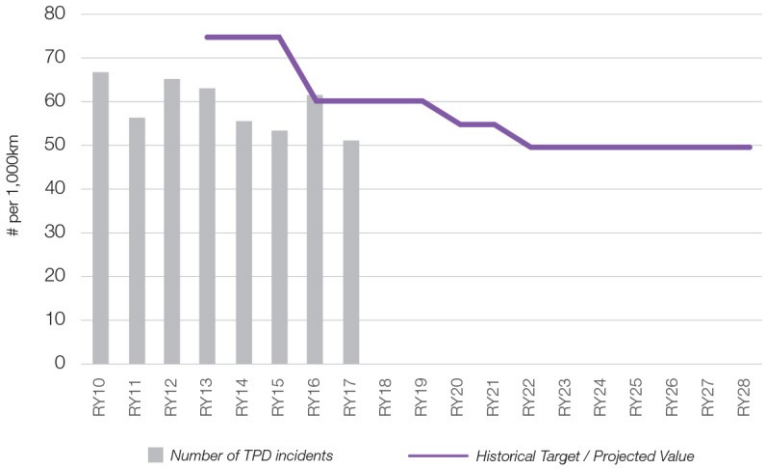
Our commitment to public safety was demonstrated during 2013 by certifying our Public Safety Management System (PSMS). Our PSMS defines the specific steps we take to ensure our assets are designed to be safe and to remain safe during operation.

4.3.1.1 THIRD PARTY DAMAGE

Third-party damage (TPD) to our networks represents one of the greatest public safety risks and impacts on supply reliability. While most TPD incidents are relatively benign, they have the potential to cause significant damage and injury, and the number of TPD incidents is an important public safety measure.

Despite high levels of activity in road corridors, we have managed to reduce the rate of incidents on the network. This is a continuous effort and we have to maintain a strong focus on education and assistance. Encouraging contractors to use new technology, such hydrovac excavation, is an example of what we do to manage this risk. We expect the level of TPD to steadily reduce, as shown on Figure 4.1.

Figure 4.1: Historical and Projected Third Party Damage.

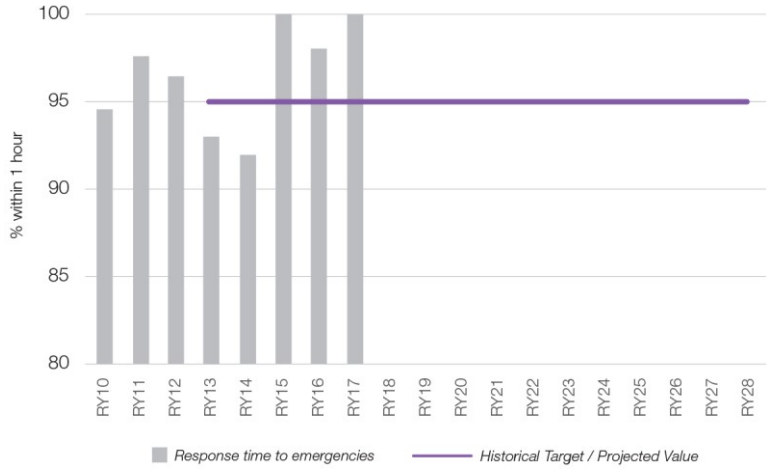


4.3.1.2 RESPONSE TIME TO EMERGENCY AND EMERGENCY CALLS

Response time to an emergency is a quality standard set out in the Commerce Commission's Price-Quality path. It is an important measure of our ability to control incidents and prevent escalating consequences. Our response to emergencies relies on our system for receiving emergency calls from the public. Accordingly, we set targets and measure our time to receive emergency calls.

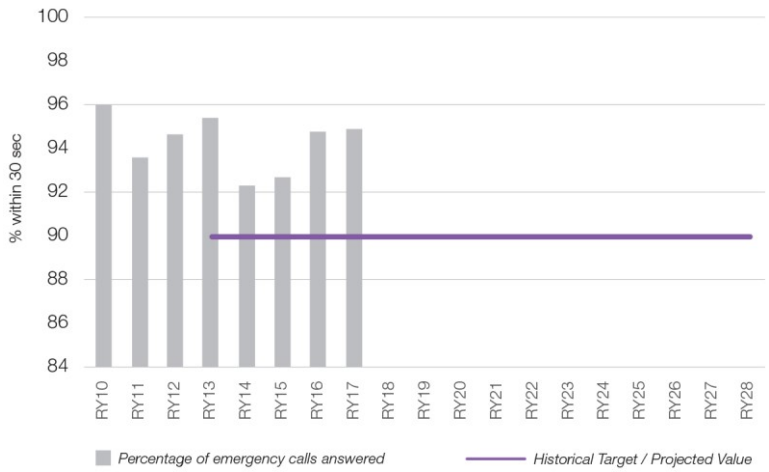
The requirements in our Price Quality standard for response to emergencies are 80% under 60 minutes, and 100% under 180 minutes. For simplicity, our internal target is responding to 95% of emergencies within one hour as shown on Figure 4.2. However this higher target ensures we meet the requirements in our Price Quality standard.

Figure 4.2: Historical and Projected Response Time to Emergencies.



Our response time to emergency calls has constantly been meeting our expectations as shown on Figure 4.3 below.

Figure 4.3: Historical and Projected Emergency Calls Answered Within 30 Seconds.



4.3.1.3 SUMMARY OF PUBLIC SAFETY AND TARGETS

Together, Third Party Damage rate, response time to emergency and response time to emergency calls form our Public Safety measures and targets. They are summarised in the table below.

Table 4.1: Public Safety Measures and Targets.

TARGET	MEASURE	VALUE	BASIS FOR THE VALUE	WHEN
Minimise risk caused by third-party damage	Number of TPD incidents	<50 p.a. per 1,000km	Historical value, amended with our risk modelling work	By RY22
Response to emergencies	Time to respond (to site) when an emergency is reported	>95% within 1 hour[2]	Chosen to exceed the requirements under the Price-Quality standard	Throughout the period
Receive emergency calls efficiently	Percentage of emergency calls answered within 30 seconds	>90%	Historical value	Throughout the period

4.3.2 PEOPLE SAFETY

People Safety Objective:
Keep our staff and contractors free from harm.

The objective, expressed above, is reinforced by our safety strap-line of:

Think Safe, Work Safe, Home Safe.

Powerco is committed to ensuring the highest levels of safety for our staff and contractors who are responsible for the construction and maintenance of the gas network. We strive to continually improve our leadership, systems, and culture in this area.

The core philosophy behind our health and safety approach is to provide committed safety leadership that supports the development of a safety-first culture across our workforce. This safety culture is strongly supported by the understanding that good health and safety outcomes are the result of integrating and embedding safety practices within the business as part of our overall operational excellence philosophy as illustrated in Figure 4.4: Powerco Safety Strategy Model.

[2] Price-Quality standard is 80% <60 minutes and 100% within 3 hours.

Figure 4.4: Powerco Safety Strategy Model

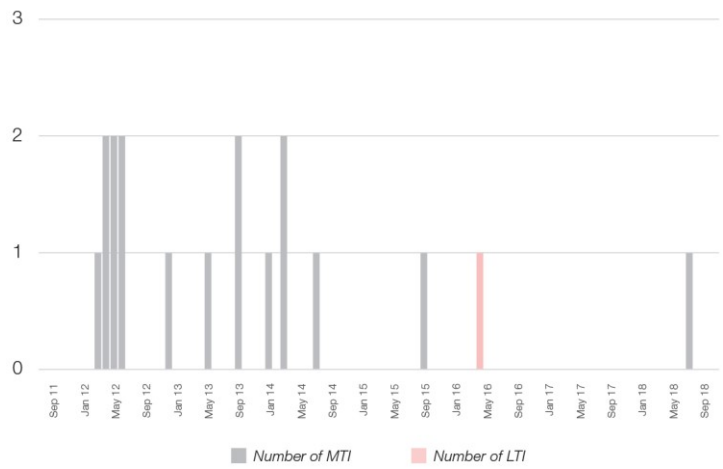
Consistent with our approach to public safety, we have one target to summarise the outcome from all these actions: 0 Lost Time Injury. Our objective is to take all necessary steps to prevent harm to those who work on or around our networks, with a particular focus on events that could cause serious injuries. We strongly believe that we must strive to prevent injuries to our employees and so any other target is not acceptable.

Table 4.2: People Safety Measure and Target.

TARGET	MEASURE	VALUE	BASIS FOR THE VALUE	WHEN
No harm to our staff or contractors	Lost time injury	0	Company commitment to Safety	Throughout the period

Powerco has put a strong focus on safety in the last few years. The commitment by our staff and service providers in providing a safe workplace safe is demonstrated by a consistently low number of medical treatment and lost-time injury rates across our business, as illustrated in the figure below.

Figure 4.5: Medical Treatment Injuries and Lost Time Injuries (Gas Network Activities).



4.4 DELIVERY

Powerco strives to deliver a high-quality gas supply to its customers by ensuring that the capacity of the network allows for foreseeable demand to be met and that our networks are designed and constructed to be inherently resilient.

We have chosen to evaluate our networks against two criteria: network capacity and network resilience. Together, these measures (along with those described under the reliability objectives) demonstrate our performance in delivering assets that are both effective and efficient.

4.4.1 NETWORK CAPACITY

Capacity Objective:
Ensure our networks have the capacity levels to meet our customers' needs.

To meet this objective, we must proactively manage the capacity of the network. This means understanding both the current system demand and capacity of the network under both normal and extreme conditions, and having robust forecasts of how demand will increase over our planning horizon.

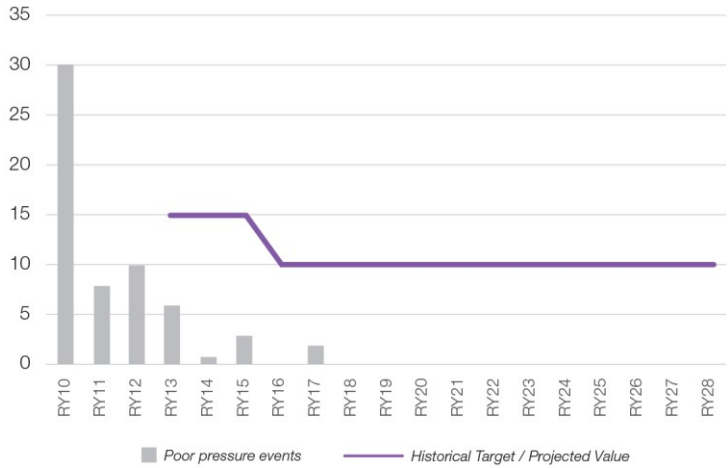
The challenge is to ensure we have sufficient capacity to allow for uncertainty in demand, and allowing sufficient capacity to cater for new demand while taking into account the timeframes and constraints that impact on the development of new capacity when it's required. By way of example, our new residential customers typically want new gas connections to be available within two weeks of their commitment. To reliably meet this timeframe, the network capacity must have sufficient headroom to enable the forecast rates of connection to be accommodated.

A good indicator of whether the current capacity is appropriate for the level of customer demand is the pressure at representative points on the network. Accordingly, to assess our performance against this objective we monitor the pressure and loads at specific locations on our network and regularly validate the capacity performance against the objective criteria. Network systems that are identified as being near capacity each have a capacity management plan that is being progressively implemented, and, accordingly, we expect the risk of customers being affected by low-pressure to reduce. The associated measures for these issues are the number of poor pressure events observed on a network and the number of applications for new connections that we have to defer due to insufficient capacity.

Poor pressure events have drastically diminished since we implemented our pressure monitoring programme across the network .This is shown on Figure 4.6 below. With the completion of programme of works across our network, and more particularly within Wellington CBD, we expect the number of poor pressure events to remain under 10 per annum throughout the planning period. We are not looking at reducing this target further as this would result in a significant increase in expenditure.

Since we implemented the metric in 2013, we have not recorded any residential application for a new connection which had been deferred due to insufficient capacity.

Figure 4.6: Historical and Projected Poor Pressure Events.



The targets for each of these measures are summarised below.

Table 4.3: Network Capacity Measures and Targets

TARGET	MEASURE	VALUE	BASIS FOR THE VALUE	WHEN
Adequate network capacity	Poor pressure events under normal network configuration	<10 p.a.	Historical value informed by customers feedback	Throughout the period
Network capacity for growth	Residential applications deferred due to insufficient system capacity	0	Company commitment to customer service	Throughout the period

4.4.2 NETWORK RESILIENCE

Resilience Objective:
Ensure our networks have the optimal level of inherent resilience.

Powerco strives to optimise supply security through the incorporation of system resilience where it is economically efficient to do so. An example of system resilience is the design of network loops that maintain supply to customers in the event that a section of pipe is damaged.

With most of our networks primarily configured as a grid, a simple measure of system redundancy, such as N-1, is not a good measure of resilience. Instead, the level of resilience is modelled taking account of the nature of the network or sub-network, and the likelihood and consequence of a fault condition.

It is difficult to isolate the impact that sub-optimal design may have on resilience (the outcome of the level of resilience we have in our networks is generally covered by other metrics we have established within this AMP). Target measures for resilience specifically are therefore not proposed in this AMP, however we are looking to introduce a metric that reflects the number of pressure systems compliant with our security of supply strategy. Overall, resilience remains an important objective as it establishes an important principle for network design and operation.

4.5 RELIABILITY

Powerco strives to ensure that our gas network assets perform reliably. This means maintaining network integrity to ensure the safe containment of gas and the reliable delivery of gas to our customers. This is both expected by our customers and the wider public, and is a legislative requirement.

For electricity networks, SAIDI is the generally applied industry measure for delivery reliability. Measuring a gas networks' reliability is more difficult for a number of reasons. Gas networks, being underground, are inherently more secure but when outages occur the time to reinstate can be much longer. The process of reinstatement requires the careful purging of the network and the re-commissioning of each customer. This means that a widespread outage can disrupt supply for several weeks. This leads to a SAIDI measure that is very volatile from year to year and makes any short-term trend analysis difficult and potentially misleading.

Therefore, Powerco does not use SAIDI as a short-term measure but the long-run average is useful to demonstrate the overall reliability performance. For Powerco, the historical performance translates to greater than 99.999% availability. This is a high-quality service which the vast majority of our customers indicate meets their expectation.

Within this context, reliability can be considered as consisting of two primary components:

- Network integrity
- Operational reliability

Together, these provide a more direct measure of our reliability performance across our networks and the level of service delivered to our customers.

4.5.1 NETWORK INTEGRITY

Integrity Objective:
Ensure we minimise uncontrolled gas releases.

The hazardous nature of natural gas means that gas containment is a critical aspect to maintaining a safe and reliable network and to minimise harm to the environment. Reliable containment is also necessary to ensure continuous gas delivery as rectifying gas escapes may involve shutting down a section of the network. Our reliability objective therefore requires that the number of uncontrolled gas releases is as low as reasonably practicable.

Uncontrolled gas releases can occur for a number of reasons including:

- Faulty components or installation
- Gradual penetration of PE pipe by rocks
- Corrosion (steel pipelines and components)
- Operational error while working on the network
- Incorrect pressures (resulting in pressure safety devices venting)
- Damage to the pipeline by third parties

To effectively measure our performance against this objective we need to track the overall number of gas-release incidents we have on the network. Gas releases may be reported by the public or through our inspection regime. Gas releases as a result of third-party damage (such as a contractor excavating in the road) are excluded

from this measure because such incidents do not relate to the condition of the asset and are already accounted for in our public safety objectives.

The number of leaks reported by the public can vary highly dependent on public's perception. For example, after the earthquakes, we encourage the public to report any smell of gas. As a result, we can observe variations year-on-year that are not necessarily a sign of rapid evolution of asset condition. It also explains why leakage detected by system survey has a different target.

Those two measures and their targets are shown in Figures 4.7 and 4.8 below, and summarised in Table 4.4. We are starting to consolidate our data and reporting mechanisms to consider a total leakage rate for future iterations of the AMP. In the meantime, we will maintain our historical targets.

Our goal is to gradually reduce leaks by replacing our assets that are the most at risk of leaking.

Figure 4.7: Historical and Projected Leaks Identified by the Public.

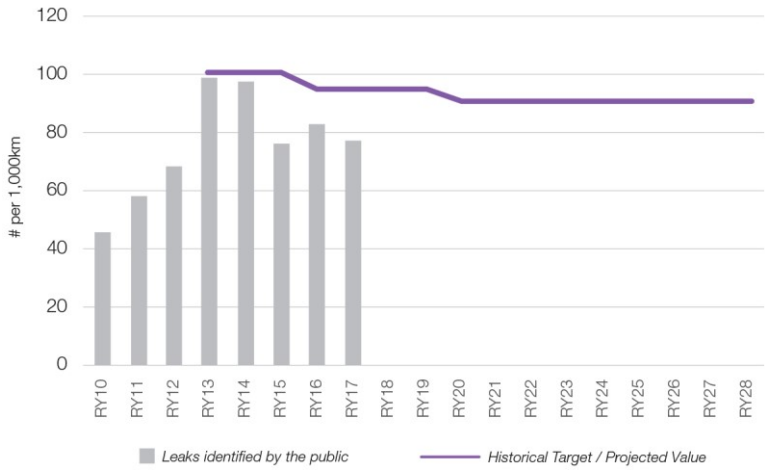


Figure 4.8: Historical and Projected Leaks Identified by Inspection.

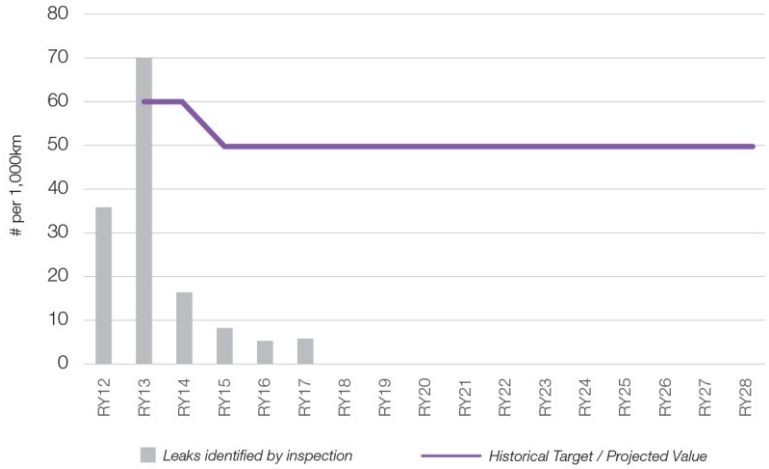


Table 4.4: Network Integrity Measures and Targets.

TARGET	MEASURE	VALUE	BASIS FOR THE VALUE	WHEN
Reliable network integrity	Total reported leaks (excluding third-party damage)	<90 per 1,000 km	Historical value, amended due to better reporting and potential asset condition	By RY21
Reliable network integrity	Number of leaks detected by routine inspection	<50 per 1,000 km	Historical value, amended due to better reporting and potential asset condition	Throughout the period

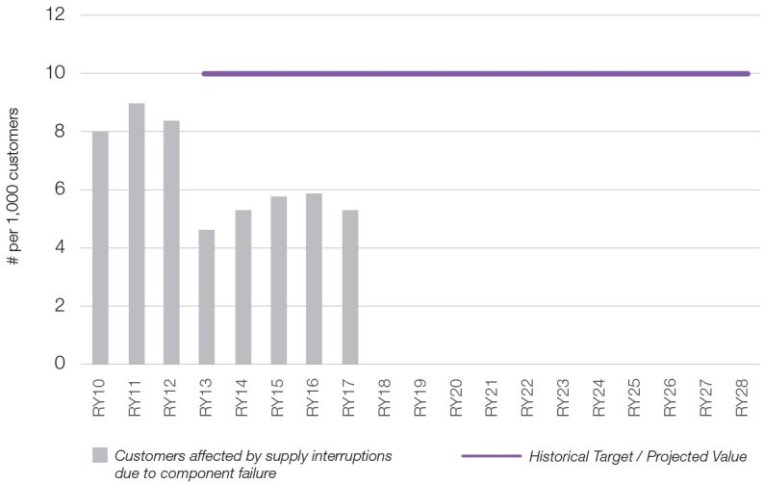
4.5.2 OPERATIONAL RELIABILITY

Operational Reliability Objective:
Operating reliably to deliver gas to our customers at the right quality.

Delivering a reliable gas supply means the gas network assets (e.g. regulators and valves) must operate reliably. To meet this objective and deliver cost-effective services requires optimal design, maintenance, and monitoring of the network assets.

Figure 4.9 below shows how this commitment has resulted in a very low number of customers having their supply interrupted due to a lack of investment on the network.

Figure 4.9: Historical and Projected Customers Interruptions due to Component Failure.



Operational reliability also means ensuring that the gas is delivered at the right quality. In New Zealand, all gas must meet the specification requirements and be odorised as set out in NZS 5442:2008 and NZS 5263:2003 respectively. No single party has full responsibility for gas quality. Gas composition is controlled and monitored by the gas-processing facilities and transmission companies. Gas odorant is added by the transmission companies and monitored by them at gate stations.

Gas network operators, such as Powerco, are responsible for ensuring that the quality of gas delivered to the network is maintained as it travels through the network, with no degradation due to contaminants such as water, dust or oil being added. We are responsible for monitoring gas odorant levels at representative points within the network and to report on non-compliant odour readings. Depending on the actual result of the test, we have an escalation process to communicate with the rest of the gas supply chain.

The strengthening of our processes with the rest of the Gas Industry allowed us to reduce the number of non-compliant reading as shown on Figure 4.10

Figure 4.10: Historical and Projected Non-Compliant Odour Test Reported.

These aspects result in the two measures described in Table 4.5 that we use to monitor our performance.

Table 4.5: Operational Reliability Measures and Targets.

TARGET	MEASURE	VALUE	BASIS FOR THE VALUE	WHEN
Reliable quality	Non-compliant odour tests reported	<10 per annum	Historical value	Throughout the period
Operational reliability	Customers affected by supply interruptions occur due to component failure	<10 per annum	Historical value	Throughout the period

4.6 EFFICIENCY

Powerco takes pride in being a cost-effective provider of gas network services. To ensure we continue to deliver value to our customers, improving the efficiency of our operations and investment decisions are a continual focus. Ultimately, we believe that maintaining a focus on improving cost efficiency is essential for the long-term and it's an outcome to which we are committed. This commitment will ensure we are

able to deliver services at a price that provides our customers with real value for money and support the on-going demand for natural gas as a cost-effective energy source.

As with any business there is no “silver bullet” to deliver cost efficiency. Costs are an inevitable part of the business we are in, with an essential service to be maintained and risks to be managed. Irrespective, improving cost efficiency requires a focus and a drive from Powerco and our service providers to improve all areas of our operations, to drive out waste, find improved ways of doing things, and to foster a culture of considered financial management.

Within this context, there are two key focus areas to guide the specific tactics we are seeking to deploy:

- Optimal investment
- Improving delivery efficiency

4.6.1 OPTIMAL INVESTMENT

Efficiency Objective:
Optimise the timing, the capacity, and the resilience of our investments.

Our networks provide an important service to the community. They must be designed and configured to minimise the risks of failure and to have adequate capacity to meet peak demand with adequate levels of security. However, equally important is the timing of our investments. Increases in capacity often require step investment to accommodate incremental load growth. Investing too early or installing too much capacity at one time means our customers face higher costs than are necessary.

Investing too late means that our customers will not receive the quality of service they would expect. Therefore, efficient investments, and the subsequent utilisation of our assets, require optimal timing and sequencing of these projects. This is strongly linked to the Network Capacity objective and associated strategies (discussed in Section 6.3).

Powerco’s asset management strategies and plans are developed with the objective of ensuring optimal investment timing that will drive efficient investments. Successfully delivering this objective will minimise unnecessary duplication or early replacement of assets and ultimately provide the lowest long-run cost of service.

Target measures are not proposed in this AMP but this objective is reflected in our development strategies and in the process we use to plan our investments. For more discussion on these aspects please refer to Section 6.5.

4.6.2 IMPROVING DELIVERY EFFICIENCY

Efficiency Objective:
Cost-effective provider of gas network services.

Powerco has a strong incentive to be highly efficient in our construction and maintenance practices. Within this context we are working through programmes to improve delivery efficiency. We have formalised our planning processes and project management framework, and our pursuit of ISO 55000 is challenging us to continuously review and improve our internal processes.

A key means of maintaining delivery efficiency is maintaining market-testing of maintenance and construction costs. Our field service contracts were renewed in 2018 through a formal tendering process. The arrangements we have in place also retain competitive price drivers through the contract period by means of prescribed competitive price adjustments and the provision to tender large or complex works.

By regularly going to market, we can ensure that the rates we obtain from our suppliers represent the current best-value supply. With the new contractual arrangements now in place, we achieved almost 90% of expenditure being market tested. We aim to maintain this level throughout the planning period as shown in Figure 4.11 and Table 4.6 below.

Figure 4.11: Historical and Projected Percentage of Market-Tested Expenditure.

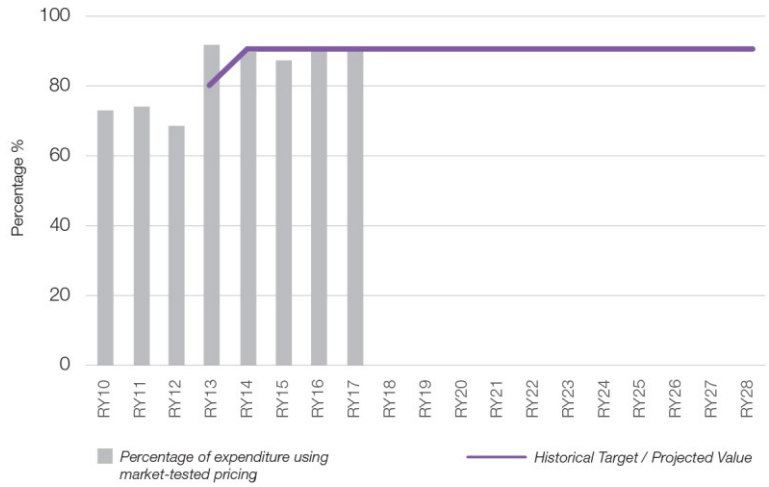


Table 4.6: Delivery Efficiency Measure and Target.

TARGET	MEASURE	VALUE	BASIS FOR THE VALUE	WHEN
Delivery efficiency	Percentage of expenditure using market-tested pricing	>90%	Company commitment to cost efficiency	Throughout the period

4.7 PARTNERSHIP

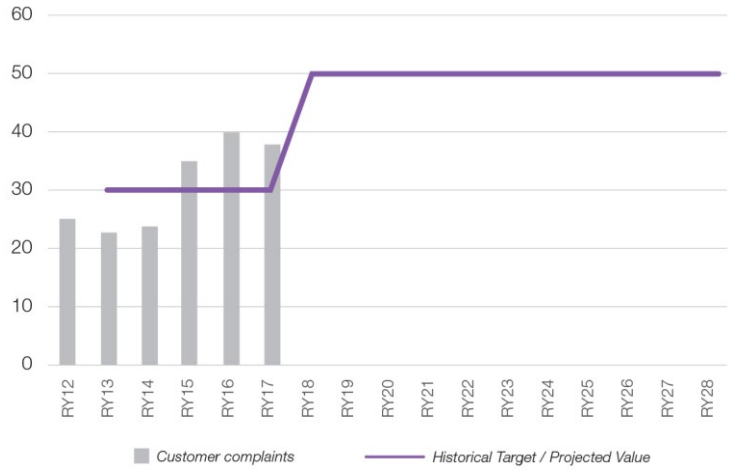
Powerco strives to partner with its stakeholders and be a good corporate citizen for New Zealand. Natural gas brings significant economic benefit to New Zealand and Powerco has a responsibility to ensure that the way we manage our networks and engage with our stakeholders and the wider public promotes the on-going economic supply of this resource to New Zealand's industry and homes. This is reflected through its commitment towards public safety as described earlier, but also through:

- Providing superior customer service through The Gas Hub
- Supporting New Zealand's economic development
- Being environmentally responsible
- Building partnerships with community organisations

We take customer service very seriously and actively seek to deliver superior service and outcomes. In recent years, we have increased the amount of channels customers, public, or stakeholders can use to easily communicate with us. This includes social media, instant chat on our website, or more regular engagement with our stakeholders.

As shown on Figure 4.12 below, we have seen the number of complaints increase. While disappointing to see this increase, it is not unexpected given the significantly increased number of connections putting pressure on our resources. We have revised our target up to reflect this increase. To maintain perspective on this new target, it represents ~1 complaint per week.

Figure 4.12: Historical and Projected Number of Customer Complaints.



We aim to maintain this commitment throughout the period, as described in Table 4.7.

Table 4.7: Partnership Measure and Target.

TARGET	MEASURE	VALUE	BASIS FOR THE VALUE	WHEN
Customer satisfaction	Customer complaints	<50 per annum	Increased activity	Throughout the period

4.7.1 IMPROVING ENVIRONMENTAL PERFORMANCE

Environmental Objective:
Improve our environmental management system.

Powerco is committed to achieving and maintaining a good environmental performance. To this end, in 2011 we embarked on a programme to become certified to ISO 14001. We currently have Platinum level Enviro-Mark accreditation. Enviro-Mark accreditation provides stepping stones to ISO 14001 certification. Our current target is to maintain Platinum accreditation.

Table 4.8: Environmental Measure and Target.

TARGET	MEASURE	VALUE	BASIS FOR THE VALUE	WHEN
Environmental management standard	Enviro-Mark accreditation level	Platinum	Company commitment to the Environment	Throughout the period

4.8 SUMMARY OF OBJECTIVES AND MEASURES

				ACTUALS								PROJECTED										
OBJECTIVE	TARGET	MEASURE	UNITS	RY10	RY11	RY12	RY13	RY14	RY15	RY16	RY17	RY18	RY19	RY20	RY21	RY22	RY23	RY24	RY25	RY26	RY27	RY28
Keep the public, our staff and contractors free from harm	Keep all network assets safety to the public	Number of TPD incidents	#p.a. per 1,000km	67.1	56.7	65.5	62.9	56.0	53.3	61.9	51.4	<60	<60	<55	<55	<50	<50	<50	<50	<50	<50	<50
		Response time to emergencies	% within 1 hour	94.6	97.6	96.4	93.0	92.0	100	98.1	100	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
		Percentage of emergency calls answered	% within 30 seconds	96.0	93.6	94.7	95.4	92.3	92.7	94.8	100	>90	>90	>90	>90	>90	>90	>90	>90	>90	>90	>90
	Keep our staff and contractors free from harm	Lost-time injury	#p.a.	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Capacity and resilience to meet the quality of supply expected by our customers	Adequate network capacity	Poor pressure events	#p.a.	30	8	10	6	1	3	0	2	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	Network capacity for growth	Residential applications deferred due to insufficient system capacity	#p.a.	N/A	N/A	N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ensure we minimise uncontrolled gas releases	Reliable network integrity	Leaks identified by the public	#p.a. per 1,000 km	45.6	57.6	68.4	97.7	97.0	76.3	82.6	76.8	<95	<95	<90	<90	<90	<90	<90	<90	<90	<90	<90
		Leaks identified by inspection	#p.a. per 1,000 km	N/A	N/A	36	70.1	16.7	8.5	5.6	5.9	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Operating reliably to deliver gas to our customers at the right quality	Operational reliability	Customers affected by supply interruptions due to component failure	#p.a. per 1,000 customers	8.13	8.91	8.36	4.60	5.23	5.77	5.85	5.27	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	Ensure gas is delivered reliably and at the right quality	Non-compliant odour test reported	#p.a.	13	21	11	19	5	2	0	0	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Cost-effective provider of gas network services	Maintain market –tested maintenance and construction costs	Percentage of expenditure using market-tested pricing	%	73	74	69	91	89	87	89	91	>90	>90	>90	>90	>90	>90	>90	>90	>90	>90	>90
Be a responsible partner for our customers and our other stakeholders	Environmental management standard	Enviro-Mark accreditation level	Enviro-Mark standard	N/A	N/A	Bronze	Silver	Gold	Gold	Platinum	Platinum	Platinum	Platinum	Platinum	Platinum	Platinum	Platinum	Platinum	Platinum	Platinum	Platinum	Platinum
	Customer satisfaction	Customer complaints	#p.a.	N/A	N/A	25	23	24	35	40	38	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50

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5 POWERCO'S ASSETS AND CUSTOMERS

5.1 INTRODUCTION

The first step of asset management is to understand our assets and where they are located. Equally important is understanding our customers, how much gas is used, and is likely to be used going forward.

In describing these characteristics, this section sets the scene for the environment within which we operate. We discuss our assets by category, including age profile and a summary of their condition. We also describe our SCADA systems, non-network assets and the type and number of consumers that drive our asset management decisions.

This section focuses on:

- Powerco gas customers,
- Geographical location of our network and assets, and
- Assets and their age profiles.

Unless specified otherwise, the figures presented in this Section represent "live" assets installed before 30/09/2017.

5.2 POWERCO'S GAS CUSTOMERS

Powerco supplies a range of gas customers, and the provision of a safe and reliable gas network distribution service is an integral part of Powerco's business.

Powerco targets and achieves a very high level of availability, throughout its networks to all customer classes. Network safety requirements dictate our approach to system condition and reliability. Consequently, different levels of quality are not offered to different customers, i.e. all customers receive the same level of service quality in terms of system reliability, system condition and integrity, and customer service. However, we maintain a classification for customers for capacity and commercial purposes.

5.2.1 CUSTOMER OVERVIEW

Powerco maintains three consumer type classifications consisting of eight network load groups. Six of these groups are defined by nominal capacity, in standard cubic meters per hour (scm/hr) and by annual consumption; and they are charged the standard published tariffs. The remaining two (G30 and G40) are considered non-standard customers that fall outside the definitions above because they are too large to fall into one of the categories and/or because individual pricing arrangements apply to them.

- **Residential/Small commercial consumers:** Consumers in the residential and small commercial category use around 30GJ per year with a maximum load of less than or equal to 10 scm/hr. These consumers are generally using individual hot water systems, whether instantaneous or storage cylinders, central heating systems or gas cooking equipment. This drives high demand peaks in the morning and evenings when people use these appliances at home. In comparison, consumption during the rest of the day is low. Our current network performance objectives have been set to accommodate these consumers anywhere on our network.
- **Commercial consumers**: Commercial consumers are diverse in nature and include restaurants, office buildings and small industries where the gas is used to cook, heat spaces or water at a large scale. They have a high load (between 10 and 200 scm/hr), but they mostly use their appliances during daytime. Some of these installations can be small industrial plants where gas is used in operational processes. Our current network performance objectives have been set to accommodate these consumers with a maximum load of up to 60 scm/hr without having to undertake reinforcement work. If their load is larger, we would work with the consumers to find the best way to connect them on the network at a competitive cost, with a balanced consumer contribution.
- **Industrial consumers**: These consumers usually use gas as part of their industrial processes. They are typically diary, food processing, laundry or sawmill plants. The loads tend to be large (more than 200 scm/hr) but relatively stable throughout the day. The network is generally not designed to cater for these consumers without reactive, targeted reinforcement work. We have key account managers who look after these consumers to anticipate their future needs that are then integrated into our long-term plans. We also operate at higher pressure in industrial parks to provide greater capacity, such as Bell Block in New Plymouth or Mihaere drive in Palmerston North.

The load group names and the criteria for allocating customers to these groups are described in Table 5.1.

Table 5.1: Typical Characteristics of Different Load Group Customers.

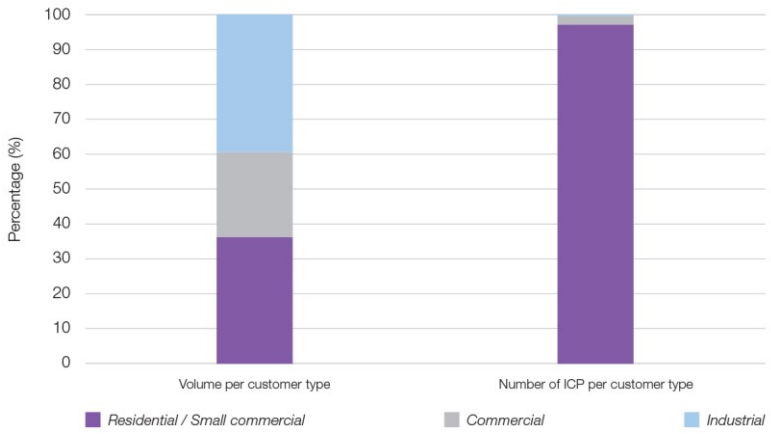
LOAD GROUP	TYPICAL CUSTOMERS
Residential	
G06	Low volume residential customers.
G11	Standard residential customers. Small commercial customers: Small cafes, fish and chip shops, pizza shops.
Residential / Small Commercial	
G12	Restaurants, small apartment / office buildings, small to mid-sized motels
G14	Hotels, large motels, shopping complexes, swimming pools
G16	Large office buildings, apartment blocks, commercial kitchens
G18	Commercial laundries, dry cleaners

LOAD GROUP	TYPICAL CUSTOMERS
Industrial	
G30	Individually priced customers who do not have a time of use (TOU) meter e.g. large commercial customers, large hotels
G40	Individually priced customers with a TOU meter, with an annual volume generally greater than 10TJ, such as Manufacturing and industrial businesses, such as dairy, meat or food processing plants.

5.2.2 LARGE CUSTOMERS THAT HAVE A SIGNIFICANT IMPACT ON NETWORK OPERATIONS OR ASSET MANAGEMENT PRIORITIES

As stated earlier, we operate all parts of the networks to the same level of availability regardless of customer group or volume. However, industrial customers in load group G40 have a significant potential to impact on network operations as their consumption is high. Figure 5.1 illustrates the correlation between the number of customers in each category and their annual volume.

Figure 5.1: Comparison of Network Customer Numbers with Gas Consumption (as of 30/09/2017).



The impact that each large customer has on our network depends on their load profile and operational requirements. For example, the available windows for maintenance are dictated by the special needs of each customer or network development based on demand forecasts.

Figure 5.2: Breakdown of Large Customers by Region.

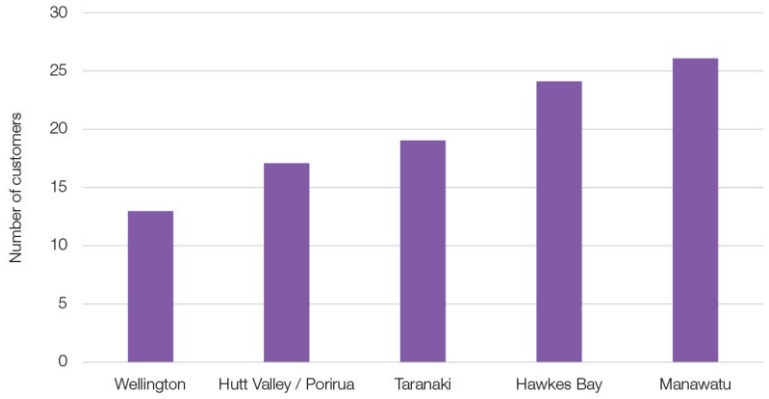
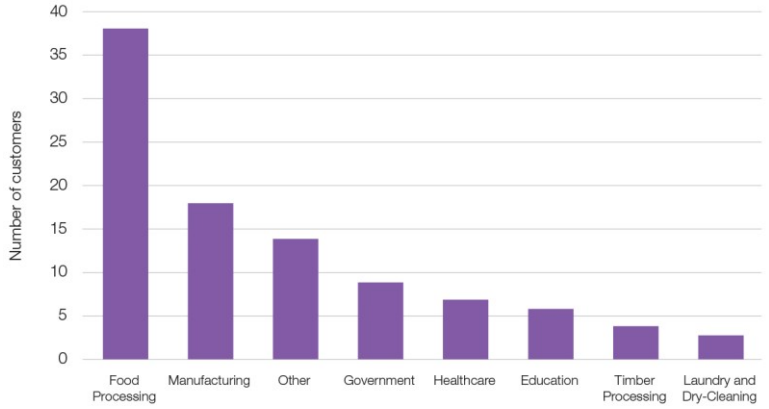


Figure 5.3: Breakdown of Large Customers by Sector.



5.3 NETWORK OVERVIEW

Powerco's gas network assets supply around 108,000 customers in the North Island and comprise 6,400km of pipelines and services. Our network is the largest in NZ in terms of number of customers connected and second largest in terms of length.

For regulatory disclosure purposes, our gas network is divided into two sub-networks referred to as the "Lower North Island" (Wellington, Hutt Valley and Porirua) and the "Central North Island" (Taranaki, Manawatu and Hawkes Bay). The Lower North Island is considered an urban area while Central North Island is

predominantly rural with few urban areas. Geographic, population and load characteristics differ between areas of Powerco's supply territory, necessitating an asset management approach that accounts for the differences while seeking to deliver an equal standard of supply to all consumers. Table 5.2 provides the key statistics for the two regions.

Table 5.2: Powerco's Gas Network Statistics.

ASSET TYPE	CENTRAL NETWORK	LOWER NETWORK	TOTAL
Main Pipes	2,098 km	1,867 km	3,965 km
Service Pipes	1,071 km	927 km	1,998 km
Line Valves	994	1,486	2,480
Stations	95	101	196
Special Crossings	203	142	345
Cathodic Protection Systems	37	15	52
SCADA Systems	35	41	76

5.4 NETWORK AREA DESCRIPTION

For asset management purposes, Powerco splits the Central and Lower sub-networks into five regions, as shown in Figure 5.4. The regions are:

- Wellington
- Hutt Valley and Porirua
- Taranaki
- Manawatu
- Hawkes Bay

The geographical and network asset characteristics of each region are described on the next page.

5.4.1 OUR CRITICAL NETWORKS

As the network consists of individual regions of various sizes and characteristics, different approaches and objectives are applied to reflect the diversity. We have identified six sub-regions as being critical due to representing 85% of the consumers connected to the network.

Figure 5.4: Powerco's Network Shown by Regions.

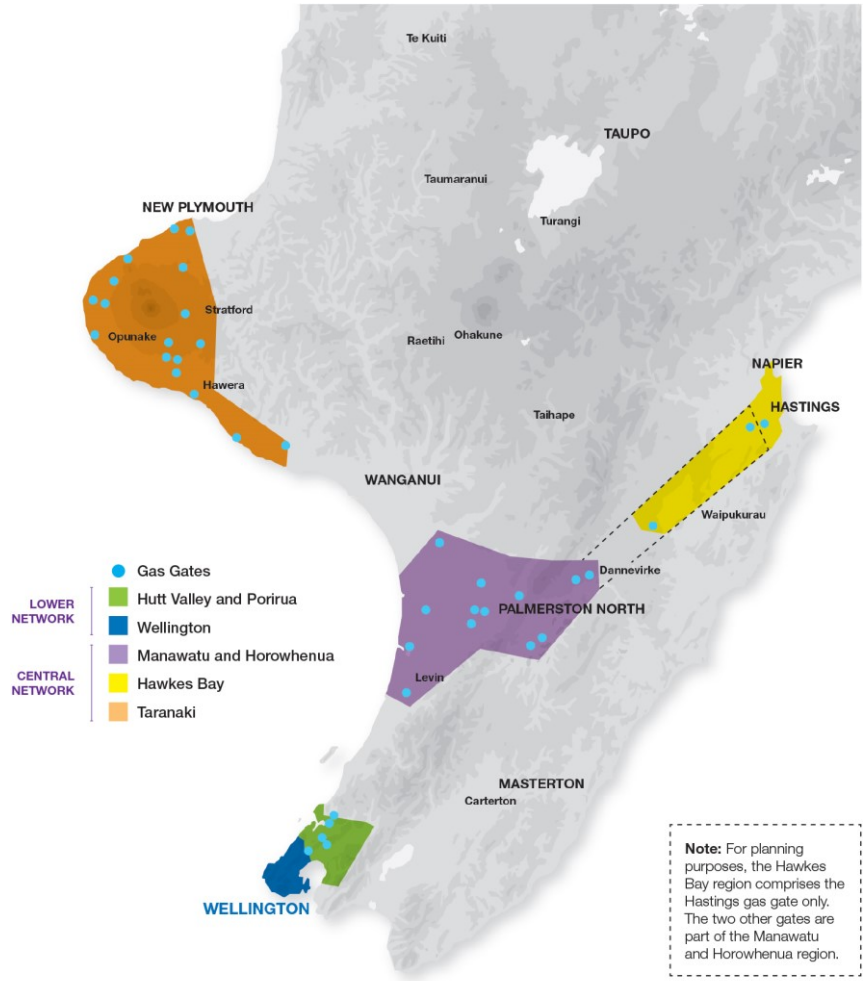


Table 5.3: Powerco's Critical Networks' Characteristics.

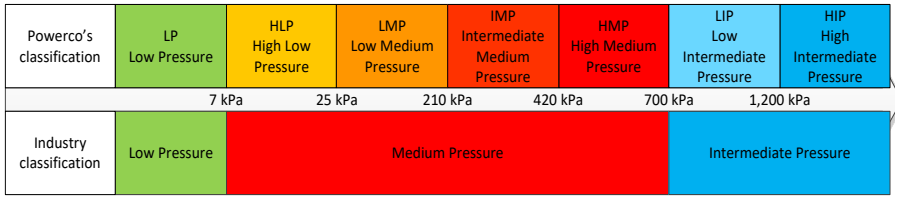
GEOGRAPHIC AREA	NETWORK (GAS GATE)	NUMBER OF CONSUMERS	PERCENTAGE OF ICPS
Wellington	Tawa	31,741	29%
Hutt Valley	Belmont	23,589	22%
Palmerston North	Palmerston North	15,197	14%
New Plymouth	New Plymouth	12,189	11%
Porirua	Waitangirua and Pautahanui	7,321	7%
Hastings and Napier	Hastings	5,024	5%
Other	Other	12,620	12%

5.4.2 PRESSURE REGIMES

Gas networks can operate at pressures ranging from 7 to 2,000kPa. With such a wide range, we have established pressure bands so that GMS owners have assurance of the pressure range supplying their assets. Our pressure systems are classified by industry standards of low, medium or intermediate pressure. These operating pressures are further broken down into seven categories. This split has been chosen to drive efficiency in the supply chain, as they align with equipment characteristics

The following figure shows Powerco's classifications.

Figure 5.5: Powerco's Pressure Classification.



5.5 NETWORK CONFIGURATION

The five network regions are connected to the gas transmission network by 37 gas gates. The maps in Appendix 9 display the network configuration broken down by gas gate. This includes:

- Main pipes distinguished by operating pressure
- ICPs that have a significant impact on network operations
- Gate stations and pressure regulation stations

5.5.1 WELLINGTON – AREA DESCRIPTION

The Wellington region is supplied from the Tawa Gate (that we own and operate), located north of the city. An Intermediate Pressure pipeline runs from the gate to the suburb of Kilbirnie. Wellington CBD has the largest number of commercial buildings on a single network; it is also the only network that still has a significant quantity of mains operating at low pressure.

Table 5.4: Wellington Region Networks.

NETWORK (GAS GATE)	DESCRIPTION AND MAJOR CUSTOMERS	NUMBER OF CONSUMERS (PER TYPE)	TOTAL NETWORK LENGTH (BY PRESSURE CLASS)	MAXIMUM GAS GATE LOAD	MAXIMUM GAS GATE ANNUAL VOLUME
Tawa A	City network supplying a wide range of consumers, from residential to large industrials	Res./sml. com.: 30,947 Commercial: 781 Industrial: 13	IP: 33.0km MP: 1,066.0km LP: 36.8km	524.5GJ/h	2,062.5TJ

5.5.2 HUTT VALLEY AND PORIRUA – AREA DESCRIPTION

Hutt Valley and Porirua region encompasses the three networks located north of Wellington city. They mainly supply residential consumers and we observe an important subdivision activity in this region.

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Table 5.5: Hutt Valley and Porirua Region Networks.

NETWORK (GAS GATE)	DESCRIPTION AND MAJOR CUSTOMERS	NUMBER OF CONSUMERS (PER TYPE)	TOTAL NETWORK LENGTH (BY PRESSURE CLASS)	MAXIMUM GAS GATE LOAD	MAXIMUM GAS GATE ANNUAL VOLUME
Belmont	City network supplying the whole Hutt Valley region, including the Industrial areas in Seaview	Res./sml. com.: 22,935 Commercial: 643 Industrial: 11	IP: 101.0km MP: 1,133.0km LP: 0.8km	338.4GJ/h	1,390.4TJ
Waitangirua & Pauathanui #1	City network supplying the Northern part of the Wellington region, including Tawa, Porirua and Paremata. Both gas gates are linked in Paremata	Res./sml. com. 7,120 Commercial: 193 Industrial: 4	IP: 34.3km MP: 386.2km LP: 0.1km	78.0GJ/h and 23.2GJ/h	339.9TJ
Pauatahanui #2	Rural network supplying residential consumers	Res./sml. com.: 4 Commercial: 0 Industrial: 0	IP: 0.0km MP: 0.3km LP: 0km	0.2GJ/h	0.5TJ

5.5.3 TARANAKI – AREA DESCRIPTION

We operate 17 networks in the Taranaki region. With the exception of New Plymouth, the majority of the networks in the Taranaki area are small, supplying less than 1,000 ICPs. They were generally built to supply large industrial consumers in the area – such as a dairy plant in Hawera. This allowed the reticulation of adjacent cities or townships. In some networks, the cornerstone industrial customer has shut down but we still ensure supply to the remaining customers.

Table 5.6: Taranaki Region Networks.

NETWORK (GAS GATE)	DESCRIPTION AND MAJOR CUSTOMERS	NUMBER OF CONSUMERS (PER TYPE)		TOTAL NETWORK LENGTH (BY PRESSURE CLASS)		MAXIMUM GAS GATE LOAD	MAXIMUM GAS GATE ANNUAL VOLUME
Eltham	Small township network supplying large industrial consumers: 2 dairy factories and 1 abattoir	Res./sml. com.: Commercial: Industrial:	326 6 3	IP: MP: LP:	1.6km 30.1km 0.0km	27.1GJ/h	144.0TJ
Hawera	A network feeding two towns and a large dairy site outside Hawera	Res./sml. com.: Commercial: Industrial:	2,811 40 2	IP: MP: LP:	3.8km 166.4km 0.1km	80.5GJ/h	281.6TJ
Inglewood	Town network supplying residential consumers	Res./sml. com.: Commercial: Industrial:	627 9 0	IP: MP: LP:	0.0km 44.7km 0.0km	7.2GJ/h	29.3TJ
Kaponga	Township network supplying residential consumers	Res./sml. com.: Commercial: Industrial:	3 1 1	IP: MP: LP:	0.0km 5.8km 0.0km	0.4GJ/h	1.4TJ
Kapuni	Very small township network supplying a dairy factory	Res./sml. com.: Commercial: Industrial:	55 1 0	IP: MP: LP:	0.4km 1.6km 0.0km	7.8GJ/h	19.6TJ
Manaia	Small township network supplying Okaiawa, Manaia and an industrial bakery	Res./sml. com.: Commercial: Industrial:	252 0 1	IP: MP: LP:	0.0km 29.3km 0.0km	3.3GJ/h	15.3TJ
Matapu	Rural network supplying farming installations	Res./sml. com.: Commercial: Industrial:	5 1 0	IP: MP: LP:	0.0km 1.9km 0.0km	0.1GJ/h	0.5TJ
New Plymouth	City network supplying a wide range of consumers, from residential to large industrials	Res./sml. com.: Commercial: Industrial:	11,948 233 8	IP: MP: LP:	18.5km 671.7km 0.9km	168.7GJ/h	818.7TJ
Oakura	Small township network supplying residential consumers	Res./sml. com.: Commercial: Industrial:	305 6 0	IP: MP: LP:	0.0km 20.4km 0.0km	3.2GJ/h	8.5TJ
Okato	Small township network supplying residential consumers	Res./sml. com.: Commercial: Industrial:	69 2 0	IP: MP: LP:	0.0km 8.5km 0.0km	0.7GJ/h	1.9TJ
Opunake	Small township network	Res./sml. com.: Commercial: Industrial:	189 10 0	IP: MP: LP:	0.0km 26.4km 0.0km	1.9GJ/h	7.2TJ
Patea	Small township network supplying a greenhouse	Res./sml. com.: Commercial: Industrial:	185 2 1	IP: MP: LP:	0.0km 18.2km 0.0km	5.3GJ/h	16.5TJ
Pungarehu 1	Very small township network built to supply a dairy plant now closed down	Res./sml Com.: recorded Commercial: recorded Industrial:	Not Not Not recorded	IP: MP: LP:	0.0km 0.2km 0.0km	0.0GJ/h	0.1TJ
Pungarehu 2	Rural network supplying a single ICP since the dairy plant shut down	Res./sml. com.: Commercial: Industrial:	14 1 0	IP: MP: LP:	0.0km 7.3km 0.0km	0.2GJ/h	0.4TJ
Stratford	Small town network supplying residential and small commercial consumers, as well as an abattoir in the outskirts of town	Res./sml. com.: Commercial: Industrial:	960 27 2	IP: MP: LP:	5.4km 89.9km 0.0km	14.0GJ/h	53.9TJ
Waitara	Small town network with high density residential area (subdivisions) supplying a major food processing plant and the township of Lepperton	Res./sml. com.: Commercial: Industrial:	1,184 36 1	IP: MP: LP:	5.8km 108.5km 0.0km	24.3GJ/h	86.9TJ
Waverley	Very small township network supplying a major sawmill	Res./sml. com.: Commercial: Industrial:	8 0 0	IP: MP: LP:	0.0km 6.0km 0.0km	0.1GJ/h	0.1TJ

5.5.4 MANAWATU AND HOROWHENUA – AREA DESCRIPTION

Our 13 networks in the Manawatu and Horowhenua regions are small. Only Palmerston North has a dense city network. Some of these networks were constructed to accommodate single large customers (e.g. Kairanga, Kakariki).

Table 5.7: Manawatu and Horowhenua Region Networks.

NETWORK (GAS GATE)	DESCRIPTION AND MAJOR CUSTOMERS	NUMBER OF CONSUMERS (PER TYPE)		TOTAL NETWORK LENGTH (BY PRESSURE CLASS)		MAXIMUM GAS GATE LOAD	MAXIMUM GAS GATE ANNUAL VOLUME
Ashhurst	A small-town network	Res./sml. com.: Commercial: Industrial:	227 5 0	IP: MP: LP:	0.0km 25.2km 0.0km	2.1GJ/h	8.3TJ
Dannevirke	A small-town network also feeding a sawmill and an abattoir	Res./sml. com.: Commercial: Industrial:	89 14 2	IP: MP: LP:	3.4km 17.6km 0.0km	8.6GJ/h	35.1TJ
Fielding	A network supplying two towns, agricultural processing and an Air Force Base.	Res./sml. com.: Commercial: Industrial:	1,684 61 6	IP: MP: LP:	0.0km 183.2km 0.0km	44.2GJ/h	189.5TJ
Foxton	A small-town network	Res./sml. com.: Commercial: Industrial:	269 9 1	IP: MP: LP:	1.4km 46.2km 0.1km	9.2GJ/h	31.5TJ
Kairanga	A rural network	Res./sml. com.: Commercial: Industrial:	3 0 1	IP: MP: LP:	0.0km 1.9km 0.0km	0.0GJ/h	0.1TJ
Kakariki	A rural network supplying a meat works.	Res./sml. com.: Commercial: Industrial:	0 1 1	IP: MP: LP:	0.0km 10.2km 0.0km	14.3GJ/h	73.9TJ
Levin	A town network with a number of large commercial and industrial consumers.	Res./sml. com.: Commercial: Industrial:	2,617 72 5	IP: MP: LP:	0.0km 228.0km 0.1km	56.9GJ/h	260.8TJ
Longburn	A small-town network also feeding a number of industrial consumers, a prison and an army base	Res./sml. com.: Commercial: Industrial:	298 6 6	IP: MP: LP:	9.2km 28.9km 0.0km	34.3GJ/h	217.3TJ
Mangatainoka	A rural network supplying a brewery	Res./sml. com.: Commercial: Industrial:	0 0 1	IP: MP: LP:	0.0km 1.2km 0.0km	0.3GJ/h	0.7TJ
Oroua Downs	A rural network supplying a large commercial nursery.	Res./sml. com.: Commercial: Industrial:	2 1 0	IP: MP: LP:	0.0km 3.7km 0.0km	8.2GJ/h	5.8TJ
Pahiatua	A small-town network also supplying a large dairy factory	Res./sml. com.: Commercial: Industrial:	86 7 0	IP: MP: LP:	0.0km 12.9km 0.0km	2.2GJ/h	7.9TJ
Palmerston North	City network supplying a wide range of consumers, from residential to large industrials	Res./sml. com.: Commercial: Industrial:	14,840 350 7	IP: MP: LP:	12.9km 838.7km 0.6km	208.6GJ/h	879.4TJ
Takapau	A rural network supplying a meat works.	Res./sml. com.: Commercial: Industrial:	0 0 0	IP: MP: LP:	4.0km 0.0km 0.0km	19.7GJ/h	79.9TJ

5.5.5 HAWKES BAY – AREA DESCRIPTION

In the Hawkes Bay region, we operate a single network in Hastings and Napier that is supplied by a single gas gate located in Hastings. The defining feature of this network is the relatively large number of major industrial customers. This network is the second largest in terms of gas conveyed and has the greatest average volume per ICP.

Table 5.8: Hawkes Bay Region Networks.

NETWORK (GAS GATE)	DESCRIPTION AND MAJOR CUSTOMERS	NUMBER OF CONSUMERS (PER TYPE)		TOTAL NETWORK LENGTH (BY PRESSURE CLASS)		MAXIMUM GAS GATE LOAD	MAXIMUM GAS GATE ANNUAL VOLUME
Hastings	Network supplying a large number of industrial and large commercial customers as well as the cities of Hastings and Napier.	Res./sml. com.: Commercial: Industrial:	4,684 319 21	IP: MP: LP:	42.6km 411.0km 8.5km	350.1GJ/h	1,716.6TJ

5.5.6 NETWORK CHANGES

In the period from 1 October 2017 to 30 September 2018, there were no significant changes on the network.

5.6 ASSET CLASSES

This section describes the different classes of assets that Powerco owns, operates and manages on the network. Additionally, it includes the asset life for the main asset classes as a whole and by region. These are shown below in Table 5.10.

When considering the information, the following points should be noted.

- Line and service valves are grouped together as both categories have the same maintenance and operation requirements.
- Unspecified line and service valves are listed separately as their quantity is significant (around 60% of the total number of assets). Valve materials can usually be inferred from the pipe material it is connected to.

Table 5.10: Description of Powerco's Gas Network Assets.

ASSET CLASS	ASSET TYPE	ASSET LIFE (IN YEARS)	DESCRIPTION
Pipes (Services and mains)	Steel Pipe	60 to 70	Steel pipes are mainly used on IP systems as their mechanical characteristics allow the transport of higher pressure gas. They are

ASSET CLASS	ASSET TYPE	ASSET LIFE (IN YEARS)	DESCRIPTION
			protected against corrosion using Cathodic Protection systems and wrapping.
	PE	50 to 60	PE is our preferred material for pipes as they are easier to assemble using electrofusion technics. PE pipes are pinchable, allowing quick isolation by squeezing off the pipe. Some of the PE used (especially installed before 1985) may have a shorter life. We are monitoring the issue to better understand if the mode of failure is actually age related.
	Galvanised steel	60 to 70	We have a few instances of galvanised steel on our networks. It is not a standard solution and only used on a case by case basis.
	Cast Iron	30	The majority of our Cast Iron has been replaced. We are investigating the remaining small quantity recorded in our GIS to check and validate the information.
Line and service valves	Steel	60 to 70	Steel valves are used to isolate a section of steel pipe. They also are protected against corrosion by the same systems as steel pipes.
	PE	50 to 60	PE valves can be easily fitted on PE pipes using electrofusion, offering a high level of reliability,
	Other material	50 to 60	This includes Cast Iron and Brass
	Unspecified material	N/A	These are the valves where the material has not been recorded properly in our systems. The majority of them should be made of PE. We are working towards increasing the accuracy of our data.
Stations	Pipework, regulators, etc.	30 to 35	Stations (DRS) are mostly above ground. They are made of several components to achieve pressure reduction. This includes regulators, filters, valves and facilities (building or enclosure). We also use underground DRS units called “cocons.” They are not prone to vehicle collision and limit the visual nuisance, especially in the urban environment.
Special crossings	Bridge, railways, major roads crossings	Same as pipeline	The life of the crossed facility (bridge, railway track) is taken into account when known
Cathodic Protection	Rectifiers	30 to 35	Rectifiers impress a current on the steel pipelines to protect them from corrosion. They must be used with an impressed anode.
	Impressed anodes	30 to 35	Impressed anodes are used in conjunction with a rectifier to ensure the current flows form the pipe.
	Sacrificial anodes	30 to 35	Sacrificial anodes are used to protect steel pipelines from corrosion. They do not require impressed current.
SCADA systems	Transducers, telecommunication systems, etc.	10 to 20	Our SCADA system monitors the pressure and/or flow at key stations on the network. The information is transmitted back to Powerco’s office via the cellular network. Alarms are set up to alert us of abnormal conditions.

Figure 5.6: Electrofusion Operation to Joint Two Pipes.

5.7 ASSET PROFILES

Powerco's gas network has been formed through the amalgamation of multiple networks. This means that the asset profile in each region differs from other regions. For this reason we describe the asset profile in each region separately.

The data shown in the tables below is sourced from our GIS system and is based on the best information we have available to date. While we are confident with the accuracy of most data available in our GIS system, one of our primary asset management improvement initiatives is targeted at enhancing our core asset information and dataset.

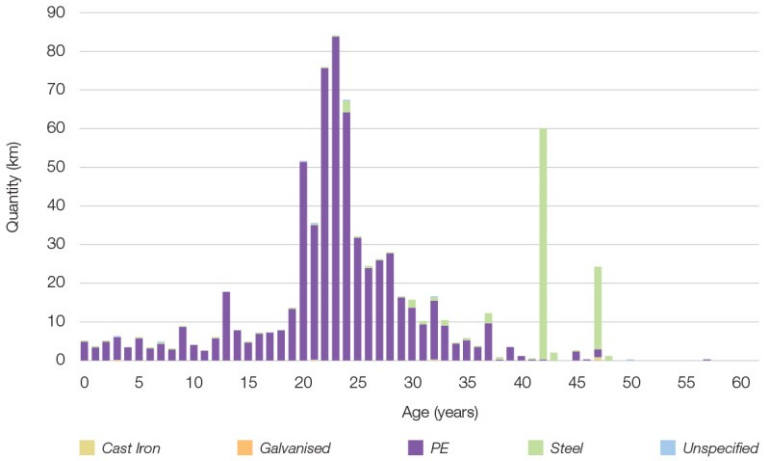
5.7.1 WELLINGTON REGION

Our networks in Wellington are primarily made of PE. The IP line coming down from Tawa is made of steel and protected by an impressed current cathodic protection system. On the age profile, we can clearly see the IP line being built first 40 years ago. The cast-iron pipes present in the CBD were progressively replaced by modern PE.

Table 5.11: Assets Quantities and Average Age in Wellington Region.

ASSET CLASS	ASSET DESCRIPTION	ASSET LIFE (IN YEARS)	QUANTITY	AVERAGE AGE
Pipes (services and mains)	Steel Pipe	60 to 70	44.6 km	38
	PE	50 to 60	1,089.8 km	22
	Galvanised steel	60 to 70	0.4 km	4
	Cast-iron	30	0. km	33
	Unspecified pipe	50 to 60	1.7 km	34
Lines and service valves	Steel	60 to 70	97	11
	PE	50 to 60	249	10
	Other material	50 to 60	2	6
	Unspecified material	N/A	259	24
Stations	Pipework, regulators, etc.	30 to 35	45	16
Special crossings	Bridge, railways, major roads crossings	Same as pipeline	25	24
Cathodic protection	Rectifiers	30 to 35	2	36
	Impressed anodes	30 to 35	25	43
	Sacrificial anodes	30 to 35	33	33
SCADA systems	Transducers, telecommunication systems, etc.	10 to 20	23	7

Figure 5.7: Main Pipes Age Profile for Wellington Region.



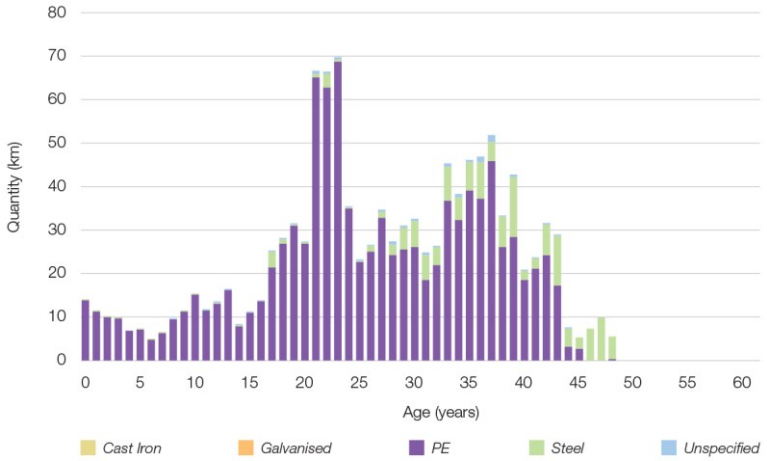
5.7.2 HUTT VALLEY AND PORIRUA REGION

While PE is the main material used, the networks in the Hutt Valley and Porirua region have a large quantity of steel pipes protected by impressed current cathodic protection systems. The majority of PE pipes are still in the first third of their life.

Table 5.12: Assets Quantities and Average Age in Hutt Valley and Porirua Region.

ASSET CLASS	ASSET DESCRIPTION	ASSET LIFE (IN YEARS)	QUANTITY	AVERAGE AGE
Pipes (services and mains)	Steel Pipe	60 to 70	148.0 km	37
	PE	50 to 60	1,471.9 km	26
	Galvanised steel	60 to 70	0.1 km	29
	Cast-iron	30	0.0 km	N/A
	Unspecified pipe	50 to 60	37.2 km	33
Lines and service valves	Steel	60 to 70	468	32
	PE	50 to 60	143	17
	Other material	50 to 60	0	N/A
	Unspecified material	N/A	268	30
Stations	Pipework, regulators, etc.	30 to 35	56	31
Special crossings	Bridge, railways ,major roads crossings	Same as pipeline	117	32
Cathodic protection	Rectifiers	30 to 35	5	33
	Impressed anodes	30 to 35	19	32
	Sacrificial anodes	30 to 35	10	30
SCADA systems	Transducers, telecommunication systems, etc.	10 to 20	18	6

Figure 5.8: Main Pipes Age Profile for Hutt Valley and Porirua Region.



5.7.3 TARANAKI REGION

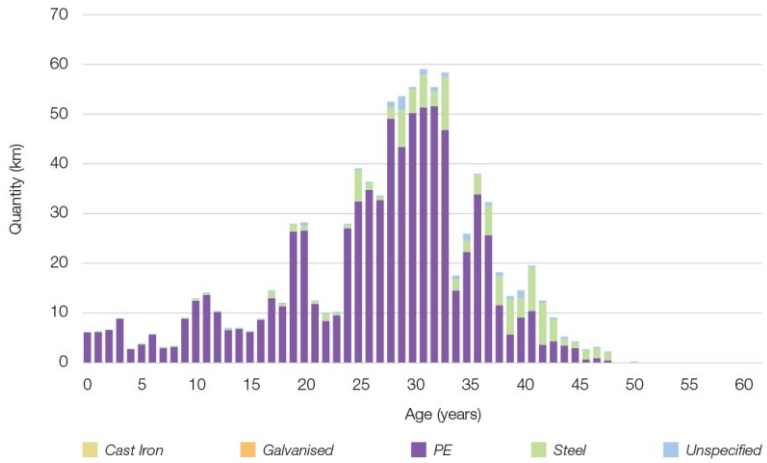
Most of the network in the Taranaki region is made of PE pipes. We still have two records of cast-iron pipes located in New Plymouth – one is a road crossing, the other is a low-pressure sub-network supplying a few residential consumers. The data shows a large number of service pipes recorded with unspecified material. Looking at the installation date, the majority of them are likely to be made of PE.

The average age of the assets is described in Table 5.13.

Table 5.13: Assets Quantities and Average Age in Taranaki Region.

ASSET CLASS	ASSET DESCRIPTION	ASSET LIFE (IN YEARS)	QUANTITY	AVERAGE AGE
Pipes (services and mains)	Steel Pipe	60 to 70	105.3 km	36
	PE	50 to 60	1,123.8 km	26
	Galvanised steel	60 to 70	0.2 km	36
	Cast-iron	30	0.0 km	43
	Unspecified pipe	50 to 60	45.2 km	34
Lines and service valves	Steel	60 to 70	96	23
	PE	50 to 60	100	10
	Other material	50 to 60	1	13
	Unspecified material	N/A	148	29
Stations	Pipework, regulators, etc.	30 to 35	25	22
Special crossings	Bridge, railways, major roads crossings	Same as pipeline	80	32
Cathodic protection	Rectifiers	30 to 35	2	34
	Impressed anodes	30 to 35	3	30
	Sacrificial anodes	30 to 35	29	26
SCADA systems	Transducers, telecommunication systems, etc.	10 to 20	11	5

Figure 5.9: Main Pipes Age Profile for Taranaki Region.



5.7.4 MANAWATU AND HOROWHENUA REGION

The Palmerston North network is unusual in that there are more than 40 DRSs in the city alone. This creates a multitude of pressure systems that add complexity to managing the network. In the rest of the region, we own and operate networks mainly made of PE. The cast-iron identified in the region is not thought to be live but is being investigated.

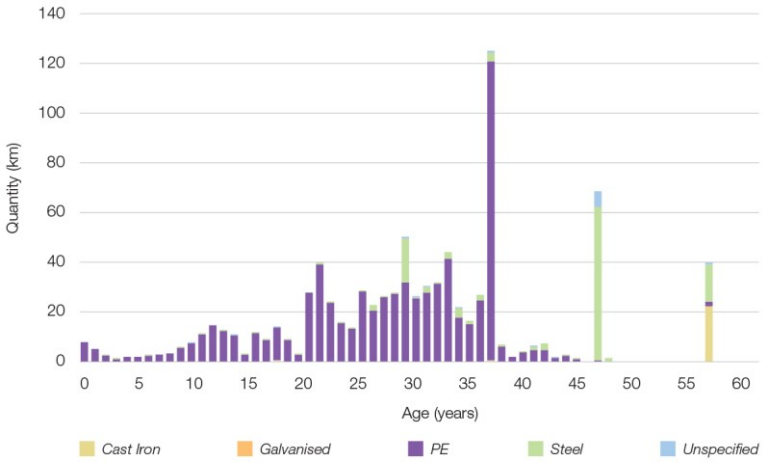
The average age of the assets is described in Table 5.14.

Table 5.14: Assets Quantities and Average Age in Manawatu and Horowhenua Region.

ASSET CLASS	ASSET DESCRIPTION	ASSET LIFE (IN YEARS)	QUANTITY	AVERAGE AGE
Pipes (services and mains)	Steel Pipe	60 to 70	138.6 km	41
	PE	50 to 60	1,290.0 km	27
	Galvanised steel	60 to 70	0.7 km	58
	Cast-iron	30	0.0 km	48
	Unspecified pipe	50 to 60	1.3 km	23
Lines and service valves	Steel	60 to 70	20	9
	PE	50 to 60	54	11

	Other material	50 to 60	1	47
	Unspecified material	N/A	322	28
Stations	Pipework, regulators, etc.	30 to 35	61	29
Special crossings	Bridge, railways, major roads crossings	Same as pipeline	70	32
Cathodic protection	Rectifiers	30 to 35	2	25
	Impressed anodes	30 to 35	6	40
	Sacrificial anodes	30 to 35	46	40
SCADA systems	Transducers, telecommunication systems, etc.	10 to 20	16	6

Figure 5.10: Main Pipes Age Profile for Manawatu and Horowhenua Region.



5.7.5 HAWKES BAY REGION

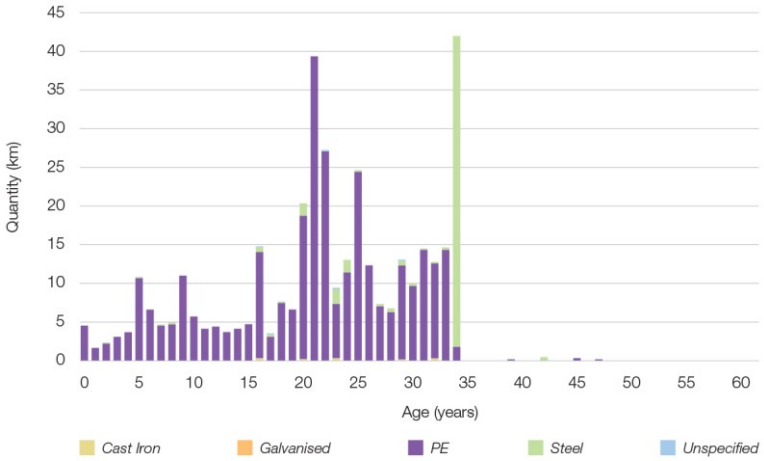
A long IP line has supplied Napier from Hastings gas gate for almost 30 years. This is reflected in the age profile with a spike of steel pipe being installed before constructing the remaining network. At the time we are writing this AMP, the last significant section of cast-iron pipe is being removed as part of the 2013 works plan.

The average age of the assets is described in Table 5.15.

Table 5.15: Assets Quantities and Average Age in Hawkes Bay Region.

ASSET CLASS	ASSET DESCRIPTION	ASSET LIFE (IN YEARS)	QUANTITY	AVERAGE AGE
Pipes (services and mains)	Steel Pipe	60 to 70	46.4 km	33
	PE	50 to 60	417.3 km	20
	Galvanised steel	60 to 70	0.0 km	N/A
	Cast-iron	30	0.7 km	28
	Unspecified pipe	50 to 60	0.0 km	21
Lines and service valves	Steel	60 to 70	31	21
	PE	50 to 60	59	8
	Other material	50 to 60	0	N/A
	Unspecified material	N/A	162	26
Stations	Pipework, regulators, etc.	30 to 35	9	30
Special crossings	Bridge, railways, major roads crossings	Same as pipeline	53	34
Cathodic protection	Rectifiers	30 to 35	1	35
	Impressed anodes	30 to 35	1	4
	Sacrificial anodes	30 to 35	0	N/A
SCADA systems	Transducers, telecommunication systems, etc.	10 to 20	8	6

Figure 5.11: Main Pipes Age Profile for Hawkes Bay Region.



5.8 NON-NETWORK ASSETS

Non-network assets include information systems, asset management systems, and other non-network fixed assets, such as motor vehicles and tools, plant and machinery. These are described below.

5.8.1 INFORMATION SYSTEMS

5.8.1.1 SYSTEM USED TO MANAGE ASSET DATA

Powerco uses the following information systems as part of asset management, and these systems are considered non-network assets.

- ESRI Geographical Information System (GIS)
- JD Edwards (JDE) Maintenance, Work Management and Financial System
- Service Provider Application (SPA) web application and field data entry system
- Connections Works Management System (CWMS)
- Hard copy records and Engineering Drawing Management System (EDMS)
- Ancillary databases

We are currently implementing a new system architecture articulated around a new Enterprise Resource Planning system: SAP. In this section, we describe the current environment. More information on the transition to SAP can be found along with our non-network plans in Section 8 of this AMP.

5.8.1.2 GEOGRAPHICAL INFORMATION SYSTEM (GIS)

Powerco uses a GIS to capture, store, manage and visualise its network assets. The GIS is built on top of a set of ESRI and Schneider Electric applications (ArcGIS, ArcFM) that deliver data in Web, desktop and service-based solutions. The system contains data about the pipes, valves, stations and protection systems on the distribution network.

GIS is the master system for current assets in the network, but it also distributes and informs other systems about the current assets via a middleware system interface (Biztalk server). The primary consumer of this data is the enterprise system (JDE), which acts as the works management and financial system that operates as a slave system off the GIS data. This integration allows calculating and managing the network fixed asset register and the network maintenance plans. The asset spatial information is also a key input into maintenance scheduling where geographical and network hierarchy factors are considered in the planning, monitoring and improvement of the asset base.

5.8.1.3 MAINTENANCEM WORKS MANAGEMENT AND FINANCIAL SYSTEM

Powerco operates a JDE system, which provides asset management and reporting capability, including financial tracking, works management, procurement and maintenance management. Powerco has centralised asset condition and maintenance programming in JDE. Within JDE, Powerco has implemented system and process improvements for defect and rotable asset management.

5.8.1.4 SERVICE PROVIDER APPLICATION (SPA)

Powerco has a mobile platform that delivers applications to field services PCs and mobile devices. This application enables field capture of asset condition, maintenance activity results and defects. Reporting on the data generated by the SPA application is delivered via a suite of reports out of both JDE and Business Objects. The defect and condition data can also be viewed spatially from the GIS.

5.8.1.5 CONNECTIONS WORKS MANAGEMENT SYSTEM (CWMS) GAS

This is an online workflow management system, which facilitates/tracks the processes associated with connection applications, approvals, and works completion. Application, review and input work steps are available to Powerco-approved contractors via the internet. The primary function of the system is to manage the flow of customer-initiated work requests through Powerco's formal process, from initial request through to establishment of the Installation Control Point (ICP) in billing and reference systems.

The workflow ensures that the latest business rules are applied to all categories of connection work.

Requests for new or existing customers to carry out work on Powerco's network are covered by Powerco's Customer-Initiated Works process. This process places

importance on providing new and existing consumers a direct service from Powerco, undertaken by our contractors at their connection point(s). The business rules of the process ensure that the capacity of the overall local network and the quality of supply to adjacent consumers is retained.

5.8.1.6 DRAWING MANAGEMENT SYSTEM

The drawing management system is based on IC Meridian, and works in conjunction with AutoCAD drawing software. It is a database of all engineering drawings, including regulator stations, special crossings and metering stations. In addition, there is a separate vault that contains legal documents relating primarily to line routes over private property.

5.8.1.7 CUSTOMER COMPLAINTS MANAGEMENT SYSTEM

This is a workflow management system that maintains an auditable record through the lifecycle of a customer complaint. The application is designed to work within the Electricity and Gas Complaints Commission rules regarding complaints, and automatically generates the key reports required.

Another feature of the application is the integration with the GIS and ICP data sources, to provide spatial representation of complaints and gas quality issues. This will provide valuable information to the planning teams.

5.8.1.8 SAFETY MANAGER

Safety Manager is one of the systems that supports Powerco's operational risk model and workflow. As the central repository for incidents, hazards and identified risks, it acts as a platform to manage these across internal and external stakeholders at both an operational and strategic level. In addition, it supports the Health, Safety, Environment and Quality (HSEQ) Team for the management of Personal Protection Equipment (PPE) and H&S competencies for all Powerco employees.

5.8.2 OTHER NON-NETWORK ASSETS

5.8.2.1 SPECIALIST TOOLS AND SPARE PARTS

Powerco owns tools and spare parts that are essential for the operation of the networks. These are generally high-value assets that are not used frequently on the network. This includes:

- Tools to isolate pipelines:
    - Stoppling gear
    - Clamps
    - Large squeeze off equipment
- Steel pipe
- Correctors and meters

They are made available to and located with our service providers. We retain the responsibility to maintain these assets.

5.8.2.2 OFFICE BUILDINGS, DEPOTS AND WORKSHOP

Powerco operates from facilities located throughout our network footprint. This has many advantages, including employees with local knowledge being situated close to customers and service providers. Our facilities include a newly leased office in central Wellington, three offices in New Plymouth, a large, leased stores facility in Lower Hutt and small offices located in our service providers' depots in Napier, Palmerston North and Lower Hutt. We also have a backup control centre facility in New Plymouth as part of our business resilience plan.

A new Network Control Operation Centre is currently under construction at our Junction Street site in New Plymouth. It will add additional space to deal with the increase in activity on our electricity networks, and associated support staff.

5.8.2.3 OFFICE FURNITURE AND EQUIPMENT

The office facilities operated by Powerco are fitted out with work stations to accommodate nearly 40 employees in its Wellington office. A standard workstation setup includes a height adjustable desk, chair, storage, PC and communication equipment. Offices also host meeting spaces and relevant office equipment required to effectively operate, such as printers, storage and meeting room technology.

Office areas including equipment and furniture are regularly inspected to ensure that any required repairs or maintenance are noted and addressed promptly. As new office furniture was installed with the fit-out there is no intention to replace furniture in the next few years.

5.8.2.4 MOTOR VEHICLES

Powerco has a fully maintained fleet of 11 vehicles dedicated to the Gas business. A 2018 review of our fleet resulted in the selection of new vehicles that fit defined criteria, including that vehicles must have a five-star NCAP rating, low emissions and be fit for purpose. Powerco undertakes to have regular vehicle inspections to ensure vehicles are well maintained and serviced as per the manufacturers' recommendations.

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6 ASSET MANAGEMENT STRATEGIES

In the previous sections, we described the assets we own and operate, the governance arrangements and processes we have in place, and our asset management objectives and performance measures. In this section, we expand on our asset management objectives and measures and show how we apply these strategically to our asset management plans. As set out in Section 4, our asset management objectives cover five areas:

- **Safety** – Keep the public, our staff and our contractors safe from harm.
- **Delivery** – Ensure our networks have the capacity and resilience to meet the quality of supply expected by our customers.
- **Reliability** – Safe containment of gas and operational reliability to deliver gas to our customers at the right quality and pressure.
- **Efficiency** – Continuously seek out and deliver cost efficiencies.
- **Partnership** – Be a responsible partner for our customers and other stakeholders.

Each of these translates directly into one or more asset management strategies that we employ in the whole-of-life management of our asset fleet and network development initiatives. In addition, there is typically not a one-for-one relationship between an objective and the strategy. For example, leakage management is a fundamental component to ensuring public safety, network resilience and operational reliability.

6.1 DEVELOPPING OUR STRATEGIES

Our asset management strategies enable the delivery of our asset management objectives through the establishment of guidelines that drive the plans and physical activities on our networks.

6.1.1 BASIS OF OUR STRATEGIES

In line with our pursuing of ISO 55000, our strategies are based on the following principles:

- **Clear line of sight**: All the strategies are designed to achieve one or more asset management objective.
- **Data-driven**: We strive to use the data and information we have about our assets, their performance and their environment to drive our strategies.
- **Risk-based**: The strategies use risk management techniques to identify the actions and guidelines presented in the strategies. We give more details on how we use risk management in our strategy in Section 6.1.2 below.
- **Continuous improvement**: Each strategy is reviewed on a periodical basis to assess its efficiency and relevance.
- **Assets fit for the future**: we are building, operating and maintaining a network capable of withstanding the changes in New Zealand's energy future. This includes maintaining enough capacity to enable distributed generation and energy storage, as well as enabling the transport of alternative fuels.

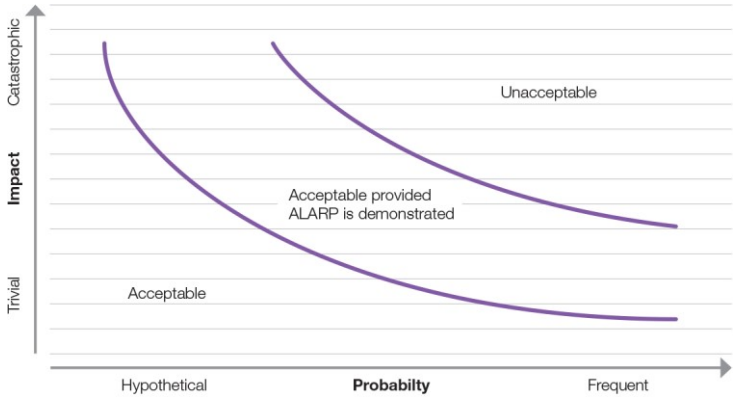
6.1.2 APPLICATION OF RISK MANAGEMENT

All the strategies described in this section rely on risk management. Depending on the intensity of the risks, we class them as:

- Unacceptable
- Acceptable provided ALARP (As Low As Reasonably Practical) is demonstrated
- Acceptable

The following figure illustrates this risk-based approach to our strategies.

Figure 6.1: Risk Management Strategy.



An important consideration when reading through this section is that we strive to continuously improve the way we approach whole-of-life asset management and the implementation of our asset management practices. The means of assessing risk and the acceptability of safety and supply security risks will continue to evolve. As such, these strategies will likely change and improve over time.

6.2 SAFETY

6.2.1 PUBLIC SAFETY

Our objective for public safety is to ensure that none of our assets and operations present a risk to the public. As established in Section 4, our targets are:

Table 6.1: Public Safety Measures and Targets.

TARGET	MEASURE	VALUE	BASIS FOR THE VALUE	WHEN
Minimise risk caused by third-party damage	Number of TPD incidents	<50 p.a. per 1,000km	Historical value, amended with our risk modelling work	By RY22
Response to emergencies	Time to respond (to site) when an emergency is reported	>95% within 1 hour[3]	Chosen to exceed the requirements under the Price-Quality standard	Throughout the period
Receive emergency calls efficiently	Percentage of emergency calls answered within 30 seconds	>90%	Historical value	Throughout the period

To enable us to achieve our goal of keeping people safe, we have implemented a Public Safety Management System (PSMS). It is an overarching system that helps us place public safety at the core of all our activities. In May 2013, we achieved the certification to NZS 7901 Safety Management System for Public Safety.

The key strategies we utilise in managing public safety are:

- We design, construct, operate, maintain and decommission our network and assets following industry standards, primarily AS/NZS 4645:2018 and NZS 5263:2003
- We systematically assess risks to the public for all activities done on the network. This is our Formal Safety Assessment, reviewed every five years and completed by an ALARP (As Low As Reasonably Practical) assessment for risks intermediate and above
- We use safety-in-design methodologies (including physical protection) and any safety-related network enhancement programmes have higher priority in the works plan
- We make sure gas escapes can be detected before they accumulate and reach a level that can cause a risk or concern to the public – using odorant and carrying out leak surveys with risk-based frequencies
- We maintain a response capability to fault and emergencies by implementing and maintaining an emergency response plan that defines roles and responsibilities, timeframes and procedures to be applied to make safe and restore supply
- We manage third-party damages to our underground pipelines by supplying network location, mark out and plan issues free of charge via the service "Dial before you dig". We also operate a permit system when third parties intend to work in the vicinity of strategic assets
- We monitor and solve any non-conformity with the PSMS
- We carry out safety inspections as part of our maintenance programme. The frequency of the inspections is driven by industry standards and manufacturers' specifications
- We strategically locate crews at the appropriate staffing level to effectively manage faults and emergency response to incidents.

Managing public safety risks is an everyday challenge. The effectiveness of these strategies and associated activities are regularly reviewed. For example, we are currently reviewing the end-to-end process for informing others of the location and risks posed by our pipelines.

This year, in-line with our continuous improvement processes, we have introduced bow-tie methodology to help us better understand the controls we have in place and their efficiency. We will then adjust our strategies to reflect any changes.

Figure 6.2: Example of Safety Signage.

[3] Price-Quality standard is 80% <60 minutes and 100% within 3 hours.

These key strategies flow through to our approach to design, our equipment standards and how we manage the assets we have in place. Due to the nature of gas distribution, safety drives a large proportion of our operational costs. In particular, there are two fundamental components to our operations that result from these elements:

- Leakage management
- Fault response

6.2.1.1 LEAKAGE MANAGEMENT

Managing (and minimising) leaks is key to safety, network integrity (refer to Section 6.4.1), and the efficient management of the network assets (refer to Section 6.5). Gas containment is also essential for all our other activities and our assets must perform this function efficiently. When assets are designed to allow controlled gas release (e.g. through venting), we need to ensure they do so safely.

The primary mechanism we use to manage gas leakage is through the use of regular leak surveys, asset inspections and reports from the public to monitor asset performance.

We have analysed the effect of undetected leaks and the probability that they will occur, and applied this information, in conjunction with our public safety management processes and the mandatory requirements of AS/NZS 4645:2018, to identify appropriate survey frequencies for different network equipment. For example, gas gates are surveyed every month, as the safety risk associated with a leak at a gas gate is high (due to the large amount of energy that could potentially be released by such a leak). By contrast, rural networks are surveyed only every five years.

The frequency of our leak surveys is based on risk to the public. Increasing the focus on assets classes that have been prone to leakage and reducing the frequency for new, modern electro-fused networks, which have proven to have very low leakage rates.

To ensure leakage can be detected easily, gas is odorised in accordance with New Zealand standard NZS 5263:2003. The Transmission System Operator is responsible for adding odorant before it enters the distribution systems.

The following table shows the leak survey frequency currently applied to different classes of network asset.

Table 6.2: Leak Survey Frequencies by Asset Type.

ASSET TYPE	MONTHLY	3 MONTHLY	ANNUALLY	5-YEARLY
Gas gate	X			
Special crossings where physical movement is expected (e.g. bridge crossings)		X		
DRS			X	
Mains and services in high consequence areas			X	
Line valves			X	
Other network equipment not covered above				X

Between these formal surveys, every time an operation or inspection is carried out on equipment, it will be inspected for leaks. A last-resort leak check mechanism relies on the public reporting leaks, which we call Public Reported Escapes (PRE).

We run a 24-hour seven-day a week call centre, shared with Electricity's network operation control team. The centre answers calls on our free emergency number 0800 111 848. The calls could come from members of the public, retailers or emergency services. Calls are categorised and relayed to a faultman, who will use his best endeavours to be on any non-CBD site in less than 60 minutes from the time the call was received and 30 minutes for a CBD site.

Figure 6.3: Pipe Repair Operation with Squeeze-off Equipment.

6.2.1.2 FAULT MANAGEMENT

Due to the potentially hazardous nature of gas, whenever a fault (or outage) occurs, irrespective of its cause, we initially treat it as an emergency response. The initial response will always be the dispatch of a faultman to make sure the public is safe and installations are protected.

On-site fault response is provided by our service providers, who must report any problems to Powerco.

When a leak is detected, it is classified according to its location, size and impact on supply. This classification defines the degree of urgency attached to either corrective maintenance or renewal. Once the leak is precisely located, the gas supply at this location is isolated by using one of these three techniques:

- Shutting off the line valves
- Performing a squeeze-off, which involves pinching the pipe to stop the flow of gas
- Using stoppling gear to install a temporary valve on the pipe

If customers will be affected by the isolation, a bypass can be installed to ensure continuity of supply.

Our preferred choice to deal with a failed asset is to replace the section concerned.

Together, leakage management and prevention, and fault response accounts for almost 50% of our network operational costs. Section 9 sets out our expected operational costs over the AMP period.

6.2.2 PEOPLE SAFETY

Our second safety objective is to ensure that safety of our staff and contractors and keep them free from harm. As established in Section 4, our targets in respect of this are:

Table 6.3: People Safety Measure and Target.

TARGET	MEASURE	VALUE	BASIS FOR THE VALUE	WHEN
No harm to our staff or contractors	Lost time injury	0	Company commitment to Safety	Throughout the period

Our goal of zero lost-time injuries (LTI) is a real challenge for an organisation where the works required to construct, build, maintain, operate and decommission the assets is performed outdoors, in trenches with restricted space, in the presence of other utilities' infrastructure or other contractors, and, most of the time, in the middle of the road.

Our aim is of no lost-time injuries (LTI) is a real challenge for an organisation where the works required to construct, build, maintain, operate and decommission the assets is performed outdoors, in trenches with restricted space, in the presence of other utilities' infrastructure or other contractors, and, most of the time, in the middle of the road.

Our "Safety in design" approach is an ongoing collaborative process that we implemented in 2015. This process identifies risks in the design phase of the lifecycle of the asset. By anticipating those, we can build in mitigations into the design that will make the asset safer. This can include location of the asset, type of equipment chosen, or maintenance access.

We also recognise the risks and hazards in an office environment.

Powerco has put in place a Health and Safety system that enables us to deliver our "Think Safe, Work Safe, Home Safe" objective to our staff and contractors. We are using a risk approach to Health and Safety to achieve the right balance between safety and efficiency.

Our Health and Safety system encompasses:

- Systematic hazard identification and mitigation

- Committed safety leadership, with every member of our management teams required to carry out safety observation, toolbox meetings with the field staff and regular health and safety meetings
- The use of an independent contractor approval system to ensure their safety systems meet or surpass Powerco's requirements to health and safety
- Having documented processes and procedures to carry out any activity on the network
- Competency management for every person working on our network through the industry certification (e.g. Certificate of Competency)
- A systematic investigation after incidents
- An external auditing programme to ensure safety standards are properly applied on the field
- Participation and involvement with industry workgroups

6.3 DELIVERY

Our delivery objectives ensure that our networks are designed and built to meet the needs of our current and future customers. We strive to enable our customers to use their gas appliances at any time, without the need for demand-side management.

Demand-side management for gas networks is a less effective alternative than for electricity networks. Unlike electricity, switching gas loads off does not have an instantaneous effect on the network pressure due to the compressible nature of gas. Many older gas appliances cannot safely be switched off and on, due to the need to relight the pilot light. The need for demand-side management is also mitigated by the gases' compressibility, which allows short-term peaks to be met from line-pack.

We consider that to meet the delivery objectives, the capacity of each network must be sufficient to cope with a one-in-20-year peak load. The use of one-in-20-year peak load is an indicator of the peak loading on our network and is based on common industry practice. It allows sufficient time for planning and development work to be completed prior to the occurrence of poor pressure events. Capacity also needs to be sufficient:

- During the upgrade process, otherwise the work itself will create a low-pressure event
- To allow for new residential and small commercial customers to connect in timely fashion (typically in less than two weeks) without creating a risk of poor pressure events

Figure 6.4: Tawa Gate Upgrade to Maintain Quality of Supply in Wellington (2011).

6.3.1 GROWTH ASSUMPTIONS AND FORECASTS

Sizing of gas network is based on peak-demand rather than total volume conveyed. If the latter is important for revenue purposes, network resiliency is measured by its ability to meet demand at any time. Therefore, we do not forecast overall volumes and focus on peak demand.

6.3.1.1 LOAD ASSUMPTIONS USED TO ASSESS PEAK NETWORK DEMAND

We currently use 2011 as a representative one-in-20-year demand (meteorological articles show 2011 sits in a range from 16 to 50 years, depending on the forecasters). The measured quantities from 2011 form a baseline for our forecasting of future demand.

2011 is used because:

- Gas consumption is at its highest when the weather is cold (and it was exceptionally cold in the winter of 2011)
- Our pressure monitoring programme was well deployed in the regions and allowed us to gather accurate data
- We did not record any poor pressure events at that particular time. Therefore 2011 provides a good baseline for un-attenuated high-demand events

On-going pressure and flow monitoring data is then used for updating our models to most accurately represent the networks under current configuration and operating conditions. This includes network growth since 2011, and it ensures that we capture the effects of changes to the networks on a continued basis.

We aim to rebuild our network models every 5 years. At that time, we reassess the best baseline year for our forecast.

6.3.1.2 EXPECTED DEMAND GROWTH

In addition to peak load modelling, we forecast the mean demand growth in our networks. The primary indicator we use to forecast growth is the number of ICPs connected on our network. To forecast the number of ICPs, we use:

- Historical connection numbers
- Economic factors, including GDP and building consents (extracted from New Zealand Institute Economic Research)
- Industry reports
- Marketing and sales efforts

The last point is a key part of The Gas Hub strategy. We operate in a market where gas is competing against other energy sources, including electricity, solar, LPG, etc. The Gas Hub is our main vehicle to present and communicate the gas proposition to the public.

Natural gas networks in New Zealand plays, and will continue to play, an important part of the energy mix for the foreseeable future. It is an integral part of the country's energy security, is affordable, and has the potential to lower greenhouse gas emissions when displacing coal. The changes in New Zealand's legislative environment with the Zero Carbon Act are not going to affect the development of the network in the short term. We are also investigating the possibility to convey a different gas fuel through our assets, such as biomethane and hydrogen.

Over the next 10 years, we forecast a growth in the net number of ICPs on our network. It is the result of new connections, minus disconnections.

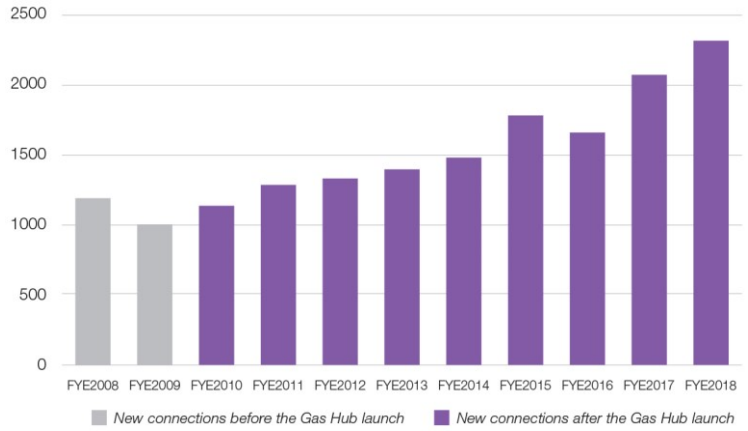
6.3.1.3 NEW CONNECTIONS

New connections are coming from three main streams:

- Subdivisions (new builds)
- Infill growth (consumers already mains-fronted)
- Reconnections

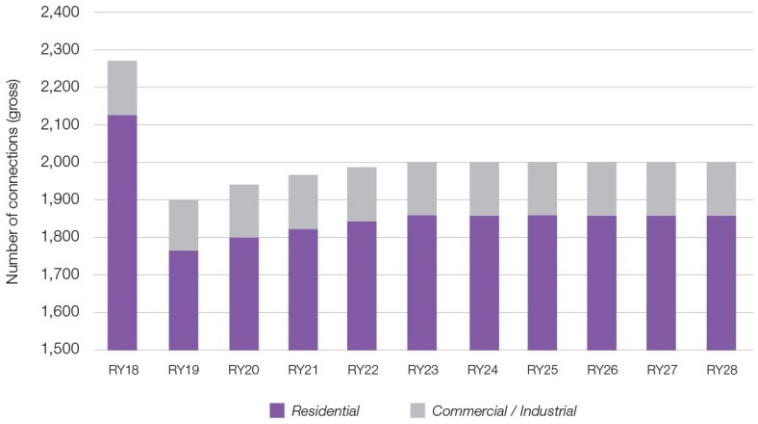
Through the 2000s, our connection numbers trended down, reaching a low point in FYE 2009. To counter this decrease, we launched The Gas Hub brand at the end of that same year and managed to lift the number of new connections and reconnections. At the end of financial year-ending March 2018, we added a record 2,482 connections to our network, being the 8th consecutive year to grow our number of new connections year-on-year as shown on Figure 6.5 below.

Figure 6.5: Influence of The Gas Hub Strategy on the Number of Connections.



In the next 10 years, we forecast to maintain or increase new connections on our networks as a result of The Gas Hub strategies as shown in the figure below.

Figure 6.6: Gross Connection Numbers Forecasted in the Next 10 Years.



6.3.1.4 NET ICP GROWTH

With the growth in the number of connections and our continuous efforts to reinforce the gas proposition on the market through our brand, we expect to see a growth in our total number of ICPs as shown on the figure below.

Figure 6.7: Total ICP Numbers Forecasted in the Next 10 Years.

This growth forecast is reflected in our asset management plans presented in Sections 7 and 8. The two primary objectives under Delivery are:

- Network capacity
- Network resilience

The strategies that we employ to meet our objectives for each of these are described below.

6.3.2 NETWORK CAPACITY

Our network capacity objective is to ensure that our networks have sufficient capacity to meet our customers' needs. As set out in Section 4, the targets in relation to this objective are:

Table 6.4: Network Capacity Measures and Targets.

TARGET	MEASURE	VALUE	BASIS FOR THE VALUE	WHEN
Adequate network capacity	Poor pressure events under normal network configuration	<10 p.a.	Historical value informed by customers feedback	Throughout the period
Network capacity for growth	Residential applications deferred due to insufficient system capacity	0	Company commitment to customer service	Throughout the period

To limit the loss of supply by poor pressure events, and allow mass-market customers to connect to our networks without major reinforcement, we have set a pressure threshold that triggers further investigation. This lower limit is a 40% pressure droop physically recorded on the network, or modelled under simulated peak conditions.

This level of droop represents around two thirds of the network capacity being utilised. This approach maintains headroom to enable us to achieve our objective during peak demand periods (guaranteeing security of supply) and not to defer any residential connection due to insufficient system capacity. We also take into account the minimum required operating pressure of the equipment connected to the network (GMS, DRS or other pressure regulation equipment), gas velocity (to limit noise), and the environment in which the network operates (e.g. pressure choice to ensure safety).

If the trigger of 40% droop is reached, we undertake a detailed analysis that potentially leads to reinforcement works on the network. Part of the analysis is a reassessment of the risk that consumers lose supply through a poor pressure event, taking into account our growth projections.

To measure pressure, we run a pressure-monitoring programme on an annual basis for our critical networks and reactively on others informed by our modelling tool or

reported network issues. We have flow measurement devices at some stations on the networks and plan to install more to increase the accuracy of our modelling.

There are three approaches we use to increase capacity of the network:

- Add more points of supply on the network, which allows more gas to be injected in the system
- Construct high-capacity mains, or “strategic mains” to maximise the conveyance along a defined route
- Increase the network operating pressure within permitted limits

The choice of the approach is dependent on the specific characteristics encountered in each network, the type of end-consumers and the circumstances that lead to the pressure droop.

6.3.2.1 LARGE COMMERCIAL AND INDUSTRIAL CONSUMERS

For large commercial or industrial consumers, we adopt a reactive approach. Even by collecting intelligence from council zoning (e.g. location of industrial parks), it is difficult to design a network that will match what the consumers want without knowing what type of activities are exactly expected in the region, therefore the requirements for specific loads and usages.

6.3.2.2 RESIDENTIAL CONSUMERS

Our approach to growth with residential consumers is to have a network that can accommodate new connections without any work other than installing a service pipe. Consumers that need a new energy source are generally time-constrained and we want to offer them a competitive and timely proposition. We have a 40-metre free connection policy and guaranteed immediate access to the network. It also enables us to increase utilisation of the existing assets, which leads, in the long-term, to more competitive and efficient pricing.

We have three strategies to accommodate growth on the network:

- Reticulate new development areas (subdivisions) linked to our existing network
- Connect infill new builds or infill subdivisions (existing parcels subdivided into two to ten dwellings)
- Connect consumers directly fronting our mains or previous consumer now disconnected.

Budgets for new developments are derived from our detailed system growth budget forecast. Budgets for infill and reconnection growth are forecasted based on expected connection numbers, marketing efforts and historical values.

Our development plans are described in more detail for each region in Section 8.

6.3.3 NETWORK RESILIENCE

Our objective for network resilience is to ensure we have the appropriate level to maintain supply to our customers during the failure of network equipment. Network design is key to meeting resilience requirements. We mesh the networks and create “loops” utilising strategic mains with multiple supply points. This tactic enables us to reduce the number of customers impacted if a section of strategic main needs to be isolated as it is back-fed. To define the size of these strategic mains, the necessity to loop them and the location of supply points, we use modelling software and apply a case-by-case, risk-based approach.

To ensure the system is resilient enough to constantly deliver the demand, the pressure systems’ points of supply (DRS) are designed following industry best practice.

We are implementing a Security of Supply policy that gives guidance on the level of redundancy required. The policy takes into account the number and type of consumers, the ability of the network to convey gas along trunk mains, and other point of supply onto the network.

We also look at each station’s capacity and make sure the flow under peak conditions can still be delivered on one stream, at a one-, five- and 10-year horizon, using the growth assumption (see Section 6.3.1). If the station is not able to deliver the suitable volumes while keeping the N-1 redundancy, we would investigate its upgrade or replacement to increase capacity.

Lastly, we use a SCADA system and additional mobile pressure loggers, with real-time monitoring and alarm capabilities to detect potential failures. Part of the security of supply policy, we are reviewing which stations will benefit from being connected to our SCADA system.

The implementation of our resilience objective is entirely situation-specific. With our network being constructed over a long period, utilising independent designs and equipment standards, how we ensure resilience has to be handled on a case-by-case basis.

Figure 6.8: Twin Stream DRS

6.4 RELIABILITY

As for safety, reliability is mainly ensured by the construction techniques used on the networks. AS/NZS 4645:2018 is the industry standards we use as a baseline to achieve reliability. We have developed our own strategies regarding network integrity and operational reliability, as described below.

6.4.1 NETWORK INTEGRITY

Our objective for network integrity is to ensure that any uncontrolled gas releases are minimised. As noted in Section 6.2.1 above, our leakage management is a key part of achieving this objective and is closely related to our Public Safety objectives. The targets for network integrity set out in Section 4 are:

Table 6.5: Network Integrity Measures and Targets. Operational Reliability Measures and Targets.

TARGET	MEASURE	VALUE	BASIS FOR THE VALUE	WHEN
Reliable network integrity	Total reported leaks (excluding third-party damage)	<90 per 1,000 km	Historical value, amended due to better reporting and potential asset condition	By RY21
Reliable network integrity	Number of leaks detected by routine inspection	<50 per 1,000 km	Historical value, amended due to better reporting and potential asset condition	Throughout the period

For the gas networks, a reliable asset is one that is able to maintain containment while performing its primary function (e.g. pressure regulation for a regulator, isolation for a valve, etc.).

We are moving from time-based inspection and a combination of condition-based and run-to-failure renewal strategies towards a reliability-centred maintenance approach. Through the implementation of our new ERP system, we are implementing processes that enable us to collect the right defect or fault information. We have started developing and monitoring FMEA (Failure Mode and Effect Analysis) for each asset class to refine our reliability strategies.

The detailed strategy employed is dependent on the asset class:

- For underground steel pipelines, we operate and maintain corrosion protection systems and carry out DCVG inspections that identify protective coating defects
- For above ground assets (stations, bridge crossings), we carry visual inspections of asset condition, including corrosion
- We utilise a time-based preventative maintenance and inspection programme. Maintenance activities and frequency of inspection are dependent on the manufacturer's information, industry standards, or legislative requirements
- When an asset fails or its condition requires attention, we record information that will allow us to analyse the mode of failure by issuing a defect against the asset
- We record all defects into a single Computerised Maintenance Management System, classified depending on their urgency
- We have processes that allow immediate fixing after a defect is discovered
- We determine asset condition at an asset class level, analysing the number of defects detected per asset class

The means of implementing our network integrity objectives for each asset class is described in Section 7.

6.4.2 OPERATIONAL RELIABILIITY

Our operational reliability objective is to ensure the delivery of gas to our customers at the right quality. The targets for operational reliability set out in Section 4 are:

Table 6.6: Operational Reliability Measures and Targets.

TARGET	MEASURE	VALUE	BASIS FOR THE VALUE	WHEN
Reliable quality	Non-compliant odour tests reported	<10 per annum	Historical value	Throughout the period
Operational reliability	Customers affected by supply interruptions occur due to component failure	<10 per annum	Historical value	Throughout the period

To deliver gas with the right quality (at the right level of odorisation and free of contamination) to our customers, we use different strategies at each stage of the asset lifecycle:

- We design the networks with filters to capture any contaminant at the supply point
- We construct, operate, maintain and decommission the assets with tools, techniques and procedures that minimise the introduction of foreign elements in the network
- We apply a time-based inspection regime to monitor the level of contamination in the filters located at each station
- We monitor the odorant level on a time-based inspection regime, according to industry standards
- We have operational arrangements with the transmission system operator who controls the odorant injection to ensure we maintain the right level of odorisation on the network

These activities drive elements of our routine maintenance costs discussed in Section 9.

6.5 EFFICIENCY

Delivering value to our customers involves three aspects:

- Ensuring our network investments are optimised
- Ensuring that the delivery of our services is efficient
- Ensuring our designs and solutions are standardised

6.5.1 OPTIMAL INVESTMENT

Our first efficiency objective is to ensure that the timing of capacity, resilience and renewal investments are optimised. To optimise costs, time, and asset utilisation, we act with these principles:

- We take decisions on our asset classes and individual assets considering their whole-of-life costs and performance
- We primarily use standards in our design, operation, maintenance and renewal or decommissioning activities. When a standard cannot be applied, we require extra justification to demonstrate the appropriateness of the solution
- We look for opportunities to achieve greater standardisation of design and asset type where cost-effective to do so
- Before approving projects, we look at the trade-off between operational and capital expenditure

A key focus of the network plans is to optimise planning and delivery of growth and quality of supply-related works. We see this as an area where we are still developing and where further future efficiencies can be leveraged by increasing our understanding of asset utilisation. The objective of network planning being optimised is to:

- Promote a holistic approach to solving constraints
- Optimise the joint timing of investments, especially growth (network capacity), quality of supply (network resilience) and renewal (network reliability)
- Support the use of options analysis and optimise solutions where two or more constraints interact
- Focus on the specific needs, age and condition of the local network and assets, and the specific local customer requirements

We are transitioning from a period where network capacity has tended to be the dominant driver, addressing historical capacity issues detected through our on-going pressure monitoring programme. We are now focusing on reliability, ensuring the assets, and asset classes that are becoming too costly to maintain are dealt with. We continue using network plans by gas gate as they allow for an optimisation of network planning by integrating the growth, quality of supply and renewal works.

6.5.1.1 DELIVERING THE PROGRAMME OF WORKS

Our programme of works is delivered using external contractors. We continually test the market to ensure our rates for this work are efficient. Our service delivery model was restructured in 2012, with new field service contracts awarded through a competitive tender process. The field service contracts include market-testing mechanisms and KPIs to ensure competitive rates throughout the contract period

(five years). Routine work is assigned standard activity rates to drive lower administration costs. Larger or more complex works can be market-tested through fair price provisions, and major projects are individually tendered.

The new service delivery model was developed in parallel with optimised business processes that drive efficiency through simple and flexible scheduling that deliver well-managed, consistent work flows to our contractors. The processes also promote efficient risk-based find-and-fix processes.

Powerco has moved responsibility for design in-house and increased its field supervision role to gain better control over works delivery and improve efficiency. These changes also drive better asset condition information that enables more informed and optimal asset management decisions.

This new model, started in October 2012, allowed us to achieve cost savings through greater efficiency, as well as a better control on the service providers' resources availability. That being said, the first two years of the new arrangements were proven to be challenging for the delivery of the programme of works. Our capital expenditure profile has been revised to deliver the works that have not been delivered in those two years before the end of the regulatory period.

6.5.2 UTILISING STANDARD DESIGNS

We recognise the usage of standard designs and equipment is an efficient way to achieve efficiency. Our suite of standards set our preferred criteria, including:

- Material. For example, we use steel for IP pipelines, PE for MP and LP pipelines
- Suppliers
- Pipeline location and depth of burial
- Signage
- Risers and meter kits location

Assets currently covered by standards are:

- Pipes (part of the "Mains and Services" standard)
- Valves (part of the "Mains and Services" standard)
- DRSs
- GMSs
- Corrosion Protection systems

Our standards are defined and enhanced based on the following consideration:

- Industry best practices
- Risk levels
- Overall costs on the whole-of-life management of the asset

6.6 PARTNERSHIP

The partnership we have with our stakeholders, and our will to be a good corporate citizen is pervasive through all our activity as a gas distribution business. We have in place several strategic initiatives that enable us to achieve this. Of paramount importance to us is our connection with our customers and the delivery of value to their lives. To this end, our customer-facing brand, The Gas Hub, has been and continues to be highly successful. In addition to providing a contact point for our customers, our aim is also to educate the public to the benefits of natural gas for New Zealand. The second part of our partnership strategy is to ensure that our activities in the communities in which we operate meet very high environmental standards.

These strategies are described below.

6.6.1 CUSTOMER STRATEGIES

Customers are core to our business. The Gas Hub is our primary contact point and has been successful in driving up connection numbers against a backdrop of falling new house numbers post the global financial crisis. The Gas Hub strategies have also increased the usage of gas (e.g. water heating and space heating) across our new and existing customer base. This outcome is beneficial for Powerco, our customers and New Zealand by driving higher utilisation of the assets to deliver greater efficiency.

Higher gas utilisation reduces demand on capacity-constrained electricity infrastructure assets and promotes positive energy efficiency outcomes through the high efficiency use of gas (relative to using gas for thermal generation) and lower transmission losses.

The Gas Hub is used by Powerco to provide direct customer engagement (in an interposed commercial model). Through The Gas Hub, we strive to promote how natural gas can bring benefits to our customers and New Zealand:

- We conduct market research to gauge customers' satisfaction with the reliability of their on-going gas supply
- We measure customers' satisfaction when they interact with us and our service providers to get connected to the network
- We promote the cost efficiency, the low environmental impact and the increase in life quality brought by natural gas through our marketing campaigns
- We provide customers with independent gas appliance advice
- We offer a 40m free connection to new customers who recognise gas as being their first choice for hot water or central heating

Customer expectations and information we gather from The Gas Hub provides good, on-going and up-to-date information that we utilise within our network development processes and asset management plans.

6.6.2 IMPROVING ENVIRONMENTAL PERFORMANCE

Our objective is to ensure that we achieve and maintain a good environmental track record. The targets we described in Section 4 are:

Table 6.7: Environmental Measure and Target.

TARGET	MEASURE	VALUE	BASIS FOR THE VALUE	WHEN
Environmental management standard	Enviro-Mark accreditation level	Platinum	Company commitment to the Environment	Throughout the period

In order to achieve this, we follow the ISO 14001 principles for environmental performance. This includes the identification of our significant environmental impacts, the implementation of an environmental management plan and the regular external audit of this system.

6.7 INFORMATION STRATEGY

Underlying these strategies is a dependency on high-quality information to support operational deployment and long-term investment decision support. As such, our strategy around collecting and analysing information is critical because it supports all our asset management activities. In turn, our information systems ensure that this information is accessible at the right time and enable this to occur in an efficient manner.

Our goal with asset information is based on the following principles:

- To provide a good understanding of our assets (their condition, location and other specific attributes)
- To ensure that the right information is available to Powerco's staff and contractors

As described in Section 5.8.1, we use several systems to record and retrieve information. Some data is duplicated and used for different purposes. It is essential that we have a good understanding of the main repository of data and the different ways to access it.

This is a difficult exercise that can lead to errors, and require high operating costs to ensure the systems are properly linked together. Our strategy is now to reduce the number of those systems to gain efficiency. We are implementing an Enterprise Resource Planning system to centralize this information, and ensure there is a single source of truth. This is discussed in Section 8.8.

As our assets are mainly underground, we have limited opportunities to collect and gather information. Our main means of collection is a process that records the location of the assets, as well as their main characteristics, into our GIS system at the time of construction. As such, we require structured information from field staff. We have designed standard forms (both paper-based and electronic) the field staff use to bring back the data in a useful format.

When entering data in the systems, we try to limit the number of errors by standardising the input fields using drop-down lists and structured information trees, and ensure the completeness of essential data by flagging mandatory information. For some activities, contractors are incentivised to ensure completeness of the data by provisions to withhold the payment for their activities if some fields are incorrect.

When we discover unreliable or incomplete data, our preference is to correct the data in an incremental manner. Where a dataset shows signs of inaccuracy, we also run targeted programmes to improve data quality by random sampling (e.g. for pipe location).

To ensure information is easily available for Powerco's staff and contractors, we have information systems that will allow display, input and analysis of the data. We have set up extranet tools and mobility solutions that contractors can use on the field. Our customer works management system (CWMS) is open to retailers and contractors to accelerate the connection process. We also have a data warehouse that consolidates different data sources to allow analysis and better asset management decisions.

7 ASSET LIFECYCLE PLANS

This section describes how we manage our assets throughout their lifecycles. In doing so, we describe the condition of our assets, our approach to operations and maintenance, and our refurbishment and renewal programmes. To enhance the readability of this section, detailed asset condition tables are located in Appendix 2.

As described in our Asset Management Strategies (Section 6), most of our maintenance activities are driven by industry standards. They often prescribe minimum inspection frequencies and ensure the safe operation of the network, but also offer the possibility to use a risk-based approach. In recent years, our internal standards have evolved towards a risk-based approach. They follow the principles of Reliability Centred Maintenance (RCM) aimed at further improving the efficiency, and optimisation of our asset lifecycle management. This will lead to a change in frequency of leakage surveys and inspections, as discussed in Section 6. At the time of writing, these new standards have not been fully implemented, and the values in this section are currently applied to our network.

The key to our RCM is information about the actual condition of our assets and better analytical tools to identify the causes of asset failure. Improving the information sets and our analysis tools is one of our priority improvement initiatives, as discussed in our information strategy in Section 6.

In this section, we also discuss, for each asset class, their condition and our current understanding of their systemic issues. The asset classes covered in this section are:

- Mains and services pipes
- District Regulation Stations (DRS)
- Line and service valves
- Special crossings
- Monitoring and control systems
- Cathodic protection systems

7.1 CONDITION GRADING

To indicate the condition of our assets, we utilise a standardised grading system. The grades are described in the table below.

Table 7.1: Condition Grading Definition.

GRADE	DEFINITION
Grade 1	End of serviceable life, immediate intervention required
Grade 2	Material deterioration but asset condition still within serviceable life parameters. Intervention likely to be required within 3 years
Grade 3	Normal deterioration requiring regular monitoring
Grade 4	Good or as new condition
Grade unknown	Condition unknown or not yet assessed

With most of our assets being underground, we use several parameters, assumptions and mechanisms to assess asset condition:

- Asset age
- Number of defects identified per asset class
- Number of leaks identified
- Results of specific condition assessment (e.g., DCVG surveys described in Section 7.2.1)

7.2 MAINS AND SERVICES PIPES

Mains and service pipes are our largest asset category. Table 7.2 shows a breakdown of the types of pipe we operate and the associated lengths. The distinguishing feature of the asset class is that pipes are primarily underground and therefore condition assessment and inspection require more innovative approaches.

Table 7.2: Mains and Services Lifecycle Activities.

ASSET TYPE	QUANTITY	LEAKAGE MANAGEMENT – INSPECTION FREQUENCY	OPERATION AND MAINTENANCE PLAN	RENEWAL PLAN
Cast-iron	2.0km (live) 157.1km (total)	1 to 5 years	None	Investigation in progress to check data accuracy
PE	5,239km (live) 5,405km (total)	1 to 5 years	None	Targeted programme for pre-85 PE
Steel	488.6km (live) 874.7km (total)	1 to 5 years	DCVG surveys CP readings	None
Other	92.7km (live) 169.0km (total)	1 to 5 years	None	None

7.2.1 CURRENT ASSET CONDITION

The condition of PE and steel pipes is determined using proxy measures. For example, we use DCVG (Direct Current Voltage Gradient) surveys, and readings from the Cathodic Protection systems on steel pipes to inspect pipe coating condition.

For PE pipes, the mode of failure is largely dependent on the quality of the workmanship when the pipe was constructed. The best way we have found to assess the condition of the asset is to compare current leakage against historical rates.

The condition of the PE and steel pipes is commensurate with their age, with the exception of high-density PE pipes. High-density PE pipes installed before 1985 are covered by a replacement programme, as discussed in Section 7.2.3.

The table below summarises the condition of pipes, classified by pressure regime. A detailed table with the condition of all our assets are in Appendix 2 as part of Schedule 12a.

Table 7.3: Mains and Services Asset Condition.

ASSET TYPE	QUANTITY	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE UNKNOWN	DATA ACCURACY
Steel main (IP networks)	329km	0.00%	0.00%	79.87%	0.26%	19.80%	3
Steel services (IP networks)	43.8km	0.00%	0.02%	24.41%	0.85%	74.73%	3
PE main (MP networks)	3,418km	0.16%	0.02%	89.31%	9.74%	0.77%	3
PE services (MP networks)	1,831km	0.00%	0.08%	84.11%	11.76%	4.05%	3
Steel main (MP networks)	192km	0.00%	0.02%	80.01%	0.17%	19.80%	3
Steel services (MP networks)	210km	0.00%	0.04%	25.15%	0.10%	74.71%	3
PE main (LP networks)	41.36km	0.00%	0.01%	89.22%	10.00%	0.77%	3
PE services (LP networks)	18.44km	0.00%	0.40%	85.92%	9.63%	4.05%	3
Steel main (LP networks)	5.2km	0.00%	0.00%	80.17%	0.03%	19.80%	3
Steel services (LP networks)	7.2km	0.00%	0.00%	24.95%	0.34%	74.71%	3

While doing our regular network inspection, we can encounter some instances where the customer installations or the environment where the pipe is laid has changed.

This could happen, for example, when a homeowner decides to extend his house over one of our pipes, to install a new appliance close to the meter's exclusion zone without notifying us, or if the pipe was installed in a location that would not suit our current safety standards. We have a reactive approach to each of these instances, and part of our response is to move or renew the pipe.

7.2.2 OPERATION AND MAINTENANCE PLANS

Once constructed, our PE pipelines do not require any direct maintenance on the assets themselves. Pipeline warning signage requires ongoing maintenance and significant upgrading of signage is ongoing. Steel pipelines require corrosion protection systems (cathodic protection) using impressed current or sacrificial anodes.

Refer to Section 7.7.2 for more information on the operation of the protection systems.

Steel pipelines can conduct electricity which represents a hazard to field staff. To manage this risk, we are currently implementing mitigations across our networks, such as earth mat installation on our stations, and data loggers to measure the current on the pipeline.

The largest operational costs with mains and service pipes are associated with our regular leakage management and inspections and fault response during an event (as described within our Public Safety, and Network Integrity related strategies in Section 6). The leakage inspection cycles for pipes by type is shown in Table 7.4 below.

Table 7.4: Mains and Services Leakage Survey Frequency.

ASSET TYPE	MONTHLY	3 MONTHLY	ANNUALLY	5-YEARLY
Mains and services in high consequence areas			X	
Steel pipeline when CP system is faulty			X	
Other pipes not covered above				X

7.2.3 RENEWAL PLAN

The majority of our mains and service pipes are in good condition, with much of the network being relatively young. This means our renewal plans for pipes are limited. In the past, we have run an extensive programme to replace all cast-iron pipes on our networks. This programme has come to an end and the remainder of the pipes labelled as cast-iron in our systems are being investigated to check the validity of this data.

In 2014, we analysed failure data on PE pipelines installed before 1985. There is industry-wide evidence that pipes which have been squeezed off tend to have a higher leakage rate. As a result of the mechanical deformation, the pipe material becomes brittle and cracks can appear along the body of the pipe.

The location of squeeze off points is rarely recorded in our systems. Further analysis showed the likelihood of leakage was high for pipes installed in certain years, and pipes that have been repaired in the past are likely to leak in the vicinity of the leak repair, whatever the region or workmanship. Manufacturer information is not considered here as most of the pipe material was sourced from a single supplier.

Some overseas operators have reduced the pressure in their pipelines to reduce the amount of gas released by leaks. We do not believe it is a viable solution and have decided to start a replacement programme. The initial phase will also collect additional data as we proactively replace those pipelines.

We commenced a replacement programme in RY15 and have forecast up to $1m per year for during the planning period, with annual checkpoints as we develop our annual works programme, to maintain cost efficiency and validation of performance improvement.

The remainder of pipe renewal is dealt with as individual projects, where and as required. This includes modification to the pipework due to its environment or location as discussed in Section 7.2.1 above.

7.3 DISTRICT REGULATION STATIONS (DRS)

DRSs represent our second largest network asset category by value after pipelines. In 2014, we undertook a review of small, often isolated, pressure reduction equipment. Some of these were wrongly recorded as part of GMS equipment. As a result of these changes the number of DRSs recorded in our systems will increase.

Table 7.5 summarises our lifecycle plans for DRS asset class.

Table 7.5: DRS Lifecycle Activities

ASSET TYPE	QUANTITY	LEAKAGE MANAGEMENT – INSPECTION FREQUENCY	OPERATION AND MAINTENANCE PLAN	RENEWAL PLAN
IP Stations	172 (live) 173 (total)	Six-monthly (monthly for gas gates)	Inspections at the same time as leak surveys	Ongoing 10-yearly inspection/ refurbishment Safety risk mitigation
MP Stations	88 (live) 97 (total)	Six-monthly	Inspections at the same time as leak surveys	Ongoing 10-yearly inspection/ refurbishment Safety risk mitigation

7.3.1 CURRENT ASSET CONDITION

DRSs are often above ground, making them the most visible parts of our network. Being above ground also makes them more vulnerable to external damages, such as impact by vehicles or vandalism. In high consequence areas, such as Wellington, we have initiated a protection programme.

Across our regions, we are rationalising the amount of stations feeding some networks by removing smaller capacity stations by larger, more cost-effective units.

Figure 7.1: Artwork on Tory Street DRS in Wellington to Deter Vandalism.

The components of DRSs (regulators, transducers, etc.) are prone to wear and obsolescence, but by modifying our maintenance programme and activities we have managed to extend the useful life of these stations. There are a few instances where we have had to replace these components because of ageing. However, our standard design uses common componentry that limits this risk.

The table below summarises the condition of DRSs, classified by pressure regime.

ASSET TYPE	QUANTITY	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE UNKNOWN	DATA ACCURACY
IP Stations	173	0.00%	3.47%	86.71%	9.25%	0.58%	2
MP Stations	97	0.00%	6.19%	76.29%	8.25%	9.28%	2

7.3.2 OPERATION AND MAINTENANCE PLANS

DRSs are inspected for maintenance every six months. We use this opportunity to carry out the following standard operations:

- Pressure recording, and adjustment if necessary
- Every year, changing the regulators' settings to swap the "working" and "stand-by" streams

In addition to the activities described above, we undertake the following every six months (or every year for the last item):

- Check for leaks
- Inspect for corrosion
- Undertake valve half operation and lubrication
- Check filters and clean if required
- Every year, test the over-pressure protection

To extend the lives of the stations, we have a 10-year inspection programme. The weak points of most of our stations are corrosion and regulators. Where required, we sandblast and repaint the stations, inspect the regulators and change their soft parts.

7.3.3 RENEWAL PLAN

We are reviewing options to protect the stations from external threats. We have conducted an on-site risk assessment of all our DRSs, considering what are the relevant threats and their impact on safety and delivery.

The review of risk mitigation options led us to consider three options:

- Upgrading the stations by installing physical protection (e.g. bollards to protect from a vehicle collision)
- Replacing the above ground assets with underground units (cocons)
- Removing the station by modifying gas flow in the network

Our initial assessment shows that undergrounding will be required for nine stations. Their location and criticality in terms of supply, require us to carefully plan any work on them. We are forecasting up to $1.0m every year for the entirety of the planning period.

We are improving efficiency of the network by rationalising the number of stations we operate. Through our pressure monitoring and network modelling, we have identified stations that could be rationalised without negatively impacting their networks and we are considering decommissioning these stations. Palmerston North is underway, and Porirua is on our network plans. However, we need to carefully assess the cost-benefits analysis. We will also take this opportunity to increase the level of equipment standardisation of these DRSs.

As part of our delivery strategy described in Section 6.3, we plan to install flow measurement equipment on our critical stations. This will enable us to gain better accuracy in load forecasting and monitoring, striving to achieve our delivery objective.

Lastly, some of our stations have obsolete equipment which cannot be maintained anymore. Additional work is being undertaken to identify these stations and determine the best course of action. This will be by either replacing the obsolete equipment or replacing the whole station with a standard unit.

In every cases, we reassess the condition of the network and reduce the number of stations where possible, while maintaining the requirements of our security of supply policy.

7.4 LINE AND SERVICE VALVES

Lines and service valves represent 1% of our asset base. Table 7.7 summarises our lifecycle plans for line and service valves. We carry out the same inspection, operation and maintenance plan for line and service valves. To facilitate the reading, the data presented in this section concerns only line valves.

Table 7.7: Line and Service Valves Lifecycle Activities.

ASSET TYPE	QUANTITY	LEAKAGE MANAGEMENT – INSPECTION FREQUENCY	OPERATION AND MAINTENANCE PLAN	RENEWAL PLAN
IP Valves	606 (live) 928 (total)	Yearly	Yearly inspections at the same time as leak surveys	None
MP Valves	1135 (live) 1716 (total)	Yearly	Yearly inspections at the same time as leak surveys	None
LP Valves	138 (live) 210 (total)	Yearly	Yearly inspections at the same time as leak surveys	None

7.4.1 CURRENT ASSET CONDITION

Most of the valves we operate on the network are located underground. As the main failure risk for pipes is leakage, we operate the valves regularly to ensure they are able to perform their isolation function should a leak or a major event occur.

In order to define asset condition, we look at the defect rate for each asset class which includes leakage and seized mechanisms. When reviewing defects, we have not encountered any instances where the valve was in such a poor condition that we needed to replace it.

The table below summarises the condition of line valves, classified by pressure regime.

Table 7.8: Line Valves Asset Condition.

ASSET TYPE	QUANTITY	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE UNKNOWN	DATA ACCURACY
IP Valves	928	0.00%	0.41%	56.40%	8.52%	34.68%	2
MP Valves	1716	0.00%	0.59%	48.59%	16.95%	33.87%	2
LP Valves	210	0.00%	0.17%	35.08%	30.49%	34.26%	2

7.4.2 OPERATION AND MAINTENANCE PLANS

Our network configuration is fixed and valves are not operated unless there is an emergency or planned isolation activities. Isolation valves that separate different pressure systems are clearly identified and usually padlocked to prevent their operation.

Line valves are inspected on a yearly basis. As part of this inspection we make sure that:

- No gas leaks from the valves or their surroundings
- The valves are accessible and clearly located
- The valve lids are sound and do not present a risk for the public
- The valves are properly lubricated and can operate half way (if not padlocked)
- Corrosion levels are acceptable

If a valve fails, we assess whether we should replace, refurbish or permanently decommission it on a case-by-case basis.

7.4.3 RENEWAL PLAN

On the IP pipelines especially, we plan to proactively renew valves that are critical for the isolation of the network if a major event were to occur.

For other valves, based on the asset condition and very low fault rates, we have no planned replacement.

7.5 SPECIAL CROSSINGS

Special crossings assets are used to enable pipelines to cross rivers, railways, roads, whether above ground (bridges) or underground (generally using ventilated casings). Table 7.9 summarises our lifecycle plans for line and service values.

Table 7.9: Special Crossings Lifecycle Activities.

ASSET TYPE	QUANTITY	LEAKAGE MANAGEMENT – INSPECTION FREQUENCY	OPERATION AND MAINTENANCE PLAN	RENEWAL PLAN
IP Crossings	81 (live) 105 (total)	3-monthly to yearly	Yearly inspections	None

MP Crossings	211 (live) 286 (total)	3-monthly to yearly	Yearly inspections	None
LP Crossings	7 (live) 8 (total)	3-monthly to yearly	Yearly inspections	None

7.5.1 CURRENT ASSET CONDITION

The condition of special crossings is generally related to the pipes they carry. If we observe corrosion on pipe supports (for bridge crossings) this is dealt with within a year of its discovery through our defect process. For river crossings, if the pipe is located under the river bed, it is possible that the river erosion leads to the pipe exposure as we have experienced in Hutt Valley (refer to Section 8.3).

We are reviewing the existing standard crossing design to ensure they cater properly for thermal expansion. The result of the review could lead to additional work during the planning period.

The table below summarises the condition of special crossings, classified by pressure regime.

Table 7.10: Special Crossings Asset Condition.

ASSET TYPE	QUANTITY	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE UNKNOWN	DATA ACCURACY
IP Crossings	105	2.85%	1.20%	72.55%	0.51%	22.89%	2
MP Crossings	286	0.00%	1.76%	69.43%	2.59%	26.23%	2
LP Crossings	7	0.00%	0.00%	90.30%	0.61%	9.09%	2

7.5.2 RENEWAL PLAN

As discussed above, we are not currently planning any programme to renew crossings. If renewals are required, as is the case with the Hutt River IP crossing described in Section 8.3, they are handled on a case-by-case basis.

Figure 7.2: Bridge Crossing in Hawkes Bay

7.6 MONITORING AND CONTROL SYSTEMS

Monitoring and control systems are a key part of our network infrastructure. Utilisation of the information they provide is a fundamental part of our improvement initiatives. Table 7.11 summarises our lifecycle plans for monitoring and control systems.

Table 7.11: Monitoring and Control Systems Lifecycle Activities.

ASSET TYPE	QUANTITY	INSPECTION FREQUENCY	OPERATION AND MAINTENANCE PLAN	RENEWAL PLAN
Remote terminal unit	63	Inspection with the DRS	N/A	Upgrade from RY16

7.6.1 CURRENT ASSET CONDITION

We are not currently using any control functions and don't see a need to do so over the planning period, which means our system is used for real-time monitoring only.

However our system experiences intermittent faults on some transducers. Whilst we are investigating the possible causes for these issues, it reflects the lack of support for this system discussed in the 2013 AMP. With a strain on our specialist IS resources, we have put on hold our replacement programme until a detailed needs analysis can be completed.

The table below summarises the condition of our SCADA remote terminal units.

Table 7.12: Monitoring and Control Systems Asset Condition.

ASSET TYPE	QUANTITY	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE UNKNOWN	DATA ACCURACY
Remote Terminal Unit	63	0%	0%	41.27%	58.73%	0%	4

7.6.2 OPERATION AND MAINTENANCE PLANS

The SCADA system operation is totally autonomous and data transfer is done via the national mobile phone network. We inspect the transducers as part of the DRS inspection programme.

7.6.3 RENEWAL PLAN

Once our overall asset management strategy has been defined, we intend to identify the best option to upgrade the system.

7.7 CATHODIC PROTECTION SYSTEMS

Powerco has 26 cathodic protection systems deployed within our network. These assist with maintaining and monitoring the condition of our steel pipes. Table 7.13 summarises our lifecycle plans for cathodic protection systems.

Table 7.13: Cathodic Protection Systems Lifecycle Activities.

ASSET TYPE	QUANTITY	INSPECTION FREQUENCY	OPERATION AND MAINTENANCE PLAN	RENEWAL PLAN
Cathodic Protection	26	N/A	Monthly inspections	In progress

7.7.1 CURRENT ASSET CONDITION

We have engaged consultants to help us assess the operation of our CP systems. Their recommendation showed that, while some systems are generally operating within specification (e.g. New Plymouth), others, such as Palmerston North require renewal works.

In addition, we have experienced some abnormal operating conditions due to the presence of stray currents on the pipelines which are a posing a risk to the good operation of CP systems.

The table below summarises the condition of our cathodic protection systems.

Table 7.14: Cathodic Protection Systems Asset Condition.

ASSET TYPE	QUANTITY	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE UNKNOWN	DATA ACCURACY
Cathodic Protection	26	0.00%	6.10%	56.61%	6.10%	31.19%	3

7.7.2 OPERATION AND MAINTENANCE PLANS

Cathodic protection systems typically require little maintenance, but this is dependent on specific ground conditions. Typical operation and maintenance activities include setting operating parameters, checking joints and, where necessary, replacing anodes.

Only systems with impressed current require operating parameters to be set. These parameters are set on a once-only basis to ensure that the ground's potential is above the pipe's potential. Changes to the settings are made only when a fault has been detected during inspections.

We check and record the potentials, current and electrical bonds at joints on a one, two, three or six-monthly basis during inspections.

Cathodic protection systems are currently maintained on a run-to-failure basis for rectifiers and bonds. Anodes are maintained based on condition: we analyse the variations we observe from the current and potentials inspections and decide on a case-by-case basis what interventions, if any, are required.

7.7.3 RENEWAL PLAN

We have an ongoing renewal programme across our main IP networks reconfigure or renew our CP systems. We will spend up to $450k per year over the next three to five years to complete this programme. Once completed, we will investigate the remainder of our steel networks.

7.8 ASSET LIFECYCLE PLAN SUMMARY

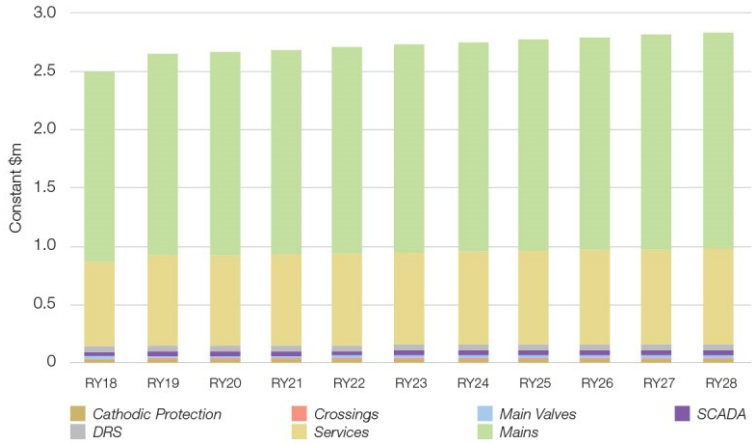
The following table summarises the various maintenance and renewal activities we currently undertake, and their frequencies.

Table 7.15: Lifecycle Activities Summary.

ASSET TYPE	INSPECTION FREQUENCY	OPERATION AND MAINTENANCE PLAN	RENEWAL PLAN
Main and Service pipes	1-to 5-yearly	Surveyed as part of leakage management Steel pipelines are monitored through DCVG surveys, and CP system performance	Pre-85 PE
DRS	Monthly (gas gate) to yearly (other stations)	Inspections at the same time as leak surveys	Ongoing 10-yearly inspection/ refurbishment Safety risk Mitigation Rationalisation
Line and Service valves	Yearly	Yearly inspection at the same time as leak surveys	IP Valve
Special Crossings	3-monthly to yearly	Yearly inspections	None
Monitoring and Control Systems	N/A	Inspected with DRS	Upgrade pending
Cathodic Protection Systems	N/A	Monthly inspections	In progress

Across the planning period, we expect to spend a minimum of $2m every year in routine and corrective maintenance and inspection directly on the assets. This includes all costs related to leak-survey activities. The breakdown of this cost per asset category is shown in Figure 7.3 below.

Figure 7.3: Breakdown of the Routine and Corrective Maintenance and Inspection Expenditure Forecast per Assets (excl. non-asset activities).



8 NETWORK AND NON-NETWORK PLANS

In the previous sections, we have described our objectives of delivering gas safely and efficiently, how our current assets enable us to achieve this, how we make our strategic decisions and develop network plans, and how we are structured to deliver them.

In this section, we describe what these decisions mean for each region covered by our network.

For each region, we will describe the major programme of works that we have forecasted. We have a strong focus on the safety and delivery objectives. You will see the options we have considered so far and those we prefer based on cost, efficiency and ability to deliver. The list of projects in this section is providing greater levels of detail on a three to five-year horizon. When possible, we extended this vision to 10 years.

The forecasts regarding future demand referenced in this section are detailed in Section 6. The network development assumptions are based on the councils, developers and commercial information, and translated into the growth projects described in each section.

8.1 SUMMARY

The two primary drivers for network development are described in Section 6 and driven by our Delivery and Efficiency strategies. These include aspects such as:

- The rate of demand growth
- Network capacity and utilisation
- Network reliability
- Efficiency and location of DRSs
- Optimisation of our investment

Together, these form the basis for our network development plans. Table 8.2 summarises the major development plans for each region within our network that are required to achieve our performance targets. It also gives the current and expected performance levels if no projects are carried out. The proposed projects are detailed in Sections 8.2 to 8.7. These projects are also summarised in the Information Disclosure schedules included in Appendix 2.

The projects included in the table do not consider post-2024. This is reflective of our current knowledge and understanding of the network performance and our planning being less accurate after a five-year horizon.

Table 8.1: Network Status Key.

STATUS	NETWORK PERFORMANCE AND MAXIMUM PRESSURE DROOP
🟢	Satisfactory (<40%)
🟡	Low-pressure (>40%)
🟠	Very low-pressure (>80%)
🔴	Loss of supply

Table 8.2: Development Plan Summary.

REGION	NETWORK	CURRENT PRESSURE PERFORMANCE AND DROOP	PLANNING PERIOD (IF STATUS QUO)	PROPOSED PROJECTS	DELIVERY TARGET AND BUDGET
Wellington (Section 8.2)	Wellington CBD	Status: 🟡	Status: 🔴	CBD upgrade	2022 - $4.6m
	Wellington North	Status: 🟡	Status: 🟠	Granada North and Churton Park overlays	2022 – $25k
	Wellington 25kPa	Status: 🟡	Status: 🟡	CBD upgrade	See Above
	Karori	Status: 🟡	Status: 🟡	None - active monitoring	
	Wellington IP	Status: 🟢	Status: 🟡	Active monitoring and Karori project	2023 – $550
	Chartwell	Status: 🟢	Status: 🟡	None – routine monitoring	
	Eastern Suburbs	Status: 🟢	Status: 🟡	None – routine monitoring	
	Other networks	Status: 🟢	Status: 🟢	None – routine monitoring	
Hutt Valley and Porirua (Section 8.3)	Pauatahanui IP	Status: 🟡	Status: 🟡	None - active monitoring	
	Belmont LIP	Status: 🟢	Status: 🟡	Upper Hutt IP interconnection	2024 - $700k

REGION	NETWORK	CURRENT PRESSURE PERFORMANCE AND DROOP	PLANNING PERIOD (IF STATUS QUO)	PROPOSED PROJECTS	DELIVERY TARGET AND BUDGET
				Avalon/Belmont DRS rationalisation	2020 - $1.6m
	Kelson	Status:	Status:	Kelson point of supply	2021 – $200k
	Lower Hutt LMP	Status:	Status:	None – Active monitoring	
	Wainuionmata	Status:	Status:	Wainuiomata rationalisation	2020 - 400k
	Other networks	Status:	Status:	None – routine monitoring	
Taranaki (Section 8.4)	New Plymouth MP	Status:	Status:	None – active monitoring	
	Waitara MP	Status:	Status:	Lepperton pressure elevation	2019 - $65k
	Bell Block North (New Plymouth)	Status:	Status:	Nugent St overlay	2019 - $60k
	New Plymouth IP	Status:	Status:	None – active monitoring	
	Patea	Status:	Status:	None – active monitoring	
	Manaia	Status:	Status:	None – active monitoring	
	Other networks	Status:	Status:	None – routine monitoring	
Manawatu and Horowhenua (Section 8.5)	Palmerston North LMP	Status:	Status:	Palmerston North rationalisation	2024 - $1m
	Palmerston North MP West	Status:	Status:	None - Active monitoring	
	Summerhill	Status:	Status:	Summerhill reinforcement	2023 - $250k
	Milson	Status:	Status:	Milson line rationalisation	2020 - $450k
	Feilding	Status:	Status:	None - active monitoring	
	Foxton	Status:	Status:	None - active monitoring	
	Levin	Status:	Status:	None - active monitoring	
Hawkes Bay (Section 8.6)	All networks	Status:	Status:	None - routine monitoring	

In addition, our non-network investments described in Sections 8.7 and 8.8 are focused on increasing our performance in Safety and Hazard management, delivering and analysing more accurate information through efficient systems, as well as increasing skills and capacity of our workforce.

Note that in this edition of the AMP, we have chosen to highlight regions where growth occurs as opposed to individual development projects as we have done in the past. This reflects the dynamic nature of competing developers that will release land to the market by phases, based on the progress of their previous developments.

8.2 WELLINGTON

8.2.1 CURRENT PERFORMANCE AND FUTURE DEMAND

Wellington CBD remains constrained in some parts of the network. The pressure elevation programme we started in 2013 has allowed us to increase pressure in areas where demand was the highest. Works are ongoing, and the entirety of the CBD pressure system will be operating at a new operating pressure in RY22. This is discussed in Section 8.2.3.1.

Wellington's 25kPa network currently continues to experience pressure droops that breach our limit of 40% droop at its extremities. Once the CBD pressure upgrade is complete, both pressure system will be merged, and we expect the pressure to increase in the Mt Cook area. Enhancements to the Dover St station in the southern end of the city (Island Bay) will increase capacity and will support growth. We still expect localised pressure droops that we will monitor.

In the northern suburbs, the city is expanding with new buildings and subdivisions and it is expected that the city will eventually form one continuous urban area all the

way to Tawa. Some low-pressure points have been identified on this part of the network and will be remedied during the planning period. Ongoing work will also be required to accommodate growth as the city expands.

Towards the East, increased commercial loads are creating minor constraints that we will continue to monitor.

Wellington LIP system remains under scrutiny as we monitor the impact of the network reconfiguration. We will start investigations to increase performance on the Karori lateral in RY22.

The remainder of Wellington's networks have been upgraded in the last 10 years from low to medium pressure network and are more resilient.

8.2.2 SAFETY PROJECTS

With the population concentration in the area, our risk levels are usually higher than rural areas. To mitigate these risks, we are implementing more frequent leak surveys, specific urban design with traffic protection and signage.

The use of "cocon" units such as the one shown in Figure 8.1 is one of the mitigations we use in urban areas to reduce the risk of interference with the assets.

Figure 8.1: View of a Cocon Unit and an Above Ground Station.

8.2.3 DELIVERY PROJECTS

Wellington CBD used to be a cast-iron network. It has been upgraded to modern PE by inserting smaller diameter pipes in the cast-iron pipes. While the inserted PE has an MP rating, the pressure was maintained at 7kPa (LP network) to prevent the need to replace GMS equipment.

While this was a cost-effective solution at the time, the reduction in diameter means lower capacity on the network. The LP pressure has been increased to 10kPa to continue meeting demand. In 2013, we initiated a multi-year project to permanently raise the pressure to 25kPa in the CBD.

8.2.3.1 QUALITY OF SUPPLY

1) Wellington CBD pressure upgrade

In our previous AMPs, we described our strategy to upgrade pressure in part of the CBD to 25kPa. We also explained the options explored at the time, and why this is the most cost-efficient solution. This project started in 2013 and is due to continue until RY22. We will be spending between $2m and $2.8m every year to upgrade the network and connected equipment.

For this highly complex project, we have also reviewed our project management and contracting strategy to ensure a safe, on time and cost-efficient delivery. We use the industry-standard EPCM (Engineering, Procurement, Construction Management) model.

Refer to item 1 on Figure 8.2.

2) Karori IP investigation and Karori road interconnection

With the increase of load in the suburb of Karori, we are seeing strain on the IP lateral servicing the area, and on the medium pressure system. Starting RY20, we will investigate what reinforcement options are available in the area, including:

- Building trunk mains between existing point of supply
- Increasing the diameter of the IP pipeline
- Adding a new point of supply in the area

We will spend $50k in RY20 to investigate the options, and we have set aside $0.5m across RY22 and RY23 to build any reinforcement required.

Refer to item 2 on Figure 8.2.

3) Grenada North and Churton Park overlays

We anticipate that the demand growth resulting from subdivision activity around Grenada North and Churton Park will warrant several overlays to ensure pressure droops remains within the security of supply requirements.

We have identified three possible projects along Middleton Road, Mark Avenue and Wetschester Drive. Depending on the results of our pressure monitoring programme, we will determine which projects are required.

We will spend between $260k and $280k per year between RY21 and RY22 to complete the works.

Refer to item 3 on Figure 8.2.

8.2.3.2 SYSTEM GROWTH

Growth in this region is happening on the northern part of the network. Wellington City Council's urban plans show the extension of the city along the state highway to Porirua, and this aligns with the plans we have discussed with potential developers.

Growth in the area is set to occur around:

a) Churton Park
b) Grenada North
c) Woodridge
d) Newlands
e) Karori
f) Island Bay

8.2.3.3 RELIABILITY PROJECTS

#) Dover Street DRS renewal

As part of our DRS renewal programme described in Section 7.3.3, Dover Street DRS will be replaced across RY18 and RY19.

We will spend $60k in RY18, and $350k in RY19 to remove the existing station and replace it by an underground cocon unit.

Refer to item "#" on Figure 8.2.

@) Electrical voltage mitigation

Wellington IP pipeline is made of steel and is prone to stray and induced currents as described in sections 7.2.1 and 7.7. A project to ensure the adequate management of the risk, and the good operation of the CP system is currently underway on all our IP pipelines. We will spend a total of $790k in both OPEX and CAPEX from RY18 to RY20 to upgrade the CP system and associated equipment.

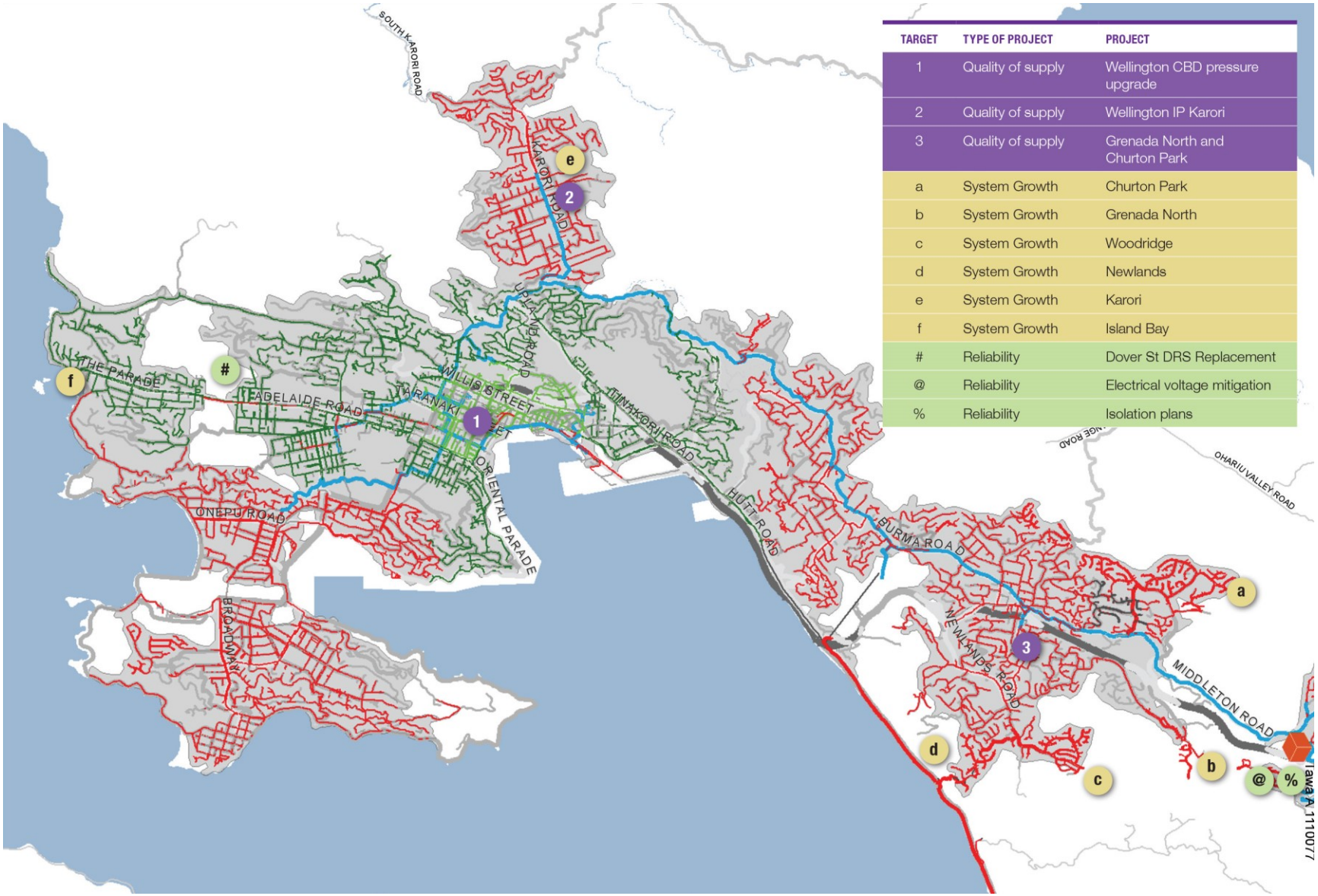
Refer to item "@" on Figure 8.2.

%) Isolation plans and resilience

As we increase the resilience of our networks against catastrophic events, we are installing new isolation valves throughout the Wellington network. This will enable us to easily and quickly isolate the network in case of a major event (e.g. earthquake). This is an ongoing project across all our regions, but Wellington will be the first network to be complete by the end of RY19.Figure 8.2: Network Projects in the Wellington Region.

Refer to item "%" on Figure 8.2.

Figure 8.2: Network Projects in the Wellington Region.



TARGET	TYPE OF PROJECT	PROJECT
1	Quality of supply	Wellington CBD pressure upgrade
2	Quality of supply	Wellington IP Karori
3	Quality of supply	Grenada North and Churton Park
a	System Growth	Churton Park
b	System Growth	Grenada North
c	System Growth	Woodridge
d	System Growth	Newlands
e	System Growth	Karori
f	System Growth	Island Bay
#	Reliability	Dover St DRS Replacement
@	Reliability	Electrical voltage mitigation
%	Reliability	Isolation plans

8.3 HUTT VALLEY AND PORIRUA

8.3.1 CURRENT PERFORMANCE AND FUTURE DEMAND

Hutt Valley and Porirua networks are mainly operating in the medium pressure range, supplying residential customers. The networks in Hutt Valley run on a large geographical area, from the gas gate in Belmont as far as Upper Hutt in the North, Eastbourne and Ngauranga Gorge on the South. In Porirua, the networks are supplying an area going from Plimmerton to Whitby (Mana), including Titahi Bay.

Plimmerton IP, and Lower Hutt LMP systems remain constrained. However, we consider this situation acceptable as the growth planned won't impact those systems. We will maintain an active monitoring.

With large subdivision growth happening in this region, reinforcement work will need to be carried out on other networks approximatively five years from now.

8.3.2 SAFETY PROJECTS

#) Porirua CBD DRS rationalisation

Porirua CBD is fed by seven small, distinct pressure systems, each of them is fed by an above ground station. The large number of stations increases the chances of third party damage. Flow modelling studies showed that those seven systems could be linked, and five stations could be replaced by a single underground station. The reduction in the number of stations will also reduce the amount of maintenance required on the network.

This project was initially due to be completed in RY17. Field resources availability delayed the start of this project, and we are now expecting the completion of this project in RY19.

Refer to item "#" on Figure 8.3

8.3.3 DELIVERY PROJECTS

To reach an acceptable level of performance and meet out delivery objectives, the following major projects are scheduled during the planning period in the region.

8.3.3.1 QUALITY OF SUPPLY

1) Kelson additional point of supply

Slow growth has been happening in Kelson. It is currently fed by a single point of supply with no built-in redundancy. As the number of customers increase, we will replace the ageing, above ground, single stream station with an underground station with built-in redundancy to meet our quality of supply standards.

We forecast to spend $200k in RY21, however the Avalon/Belmont rationalisation project described below might drive us to revise the timing to reduce construction costs.

Refer to item 1 on Figure 8.3.

2) Wallaceville additional point of supply

The growth in the Wallaceville suburb will require us to add a new point of supply to meet our security of supply policy. Once the number of customers on this network exceeds 500, we will install a cocon unit around Wilford St, allowing us to decommission the smaller Lane St DRS. Alternatives options include the extension of the IP pipeline to Dante Road.

We forecast that the pressure threshold will be met in RY20, at which stage we expect to spend $150k for the installation of the station. In a high growth scenario, additional work will be required in RY22. We will then spend an additional $400k to reinforce the network.

Refer to item 2 on Figure 8.3.

3) Wainuiomata rationalisation

The Wainuiomata pressure system has been identified for rationalisation to reduce the number of stations supplying the network. Two options have been identified; the first is to reduce the number of stations from four to three and the second to reduce the number of stations from four to two with some mains reinforcements (interconnections and overlay of small diameter with larger diameter). We will spend $400K across RY19 and RY20 for construction.

Refer to item 3 on Figure 8.3.

4) Upper Hutt IP interconnection

Growth forecasts show that the IP pipeline in Upper Hutt will become constrained due to the small diameter of the pipe along Fergusson Drive. We are considering three options:

- Laying 300 to 500m of 100mm steel pipeline. This allows us to maintain a unique type of material and allow us the possibility to increase the pressure in the future.
- Laying 300 to 500m of 100mm high pressure polyethylene pipeline. This is a cheaper option, but will restrict our ability to increase the pressure if required in the future.
- Increasing the pressure to 1,200kPa across the whole IP system. As some residential customers are connected to this network, additional studies need to take place to gauge the additional work required.

Depending on our preferred option, costs could vary from $300k to $1m. We will forecast $700k for RY24, and we will refine the approach during the planning period.

Refer to item 4 on Figure 8.3.

8.3.3.2 SYSTEM GROWTH

Porirua subdivision growth is high. In the Hutt Valley, only small subdivisions are being developed, which should not impact our network. However there are major plans to increase the city's footprint.

The primary areas of expected growth, for which we are planning additional supply capacity to, are:

a) Whitby (Porirua)

b) Staithes Drive North (Porirua)

c) Aotea (Porirua)

d) Keneperu (Porirua)

8.3.4 RELIABILITY PROJECTS

@) Riddlers Crescent

Riddlers Crescent DRS is an old, oversized station located in a residential area next to the railway line. Several leaks were identified in the compound, which made the repair of the station uneconomical. We have removed this station in RY18 and replaced it by three underground cocons.

Refer to item "@" on Figure 8.3.

%) Avalon/Belmont DRS rationalisation

The Avalon station is located in a Powerco-owned building containing two DRS servicing Lower Hutt. It is in a zone prone to flooding, on the border of a public park. The station is at the end of its serviceable life and the flood risk drove the decision to relocate this station.

After an option analysis, it was deemed that the best location for the new station was in Belmont, on the other side of the river, where another station already feeds from the IP pipeline. As part of the project, we are taking the opportunity to rationalise the supply into adjacent suburb, including the removal of an above-ground station located close to a school.

This multi-year project was started in RY18 and will be completed in RY20. We will spend a total of $1.6m to procure and install new cocon units and decommission and reinstate the old site.

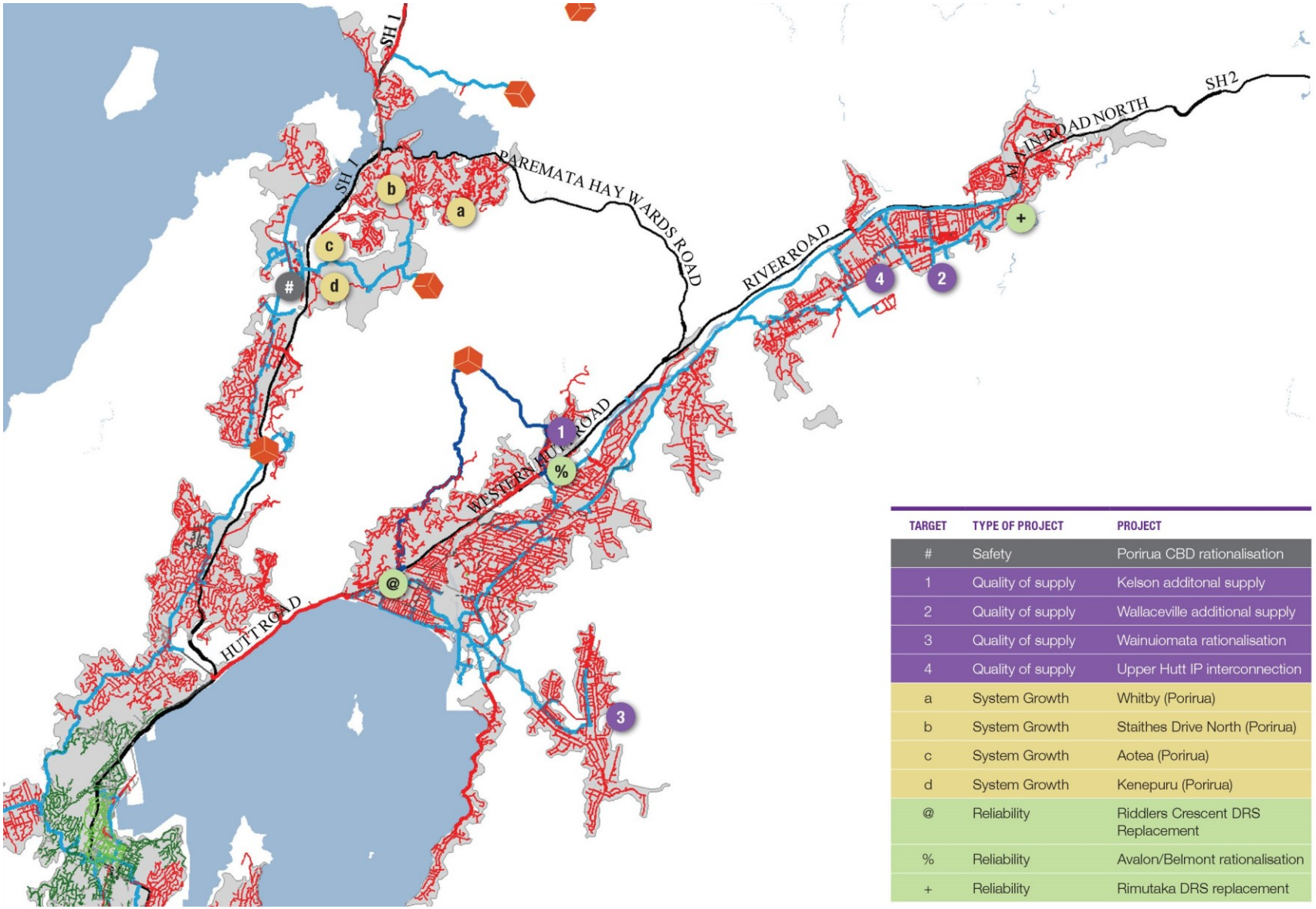
Refer to item "%" on Figure 8.3.

+) Rimutaka DRS

In Upper Hutt, the Rimutaka DRS is located next to an electricity substation. Being at the end of its economic life, we will relocate the station. With the design and procurement complete in RY18, we have forecasted $220k in RY20 to install the station.

Refer to item "+" on Figure 8.3.

Figure 8.3: Network Projects in the Hutt Valley and Porirua Regions.



TARGET	TYPE OF PROJECT	PROJECT
#	Safety	Porirua CBD rationalisation
1	Quality of supply	Kelson additonal supply
2	Quality of supply	Wallaceville additional supply
3	Quality of supply	Wainuiomata rationalisation
4	Quality of supply	Upper Hutt IP interconnection
a	System Growth	Whitby (Porirua)
b	System Growth	Staithes Drive North (Porirua)
c	System Growth	Aotea (Porirua)
d	System Growth	Kenepuru (Porirua)
@	Reliability	Riddlers Crescent DRS Replacement
%	Reliability	Avalon/Belmont rationalisation
+	Reliability	Rimutaka DRS replacement

8.4 TARANAKI

8.4.1 CURRENT PERFORMANCE AND FUTURE DEMAND

Our networks in the Taranaki region are of various sizes and performance. The latest results of our pressure monitoring programme show that most of the networks are within the 40% droop limit, therefore do not require any major investment in the short-term.

There are six networks that exceed 40% droop in New Plymouth (three networks), Patea, Manaia, and Waitara. Considering the decrease in consumers in Patea and Manaia, we have decided to hold reinforcement until any significant development is flagged.

In New Plymouth, previous years' projects have increased the performance of all of the networks. On the medium pressure network, only localised issues have been identified. Bell Block north and the New Plymouth IP systems are under active monitoring.

In Waitara, seasonal pressure drops have occurred in the township of Lepperton. Works to be carried in RY18 will see the pressure issues remedied.

Looking at future demand, our high-level study in the region flags that the networks in Hawera and Stratford could reach the 40% droop in 10 years if high growth occurs. We will keep a watching brief on them as part of our pressure-monitoring programme.

8.4.2 SAFETY PROJECTS

The network currently meets our safety standards.

8.4.3 DELIVERY PROJECTS

New Plymouth networks are all supplied from the north side of the city where the IP pipeline is located, with strategic mains going southwards along the main road infrastructure. The size of the pipes constituting these strategic mains varies from 50mm to 100mm, which creates bottlenecks in some areas. In the long-term, to increase security of supply we are looking at interconnecting these mains in the southern suburbs on both an opportunistic and planned approach as growth occurs.

8.4.3.1 QUALITY OF SUPPLY

1) Lepperton

At the southern extremity of the Waitara network, Lepperton hosts several poultry sheds. Those commercial loads put the single pipeline built between the two towns under high constraints and we need to increase the capacity of this network to maintain sufficient headroom to accommodate current demand.

Replacing the pipeline with a bigger diameter is not economically viable without significant customer contribution. We plan to increase the pressure in this area to maintain acceptable performance with the current load, but we will not be able to accommodate further work without significant investment from those users.

We will spend $65k in RY18 and RY19 to carry the works.

Refer to item 1 on Figure 8.4.

2) Nugent Street overlay

A small diameter main is resulting in low pressures in the southwest area of Bell Block North. An overlay of this pipe in a larger diameter will bring the pressures in this network up to acceptable levels. The project initially planned for RY17, has been deferred to RY19.

We forecast to spend $60k in RY19.

Refer to item 2 on Figure 8.4.

8.4.3.2 SYSTEM GROWTH

In the next five years, we expect to reticulate several subdivisions in New Plymouth in a staged manner to align with the developments. In the longer term, we will also support the council's plans to expand the city along Smart Road.

The primary areas of growth in the region are:

a) Cyrus Street

b) Fernbrook

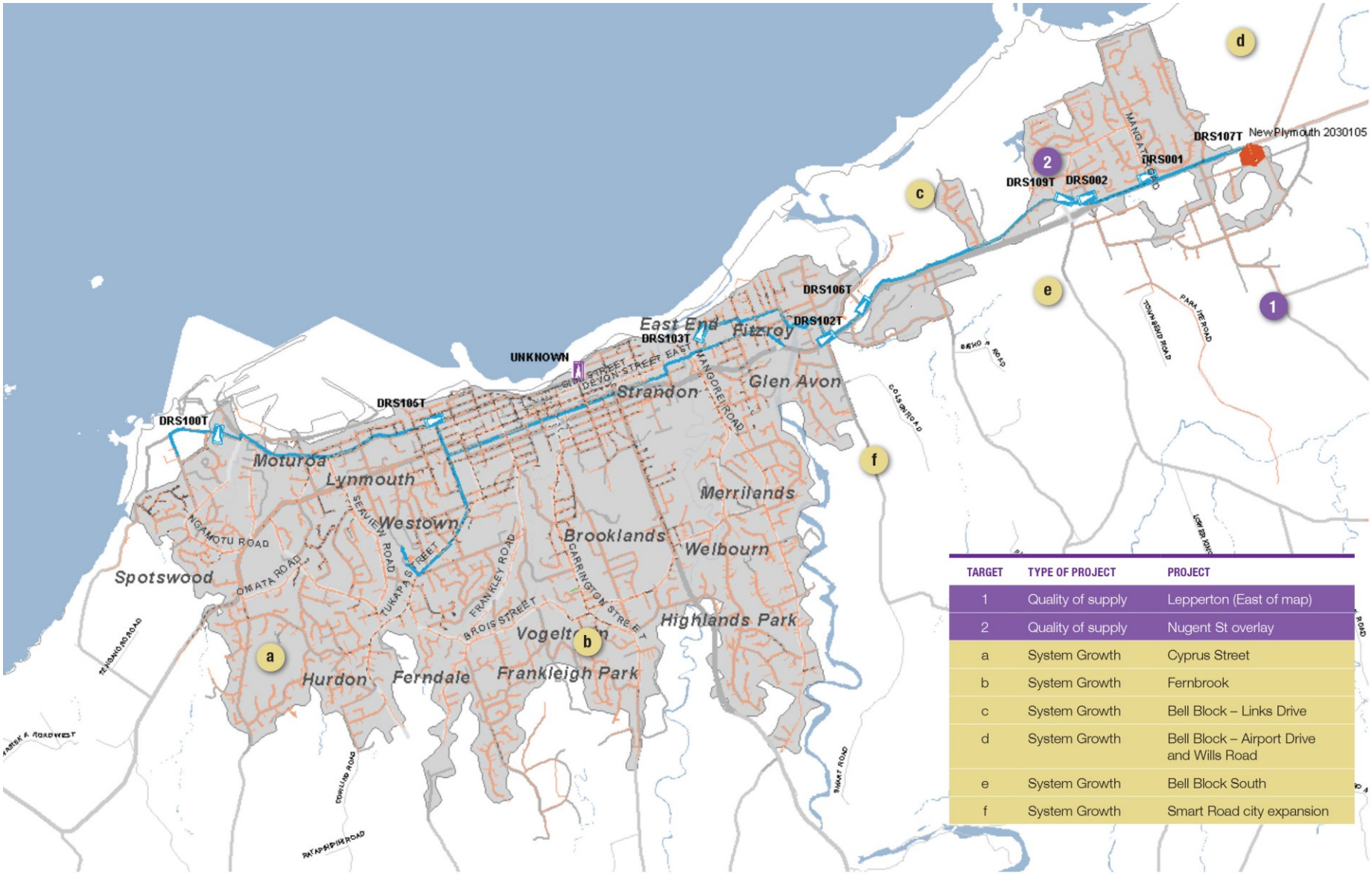
c) Bell Block – Links Drive

d) Bell Block – Airport Drive and Wills Road

e) Bell Block South

f) Smart Road city expansion

Figure 8.4: Network Projects in New Plymouth.



TARGET	TYPE OF PROJECT	PROJECT
1	Quality of supply	Lepperton (East of map)
2	Quality of supply	Nugent St overlay
a	System Growth	Cyprus Street
b	System Growth	Fernbrook
c	System Growth	Bell Block – Links Drive
d	System Growth	Bell Block – Airport Drive and Wills Road
e	System Growth	Bell Block South
f	System Growth	Smart Road city expansion

8.5 MANAWATU AND HOROWHENUA

8.5.1 CURRENT PERFORMANCE AND FUTURE DEMAND

Our networks in the Manawatu and Horowhenua mainly comprise small-town networks, usually supplying a few large commercial or industrial customers. In Palmerston North our third largest network in terms of customers, we have seen large commercial and industrial activity in recent years, creating strain on two networks.

Other networks currently operate at a satisfactory level. Feilding, Foxton and Levin are actively monitored for growth.

Palmerston North city is expected to grow significantly over the planning period. As well as subdivisions expanding the city, the city council is planning a major expansion on the eastern side of the city. This is accompanied by a significant industrial and commercial activity.

8.5.2 SAFETY PROJECTS

The network currently meets our safety standards.

8.5.3 DELIVERY PROJECTS

In Palmerston North, the Hokowhitu area within the city relies on small-diameter pipes. This was the last system running different operating pressures in summer (80kPa) and winter (100kPa).

Over the last planning period, we have permanently increased the pressure to 100kPa. Additional investigation showed that extra work is required to maintain performance levels when growth occurs.

8.5.3.1 QUALITY OF SUPPLY

1) Milson Line rationalisation

The Milson Line Rationalisation project aims at increasing the security of supply to the Milson and Cloverlea areas of Palmerston North. A combination of joining pressure systems, station renewals and mains interconnections will allow us to meet the minimum redundancy and capacity requirements for these networks. Additional benefits include a reduction in the number of stations down from six to three and the removal of three stations that were deemed to be in high consequence areas and at end-of-life.

We have begun project in RY18 with feasibility and design, and we will spend an additional 4$50k in RY19/20 to complete construction.

Refer to item 1 on Figure 8.5.

2) Palmerston North rationalisation

Palmerston North's network architecture is characterised by numerous small stations spread out across the city. As the stations reach their end of life, we will reconfigure the network to reduce their numbers while increasing capacity. We have set aside $1m between RY22 and RY24 to carry out this project.

Refer to item 2 on Figure 8.5.

3) Summerhill reinforcement

The growth occurring in Summerhill will put strain on the southern end of the network. We expect that by RY23, the pressure droop will breach our security of supply policy, and we will need to reinforce the network. We are investigating two options:

- Adding a new point of supply
- Increasing the pressure in the area

We will spend $250k in RY23 to complete this project.

Refer to item 3 on Figure 8.5.

8.5.3.2 SYSTEM GROWTH

We continue to see sustained growth in the region. In Feilding and Levin, new subdivisions are being connected to our network as they grow.

In Palmerston North, we continue to see growth in the following areas:

a) Eastern city expansion

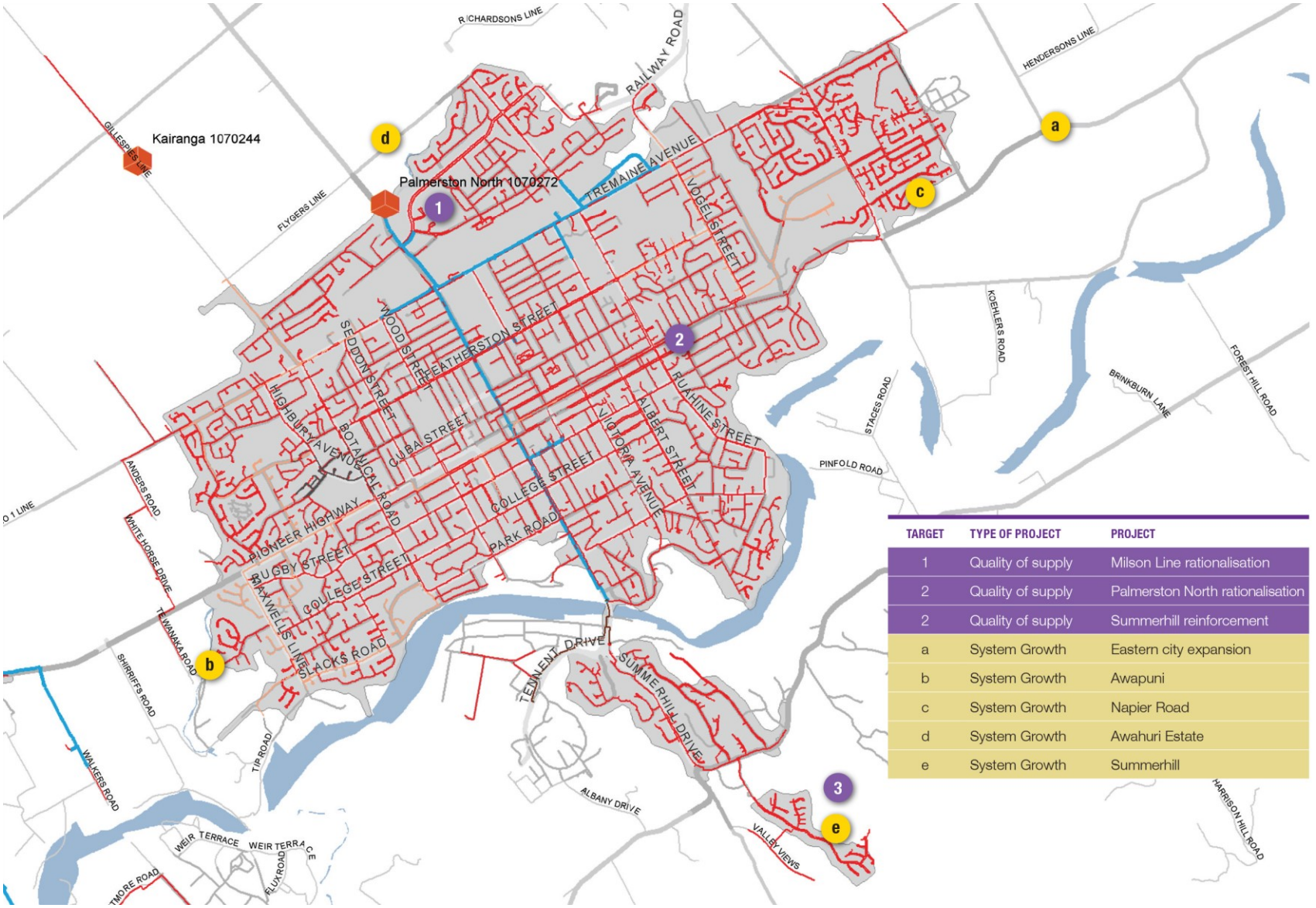
b) Awapuni

c) Napier Road

d) Awahuri

e) Summerhill

Figure 8.5: Network Projects in Palmerston North.



TARGET	TYPE OF PROJECT	PROJECT
1	Quality of supply	Milson Line rationalisation
2	Quality of supply	Palmerston North rationalisation
2	Quality of supply	Summerhill reinforcement
a	System Growth	Eastern city expansion
b	System Growth	Awapuni
c	System Growth	Napier Road
d	System Growth	Awahuri Estate
e	System Growth	Summerhill

8.6 HAWKES BAY

8.6.1 CURRENT PERFORMANCE AND FUTURE DEMAND

We operate three networks in Hawkes Bay. The network supplying Napier and Hastings conveys the highest volume of all of our networks due to the presence of large industrial customers.

These three networks in Hawkes Bay are currently able to meet the demand.

Growth in the region is supported by large subdivision activity in Napier and Hastings. The number and location of those growth areas will require reinforcement work on the network in Brooklands, Te Awa, and Hospital Hill. We are monitoring those developments and an additional point of supply or network interconnection will be looked at in due time.

8.6.2 DELIVERY PROJECTS

Whilst we have not identified any performance issues in the region, some growth project will require addition supply brought onto the newly developed areas.

8.6.2.1 QUALITY OF SUPPLY

We are currently reviewing the single supply to Havelock North. We are discussing with some industrial customers in the area. If they were to connect to our networks, we would reinforce the network.

8.6.2.2 SYSTEM GROWTH

Growth in the region is occurring in both Napier, Hastings and Havelock North. The main developments are:

a) Northwood (Hastings)

b) Frimley (Hastings)

c) Parklands (Napier)

d) Te Awa Estate (Napier)

e) Aratiki Road (Havelock North)

8.6.3 RELIABILITY PROJECTS

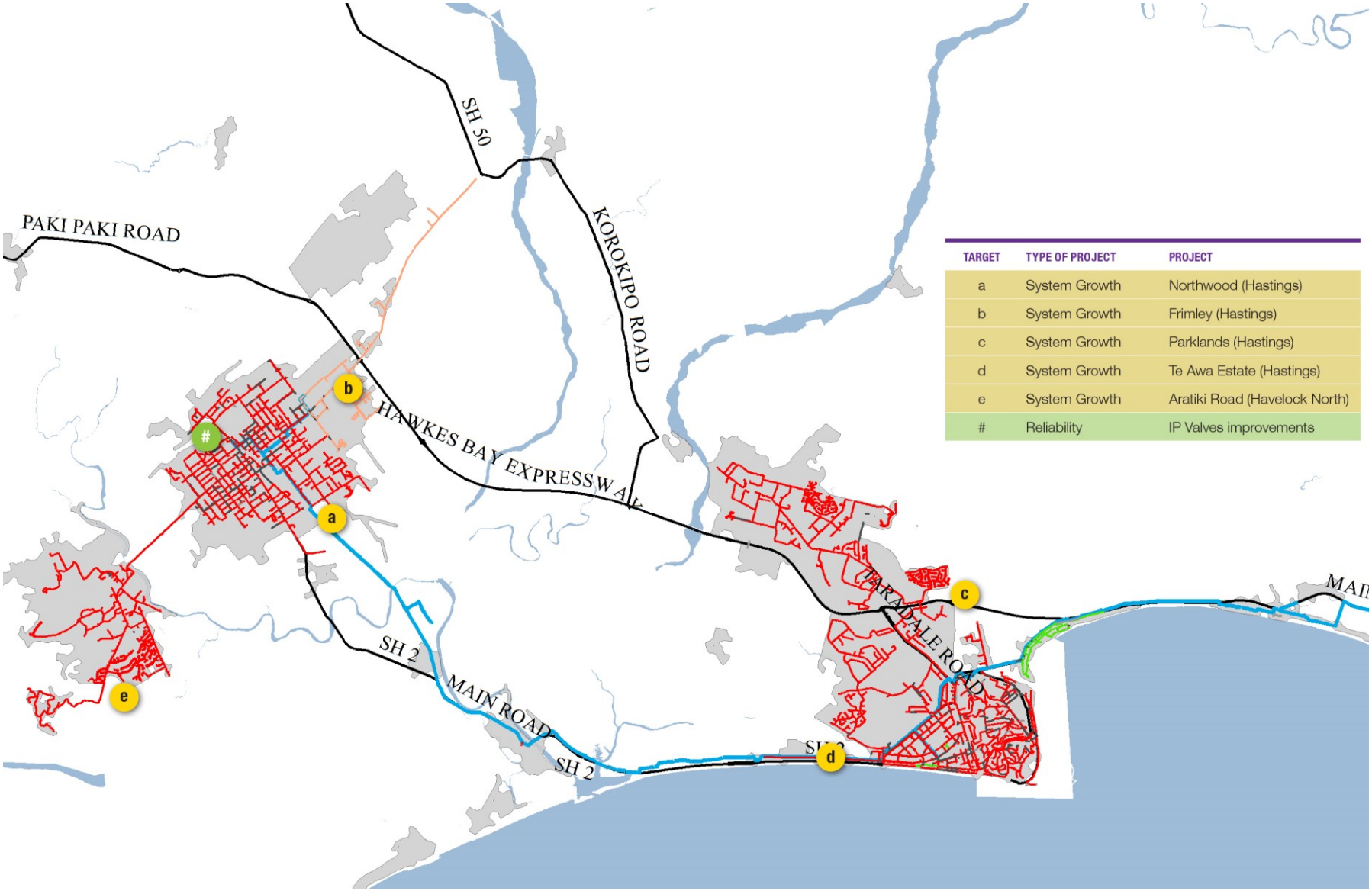
#) IP Valves improvements

Our intermediate pressure pipeline was built with large, hard to maintain isolation valves, located in vaults. In an effort to increase safety by removing enclosed spaces and reduce on-going costs, we are removing valves that are not used anymore, and building safe access to those that are required to operate the network.

We will spend $425k from RY18 to RY20 to carry out this project.

Refer to item “#” on Figure 8.6.

Figure 8.6: Network Projects in the Hawkes Bay Region.



TARGET	TYPE OF PROJECT	PROJECT
a	System Growth	Northwood (Hastings)
b	System Growth	Frimley (Hastings)
c	System Growth	Parklands (Hastings)
d	System Growth	Te Awa Estate (Hastings)
e	System Growth	Aratiki Road (Havelock North)
#	Reliability	IP Valves improvements

8.7 NON-NETWORK IMPROVEMENT PROGRAMMES

As detailed in Section 6, our information strategy is a key improvement initiative. Improvement of information systems also contribute to our strategies relating to safety, delivery, reliability and efficiency.

8.7.1 NEW FOUNDATIONS

We are currently undergoing a significant IT project to rationalise and simplify our system landscape, while gaining new capabilities through new tools. This multi-year programme, called New Foundations, will see our core enterprise asset resource planning system replaced by SAP by the end of RY19. This will comprise a new field mobility solution, and better access to data.

Building on this new core, we will then implement additional functionalities such as advanced risk management, health and safety, and billing as we retire systems that reach their end-of-life.

More information on our IS strategy can be found in Section 22 of our Electricity business' Asset Management Plan, available in the Electricity Disclosures section of our website (https://www.powerco.co.nz/publications/disclosures/electricity/).

Programmes of work are in progress within our Electricity business to replace the SCADA and outage management systems with best practice and modern technology. These projects will deliver a platform that we will utilise to foster closer interaction with our customers, enable greater real-time reporting and better analysis of asset information. Automation of maintenance management practices also continues to improve asset information and data on asset condition. It has the ability to use this information to drive an optimised renewal planning and condition-based maintenance programme. Programmes of work aligned to Powerco's FY2014-2018 Business Plan have been initiated to ensure we are working on the right projects at the right time, contributing to continuous improvement of our Asset Management practices and systems.

Business improvement programmes include:

- Automated maintenance management to simplify and automate business processes to permit the delivery of consistent, timely and accurate maintenance plans and work schedules;
- Enhance network improvement to provide easily accessible, timely and accurate information on network assets;
- Information management to realise the capability to manage information effectively within Powerco, including the provision of end-to-end knowledge management systems and processes; and
- Continuous improvement to release incremental improvements to systems and processes and to embed a continuous improvement culture at Powerco.

8.7.2 SAFETY AND HAZARD MANAGEMENT

The Gas Safety and Measurement Regulations require asset owners to have a Public Safety Management System that addresses how we operate our network to prevent serious harm to the public or significant damage to property. The regulations require an auditable regime for public safety management. Powerco Gas passed its first TELARC audit in May 2013 and has been regularly audited by Telarc since then. The audit process provided an opportunity for Powerco to review its existing safety management system, apply improvements where required, and set up a continuous improvement approach. An area of focus is to improve the means by which Powerco communicates about hazards to the people working on the assets.

A Gas Network Hazard Register has been established in our chosen application, Safety Manager. The register identifies the hazards applicable to Powerco employees, their contractors and the public. A copy of the register is provided to Powerco employees and their contractors. The register is reviewed and updated on a regular basis or as a result of an incident or investigation recommendations.

8.7.3 SUMMARY OF CURRENT IMPROVEMENT PROGRAMMES

Additional improvement initiatives are being undertaken in the planning period. These include:

- Continuation of our data quality programme, using new Foundations as a natural step to clean up and manage asset data
- Building of a new Network Operations Centre
- Certification to ISO 55000 (See below)

8.8 ASSET MANAGEMENT IMPROVEMENT PROGRAMME

We are committed to becoming certified against international asset management standards ISO 55000. In RY18, we went through an independent assessment against the requirements of the standard.

The results of this assessment are being processed at the time of writing. It is the view of the assessors, that we are close to the maturity level required for certification. Additional work is required to document clearly how we meet some of the requirements and how we manage competency.

In the next two years, we will:

- Document clearly the scope of the Asset Management System and associated processes
- Develop an action tracking tool to ensure potential non-conformance and continuous improvement actions are proactively managed
- Develop, document and follow a competency framework

These actions will be funded from our existing forecasts, as part of our business-as-usual continuous improvement activities.

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9 EXPENDITURE FORECASTS

9.1 EXECUTIVE SUMMARY

This section sets out forecast expenditure we anticipate will be required to operate, develop and maintain our networks to support our asset management objectives.

The information provided in this section summarises the more detailed discussions provided in sections 6 and 7. To avoid duplication, we have not restated the detailed drivers of investment in this section. Instead, we have focused on providing some high-level commentary and context for the estimates and the assumptions used to derive them. Where possible, we have provided applicable cross-references for readers who require more detailed information.

Delivering to our forecasts is a constant challenge. The size of the contracting market is limited, and material suppliers, such as pipe manufacturer, are scarce. The small market means that the programme can be, and often is, dictated by availability of contractors and resources.

To mitigate this risk, we work closely with the parties in the supply chain and manage a portfolio of projects across multiple years, that allows us to reschedule projects if one is delayed, to help us achieve our forecasts.

A summary of forecast capital expenditure (capex) and forecast operational expenditure (opex) over the planning period is provided in the figures below. A more detailed summary of forecast expenditure is provided in the tables at the end of this section. The graphs that follow show, in constant dollar terms as of 2018, forecast expenditures through to 2028/29.

Figure 9.1: Capital Expenditure Forecast (constant $).

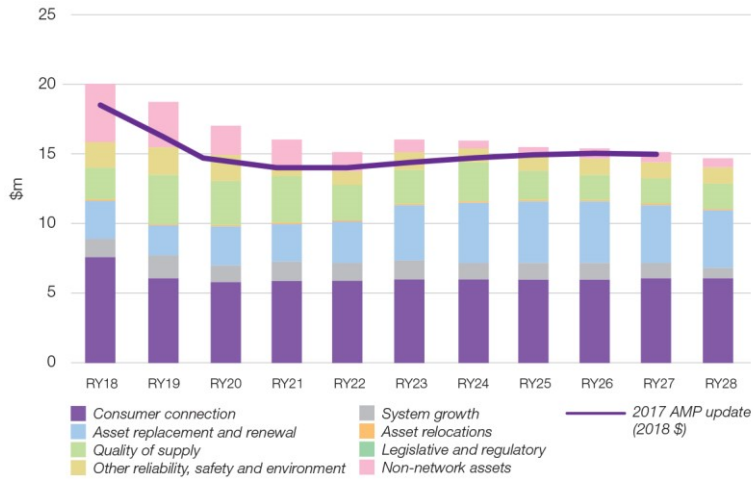
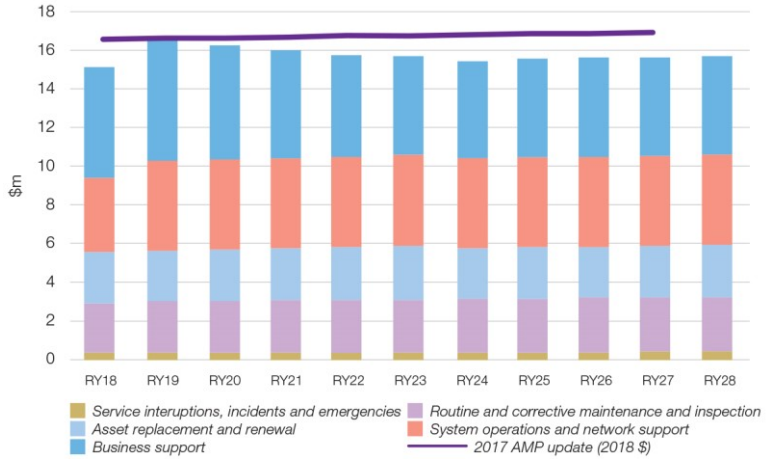


Figure 9.2: Operating Expenditure Forecast (constant $).



9.2 BACKGROUND

In general, the expenditure forecasts in this section have been developed using predictive forecasting techniques to estimate the work volumes that are applied to associated unit rates. The specific work to be completed is detailed in sections 7 and 8. However, the following general principles have been applied:

- In the case of maintenance and renewal-based expenditure, our estimates have been developed in response to the current and projected states of our assets as indicated by condition information, age profile and expected life, and the performance of our assets. The expenditure forecasts have been tailored to maintain asset condition and reliability performance.
- In the case of growth-related expenditure, we have undertaken a comprehensive analysis of current asset utilisation and simulated the effect of anticipated load growth on our networks to identify capacity and security-related issues that will require resolution during the planning period. Based on this analysis we have completed a regional assessment of the investments we believe will be required over the period.
- Individual replacement costs mainly rely on current market conditions, as opposed to historical costs. While historical costs are useful to understand particular conditions related an asset (e.g. hard to access, difficult ground conditions, etc.), we adapt our contractual agreements with our service providers based on our anticipated needs, and appropriate risk-sharing. For example, we have negotiated rates for high-volumes residential customer connections and regulatory-driven

schedule maintenance. Both allow to have a reasonable amount of certainty on costs.

9.2.1 KEY ASSUMPTIONS

Our networks are geographically diverse and the number of asset classes we operate is extensive. These factors, and the inherent uncertainty involved in making forecasts over an extended period, create significant complexity and increasing scope for variance as the planning period progresses. The key assumptions made, and the associated bases for the assumptions are summarised below:

Table 9.1: Renewal Assumptions.

ASSUMPTION	BASIS FOR THE ASSUMPTION
Renewal	
Asset age provides a reasonable proxy for asset deterioration and resulting expected life for forecasting purposes.	Except where specific performance issues or accelerated deterioration have been identified (e.g. pre-85 pipes, as discussed in Section 7), it has been assumed that assets will generally reach the end of their expected lives. This assumption is considered appropriate for forecasting work on large asset populations, given that actual works will be triggered by other factors, including asset condition and safety.
Optimisation of maintenance and renewal expenditure will continue to provide acceptable risk outcomes.	Powerco tests the effectiveness of our long-term investment decisions by considering the resulting residual risk. Our analysis suggests that the investments we propose will enable us to manage risk within an acceptable range.

Specific details regarding our approach to renewal forecasting, and our specific assumptions in this area are provided in Section 7.

Table 9.2: Growth Assumptions.

ASSUMPTION	BASIS FOR THE ASSUMPTION
Growth	
Historical correlations between planning inputs (GDP, housing statistics, etc.) and load growth will continue over the planning period.	Powerco has developed techniques to estimate ICP and volume growth, based on a combination of high-level trends, such as economic growth, as well as local trends, such as housing statistics. While we expect to make some refinements in this area, our core assumption will remain that historical correlations will hold into the future.
The Gas Hub brand will remain an enabler for growth	The presence of The Gas Hub brand in the market has already proved that better customer service, better customer relationship, targeted marketing and sales efforts influence the number of connections.
The recent ban on offshore exploration will have no impact on customer connection rates on the short term	The New Zealand government has announced a ban on offshore exploration and drilling activities in April 2018. As a result, there is a risk that consumer behaviour towards natural gas will change. However, at the time of writing, we have seen no evidence of this behaviour, but will continue to evaluate the impact. We have not taken this change into consideration for this AMP.

Specific details regarding our approach to growth forecasting are provided in Section 8.

Table 9.4: Non-network Assets Assumption.

ASSUMPTION	BASIS FOR THE ASSUMPTION
Non-network assets	
We will leverage from the investment planned by electricity while the company invests in core asset management, operational control systems and facilities to bring value to customers and deliver cost efficiencies.	Our forecasts assume investment in core asset management systems discussed in the electricity AMP will benefit gas in the longer term by bringing tools, systems and facilities that would be too onerous for gas only. This include the deployment of a new Enterprise Resource Planning system, and the building of a new Network Operations Centre, as described in Section 8. These improvements, in turn, should ultimately translate to improved cost outcomes for customers. We will continue to refine the scope and costs of these works to ensure targeted benefits can be delivered.

Specific details regarding our approach to non-network projects and our specific assumptions in this area are provided in Section 8.

Table 9.4: Assumptions for all Categories.

ASSUMPTION	BASIS FOR THE ASSUMPTION
Assumptions for all Categories	
Customers are generally satisfied with the level of service they receive.	Our estimates are based on maintaining our current levels of service over the planning period. This assumption is based on discussions, survey work and market studies we have completed in preparation for this AMP.
Asset lives remain aligned with the standard lives prescribed in the Input Methodologies.	We use standard asset lives described in the Input Methodologies to depreciate our assets. Government climate change policy may, however, reduce the economic life of our assets and we will consider if an adjustment is warranted during the planning period.
NZIER forecasts are appropriate for inflation.	We have assumed that the published NZIER inflation forecast (as noted below) provides an appropriate basis for adjusting our forecasts into nominal.

Table 9.5: CPI Forecasts Used to Produce the Expenditure Forecasts.

YEAR TO	2019	2020	2021	2022	2023	2024
End September	2.1%	2.0%	2.0%	2.0%	2.0%	2.0%

9.2.2 ENSURING RELIABLE LONG-TERM FORECASTS

Much of the work Powerco does is routine and repeatable. The resources we use are stable and their costs are well understood. The assets we build are standardised and their construction costs are expected to be stable in the longer term.

The key aspects that underpin our ability to provide reliable long-term financial estimates are noted in the table below:

Table 9.6: Powerco Approach to Effective Forecasting by Area.

ASSUMPTION	BASIS FOR THE ASSUMPTION
Forecasting Area	
Maintenance	Powerco has unit rates in place for each maintenance task, and incentivises its contractors to continually enhance their cost performance in this area. As our works managers are actively involved with works delivery, we are confident that the rates we pay are well managed and provide a strong basis for reliable forecasting.
Minor Works	We use a unit rates structure across all minor works elements. The rates have been market tested by going to tender. This process has given us confidence these rates provide a strong basis for reliable forecasting.
Major Works	The scale of Powerco's operations is such that we routinely complete major projects such as major main extensions or DRS installation. These works are tendered and the associated processes provide real-time insights into the cost of typical works. Further, our project delivery and contract management teams have the capability to tailor estimates on a consistent basis to reflect local conditions. These factors give us the expertise needed to forecast the cost of the larger projects within our works portfolios.
Programme Methodologies	The scale and large number of projects we complete each year provide us with significant advantages with respect to forecasting. While the cost of individual projects can be subject to significant uncertainty, the average cost of projects within a programme (many projects of a similar type) is significantly more stable and will tend to balance intrinsic historical risks to provide an improved basis for forecasting.
Global Impacts	Over the past few years, a number of factors have affected our costs. Increases in commodity prices due to international demand, increases in labour prices due to strong offshore demand, and enhancements to the way we manage the safety and quality of our works have lifted overall construction costs. Our current view is that these upward pressures on prices have stabilised. Consequently, we have restricted forecast price adjustments to the CPI. However, given trends in offshore markets and the potential for the NZ dollar to devalue, this is an area we are maintaining a watching brief.

9.2.3 ENSURING EFFICIENT COST OUTCOMES

Improving cost efficiency is an area of critical importance for Powerco, and it is an area that forms a central pillar of our asset management objectives framework. We have a range of key existing processes that are designed to improve future cost efficiency and these are noted in the table below.

Table 9.7: Powerco Approach to Contracting to Ensure Efficient Cost Outcomes.

ASSUMPTION	BASIS FOR THE ASSUMPTION
Forecasting Area	
Minor Works	Powerco utilises tailored contracts to maximise the benefits of scale, and minimise transaction costs for the large volume of minor works we complete each year. The contracts are incentivised to provide benefits to Powerco for smooth and effective work release, and benefits to our service providers for reducing the per unit rate of work over time. The contract negotiation periods are of three to five years' duration to ensure the costs we are paying are reflective of the market.
Major Works	Powerco competitively tenders its larger project works to enable the benefits of a competitive market to be realised. Our larger projects have scopes that are well understood, and a range of contractors who have capability in the areas we require. Strong competition and controlled pricing give us confidence that good results are being achieved.
Specialist Services	Powerco utilises a range of specialist services, such as project management, steel pipe constructions and specialist engineering services. In most cases, the costs of such services are well understood by the market. Consequently, Powerco's focus is on ensuring enduring partnerships where our specialist providers know our business and can provide maximum value while engaged. Powerco has found that this approach has provided good value in recent years.
Incentives	Powerco believes that appropriate incentives are a key supporting element to help achieve effective cost outcomes. We also employ liquidated damages in contracts for large tendered projects where timing is a critical area.

Table 9.8: Powerco Approach to Project Delivery to Ensure Efficient Cost Outcomes.

ASSUMPTION	BASIS FOR THE ASSUMPTION
Forecasting Area	
Design	Powerco utilises standard designs, standard equipment specifications, and standard layouts wherever possible. We are continually seeking to standardise our approach in ways that minimise complexity. The approach is designed to simplify construction (and therefore minimise costs) and optimise the long-term cost of ownership.
Tender	Powerco tenders all works of significant scale (typically > $100k) and have the ability to do the same for specialist works. Our ability to benchmark tender outcomes provides strong confidence in the costs achieved.
Materials Procurement	Powerco procures larger items (DRSs, specialist material, large quantity of pipes, etc.) directly for larger projects. Powerco also directly tenders civil works where it makes sense to do so. Procurement of minor items is left to the contractor to ensure a smooth work flow.
Risk	Powerco takes a pragmatic approach to risk allocation. We employ contract formats that seek to achieve a balanced allocation of risk, and, by doing so, avoid paying inflated risk premiums. We utilise a range of formal risk-sharing arrangements. For larger, well-defined works, we typically seek lump-sum pricing. For smaller jobs, we utilise unit rates and/or a time and material structure.
Foreign Exchange/ Commodity Exposure	Powerco seeks to lock in project value at the point of project award. Typically, we seek binding fixed costs denominated in $NZ. In cases where we procure large items directly from overseas, we hedge the currency exposure at the point of placing the order. This approach is embedded within Powerco's treasury polices.

9.3 INTERPRETING THE FORECASTS

9.3.1 EXPENDITURE CATEGORIES

The financial summaries that follow provide a summary of forecast expenditure over the planning period in our key expenditure areas. For simplicity, we have split expenditure into operational and capital expenditure areas, and provided specific projections for each subcategory. The categories and subcategories are consistent with the most recent information disclosure requirements.

The operational expenditure categories are:

- Service interruptions and emergencies
- Routine and corrective maintenance and inspection
- Asset replacement and renewal
- System operations and network support
- Business support

The capital expenditure categories are:

- Consumer connection;
- System growth;
- Asset replacement and renewal;
- Asset relocations;
- Reliability, safety and environment; and
- Non-network assets.

9.3.2 OUR APPROACH TO ESTIMATING UNCERTAINTY

All of the financial forecasts included in this section and elsewhere in the document represent our most current expected estimates of the costs associated with operating and developing our networks.

To the extent possible, we have considered the effects of the assumptions we have made when developing our estimates and developed a view that represents the most likely outcome in cost terms.

Powerco's philosophy is to derive a P50 estimate for the estimates we produce. A P50 has a 50% likelihood that actual costs will fall at or below the estimate level. P50s are generally considered appropriate for use in a regulated utility environment, particularly for programme-based works such as asset renewal.

In practice, our actual future costs can be anticipated to fall within a range around the P50 value. However, our current estimates reflect what is, in our view, a reasonable and balanced view of future cost outcomes on our network. As part of our asset management journey, we are continuously seeking ways to enhance our forecasting systems to provide more detail on the nature and quantum of variance, which could be reasonably expected from our forecasting process.

9.3.3 INTERPRETING THE GRAPHS

The graphs that follow in this section show forecast expenditures from RY2018 to 2028. The expenditure forecasts are denominated in constant value terms based on 1 October 2018 dollar values.

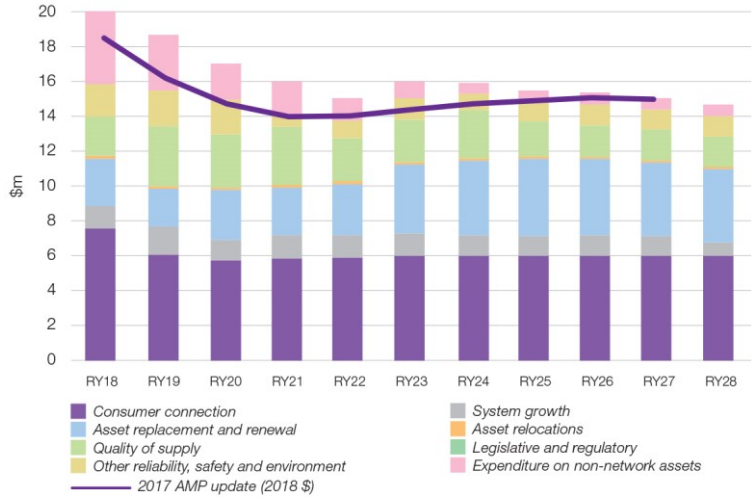
We have also provided historical actual expenditure values for RY13 to RY17 as published in our Information Disclosure document required under Part 4 of the Commerce Act, and available on our website.

9.4 HIGH-LEVEL SUMMARIES

9.4.1 CAPITAL EXPENDITURE

Capital expenditure is used to create new assets or to increase the performance or useful life of an existing asset. Capital expenditure increases the value of the asset stock and is capitalised in accordance with generally accepted accounting practice (GAAP).

Figure 9.3: Total Capital Expenditure.

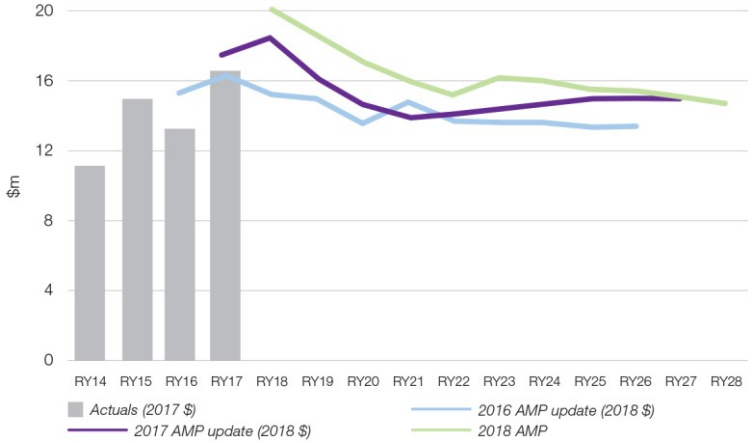


The capital expenditure forecast is slightly higher over the period, predominantly due to the costs of Implementing our new ERP system. We are also seeing stronger than forecast customer-initiated works. Reasons for the changes in expenditure are:

- An increase in volumes and value of customer connections. In RY18, we have connected several large-capacity commercial and industrial customers with high connection costs that we not forecast. Such connections are hard to predict and we can only maintain a reactive approach when they occur.
- We have rebalanced our expenditure between the Asset Replacement and Renewal and Quality of Supply categories as we focus more on renewing and rationalising our stations to address both age, and on-going cost efficiencies.
- Non-network capex is slightly higher in RY18 and RY19 as our ERP implementation project was delayed while we were working through commercial agreements with the preferred vendors.

The figure below compares the forecasts previously disclosed in our 2016 and 2017 AMP updates, and the actuals since RY13 (converted into 2018 constant $).

Figure 9.4: Comparison of Capital Expenditure.

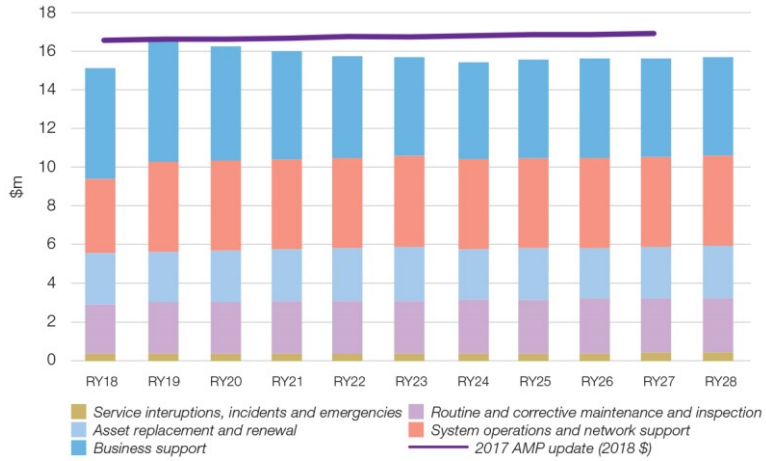


As explained in our yearly information disclosure documents, achieving our forecasts can be challenging. We constantly review and adapt our forecasts against our actual expenditure. Delays in the execution of the projects remain, however, the main reason for the gap we have observed.

9.4.2 OPERATING EXPENDITURE

Operating expenditure (opex) is directly associated with running the gas distribution network, and ensures it is operating safely at any time. Operating expenditure includes maintenance and inspection costs required to survey and maintain the assets to achieve their original design lives and service potentials. It also includes the expenses related to our third-party prevention programme.

Figure 9.5: Total Network Opex.

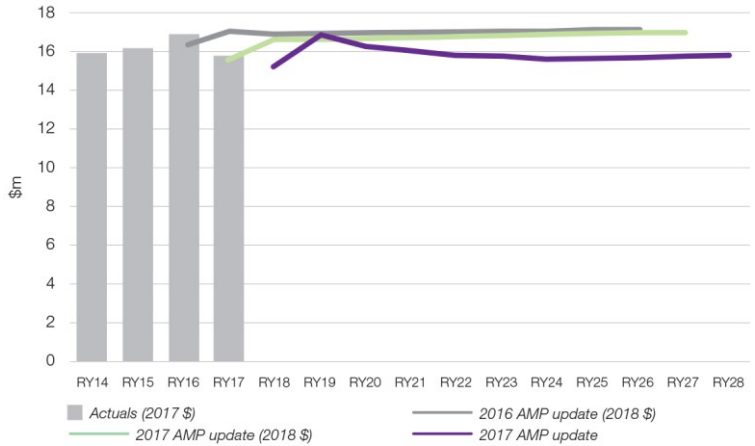


Our on-going analysis of costs has shown most of this expenditure is mandatory, dictated by legislation or accepted code of practice across the industry to operate as a prudent distribution company. The key areas for operational expenditure are:

- Routine and corrective maintenance and inspection (see Section 9.5.1 below): Most of these “minor work” type activities are based on the maintenance schedule and rates.
- Asset replacement and renewal (see Section 9.5.2 below): This category contains all the replacement and renewal jobs that can’t be capitalised. Their individual value is generally low (under $500).
- Service interruptions, incident and emergencies (see Section 9.5.3 below).

The figure below compares the forecasts previously disclosed in our 2016 and 2017 AMP update, and the actuals since RY13.

Figure 9.6: Comparison of Operational Expenditure.



Operational expenditure remains broadly flat throughout the period. Non-network expenditure, formed by the Business Support and System Operations and Network Support categories, can vary from one year to another based on business requirements at the time.

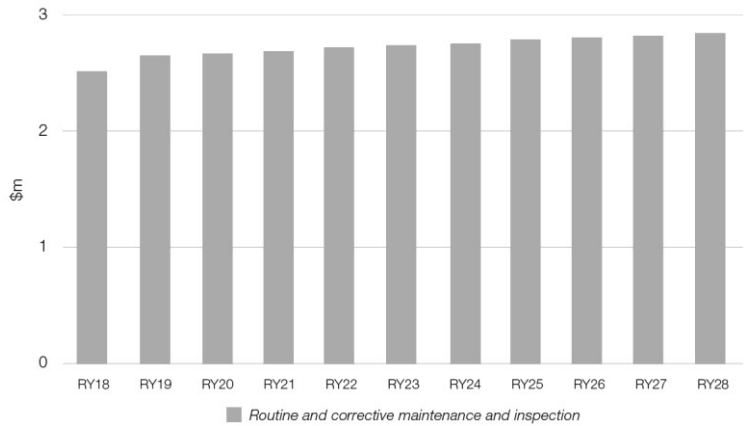
9.5 MAINTENANCE

9.5.1 ROUTINE AND CORRECTIVE MAINTENANCE AND INSPECTION OPEX

Routine and Corrective Maintenance operational expenditure is driven by pre-planned work schedules. It comprises network inspections and routine servicing of equipment, as well as repair of defective equipment in accordance with the annual maintenance plan. This expenditure category also includes maintenance of a non-routine nature, such as relocations of rotatable assets.

As outlined in section 7, most of our routine and inspection maintenance program is driven by legislation and industry standards.

Figure 9.7: Routine and Corrective Maintenance.



Assumptions and Uncertainties

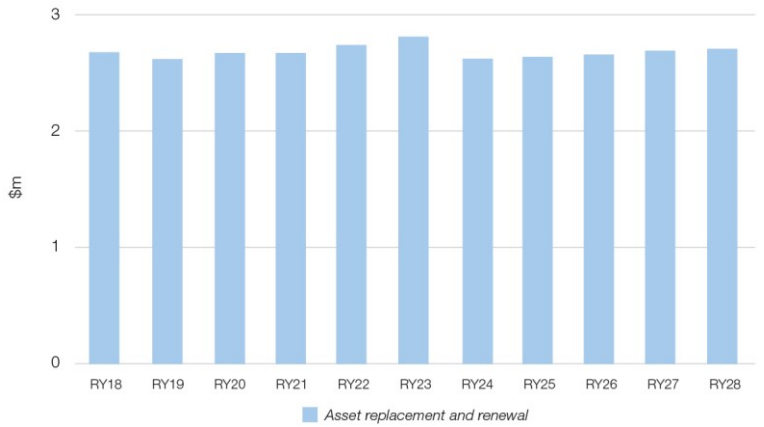
Basis	Unit rate forecasts represent our current cost base, escalated for inflation, and include consideration of local cost influences.
Supporting information	During 2012, Powerco implemented enhancements to its defect management systems that provide improved oversight of work completed in this category. This has provided a strong basis for establishing future requirements for this investment category.
Uncertainties – Third Party requests	The quantity of plan, location and standovers is driven by third party requests that we can't control or influence.

9.5.2 ASSET REPLACEMENT AND RENEWAL MAINTENANCE

Replacement and Renewal Maintenance is operating expenditure where the primary driver is the maintenance of asset integrity to address the progressive deterioration or obsolescence of particular assets, or the need to maintain physical security.

Because there is a potential cross-over between this expenditure and corrective maintenance expenditure, Powerco interprets Asset Replacement and Renewal maintenance to include defect remedy of a non-routine nature which require the replacement of a capitalised assets or subcomponent. On the other hand corrective maintenance includes renewal of subcomponents or parts that are not part of our capitalisation policy and which value is inferior to a certain threshold.

Figure 9.8: Asset Replacement and Renewal.



Assumptions and Uncertainties

Basis	Volumes have been determined based on network age and condition. Unit rate forecasts are based on historical works escalated for inflation.
Supporting information	Powerco's planning defect identification and analysis processes and data provide a good basis for future volumes.

9.5.3 SERVICE INTERRUPTIONS, INCIDENT AND EMERGENCIES MAINTENANCE

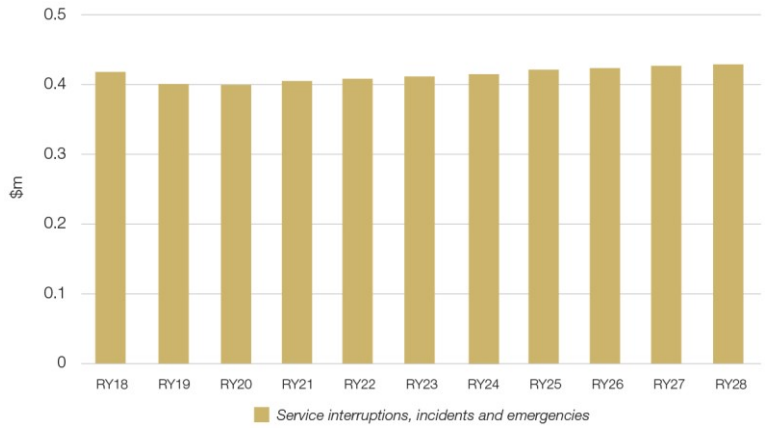
Service interruption (faults) and emergency maintenance work is completed as needed in response to supply interruptions, major leakage or public reported escapes, and generally comprises callouts to restore supply or to make the network safe.

Work comprises activities undertaken by field personnel responding to a reported failure of the network, including any back-up assistance needed at the time to restore supply or make the network safe. The work can be either temporary or permanent in nature. Where follow-up work is needed, that is deemed to be corrective in nature.

As outlined in Section 6.1.6 (operating strategy) our fault response capability is measured by the response to emergency time and closely monitored.

We have more work to do to analyse the effects of network condition and link these to our fault and emergency response volumes. However, we don't foresee any immediate need to increase the expenditure in this domain.

Figure 9.9: Service Interruptions and Emergencies.



Assumptions and Uncertainties

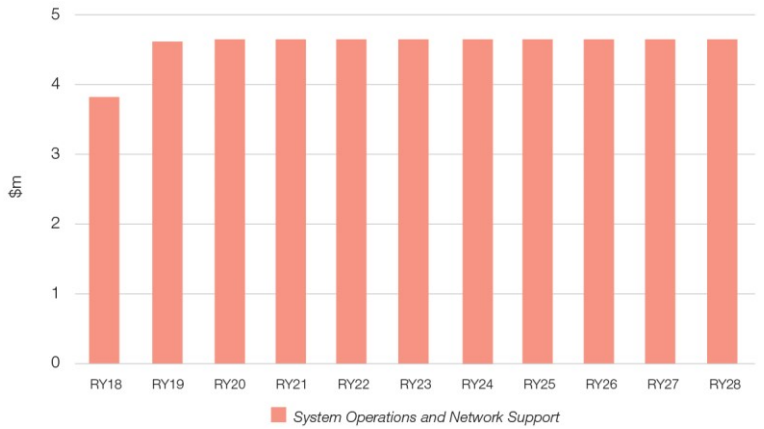
Basis	Volumes of faults are determined based on historical trends. Unit rate forecasts are our current cost basis, escalated for inflation, and include consideration of local conditions.
Supporting information	Powerco has a well-developed understanding of the requirements to respond to emergencies and ensure safety of the public and customers around our network.

9.5.4 SYSTEM OPERATIONS AND NETWORK SUPPORT EXPENDITURE

System Operations and Network Support expenditure includes the direct costs associated with managing the network – these include network planning process expenses, the non-capitalisable portion of the service provider relationship management process (contract and project management), information system management (GIS) costs and network operations expenses.

The operating and maintenance expenditure also includes management costs not directly associated with creating network assets, such as the costs of customer management, network planning, network operating and managing service provider relationships. These costs include site leases, site service charges, network insurance premiums and charter payments, and may include the costs of decommissioning existing assets (where a new asset has not been created).

Figure 9.10: System Operations and Network Support Expenditure.



Assumptions and Uncertainties

Basis	Costs have been developed based on a review of historical work volumes and the staff structures and costs required to support these work volumes. The application of technology (to minimise additional staff requirements) has been considered when developing these forecasts.
Supporting information	Powerco has a well-developed understanding of organisational requirements to support work delivery, and corporate systems and benchmarking processes, which provide us with confidence about the anticipated financial costs of these structures.

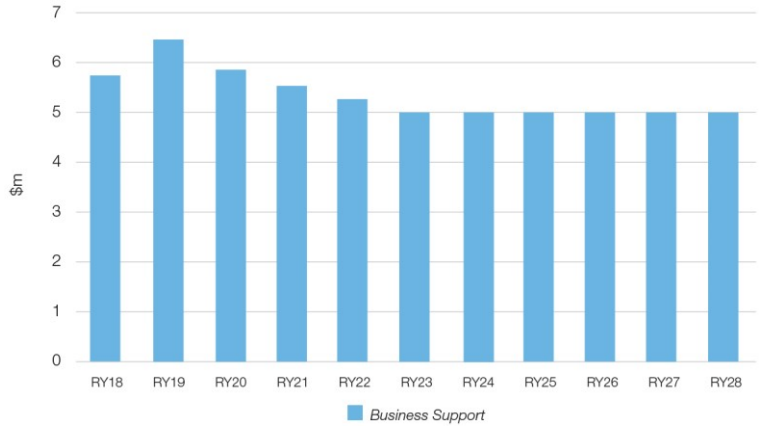
9.5.5 BUSINESS SUPPORT

Business Support expenditure represents the allocation of Powerco's corporate support activities relating to its centralised corporate functions. Key functions provided for include finance, legal, audit and compliance, pricing, human resources, health and safety, corporate communications, information services, business projects, and general administration.

Powerco has well-established functions in all of these areas, which we consider to be appropriately sized to provide effective corporate oversight and management. As a result, costs in this area are forecast to remain stable over the planning period.

Business support expenditure is overall lower than previous forecasts as we adjust the cost allocation with our electricity business.

Figure 9.11: Business Support.



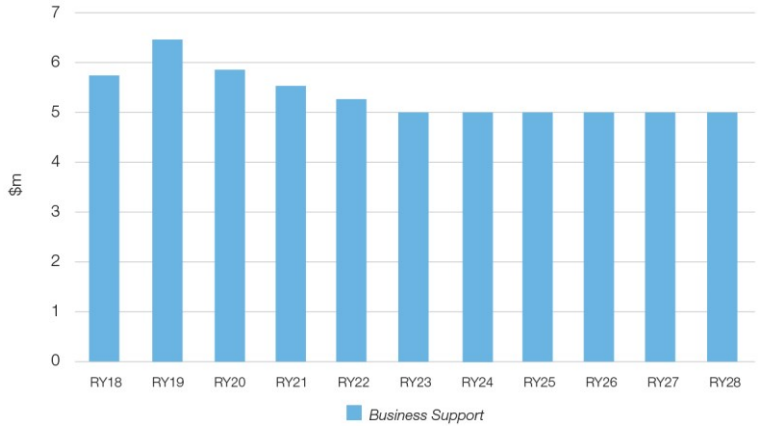
9.6 RENEWAL

9.6.1 ASSET REPLACEMENT AND RENEWAL (CAPEX)

Asset Renewal (capex) generally relates to addressing the progressive deterioration of the condition of network assets or the obsolescence of network assets. This may include replacement of existing assets where these assets have been identified as reaching their assessed criteria or trigger for replacement. These include reactive replacements following technical failure or risks associated with age, condition or obsolescence).

We have forecasted the asset replacement programmes discussed in Section 7 in our expenditure profile. This includes the replacement of pre-85 pipes, aging stations, and the renewal of CP systems.

Figure 9.12: Asset Replacement and Renewal Capital Expenditure.



Assumptions and Uncertainties

Basis	The cost of replacement reflects our current unit rates escalated for inflation, and reflects localised impacts for some of our more remote areas.
Supporting Information	Powerco's planning defect identification and analysis processes and data provide a good basis for future volumes.

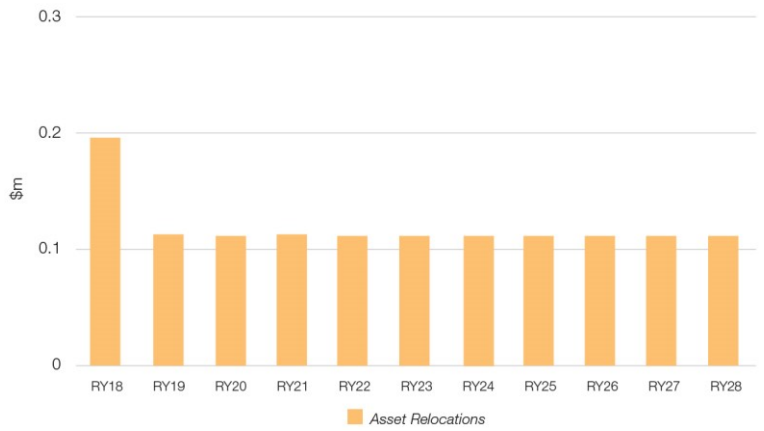
9.6.2 ASSET RELOCATION

Asset Relocation is capital expenditure associated with the need to move assets as a result of third-party requests. As it is a capital expenditure, the expectation is that new assets would be created as a result of the relocation: a simple relocation of an existing asset is an activity that should be expensed.

Asset relocation mainly includes new pipe constructed as part of route realignment due to a third-party request (such as road widening).

While we have seen high volatility in the level of relocation required over time, we forecast a level of around $100k (not including customer contribution).

Figure 9.13: Asset Relocations Capex.



Assumptions and Uncertainties

Basis	Volumes have been based on historical levels of relocation. The cost of relocation represents our current cost base, escalated for inflation.
Supporting information	Our engineers and customer teams maintain a watching brief regarding emerging relocation requirements. Where major works in excess of our forecasts are known, these are factored into our forecasts.

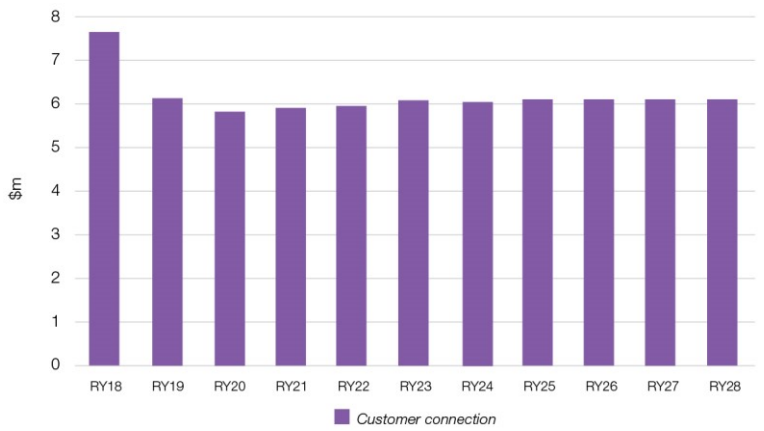
9.7 GROWTH

9.7.1 CUSTOMER CONNECTION

Customer Connection is capital expenditure primarily associated with the connection of new consumers to the network, or alterations to the connections of existing consumers, where main extension is generally not required. Consumer connection capex is shown in Figure 9.14.

The efforts put in The Gas Hub have driven growth in our connection numbers, and we expect this to continue over the period. We have reviewed our previous forecasts up to reflect the high level of activity in this area. RY18 expenditure is higher than typical due to a number of large commercial and industrial connections, which were not forecast.

Figure 9.14: Customer Connection Capital Expenditure.



Assumptions and Uncertainties

Basis	Volumes are based on anticipated projects, the mix and number of which reflect our current view of the level of economic and residential activity on our footprint.
Supporting information	Our systems utilise a range of information about future growth assumptions. Economic forecasts, council forecasts, and detailed local development knowledge from our engineers and customer teams support appropriate forecasting in this area.

9.7.2 SYSTEM GROWTH CAPEX

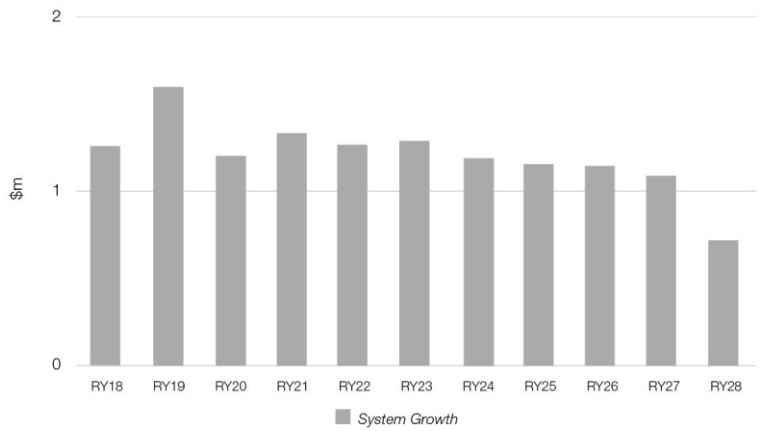
System Growth capex relates to development or enhancement of the network. This category is for work driven by:

- Growth in network load, which requires an increase in network capacity
- Mains extension or network upgrade to connect new consumers

Our forecasts for system growth capex have been developed on a bottom up basis, by considering specific area by area growth rates, and long-term security outcomes. This process has provided us with appropriate confidence regarding the quantum of future expenditure for this category of capex.

The detailed region overviews provided in section 8 provide details of the specific drivers for investment and the proposed projects. This analysis has confirmed longer term investment at near current levels.

Figure 9.15: System Growth Capital Expenditure.



Assumptions and Uncertainties

Basis	Specific volumes of projects, and the mix of projects required to deliver our asset management objectives are determined via our area planning framework. The costs of the projects identified are based on our current cost base, escalated for inflation.
Supporting information	Powerco has progressively enhanced levels of growth and security-related investment over the past decade. As a result, we have developed strong capability in delivery, and good cost benchmarks for work in this category. This information provides a good basis for forward estimating.

9.8 SYSTEM ENHANCEMENT

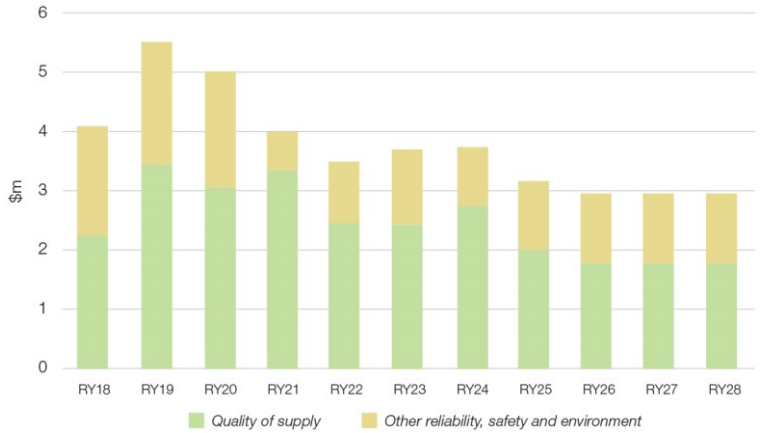
9.8.1 RELIABILITY, SAFETY AND ENVIRONMENT CAPEX

Reliability, Safety and Environment capex is capital expenditure that:

- Maintains or improves the safety of the network for the public, employees and contractors
- Improves reliability, security of supply or service standards and/or
- Is needed to meet environmental standards

We have incorporated expenditure to enable us to deliver targeted asset specific investment programmes focused on reliability, and improved public safety. Our recent focus in this area has resulted in progressive identification of valuable enhancement initiatives, and we have set overall future expenditure to reflect this trend.

Figure 9.16: Reliability, Safety and Environment Capital Expenditure.



Assumptions and Uncertainties

Basis	This category of investment relates to portfolios of projects covering specific, targeted enhancement areas. The costs of specific projects and programmes are based on our recent experience in managing similar types of initiatives escalated for inflation.
Supporting information	Powerco's scale has enabled it to develop a strong information and business projects capability. This capability provides us with confidence in both forecasting delivery risk and our ability to manage that risk.

9.9 EXPENDITURE FORECAST SUMMARIES

To simplify overall presentation, full details, including tabular costs summaries for all operational and capex cost categories, are provided in Appendix 2, schedules 11a and 11b.

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APPENDIX 1 GLOSSARY OF KEY TERMS

AMMAT means Asset Management Maturity Assessment Tool.

AMP means Asset Management Plan.

AMS means Asset Management System.

BCP means Business Continuity Plan.

Capital Expenditure (capex) means the expenditure used to create new assets or increase the service performance or service potential of existing assets beyond the original design service performance or service potential. Capex increases the value of the asset stock, and is capitalised in accounting terms.

CBD means Central Business District.

CPP means Customised Price-quality Path.

CWMS means Customer Workplace Management System, otherwise known as "Green".

DPP means Default Price-quality Path.

EMT means Powerco's Executive Management team.

ERP means the Emergency Response Plan.

FSC means Field Service Co-ordinator. It is a role introduced in the gas Contracts Management team to ensure the operational link between Powerco and the service providers (see Section 3.1.3).

FY means Financial Year ending 31 March of the year in question.

GDB means Gas Distribution Business.

GIC means the Gas Industry Company.

HDCU means High Density Community Usage.

HSEQ means Powerco's Health, Safety, Environment and Quality team.

ICP means Installation Control Point, which is the point of connection of a customer to the Powerco network.

IP means Intermediate Pressure (700-2000kPa).

ISO 55000 refers to the International Standard Organization publication 55 000.

IT means Information Technology (in terms of infrastructure).

JDE means J.D.Edwards, Powerco's choice of enterprise resource planning application.

KPI means Key Performance Indicator.

LP means Low Pressure (0-7kPa).

MP means Medium Pressure (7-700kPa).

NOC means Network Operations Centre.

Operational Expenditure (opex) Operating expenditure (opex) is expenditure directly associated with running the gas distribution network, and ensures it is operating safely at any time. Operating expenditures include maintenance and inspection expenditures required to survey and maintain the assets to achieve their original design lives and service potentials. It also includes the expenses related to our third-party prevention programme.

PAS55 refers to the Publicly Available Specification 55.

PE means Polyethylene, which is the material plastic gas pipes are made from.

UFB means Ultra-Fast Broadband, which is being rolled out around New Zealand.

SPA means Service Provider Application.

RY means Regulatory Year ending 31 September of the year in question.

Company Name	**Powerco Limited**
AMP Planning Period	**1 October 2018 – 30 September 2028**

SCHEDULE 11a: REPORT ON FORECAST CAPITAL EXPENDITURE

This schedule requires a breakdown of forecast expenditure on assets for the current disclosure year and a 10 year planning period. The forecasts should be consistent with the supporting information set out in the AMP. The forecast is to be expressed in both constant price and nominal dollar terms. Also required is a forecast of the value of commissioned assets (i.e., the value of RAB additions)
GDBs must provide explanatory comment on the difference between constant price and nominal dollar forecasts of expenditure on assets in Schedule 14a (Mandatory Explanatory Notes).
This information is not part of audited disclosure information.

sch ref			*Current Year CY*	*CY+1*	*CY+2*	*CY+3*	*CY+4*	*CY+5*	*CY+6*	*CY+7*	*CY+8*	*CY+9*	*CY+10*
8		for year ended	**30 Sep 18**	**30 Sep 19**	**30 Sep 20**	**30 Sep 21**	**30 Sep 22**	**30 Sep 23**	**30 Sep 24**	**30 Sep 25**	**30 Sep 26**	**30 Sep 27**	**30 Sep 28**
9	**11a(i): Expenditure on Assets Forecast**		**$000 (nominal dollars)**										
10		Consumer connection	7,616	6,242	6,045	6,289	6,452	6,697	6,822	6,968	7,124	7,285	7,435
11		System growth	1,258	1,624	1,250	1,412	1,379	1,431	1,347	1,337	1,350	1,307	876
12		Asset replacement and renewal	2,723	2,261	2,949	2,913	3,229	4,374	4,831	5,062	5,175	5,026	5,129
13		Asset relocations	195	115	116	120	121	123	125	128	131	134	136
14		Reliability, safety and environment:											
15		Quality of supply	2,239	3,514	3,201	3,541	2,677	2,668	3,099	2,301	2,091	2,138	2,182
16		Legislative and regulatory	-	-	-	-	-	-	-	-	-	-	-
17		Other reliability, safety and environment	1,853	2,076	2,029	694	1,079	1,401	1,113	1,329	1,359	1,390	1,419
18		**Total reliability, safety and environment**	4,091	5,590	5,231	4,235	3,756	4,068	4,213	3,630	3,450	3,528	3,601
19		**Expenditure on network assets**	15,883	15,833	15,591	14,968	14,937	16,694	17,337	17,125	17,229	17,280	17,178
20		Expenditure on non-network assets	4,115	3,255	2,179	2,061	1,436	1,036	624	707	853	801	782
21		**Expenditure on assets**	19,998	19,088	17,770	17,029	16,374	17,729	17,962	17,832	18,082	18,081	17,959
22													
23	*plus*	Cost of financing	58	45	44	42	42	57	70	69	69	69	69
24	*less*	Value of capital contributions	414	364	324	347	348	359	354	358	365	366	328
25	*plus*	Value of vested assets	-	-	-	-	-	-	-	-	-	-	-
26		**Capital expenditure forecast**	19,641	18,770	17,490	16,724	16,068	17,428	17,677	17,542	17,787	17,785	17,700
27													
28		Assets commissioned	19,167	18,900	17,682	16,839	16,166	17,224	17,639	17,562	17,750	17,785	17,713
29													
30			*Current Year CY*	*CY+1*	*CY+2*	*CY+3*	*CY+4*	*CY+5*	*CY+6*	*CY+7*	*CY+8*	*CY+9*	*CY+10*
31		for year ended	**30 Sep 18**	**30 Sep 19**	**30 Sep 20**	**30 Sep 21**	**30 Sep 22**	**30 Sep 23**	**30 Sep 24**	**30 Sep 25**	**30 Sep 26**	**30 Sep 27**	**30 Sep 28**
32			**$000 (in constant prices)**										
33		Consumer connection	7,616	6,112	5,801	5,915	5,950	6,055	6,046	6,054	6,069	6,085	6,088
34		System growth	1,258	1,591	1,199	1,328	1,272	1,294	1,194	1,162	1,150	1,092	718
35		Asset replacement and renewal	2,723	2,214	2,830	2,740	2,977	3,954	4,282	4,399	4,409	4,197	4,200
36		Asset relocations	195	113	112	113	112	111	111	111	111	112	112
37		Reliability, safety and environment:											
38		Quality of supply	2,239	3,441	3,072	3,330	2,468	2,412	2,747	1,999	1,781	1,786	1,787
39		Legislative and regulatory	-	-	-	-	-	-	-	-	-	-	-
40		Other reliability, safety and environment	1,853	2,033	1,947	653	995	1,266	987	1,155	1,158	1,161	1,162
41		**Total reliability, safety and environment**	4,091	5,474	5,019	3,983	3,464	3,678	3,734	3,154	2,939	2,947	2,949
42		**Expenditure on network assets**	15,883	15,503	14,961	14,079	13,774	15,092	15,367	14,881	14,678	14,432	14,066
43		Expenditure on non-network assets	4,115	3,187	2,091	1,938	1,324	936	553	614	727	669	640
44		**Expenditure on assets**	19,998	18,690	17,052	16,017	15,099	16,028	15,920	15,495	15,405	15,101	14,706
45	**Subcomponents of expenditure on assets (where known)**												
46		Research and development	-	-	-	-	-	-	-	-	-	-	-

	Current Year CY	CY+1	CY+2	CY+3	CY+4	CY+5	CY+6	CY+7	CY+8	CY+9	CY+10
for year ended	30 Sep 18	30 Sep 19	30 Sep 20	30 Sep 21	30 Sep 22	30 Sep 23	30 Sep 24	30 Sep 25	30 Sep 26	30 Sep 27	30 Sep 28
Difference between nominal and constant price forecasts	$000										
Consumer connection	-	130	244	374	502	643	775	913	1,055	1,201	1,347
System growth	-	34	51	84	107	137	153	175	200	215	159
Asset replacement and renewal	-	47	119	173	251	420	549	663	766	828	929
Asset relocations	-	2	5	7	9	12	14	17	19	22	25
Reliability, safety and environment:											
Quality of supply	-	73	129	210	208	256	352	301	310	352	395
Legislative and regulatory	-	-	-	-	-	-	-	-	-	-	-
Other reliability, safety and environment	-	43	82	41	84	134	127	174	201	229	257
Total reliability, safety and environment	-	117	211	252	292	390	479	476	511	581	652
Expenditure on network assets	-	330	630	889	1,163	1,602	1,971	2,244	2,551	2,847	3,112
Expenditure on non-network assets	-	68	88	122	112	99	71	93	126	132	142
Expenditure on assets	-	398	718	1,012	1,275	1,701	2,042	2,337	2,678	2,979	3,254

	Current Year CY	CY+1	CY+2	CY+3	CY+4	CY+5
for year ended	30 Sep 18	30 Sep 19	30 Sep 20	30 Sep 21	30 Sep 22	30 Sep 23
11a(ii): Consumer Connection						
*Consumer types defined by GDB**	$000 (in constant prices)					
Residential / Small Commercial	6,381	5,735	5,415	5,526	5,560	5,668
Commercial	1,235	377	386	389	390	387
[GDB consumer type]						
[GDB consumer type]						
[GDB consumer type]						
** include additional rows if needed*						
Consumer connection expenditure	7,616	6,112	5,801	5,915	5,950	6,055
less Capital contributions funding consumer connection	139	111	106	108	108	110
Consumer connection less capital contributions	7,477	6,000	5,696	5,808	5,841	5,945
11a(iii): System Growth						
Intermediate pressure						
Main pipe	-	-	-	-	-	-
Service pipe	-	-	-	-	-	-
Stations	0	503	111	225	-	-
Line valve	-	-	-	-	-	-
Special crossings	-	-	-	-	-	-
Intermediate Pressure total	0	503	111	225	-	-
Medium pressure						
Main pipe	1,261	1,013	1,089	1,103	1,272	1,294
Service pipe	(3)	69	-	-	-	-
Stations	-	-	-	-	-	-
Line valve	(0)	2	-	-	-	-
Special crossings	(0)	0	-	-	-	-
Medium Pressure total	1,258	1,085	1,089	1,103	1,272	1,294

92		**Low Pressure**						
93		Main pipe	(0)	2	-	-	-	-
94		Service pipe	(0)	1	-	-	-	-
95		Line valve	(0)	0	-	-	-	-
96		Special crossings	(0)	0	-	-	-	-
97		**Low Pressure total**	(0)	2	-	-	-	-
98		**Other network assets**						
99		Monitoring and control systems	-	-	-	-	-	-
100		Cathodic protection systems	-	-	-	-	-	-
101		Other assets (other than above)	-	-	-	-	-	-
102		**Other network assets total**	-	-	-	-	-	-
103								
104		**System growth expenditure**	1,258	1,591	1,199	1,328	1,272	1,294
105	*less*	Capital contributions funding system growth	124	157	118	131	125	127
106		**System growth less capital contributions**	1,134	1,434	1,081	1,197	1,147	1,167
107								
108								
109			*Current Year CY*	*CY+1*	*CY+2*	*CY+3*	*CY+4*	*CY+5*
		for year ended	**30 Sep 18**	**30 Sep 19**	**30 Sep 20**	**30 Sep 21**	**30 Sep 22**	**30 Sep 23**
110	**11a(iv): Asset Replacement and Renewal**							
111		**Intermediate pressure**	**$000 (in constant prices)**					
112		Main pipe	21	16	19	26	33	44
113		Service pipe	9	7	8	11	14	19
114		Stations	544	111	223	225	391	999
115		Line valve	0	0	0	0	0	1
116		Special crossings	0	0	0	0	0	0
117		**Intermediate Pressure total**	574	135	251	263	439	1,063
118		**Medium pressure**						
119		Main pipe	1,392	937	1,352	1,312	1,451	1,657
120		Service pipe	720	1,050	854	840	899	986
121		Station	-	-	-	-	-	-
122		Line valve	6	49	49	7	9	12
123		Special crossings	1	1	1	1	1	2
124		**Medium Pressure total**	2,119	2,037	2,256	2,160	2,361	2,656
125		**Low Pressure**						
126		Main pipe	4	3	4	5	7	9
127		Service pipe	2	1	2	2	3	4
128		Line valve	0	0	0	0	0	0
129		Special crossings	0	0	0	0	0	0
130		**Low Pressure total**	6	5	5	8	10	13

11a(vii): Legislative and Regulatory

	Project or programme						
	None						
	** include additional rows if needed*						
	All other projects or programmes - legislative and regulatory						
	Legislative and regulatory expenditure	-	-	-	-	-	-
less	Capital contributions funding legislative and regulatory						
	Legislative and regulatory less capital contributions	-	-	-	-	-	-

11a(viii): Other Reliability, Safety and Environment

	*Project or programme**						
	HB Valves Safety Improvement	296	92	-	-	-	-
	DRS SCADA & Flow measurement	85	195	335	338	336	333
	Isolation plans and resilience	-	360	336	202	269	267
	DRS Renewals	1,184	1,256	1,165	-	-	-
	Palmerston North Rationalisation	-	-	-	-	278	555
	** include additional rows if needed*						
	All other projects or programmes - other reliability, safety and environment	288	130	112	113	112	111
	Other reliability, safety and environment expenditure	1,853	2,033	1,947	653	995	1,266
less	Capital contributions funding other reliability, safety and environment	-	-	-	-	-	-
	Other Reliability, safety and environment less capital contributions	1,853	2,033	1,947	653	995	1,266

11a(ix): Non-Network Assets

Routine expenditure

	*Project or programme**						
	ICT capex	3,114	2,532	1,836	1,612	986	713
	Facilities capex	89	85	79	65	17	52
	** include additional rows if needed*						
	All other projects or programmes - routine expenditure						
	Routine expenditure	3,203	2,617	1,915	1,678	1,003	766

Atypical expenditure

	*Project or programme**						
	Facilities capex	912	571	176	260	321	170
	** include additional rows if needed*						
	All other projects or programmes - atypical expenditure						
	Atypical expenditure	912	571	176	260	321	170
	Expenditure on non-network assets	4,115	3,187	2,091	1,938	1,324	936

131		**Other network assets**						
132		Monitoring and control systems	-	-	-	-	-	-
133		Cathodic protection systems	25	37	318	310	167	222
134		Other assets (other than above)	-	-	-	-	-	-
135		**Other network assets total**	25	37	318	310	167	222
136								
137		**Asset replacement and renewal expenditure**	2,723	2,214	2,830	2,740	2,977	3,954
138	*less*	Capital contributions funding asset replacement and renewal	-	-	-	-	-	-
139		**Asset replacement and renewal less capital contributions**	2,723	2,214	2,830	2,740	2,977	3,954
140								

11a(v): Asset Relocations

142		*Project or programme**						
143		None						
144								
145								
146								
147								
148		** include additional rows if needed*						
149		All other projects or programmes - asset relocations	195	113	112	113	112	111
150		**Asset relocations expenditure**	195	113	112	113	112	111
151	*less*	Capital contributions funding asset relocations	152	88	87	88	87	87
152		**Asset relocations less capital contributions**	43	25	25	25	25	24
153								

11a(vi): Quality of Supply

			Current Year CY	*CY+1*	*CY+2*	*CY+3*	*CY+4*	*CY+5*
154		for year ended	**30 Sep 18**	**30 Sep 19**	**30 Sep 20**	**30 Sep 21**	**30 Sep 22**	**30 Sep 23**
155								
156								
157		*Project or programme**	**$000 (in constant prices)**					
158		Wellington CBD Pressure Upgrade	1,991	2,804	2,123	2,025	-	-
159		Westown Capacity Reinforcement - Ferndale (Taranaki)	12	144	167	169	146	-
160		Mark Ave Overlay - Grenada	-	-	-	293	-	-
161		Kelson additional point of supply (HVP)	-	-	-	225	-	-
		Middleton Road Overlay	-	-	-	-	314	-
		Waimea/Brois Link	-	-	-	-	22	217
162		Karori IP reinforcement	-	-	-	-	195	361
163		** include additional rows if needed*						
164		All other projects or programmes - quality of supply	236	493	782	619	1,791	1,833
165		**Quality of supply expenditure**	2,239	3,441	3,072	3,330	2,468	2,412
166	*less*	Capital contributions funding quality of supply	-	-	-	-	-	-
167		**Quality of supply less capital contributions**	2,239	3,441	3,072	3,330	2,468	2,412
168								

Company Name	**Powerco Limited**
AMP Planning Period	**1 October 2018 – 30 September 2028**

SCHEDULE 11b: REPORT ON FORECAST OPERATIONAL EXPENDITURE

This schedule requires a breakdown of forecast operational expenditure for the disclosure year and a 10 year planning period. The forecasts should be consistent with the supporting information set out in the AMP. The forecast is to be expressed in both constant price and nominal dollar terms.
GDBs must provide explanatory comment on the difference between constant price and nominal dollar operational expenditure forecasts in Schedule 14a (Mandatory Explanatory Notes).
This information is not part of audited disclosure information.

sch ref												
7		*Current year CY*	*CY+1*	*CY+2*	*CY+3*	*CY+4*	*CY+5*	*CY+6*	*CY+7*	*CY+8*	*CY+9*	*CY+10*
8	for year ended	**30 Sep 18**	**30 Sep 19**	**30 Sep 20**	**30 Sep 21**	**30 Sep 22**	**30 Sep 23**	**30 Sep 24**	**30 Sep 25**	**30 Sep 26**	**30 Sep 27**	**30 Sep 28**
9	**Operational Expenditure Forecast**	**$000 (in nominal dollars)**										
10	Service interruptions, incidents and emergencies	419	410	421	432	444	457	470	483	496	510	524
11	Routine and corrective maintenance and inspection	2,501	2,707	2,780	2,853	2,935	3,020	3,104	3,190	3,278	3,369	3,462
12	Asset replacement and renewal	2,653	2,673	2,775	2,835	2,963	3,091	2,946	3,027	3,111	3,197	3,285
13	**Network opex**	5,573	5,789	5,976	6,120	6,342	6,568	6,519	6,700	6,885	7,075	7,271
14	System operations and network support	3,842	4,746	4,851	4,950	5,050	5,151	5,254	5,359	5,466	5,575	5,687
15	Business support	5,731	6,587	6,092	5,901	5,690	5,644	5,757	5,872	5,990	6,109	6,232
16	**Non-network opex**	9,573	11,333	10,943	10,851	10,740	10,795	11,011	11,231	11,456	11,685	11,919
17	**Operational expenditure**	15,147	17,122	16,919	16,971	17,082	17,363	17,530	17,931	18,341	18,760	19,190
18		*Current year CY*	*CY+1*	*CY+2*	*CY+3*	*CY+4*	*CY+5*	*CY+6*	*CY+7*	*CY+8*	*CY+9*	*CY+10*
19	for year ended	**30 Sep 18**	**30 Sep 19**	**30 Sep 20**	**30 Sep 21**	**30 Sep 22**	**30 Sep 23**	**30 Sep 24**	**30 Sep 25**	**30 Sep 26**	**30 Sep 27**	**30 Sep 28**
20		**$000 (in constant prices)**										
21	Service interruptions, incidents and emergencies	419	401	404	406	410	413	416	419	423	426	429
22	Routine and corrective maintenance and inspection	2,501	2,650	2,668	2,684	2,706	2,731	2,751	2,772	2,792	2,813	2,835
23	Asset replacement and renewal	2,653	2,617	2,662	2,666	2,733	2,794	2,611	2,631	2,650	2,670	2,690
24	**Network opex**	5,573	5,669	5,734	5,756	5,849	5,938	5,778	5,822	5,865	5,909	5,954
25	System operations and network support	3,842	4,647	4,655	4,656	4,657	4,657	4,657	4,657	4,657	4,657	4,657
26	Business support	5,731	6,450	5,846	5,550	5,247	5,103	5,103	5,103	5,103	5,103	5,103
27	**Non-network opex**	9,573	11,097	10,501	10,207	9,904	9,759	9,759	9,759	9,759	9,759	9,759
28	**Operational expenditure**	15,147	16,765	16,235	15,963	15,752	15,697	15,538	15,581	15,625	15,669	15,713
29	**Subcomponents of operational expenditure (where known)**											
30	Research and development	-	-	-	-	-	-	-	-	-	-	-
	Insurance	91	93	95	97	98	100	102	105	107	109	111
32												
33		*Current year CY*	*CY+1*	*CY+2*	*CY+3*	*CY+4*	*CY+5*	*CY+6*	*CY+7*	*CY+8*	*CY+9*	*CY+10*
34	for year ended	**30 Sep 18**	**30 Sep 19**	**30 Sep 20**	**30 Sep 21**	**30 Sep 22**	**30 Sep 23**	**30 Sep 24**	**30 Sep 25**	**30 Sep 26**	**30 Sep 27**	**30 Sep 28**
35	**Difference between nominal and real forecasts**	**$000**										
36	Service interruptions, incidents and emergencies	-	9	17	26	35	44	53	63	73	84	95
37	Routine and corrective maintenance and inspection	-	56	112	170	229	290	353	418	485	555	627
38	Asset replacement and renewal	-	56	112	168	231	296	335	397	461	527	595
39	**Network opex**	-	121	241	364	494	630	741	878	1,020	1,166	1,317
40	System operations and network support	-	99	196	294	393	494	597	702	809	919	1,030
41	Business support	-	137	246	351	443	541	654	770	887	1,007	1,129
42	**Non-network opex**	-	236	442	645	836	1,036	1,252	1,472	1,696	1,925	2,159
43	**Operational expenditure**	-	357	684	1,008	1,330	1,666	1,993	2,350	2,716	3,091	3,476

Company Name	**Powerco Limited**
AMP Planning Period	**1 October 2018 – 30 September 2028**

SCHEDULE 12a: REPORT ON ASSET CONDITION

This schedule requires a breakdown of asset condition by asset class as at the start of the forecast year. The data accuracy assessment relates to the percentage values disclosed in the asset condition columns. Also required is a forecast of the percentage of units to be replaced in the next 5 years. All information should be consistent with the information provided in the AMP and the expenditure on assets forecast in Schedule 11a.

sch ref

					Asset condition at start of planning period (percentage of units by grade)						
8	**Operating Pressure**	**Asset category**	**Asset class**	**Units**	**Grade 1**	**Grade 2**	**Grade 3**	**Grade 4**	**Grade unknown**	**Data accuracy (1–4)**	**% of asset forecast to be replaced in next 5 years**
9	Intermediate Pressure	Main pipe	IP PE main pipe	km	-	-	0.14%	99.11%	0.76%	3	-
10	Intermediate Pressure	Main pipe	IP steel main pipe	km	0.00%	-	79.87%	0.31%	19.82%	3	0.00%
11	Intermediate Pressure	Main pipe	IP other main pipe	km	-	-	-	-	-	3	-
12	Intermediate Pressure	Service pipe	IP PE service pipe	km	-	-	87.85%	9.39%	2.76%	3	-
13	Intermediate Pressure	Service pipe	IP steel service pipe	km	-	0.03%	23.83%	0.74%	75.40%	3	0.03%
14	Intermediate Pressure	Service pipe	IP other service pipe	km	-	-	93.76%	1.85%	4.39%	3	-
15	Intermediate Pressure	Stations	Intermediate pressure DRS	No.	2.76%	4.14%	75.86%	17.24%	-	3	6.90%
16	Intermediate Pressure	Line valve	IP line valves	No.	0.52%	0.81%	56.56%	5.15%	36.96%	3	0.92%
17	Intermediate Pressure	Special crossings	IP crossings	No.	-	0.91%	85.10%	0.83%	13.16%	2	0.45%
18	Medium Pressure	Main pipe	MP PE main pipe	km	0.18%	0.02%	91.06%	7.99%	0.76%	3	0.19%
19	Medium Pressure	Main pipe	MP steel main pipe	km	0.79%	0.02%	79.17%	0.20%	19.82%	3	0.81%
20	Medium Pressure	Main pipe	MP other main pipe	km	-	-	21.75%	0.02%	78.23%	3	-
21	Medium Pressure	Service pipe	MP PE service pipe	km	-	0.10%	85.11%	12.02%	2.76%	3	0.10%
22	Medium Pressure	Service pipe	MP steel service pipe	km	1.20%	0.06%	23.29%	0.05%	75.40%	3	1.26%
23	Medium Pressure	Service pipe	MP other service pipe	km	-	0.02%	94.45%	1.13%	4.39%	3	0.02%
24	Medium Pressure	Stations	Medium pressure DRS	No.	-	8.82%	77.94%	10.29%	2.94%	3	8.82%
25	Medium Pressure	Line valve	MP line valves	No.	0.16%	1.01%	46.48%	15.89%	36.46%	3	0.66%
26	Medium Pressure	Special crossings	MP special crossings	No.	-	1.77%	81.99%	2.16%	14.08%	2	0.88%
27	Low Pressure	Main pipe	LP PE main pipe	km	-	0.01%	89.56%	9.67%	0.76%	3	0.01%
28	Low Pressure	Main pipe	LP steel main pipe	km	-	-	80.03%	0.15%	19.82%	3	-
29	Low Pressure	Main pipe	LP other main pipe	km	-	-	5.47%	16.30%	78.23%	3	-
30	Low Pressure	Service pipe	LP PE service pipe	km	-	0.88%	85.72%	10.64%	2.76%	3	0.88%
31	Low Pressure	Service pipe	LP steel service pipe	km	-	-	24.11%	0.49%	75.40%	3	-
32	Low Pressure	Service pipe	LP other service pipe	km	-	-	80.18%	15.43%	4.39%	3	-
33	Low Pressure	Line valve	LP line valves	No.	-	0.77%	39.21%	21.15%	38.87%	3	0.38%
34	Low Pressure	Special crossings	LP special crossings	No.	-	-	95.57%	-	4.43%	2	-
35	All	Monitoring and control systems	Remote terminal units	No.	-	8.13%	65.00%	26.88%	-	4	-
36	All	Cathodic protection systems	Cathodic protection	No.	-	28.81%	47.46%	11.86%	11.86%	3	7.20%

Company Name	**Powerco Limited**
AMP Planning Period	**1 October 2018 – 30 September 2028**

SCHEDULE 12b: REPORT ON FORECAST UTILISATION

This Schedule requires a breakdown of current and forecast utilisation (for heavily utilised pipelines) consistent with the information provided in the AMP and the demand forecast in schedule S12c.

sch ref

7 **Forecast Utilisation of Heavily Utilised Pipelines**

8 **Utilisation**

9															
10	Region	Network	Pressure system	Nominal operating pressure (NOP) (kPa)	Minimum operating pressure (MinOP) (kPa)	Total capacity at MinOP (scmh)	Remaining capacity at MinOP (scmh)	Unit	*Current Year CY* y/e 30 Sep 18	*CY+1* y/e 30 Sep 19	*CY+2* y/e 30 Sep 20	*CY+3* y/e 30 Sep 21	*CY+4* y/e 30 Sep 22	*CY+5* y/e 30 Sep 23	Comment
11	Hawkes Bay	Hastings	Hastings LMP	150	90	1,328	71	scmh	1,328	1,345	1,465	1,534	1,598	1,663	This subsystem currently experiences droops higher than 40%, with strong growth projected in the form of additional subdivisions. We expect the subsystem to reach 50% droop next one to two years if growth continues at its current rate. A two-phased upgrade is proposed: in RYE2020, LIP extensions from the gas gate will be constructed to improve supply to Havelock North; In RYE2023 we will uplift the pressure in part of the region to a nominal operating pressure of 350kPa.
12								kPa	90	74	113	103	88	69	
	Hawkes Bay	Hastings	Taradale	140	84	680	124	scmh	681	748	821	884	948	1,009	We will actively monitor subdivision growth on this network. We expect this system to reach 50% droop in RYE2021. Long-term council plans indicate significant growth in the area and the network will require reinforcement. We will plan to uprate the network in RY21.
								kPa	94	84	72	309	303	296	
	Hutt Valley/Porirua	Belmont	Belmont LIP	860	516	17370	260	scmh	17,437	17,600	17,695	17,743	18,555	18,590	Belmont LIP will become constrained in RYE2020 due to the small diameter pipe supplying the Miro St DRS in Upper Hutt, and the growth around Wallaceville. We will monitor this closely and adjust pressure settings at Miro St DRS until the station is removed as part of a rationalisation proejct in RYE2023.
								kPa	443	408	467	441	395	414	
	Hutt Valley/Porirua	Belmont	Kelson	200	120	554	34	scmh	528	528	564	600	1,062	1,098	The development of a new subdivision has been delayed and network constraints are not expected until RYE2020. We have deferred the installation of a new point of supply to RYE2021, and we will continue to monitor the growth as it occurs. The existing Kelson DRS will also need to be replaced in RYE2021 if it cannot cope on its own with the growth. We will reassess at the time what the most efficient system configuration is.
								kPa	133	133	118	117	131	131	
	Hutt Valley/Porirua	Belmont	Lower Hutt LMP	125	81	5474	98	scmh	5,508	5,608	5,608	5,608	5,608	5,608	We continue to monitor this system through the pressure monitoring programme. Should the network become constrained up to a 50% droop from NOP, we would consider building an interconnection with Normandale where there is more capacity.
								kPa	67	65	65	65	65	65	
	Hutt Valley/Porirua	Belmont	Wainuiomata	110	66	1157	274	scmh	977	1,044	1,117	1,143	1,154	1,165	The system reconfiguration that will be complete in RYE2019 will reduce system pressures reduced (as modelled). If the pressures prove constrained as modelled, we will lay some new 100NB main beginning a trunk between Parkway and Norfolk DRSs. These mains are expected to be required in RY21 (breach 50% droop in RY21).
								kPa	86	62	55	71	71	71	
	Hutt Valley/Porirua	Waitangirua/ Pauatahanui	Elsdon	100	60	470	33	scmh	472	472	472	497	521	544	This supply of this pressure system was rationalised through the decommissioning of several smaller stations/network as part of the Porirua CBD rationalisation project. This system is expected to grow with new subdivisions and will be actively monitored.
								kPa	58	58	58	58	58	58	
	Hutt Valley/Porirua	Waitangirua/ Pauatahanui	Pauatahanui IP	1000	300	1290	671	scmh	1,087	1,145	1,093	1,113	1,131	1,138	The completion of the link at Queen Charlotte Drive (Aotea) in RYE2020 will reduce the strain on thins system and will remove it network from this list. This pressure system is actively monitored through SCADA.
								kPa	651	628	668	659	651	646	
	Manawatu	Palmerston North	Palmerston North LMP	100	60	5653	102	scmh	5,686	5,721	5,771	5,821	5,870	5,892	As planned, the James Line railway crossing reduced constraint in the Kelvin Grove area in RYE2018, the Hokowhitu area remains constrained. In RYE2020, we will build a road crossing at Main St and Victoria Ave and enhance the point of supply to improve pressure in the Hokowhitu area and add support to the system as a whole.
								kPa	49	49	62	62	62	62	
	Manawatu	Palmerston North	Summerhill	100	60	514	203	scmh	445	478	510	543	575	589	As the biggest identified area for growth in Palmerston North, we will actively monitor demand and pressure levels. We plan to raise the NOP around RYE2023 if the growth happens as modelled.
								kPa	71	66	62	56	51	169	

	Taranaki	New Plymouth	Bell Block North	225	135	958	103	scmh	977	1,031	1,067	1,103	1,139	1,182	The Nugent Street reinforcement project identified in the 2017 AMP update has been deferred to RYE2019. We continue to monitor pressure and expected growth in the area. The Mangati Road DRS is approaching capacity and is currently being run at a lower pressure to minimise the load. It will be replaced in RYE2019, and the pressure will be set back to its original setting. Depending on the growth in the area and the potential expansion of "Area Q", the network will need to be reinforced again between RYE2021 and RYE2022.
								kPa	123	144	140	135	132	127	
	Taranaki	Manaia	Manaia	340	204	147	53	scmh	169	169	169	169	169	169	This pressure system is dependent on a single commercial consumer. We do not expect any increase in the demand on this network, but we will actively monitor the performance of this system.
								kPa	148	148	148	148	148	148	
	Taranaki	New Plymouth	New Plymouth IP	1250	450	8883	1467	scmh	8,430	8,521	8,614	8,729	8,823	8,925	The pressure at the inlet of Tukapa Street station is constrained, however it does not adversely affect the perfomanace of the interconnected systems. We will monitor through SCADA.
								kPa	657	650	639	627	578	535	
13	Taranaki	New Plymouth	New Plymouth MP	250	150	5820	79	scmh	5,811	5,843	5,900	5,957	5,994	6,030	Although no poor pressure events have been recorded recorded, pressure monitoring has confirmed localised pressure constraints at Port Taranaki due to a relatively long, small diameter main feeding large consumers. We will continue to actively monitor this area of the network. The remainder of the system remains in good health throughout the period.
14								kPa	72	72	72	71	71	70	
15	Taranaki	Patea	Patea	350	210	337	73	scmh	374	374	374	374	374	374	This pressure system has no expected growth and network performance is not expected to change. We will actively monitor the performance of this pressure system.
16								kPa	135	135	135	135	135	135	
17	Wellington	Tawa A	Chartwell	70	42	222	105	scmh	132	163	187	209	226	226	The new Crofton Downs subdivision will constrain this network, and we expect that our pressure threshild will be reached in RYE2020. We will monitor the pressure and demand on the network, and increase the NOP in RYE2020 if needed.
18								kPa	61	61	54	42	67	67	
19	Wellington	Tawa A	Eastern Suburbs	125	75	3578	79	scmh	3,616	3,616	3,616	3,616	3,616	3,616	An additional commercial load has resulted in an increased demand in RYE2018. We will continue to actively monitor to evaluate the overall performance of the network, and identify any potential reinforcements.
20								kPa	49	49	49	49	49	49	
21	Wellington	Tawa A	Karori	130	78	1216	37	scmh	1,229	1,229	1,229	1,229	1,229	1,229	Pressures measured through our monitoring programme are better than previously modelled. We will continue to actively monitor this network.
22								kPa	63	63	63	63	63	63	
23	Wellington	Tawa A	Wellington 25 kPa	25	15	9537	72	scmh	9,560	11,669	11,684	12,365	15,084	15,084	The Wellington CBD pressure upgrade project will increase the performance of this system. Additional work in RYE2018 will improve performance when Dover Street DRS is replaced. Development in the suburb of Island Bay might lower pressures locally. We will continue to actively monitor pressures in these areas.
24								kPa	11	14	14	14	13	13	
25	Wellington	Tawa A	Wellington CBD	10	6	5335	78	scmh	5,352	3,370	3,370	2,705	-	-	The Wellington CBD upgrade project will connect this network to the Wellington 25kPa. The Wellington CBD (LP) pressure system will then cease to exist in RY22.
26								kPa	5	5	5	4	-	-	
27	Wellington	Tawa A	Wellington LIP	1200	300	30903	1751	scmh	30,529	30,827	30,982	31,136	31,235	31,297	The low point on this system is Newtown. The Minimum Operating Pressure in the area has been reviewed and set to 300kPa. We will continue to monitor through SCADA. Note that the Wellington CBD upgrade proejct will improve the performance of this system through network reconfiguration.
28								kPa	405	403	393	369	363	361	
29	Wellington	Tawa A	Wellington North	185	111	6116	306	scmh	6,182	6,322	6,437	6,551	6,630	6,688	Subdivision activity in the region will increase demand. Although the reinforcement work completed in RYE2018 will support future growth in the area, we still expect constraints in Grenada North, Woodridge and Churton Park over the planning period. We will reinforce with several overlays described in the Network Plans. This system is being continuously monitored.
30								kPa	74	74	73	73	71	71	

31 ** Current year utilisation figures may be estimates. Year 1–5 figures show the utilisation forecast to occur given the expected system configuration for each year, including the effect of any new investment in the pressure system.*

32

33 **Disclaimer for supply enquiries**

The information in this table contains modelled estimates of utilisation and capacity. Any interested party seeking to invest in supply from Powerco's distribution networks should contact Powerco or their retailer and confirm availability of capacity.

34

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36 **Notes and assumptions**

37 Growth patterns used are outlined in the 2018 Gas AMP, reflecting our knowledge at the time of writing.

38 If the growth was expected to spread over multiple years, it was uniformly spread over life.

39 The number of lots identified in the 2018 Gas AMP was multiplied by 0.6scm/h to calculate a diversified load per connection. This was summed and placed at a single point in the model where the load is expected to occur.

40 If the growth specified in the 2018 Gas AMP was inferior to our other supply forecasts, we would reconcile these by adding the load at one extremity of the network.

41

42

Company Name	**Powerco Limited**
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SCHEDULE 12c: REPORT ON FORECAST DEMAND

This schedule requires a forecast of new connections (by consumer type), peak demand and energy volumes for the disclosure year and a 5 year planning period. The forecasts should be consistent with the supporting information set out in the AMP as well as the assumptions used in developing the expenditure forecasts in Schedule 11a and Schedule 11b and the capacity and utilisation forecasts in Schedule 12b.

sch ref

12c(i) Consumer Connections

Number of ICPs connected in year by consumer type

Consumer types defined by GDB	*Current year CY* **30 Sep 18**	*CY+1* **30 Sep 19**	*CY+2* **30 Sep 20**	*CY+3* **30 Sep 21**	*CY+4* **30 Sep 22**	*CY+5* **30 Sep 23**
Residential	2,121	1,765	1,799	1,824	1,844	1,858
Commercial / Industrial	145	138	139	139	140	140
Total	2,267	1,903	1,937	1,963	1,983	1,999

12c(ii): Gas Delivered

	Current year CY **30 Sep 18**	*CY+1* **30 Sep 19**	*CY+2* **30 Sep 20**	*CY+3* **30 Sep 21**	*CY+4* **30 Sep 22**	*CY+5* **30 Sep 23**
Number of ICPs at year end (at year end)	108,383	109,847	111,245	112,619	113,963	115,272
Maximum daily load (GJ per day)	43,187	43,795	43,764	43,733	43,703	43,672
Maximum monthly load (GJ per month)	980,310	994,110	993,413	992,717	992,020	991,324
Number of directly billed ICPs (at year end)	-	-	-	-	-	-
Total gas conveyed (GJ per annum)	8,616,803	8,627,751	8,652,506	8,677,261	8,702,016	8,726,771
Average daily delivery (GJ per day)	23,608	23,638	23,641	23,773	23,841	23,909
Load factor	73.25%	72.32%	72.58%	72.84%	73.10%	73.36%

Company Name	**Powerco Limited**
AMP Planning Period	**1 October 2018 – 30 September 2028**
Asset Management Standard Applied	**ISO 55000:2014**

SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY

This schedule requires information on the GDB'S self-assessment of the maturity of its asset management practices.

Question No.	Function	Question	Score	Evidence—Summary	Why	Who	Record/documented Information
3	Asset management policy	To what extent has an asset management policy been documented, authorised and communicated?	3	Powerco has a company-wide published Asset Management Policy which has been approved by the Chief Executive Officer. It is circulated inside the company, and published in the Gas Asset Management Plan. The policy has guided the development of our Asset Management System and Objectives, and Plan.	Widely used AM practice standards require an organisation to document, authorise and communicate its asset management policy (eg, as required in PAS 55 para 4.2 i). A key pre-requisite of any robust policy is that the organisation's top management must be seen to endorse and fully support it. Also vital to the effective implementation of the policy, is to tell the appropriate people of its content and their obligations under it. Where an organisation outsources some of its asset-related activities, then these people and their organisations must equally be made aware of the policy's content. Also, there may be other stakeholders, such as regulatory authorities and shareholders who should be made aware of it.	Top management. The management team that has overall responsibility for asset management.	The organisation's asset management policy, its organisational strategic plan, documents indicating how the asset management policy was based upon the needs of the organisation and evidence of communication.
10	Asset management strategy	What has the organisation done to ensure that its asset management strategy is consistent with other appropriate organisational policies and strategies, and the needs of stakeholders?	3	Our Asset Management Strategy exists as a standalone document and is described in Section 2 of our AMP. The Asset Management Strategy is aligned to our Asset Management Objectives that fall out of our Organisational Strategic Plan. Stakeholers requirements, both internal and external have guided its development. As a result, the predominant drivers of the Asset Management Strategy and associated documents are safety, affordability, and practicality of implementation.	In setting an organisation's asset management strategy, it is important that it is consistent with any other policies and strategies that the organisation has and has taken into account the requirements of relevant stakeholders. This question examines to what extent the asset management strategy is consistent with other organisational policies and strategies (eg, as required by PAS 55 para 4.3.1 b) and has taken account of stakeholder requirements as required by PAS 55 para 4.3.1 c). Generally, this will take into account the same polices, strategies and stakeholder requirements as covered in drafting the asset management policy but at a greater level of detail.	Top management. The organisation's strategic planning team. The management team that has overall responsibility for asset management.	The organisation's asset management strategy document and other related organisational policies and strategies. Other than the organisation's strategic plan, these could include those relating to health and safety, environmental, etc. Results of stakeholder consultation.
11	Asset management strategy	In what way does the organisation's asset management strategy take account of the lifecycle of the assets, asset types and asset systems over which the organisation has stewardship?	3	Our Asset Management Strategy and the suite of associated documents consider the status of the assets in their lifecyle. For example, we apply a different strategy for existing assets, to those newly built. This Reliability-Centred, Maintenance-based approach that we are implementing improves the efficiency of our asset lifecycle management.	Good asset stewardship is the hallmark of an organisation compliant with widely used AM standards. A key component of this is the need to take account of the lifecycle of the assets, asset types and asset systems. (For example, this requirement is recognised in 4.3.1 d) of PAS 55). This question explores what an organisation has done to take lifecycle into account in its asset management strategy.	Top management. People in the organisation with expert knowledge of the assets, asset types, asset systems and their associated life-cycles. The management team that has overall responsibility for asset management. Those responsible for developing and adopting methods and processes used in asset management	The organisation's documented asset management strategy and supporting working documents.
26	Asset management plan(s)	How does the organisation establish and document its asset management plan(s) across the life cycle activities of its assets and asset systems?	3	Our Asset Class Strategies and Technical Standards are well developed and set the basis for all activities required during the lifecycle of our assets. this has allowed us to refine our maintenance programme, aligning it with the principles of reliability-centred maintenance.	The asset management strategy need to be translated into practical plan(s) so that all parties know how the objectives will be achieved. The development of plan(s) will need to identify the specific tasks and activities required to optimize costs, risks and performance of the assets and/or asset system(s), when they are to be carried out and the resources required.	The management team with overall responsibility for the asset management system. Operations, maintenance and engineering managers.	The organisation's asset management plan(s).

Company Name	**Powerco Limited**
AMP Planning Period	**1 October 2018 – 30 September 2028**
Asset Management Standard Applied	**ISO 55000:2014**

SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY (cont)

Question No.	Function	Question	Maturity Level 0	Maturity Level 1	Maturity Level 2	Maturity Level 3	Maturity Level 4
3	Asset management policy	To what extent has an asset management policy been documented, authorised and communicated?	The organisation does not have a documented asset management policy.	The organisation has an asset management policy, but it has not been authorised by top management, or it is not influencing the management of the assets.	The organisation has an asset management policy, which has been authorised by top management, but it has had limited circulation. It may be in use to influence development of strategy and planning but its effect is limited.	The asset management policy is authorised by top management, is widely and effectively communicated to all relevant employees and stakeholders, and used to make these persons aware of their asset related obligations.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
10	Asset management strategy	What has the organisation done to ensure that its asset management strategy is consistent with other appropriate organisational policies and strategies, and the needs of stakeholders?	The organisation has not considered the need to ensure that its asset management strategy is appropriately aligned with the organisation's other organisational policies and strategies or with stakeholder requirements. OR The organisation does not have an asset management strategy.	The need to align the asset management strategy with other organisational policies and strategies as well as stakeholder requirements is understood and work has started to identify the linkages or to incorporate them in the drafting of asset management strategy.	Some of the linkages between the long-term asset management strategy and other organisational policies, strategies and stakeholder requirements are defined but the work is fairly well advanced but still incomplete.	All linkages are in place and evidence is available to demonstrate that, where appropriate, the organisation's asset management strategy is consistent with its other organisational policies and strategies. The organisation has also identified and considered the requirements of relevant stakeholders.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
11	Asset management strategy	In what way does the organisation's asset management strategy take account of the lifecycle of the assets, asset types and asset systems over which the organisation has stewardship?	The organisation has not considered the need to ensure that its asset management strategy is produced with due regard to the lifecycle of the assets, asset types or asset systems that it manages. OR The organisation does not have an asset management strategy.	The need is understood, and the organisation is drafting its asset management strategy to address the lifecycle of its assets, asset types and asset systems.	The long-term asset management strategy takes account of the lifecycle of some, but not all, of its assets, asset types and asset systems.	The asset management strategy takes account of the lifecycle of all of its assets, asset types and asset systems.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
26	Asset management plan(s)	How does the organisation establish and document its asset management plan(s) across the life cycle activities of its assets and asset systems?	The organisation does not have an identifiable asset management plan(s) covering asset systems and critical assets.	The organisation has asset management plan(s) but they are not aligned with the asset management strategy and objectives and do not take into consideration the full asset life cycle (including asset creation, acquisition, enhancement, utilisation, maintenance decommissioning and disposal).	The organisation is in the process of putting in place comprehensive, documented asset management plan(s) that cover all life cycle activities, clearly aligned to asset management objectives and the asset management strategy.	Asset management plan(s) are established, documented, implemented and maintained for asset systems and critical assets to achieve the asset management strategy and asset management objectives across all life cycle phases.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.

Company Name	**Powerco Limited**
AMP Planning Period	**1 October 2018 – 30 September 2028**
Asset Management Standard Applied	**ISO 55000:2014**

SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY (cont)

Question No.	Function	Question	Score	Evidence—Summary	Why	Who	Record/documented Information
27	Asset management plan(s)	How has the organisation communicated its plan(s) to all relevant parties to a level of detail appropriate to the receiver's role in their delivery?	3	Our plans are widely shared with relevant stakeholders. The Gas Asset Management Plan is made available to the public on our website. It is communicated to our service providers, internal teams and external stakeholders. We also run roadshows presentations on an ad-hoc basis to facilitate the understanding of the plan.	Plans will be ineffective unless they are communicated to all those, including contracted suppliers and those who undertake enabling function(s). The plan(s) need to be communicated in a way that is relevant to those who need to use them.	The management team with overall responsibility for the asset management system. Delivery functions and suppliers.	Distribution lists for plan(s). Documents derived from plan(s) which detail the receivers role in plan delivery. Evidence of communication.
29	Asset management plan(s)	How are designated responsibilities for delivery of asset plan actions documented?	3	Designated responsibilities for asset management plan delivery are described from a strategic level across Section 3 of the AMP, i.e. network planning and work delivery responsibilities. From an operational view point, further detail of responsibility is documented across the business and including the Business Plan, business unit tactical plans, position descriptions and employees' annual review and development forms. Powerco has detailed documents on responsibilities of service providers as well.	The implementation of asset management plan(s) relies on (1) actions being clearly identified, (2) an owner allocated and (3) that owner having sufficient delegated responsibility and authority to carry out the work required. It also requires alignment of actions across the organisation. This question explores how well the plan(s) set out responsibility for delivery of asset plan actions.	The management team with overall responsibility for the asset management system. Operations, maintenance and engineering managers. If appropriate, the performance management team.	The organisation's asset management plan(s). Documentation defining roles and responsibilities of individuals and organisational departments.
31	Asset management plan(s)	What has the organisation done to ensure that appropriate arrangements are made available for the efficient and cost effective implementation of the plan(s)? (Note this is about resources and enabling support)	3	We use different mechanisms to ensure a cost-effective, on-time and on-quality delivery of the plans. We have the possibility to insource or outsource the design and project management of the plans. All field activities are outsourced and delivered through market-tested agreements, guaranteeing efficient pricing.	It is essential that the plan(s) are realistic and can be implemented, which requires appropriate resources to be available and enabling mechanisms in place. This question explores how well this is achieved. The plan(s) not only need to consider the resources directly required and timescales, but also the enabling activities, including for example, training requirements, supply chain capability and procurement timescales.	The management team with overall responsibility for the asset management system. Operations, maintenance and engineering managers. If appropriate, the performance management team. If appropriate, the performance management team. Where appropriate the procurement team and service providers working on the organisation's asset-related activities.	The organisation's asset management plan(s). Documented processes and procedures for the delivery of the asset management plan.
33	Contingency planning	What plan(s) and procedure(s) does the organisation have for identifying and responding to incidents and emergency situations and ensuring continuity of critical asset management activities?	3	Well developed and established procedures for dealing with network incidents and emergencies are in place through our Public Safety Management System, and managed centrally by our Network Operations Centre. Our dedicated Risk and Assurance Team is the custodian of our ISO31000-based Risk and Compliance Management Policy. A Safety and Operating Plan and the Emergency Response plan exists and is reviewed on a regular basis. A comprehensive approach to staff training is taken with a range of courses offered though a planned approach annually.	Widely used AM practice standards require that an organisation has plan(s) to identify and respond to emergency situations. Emergency plan(s) should outline the actions to be taken to respond to specified emergency situations and ensure continuity of critical asset management activities including the communication to, and involvement of, external agencies. This question assesses if, and how well, these plan(s) triggered, implemented and resolved in the event of an incident. The plan(s) should be appropriate to the level of risk as determined by the organisation's risk assessment methodology. It is also a requirement that relevant personnel are competent and trained.	The manager with responsibility for developing emergency plan(s). The organisation's risk assessment team. People with designated duties within the plan(s) and procedure(s) for dealing with incidents and emergency situations.	The organisation's plan(s) and procedure(s) for dealing with emergencies. The organisation's risk assessments and risk registers.

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SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY (cont)

Question No.	Function	Question	Maturity Level 0	Maturity Level 1	Maturity Level 2	Maturity Level 3	Maturity Level 4
27	Asset management plan(s)	How has the organisation communicated its plan(s) to all relevant parties to a level of detail appropriate to the receiver's role in their delivery?	The organisation does not have plan(s) or their distribution is limited to the authors.	The plan(s) are communicated to some of those responsible for delivery of the plan(s). OR Communicated to those responsible for delivery is either irregular or ad-hoc.	The plan(s) are communicated to most of those responsible for delivery but there are weaknesses in identifying relevant parties resulting in incomplete or inappropriate communication. The organisation recognises improvement is needed as is working towards resolution.	The plan(s) are communicated to all relevant employees, stakeholders and contracted service providers to a level of detail appropriate to their participation or business interests in the delivery of the plan(s) and there is confirmation that they are being used effectively.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
29	Asset management plan(s)	How are designated responsibilities for delivery of asset plan actions documented?	The organisation has not documented responsibilities for delivery of asset plan actions.	Asset management plan(s) inconsistently document responsibilities for delivery of plan actions and activities and/or responsibilities and authorities for implementation inadequate and/or delegation level inadequate to ensure effective delivery and/or contain misalignments with organisational accountability.	Asset management plan(s) consistently document responsibilities for the delivery of actions but responsibility/authority levels are inappropriate/ inadequate, and/or there are misalignments within the organisation.	Asset management plan(s) consistently document responsibilities for the delivery actions and there is adequate detail to enable delivery of actions. Designated responsibility and authority for achievement of asset plan actions is appropriate.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
31	Asset management plan(s)	What has the organisation done to ensure that appropriate arrangements are made available for the efficient and cost effective implementation of the plan(s)? (Note this is about resources and enabling support)	The organisation has not considered the arrangements needed for the effective implementation of plan(s).	The organisation recognises the need to ensure appropriate arrangements are in place for implementation of asset management plan(s) and is in the process of determining an appropriate approach for achieving this.	The organisation has arrangements in place for the implementation of asset management plan(s) but the arrangements are not yet adequately efficient and/or effective. The organisation is working to resolve existing weaknesses.	The organisation's arrangements fully cover all the requirements for the efficient and cost effective implementation of asset management plan(s) and realistically address the resources and timescales required, and any changes needed to functional policies, standards, processes and the asset management information system.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
33	Contingency planning	What plan(s) and procedure(s) does the organisation have for identifying and responding to incidents and emergency situations and ensuring continuity of critical asset management activities?	The organisation has not considered the need to establish plan(s) and procedure(s) to identify and respond to incidents and emergency situations.	The organisation has some ad-hoc arrangements to deal with incidents and emergency situations, but these have been developed on a reactive basis in response to specific events that have occurred in the past.	Most credible incidents and emergency situations are identified. Either appropriate plan(s) and procedure(s) are incomplete for critical activities or they are inadequate. Training/ external alignment may be incomplete.	Appropriate emergency plan(s) and procedure(s) are in place to respond to credible incidents and manage continuity of critical asset management activities consistent with policies and asset management objectives. Training and external agency alignment is in place.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.

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SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY (cont)

Question No.	Function	Question	Score	Evidence—Summary	Why	Who	Record/documented Information
37	Structure, authority and responsibilities	What has the organisation done to appoint member(s) of its management team to be responsible for ensuring that the organisation's assets deliver the requirements of the asset management strategy, objectives and plan(s)?	3	Section 3 provides an overview of responsibilities and delegations, with a dedicated gas division, led by the General Manager Gas, to provide an end-to-end process. Responsibilities are detailed in the Asset Policy, then reflected in the Business Plan, tactical plans, position descriptions and personal objectives. A recent gas division restructure has made asset management-related responsibilities clearer to the business and ensured role descriptions reflect and cover all areas of the end-to-end asset management process. Examples of changes driven by the restructure are that project work now goes through a sign-off process taking into account the new organisation structure and delegated Financial Authorities have also been reviewed to enable staff to be fully responsible.	In order to ensure that the organisation's assets and asset systems deliver the requirements of the asset management policy, strategy and objectives responsibilities need to be allocated to appropriate people who have the necessary authority to fulfil their responsibilities. (This question, relates to the organisation's assets eg, para b), s 4.4.1 of PAS 55, making it therefore distinct from the requirement contained in para a), s 4.4.1 of PAS 55).	Top management. People with management responsibility for the delivery of asset management policy, strategy, objectives and plan(s). People working on asset-related activities.	Evidence that managers with responsibility for the delivery of asset management policy, strategy, objectives and plan(s) have been appointed and have assumed their responsibilities. Evidence may include the organisation's documents relating to its asset management system, organisational charts, job descriptions of post-holders, annual targets/objectives and personal development plan(s) of post-holders as appropriate.
40	Structure, authority and responsibilities	What evidence can the organisation's top management provide to demonstrate that sufficient resources are available for asset management?	3	The gas division restructure reviewed human resource needs and subsequently reallocated role tasks and introduced new roles to optimally deliver the asset management strategy. These resources are reviewed annually as part of the annual planning process, and a pool of engineering consultants, and service providers have been constituted to increase the volume of work delivered. We are also securing procurement arrangement to deal with the availability of materials critical for the delivery of the work programme.	Optimal asset management requires top management to ensure sufficient resources are available. In this context the term 'resources' includes manpower, materials, funding and service provider support.	Top management. The management team that has overall responsibility for asset management. Risk management team. The organisation's managers involved in day-to-day supervision of asset-related activities, such as frontline managers, engineers, foremen and chargehands as appropriate.	Evidence demonstrating that asset management plan(s) and/or the process(es) for asset management plan implementation consider the provision of adequate resources in both the short and long term. Resources include funding, materials, equipment, services provided by third parties and personnel (internal and service providers) with appropriate skills competencies and knowledge.
42	Structure, authority and responsibilities	To what degree does the organisation's top management communicate the importance of meeting its asset management requirements?	3	A range of activities are undertaken to communicate the importance of meeting asset management requirements. The requirements are reflected in the Business Plan, which has a comprehensive communication process via road shows, KPI reporting and emails from the CEO. The GM Gas also provides regular briefings on progress. Specific asset management objectives are set up for the business from a board level and reported back. The Gas division has an internal communications process that ensures all staff are aware of asset management targets and actuals. For tactical projects, a more formal process to engage with the wider audience in the company (Finance, Programme office, etc.) is being developed.	Widely used AM practice standards require an organisation to communicate the importance of meeting its asset management requirements such that personnel fully understand, take ownership of, and are fully engaged in the delivery of the asset management requirements (eg, PAS 55 s 4.4.1 g).	Top management. The management team that has overall responsibility for asset management. People involved in the delivery of the asset management requirements.	Evidence of such activities as road shows, written bulletins, workshops, team talks and management walk-abouts would assist an organisation to demonstrate it is meeting this requirement of PAS 55.
45	Outsourcing of asset management activities	Where the organisation has outsourced some of its asset management activities, how has it ensured that appropriate controls are in place to ensure the compliant delivery of its organisational strategic plan, and its asset management policy and strategy?	3	Contractual arrangements are in place to provide a clear and accountable set of standards and work instructions, to agree, instruct and review field work. Dedicated roles exist within the Powerco operations team to manage the relationship and work. The Operations Manager has the responsibility of ensuring the overall delivery is achieved in line with guiding documentation. For health and safety matters, every contractor should go through a contractor approval process prior to execute works on the network to ensure they have the appropriate systems to follow our requirements.	Where an organisation chooses to outsource some of its asset management activities, the organisation must ensure that these outsourced process(es) are under appropriate control to ensure that all the requirements of widely used AM standards (eg, PAS 55) are in place, and the asset management policy, strategy objectives and plan(s) are delivered. This includes ensuring capabilities and resources across a time span aligned to life cycle management. The organisation must put arrangements in place to control the outsourced activities, whether it be to external providers or to other in-house departments. This question explores what the organisation does in this regard.	Top management. The management team that has overall responsibility for asset management. The manager(s) responsible for the monitoring and management of the outsourced activities. People involved with the procurement of outsourced activities. The people within the organisations that are performing the outsourced activities. The people impacted by the outsourced activity.	The organisation's arrangements that detail the compliance required of the outsourced activities. For example, this this could form part of a contract or service level agreement between the organisation and the suppliers of its outsourced activities. Evidence that the organisation has demonstrated to itself that it has assurance of compliance of outsourced activities.

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SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY (cont)

Question No.	Function	Question	Maturity Level 0	Maturity Level 1	Maturity Level 2	Maturity Level 3	Maturity Level 4
37	Structure, authority and responsibilities	What has the organisation done to appoint member(s) of its management team to be responsible for ensuring that the organisation's assets deliver the requirements of the asset management strategy, objectives and plan(s)?	Top management has not considered the need to appoint a person or persons to ensure that the organisation's assets deliver the requirements of the asset management strategy, objectives and plan(s).	Top management understands the need to appoint a person or persons to ensure that the organisation's assets deliver the requirements of the asset management strategy, objectives and plan(s).	Top management has appointed an appropriate people to ensure the assets deliver the requirements of the asset management strategy, objectives and plan(s) but their areas of responsibility are not fully defined and/or they have insufficient delegated authority to fully execute their responsibilities.	The appointed person or persons have full responsibility for ensuring that the organisation's assets deliver the requirements of the asset management strategy, objectives and plan(s). They have been given the necessary authority to achieve this.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
40	Structure, authority and responsibilities	What evidence can the organisation's top management provide to demonstrate that sufficient resources are available for asset management?	The organisation's top management has not considered the resources required to deliver asset management.	The organisations top management understands the need for sufficient resources but there are no effective mechanisms in place to ensure this is the case.	A process exists for determining what resources are required for its asset management activities and in most cases these are available but in some instances resources remain insufficient.	An effective process exists for determining the resources needed for asset management and sufficient resources are available. It can be demonstrated that resources are matched to asset management requirements.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
42	Structure, authority and responsibilities	To what degree does the organisation's top management communicate the importance of meeting its asset management requirements?	The organisation's top management has not considered the need to communicate the importance of meeting asset management requirements.	The organisations top management understands the need to communicate the importance of meeting its asset management requirements but does not do so.	Top management communicates the importance of meeting its asset management requirements but only to parts of the organisation.	Top management communicates the importance of meeting its asset management requirements to all relevant parts of the organisation.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
45	Outsourcing of asset management activities	Where the organisation has outsourced some of its asset management activities, how has it ensured that appropriate controls are in place to ensure the compliant delivery of its organisational strategic plan, and its asset management policy and strategy?	The organisation has not considered the need to put controls in place.	The organisation controls its outsourced activities on an ad-hoc basis, with little regard for ensuring for the compliant delivery of the organisational strategic plan and/or its asset management policy and strategy.	Controls systematically considered but currently only provide for the compliant delivery of some, but not all, aspects of the organisational strategic plan and/or its asset management policy and strategy. Gaps exist.	Evidence exists to demonstrate that outsourced activities are appropriately controlled to provide for the compliant delivery of the organisational strategic plan, asset management policy and strategy, and that these controls are integrated into the asset management system	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.

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SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY (cont)

Question No.	Function	Question	Score	Evidence—Summary	Why	Who	Record/documented Information
48	Training, awareness and competence	How does the organisation develop plan(s) for the human resources required to undertake asset management activities - including the development and delivery of asset management strategy, process(es), objectives and plan(s)?	2	Powerco's Human Resources Division has undertaken a range of analysis, in conjunction with the Gas Team, on training and competence needs required to deliver our services, and there is a structured approach to training in Powerco. We are currently refining this approach to formalise our asset management core competencies. If the competency of field staff is managed by service providers, Powerco is part of industry groups in charge of developping field competency frameworks with the Industry Training Organisation (ITO).	There is a need for an organisation to demonstrate that it has considered what resources are required to develop and implement its asset management system. There is also a need for the organisation to demonstrate that it has assessed what development plan(s) are required to provide its human resources with the skills and competencies to develop and implement its asset management systems. The timescales over which the plan(s) are relevant should be commensurate with the planning horizons within the asset management strategy considers e.g. if the asset management strategy considers 5, 10 and 15 year time scales then the human resources development plan(s) should align with these. Resources include both 'in house' and external resources who undertake asset management activities.	Senior management responsible for agreement of plan(s). Managers responsible for developing asset management strategy and plan(s). Managers with responsibility for development and recruitment of staff (including HR functions). Staff responsible for training. Procurement officers. Contracted service providers.	Evidence of analysis of future work load plan(s) in terms of human resources. Document(s) containing analysis of the organisation's own direct resources and contractors resource capability over suitable timescales. Evidence, such as minutes of meetings, that suitable management forums are monitoring human resource development plan(s). Training plan(s), personal development plan(s), contract and service level agreements.
49	Training, awareness and competence	How does the organisation identify competency requirements and then plan, provide and record the training necessary to achieve the competencies?	3	Powerco has a strong focus on training and development, supported by a structured annual review and development process. All employees have individual development plans that align with Powerco's competency standard, and a generous training budget is available. In the coming year we are looking to further refine our skills and competencies, assessments and training to align with our asset management expectations.	Widely used AM standards require that organisations to undertake a systematic identification of the asset management awareness and competencies required at each level and function within the organisation. Once identified the training required to provide the necessary competencies should be planned for delivery in a timely and systematic way. Any training provided must be recorded and maintained in a suitable format. Where an organisation has contracted service providers in place then it should have a means to demonstrate that this requirement is being met for their employees. (eg, PAS 55 refers to frameworks suitable for identifying competency requirements).	Senior management responsible for agreement of plan(s). Managers responsible for developing asset management strategy and plan(s). Managers with responsibility for development and recruitment of staff (including HR functions). Staff responsible for training. Procurement officers. Contracted service providers.	Evidence of an established and applied competency requirements assessment process and plan(s) in place to deliver the required training. Evidence that the training programme is part of a wider, co-ordinated asset management activities training and competency programme. Evidence that training activities are recorded and that records are readily available (for both direct and contracted service provider staff) e.g. via organisation wide information system or local records database.
50	Training, awareness and competence	How does the organization ensure that persons under its direct control undertaking asset management related activities have an appropriate level of competence in terms of education, training or experience?	3	Powerco's has clearly developed competence requirements for internal employees and contractors, including qualifications and training requirements that are based on industry standards frameworks. These are fully enforced and audited for health and safety reasons. For non-standard activities on the network, work instructions are developed and implemented with our service providers. In addition, every contractor should go through a contractor approval process prior to execute works on the network to ensure they have the appropriate systems to follow our requirements.	A critical success factor for the effective development and implementation of an asset management system is the competence of persons undertaking these activities. organisations should have effective means in place for ensuring the competence of employees to carry out their designated asset management function(s). Where an organisation has contracted service providers undertaking elements of its asset management system then the organisation shall assure itself that the outsourced service provider also has suitable arrangements in place to manage the competencies of its employees. The organisation should ensure that the individual and corporate competencies it requires are in place and actively monitor, develop and maintain an appropriate balance of these competencies.	Managers, supervisors, persons responsible for developing training programmes. Staff responsible for procurement and service agreements. HR staff and those responsible for recruitment.	Evidence of a competency assessment framework that aligns with established frameworks such as the asset management Competencies Requirements Framework (Version 2.0); National Occupational Standards for Management and Leadership; UK Standard for Professional Engineering Competence, Engineering Council, 2005.
53	Communication, participation and consultation	How does the organisation ensure that pertinent asset management information is effectively communicated to and from employees and other stakeholders, including contracted service providers?	3	Powerco's Asset Management Policy and AMP are available to all employees, service providers, and the public. The AMP was also presentefd to all service providers. Powerco's progress on KPIs is reported on the intranet for all staff to view and specific KPIs for service providers are made available through the gas contractor portal. We also seek a range of ways for staff to feed back into the asset management process, e.g. via discussions on the Business Plan. As a high priority, safety related discussion are regularly held and communicated to staff and contractors.	Widely used AM practice standards require that pertinent asset management information is effectively communicated to and from employees and other stakeholders including contracted service providers. Pertinent information refers to information required in order to effectively and efficiently comply with and deliver asset management strategy, plan(s) and objectives. This will include for example the communication of the asset management policy, asset performance information, and planning information as appropriate to contractors.	Top management and senior management representative(s), employee's representative(s), employee's trade union representative(s); contracted service provider management and employee representative(s); representative(s) from the organisation's Health, Safety and Environmental team. Key stakeholder representative(s).	Asset management policy statement prominently displayed on notice boards, intranet and internet; use of organisation's website for displaying asset performance data; evidence of formal briefings to employees, stakeholders and contracted service providers; evidence of inclusion of asset management issues in team meetings and contracted service provider contract meetings; newsletters, etc.

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SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY (cont)

Question No.	Function	Question	Maturity Level 0	Maturity Level 1	Maturity Level 2	Maturity Level 3	Maturity Level 4
48	Training, awareness and competence	How does the organisation develop plan(s) for the human resources required to undertake asset management activities - including the development and delivery of asset management strategy, process(es), objectives and plan(s)?	The organisation has not recognised the need for assessing human resources requirements to develop and implement its asset management system.	The organisation has recognised the need to assess its human resources requirements and to develop a plan(s). There is limited recognition of the need to align these with the development and implementation of its asset management system.	The organisation has developed a strategic approach to aligning competencies and human resources to the asset management system including the asset management plan but the work is incomplete or has not been consistently implemented.	The organisation can demonstrate that plan(s) are in place and effective in matching competencies and capabilities to the asset management system including the plan for both internal and contracted activities. Plans are reviewed integral to asset management system process(es).	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
49	Training, awareness and competence	How does the organisation identify competency requirements and then plan, provide and record the training necessary to achieve the competencies?	The organisation does not have any means in place to identify competency requirements.	The organisation has recognised the need to identify competency requirements and then plan, provide and record the training necessary to achieve the competencies.	The organisation is the process of identifying competency requirements aligned to the asset management plan(s) and then plan, provide and record appropriate training. It is incomplete or inconsistently applied.	Competency requirements are in place and aligned with asset management plan(s). Plans are in place and effective in providing the training necessary to achieve the competencies. A structured means of recording the competencies achieved is in place.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
50	Training, awareness and competence	How does the organization ensure that persons under its direct control undertaking asset management related activities have an appropriate level of competence in terms of education, training or experience?	The organization has not recognised the need to assess the competence of person(s) undertaking asset management related activities.	Competency of staff undertaking asset management related activities is not managed or assessed in a structured way, other than formal requirements for legal compliance and safety management.	The organization is in the process of putting in place a means for assessing the competence of person(s) involved in asset management activities including contractors. There are gaps and inconsistencies.	Competency requirements are identified and assessed for all persons carrying out asset management related activities - internal and contracted. Requirements are reviewed and staff reassessed at appropriate intervals aligned to asset management requirements.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
53	Communication, participation and consultation	How does the organisation ensure that pertinent asset management information is effectively communicated to and from employees and other stakeholders, including contracted service providers?	The organisation has not recognised the need to formally communicate any asset management information.	There is evidence that the pertinent asset management information to be shared along with those to share it with is being determined.	The organisation has determined pertinent information and relevant parties. Some effective two way communication is in place but as yet not all relevant parties are clear on their roles and responsibilities with respect to asset management information.	Two way communication is in place between all relevant parties, ensuring that information is effectively communicated to match the requirements of asset management strategy, plan(s) and process(es). Pertinent asset information requirements are regularly reviewed.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.

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SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY (cont)

Question No.	Function	Question	Score	Evidence—Summary	Why	Who	Record/documented Information
59	Asset Management System documentation	What documentation has the organisation established to describe the main elements of its asset management system and interactions between them?	2	Powerco has an extensive range of documentation to support its asset management, such as standards, approval documentation and process mapping. Within the next two years, we will review our process documentation to leverage the rollout of our new Entreprise Resource Planning system. As described in Section 2, our asset management policy presides over all our asset management activities in our asset management system; objectives and strategies all reference the policy and/or the organisational strategy.	Widely used AM practice standards require an organisation maintain up to date documentation that ensures that its asset management systems (ie, the systems the organisation has in place to meet the standards) can be understood, communicated and operated. (eg, s 4.5 of PAS 55 requires the maintenance of up to date documentation of the asset management system requirements specified throughout s 4 of PAS 55).	The management team that has overall responsibility for asset management. Managers engaged in asset management activities.	The documented information describing the main elements of the asset management system (process(es)) and their interaction.
62	Information management	What has the organisation done to determine what its asset management information system(s) should contain in order to support its asset management system?	2	Powerco is undergoing a profound change in its suite of core systems that support our end-to-end asset management processes. The implementation of our new Entrprise Resource Planning system will give us flexible tools to ensure our asset information is up to date and available.	Effective asset management requires appropriate information to be available. Widely used AM standards therefore require the organisation to identify the asset management information it requires in order to support its asset management system. Some of the information required may be held by suppliers. The maintenance and development of asset management information systems is a poorly understood specialist activity that is akin to IT management but different from IT management. This group of questions provides some indications as to whether the capability is available and applied. Note: To be effective, an asset information management system requires the mobilisation of technology, people and process(es) that create, secure, make available and destroy the information required to support the asset management system.	The organisation's strategic planning team. The management team that has overall responsibility for asset management. Information management team. Operations, maintenance and engineering managers	Details of the process the organisation has employed to determine what its asset information system should contain in order to support its asset management system. Evidence that this has been effectively implemented.
63	Information management	How does the organisation maintain its asset management information system(s) and ensure that the data held within it (them) is of the requisite quality and accuracy and is consistent?	2	Powerco has a range of controls to ensure data is accurate and there is an adequate process of change management - for example, security controls, off-site back up and restricted fields. We have invested in an internal assurance team, to provide increased checks on data accuracy, however, this is an area we are always seeking to improve.	The response to the questions is progressive. A higher scale cannot be awarded without achieving the requirements of the lower scale. This question explores how the organisation ensures that information management meets widely used AM practice requirements (eg, s 4.4.6 (a), (c) and (d) of PAS 55).	The management team that has overall responsibility for asset management. Users of the organisational information systems.	The asset management information system, together with the policies, procedure(s), improvement initiatives and audits regarding information controls.
64	Information management	How has the organisation's ensured its asset management information system is relevant to its needs?	2	Powerco is going through two major initiatives to enhance asset data and systems. Projects are in place to quanitatively assess the quality of asset data. As we are currently replacing our core entreprise resource planning system, we have build a company-wide capability plan looking at our future system needs.	Widely used AM standards need not be prescriptive about the form of the asset management information system, but simply require that the asset management information system is appropriate to the organisations needs, can be effectively used and can supply information which is consistent and of the requisite quality and accuracy.	The organisation's strategic planning team. The management team that has overall responsibility for asset management. Information management team. Users of the organisational information systems.	The documented process the organisation employs to ensure its asset management information system aligns with its asset management requirements. Minutes of information systems review meetings involving users.

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SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY (cont)

Question No.	Function	Question	Maturity Level 0	Maturity Level 1	Maturity Level 2	Maturity Level 3	Maturity Level 4
59	Asset Management System documentation	What documentation has the organisation established to describe the main elements of its asset management system and interactions between them?	The organisation has not established documentation that describes the main elements of the asset management system.	The organisation is aware of the need to put documentation in place and is in the process of determining how to document the main elements of its asset management system.	The organisation in the process of documenting its asset management system and has documentation in place that describes some, but not all, of the main elements of its asset management system and their interaction.	The organisation has established documentation that comprehensively describes all the main elements of its asset management system and the interactions between them. The documentation is kept up to date.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
62	Information management	What has the organisation done to determine what its asset management information system(s) should contain in order to support its asset management system?	The organisation has not considered what asset management information is required.	The organisation is aware of the need to determine in a structured manner what its asset information system should contain in order to support its asset management system and is in the process of deciding how to do this.	The organisation has developed a structured process to determine what its asset information system should contain in order to support its asset management system and has commenced implementation of the process.	The organisation has determined what its asset information system should contain in order to support its asset management system. The requirements relate to the whole life cycle and cover information originating from both internal and external sources.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
63	Information management	How does the organisation maintain its asset management information system(s) and ensure that the data held within it (them) is of the requisite quality and accuracy and is consistent?	There are no formal controls in place or controls are extremely limited in scope and/or effectiveness.	The organisation is aware of the need for effective controls and is in the process of developing an appropriate control process(es).	The organisation has developed a controls that will ensure the data held is of the requisite quality and accuracy and is consistent and is in the process of implementing them.	The organisation has effective controls in place that ensure the data held is of the requisite quality and accuracy and is consistent. The controls are regularly reviewed and improved where necessary.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
64	Information management	How has the organisation's ensured its asset management information system is relevant to its needs?	The organisation has not considered the need to determine the relevance of its management information system. At present there are major gaps between what the information system provides and the organisations needs.	The organisation understands the need to ensure its asset management information system is relevant to its needs and is determining an appropriate means by which it will achieve this. At present there are significant gaps between what the information system provides and the organisations needs.	The organisation has developed and is implementing a process to ensure its asset management information system is relevant to its needs. Gaps between what the information system provides and the organisations needs have been identified and action is being taken to close them.	The organisation's asset management information system aligns with its asset management requirements. Users can confirm that it is relevant to their needs.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.

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SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY (cont)

Question No.	Function	Question	Score	Evidence—Summary	Why	Who	Record/documented Information
69	Risk management process(es)	How has the organisation documented process(es) and/or procedure(s) for the identification and assessment of asset and asset management related risks throughout the asset life cycle?	3	Powerco has a formal, documented process for risk management and a structured approach across the business for identifying risks, and a detailed risk register. Specific asset-related risks during their lifecycle are also taking place in the form a Failure Mode and Effect Analysis, ands Formal Safety Assessment. Planned activities that drive our work plans are based on a risk management methodology that focuses on whether risk levels are acceptable or not in terms or safety, reliability or delivery.	Risk management is an important foundation for proactive asset management. Its overall purpose is to understand the cause, effect and likelihood of adverse events occurring, to optimally manage such risks to an acceptable level, and to provide an audit trail for the management of risks. Widely used standards require the organisation to have process(es) and/or procedure(s) in place that set out how the organisation identifies and assesses asset and asset management related risks. The risks have to be considered across the four phases of the asset lifecycle (eg, para 4.3.3 of PAS 55).	The top management team in conjunction with the organisation's senior risk management representatives. There may also be input from the organisation's Safety, Health and Environment team. Staff who carry out risk identification and assessment.	The organisation's risk management framework and/or evidence of specific process(es) and/ or procedure(s) that deal with risk control mechanisms. Evidence that the process(es) and/or procedure(s) are implemented across the business and maintained. Evidence of agendas and minutes from risk management meetings. Evidence of feedback in to process(es) and/or procedure(s) as a result of incident investigation(s). Risk registers and assessments.
79	Use and maintenance of asset risk information	How does the organisation ensure that the results of risk assessments provide input into the identification of adequate resources and training and competency needs?	2	Powerco has a structured approach to how risks are managed, and actions, including monitoring that reports to the Board Risk and Assurance sub-committee. Risk assessment processes are currently drafted, and this process can be improved. Currently we are working more on a reactive basis than a risk approach to asset management for day-to-day operations and will be looking at this further in the short term. Training is currently predominantly focused on safety.	Widely used AM standards require that the output from risk assessments are considered and that adequate resource (including staff) and training is identified to match the requirements. It is a further requirement that the effects of the control measures are considered, as there may be implications in resources and training required to achieve other objectives.	Staff responsible for risk assessment and those responsible for developing and approving resource and training plan(s). There may also be input from the organisation's Safety, Health and Environment team.	The organisations risk management framework. The organisation's resourcing plan(s) and training and competency plan(s). The organisation should be able to demonstrate appropriate linkages between the content of resource plan(s) and training and competency plan(s) to the risk assessments and risk control measures that have been developed.
82	Legal and other requirements	What procedure does the organisation have to identify and provide access to its legal, regulatory, statutory and other asset management requirements, and how is requirements incorporated into the asset management system?	3	Powerco has invested significant resources in all aspects of legal and regulatory compliance. The Risk and Assurance and Regulatory teams monitor changes and update the business. Given the high level of compliance impacting gas distribution, this is always an area we are looking to continually improve in by developing expertise. The team plays an active role in annual asset management planning and is responsible for ensuring requirements are communicated and understood by the Gas team.	In order for an organisation to comply with its legal, regulatory, statutory and other asset management requirements, the organisation first needs to ensure that it knows what they are (eg, PAS 55 specifies this in s 4.4.8). It is necessary to have systematic and auditable mechanisms in place to identify new and changing requirements. Widely used AM standards also require that requirements are incorporated into the asset management system (e.g. procedure(s) and process(es))	Top management. The organisations regulatory team. The organisation's legal team or advisors. The management team with overall responsibility for the asset management system. The organisation's health and safety team or advisors. The organisation's policy making team.	The organisational processes and procedures for ensuring information of this type is identified, made accessible to those requiring the information and is incorporated into asset management strategy and objectives
88	Life Cycle Activities	How does the organisation establish implement and maintain process(es) for the implementation of its asset management plan(s) and control of activities across the creation, acquisition or enhancement of assets. This includes design, modification, procurement, construction and commissioning activities?	3	Powerco has comprehenive processes to ensure the asset creation and acquisition are in line with our different plans. Multi-year planning, standards, safety in design, and periodic reporting are some examples of the activities we carry to ensure assets activities are justified and built according to our requirements.	Life cycle activities are about the implementation of asset management plan(s) i.e. they are the "doing" phase. They need to be done effectively and well in order for asset management to have any practical meaning. As a consequence, widely used standards (eg, PAS 55 s 4.5.1) require organisations to have in place appropriate process(es) and procedure(s) for the implementation of asset management plan(s) and control of lifecycle activities. This question explores those aspects relevant to asset creation.	Asset managers, design staff, construction staff and project managers from other impacted areas of the business, e.g. Procurement	Documented process(es) and procedure(s) which are relevant to demonstrating the effective management and control of life cycle activities during asset creation, acquisition, enhancement including design, modification, procurement, construction and commissioning.

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SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY (cont)

Question No.	Function	Question	Maturity Level 0	Maturity Level 1	Maturity Level 2	Maturity Level 3	Maturity Level 4
69	Risk management process(es)	How has the organisation documented process(es) and/or procedure(s) for the identification and assessment of asset and asset management related risks throughout the asset life cycle?	The organisation has not considered the need to document process(es) and/or procedure(s) for the identification and assessment of asset and asset management related risks throughout the asset life cycle.	The organisation is aware of the need to document the management of asset related risk across the asset lifecycle. The organisation has plan(s) to formally document all relevant process(es) and procedure(s) or has already commenced this activity.	The organisation is in the process of documenting the identification and assessment of asset related risk across the asset lifecycle but it is incomplete or there are inconsistencies between approaches and a lack of integration.	Identification and assessment of asset related risk across the asset lifecycle is fully documented. The organisation can demonstrate that appropriate documented mechanisms are integrated across life cycle phases and are being consistently applied.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
79	Use and maintenance of asset risk information	How does the organisation ensure that the results of risk assessments provide input into the identification of adequate resources and training and competency needs?	The organisation has not considered the need to conduct risk assessments.	The organisation is aware of the need to consider the results of risk assessments and effects of risk control measures to provide input into reviews of resources, training and competency needs. Current input is typically ad-hoc and reactive.	The organisation is in the process ensuring that outputs of risk assessment are included in developing requirements for resources and training. The implementation is incomplete and there are gaps and inconsistencies.	Outputs from risk assessments are consistently and systematically used as inputs to develop resources, training and competency requirements. Examples and evidence is available.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
82	Legal and other requirements	What procedure does the organisation have to identify and provide access to its legal, regulatory, statutory and other asset management requirements, and how is requirements incorporated into the asset management system?	The organisation has not considered the need to identify its legal, regulatory, statutory and other asset management requirements.	The organisation identifies some its legal, regulatory, statutory and other asset management requirements, but this is done in an ad-hoc manner in the absence of a procedure.	The organisation has procedure(s) to identify its legal, regulatory, statutory and other asset management requirements, but the information is not kept up to date, inadequate or inconsistently managed.	Evidence exists to demonstrate that the organisation's legal, regulatory, statutory and other asset management requirements are identified and kept up to date. Systematic mechanisms for identifying relevant legal and statutory requirements.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
88	Life Cycle Activities	How does the organisation establish implement and maintain process(es) for the implementation of its asset management plan(s) and control of activities across the creation, acquisition or enhancement of assets. This includes design, modification, procurement, construction and commissioning activities?	The organisation does not have process(es) in place to manage and control the implementation of asset management plan(s) during activities related to asset creation including design, modification, procurement, construction and commissioning.	The organisation is aware of the need to have process(es) and procedure(s) in place to manage and control the implementation of asset management plan(s) during activities related to asset creation including design, modification, procurement, construction and commissioning but currently do not have these in place (note: procedure(s) may exist but they are inconsistent/incomplete).	The organisation is in the process of putting in place process(es) and procedure(s) to manage and control the implementation of asset management plan(s) during activities related to asset creation including design, modification, procurement, construction and commissioning. Gaps and inconsistencies are being addressed.	Effective process(es) and procedure(s) are in place to manage and control the implementation of asset management plan(s) during activities related to asset creation including design, modification, procurement, construction and commissioning.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.

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SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY (cont)

Question No.	Function	Question	Score	Evidence—Summary	Why	Who	Record/documented Information
91	Life Cycle Activities	How does the organisation ensure that process(es) and/or procedure(s) for the implementation of asset management plan(s) and control of activities during maintenance (and inspection) of assets are sufficient to ensure activities are carried out under specified conditions, are consistent with asset management strategy and control cost, risk and performance?	3	Powerco has a clearly structured process for controlling the implementation of asset management plans. This includes dedicated regional resources to liaise with service providers, and prescribed work instructions agreed with service providers. A field audit programme is in place that is implemented through independent auditors who report non-compliance. Service provider KPIs are strongly lined to the proper application of work instructions. The KPIs are made available through the Gas Contractor Portal, and discussed on a monthly basis in contracts meetings.	Having documented process(es) which ensure the asset management plan(s) are implemented in accordance with any specified conditions, in a manner consistent with the asset management policy, strategy and objectives and in such a way that cost, risk and asset system performance are appropriately controlled is critical. They are an essential part of turning intention into action (eg, as required by PAS 55 s 4.5.1).	Asset managers, operations managers, maintenance managers and project managers from other impacted areas of the business	Documented procedure for review. Documented procedure for audit of process delivery. Records of previous audits, improvement actions and documented confirmation that actions have been carried out.
95	Performance and condition monitoring	How does the organisation measure the performance and condition of its assets?	2	Section 4 outlines the objectives and associated targets that are embedded in our asset management policy and strategies. Many of these provide indications of our asset performance and condition. Assets which condition is critical for the deployment of the asset strategy have been identified through risks analysis. Additionally, processes, such as the Defect process, provide us with essential detailed information on assets.	Widely used AM standards require that organisations establish implement and maintain procedure(s) to monitor and measure the performance and/or condition of assets and asset systems. They further set out requirements in some detail for reactive and proactive monitoring, and leading/lagging performance indicators together with the monitoring or results to provide input to corrective actions and continual improvement. There is an expectation that performance and condition monitoring will provide input to improving asset management strategy, objectives and plan(s).	A broad cross-section of the people involved in the organisation's asset-related activities from data input to decision-makers, i.e. an end-to end assessment. This should include contactors and other relevant third parties as appropriate.	Functional policy and/or strategy documents for performance or condition monitoring and measurement. The organisation's performance monitoring frameworks, balanced scorecards etc. Evidence of the reviews of any appropriate performance indicators and the action lists resulting from these reviews. Reports and trend analysis using performance and condition information. Evidence of the use of performance and condition information shaping improvements and supporting asset management strategy, objectives and plan(s).
99	Investigation of asset-related failures, incidents and nonconformities	How does the organisation ensure responsibility and the authority for the handling, investigation and mitigation of asset-related failures, incidents and emergency situations and non conformances is clear, unambiguous, understood and communicated?	2	Powerco has invested in expanding its Health and Safety team and in environmental compliance. However, given the level of importance of this area, we are still aiming to improve internal communication and making sure responsibilities for investigating incidents and their authorities are absolutely clear throughout the organisation. For example, improving information on asset failures is one area we plan to improve. We currently have a process in place where investigations are held on a case-by-case basis by the Gas Operations team, with the support of our internal Health, Safety, Environment and Quality team. The appointment of an Asset Reliability Engineer will help build our investigation capabilities.	Widely used AM standards require that the organisation establishes implements and maintains process(es) for the handling and investigation of failures incidents and non-conformities for assets and sets down a number of expectations. Specifically this question examines the requirement to define clearly responsibilities and authorities for these activities, and communicate these unambiguously to relevant people including external stakeholders if appropriate.	The organisation's safety and environment management team. The team with overall responsibility for the management of the assets. People who have appointed roles within the asset-related investigation procedure, from those who carry out the investigations to senior management who review the recommendations. Operational controllers responsible for managing the asset base under fault conditions and maintaining services to consumers. Contractors and other third parties as appropriate.	Process(es) and procedure(s) for the handling, investigation and mitigation of asset-related failures, incidents and emergency situations and non conformances. Documentation of assigned responsibilities and authority to employees. Job Descriptions, Audit reports. Common communication systems i.e. all Job Descriptions on Internet etc.
105	Audit	What has the organisation done to establish procedure(s) for the audit of its asset management system (process(es))?	2	Powerco currently audit only the field activities and public safety activities. This is currently achieved through independent auditors who report non-compliance of work instructions. We will be looking to expand auditing across other appropriate asset-related activities in the short to medium term. We also carry independent review of our asset management system against ISO55000, as the one completed in April 2018.	This question seeks to explore what the organisation has done to comply with the standard practice AM audit requirements (eg, the associated requirements of PAS 55 s 4.6.4 and its linkages to s 4.7).	The management team responsible for its asset management procedure(s). The team with overall responsibility for the management of the assets. Audit teams, together with key staff responsible for asset management. For example, Asset Management Director, Engineering Director. People with responsibility for carrying out risk assessments	The organisation's asset-related audit procedure(s). The organisation's methodology(s) by which it determined the scope and frequency of the audits and the criteria by which it identified the appropriate audit personnel. Audit schedules, reports etc. Evidence of the procedure(s) by which the audit results are presented, together with any subsequent communications. The risk assessment schedule or risk registers.

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SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY (cont)

Question No.	Function	Question	Maturity Level 0	Maturity Level 1	Maturity Level 2	Maturity Level 3	Maturity Level 4
91	Life Cycle Activities	How does the organisation ensure that process(es) and/or procedure(s) for the implementation of asset management plan(s) and control of activities during maintenance (and inspection) of assets are sufficient to ensure activities are carried out under specified conditions, are consistent with asset management strategy and control cost, risk and performance?	The organisation does not have process(es)/procedure(s) in place to control or manage the implementation of asset management plan(s) during this life cycle phase.	The organisation is aware of the need to have process(es) and procedure(s) in place to manage and control the implementation of asset management plan(s) during this life cycle phase but currently do not have these in place and/or there is no mechanism for confirming they are effective and where needed modifying them.	The organisation is in the process of putting in place process(es) and procedure(s) to manage and control the implementation of asset management plan(s) during this life cycle phase. They include a process for confirming the process(es)/procedure(s) are effective and if necessary carrying out modifications.	The organisation has in place process(es) and procedure(s) to manage and control the implementation of asset management plan(s) during this life cycle phase. They include a process, which is itself regularly reviewed to ensure it is effective, for confirming the process(es)/ procedure(s) are effective and if necessary carrying out modifications.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
95	Performance and condition monitoring	How does the organisation measure the performance and condition of its assets?	The organisation has not considered how to monitor the performance and condition of its assets.	The organisation recognises the need for monitoring asset performance but has not developed a coherent approach. Measures are incomplete, predominantly reactive and lagging. There is no linkage to asset management objectives.	The organisation is developing coherent asset performance monitoring linked to asset management objectives. Reactive and proactive measures are in place. Use is being made of leading indicators and analysis. Gaps and inconsistencies remain.	Consistent asset performance monitoring linked to asset management objectives is in place and universally used including reactive and proactive measures. Data quality management and review process are appropriate. Evidence of leading indicators and analysis.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
99	Investigation of asset-related failures, incidents and nonconformities	How does the organisation ensure responsibility and the authority for the handling, investigation and mitigation of asset-related failures, incidents and emergency situations and non conformances is clear, unambiguous, understood and communicated?	The organisation has not considered the need to define the appropriate responsibilities and the authorities.	The organisation understands the requirements and is in the process of determining how to define them.	The organisation are in the process of defining the responsibilities and authorities with evidence. Alternatively there are some gaps or inconsistencies in the identified responsibilities/authorities.	The organisation have defined the appropriate responsibilities and authorities and evidence is available to show that these are applied across the business and kept up to date.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
105	Audit	What has the organisation done to establish procedure(s) for the audit of its asset management system (process(es))?	The organisation has not recognised the need to establish procedure(s) for the audit of its asset management system.	The organisation understands the need for audit procedure(s) and is determining the appropriate scope, frequency and methodology(s).	The organisation is establishing its audit procedure(s) but they do not yet cover all the appropriate asset-related activities.	The organisation can demonstrate that its audit procedure(s) cover all the appropriate asset-related activities and the associated reporting of audit results. Audits are to an appropriate level of detail and consistently managed.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.

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SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY (cont)

Question No.	Function	Question	Score	Evidence—Summary	Why	Who	Record/documented Information
109	Corrective & Preventative action	How does the organisation instigate appropriate corrective and/or preventive actions to eliminate or prevent the causes of identified poor performance and non conformance?	2	Powerco has established processes that identify and address safety and field audit issues. Identified issues are assessed for risk levels and, if required, appropriate actions are programmed. Further work needs to be done around rolling the process out to asset failures. The appointment of an Asset Reliability Engineer will help build our investigation capabilities.	Having investigated asset related failures, incidents and non-conformances, and taken action to mitigate their consequences, an organisation is required to implement preventative and corrective actions to address root causes. Incident and failure investigations are only useful if appropriate actions are taken as a result to assess changes to a businesses risk profile and ensure that appropriate arrangements are in place should a recurrence of the incident happen. Widely used AM standards also require that necessary changes arising from preventive or corrective action are made to the asset management system.	The management team responsible for its asset management procedure(s). The team with overall responsibility for the management of the assets. Audit and incident investigation teams. Staff responsible for planning and managing corrective and preventive actions.	Analysis records, meeting notes and minutes, modification records. Asset management plan(s), investigation reports, audit reports, improvement programmes and projects. Recorded changes to asset management procedure(s) and process(es). Condition and performance reviews. Maintenance reviews
113	Continual Improvement	How does the organisation achieve continual improvement in the optimal combination of costs, asset related risks and the performance and condition of assets and asset systems across the whole life cycle?	3	Current asset management performance is assessed and gaps used to drive improvement programmes. An example of this is the suite of improvement projects that have been planned as a result of the assessments identifying that an improvement in asset information is needed. Additionally, our service provider arrangements have been driven by identification of opportunities to reduce costs and improve asset management delivery. Powerco has a strong culture of continuous improvement supported by a dedicated team, as a result improvement opportunities are looked for in all areas of our asset management processes continually.	Widely used AM standards have requirements to establish, implement and maintain process(es)/procedure(s) for identifying, assessing, prioritising and implementing actions to achieve continual improvement. Specifically there is a requirement to demonstrate continual improvement in optimisation of cost risk and performance/condition of assets across the life cycle. This question explores an organisation's capabilities in this area—looking for systematic improvement mechanisms rather that reviews and audit (which are separately examined).	The top management of the organisation. The manager/team responsible for managing the organisation's asset management system, including its continual improvement. Managers responsible for policy development and implementation.	Records showing systematic exploration of improvement. Evidence of new techniques being explored and implemented. Changes in procedure(s) and process(es) reflecting improved use of optimisation tools/techniques and available information. Evidence of working parties and research.
115	Continual Improvement	How does the organisation seek and acquire knowledge about new asset management related technology and practices, and evaluate their potential benefit to the organisation?	3	Powerco has good practices for seeking out new asset management technology and practices. We are active in the Gas Association of New Zealand (GANZ) and Gas industry Co (GIC) and regularly talk with our peers. Staff regularly attend and present at conferences and we consider that our recruitment as led us to have knowledgeable and respected industry specialists. We have the ability to control and drive the assets and technology on our network. We have a Research and Development division that leads research into this area.	One important aspect of continual improvement is where an organisation looks beyond its existing boundaries and knowledge base to look at what 'new things are on the market'. These new things can include equipment, process(es), tools, etc. An organisation which does this (eg, by the PAS 55 s 4.6 standards) will be able to demonstrate that it continually seeks to expand its knowledge of all things affecting its asset management approach and capabilities. The organisation will be able to demonstrate that it identifies any such opportunities to improve, evaluates them for suitability to its own organisation and implements them as appropriate. This question explores an organisation's approach to this activity.	The top management of the organisation. The manager/team responsible for managing the organisation's asset management system, including its continual improvement. People who monitor the various items that require monitoring for 'change'. People that implement changes to the organisation's policy, strategy, etc. People within an organisation with responsibility for investigating, evaluating, recommending and implementing new tools and techniques, etc.	Research and development projects and records, benchmarking and participation knowledge exchange professional forums. Evidence of correspondence relating to knowledge acquisition. Examples of change implementation and evaluation of new tools, and techniques linked to asset management strategy and objectives.

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SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY (cont)

Question No.	Function	Question	Maturity Level 0	Maturity Level 1	Maturity Level 2	Maturity Level 3	Maturity Level 4
109	Corrective & Preventative action	How does the organisation instigate appropriate corrective and/or preventive actions to eliminate or prevent the causes of identified poor performance and non conformance?	The organisation does not recognise the need to have systematic approaches to instigating corrective or preventive actions.	The organisation recognises the need to have systematic approaches to instigating corrective or preventive actions. There is ad-hoc implementation for corrective actions to address failures of assets but not the asset management system.	The need is recognized for systematic instigation of preventive and corrective actions to address root causes of non compliance or incidents identified by investigations, compliance evaluation or audit. It is only partially or inconsistently in place.	Mechanisms are consistently in place and effective for the systematic instigation of preventive and corrective actions to address root causes of non compliance or incidents identified by investigations, compliance evaluation or audit.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
113	Continual Improvement	How does the organisation achieve continual improvement in the optimal combination of costs, asset related risks and the performance and condition of assets and asset systems across the whole life cycle?	The organisation does not consider continual improvement of these factors to be a requirement, or has not considered the issue.	A Continual Improvement ethos is recognised as beneficial, however it has just been started, and or covers partially the asset drivers.	Continuous improvement process(es) are set out and include consideration of cost risk, performance and condition for assets managed across the whole life cycle but it is not yet being systematically applied.	There is evidence to show that continuous improvement process(es) which include consideration of cost risk, performance and condition for assets managed across the whole life cycle are being systematically applied.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
115	Continual Improvement	How does the organisation seek and acquire knowledge about new asset management related technology and practices, and evaluate their potential benefit to the organisation?	The organisation makes no attempt to seek knowledge about new asset management related technology or practices.	The organisation is inward looking, however it recognises that asset management is not sector specific and other sectors have developed good practice and new ideas that could apply. Ad-hoc approach.	The organisation has initiated asset management communication within sector to share and, or identify 'new' to sector asset management practices and seeks to evaluate them.	The organisation actively engages internally and externally with other asset management practitioners, professional bodies and relevant conferences. Actively investigates and evaluates new practices and evolves its asset management activities using appropriate developments.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.

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SCHEDULE 14A: MANDATORY EXPLANATORY NOTES ON FORECAST INFORMATION

1. This schedule requires GDBs to provide explanatory notes to reports prepared in accordance with clause 2.6.6.
2. This schedule is mandatory—GDBs must provide the explanatory comment specified below, in accordance with clause 2.7.2. This information is not part of the audited disclosure information, and so is not subject to the assurance requirements specified in section 2.8.

Commentary on difference between nominal and constant price capital expenditure forecasts (Schedule 11a)

3. In the box below, comment on the difference between nominal and constant price capital expenditure for the current disclosure year and the 10 year planning period, as disclosed in Schedule 11a.

Box 1: Commentary on difference between nominal and constant price capital expenditure forecasts

The index used to translate nominal $ forecasts into constant $ forecasts is the Statistics NZ CPI (All Groups). The CPI index applied is the annual average rate of increase based on the CPI index predictions included in the NZIER Quarterly Predictions from March 2018.

For example, the index used for the year ending 30 September 2018 is based on the annual average movement using CPI predictions (actuals where available) as follows:

(Q1 RY18 + Q2 RY18 + Q3 RY18 + Q4 RY18)/(Q1 RY17 + Q2 RY17 + Q3 RY17 + Q4 RY17).

Commentary on difference between nominal and constant price operational expenditure forecasts (Schedule 11b)

4. In the box below, comment on the difference between nominal and constant price operational expenditure for the current disclosure year and the 10 year planning period, as disclosed in Schedule 11b.

Box 2: Commentary on difference between nominal and constant price operational expenditure forecasts

The index used to translate nominal $ forecasts into constant $ forecasts is the Statistics NZ CPI (All Groups). The CPI index applied is the annual average rate of increase based on the CPI index predictions included in the NZIER Quarterly Predictions from March 2018.

For example, the index used for the year ending 30 September 2018 is based on the annual average movement using CPI predictions (actuals where available) as follows:

(Q1 RY18 + Q2 RY18 + Q3 RY18 + Q4 RY18)/(Q1 RY17 + Q2 RY17 + Q3 RY17 + Q4 RY17).

Powerco vision is to be a reliable partner, delivering New Zealand's energy future.

Effective asset management is the cornerstone for the delivery of our vision and underpins our approach at all levels of the organisation.

We will strive to achieve the following asset management outcomes:

- Positioning the safety of the public, our staff and contractors as paramount
- Developing our networks in a way that reflects the evolving needs of our customers
- Delivering a cost-effective service by optimising asset cost and performance
- Be proactive, transparent, and authentic in our interactions with our stakeholders
- Meeting all statutory and regulatory obligations

We will achieve these asset management outcomes by:

- Aligning corporate and asset management governance to ensure a singular focus
- Underpinning asset management decisions with structured processes and systems
- Ensuring asset management decisions are supported by accurate information / data
- Managing data as an asset, via structured development over time
- Continually enhancing our asset management capability and skills over time
- Aligning to the best international approach via ISO 55000
- Recognising the importance of people and their development to the process

We strive to be New Zealand's leading asset manager, enabling us to provide excellent customer service, and a consistently safe, reliable and cost-effective service.

Authorised by: **Nigel Barbour** (Chief Executive Officer)

APPENDIX 4 RELEVANT LEGISLATION

Powerco is accountable for complying with a certain number of Acts and regulations that impact our asset management approach, including the Gas Act 1992, the Gas Safety and Measurements Regulations 1992 and the Gas Default Quality Price Path. These are:

- Gas Act 1992
- Gas (Safety and Measurement) Regulations 2010
- Gas (Statistics) Regulations 1997
- Gas (Levy of Industry Participants) Regulations 2012
- Gas Governance (Compliance) Regulations 2008
- Gas Governance (Critical Contingency Management) Regulations 2008
- Gas (Switching Arrangement) Rules 2008
- Gas (Downstream Reconciliation) Rules 2008
- Gas Industry Company Determinations, Guidelines and Notices
- Commerce Act 1986 (Part 4)
- Consumer Guarantees Act 1993
- Electricity and Gas Complaints Commissioner Scheme
- Fair Trading Act 1986
- Government Roading Powers Act 1989
- Utilities Access Act 2010
- Railways Act 2005
- Cadastral Survey Act 2002
- Health and Safety at Work Act 2015
- Resource Management Act 1991
- Civil Defence Emergency Management Act 2002
- Local Government Act 2002

The Executive Management Team (comprised of the Chief Executive and his direct reports), is accountable for the organisation to fulfil compliance and issue an annual compliance statement.

APPENDIX 5 GENERAL NETWORK RISK ISSUES

In this section, for each hazard described in the table below, we describe what are the risks associated, their controls and risk level after mitigation.

HAZARDS	DETAILS
Gas release	Gas is released into the atmosphere (this is associated with the loss of structural integrity)
Gas release in an insufficient ventilated space	Gas is released and reaches a critical concentration that can cause asphyxiation or have the potential to be ignited if an energy source is present.
Fire and explosion	Gas is released, reaches a critical concentration and additional energy source is present (i.e. ignition source)
Electricity	People are harmed due to the usage of electrical equipment (e.g. Scada cabinet) or the presence of stray currents on metallic pipes
Pneumatic energy	The gas conveyed through the network is pressurised
Third party interference	Assets are damaged or operated by an unauthorised person, including vandalism
Environmental conditions and natural disasters	Assets are damaged during earthquakes, volcanic eruptions, lahars, thunderstorms, flooding, tsunami or landslides
Heights	People are harmed by falling, slipping or tripping on the asset
Hazardous material	Assets are made of hazardous material
Confined spaces	Assets are located in a confined space

Risks are rated against six different levels that are dependent of their likelihood and their consequence as per the following table:

		Consequence						
		1. Negligible	**2. Minor**	**3. Moderate**	**4. Serious**	**5. Major**	**6. Severe**	**7. Catastrophic**
Likelihood	10. Daily	Low	Medium	Extreme	Extreme	Extreme	Extreme	Extreme
	9. Weekly	Low	Low	Very High	Extreme	Extreme	Extreme	Extreme
	8. Monthly	Very Low	Low	High	Very High	Extreme	Extreme	Extreme
	7. Probable	Very Low	Very Low	Medium	High	Very High	Extreme	Extreme
	6. Possible	Very Low	Very Low	Medium	High	High	Very High	Extreme
	5. Unlikely	Very Low	Very Low	Low	Medium	High	Very High	Extreme
	4. Rare	Very Low	Very Low	Low	Medium	Medium	High	Very High
	3. Improbable	Very Low	Very Low	Low	Low	Medium	High	Very High
	2. Highly improbable	Very Low	Very Low	Very Low	Low	Low	Medium	High
	1. Barely credible	Very Low	Very Low	Very Low	Very Low	Low	Low	Medium

A5.1 RISKS ASSOCIATED WITH GAS RELEASE

#	RISK	DESCRIPTION	CONTROLS	CONTROLLED LIKELIHOOD	CONTROLLED CONSEQUENCE	CONTROLLED RISK
1	GMS equipment venting	Overpressure on the inlet that causes physical damage to the equipment	Overpressure protection installed at DRS Regulators and DRS settings, inspection and maintenance plans	3. Improbable	3. Moderate	Low
2	Faulty GMS equipment	Due to a fault (e.g. seat or diaphragm failure), GMS equipment releases gas	Equipment choice (token relief or full release equipment) Regular inspection and maintenance of venting equipment	4. Rare	2. Minor	Very Low
3	Contamination	Presence of contamination on the network preventing the good operation of regulators	Equipment choice (token relief or full release equipment) Regulator maintenance on GMS and DRS (filter inspection) Construction procedures	3. Improbable	2. Minor	Very Low
4	DRS equipment venting	Overpressure on the inlet that causes physical damage to the equipment	Equipment rating Pressure control and protection on upstream networks Regulators and DRS settings, inspection and maintenance plans Operational agreement with TSO	3. Improbable	3. Moderate	Low
5	Faulty DRS equipment	Due to a fault (e.g. seat or diaphragm failure), DRS equipment releases gas	Equipment choice (token relief or full release equipment) Regular inspection and maintenance of equipment	3. Improbable	3. Moderate	Low
6	Corrosion on IP steel pipeline	Leak on an IP steel pipeline due to corrosion	Wall thickness Corrosion protection (wrapping, cathodic protection) Steel pipeline integrity plan	5. Unlikely	3. Moderate	Low
7	Corrosion on MP or LP steel pipeline	Leak on an MP or LP steel pipeline due to corrosion	Wall thickness Corrosion protection (wrapping, cathodic protection) Steel pipeline integrity plan	7. Probable	2. Minor	Very Low
8	Deterioration on PE 80 pipeline	Leak on a PE pipeline due to wear or brittle material	Wall thickness Material choice	3. Improbable	2. Minor	Very Low
9	Deterioration on PE 100 pipeline	Leak on a PE pipeline due to wear or brittle material	Wall thickness Material choice	3. Improbable	3. Moderate	Low
10	Slow plastic deformation of a PE pipeline	Leak on a PE pipeline due to deformation related to pressure cycles	Material choices	2. Highly improbable	2. Minor	Very Low
11	Sudden deformation of a PE pipeline	Leak on a PE pipeline due to overpressure on the network creating a permanent deformation of the pipe	Material choice (pipe rating) DRS design, maintenance and inspection to prevent overpressure	2. Highly improbable	4. Serious	Low
12	Squeeze-off on PE pipeline	Leak on a PE pipeline due to a plastic deformation following a squeeze-off	Isolation procedures and equipment	6. Possible	2. Minor	Very Low

#	RISK	DESCRIPTION	CONTROLS	CONTROLLED LIKELIHOOD	CONTROLLED CONSEQUENCE	CONTROLLED RISK
13	Stress point failure on pipeline	Leak on a PE pipeline due to stones, vegetation, other utilities, etc.	Backfill material Clearance standards Stand-over, work permit and preparation standards	8. Monthly	2. Minor	Low
14	Mechanical joint degradation	Leak on a mechanical joint due to age	Construction standards recommending electrofusion, flange joints, fully automatic butt joining and the limitation of joints Replacement policy for mechanical joints Pipeline integrity plan	6. Possible	2. Minor	Very Low
15	Stress on mechanical joint	Leak at a mechanical joint due to stress created by ground movement (temperature cycles, traffic, etc.)	Construction standards recommending electrofusion, flange joints, fully automatic butt joining and the limitation of joints Pipeline integrity plan	5. Unlikely	3. Moderate	Low
16	Plastic fused joint degradation	Leak at plastic fused joint due to age	Jointing techniques and procedures (including pressure testing) Pipeline integrity plan	6. Possible	2. Minor	Low
17	Steel welded joint degradation	Leak at steel welded joint due to age	Jointing techniques and procedures (including non-destructive testing) Pipeline integrity plan	3. Improbable	4. Serious	Low
18	Electro-fusion joint degradation	Leak at plastic electro-fusion joint due to age	Jointing techniques and procedures (including pressure testing) Pipeline integrity plan	3. Improbable	2. Minor	Very Low
19	Valve degradation	Leak at a valve due to wear or age	Regular inspection and lubrication	8. Monthly	2. Minor	Low
20	Third-party damage on IP pipeline	Leak on a network asset running at IP after third-party damage. The asset doesn't leak at the time, it creates a dent on the pipeline or a damage to the coating.	Location and record of underground assets Depth of burial Wall thickness Signage TPD prevention	4. Rare	3. Moderate	Low
21	Third-party damage on IP pipeline	Third party damage on IP pipeline causes immediate minor leak.	Location and record of underground assets Network material Depth of burial Signage TPD prevention and site support	3. Improbable	4. Serious	Low
22	Third-party damage on LP or MP	Leak on a network asset running at LP or MP after third-party damage. The asset didn't leak at the time, it created a dent on the pipeline or a damage to the coating.	Location and record of underground assets Depth of burial Physical protection Signage	8. Monthly	2. Minor	Low

#	RISK	DESCRIPTION	CONTROLS	CONTROLLED LIKELIHOOD	CONTROLLED CONSEQUENCE	CONTROLLED RISK
			TPD prevention			

A5.2 RISKS ASSOCIATED WITH GAS RELEASE IN AN INSUFFICIENT VENTILATED LOCATION

#	RISK	DESCRIPTION	CONTROLS	CONTROLLED LIKELIHOOD	CONTROLLED CONSEQUENCE	CONTROLLED RISK
1	Undetected gas release by venting (see gas release)	An equipment vents gas that is not detected until it reaches high concentration in air	Gas odorisation Regulators, DRS and equipment maintenance Response time to emergency Public education, including signage on gas assets and retailer safety messages Discharge point design	3. Improbable	4. Serious	Low
2	Unclosed spaces	Natural gas leaks or travels to an insufficiently ventilated unenclosed space where it accumulates and subsequently causes asphyxiation	Gas odorisation Location standards Discharge point design Leak survey	3. Improbable	5. Major	Medium
3	Unenclosed spaces	Natural gas leaks or travels to an insufficiently ventilated unenclosed space where it accumulates and subsequently causes asphyxiation	Gas odorisation Location standards Pressure protection equipment Leak survey	3. Improbable	4. Serious	Low
4	Gas outage	Gas supply reinstated to the consumer without checking the effective operation of the downstream equipment	Outage and relight management plan (shutdown supply, doorknob notices, etc.)	2. Highly improbable	4. Serious	Low

A5.3 RISKS ASSOCIATED WITH FIRE AND EXPLOSION

#	RISK	DESCRIPTION	CONTROLS	CONTROLLED LIKELIHOOD	CONTROLLED CONSEQUENCE	CONTROLLED RISK
1	Ignition source	Gas explosion caused by any ignition source introduced to an explosive condition (approx. 5 to 15% gas: air).	Network materials Network design standards Pressure protection Odorisation Clearance around gas equipment Signage on gas assets	2. Highly improbable	7. Catastrophic	High
2	Naked flame	Uncontrolled gas fire caused by any ignition source	Network materials and network design standards Odorisation Signage on gas assets Public education	3. Improbable	5. Major	Medium
3	Potential difference of above-ground station	The potential difference between the assets and workers acts as an ignition source	Usage of earthing mats Bonding continuity on assets	2. Highly improbable	5. Major	Low

A5.4 RISKS ASSOCIATED WITH ELECTRICITY

#	RISK	DESCRIPTION	CONTROLS	CONTROLLED LIKELIHOOD	CONTROLLED CONSEQUENCE	CONTROLLED RISK
1	Stray and inducted currents	Electric shock caused by low frequency induction on a steel pipeline.	Design standards Procedures to work on steel pipelines at risk Installation of PCR (Polarisation Cells Replacement) Installation of isolation points	3. Improbable	4. Serious	Low
2	Stray and inducted currents	Electric shock from Earth Potential Rise (EPR).	Procedures to work on steel pipelines at risk Coating standards Electrical standards	3. Improbable	5. Major	Medium
3	Live lines	Electrocution caused by live line coming in direct contract with above ground asset	Clearance standards Signage	3. Improbable	5. Major	Low
4	Electrical appliances	Electrical appliances bonded to the network by electrician	Electrical isolation of the network Bonding procedures	3. Improbable	4. Serious	Low
5	Electrical network equipment	Presence of electrical equipment on the network (e.g. SCADA)	Construction to standards Usage of competent electrician Signage	3. Improbable	4. Serious	Low

A5.5 RISKS ASSOCIATED WITH PNEUMATIC ENERGY

#	RISK	DESCRIPTION	CONTROLS	CONTROLLED LIKELIHOOD	CONTROLLED CONSEQUENCE	CONTROLLED RISK
1	Asset failure	The pressure within the network cause assets to fail and to act as projectile	Material standards Isolation procedures Physical protection Choice of operating pressure	4. Rare	3. Moderate	Low

A5.6 RISKS ASSOCIATED WITH THIRD PARTY INTERFERENCE

#	RISK	DESCRIPTION	CONTROLS	CONTROLLED LIKELIHOOD	CONTROLLED CONSEQUENCE	CONTROLLED RISK
1	Third-party excavations (LP or MP pipeline)	Third party damage on LP or MP pipeline causes an immediate leak	TPD prevention plan Work permits, stand-overs, plan issues Odorisation Location and records Separation Signage	10. Daily	2. Minor	Medium
2	Third-party excavations (IP pipeline)	Hit on underground asset running at IP by machinery (e.g. digger) leading to a pipeline rupture	TPD prevention plan Work permits, stand-overs, plan issues Location and records Separation Signage	4. Rare	5. Major	Medium
3	Third-party excavations (IP pipeline)	Third party damage on IP pipeline causes immediate minor leak	TPD prevention plan Work permits, stand-overs, plan issues Location and records Physical protection Separation Signage	3. Improbable	4. Serious	Low
4	Vehicles	Live gas asset damage caused by vehicle impact	Location Physical protection Pipe material	2. Highly improbable	5. Major	Low

#	RISK	DESCRIPTION	CONTROLS	CONTROLLED LIKELIHOOD	CONTROLLED CONSEQUENCE	CONTROLLED RISK
5	Usage of tools	Hit on underground asset by tools	TPD prevention plan Work permits, stand-overs, plan issues Depth of burial Physical protection Separation Signage	8. Monthly	2. Minor	Low
6	Light vehicles	Hit on above-ground asset by a “light” vehicle (e.g. cyclist)	Location Physical protection Pipe material	4. Rare	3. Moderate	Low
7	Vandalism	Assets damaged by vandalism	Location Physical protection and locks Pipe material Security check as part of the maintenance inspections SCADA monitoring	4. Rare	2. Minor	Very Low
8	Terrorism	Assets damaged in a terrorist action	Physical protection Emergency management plan	1. Barely credible	6. Severe	Low
9	Vegetation	Vegetation damaging assets	Location Physical protection	5. Unlikely	2. Minor	Very Low
10	Landslips and rock falls	Foreign objects falling on above-ground assets	Location Design (e.g. crib walls, retaining walls, material selection)	4. Rare	2. Minor	Very Low
11	Other utilities	Water leak blasting on underground assets	Clearance from other utilities	4. Rare	3. Moderate	Low
12	Access to an asset	Intrusion into an asset site and operation	Site security Usage of special tools	2. Highly improbable	3. Moderate	Very Low
13	Other assets in the vicinity	Other asset owner changing the operating conditions (e.g. gate station pressure) or altering asset configuration	SCADA monitoring Physical protection and locks	2. Highly improbable	5. Major	Low
14	Operator error	Network configuration (e.g. pressure) altered because of an operator error	Works procedures Training	3. Improbable	3. Moderate	Low
15	Incorrect information	Network information is wrong and leads to a wrong operation	Network records management	3. Improbable	2. Minor	Very Low

A5.7 RISKS ASSOCIATED WITH ENVIRONMENTAL CONDITIONS AND NATURAL DISASTERS

#	RISK	DESCRIPTION	CONTROLS	CONTROLLED LIKELIHOOD	CONTROLLED CONSEQUENCE	CONTROLLED RISK
1	Asset crossing fault line	Harm caused by ruptured asset crossing fault line	Pipe material Pipeline route assessment Emergency response plan	2. Highly improbable	6. Severe	Medium
2	Earth movement during an earthquake	Asset gets damaged by the earth movement	Material choice at design stage Emergency response plan	4. Rare	3. Moderate	Low
3	External damage during an earthquake	Foreign objects falling on and damaging above-ground assets	Physical protection Clearances Emergency response plan	3. Improbable	2. Minor	Very Low
4	Liquefaction	Liquefaction after an earthquake causing network displacement	Anchoring Emergency response plan	4. Rare	2. Minor	Very Low
5	Volcanic eruption	Foreign objects and/or ashes falling on above-ground assets	Physical protection Clearances Emergency response plan	2. Highly improbable	2. Minor	Very Low
6	Lahar	Above-ground assets damaged by lahars	Construction standards Isolation valves Bridge inspections	2. Highly improbable	2. Minor	Very Low
7	Lightning	Electrocution caused by lightning travelling on steel pipeline	Earthing Procedures (weather awareness and stop work)	2. Highly improbable	5. Major	Low
8	Flooding	Above-ground or underground assets damaged by flooding	Physical protection (above-ground assets) Clearance and location Material choice (steel crossings)	3. Improbable	2. Minor	Very Low
9	Tsunami	Above-ground asset damaged and underground assets flooded	Location Emergency response plan	3. Improbable	4. Serious	Low

A5.8 RISKS ASSOCIATED WITH HEIGHTS

#	RISK	DESCRIPTION	CONTROLS	CONTROLLED LIKELIHOOD	CONTROLLED CONSEQUENCE	CONTROLLED RISK
1	Above-ground assets in the public space	Assets can be unnoticed because of their location	Location Physical protection	5. Unlikely	3. Moderate	Low
2	Asset with sharp edge	Assets might have sharp edges that can lead to harm to the public	Physical protection Assets buried Inspections as part of the maintenance programme	5. Unlikely	3. Moderate	Low
3	Uneven ground	Uneven ground or surface due to the presence of assets (e.g. valve lid)	Inspections as part of the maintenance programme	5. Unlikely	3. Moderate	Low

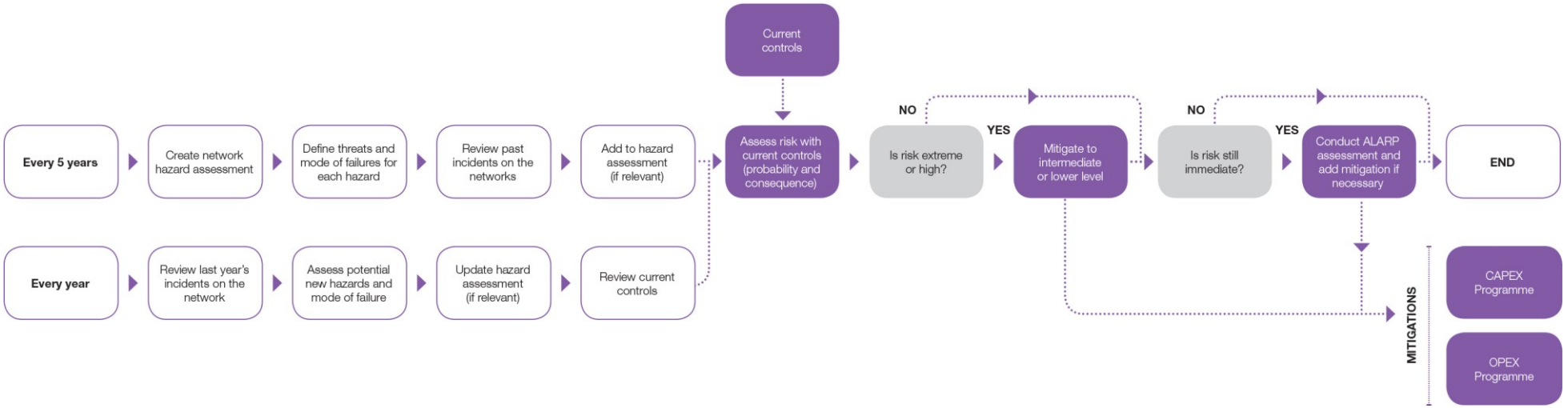
A5.9 RISKS ASSOCIATED WITH HAZARDOUS MATERIALS

#	RISK	DESCRIPTION	CONTROLS	CONTROLLED LIKELIHOOD	CONTROLLED CONSEQUENCE	CONTROLLED RISK
1	Live pipe is made of hazardous material	The carrier pipe is made of hazardous material. Contractors can be exposed if they work on the asset.	Material standards Replacement programme Hazard identification process Work instructions	2. Highly improbable	5. Major	Low
2	Duct made of hazardous material	Harm from inhalation or ingestion of hazardous material from exposed duct.	Material standards Work instructions Record management (Hazardous material is recorded in GIS) Hazard identification process Information to the wider public (including plan issuing)	3. Improbable	5. Major	Medium

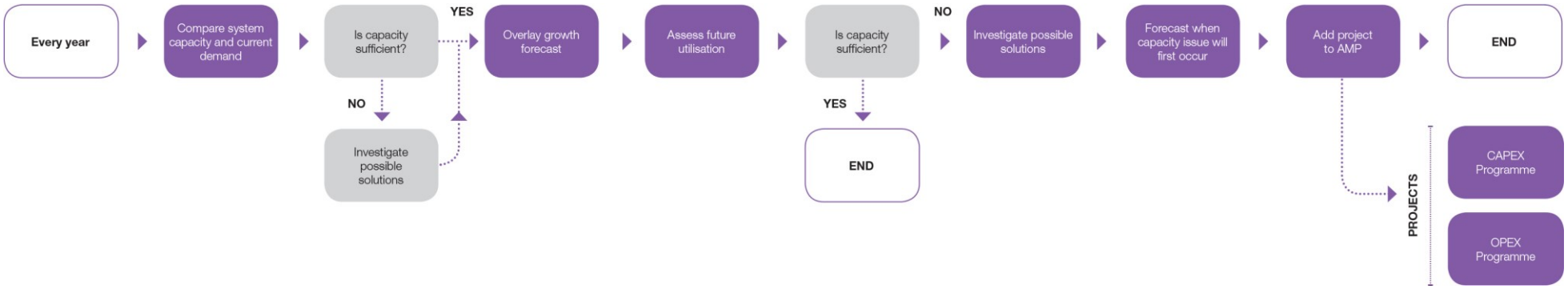
A5.10 RISKS ASSOCIATED WITH CONFINED SPACES

#	RISK	DESCRIPTION	CONTROLS	CONTROLLED LIKELIHOOD	CONTROLLED CONSEQUENCE	CONTROLLED RISK
1	Assets are located in confined spaces	Operations and inspections of assets take place in a confined space. (NB: the risk of asphyxiation due to the presence of natural gas is already covered under "Gas release in an insufficient ventilated space")	Location standards (including access restriction) Hazard identification process Work instructions and specific PPE Improvement programme	2. Highly improbable	5. Major	Low

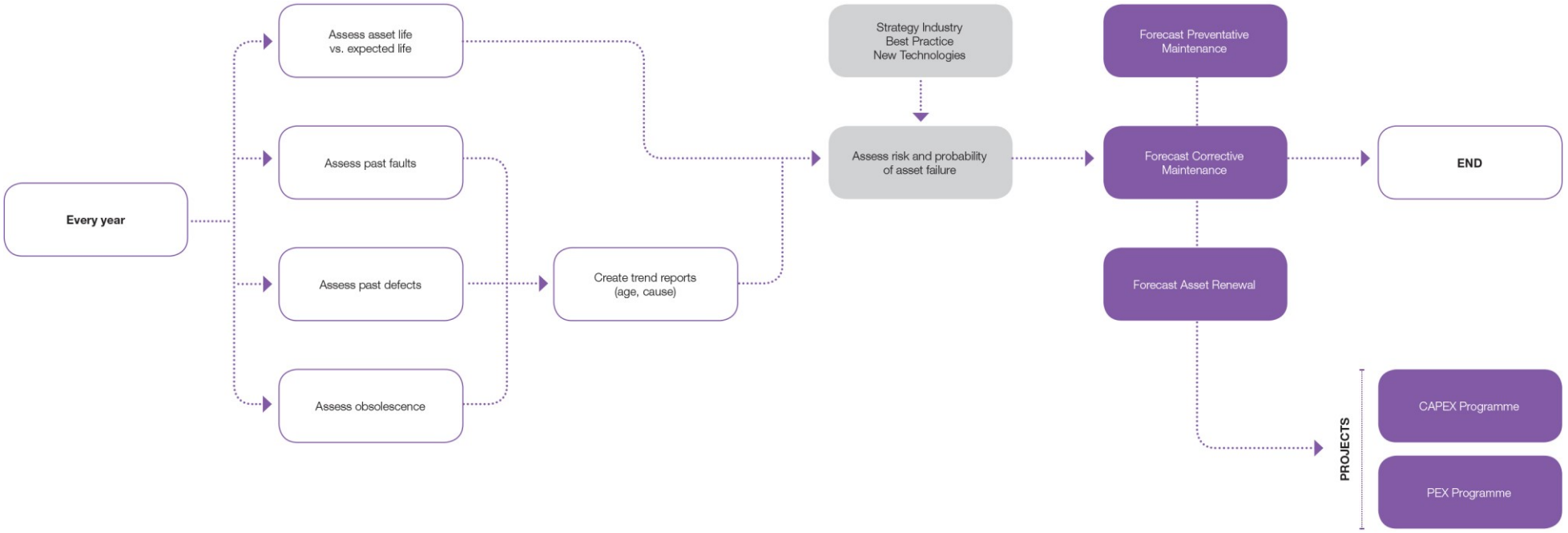
APPENDIX 6 FORMAL SAFETY ASSESSMENT PROCESS MAP



APPENDIX 7 CAPACITY ASSESSMENT PROCESS MAP



APPENDIX 8 RELIABILITY ASSESSMENT PROCESS MAP




High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Ashhurst 7050001
Ashhurst 7050001
Station detail
POWERCO
0 0.95 km
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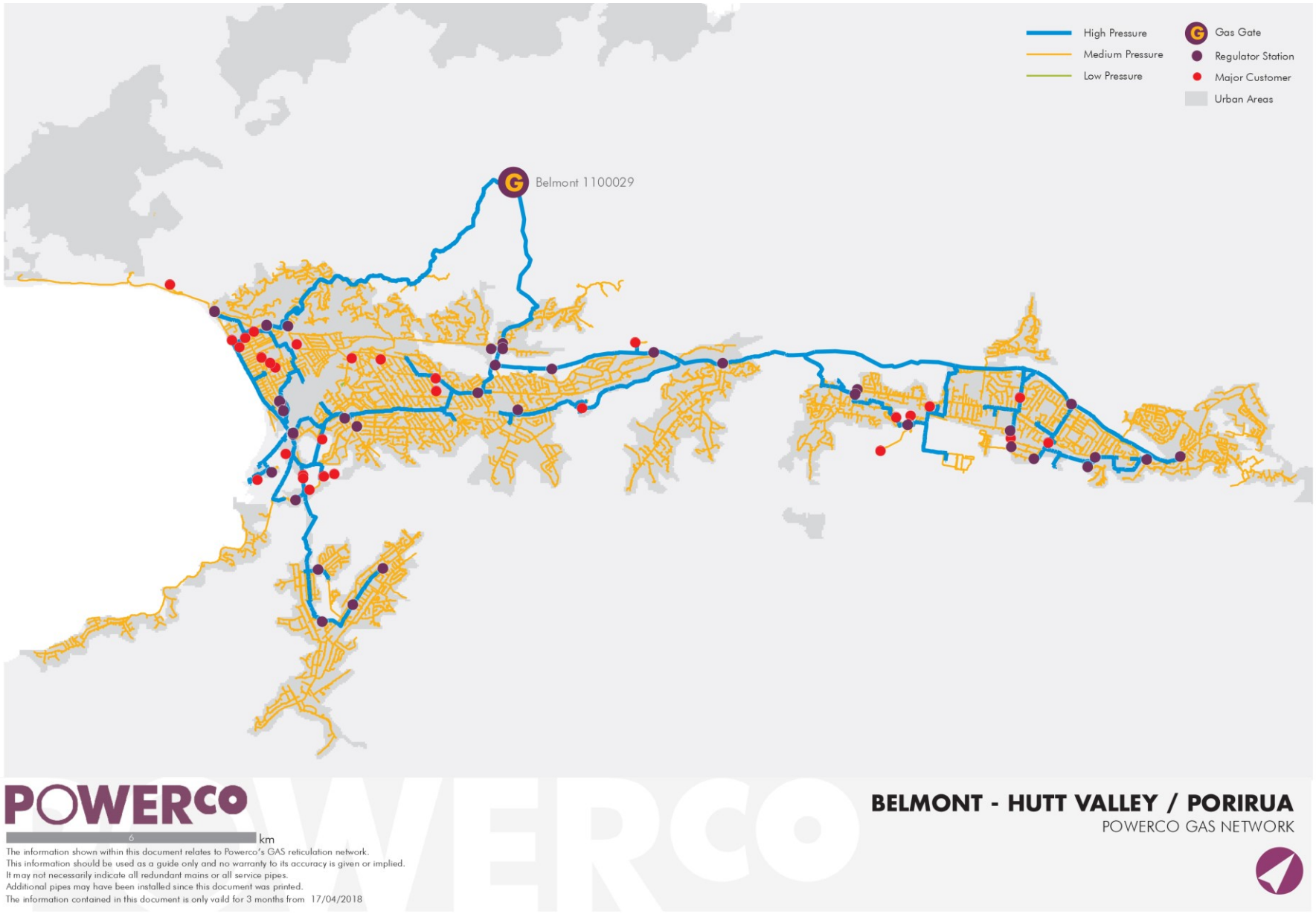
ASHHURST - MANAWATU
POWERCO GAS NETWORK


High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Belmont 1100029
POWERCO
6
km
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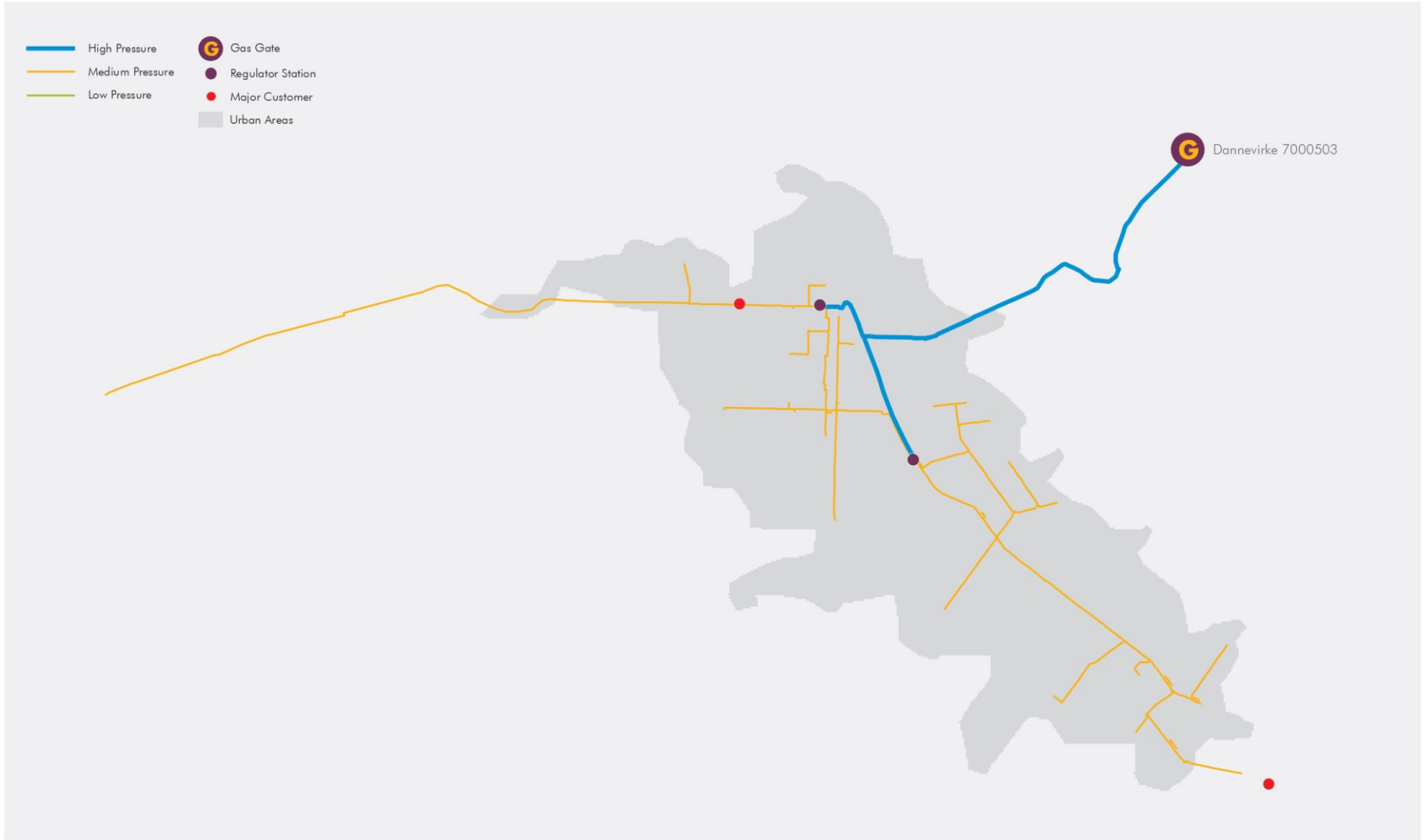
BELMONT - HUTT VALLEY / PORIRUA
POWERCO GAS NETWORK


High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Dannevirke 7000503
POWERCO
km
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DANNEVIRKE - MANAWATU
POWERCO GAS NETWORK


High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Eltham 2060076
POWERCO
0.8
km
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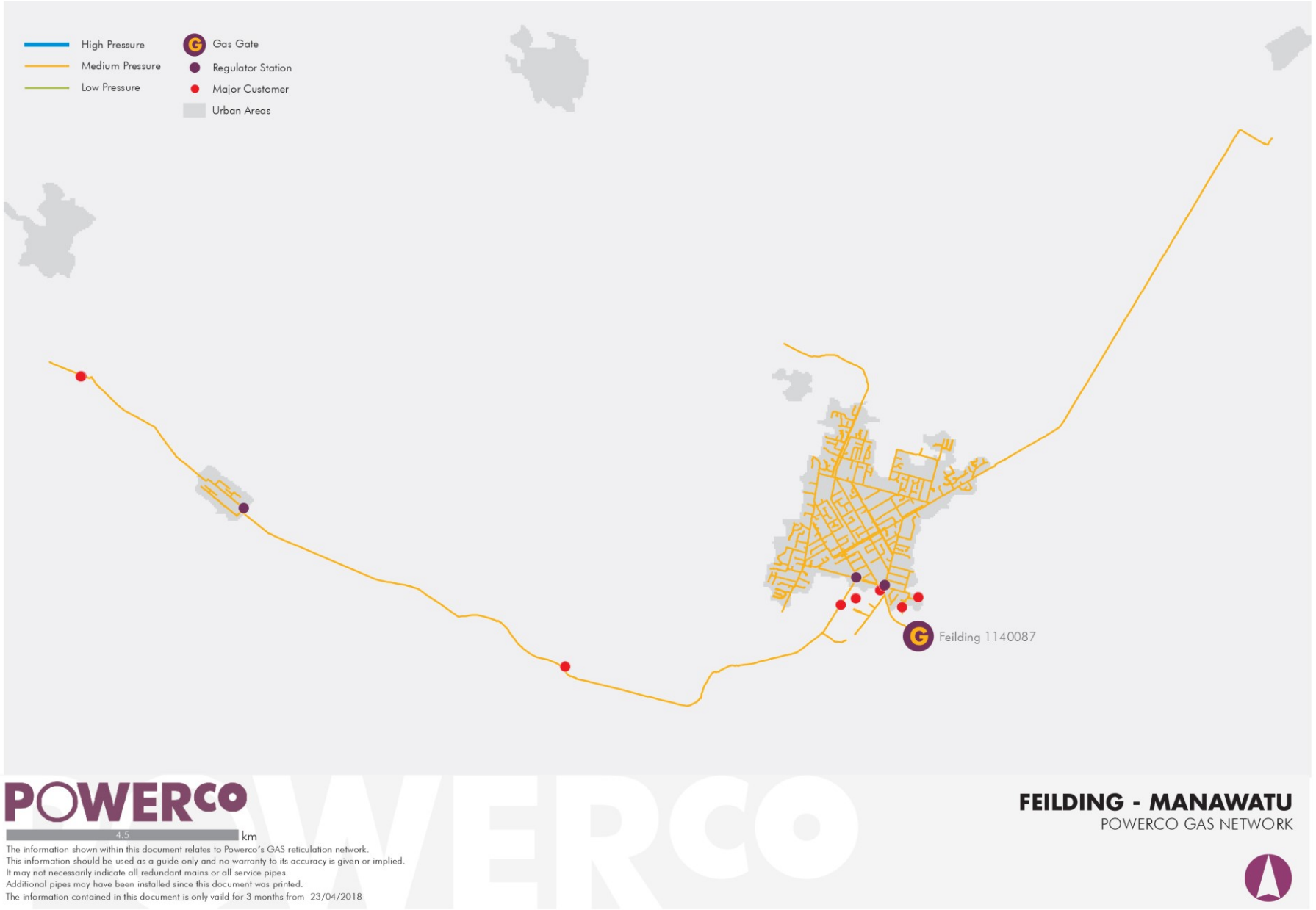
ELTHAM - TARANAKI
POWERCO GAS NETWORK


High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Feilding 1140087
POWERCO
4.5
km
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FEILDING - MANAWATU
POWERCO GAS NETWORK


Foxton 1001629
High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
POWERCO
2.5
km
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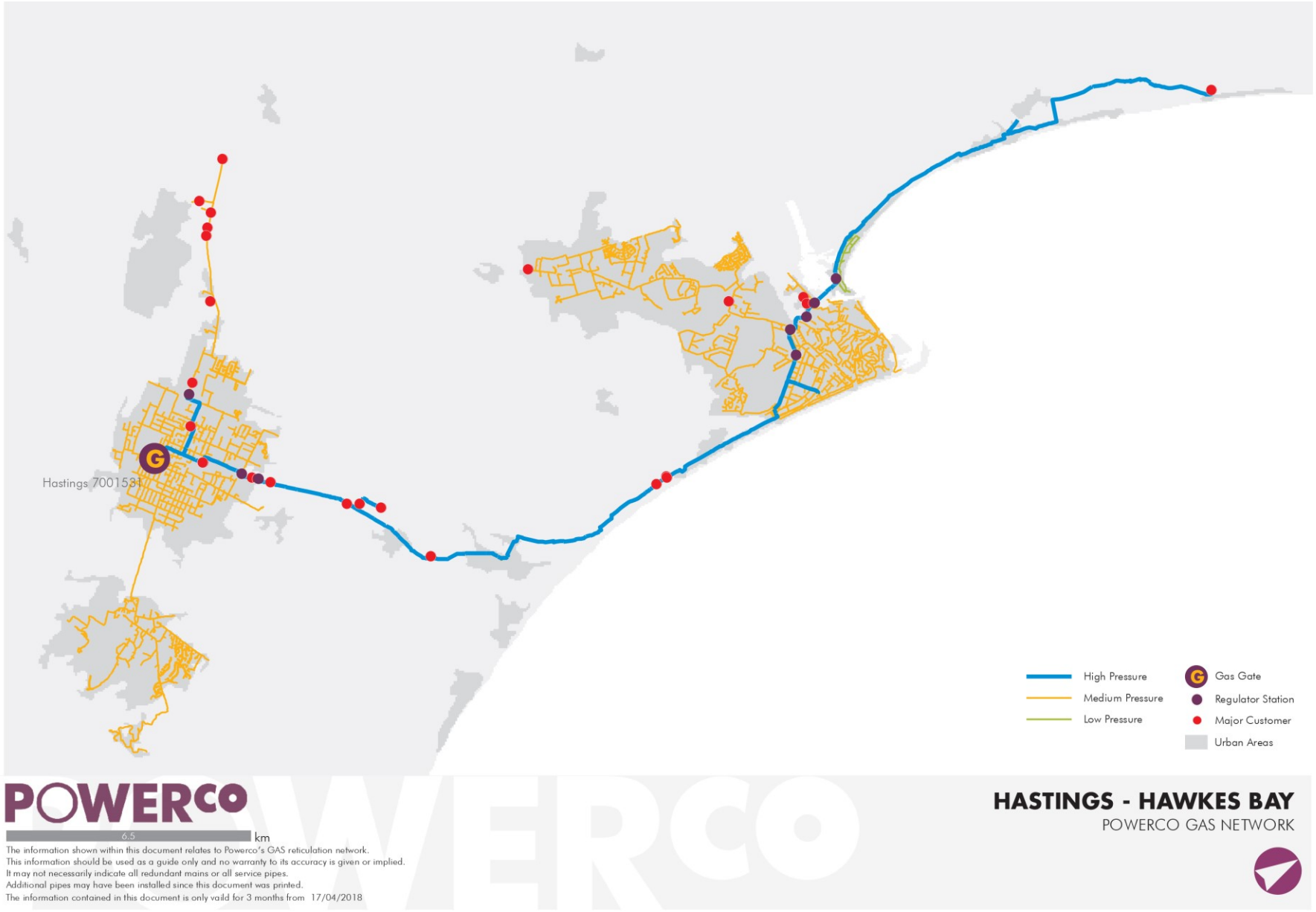
FOXTON - MANAWATU
POWERCO GAS NETWORK


Hastings 7001531
High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
POWERCO
6.5
km
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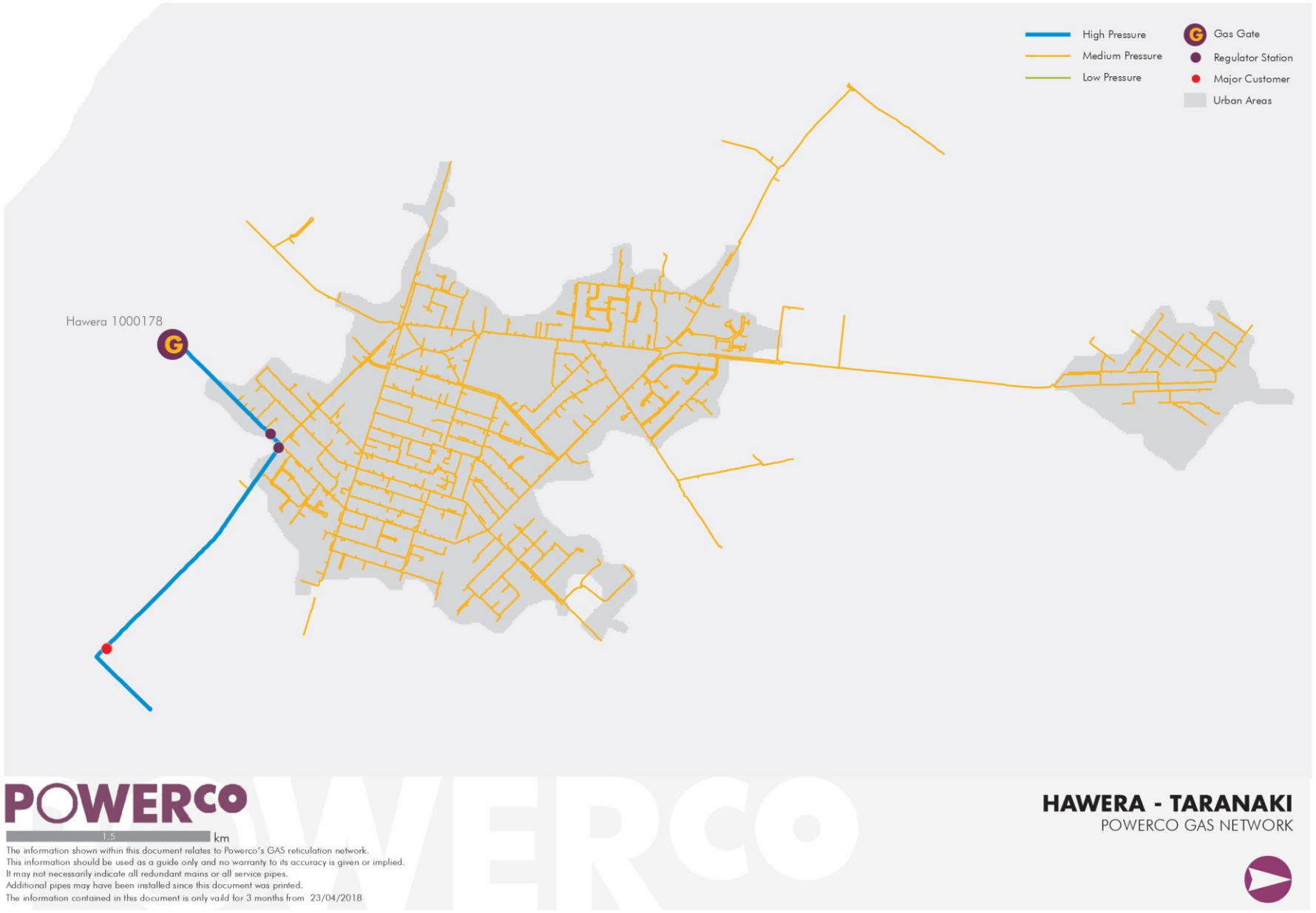
HASTINGS - HAWKES BAY
POWERCO GAS NETWORK


High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Hawera 1000178
POWERCO
1.5
km
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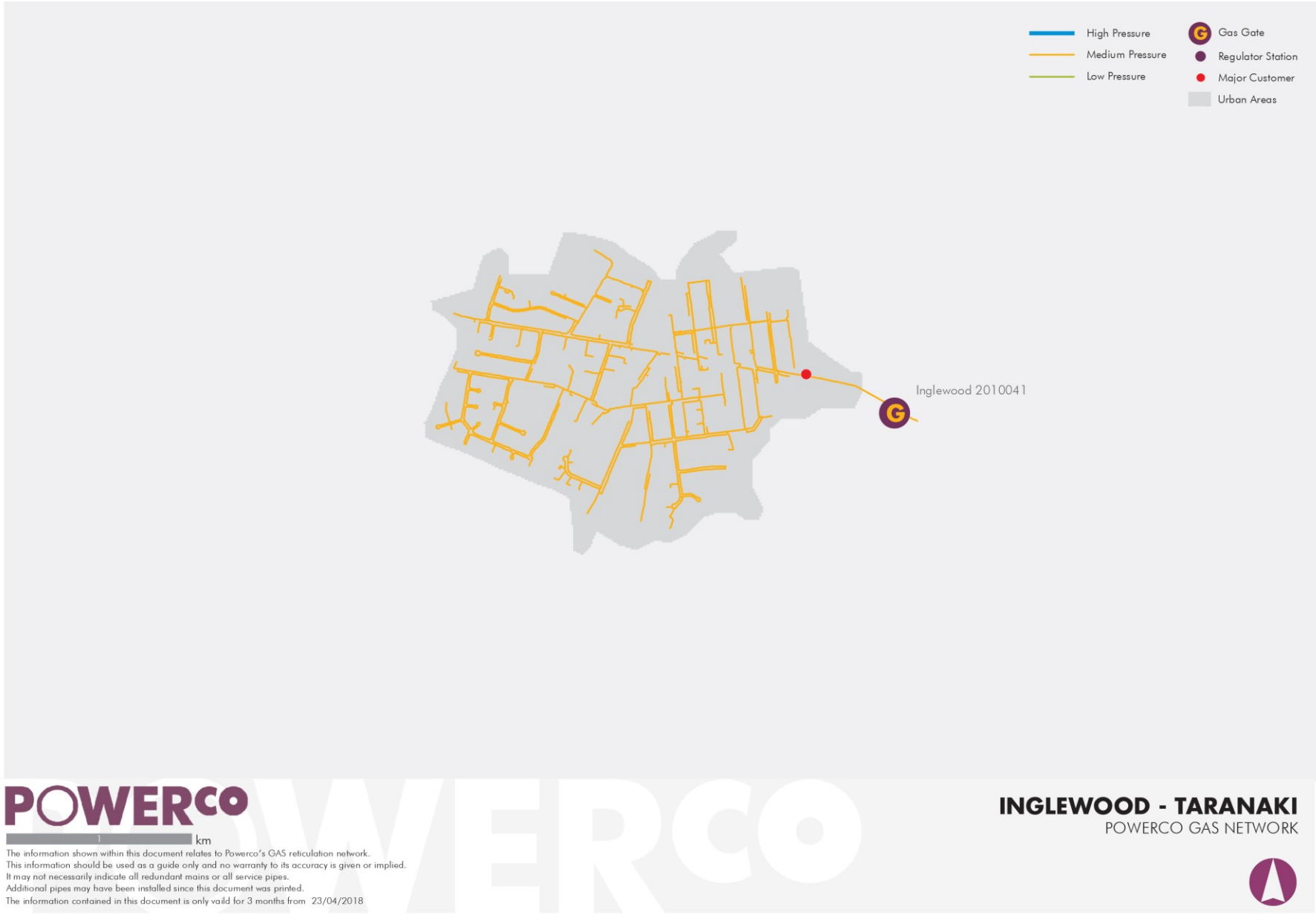
HAWERA - TARANAKI
POWERCO GAS NETWORK


High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Inglewood 2010041
POWERCO
km
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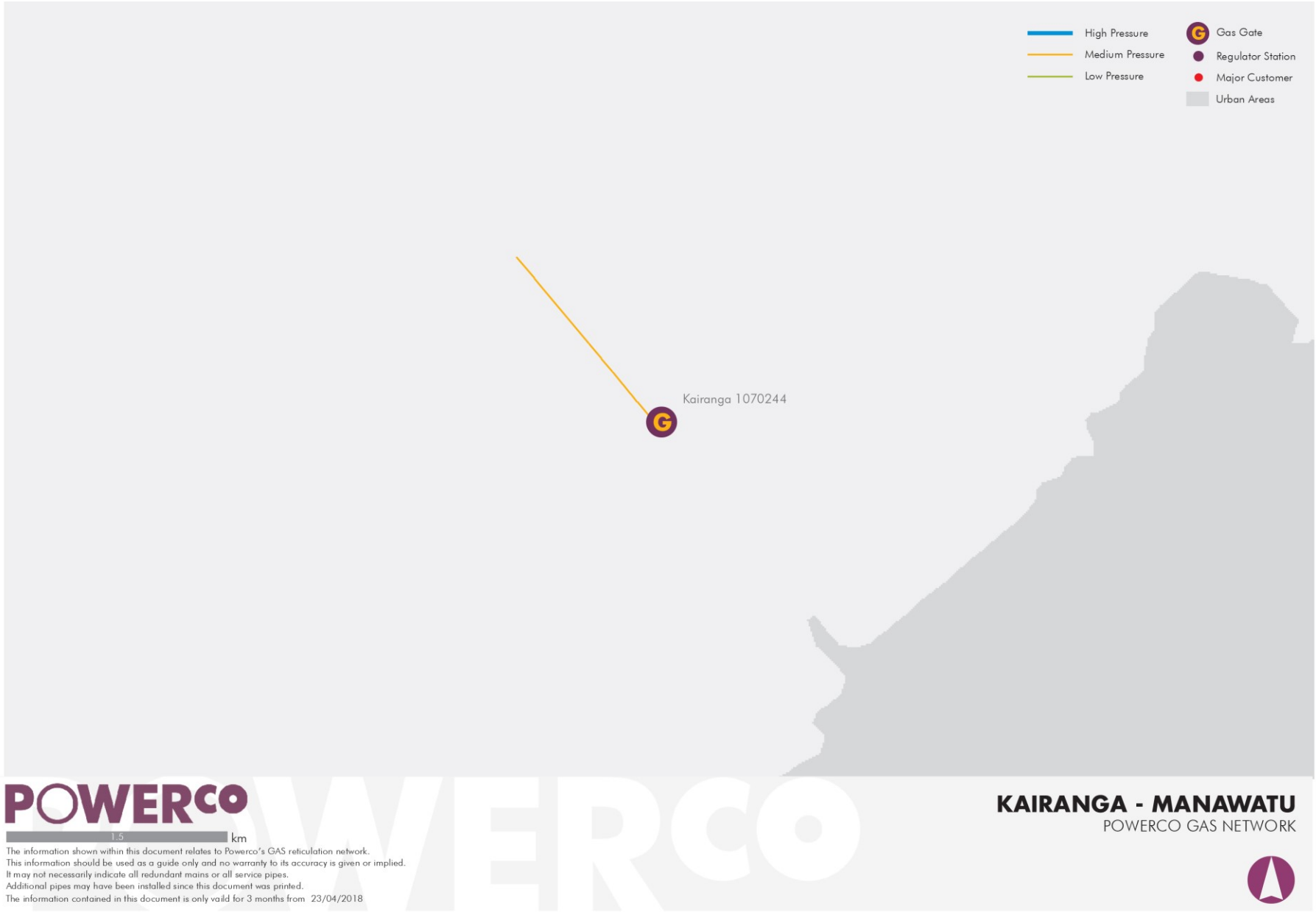
INGLEWOOD - TARANAKI
POWERCO GAS NETWORK


High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Kairanga 1070244
POWERCO
1.5
km
The information shown within this document relates to Powerco's GAS reticulation network.
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Additional pipes may have been installed since this document was printed.
The information contained in this document is only vaild for 3 months from 23/04/2018
KAIRANGA - MANAWATU
POWERCO GAS NETWORK


High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Kakariki 1150001
POWERCO
2
km
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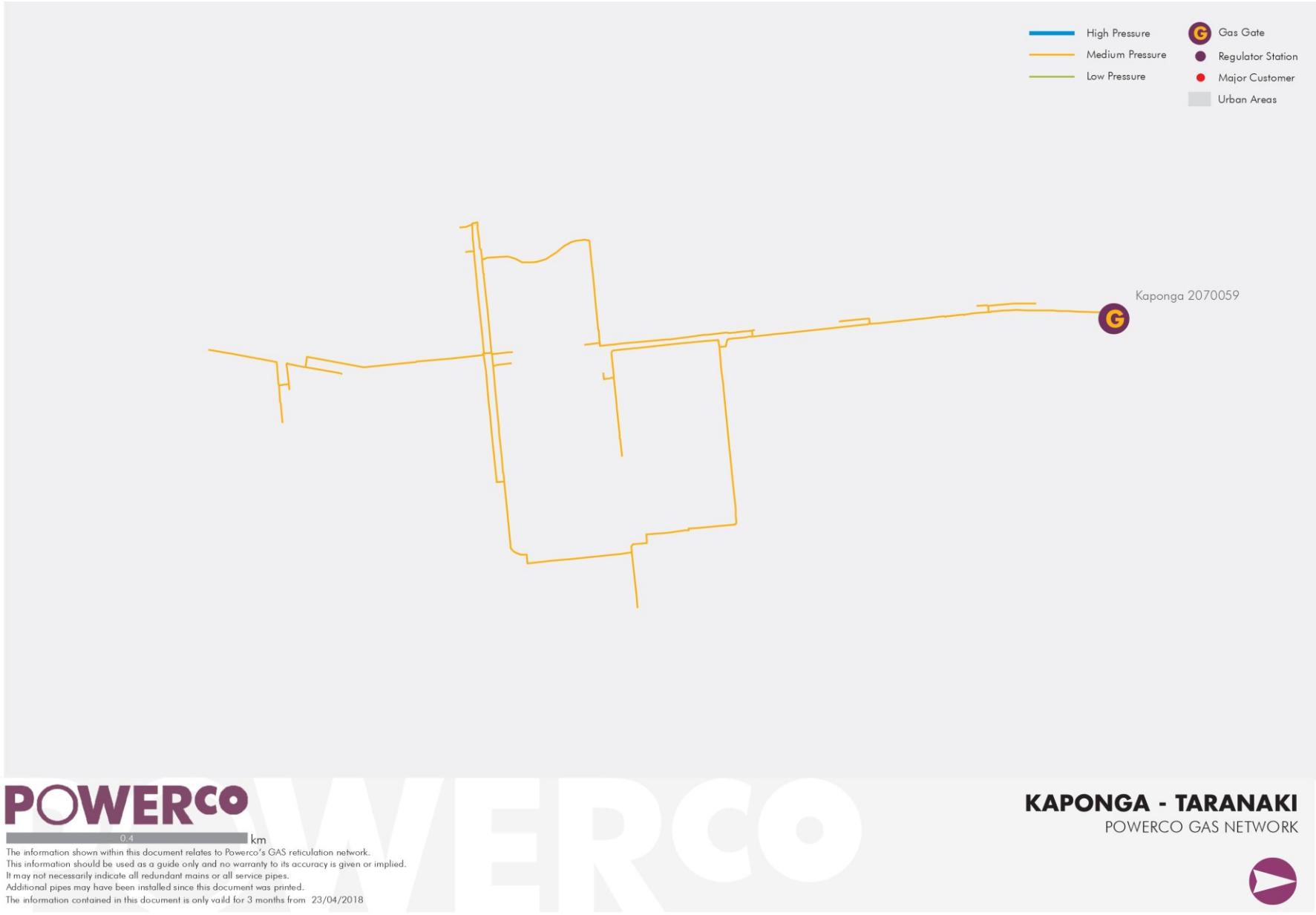
KAKARIKI - MANAWATU
POWERCO GAS NETWORK


High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Kaponga 2070059
POWERCO
0.4
km
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KAPONGA - TARANAKI
POWERCO GAS NETWORK


High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Kapuni 3060034
POWERCO
0.4
km
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KAPUNI - TARANAKI
POWERCO GAS NETWORK


High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Levin 1090052
POWERCO
2
km
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LEVIN - MANAWATU
POWERCO GAS NETWORK


High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Longburn 1080068
POWERCO
1.5
km
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LONGBURN - MANAWATU
POWERCO GAS NETWORK


High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Manaia 1010016
POWERCO
1.5
km
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MANAIA - TARANAKI
POWERCO GAS NETWORK


High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Mangatainoka 7030004
POWERCO
0.6
km
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MANGATAINOKA - MANAWATU
POWERCO GAS NETWORK


High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Matapu 1000013
POWERCO
0.6
km
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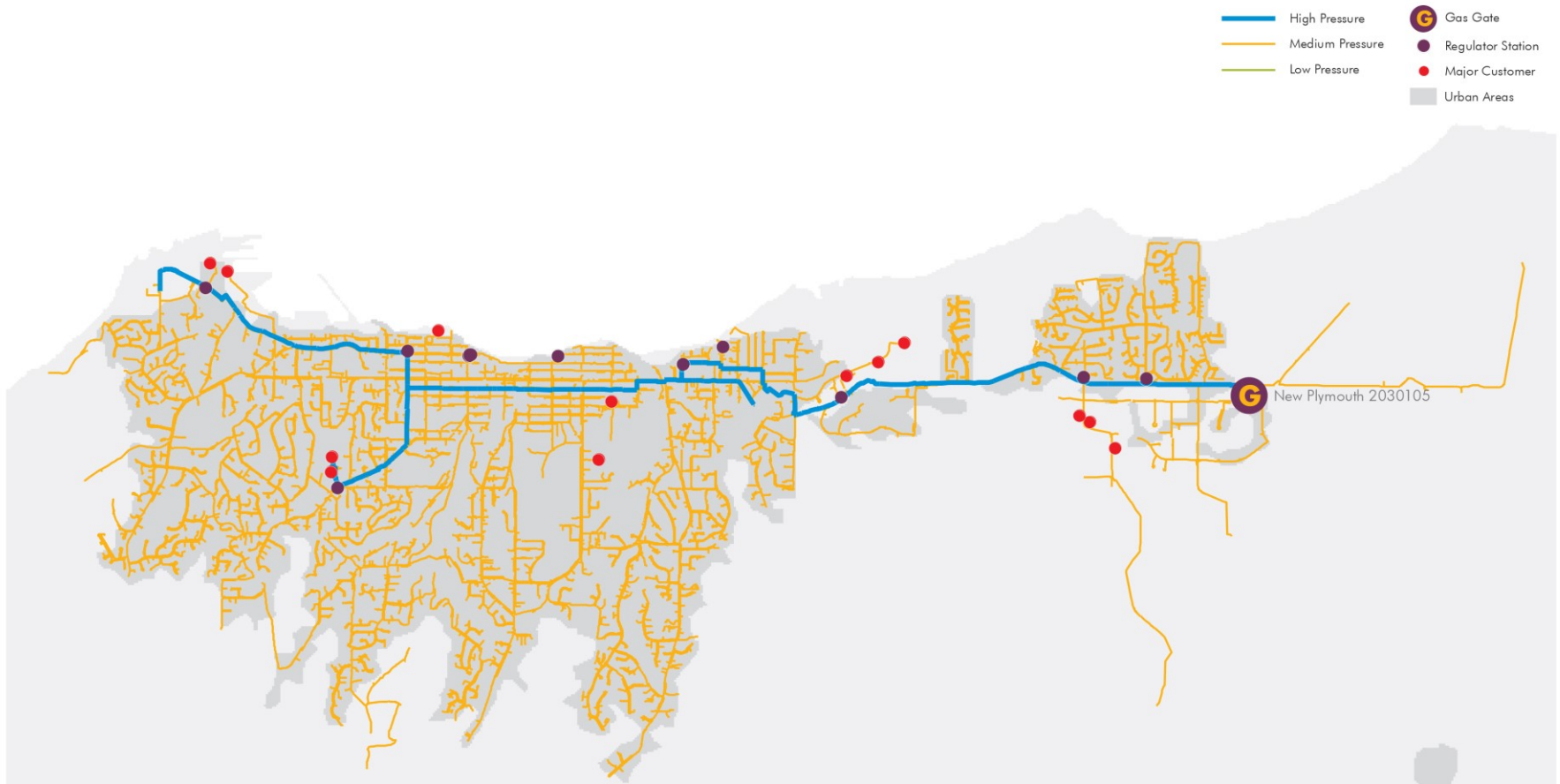
MATAPU - TARANAKI
POWERCO GAS NETWORK



POWERCO

3.5 km

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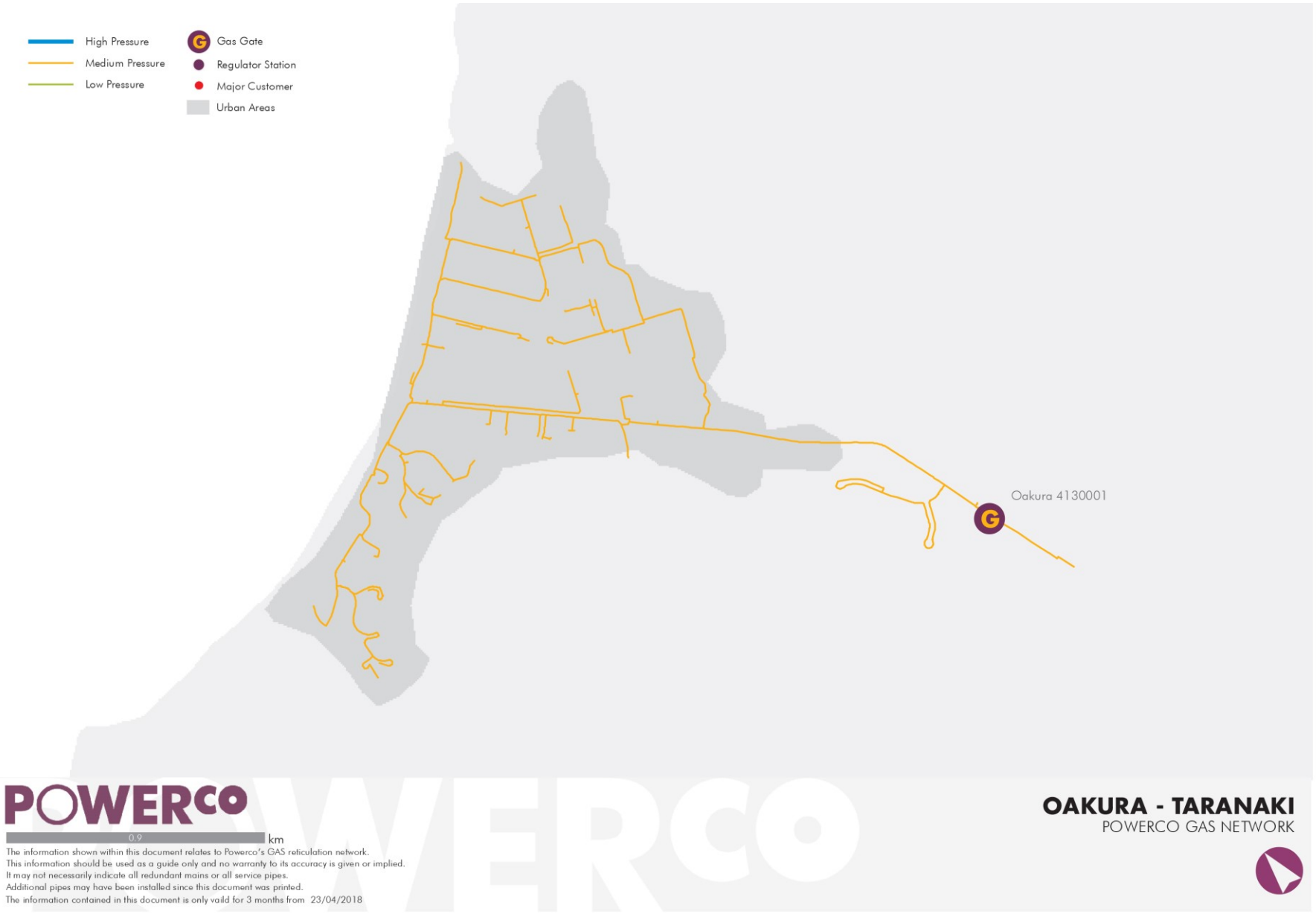
NEW PLYMOUTH - TARANAKI

POWERCO GAS NETWORK


High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Oakura 4130001
POWERCO
0.9
km
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OAKURA - TARANAKI
POWERCO GAS NETWORK


High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Okaiawa
POWERCO
0.65
km
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OKAIAWA - TARANAKI
POWERCO GAS NETWORK


High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Okato 4000231
POWERCO
km
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Additional pipes may have been installed since this document was printed.
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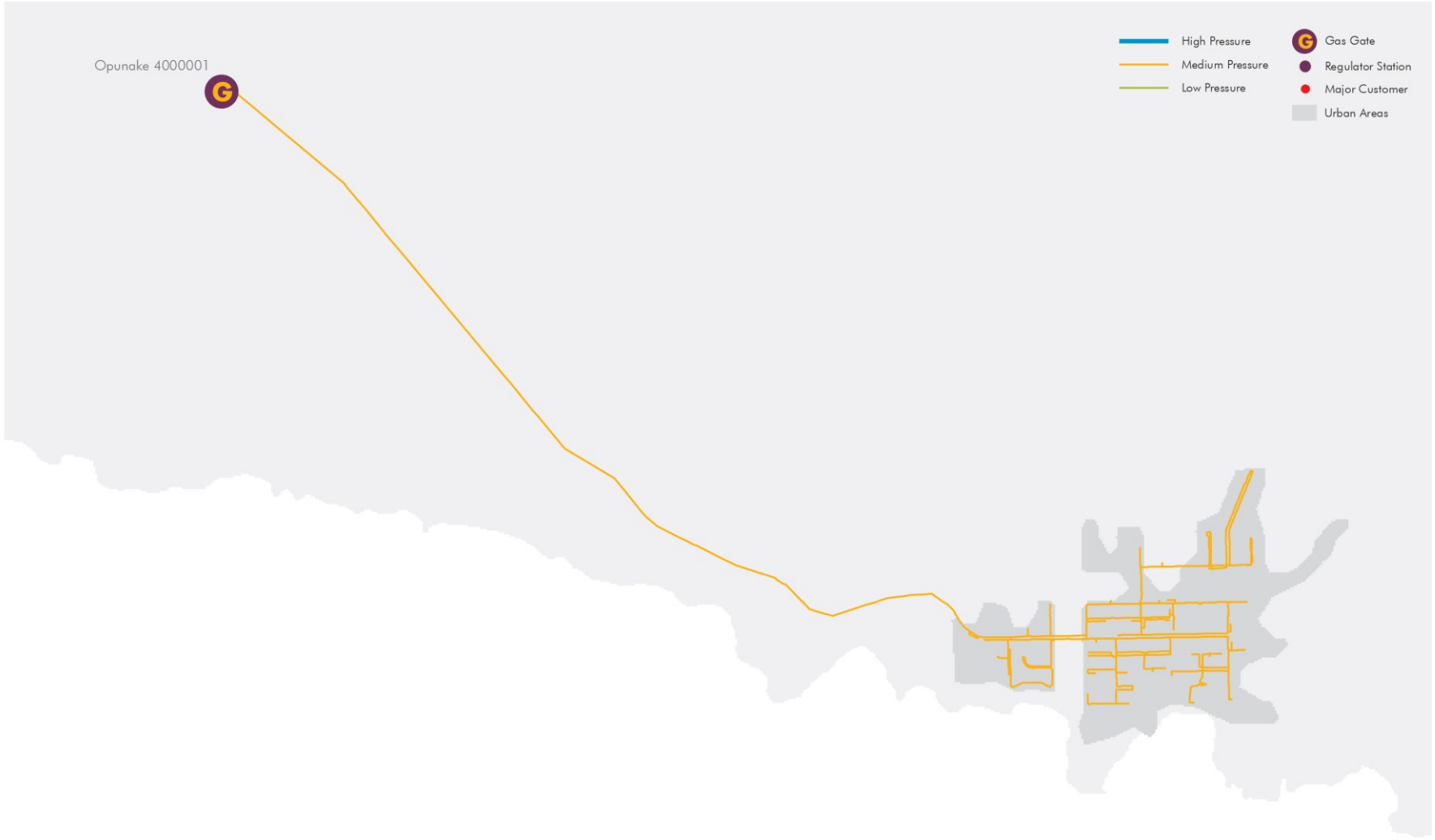
OKATO - TARANAKI
POWERCO GAS NETWORK


Opunake 4000001
High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
POWERCO
1:5
km
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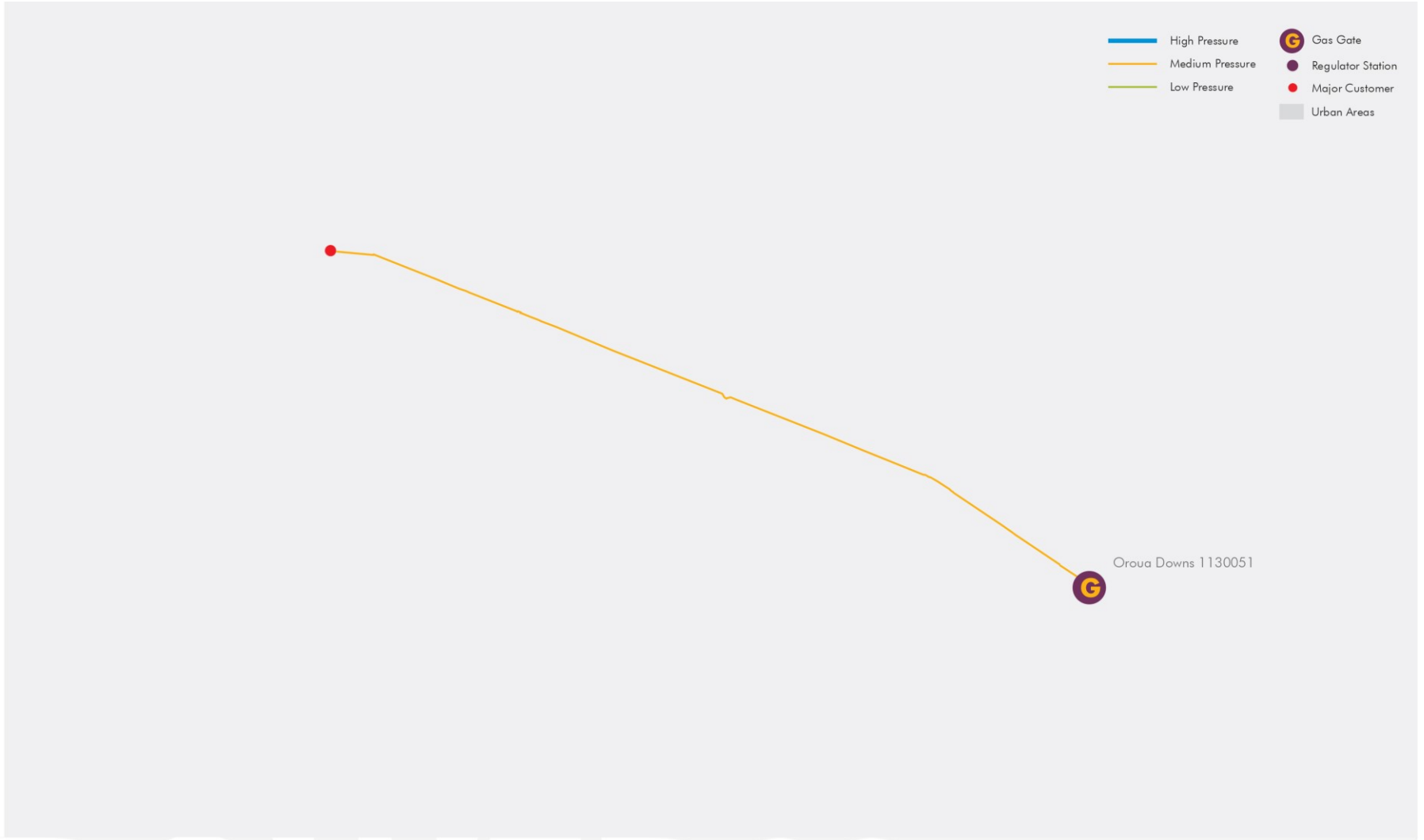
OPUNAKE - TARANAKI
POWERCO GAS NETWORK


High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Oroua Downs 1130051
POWERCO
km
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Additional pipes may have been installed since this document was printed.
The information contained in this document is only vaild for 3 months from 24/04/2018
OROUA DOWNS - MANAWATU
POWERCO GAS NETWORK


High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Pahiatua 7020212
POWERCO
0.9
km
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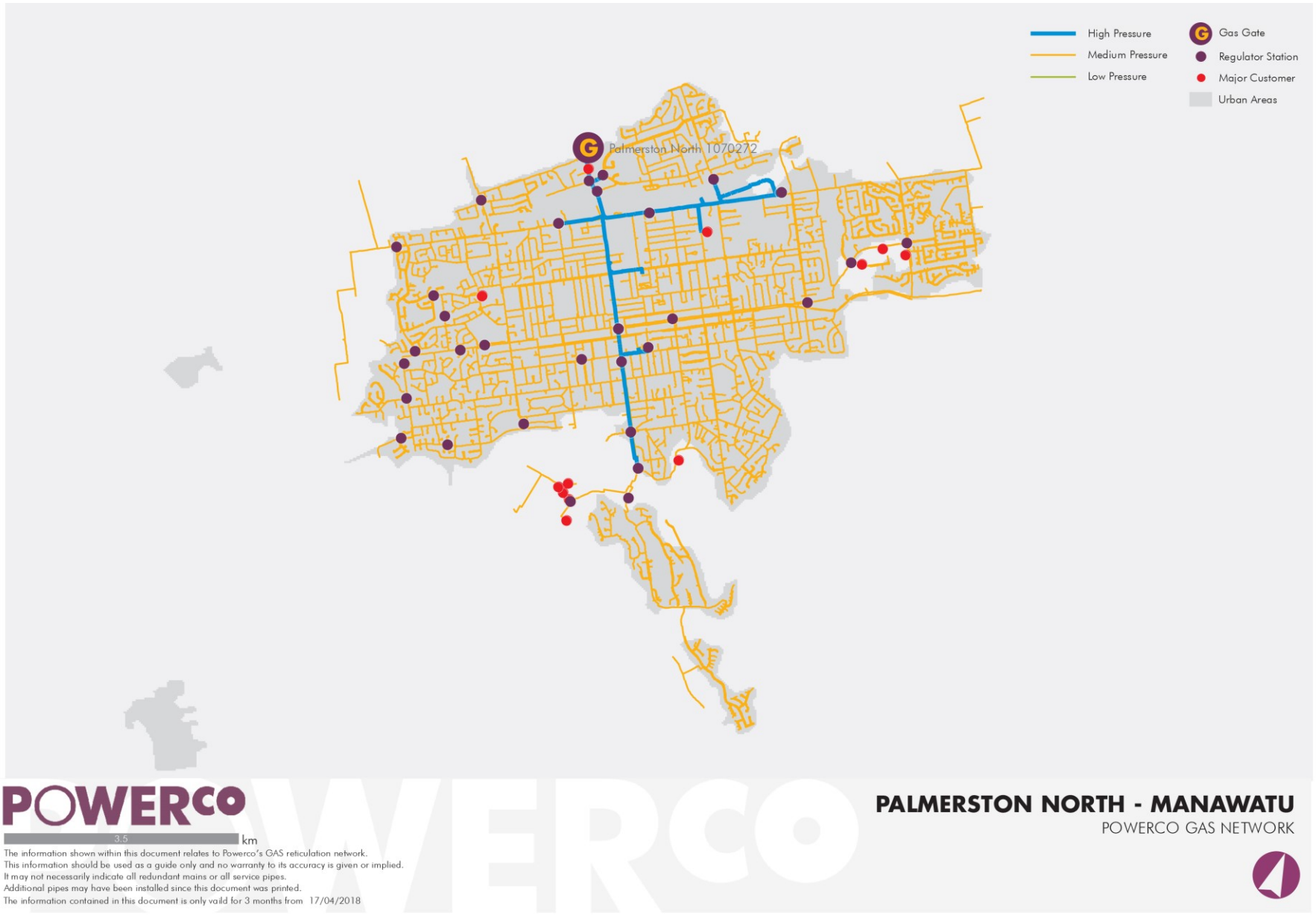
Additional pipes may have been installed since this document was printed.
The information contained in this document is only vaild for 3 months from 23/04/2018
PAHIATUA - MANAWATU
POWERCO GAS NETWORK


High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Palmerston North 1070272
POWERCO
3.5
km
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Additional pipes may have been installed since this document was printed.
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PALMERSTON NORTH - MANAWATU
POWERCO GAS NETWORK


High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Patea 1000422
POWERCO
0.75
km
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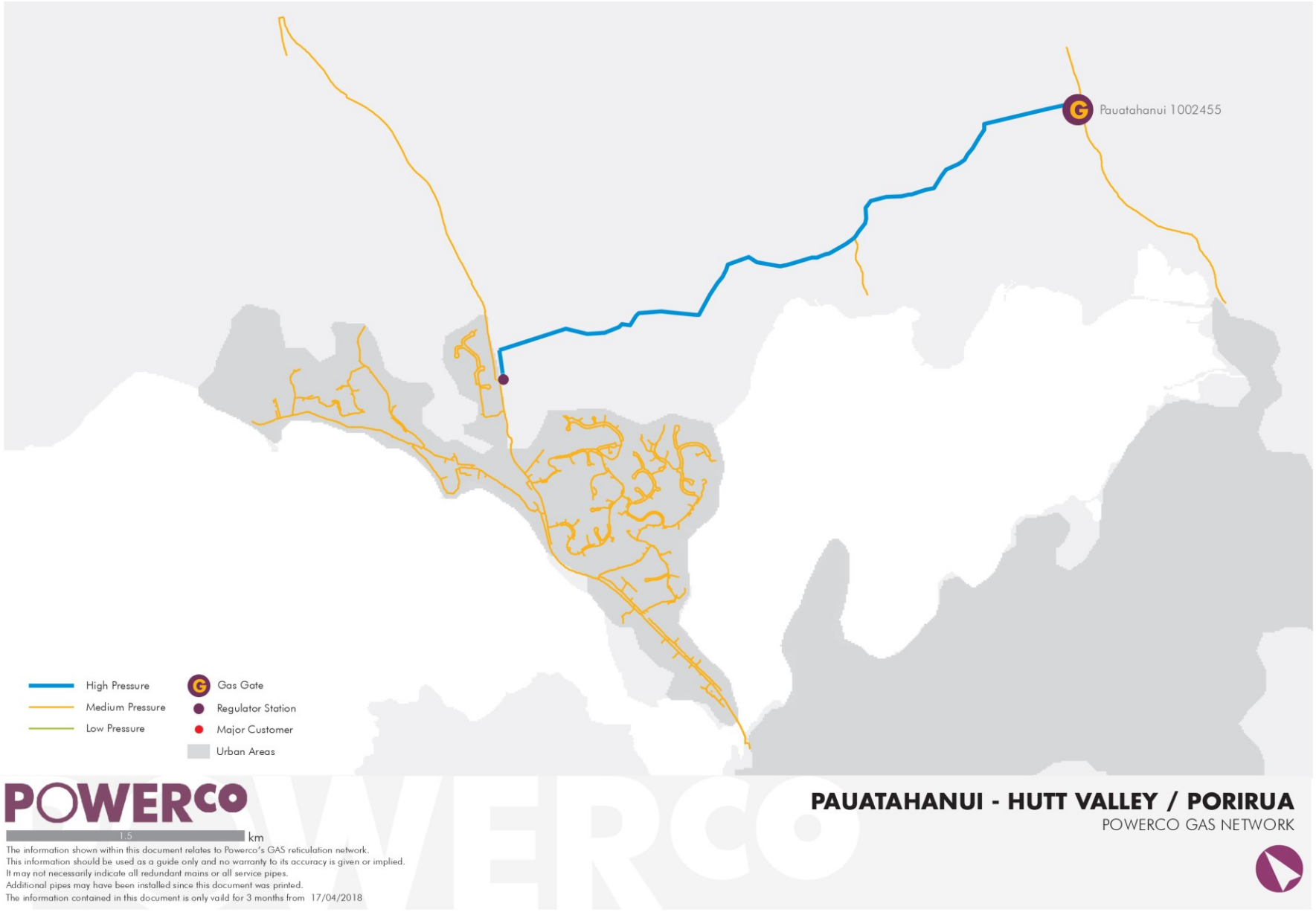
PATEA - TARANAKI
POWERCO GAS NETWORK


Pauatahanui 1002455
High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
POWERCO
1.5
km
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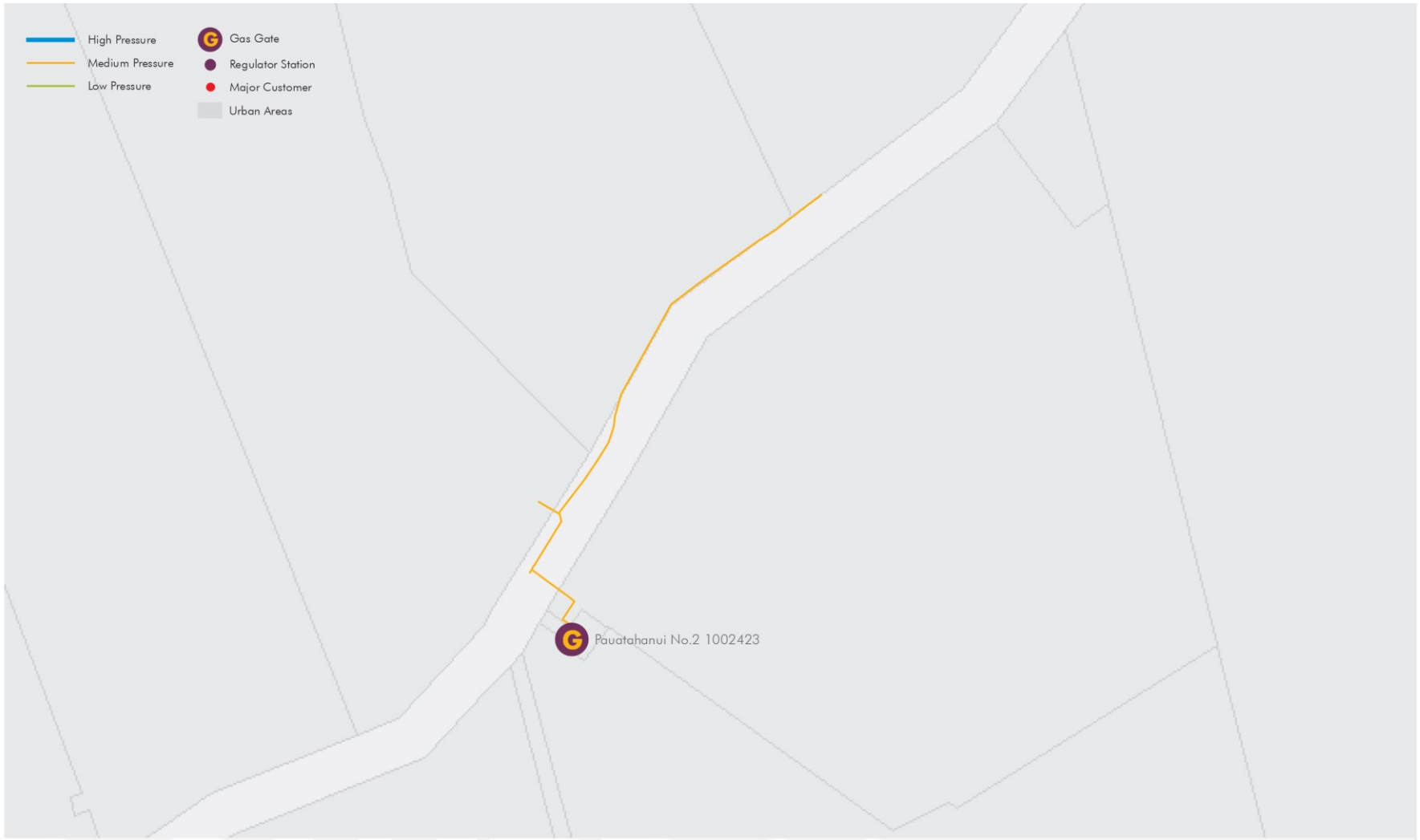
The information contained in this document is only vaild for 3 months from 17/04/2018
PAUATAHANUI - HUTT VALLEY / PORIRUA
POWERCO GAS NETWORK


High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Pauatahanui No.2 1002423
POWERCO
0.1
km
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PAUATAHANUI #2 - HUTT VALLEY / PORIRUA
POWERCO GAS NETWORK


High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Pungarehu No.1 4000132
POWERCO
0.1
km
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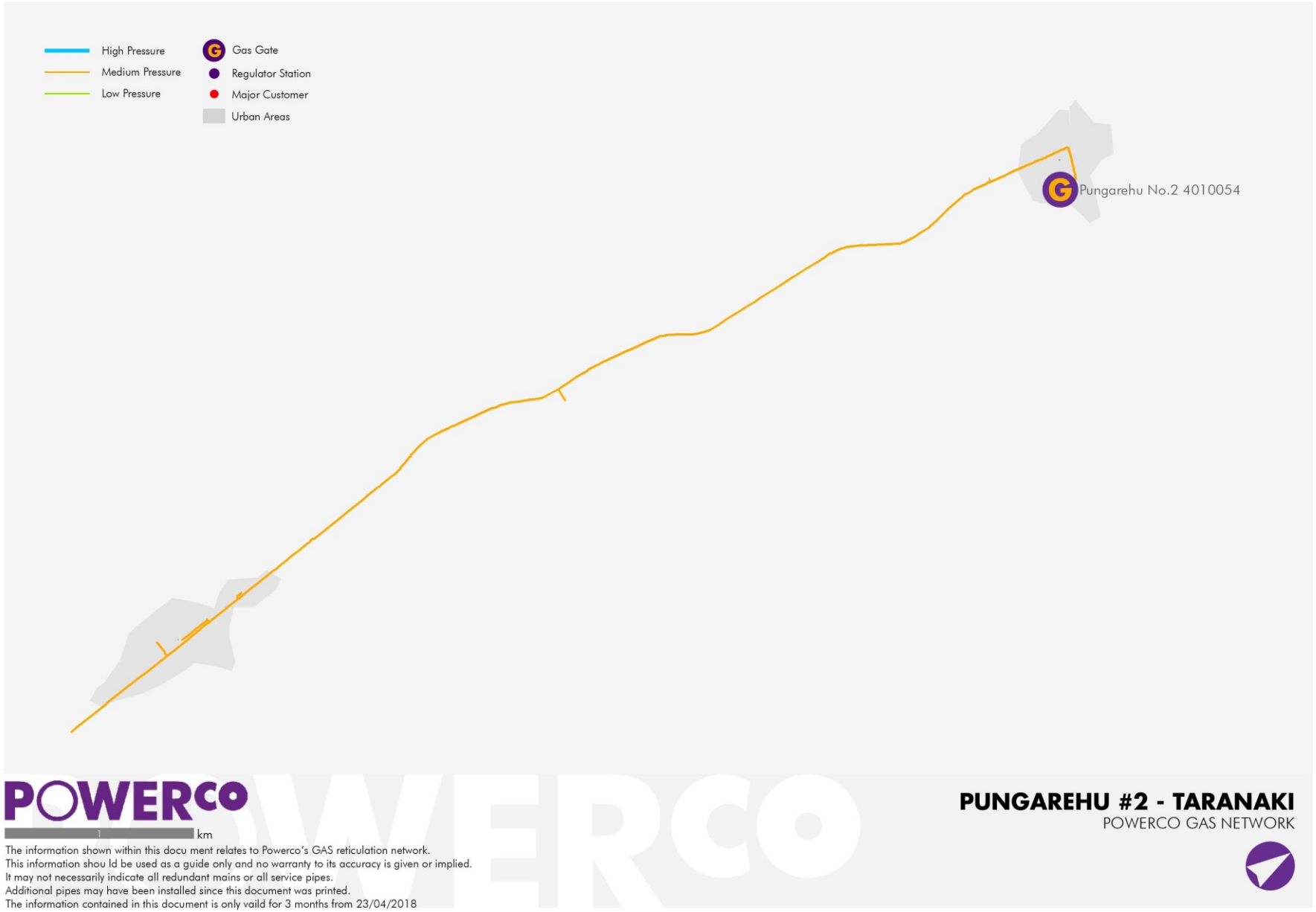
Additional pipes may have been installed since this document was printed.
The information contained in this document is only vaild for 3 months from 23/04/2018
PUNGAREHU #1 - TARANAKI
POWERCO GAS NETWORK


High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Pungarehu No.2 4010054
POWERCO
km
PUNGAREHU #2 - TARANAKI
POWERCO GAS NETWORK
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High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Stratford 2000192
POWERCO
1.5
km
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STRATFORD - TARANAKI
POWERCO GAS NETWORK


High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Takapau 7000844
POWERCO
0.7
km
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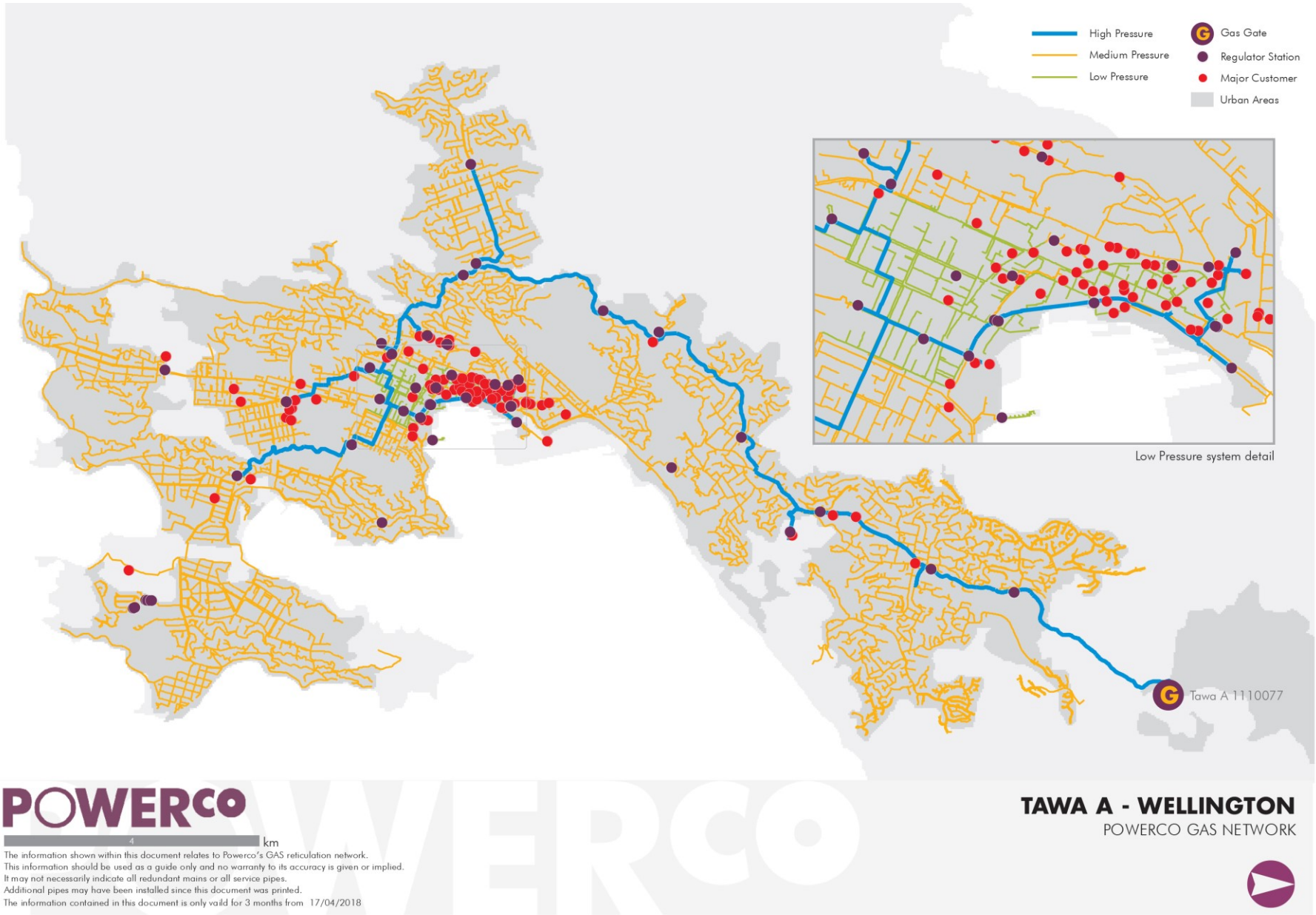
TAKAPAU - MANAWATU
POWERCO GAS NETWORK


High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Low Pressure system detail
Tawa A 1110077
POWERCO
4
km
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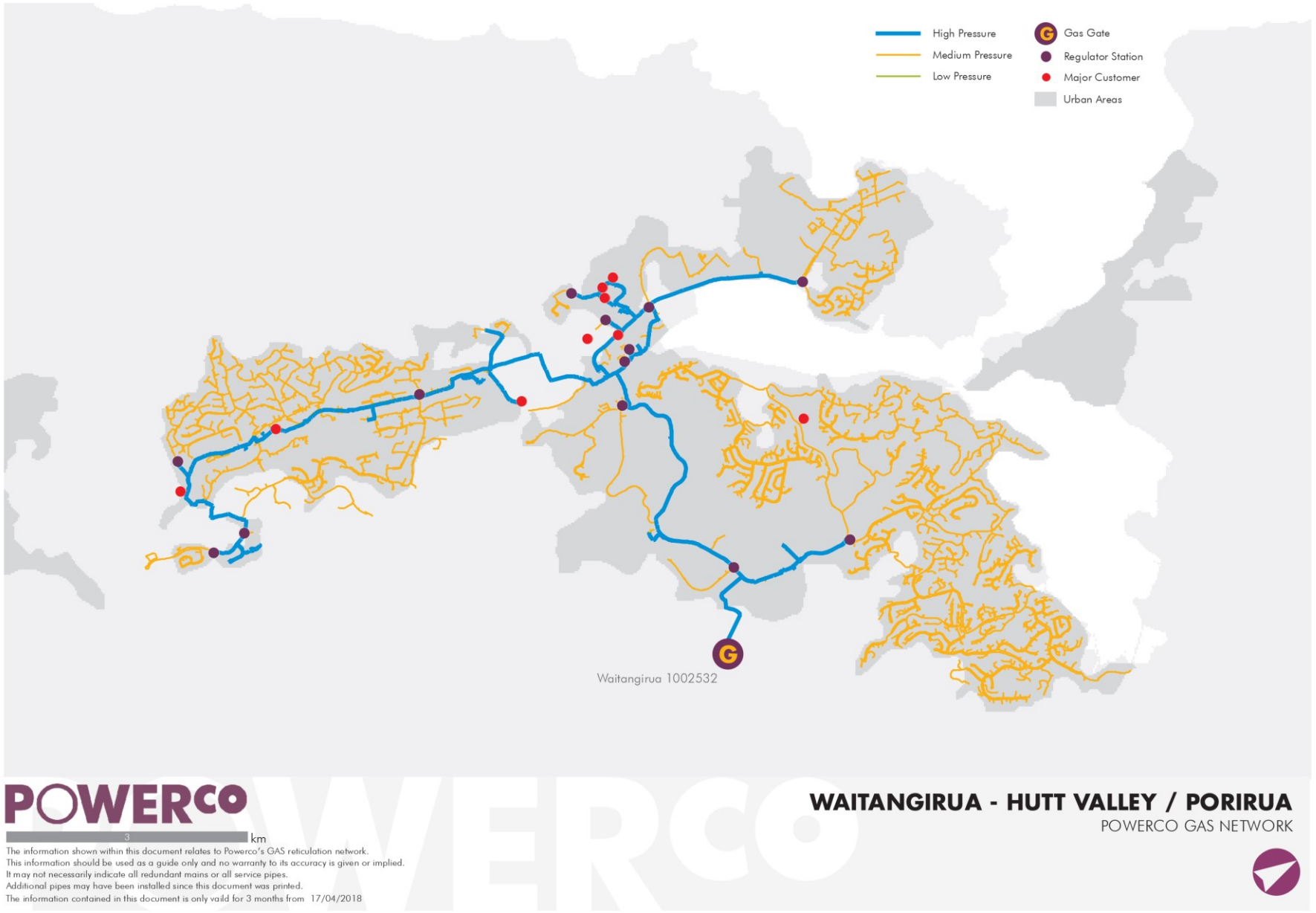
TAWA A - WELLINGTON
POWERCO GAS NETWORK


High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Waitangirua 1002532
POWERCO
3
km
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WAITANGIRUA - HUTT VALLEY / PORIRUA
POWERCO GAS NETWORK


High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Waitara 2030046
POWERCO
2.5
km
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WAITARA - TARANAKI
POWERCO GAS NETWORK


High Pressure
Medium Pressure
Low Pressure
Gas Gate
Regulator Station
Major Customer
Urban Areas
Waverley 1030058
POWERCO
1.5
km
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WAVERLEY - TARANAKI
POWERCO GAS NETWORK

APPENDIX 10 REGULATORY REQUIREMENTS LOOK-UP

2.6 ASSET MANAGEMENT PLANS AND FORECAST INFORMATION	AMP SECTION WHERE ADDRESSED
DISCLOSURE RELATING TO ASSET MANAGEMENT PLANS AND FORECAST INFORMATION	
2.6.1 Subject to clauses 2.6.3 and 2.13, before the start of each disclosure year commencing with the disclosure year 2014, every GDB must- 1) Complete an AMP that- (a) relates to the gas distribution services supplied by the GDB; (b) meets the purposes of AMP disclosure set out in clause 2.6.2; (c) has been prepared in accordance with Attachment A to this determination; Gas Distribution Information Disclosure Determination 2012 – (consolidated in 2015) (d) contains the information set out in in the schedules described in clause 2.6.6; (e) contains the Report on Asset Management Maturity as described in Schedule 13; 2) Complete the Report on Asset Management Maturity in accordance with the requirements specified in Schedule 13; and 3) Publicly disclose the AMP.	(a) The AMP relates to gas distribution services, as stated in the second paragraph of Section 1. (b) Compliance with 2.6.2 is outlined in the box below. (c) Compliance with Attachment A is outlined in Appendix 10. (d) The tables required by clause 2.6.6 are in Appendix 2 and the MS Excel schedules have been supplied to the Commission. (e) The report required is in Appendix 2 and the MS Excel schedules have been supplied to the Commission. (2) Schedule 13 is provided in Appendix 2 and is also discussed in sections 2.3.9 and 3.8.3. (3) This Asset Management Plan and its appendices are publicly available on Powerco's website (www.powerco.co.nz) and sent to the Commission.
2.6.2 The purposes of AMP disclosure referred to in subclause 2.6.1(1)(b) are that the AMP- 1) Must provide sufficient information for interested persons to assess whether- (a) assets are being managed for the long term; (b) the required level of performance is being delivered; and (c) costs are efficient and performance efficiencies are being achieved; 2) Must be capable of being understood by interested persons with a reasonable understanding of the management of infrastructure assets; 3) Should provide a sound basis for the ongoing assessment of asset-related risks, particularly high impact asset-related risks.	(1) & (2): Powerco recognises that AMPs are large and complicated documents. To assist ease of understanding we have: – Structured the AMP, as described in section 2.5; – Included our Network Asset Management Policy in Appendix 3 to reiterate our commitment to be cost efficient; and – Provided a glossary in Appendix 1 to assist understanding. (3): Risks are discussed in sections 3.2.3.2, 3.4.3, 6.1.2 and Appendix 5.
Clauses 2.6.3 to 2.6.5 relate to AMP updates	Not relevant
2.6.6 Subject to clause 2.13.2, before the start of each disclosure year, each GDB must complete and publicly disclose each of the following reports by inserting all information relating to the gas distribution services supplied by the GDB for the disclosure years provided for in the following reports- 1) the Report on Forecast Capital Expenditure in Schedule 11a; 2) the Report on Forecast Operational Expenditure in Schedule 11b; 3) the Report on Asset Condition in Schedule 12a; 4) the Report on Forecast Utilisation in Schedule 12b; 5) the Report on Forecast Demand in Schedule 12c.	Those reports are included in Appendix 2. They are publicly available on Powerco's website (www.powerco.co.nz) as part of the Asset Management Plan, and sent to the Commission by 30 September 2018.

ATTACHMENT A: ASSET MANAGEMENT PLANS	AMP SECTION WHERE ADDRESSED
AMP DESIGN	
1. The core elements of asset management - 1.1. A focus on measuring network performance, and managing the assets to achieve performance targets; 1.2. Monitoring and continuously improving asset management practices; 1.3. Close alignment with corporate vision and strategy; 1.4. That asset management is driven by clearly defined strategies, business objectives and service level targets; 1.5. That responsibilities and accountabilities for asset management are clearly assigned; 1.6. An emphasis on knowledge of what assets are owned and why, the location of the assets and the condition of the assets; 1.7. An emphasis on optimising asset utilisation and performance; 1.8. That a total lifecycle approach should be taken to asset management; 1.9. That the use of 'non-network' solutions and demand management techniques as alternatives to asset acquisition is considered.	1.1: Section 4 outlines objectives, sections 2, 3, 6, 7 and 8 describe the framework to manage assets to meet these targets; 1.2: Sections 2.3.9 and 3.8.3 provide comments on the AMMAT. Sections 2.3.9 and 3.8.1 provide detail on Powerco's approach to continuous improvement. 1.3 & 1.4: Section 2.1, Section 4 & Section 6, and Appendix 3. 1.5: Section 3.1 describes accountabilities. 1.6: Section 5.3 provides an overview of Powerco's assets. Section 5.4 and 5.5 provide details on location. Section 5.6 provides condition information for each asset class. The asset lifecycle plans in Section 7 also have a more detailed description. 1.7: Sections 4.6, 6.4, 8.1 discuss performance and Sections 4.4 and 5.5 discuss asset capacity. 1.8: This is discussed throughout sections 2, 3 and 7. Each asset lifecycle plan has a renewal strategy which considers the whole-of-life cost of each asset and therefore optimal replacement timing. 1.9: This is discussed in Section 6.3.
2. The disclosure requirements are designed to produce AMPs that – 2.1. Are based on, but are not limited to, the core elements of asset management identified in clause 1; 2.2. Are clearly documented and made available to all stakeholders; 2.3. Contain sufficient information to allow interested persons to make an informed judgement about the extent to which the GDB's asset management processes meet best practice criteria and outcomes are consistent with outcomes produced in competitive markets; 2.4. Specifically support the achievement of disclosed service level targets; 2.5. Emphasise knowledge of the performance and risks of assets and identify opportunities to improve performance and provide a sound basis for ongoing risk assessment; 2.6. Consider the mechanics of delivery including resourcing; 2.7. Consider the organisational structure and capability necessary to deliver the AMP; 2.8. Consider the organisational and contractor competencies and any training requirements; 2.9. Consider the systems, integration and information management necessary to deliver the plans; 2.10. To the extent practical, use unambiguous and consistent definitions of asset management processes and terminology consistent with the terms used in this attachment to enhance comparability of asset management practices over time and between GDBs; and 2.11. Promote continual improvements to asset management practices. *Disclosing an AMP does not constrain an GDB from managing its assets in a way that differs from the AMP if its circumstances change after preparing the plan or if the GDB adopts improved asset management practices.*	2.1: This is discussed through-out the AMP. 2.2: This AMP is widely distributed to Powerco's stakeholders. Section 3.7 describes our Asset Management communication process. 2.3: Powerco's self-assessment against the AMMAT is provided in sections 2.3.9, 3.8.3 and Appendix 2. 2.4: Powerco's service objectives are discussed in Section 4. 2.5: This is discussed in sections 3.2.1, 3.4.3 and 6. Risks are presented in Appendix 5. 2.6 is discussed in section 3.3 and 3.5. 2.7 is discussed in section 3.1. 2.8 is discussed in section 3.4.1.1. 2.9 is discussed in section 3.4.2 & 5.8.1 & 6.7 & 8.8. 2.10: Powerco has used terminology in line with this appendix, and also provided a glossary in Appendix 1. 2.11: Section 1.2 provides an overview of the focus for continual improvement. Section 3.8.3 comments on the AMMAT and Section 8.7 details continuous improvement projects. Sections 2.3.9 and 3.8.3 provide detail on Powerco's approach to continuous improvement.

ATTACHMENT A: ASSET MANAGEMENT PLANS	AMP SECTION WHERE ADDRESSED
CONTENTS OF THE AMP	
3. The AMP must include the following -	
3.1. A summary that provides a brief overview of the contents and highlights information that the GDB considers significant;	Section 1 is an executive summary and provides a brief overview and the key messages and themes in the AMP.
3.2. Details of the background and objectives of the GDB's asset management and planning processes; and	The background to Powerco's asset management and planning process is provided in sections 2.3 & 3.2. This describes the context in which Powerco operates. The objectives of Powerco's asset management and planning process are provided in Section 4.
3.3. A purpose statement which - (a) makes clear the purpose and status of the AMP in the GDB's asset management practices. The purpose statement must also include a statement of the objectives of the asset management and planning processes; (b) states the corporate mission or vision as it relates to asset management; (c) identifies the documented plans produced as outputs of the annual business planning process adopted by the GDB; (d) states how the different documented plans relate to one another, with particular reference to any plans specifically dealing with asset management; and (e) includes a description of the interaction between the objectives of the AMP and other corporate goals, business planning processes, and plans The purpose statement should be consistent with the GDB's vision and mission statements, and show a clear recognition of stakeholder interest.	(a) The purpose statement is in Section 1.1 and Section 2's introduction. (b) Powerco's corporate vision, mission and values and their relationship with the AM process is discussed in section 2.1 and is part of the Network Asset Management Policy provided in Appendix 3. (c) Sections 3.6.8 & 8 (d) See sections 3.6.7, and 6. (e) This is described in sections 2.1 – 2.3 and 6.3. The purpose statement in Section 2 introduction aligns with Powerco's vision and mission and includes the need of stakeholders, such as customers and owners.
3.4. Details of the AMP planning period, which must cover at least a projected period of 10 years commencing with the disclosure year following the date on which the AMP is disclosed Good asset management practice recognises the greater accuracy of short-to-medium term planning, and will allow for this in the AMP. The asset management planning information for the second 5 years of the AMP planning period need not be presented in the same detail as the first 5 years.	Powerco's AMP planning period is from 1 October 2018 - 31 September 2028 as described in sections 1.1 & 2.
3.5. The date that it was approved by the directors	The AMP was approved on the 20 September 2018.
3.6. A description of each of the legislative requirements directly affecting management of the assets, and details of: (a) how the GDB meets the requirements; and (b) the impact on asset management	a) Sections 2.3.1, 2.3.1 and Appendix 4. b) Section 2.3.1, 2.3.2 and Appendix 4.
3.7. A description of stakeholder interests (owners, consumers etc.) which identifies important stakeholders and indicates: (a) how the interests of stakeholders are identified; (b) what these interests are; (c) how these interests are accommodated in asset management practices; and (d) how conflicting interests are managed	An overview of Powerco's stakeholders is in Section 2.2.
3.8. A description of the accountabilities and responsibilities for asset management on at least 3 levels, including:	(a) Refer to section 3.1.1.

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(a) governance - a description of the extent of director approval required for key asset management decisions and the extent to which asset management outcomes are regularly reported to directors; (b) executive - an indication of how the in-house asset management and planning organisation is structured; and (c) field operations - an overview of how field operations are managed, including a description of the extent to which field work is undertaken in-house and the areas where outsourced contractors are used.	(b) Refer to sections 3.1.2. (c) Sections 3.1.3, 3.1.4 and 3.5 discusses field operations in detail.
3.9. All significant assumptions (a) quantified where possible; (b) clearly identified in a manner that makes their significance understandable to interested persons, including (c) a description of changes proposed where the information is not based on the GDB's existing business; (d) the sources of uncertainty and the potential effect of the uncertainty on the prospective information; and (e) the price inflator assumptions used to prepare the financial information disclosed in nominal New Zealand dollars in the Report on Forecast Capital Expenditure set out in Schedule 11a & the Report on Forecast Operational Expenditure set out in Schedule 11b.	(a) Refer to sections 2.4, 6, 8 and 9.2. (b) Section 2.4 provides key assumptions in the development of the AMP. Section 9.2 describes assumptions for each expenditure category forecast. Section 9.2.1 provides planning assumptions. (c) Non-relevant (d) Section 9.2 (e) Table 9.5
3.10. A description of the factors that may lead to a material difference between the prospective information disclosed and the corresponding actual information recorded in future disclosures	This is discussed throughout Section 9.
3.11. An overview of asset management strategy and delivery *To support the Report on Asset Management Maturity disclosure and assist interested persons to assess the maturity of asset management strategy and delivery, the AMP should identify-* (a) how the asset management strategy is consistent with the GDB's other strategy and policies; (b) how the asset strategy takes into account the lifecycle of the assets; (c) the link between the asset management strategy and the AMP; and (d) processes that ensure costs, risks and system performance will be effectively controlled when the AMP is implemented.	(a) Refer to Section 2.3 (b) Section 6. (c) Section 2.1 describes the relationship. (d) Section 3 describes the processes to ensure costs, risks and system performance is effectively controlled. Section 7 describes the lifecycle considerations of each asset class.
3.12. An overview of systems and information management data *To support the AMMAT disclosure and assist interested persons to assess the maturity of systems and information management, the AMP should describe:* (a) the processes used to identify asset management data requirements that cover the whole of lifecycle of the assets; (b) the systems used to manage asset data and where the data is used, including an overview of the systems to record asset conditions and operation capacity and to monitor the performance of assets; (c) the systems and controls to ensure the quality and accuracy of asset management information; and (d) the extent to which these systems, processes and controls are integrated.	Section 3.4.2 and 3.5.3 and provide information on systems and information management data. (a) Specifically Section 3.4.2.1 discusses processes to identify data. (b) Section 5.8.1 provides details of systems and how they manage our data. (c) Refer to Section 3.4.2. (d) Refer to Section 3.4.2.

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3.13. A statement covering any limitations in the availability or completeness of asset management data and disclose any initiatives intended to improve the quality of this data *Discussion of the limitations of asset management data is intended to enhance the transparency of the AMP and identify gaps in the asset management system.*	Limitations are described in Section 3.4.2.2 and Section 5.8. Initiatives are discussed in Section 8.8.
3.14. A description of the processes used within the GDB for: (a) managing routine asset inspections and network maintenance; (b) planning and implementing network development projects; and (c) measuring network performance.	(a) Refer Section 3.2. (b) Refer Section 3.2. (c) Refer Section 6.3.2
3.15. An overview of asset management documentation, controls and review processes *To support the Report on Asset Management Maturity disclosure and assist interested persons to assess the maturity of asset management documentation, controls and review processes, the AMP should-* *(a) identify the documentation that describes the key components of the asset management system and the links between the key components;* *(b) describe the processes developed around documentation, control and review of key components of the asset management system;* *(c) where the GDB outsources components of the asset management system, the processes and controls that the GDB uses to ensure efficient and cost-effective delivery of its asset management strategy;* *(d) where the GDB outsources components of the asset management system, the systems it uses to retain core asset knowledge in-house; and* *(e) audit or review procedures undertaken in respect of the asset management system.*	(a) is discussed in Section 2.3. (b) is discussed in sections 2.3 & 3.6. (c) is discussed in sections 3.5.1 and 6.5. (d) is discussed in Section 3.4.1.2. (e) is discussed in sections 3.8.3 and 2.3.9.
3.16. An overview of communication and participation processes To support the Report on Asset Management Maturity disclosure and assist interested persons to assess the maturity of asset management documentation, controls and review processes, the AMP should: (a) communicate asset management strategies, objectives, policies and plans to stakeholders involved in the delivery of the asset management requirements, including contractors and consultants; and (b) demonstrate staff engagement in the efficient and cost-effective delivery of the asset management requirements.	This is discussed in Section 3.7.
3.17. The AMP must present all financial values in constant price New Zealand dollars except where specified otherwise;	All figures are constant October 2018 dollars.
3.18. The AMP must be structured and presented in a way that the GDB considers will support the purposes of AMP disclosure set out in clause 2.6.2 of the determination.	Since 2013, Powerco has structured its AMP to be easier to follow and for an interested person to understand. This includes a flow which better covers the total lifecycle approach of assets, efficient delivery of services and reaching an appropriate performance level.
4. Assets Covered	
The AMP must provide details of the assets covered, including:	
4.1. A map and high-level description of the areas covered by the GDB, including the region(s) covered; and	A map and high-level description of sub-networks and regions are shown in sections 1.3, 5.3, 5.4 and 5.5

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4.2. A description of the network configuration, including: - If sub-networks exist, the network configuration information should be disclosed for each sub-network. (a) A map or maps, with any cross-referenced information contained in an accompanying schedule, showing the physical location of: (i) All main pipes, distinguished by operating pressure; (ii) All ICPs that have a significant impact on network operations or asset management priorities, and a description of that impact; (iii) All gate stations; (iv) All pressure regulation stations; and (b) if applicable, the locations where a significant change has occurred since the previous disclosure of the information referred to in subclause 4.2(a) above, including: (i) a description of the parts of the network that are affected by the change; and (ii) a description of the nature of the change.	Maps displaying the physical location of all required network elements are located in Appendix 9. Network changes are described in Section 5.5.6
NETWORK ASSETS BY CATEGORY	
5. The AMP must describe the network assets by providing the following information for each asset category: 5.1. pressure; 5.2. description and quantity of assets; 5.3. age profiles; and 5.4. a discussion of the results of formal risk assessments of the assets, further broken down by subcategory as appropriate. Systemic issues leading to the premature replacement of assets or parts of assets should be discussed.	Section 5.6 provides an overview of categories of assets, with information on age profiles, quantities and pressure. Section 7 then provides a lifecycle plans for each category of asset that discusses the condition and risk assessments.
6. The asset categories discussed in clause 5 above should include at least the following: 6.1. the categories listed in the Report on Forecast Capital Expenditure in Schedule 11a(iii); and 6.2. assets owned by the GDB but installed at gate stations owned by others.	The assets discussed in clause 5 include those specified in clause 6.1 and 6.2
SERVICE LEVELS	
7. The AMP must clearly identify or define a set of performance indicators for which annual performance targets have been defined. The annual performance targets must be consistent with business strategies and asset management objectives and be provided for each year of the AMP planning period. The targets should reflect what is practically achievable given the current network configuration, condition and planned expenditure levels. The targets should be disclosed for each year of the AMP planning period.	Section 4 details the AMP performance objectives and how they are consistent with the business strategies and asset management objectives.
8. Performance indicators for which targets have been defined in clause 7 must include: 8.1. the DPP requirements required under the price quality path determination applying to the regulatory assessment period in which the next disclosure year falls; 8.2. consumer oriented indicators that preferably differentiate between different consumer types;	Section 4 provides the required indicators, including DPP requirements and customer-orientated indicators across our objectives. Section 4.8 provides a summary of the measures required under clauses 8.3 and 8.4.

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8.3. indicators of asset performance, asset efficiency and effectiveness, and service efficiency, such as technical and financial performance indicators related to the efficiency of asset utilisation and operation; and 8.4. the performance indicators disclosed in Schedule 10b of the determination.	
9. The AMP must describe the basis on which the target level for each performance indicator was determined. Justification for target levels of service includes consumer expectations or demands, legislative, regulatory, and other stakeholders' requirements or considerations. The AMP should demonstrate how stakeholder needs were ascertained and translated into service level targets.	This is discussed in Section 4. Also see sections 2.2 and 3.2.1.
10. Targets should be compared to historic values where available to provide context and scale to the reader.	Section 4 provides historical performance.
11. Where forecast expenditure is expected to materially affect performance against a target defined in clause 7 above, the target should be consistent with the expected change in the level of performance.	Non-relevant
NETWORK DEVELOPMENT PLANNING	
12. AMPs must provide a detailed description of network development plans, including -	Network development planning is discussed in Section 8 and provides detail on all network development plans.
12.1. description of the planning criteria and assumptions for network development;	The criteria are discussed in sections 3.2 and specifically in sections 6.3 and 8.
12.2. Planning criteria for network developments should be described logically and succinctly. Where probabilistic or scenario-based planning techniques are used, this should be indicated and the methodology briefly described; and	The criteria are discussed in sections 3.2 and specifically in Section 8.
12.3. The use of standardised designs may lead to improved cost efficiencies. This section should discuss: (a) the categories of assets and designs that are standardised; and (b) the approach used to identify standard designs.	Refer to Section 6.5.
12.4. A description of the criteria used to determine the capacity of equipment for different types of assets or different parts of the network. The criteria described should relate to the GDB's philosophy in managing planning risks.	This is discussed in sections 3.2.3 & 3.2.4 & introduction to Section 6.
12.5. A description of the process and criteria used to prioritise network development projects and how these processes and criteria align with the overall corporate goals and vision.	Sections 2.2 and 2.3 outline how the overall asset management process aligns with the corporate vision and mission. Section 4 explains how the objectives align with the corporate objectives that relate to the use of reliability and security criteria and this is used in Section 7 for asset lifecycle plans. The process is also described in sections 3.2.3 to 3.2.4.
12.6. Details of demand forecasts, the basis on which they are derived, and the specific network locations where constraints are expected due to forecast increases in demand; (a) explain the load forecasting methodology and indicate all the factors used in preparing the load estimates; (b) provide separate forecasts to at least the system level covering at least a minimum five year forecast period. Discuss how uncertain but substantial individual projects/developments that affect load are taken into account in the forecasts, making clear the extent to which these uncertain increases in demand are reflected in the forecasts; and (c) identify any network or equipment constraints that may arise due to the anticipated growth in demand during the AMP planning period.	a) The methodology is provided in Section 6.3 b) Section 8 describes future demand by regions and projects that are impacted by this. c) Table 8.2 in Section 8.1 shows the networks where constraints are anticipated to occur during the planning period.

ATTACHMENT A: ASSET MANAGEMENT PLANS	AMP SECTION WHERE ADDRESSED
The AMP should include a description of the methodology and assumptions used to produce the utilisation and capacity forecasts and a discussion of the limitations of the forecasts, methodology and assumptions. The AMP should also discuss any capacity limitations identified or resolved in years during which an AMP was not disclosed.	
12.7. Analysis of the significant network level development options identified and details of the decisions made to satisfy and meet target levels of service, including: (a) the reasons for choosing a selected option for projects where decisions have been made; (b) the alternative options considered for projects that are planned to start in the next five years; and (c) consideration of planned innovations that improve efficiencies within the network, such as improved utilisation, extended asset lives, and deferred investment.	Section 8 describes projects and rational for decisions by region. Sections 3.2.4.2 and 6.5 describe how we optimise investment.
12.8. A description and identification of the network development programme and actions to be taken, including associated expenditure projections. The network development plan must include: (a) a detailed description of the material projects and a summary description of the non-material projects currently underway or planned to start within the next 12 months; (b) a summary description of the programmes and projects planned for the following four years (where known); and (c) an overview of the material projects being considered for the remainder of the AMP planning period. *For projects included in the AMP where decisions have been made, the reasons for choosing the selected option should be stated which should include how target levels of service will be impacted. For other projects planned to start in the next five years, alternative options should be discussed.*	Section 8 describes the development programme by region with a focus over the 5 year horizon and where possible 10 years.
LIFECYCLE ASSET MANAGEMENT PLANNING (MAINTENANCE AND RENEWAL)	
13. The AMP must provide a detailed description of the lifecycle asset management processes, including—	
13.1. The key drivers for maintenance planning and assumptions;	The drivers and key challenges are in Section 7. Maintenance-related assumptions are detailed in sections 7, 9.2, and 9.5.
13.2. Identification of routine and corrective maintenance and inspection policies and programmes and actions to be taken for each asset category, including associated expenditure projections. This must include- (a) the approach to inspecting and maintaining each category of assets, including a description of the types of inspections, tests and condition monitoring carried out and the intervals at which this is done; (b) any systemic problems identified with any particular asset types and the proposed actions to address these problems; and (c) budgets for maintenance activities broken down by asset category for the AMP planning period;	Powerco's maintenance strategy is discussed in sections 3.3, 7 and forecasts in Section 9. (a) Each asset class has strategy, tasks and frequencies outlined in Section 7. (b) Refer to Section 7. (c) Breakdown of the routine and corrective maintenance and inspection budgets by asset class is in Section 7.8
13.3. 13.3 Identification of asset replacement and renewal policies and programmes and actions to be taken for each asset category, including associated expenditure projections. This must include- (a) the processes used to decide when and whether an asset is replaced or refurbished, including a description of the factors on which decisions are based, and consideration of future demands on the network and the optimum use of existing network assets; (b) a description of innovations made that have deferred asset replacement; (c) a description of the projects currently underway or planned for the next 12 months;	13.3: Powerco's renewal strategy is discussed in the asset lifecycle plans in Section 7. Refer to Sections 6.4, 7 and 8 for further detail on projects and rational.

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(d) a summary of the projects planned for the following four years (where known); and (e) an overview of other work being considered for the remainder of the AMP planning period; and	
13.4. The asset categories discussed in clauses 13.2 and 13.3 should include at least the categories in clause 6 above.	The fleet plans in Section 7 and include this material.
NON-NETWORK DEVELOPMENT, MAINTENANCE AND RENEWAL	
14. AMPs must provide a summary description of material non-network development, maintenance and renewal plans, including -	
14.1. A description of non-network assets;	Section 5.8 describes non-network assets.
14.2. development, maintenance and renewal policies that cover them;	Section 8.7 describes these.
14.3. a description of material capital expenditure projects (where known) planned for the next five years; and	Section 8.7 describes the proposed projects
14.4. a description of material maintenance and renewal projects (where known) planned for the next five years.	Section 8.7.1 describes the proposed projects
RISK MANAGEMENT	
15. MPs must provide details of risk policies, assessment, and mitigation, including -	Sections 3.2.3.2 and 3.4.3 provide an overview of risk management, including details on Powerco's policies and processes for assessment and mitigation.
15.1. Methods, details and conclusions of risk analysis;	Methods are discussed in sections 3.4.3 and 6. The details and conclusions of risks are provided in sections 3.4.3.2 to 3.4.3.5 and Appendix 5.
15.2. Strategies used to identify areas of the network that are vulnerable to high impact low probability events and a description of the resilience of the network and asset management systems to such events;	This is discussed in section 3.4.3.4.
15.3. A description of the policies to mitigate or manage the risks of events identified in clause 15.2; and	This is discussed in section 3.4.3.4 and 3.4.3.5. Emergency management procedures are detailed in Section 3.4.3.5.
15.4. Details of emergency response and contingency plans.	This is discussed in Section 3.4.3.5.
Asset risk management forms a component of an EDB's overall risk management plan or policy, focusing on the risks to assets and maintaining service levels. AMPs should demonstrate how the GDB identifies and assesses asset related risks and describe the main risks within the network. The focus should be on credible low-probability, high-impact risks. Risk evaluation may highlight the need for specific development projects or maintenance programmes. Where this is the case, the resulting projects or actions should be discussed, linking back to the development plan or maintenance programme.	
EVALUATION OF PERFORMANCE	
16. AMPs must provide details of performance measurement, evaluation, and improvement, including—	
16.1. A review of progress against plan, both physical and financial; (a) referring to the most recent disclosures made under clause 2.5.1 of this determination, discussing any significant differences and highlighting reasons for substantial variances; (b) commenting on the progress of development projects against that planned in the previous AMP and provide reasons for substantial variances along with any significant construction or other problems experienced; and	Section 4 discusses the performance of our objectives, and the rationale for these targets 4. Section 9 discusses our historical expenditure targets. Section 8 describes the progress of previous projects and changes that occurred where relevant. Section 7 comments on the effectiveness of our maintenance initiatives.

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(c) commenting on progress against maintenance initiatives and programmes and discuss the effectiveness of these programmes noted.	
16.2. An evaluation and comparison of actual service level performance against targeted performance	Section 4 shows the actual service levels over the previous years.
(a) in particular, comparing the actual and target service level performance for all the targets discussed in the previous AMP under clause 7 and explain any significant variances.	Section 8.1 shows the current and forecasted performance of the networks if no projects are carried out (status quo).
16.3. An evaluation and comparison of the results of the asset management maturity assessment disclosed in the Report on Asset Management Maturity set out in Schedule 13 against relevant objectives of the GDB's asset management and planning processes.	Refer to sections 2.3.9 and 3.8.3.1.
16.4. An analysis of gaps identified in clauses 16.2 and 16.3. Where significant gaps exist (not caused by one-off factors), the AMP must describe any planned initiatives to address the situation.	Sections 2.3.7 and 8.8 describe Powerco's planned initiatives to improve AMMAT scores.
CAPABILITY TO DELIVER	
17. AMPs must describe the processes used by the GDB to ensure that	
17.1. The AMP is realistic and the objectives set out in the plan can be achieved; and	Sections 3.2.2 and 3.2.1 describe how Powerco ensures the AMP is realistic and objectives can be achieved.
17.2. The organisation structure and the processes for authorisation and business capabilities will support the implementation of the AMP plans.	Section 3.1 describes the processes and organisational structure Powerco uses for implementing the AMP.

APPENDIX 11 COMPLIANCE CERTIFICATION

CERTIFICATE FOR YEAR-BEGINNING DISCLOSURES

Pursuant to clause 2.9.1 of Section 2.9

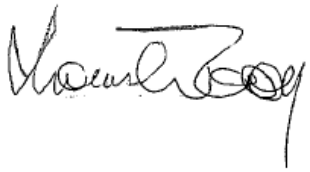
We, John Loughlin and Tom Parry being directors of Powerco Limited certify that, having made all reasonable enquiry, to the best of our knowledge:

a) the following attached information of Powerco Limited prepared for the purposes of clauses 2.6.1, 2.6.6 and 2.7.2 of the Gas Distribution Information Disclosure Determination 2012 in all material respects complies with that determination.

b) The prospective financial or non-financial information included in the attached information has been measured on a basis consistent with regulatory requirements or recognised industry standards.

c) The forecasts in Schedules 11a, 11b, 12a, 12b and 12c are based on objective and reasonable assumptions which both align with Powerco Limited's corporate vision and strategy and are documented in retained records.

Director



Director

20 September 2018

Date

20 September 2018

Date