

2018-2028 WATER SUPPLY ASSET MANAGEMENT PLAN
He Rautaki Whakahaere Rawa mō Te Wai Whakarato

PUMP STATIONS

NGĀ TAUPUNI MAPU

VOLUME THREE | PUKAPUKA TUATORU



Mountain to Sea
Te Kaunihera-ā-Rohe o Ngāmotu
NEW PLYMOUTH DISTRICT COUNCIL
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DOCUMENT CONTROL

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1. INTRODUCTION

This volume provides details of the asset lifecycle management for the **Pump Stations** asset category of the Water Supply AMP. The framework and key elements of the overall asset management plan are outlined in Table 1.

Table 1 Asset management document structure

No.	Document Name	Key Document Contents
1	Long Term Plan (LTP)	Infrastructure Strategy <ul style="list-style-type: none"> • Strategic Framework • Guiding Themes • High Level Information for Each Asset Class Council Services <ul style="list-style-type: none"> • High Level Information • Levels of Service • Financial Plan
2	Asset Management Strategy	General Asset Management Principles and Overview
3	Asset Class General Volumes	General Information and Glossary about each asset class <ul style="list-style-type: none"> • Executive Summary • Introduction • Levels of Service • Future Demand • Risk Management Plan • Financial Summary • Plan Improvement and Monitoring

4	Asset Category Lifecycle Management Volumes	Asset Life Cycle Management for each asset category within each asset class <ul style="list-style-type: none"> • Description • Condition • Remaining Lives • Valuation • Operations & Maintenance • Renewals • Acquisition and Augmentation • Disposals • Annual Work Plan • Risk Management • Financial Summary • Improvement Plan
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1. INTRODUCTION

Purpose and key issues

The purpose of our pump stations is to boost water pressure and flow to the required service levels to convey water to distribution zones where flow by gravity is not possible.

The key issues relating to water pump stations are:

- Cost of operation.
- Maintenance of building, pumps and fittings and electrical infrastructure.
- Location of pumps (particularly when sited in urban residential areas).

Levels of Service

Pump stations are required to deliver and maintain some of the customer and technical levels of service defined in section 3.1 of the Water Supply General AMP:

- Customers are satisfied with our water supply service - the total number of complaints (per 1,000 connections) received about any of the following:
 - drinking water clarity, taste, or odour;
 - drinking water pressure or flow;
 - continuity of supply; and
 - our response to any of these issues.
- The New Zealand Fire Service (NZFS) Water Supplies Code of Practice SNZ PAS 4509:2008 governs the minimum required flows and pressures for firefighting. In accordance with these standards, NPDC's targeted level of service is fire water classification FW3. However this is to be reviewed collaboratively with the Fire Service to ensure practical and suitable levels of service are provided across different areas.
- The maximum desirable working pressure for water supply is 900 kPa. This is being progressively achieved as pressure zone and demand management procedures are implemented. Some zones at higher elevations (typically on the outskirts of the city) will have pressure sustaining valves to ensure minimum pressures stay above the minimum level of service wherever possible (300 kPa for urban properties and 200 kPa for rural properties).

Future Demand

Future forecasts have identified significant issues with the capacity of treated water storage in the district. As outlined in the Section 4 of the Water Supply General AMP, the Water Master Plan addresses the options to cater for increased future demand on the water supply system. Any items from the Water Master Plan involving the augmentation of pump station assets are included in this volume.



2. LIFECYCLE MANAGEMENT PLAN

2.1 Asset Description

We have six water pump stations that boost water flow and pressure to meet the required levels of service. They are listed in Table 2.

Table 2 Pump stations location list

Location	Description
Okato Water Treatment Plant	Feed farms uphill of the treatment plant
Oakura Treatment Plant	Feeds properties uphill of the treatment plant in the Surrey Hill Road area
Cowling Road	Feeds Davies Road and Cowling Road area.
Tikorangi Reservoir	Feeds Motunui/Tikorangi zone as well as enhancing the rate of filling the Urenui reservoir
Mangorei Reservoir	Feeds upper Mangorei Rd (rural supply) area.
Veale Road Reservoir	Feeds Veale Road, Shelter Grove, Cabot Place urban supply zone.

All pumps are powered by an electrical motor driven via a connected gearbox. Each pump station has at least two pumps, configured in either working/standby mode, high/low demand mode or twin duty at times of high demand. This provides some redundancy for outages caused by failure or maintenance.

Pump station components include pumps, valves, piping, meters, cables, controls/SCADA and the associated buildings. The pump station buildings are included in the Property Asset Management Plan.

The accuracy of data presented in this AMP has been assessed and graded in accordance with Section 5 of the Asset Management Strategy. Our well maintained and updated asset inventory means the data presented in this AMP on the length, diameter, quantity and age of the assets is classed as grade B – Reliable.

2.2 Asset Condition

Asset condition grades are given in accordance with Section 5 of the Asset Management Strategy.

We have no formal asset conditions recorded for pump stations and all asset conditions are recorded in the asset inventory as 6 - Unknown. Therefore, the data accuracy for asset condition is classed as grade E – Unknown. **This is a data integrity issue and is recorded as an action in Section 5 – Improvement and Monitoring Plan.**

Despite this, our pump station assets are generally considered to be in good condition with a few known exceptions that have been addressed or will be addressed in either renewals plans or in reactive maintenance.

2.3 Asset Remaining Lives

Expected lives for pump station assets were provided by Beca as part of the plant and equipment valuation and have recently been recorded in the T1 asset inventory. The data accuracy for asset remaining lives is classed as grade B – Reliable.

The life expectancy of assets is variable as it based on construction materials and usage. Concrete structures have a life expectancy of 100 years; valves and other miscellaneous assets have a life expectancy similar to those described in Volume 4 of this AMP.

2. LIFECYCLE MANAGEMENT PLAN

2.4 Asset Valuation

As at 30 June 2016, the value of our pump station assets is as follows:

Table 3 Asset valuation

Gross Current Replacement Cost (GCRC) (\$)	Annual Depreciation (\$)	Optimised Depreciated Replacement Cost (ODRC) (\$)
623,474	21,955	179,400

A detailed valuation of each asset component was provided by Beca as part of the general plant and equipment valuation during the 2016 statutory valuation. Therefore, in conjunction with a well maintained and updated asset inventory, the data is classed as B – Reliable.

2.5 Operations and Maintenance

2.5.1 Operations

Our water treatment plant technicians are responsible for operating and maintaining pump stations, which includes a weekly general inspection.

Electrical power costs represent a significant proportion of operational expenditure. All pump stations are also monitored remotely, 24 hours per day, via our Supervisory Control and Data Acquisition (SCADA) System.

2.5.2 Maintenance

Pump stations are maintained on a regular basis. During maintenance we evaluate the performance of the pumps and identify any remedial work required.

Our in-house Electrical & Systems team maintains the electrical equipment at pump stations. Maintenance includes annual checks and calibration of flow transmitters and pressure gauges.

Vibration issues at the Tikorangi pump station require annual vibration analysis to check the pump condition and to predict when further maintenance and/or renewal may be required.

2.5.3 Critical Spares

We have not yet conducted assessment of the critical spares required for pump stations. **This is an asset data integrity issue and is recorded as an action in Section 5 – Improvement and Monitoring Plan.**

2.5.4 Opex Forecast

The general 10-year Opex forecast for water supply assets is included in the Water Supply General Volume. It includes the Opex forecast for the maintenance and operation of water treatment plant assets.

2.6 Renewal Plan

Our general approach to asset renewal is included in the Asset Management Strategy. Pump station components containing moving parts such as motors, gear boxes and pumps have finite lives in the region of 15-20 years, depending on usage. As pump stations continue to age, they will require investment in renewals to maintain current levels of reliability. Prior to confirming expenditure on renewal projects, we will undertake condition and criticality assessments and review the remaining life of the assets to ensure we achieve optimum value from the assets.

Pump stations consist of plant and equipment components. Renewals on these items is included in the general P&E planned and emergency renewal provision included in Volume 2 – Treatment Plants. Therefore, no specific renewal plan is included for pump stations.

2. LIFECYCLE MANAGEMENT PLAN

2.7 Acquisition and Augmentation Plan

Acquisition

There are no acquisitions of pump stations planned over the next 10 years.

Growth

The domestic development growth area at Upper Carrington Road will require installation of a new pump station to maintain water pressure and flow at the required levels of service. We estimate costs for this project at \$309k in 2019/20, as shown in Table 4.

Table 4 Growth expenditure forecast

Water Pump Stations Growth Expenditure Forecast (\$000)											
Activity	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28	LTP Total
WA2023 - Water Pump Station - Upper Carrington Growth Area	-	309	-	-	-	-	-	-	-	-	309
Total	-	309	-	-	-	-	-	-	-	-	309

The pump station at Tikorangi Reservoir and connecting mains may need to be upgraded in the future as the supply zone it feeds into grows. The system will be monitored and assessed to determine the optimum timing for any investment required to cater for predicted growth in the area.

The Water Master Plan includes options and cost estimates for growth projects beyond the period of the AMP, as summarised in Section 4 of the Water Supply General AMP.

2. LIFECYCLE MANAGEMENT PLAN

Levels of Service

A number of Inglewood properties are supplied from a raw water falling main at Dudley Road. Transferring these properties to a treated water supply will require a new pump station and mains, at an estimated cost of \$237k in 2020/21. This is shown in Table 5.

Table 5 Level of service expenditure forecast

Water Pump Stations Levels of Service Expenditure Forecast (\$000)											
Activity	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28	LTP Total
WA1004 - Pumped potable water supply extension to Dudley Road (Inglewood)	-	-	237	-	-	-	-	-	-	-	237
Total	-	-	237	-	-	-	-	-	-	-	237

The Water Master Plan includes options and cost estimates for level of service projects beyond the 10 year period of the AMP.

2.8 Disposal Plan

Disposal is the retirement or sale of assets when they become surplus or superseded by new or improved systems. Assets may become surplus to requirements for any of the following reasons:

- Under-utilisation
- Obsolescence
- Provision exceeds required level of service
- Replacement before end of predicted economic life
- Uneconomic to upgrade or operate
- Policy changes
- Service provided by other means (e.g. private sector involvement)
- Potential risk of ownership (financial, environmental, legal, social)

No asset disposals are planned over the 10 year AMP period.

2.9 Annual Work Plan

Detailed work plans included in Annual Plans will be based on the asset renewal forecasts included in section 2.6 and the augmentation projects identified in section 2.7.

3. RISK MANAGEMENT PLAN

3.1 Critical Assets

We have not yet conducted criticality ratings for pump station assets; therefore, there is currently no data recorded in EAM. **This is an asset data integrity issue and is recorded as an action in Section 5 – Improvement and Monitoring Plan.**

However, pump stations are considered to be critical to the continuity of water supply in the areas they feed.

Following asset criticality assessments, we will develop a focused management plan to ensure the integrity and resilience of critical assets. **This is recorded as an action in Section 5 – Improvement and Monitoring Plan.**

3.2 Risk Assessment

Details of our Risk Management Framework are included in section 6.2 of the Water Supply General AMP volume and section 7 of the Asset Management Strategy.

3.3 Infrastructure Resilience Approach

The Water Master Plan considers opportunities to improve asset resilience when planning for the construction of new assets to meet growth projections and maintain levels of service. Once we have completed asset condition and criticality assessments, we will undertake further resilience planning to identify any potential improvements.

Following on from ex-cyclone Gita which damaged one of our trunk mains crossing a pipe-bridge in February 2018 and the Havelock North Water Inquiry; the importance of our water network has been highlighted. This has caused us to consider the resilience of our water assets based on cost versus risk assessments. Section 6.3 of the General Water Supply volume gives details the items selected for investment in improving asset resilience.



4. FINANCIAL SUMMARY

The Capex forecast for pump stations is shown in Table 6.

Table 6 Expenditure forecast summary

Pump Stations Expenditure Forecast (\$000)											
Activity	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28	LTP Total
Renewals	-	-	-	-	-	-	-	-	-	-	-
Service Level	-	-	237	-	-	-	-	-	-	-	237
Growth	-	309	-	-	-	-	-	-	-	-	309
Total	-	309	237	-	-	-	-	-	-	-	546

Provision for renewals of pump station assets is included in Volume 2 – Treatment Plants.

The Opex forecast for operations and maintenance is included in the overall Opex forecast for Water Supply detailed in the LTP. It is also included in the Water Supply General Volume.

5. IMPROVEMENT AND MONITORING PLAN

Our general Asset Management Maturity Improvement Plan is included in the Asset Management Strategy.

General improvements to Water Supply assets are included in the Water Supply General Volume.

The specific areas of improvement identified for pump station assets are listed in Table 7.

Table 7 Improvements summary

No	Improvement Area	Owner	Start Date	End Date
1	Assess asset condition and record results in EAM	Asset Operations Planning Lead	Jul-18	Jun-20
2	Assess critical spares and procure any required components	Manager Three Waters	Jul-18	Jun-19
3	Assess criticality of assets and record results in EAM	Asset Operations Planning Lead	Jul-18	Jun-20
4	Produce focused management plan for those assets identified as critical	Manager Three Waters	Jul-18	Jun-20



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