

2018-2028 WASTEWATER ASSET MANAGEMENT PLAN
He Rautaki Whakahaere Rawa mō Te Wai Paranga

GENERAL VOLUME

HE PUKAPUKA MATUA



Mountain to Sea
Te Kaunihera-ā-Rohe o Ngāmotu
NEW PLYMOUTH DISTRICT COUNCIL
newplymouthnz.com

DOCUMENT CONTROL

Document Name	2018-2028 Wastewater Asset Management Plan General Volume
Prepared By	Steve Ilkovics, Asset Operations Planning Lead Cristina Gonzalez, Asset Engineer
Reviewed By	Mark Hall, Manager Three Waters
Approved By	David Langford, Infrastructure Manager

August 2018



1. Executive Summary	7	3.2 Legislative Requirements	16
1.1 Purpose of the Plan	7	3.3 Technical Levels of Service	16
1.2 Asset Description	7	3.4 Levels of Service Projects	17
1.3 Levels of Service	8	4. Future Demand	18
1.4 Future Demand	8	5. Lifecycle Management Plan	20
1.5 Lifecycle Management Plan	9	5.1 Operations and maintenance	20
1.6 Risk Management Plan	9	5.2 Renewals	22
1.7 Financial Summary	10	6. Risk Management Plan	23
1.8 Improvement and Monitoring Plan	10	6.1 Critical assets	23
2. Introduction	11	6.2 Risk Assessment	23
2.1 Background	11	6.3 Infrastructure Resilience Approach	24
2.2 Assets Included in the Plan	12	7. Financial Summary	25
2.3 Organisational Structure	13	7.1 Financial Statements and Projections	25
2.4 Document Structure	14	7.2 Funding Strategy	26
2.5 Asset Information and Data	14	7.3 Valuation Forecasts	26
3. Levels of Service	15	8. Improvement and Monitoring Plan	27
3.1 Customer Levels of Service	15		

LIST OF TABLES & FIGURES

List of Tables

Table 1 Asset summary	7
Table 2 Expenditure forecast summary	10
Table 3 Asset valuation	12
Table 4 Organisational structure	13
Table 5 Asset management document structure	14
Table 6 Customer levels of service	15
Table 7 Level of service expenditure forecast	17
Table 8 Growth expenditure forecast	19
Table 9 Opex forecast	21
Table 10 Renewals expenditure forecast	22
Table 11 Level of service resilience expenditure forecast	24
Table 12 Expenditure forecast summary	25
Table 13 Improvements summary	27

List of Figures

Figure 1 Location of assets	12
-----------------------------	----



AC	Asbestos Cement	IWWF	Instantaneous Wet Weather Flow (sewage)
ADWF	Average Dry Weather Flow (sewage)	KI	Kilo-litres
AM	Asset Management	KPI	Key Performance Indicator
AMP	Asset Management Plan	LGA	Local Government Act
AMS	Asset Management System	LIM	Land Information Memoranda
ANZCO	ANZCO Foods Limited	LOS	Level of Service
AS/NZS	Australian/New Zealand Standards	LTP	Long-Term Plan
BAC	Biologically Activated Carbon	MANN	Mannesmann Steel
BOD	Biochemical Oxygen Demand	MAV	Maximum Allowable Value
Capex	Capital Expenditure	MCC	Main Control Cabinet
CDEM Act	Civil Defence and Emergency Management Act	MfE	Ministry for Environment
CI	Cast Iron	MI	Mega-litres (1 ML = 1,000,000 litres)
City Care Ltd	Water and Wastewater reticulation maintenance contractor	MIS	Management Information System (water and wastewater)
CLDI	Concrete Ductile Iron	MoH	Ministry of Health
COD	Chemical Oxygen Demand	NAMS	National Asset Management Strategy
Communitrak	Annual Communitrak survey performed by National Research Bureau	NB	Nominal Bore
CONC	Concrete	NPDC	New Plymouth District Council
COP	Code of Practice	NPV	Net Present Value
COPP	Copper	NPWTP	New Plymouth Water Treatment Plant
CV	Corporate Vision	NPWWTP	New Plymouth Wastewater Treatment Plant
DI	Ductile Iron	NRB	National Research Bureau
DISP	Decline in Service Potential	NTU	Turbidity units
DWS	Drinking Water Standards (or the latest edition thereof)	NZWWA	New Zealand Water and Wastes Association
EColi	Bacterium Escherichia coli that produces a toxin and can cause severe illness	ODM	Optimised Decision Making
FAC	Free Available Chlorine	ODRC	Optimised Depreciated Replacement Cost
GCRC	Gross Current Replacement Cost	OTH	Other
GL	General Ledger	Opex	Operational Expenditure
HUE	Household Unit Equivalent	PIM	Project Information Memorandum
I&E	Instrumentation and Electrical	PHRMP	Public Health Risk Management Plan
Infra/Enterprise	NPDC customer support services information system	POLY-H	Polyethylene high density
IRP	Incident Response Plan	POLY-L	Polyethylene low density
		POLY-M	Polyethylene medium density

GLOSSARY

PRV	Pressure Reducing Valve
PWC	Price Waterhouse Coopers
PWWF	Peak Wet Weather Flow (sewage)
SCADA	Supervisory Control and Data Acquisition system
SDC	Stratford District Council
ST	Steel
ST-CL	Cast Iron Steel Tube
ST-GTS	Galvanised Steel Tube
ST-SWS	Stain/Steel Spiral Welded Seam
STDC	South Taranaki District Council
SWAMP	Stormwater Asset Management Plan
TDF	Thermal Drying Facility
TDHB	Taranaki District Health Board
TLA's	Territorial Local Authorities
TNZ	Transit New Zealand
TRC	Taranaki Regional Council
UAC	Uniform Annual Charge
UFW	Unaccounted-For-Water (also known as Non-Revenue Water)
UNKN	Unknown
UPVC	Un-plasticised PVC
UV	Ultra Violet disinfection treatment
VFR	Visiting friends and relations
WAMP	Water Asset Management Plan
WAP	Water Augmentation Project
WBM	Water by Meter
WINZ	Water Industry New Zealand
WOMB	Waitara Outfall Management Board
WTP	Water Treatment Plant
WWAMP	Wastewater Asset Management Plan
WWTP	Wastewater Treatment Plant



1. EXECUTIVE SUMMARY

This general Wastewater Asset Management Plan outlines how we will contribute to the community outcomes and priorities identified in the 2018-2028 Long Term Plan (LTP).

Amongst other things, our wastewater activities include operating, maintaining and developing wastewater collection, treatment and distribution facilities such as pump stations and network reticulation. Servicing more than 25,200 properties, the system handles an average of 25m litres of wastewater each day via 34 pump stations, 631km of wastewater mains/laterals and the New Plymouth Wastewater Treatment Plant. Our key service objectives for these activities are:

- To provide a safe, healthy and efficient service at an affordable cost.
- To minimise the impact of high density human populations on the environment.
- To ensure infrastructure can meet current and future demand within defined levels of service.
- To continuously improve asset management practices.
- To protect public health and the environment and we provide a high level of reliability in emergency situations.

Managing and maintaining the wastewater network is resource intensive. As at 30 June 2016, the certified fair value of our wastewater assets was \$212m, excluding land and buildings. The Gross Current Replacement Cost (GCRC) of these assets was assessed at \$386m, excluding land and buildings.

To sustain current levels of service, wastewater assets will require Opex of \$124.6m over the next 10 years. A further \$68.6m of Capex is planned for the next 10 years to provide for asset renewals, to meet forecast growth in demand and to deliver some improvements to levels of service.

Specific details about each of the asset categories in the wastewater network can be found in the Wastewater AMP volumes 1-3.

Note: All financial forecasts are shown in inflation adjusted dollar values.

1.1 Purpose of the Plan

The AMP contains the information required for effective decision making about our delivery of wastewater services in the New Plymouth District. It underpins the Long Term Plan and the Annual Plan before those documents go to the community for consultation.

The main purpose of the plan is:

- To provide a safe and efficient system to collect wastewater discharges from residential, commercial and industrial properties within the New Plymouth District;
- To maintain public health;
- To protect receiving environments; and
- To meet and exceed our customer service standards.

The AMP is not an authorisation to commit budgets to the programmes it describes. Such authorisation is made through our LTP and AP processes.

1.2 Asset Description

Wastewater assets contribute to wastewater services in New Plymouth, Oakura, Inglewood, Bell Block and Waitara. The reticulation system and pump stations collect wastewater and feed it to the central New Plymouth Waste Water Treatment Plant. Here it is treated and discharged via the outfall to the sea. The Thermal Drying Facility (TDF) processes treated sludge to produce Bioboost fertiliser. More details about each of these asset categories can be found in the wastewater AMP volumes. Table 1 contains a summary of the waste water assets.

Table 1 Asset summary

Asset Category	Description	Quantity	AMP Volume
Waste Water Treatment Plants	Outfalls	2 No	Volume 1
	WWT Plants	1 No	
Pump Stations		34 No	Volume 2
Reticulation Network	Valves	199 No	Volume 3
	Manholes	7214 No	
	Reticulation	454 km	
	Trunk Main (Trunk)	38 km	
	Laterals (Service)	245 km	

1. EXECUTIVE SUMMARY

1.3 Levels of Service

Our overall Wastewater service objective is:

‘We will deliver wastewater services that protect and promote public health, meet legislative standards, while endeavouring to meet community expectations, in a safe, efficient and affordable manner, today and for the future.’

This links to our community outcomes in the following ways:

- Treating wastewater contributes to Caring for our place - Manaaki whenua, manaaki tangata, haere whakamua. Treating potentially hazardous wastewater makes it safe for both people and the natural environment. It reduces significant environmental health issues from sewage.
- The collection and treatment of wastewater in a safe and efficient manner also contributes to Putting people first - Aroha ki te Tangata. It protects the health of our people, supporting a liveable environment for our community.
- Wastewater treatment is also critical to supporting a prosperous community - Awhi mai, awhi atu, tātou katoa through the provision of core infrastructure for industry and to accommodate growth in population and development.

To support our service objective and the community outcomes, we have established levels of service that identify key measures and targets for our wastewater service. These are summarised below. Further details can be found in Section 3.

- We provide an effective wastewater treatment and disposal system.
- We comply with all resource consents for wastewater discharge from our system.
- We respond to customer and maintenance requests in a timely manner.
- Customers are satisfied with the wastewater treatment and disposal service.

1.4 Future Demand

The volume of dry weather wastewater discharges is directly related to the consumption of potable water in the district, with an estimated 70% to 80% of water consumed in the district returning to the wastewater system. Our current water consumption is around 250-300 litres per person, per day. We intend to reduce this consumption rate by implementing demand management initiatives over the next 20 years.

The rate of inflow and infiltration (I/I) of rainwater into the wastewater network is a key contributor to wastewater treatment plant influent flows. We do have projects underway aimed at reducing wastewater inflow and infiltration issues in the various “leaky” wastewater catchments to a manageable level within the next 20 years.

Although we aim to resolve excessive infiltration issues, as the system deteriorates with age infiltration will continue to contribute to wastewater volumes. Furthermore, the rate of inflow/infiltration will be aggravated by climate change, which is expected to produce more intensive and frequent rainfall.

During the 2018-28 LTP period, we plan to produce a Wastewater Master Plan to ensure that population growth and climate change are catered for in a coordinated way. Network modelling will underpin and inform the key components of the Wastewater Master Plan. Network models are essential tools for optimising capital works programmes, particularly for service level and growth. They are considered assets in their own right and require renewal on a regular basis. Many of our existing network modelling tools require updating.

1. EXECUTIVE SUMMARY

1.5 Lifecycle Management Plan

The lifecycle of an asset consists of:

- Creation (plan, design, procure, construct);
- Operation and maintenance;
- Renewal or rehabilitation; and
- Disposal.

General descriptions of the asset management practices, processes and system we use throughout the life cycle of our assets are included in Section 4 of our Asset Management Strategy.

Particular details of how we manage the lifecycle of each asset category can be found in the asset category volumes 1-3, including how we optimise costs over a lifecycle. For example, it may be more cost efficient for us to choose a more expensive valve that costs less to maintain over the course of its life, than to choose a cheaper valve that will require a lot of maintenance.

1.6 Risk Management Plan

Our Corporate Risk Management Framework is used to identify, record, manage and mitigate key risks to the wastewater network. During project development and system performance analysis, we also investigate and assess opportunities to enhance asset resilience where appropriate.

All reticulation assets have been assigned criticality ratings which are then used to prioritise maintenance and renewal planning. We are also working to complete a full criticality assessment for the wastewater plant and equipment assets.

Further details about risk management are included in Section 6 and in the asset category volumes 1-3.



1. EXECUTIVE SUMMARY

1.7 Financial Summary

Table 2 summarises the total expenditure forecast for wastewater assets, as detailed in the individual asset category volumes.

Table 2 Expenditure forecast summary

Wastewater 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
Personnel Costs	157	186	225	254	259	348	355	363	370	378	2,896
General Operating Expenditure	2,381	2,494	2,534	2,605	2,596	2,659	2,677	2,754	2,834	2,916	26,449
Direct Cost of Activities	2,730	2,806	2,825	2,844	2,749	2,925	3,055	3,070	3,141	3,219	29,364
Shared Services (Overhead)	6,001	6,146	6,232	6,690	7,013	6,907	6,818	6,734	6,684	6,680	65,907
Opex Total	11,269	11,632	11,816	12,393	12,617	12,839	12,905	12,921	13,029	13,193	124,616
Renewals	4,182	7,508	13,340	4,214	2,726	2,713	2,786	2,853	2,923	3,001	46,245
Service Level	926	1,031	947	1,853	906	843	863	884	905	928	10,086
Growth	1,564	1,159	79	8,680	357	84	87	88	90	93	12,281
Capex Total	6,672	9,698	14,366	14,747	3,989	3,640	3,736	3,825	3,918	4,022	68,612
Total	17,941	21,329	26,182	27,139	16,606	16,479	16,642	16,746	16,947	17,216	193,227

1.8 Improvement and Monitoring Plan

Details about our general asset management maturity improvement programme can be found in our Asset Management Strategy. General identified improvements can be found in Section 8 of this volume. Specific identified improvements are included in the asset category volumes 1-3.

2.1 Background

As defined in the Council's Significance and Engagement Policy, wastewater management is a significant activity because of its complexity, its asset value and the potential risks to the community. Collecting, treating and disposing of wastewater is essential to:

- Protect public health and minimise the impact of large concentrated populations and their industrial processes on the environment.
- Ensure that human and industrial waste does not threaten the sustainability of our current environment, development and business practises.
- Protect river and ocean environments from pollution.

In order to deliver this essential service in perpetuity, we maintain and replace our assets as required.

Purpose of Plan

This plan has been developed in accordance with the planning requirements of the LGA 2002. It covers the forecast activities and expenditure for a thirty year planning period, with an emphasis on the 10 year period from 1 July 2018 to 30 June 2028. The main purpose of the plan is detailed in Section 1.1. In addition, the plan's purpose is to:

- Demonstrate that our asset management strategies support the core social, economic, environmental and cultural outcomes, identified through community consultation.
- Demonstrate responsible stewardship of the wastewater assets.
- Provide the basis for compliance with the Local Government Act by tracking changes in service potential and determining optimal long-term financial strategies for water assets.
- Demonstrate that wastewater management demands are managed in a cost effective and sustainable manner.
- Demonstrate that population growth is provided for in a sustainable and cost effective manner.

- Demonstrate that financial forecasts and projections are sound and well substantiated.
- Provide a basis for customer consultation over price/quality trade-offs relating to service level options.
- Manage the environmental, social and financial risks associated with wastewater assets.
- Achieve savings by optimising life cycle activities.
- Assess the demand and key performance indicators for wastewater assets.
- Ensure sustainability in the long term of New Plymouth District Council wastewater services.
- Identify and utilise opportunities for improvement.

Relationships with Other Documents

The relationships between AMPs and other Council-wide planning documents are detailed in our Asset Management Strategy. Other documents specific to wastewater planning are:

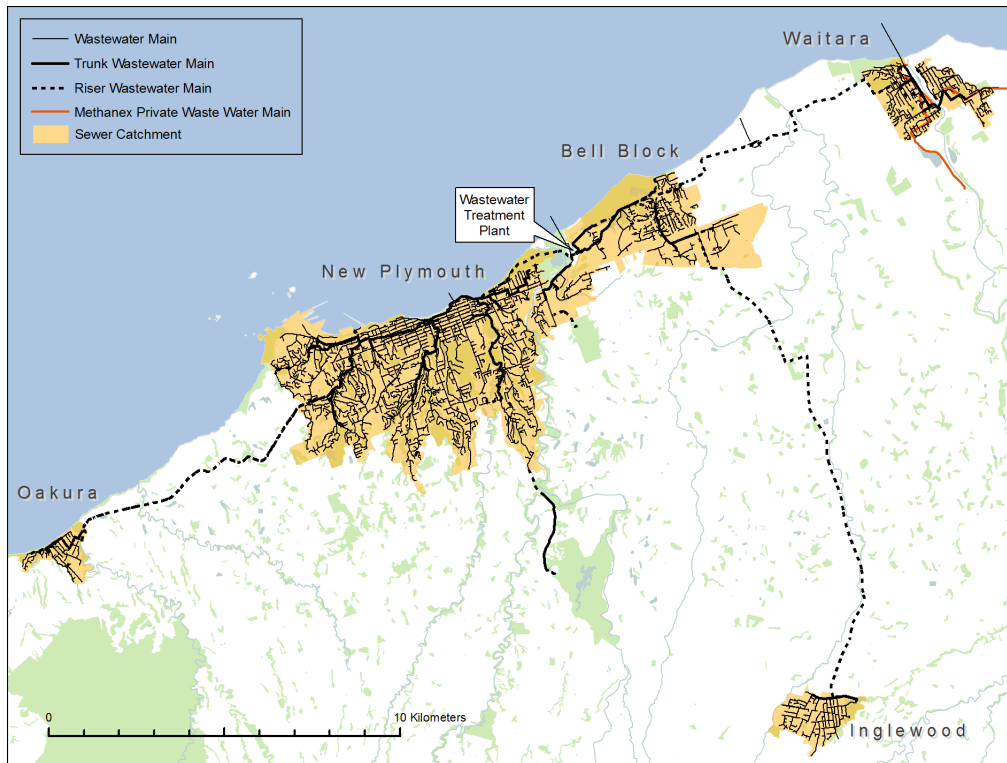
Wastewater Services Management System and Contracts: The service levels, strategies, information requirements described in the AMP are incorporated in the contract specifications, Key Performance Indicators (KPIs) and reporting requirements.

NPDC Bylaws: The Water, Wastewater and Stormwater services bylaw (2008, Part 9) sets out the terms and conditions for the provision of water, wastewater and storm water services to our customers and the residents of New Plymouth District.

2.2 Assets Included in the Plan

The location of the assets included in the wastewater AMP are depicted generally in Figure 1.

Figure 1 Location of assets



Asset Valuation

The value of our wastewater assets (excluding land and buildings) is summarised in Table 3.

Table 3 Asset valuation

Asset Category	Gross Current Replacement Cost (\$)	Annual Depreciation (\$)	Optimised Depreciated Replacement Cost (\$)
Waste Water Treatment Plant	109,424,268	2,185,055	62,160,400
Pump Stations	19,819,498	367,189	11,863,800
Reticulation System			
Valves	337,876	6,758	277,077
Manholes	25,362,503	253,628	14,072,435
Laterals	36,562,739	321,832	22,056,227
Network	194,211,912	2,055,884	101,409,106
Total	385,718,796	5,190,345	211,839,045

Assets are valued at optimised depreciated replacement cost (ODRC). To calculate the ODRC we first establish the gross current replacement cost (GCRC) of an asset by applying unit rates to quantifiable asset attributes (length, width, depth, etc.) We then deduct an estimate of the asset's accumulated depreciation from its GCRC. Accumulated depreciation is calculated on a straight line basis using estimates of useful lives and remaining useful lives.

2.3 Organisational Structure

A range of our staff are involved in preparing and delivering the AMP and providing support services for asset management. How these responsibilities are allocated, managed and delivered are shown in the hierarchical diagram in Table 4.

Table 4 Organisational structure

	Elected Members (Council)		
	Approval of key resolutions, policy, LTP, AP and AMPs to ensure Council's responsibilities to the community are being met in an effective and efficient way.		
Tier 1	Chief Executive		
	Overall management of the organisation's activities to ensure Council objectives are met.		
Tier 2	Chief Operating Officer Manages delivery the services and plans defined in the asset management plans.	Group Strategy Manager Manages production of our LTP, 30-year Blueprint and District Plan.	Chief Financial Officer Manages our information technology services, legal services, records management, property assets, payroll, accounts, rates, procurement and risk management.
Tier 3	Infrastructure Manager Manages day-to-day operations, maintenance, renewal and augmentation of the wastewater network in accordance with the LTP, AP and AMP. Overall management of resources to achieve plans including balance of internal and contract resources. Providing advice and guidance on tactical infrastructure asset management to the COO and CE.	Infrastructure Planning Lead Preparation of strategic asset management plans, asset management objectives, levels of service and the Infrastructure Strategy.	Information Services Manager Support and solutions development for asset management software and systems.
Tier 4	Asset Operations Planning Lead Preparation of the tactical aspects of the AMPs, maintaining the asset inventory and asset records, developing annual work programmes, conducting asset condition assessments and asset valuations.		Business Services Manager Preparation and monitoring of financial budgets and targets related to asset management planning.
	Manager Three Waters Delivery of day-to-day operations, maintenance and minor renewals of the wastewater network. Management of internal and contract resources.		
	Manager Infrastructure Projects Delivery of major projects and technical investigations for the renewal and augmentation of the wastewater network.		

2.4 Document Structure

A high level description of how this plan links to our vision, mission, goals and objectives can be found in our overarching LTP, with more specific detail in the Infrastructure Strategy and Council Services sections.

Asset management planning content is split between our Asset Management Strategy, a General Asset Management Plan for each asset class, and a volume for each specific asset category within that class. This Wastewater AMP includes a General volume and three specific asset category volumes:

- Volume 1 – Wastewater Treatment Plant
- Volume 2 – Pump Stations
- Volume 3 – Reticulation Network

The framework and key elements of the overall asset management plan are outlined in Table 5.

Table 5 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

2.5 Asset Information and Data

We store and manage information and data about wastewater assets in various systems, including the following:

- Enterprise Asset Management (EAM) system (Technology 1) for document management, financial management, customer information & requests, asset inventory, asset history, work order management and maintenance scheduling;
- ARCGIS for spatial records with general GIS viewer MILES;
- Drawing Management System in SharePoint on intranet and drawing files stored on server;
- Water Outlook for gathering and managing SCADA and process data; and
- Infoworks for pipe network modelling.

3. LEVELS OF SERVICE

Our levels of service are driven by our overall objectives in our LTP, customer expectations, and legislative and technical requirements. The Capex and Opex investment programmes included in this plan are based on effective asset management practices that deliver on these objectives, expectations and requirements.

3.1 Customer Levels of Service

The customer levels of service included in the LTP together with target levels and a snapshot of past performance are show in Table 6.

Table 6 Customer levels of service

What you can expect	How we measure performance	Actual 2016/17	2018/19	2019/20	2020/12	By 2027/28
We provide an effective wastewater treatment and disposal system.	The number of dry weather sewerage overflows per 1,000 connections to the wastewater system.	0.6	1 or less	1 or less	1 or less	1 or less
We comply with all resource consents for wastewater discharge from our system.	The number of abatement notices, infringement notices enforcement orders, and convictions received.	0	0	0	0	0
We respond to customer and maintenance requests in a timely manner.	The median response time to sewerage overflow callouts (from the time the Council receives notification to the time that service personnel reach the site).	0.49 hours	1 hour or less	1 hour or less	1 hour or less	1 hour or less
	The median resolution time for sewerage overflow callouts (from the time the Council receives notification to the time that service personnel confirm resolution of the fault or interruption).	2 hours	4 hours or less for sewers	4 hours or less for sewers	4 hours or less for sewers	4 hours or less for sewers
			< 250 dia	< 250 dia	< 250 dia	< 250 dia
		No call outs	8 hours or less for sewers	8 hours or less for sewers	8 hours or less for sewers	8 hours or less for sewers
			>/= 250 dia	>/= 250 dia	>/= 250 dia	>/= 250 dia
Customers are satisfied with the wastewater treatment and disposal service.	The total number of complaints received about sewerage odour; system faults or blockages, or the Council's response to issues with the sewerage system (per 1,000 connected properties).	6.28	13 or less	13 or less	13 or less	13 or less

3. LEVELS OF SERVICE

3.2 Legislative Requirements

In addition to the Levels of Service detailed above there are a number of statutory obligations relating to wastewater management. For example, compliance with wastewater effluent discharge consents is a level of service parameter driven by legislation. Wastewater management is also subject to the following:

- Local Government Act 2002 and 2010 Amendments
- Health and Safety at Work Act 2015
- Health and Safety At Work (Hazardous Substances) Regulations 2017
- Health Act 2007
- Economic Government as Commerce Act
- Waste water Utility Legislation
- Environmental Resource Management Act
- Climate Change response
- Building Act 2004
- Civil Defence & Emergency Management Act
- Public Works Act 1981
- Climate Change Response Act 2002
- Regional Fresh Water Plan (2001)
- Guidelines for Earthworks (2006)
- NZ Standards – Technical Specifications for water renewals and construction

Bylaw: The wastewater bylaw (2008, part 14) addresses the issues associated with term and conditions for the supply of wastewater services and the protection of our customers and the residents of the New Plymouth District. Details of the various wastewater bylaws can found in the Council's consolidated Bylaws (2008).

3.3 Technical Levels of Service

Technical levels of service for our wastewater assets are to be developed when the Wastewater Master Plan is developed.



3. LEVELS OF SERVICE

3.4 Levels of Service Projects

We have identified a number of projects to improve and maintain levels of service. Details are included in the asset category volumes 1-3. Table 7 summarises how the total of \$6.8m will be spent across the different asset categories over the 10 period of the AMP.

Table 7 Level of service expenditure forecast

Waste Level of Service 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
Waste Water Treatment Plants	101	206	-	-	-	-	-	-	-	-	307
Pump Stations	252	643	631	1,504	549	562	575	589	603	618	6,526
Reticulation	-	-	-	-	-	-	-	-	-	-	-
Total Levels of Service	353	849	631	1,504	549	562	575	589	603	618	6,833

Average wastewater flows to the New Plymouth wastewater treatment plant (NPWWT) have increased by approximately 12.3% over the past 17 years, from around 23,000 m³/day in 2000 to around 25,829 m³/day in 2017. Peak flows have also increased over this period, from around 36,928 m³/day in 2000 to around 38,774 m³/day in 2017 – a 5% increase.

An estimated 70% to 80% of potable water is returned to the wastewater system, directly impacting volumes of dry weather wastewater discharges. We know that the vast majority of the flow to the NPWWTP is from domestic sources (around 92%) with the remaining being contributed by trade waste customers.

The average Biological Oxygen Demand (BOD) to the NPWWTP has gradually increased, from around 3,500kg/day in 2000 to approximately 5,900 kg/day in 2015. Peak BOD to the NPWWTP has also gradually increased, from around 5,000 kg/day in 2000 to about 16,600 kg/day in 2015.

Around 70% of the BOD load to the NPWWTP is from domestic sources with the greater portion of the remaining load stemming from the largest trade waste customer (nearly 30%). The BOD load from other trade waste customers is very minimal (less than 5%). This means that while our largest trade waste customer contributes only about 9% of the total flow to the NPWWTP, the BOD load arising from this customer is significantly high (30% of the total BOD to the NPWWTP). In recent years, the NPDC Trade Waste Bylaw and recent trade waste consent conditions have set limits on the amount of instantaneous and daily mass BOD that can be discharged. As a result, our largest trade customer constructed a pre-treatment dissolved air flotation (DAF) plant, which was commissioned in Feb 2015.

The average Chemical Oxygen Demand (COD) to the NPWWTP has moderately increased from around 6,850 kg/day in 2000 to about 12,600 kg/day in 2015. The peak COD has gradually increased from approximately 10,230 kg/day in 2000 to about 16,600 kg/day in 2015. These increases, coupled with the residential growth predictions for New Plymouth, were the predominant drivers of the recently completed aeration upgrade to the NPWWTP.

The rate of inflow and infiltration (I/I) of rainwater into the wastewater network is a key contributor to wastewater treatment plant influent flows. There are projects underway aimed at reducing wastewater inflow and infiltration issues in the worst wastewater catchments to a manageable level within the next 20 years. Although we expect to largely resolve issues with excessive infiltration, as the system ages infiltration will continue to contribute to wastewater volumes. Furthermore the rate of inflow/infiltration will be aggravated by climate change, which is expected to produce more intensive and frequent rainfall.

Wastewater Flow Projections

For the purpose of estimating future wastewater flows it is assumed that:

- The average flow trends for the domestic flows NPWWTP will be consistent.
- The average flow trend for the largest trade waste customer will be consistent.
- We will calculate peak daily flows by applying a peaking factor of 1.6 to the municipal flows. We will not apply a peaking factor to industrial flows, which we assume will be unaffected by storm flows.
- Volumes of trade waste will grow at the same rate as domestic flows, **except** for our main trade waste customer, which will be considered separately.
- The impact of reduced water consumption on future wastewater volumes will be offset by the inflow/infiltration allowance.
- Residential Area Q will ultimately generate an additional average dry weather flow of 1,477 m³/day, with a peak wet weather flow allowance of 7,387 m³/day.
- Industrial Area N will generate an additional average dry weather flow of 588 m³/day, with a peak wet weather flow allowance of 2,938 m³/day.
- Water treatment plant sludge may not be directed to NPWWTP.

Wastewater Biological Load Projections

For the purpose of estimating future wastewater biological load it is assumed that:

- Trends in the average BOD for domestic flows to the NPWWTP will remain the same.
- Trade waste BOD forecasts will assume that the daily mass BOD limit is enforced.
- The total peak BOD load to the NPWWTP will increase at an average to peak flow ratio similar to the trend that has occurred in the last seventeen years.
- The BOD load from our main trade waste contributors will be considered separately. The BOD load of all other trade waste will grow at the same rate as domestic contributors.

We recently developed a strategic Water Master Plan to manage the expected growth of the district in relation to water supply. During the 2018-28 LTP period, we plan to develop a Wastewater Master Plan to ensure we cater for forecast population growth and climate change in a coordinated way. **This is system wide asset management issue and is included as Action 1 in Section 8 – Improvement and Monitoring Plan.**

4. FUTURE DEMAND

The Wastewater Master Plan will provide a number of benefits, including:

- Clearly defined technical standards for wastewater system performance;
- Strategic approach to growth and development so that up-stream development is planned for; and
- More consistent and reliable delivery of our defined levels of service.

It is essential we build and introduce up-to-date, validated system models across the wastewater system to optimise works and projects associated with renewals, levels of service and growth. **This is system wide asset management issue and is included as improvement action 2 in Section 8 – Improvement and Monitoring Plan.**

We have included provision for building network models, producing a Network Model Management Plan and for future maintenance and upkeep of models in Volume 3 – Reticulation Network.

Growth projects planned for delivery during the 10 year period of the AMP total \$12.3m and are summarised in Table 8. Details can be found in the corresponding asset category volumes 1-3.

Table 8 Growth expenditure forecast

Waste Water Growth 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
Waste Water Treatment Plants	-	772	-	-	-	-	-	-	-	-	772
Pump Stations	-	103	-	-	-	-	-	-	-	-	103
Reticulation	1,564	284	79	8,680	357	84	87	88	90	93	11,406
Total Growth	1,564	1,159	79	8,680	357	84	87	88	90	93	12,281

The lifecycle of an asset has four stages:

- Creation (plan, design, procure, construct);
- Operation and maintenance;
- Renewal or rehabilitation; and
- Disposal.

A general overview of how we manage these stages is included in our Asset Management Strategy. Detailed lifecycle management is covered in each of the asset category volumes 1-3.

5.1 Operations and maintenance

Our general approach to asset operations and maintenance can be found in Section 4.2 of our Asset Management Strategy. Specific operations and maintenance activities are detailed in each of the asset category volumes 1-3. Identified improvement areas that apply to all asset categories are outlined in the general volume. Improvement areas related to a particular asset category are included in the corresponding asset category volume.

We do not currently have a Maintenance Management Plan detailing how we identify, record, measure, analyse and optimise/improve maintenance activity and performance. This has resulted in high levels of reactive maintenance and its associated higher levels of risk and cost. **This is an asset management improvement issue and as recorded Action 3 in Section 8 – Improvement and Monitoring Plan.**

There are large discrepancies between the asset inventory of our plant and equipment (P &E) assets and the physical assets that exist on site. This has resulted in undervaluation of P&E assets and in unrecorded assets having no defined scheduled maintenance. **This is an asset management improvement issue and as recorded Action 4 in Section 8 – Improvement and Monitoring Plan.**

Many of our mechanical plant and equipment assets do not have any scheduled maintenance activities assigned to them. This has resulted in high levels of reactive maintenance and the associated higher levels of risk and cost. It has also resulted in poor reliability. **This is an asset management improvement issue and as recorded Action 5 in Section 8 – Improvement and Monitoring Plan.**

We record and schedule most maintenance tasks using T1. However, Instrumentation and Electrical maintenance is not scheduled in T1, which makes it difficult to monitor and measure performance. **This is an asset data integrity issue and is recorded as Action 6 in Section 8 – Improvement and Monitoring Plan.**

A significant number of our P&E assets are not tagged with P&ID reference numbers. This is not consistent with good engineering practice and makes it difficult to identify equipment on-site. **This is an asset management improvement issue and as recorded Action 7 in Section 8 – Improvement and Monitoring Plan.**

Many of our Piping and Instrumentation Drawings (P&IDs) and layout drawings for P&E are inaccurate, incomplete, or out of date. This causes delays and additional costs during project planning, and creates potential safety issues when operating equipment. **This is an asset management improvement issue and as recorded Action 8 in Section 8 – Improvement and Monitoring Plan.**

5. LIFECYCLE MANAGEMENT PLAN

Table 9 shows the overall 10 year Opex forecast for the activities included in the wastewater asset category volumes 1-3:

Table 9 Opex forecast

Waste Water Opex 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
Personnel Costs	157	186	225	254	259	348	355	363	370	378	2,896
General Operating Expenditure	2,381	2,494	2,534	2,605	2,596	2,659	2,677	2,754	2,834	2,916	26,449
Direct Cost of Activities	2,730	2,806	2,825	2,844	2,749	2,925	3,055	3,070	3,141	3,219	29,364
Shared Services (Overhead)	6,001	6,146	6,232	6,690	7,013	6,907	6,818	6,734	6,684	6,680	65,907
Total Opex	11,270	11,631	11,816	12,392	12,617	12,839	12,906	12,921	13,029	13,194	124,615

Personnel costs include salaries and wages not included in General Operating Expenditure and other personnel expenses including training and recruitment. General operating expenditure includes occupancy and utility costs, property maintenance and legal and professional fees. Direct costs of activities includes contractor’s costs, materials and services. Shared Services (Overhead) includes internal charges for support services e.g. Executive Leadership Team, HR, labour costing expenses and internal goods and services charges.

5. LIFECYCLE MANAGEMENT PLAN

5.2 Renewals

Our general approach to asset renewal can be found in Section 4.3 of our Asset Management Strategy. Specific renewal activities and programmes are included in each of the asset category volumes 1-3. The overall Capex forecast for wastewater renewals is \$46.2m over the next ten years, as summarised in Table 10.

Table 10 Renewals expenditure forecast

Waste Water Renewals 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
Waste Water Treatment Plants	2,634	5,916	11,614	839	858	876	898	920	942	967	26,464
Pump Stations	40	41	42	43	44	45	46	47	48	50	446
Reticulation	1,508	1,551	1,684	3,332	1,824	1,792	1,842	1,886	1,933	1,984	19,336
Total Renewals	4,182	7,508	13,340	4,214	2,726	2,713	2,786	2,853	2,923	3,001	46,245

6. RISK MANAGEMENT

6.1 Critical assets

We assess the criticality scores for wastewater reticulation mains using the process and scoring system detailed in ECM#988741 - Water, Wastewater and Stormwater Mains Criticality and Renewals Prioritisation Process. These scores are converted into criticality ratings and recorded in the T1 asset inventory to assist us with asset maintenance and renewal planning.

We recently commenced a programme to assess and record criticality ratings for plant and equipment assets in the T1 asset inventory. This process is only partially complete and is recorded as an improvement action in the corresponding asset category volumes.

6.2 Risk Assessment

Our risk assessments are conducted, recorded, managed, escalated and monitored in accordance with ECM#1479536 - Corporate Risk Management Framework: Policy & Process. A summary of how the policy and process operate and a list of the current key risks relevant to our assets is included in Section 7 of the Asset Management Strategy. The list includes risks that are applicable across all asset categories and those particular to Wastewater.



6.3 Infrastructure Resilience Approach

Following on from ex-cyclone Gita which damaged one of our water supply trunk mains crossing a pipe-bridge in February 2018 and the Havelock North Water Inquiry; the importance of our water and waste water networks has been highlighted. This has caused us to consider the resilience of our waste water assets based on cost versus risk assessments. As a result we plan to invest more on the general resilience of our waste water system to enhance security and integrity and increase performance against our levels of service. The items we have identified that we will invest in over the period of the AMP include the following.

- More inspections and preventative maintenance of our critical assets
- More back-up spare parts for our critical equipment such as spare pipes, valves and pumps.
- Enhancing scenario based planning and mitigation for weather events.
- Investigation of options to improve the resilience of our waste water treatment plant.
- Upgrading our critical pipe bridges.
- Upgrading our pump stations to include back up power supplies, warning alarm systems and increased emergency storage.

The planned capex investment for these items is shown in Table 11.

Table 11 Level of service resilience expenditure forecast

General Level 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
WW2028 Wastewater Resilience	573	182	316	349	357	281	288	295	302	310	3,253
Total	573	182	316	349	357	281	288	295	302	310	3,253

These resilience improvement plans will also result in an increase in opex investment to deliver and sustain improvements. The additional opex required is included in the overall opex forecast included in section 5.1.

We will explore and evaluate opportunities to enhance the resilience of our Wastewater network when we produce the Wastewater Master Plan.

7. FINANCIAL SUMMARY

7.1 Financial Statements and Projections

The 10-year expenditure forecast for wastewater assets is shown in Table 12. Forecasts for each of the asset categories are included in the individual volumes.

Table 12 Expenditure forecast summary

Waste Water 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
Personnel Costs	157	186	225	254	259	348	355	363	370	378	2,896
General Operating Expenditure	2,381	2,494	2,534	2,605	2,596	2,659	2,677	2,754	2,834	2,916	26,449
Direct Cost of Activities	2,730	2,806	2,825	2,844	2,749	2,925	3,055	3,070	3,141	3,219	29,364
Shared Services (Overhead)	6,001	6,146	6,232	6,690	7,013	6,907	6,818	6,734	6,684	6,680	65,907
Opex Total	11,269	11,632	11,816	12,393	12,617	12,839	12,905	12,921	13,029	13,193	124,616
Renewals	4,182	7,508	13,340	4,214	2,726	2,713	2,786	2,853	2,923	3,001	46,245
Service Level	926	1,031	947	1,853	906	843	863	884	905	928	10,086
Growth	1,564	1,159	79	8,680	357	84	87	88	90	93	12,281
Capex Total	6,672	9,698	14,366	14,747	3,989	3,640	3,736	3,825	3,918	4,022	68,612
Total	17,941	21,329	26,182	27,139	16,606	16,479	16,642	16,746	16,947	17,216	193,227

7. FINANCIAL SUMMARY

7.2 Funding Strategy

This service is funded through a uniform annual charge (UAC) paid by ratepayers connected to the wastewater system. We also charge industrial and commercial users for trade waste discharges. Capital improvements are funded by loans, while the renewal and replacement of wastewater assets is funded from renewal reserves. The replacement value of the wastewater assets is \$399m (including land and buildings).

7.3 Valuation Forecasts

The last 3-yearly statutory valuation of fixed assets was conducted in 2016. Details can be found in the Infrastructure Fixed Asset Final 2016 Certified Valuation Report (ECM#7164171). This includes the valuation methodology and a summary of the gross current replacement cost (GCRC), Optimised Depreciated Replacement Cost (ODRC or fair value) and annual depreciation for all asset categories.

The unit rates for wastewater reticulation mains were critically reviewed (including an external peer review) during the 2016 valuation. This resulted in a GCRC increase of approximately \$70m, which compared favourably with equivalent sized district councils around New Zealand. No future significant variation in valuation forecasts is anticipated.

We are currently surveying our three waters plant and equipment assets and have found that a significant proportion of assets are not recorded on the asset register. This will have the effect of increasing the value of our assets as the survey progresses through to completion.



8. IMPROVEMENT AND MONITORING PLAN

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

General improvements to wastewater assets are shown in Table 13. Specific areas of improvement identified for different asset categories are included in the individual volumes.

Table 13 Improvements summary

No	Improvement Area	Owner	Start Date	End Date
1	Produce wastewater master plan	Asset Operations Planning Lead	Jul 2018	Jun 2020
2	Produce fully validated wastewater network models to facilitate improved planning and operations	Asset Operations Planning Lead	Jul 2018	Jun 2020
3	Produce and implement Maintenance Management Plan	Manager Three Waters	Jul 2018	Jun 2020
4	Survey all plant and equipment and match inventory to on-site status	Asset Operations Planning Lead	Mar 2018	Jun 2020
5	Produce full set of scheduled maintenance and check sheets for mechanical plant and equipment and record/implement schedule in T1.	Manager Three Waters	Jul 2018	Jun 2020
6	Record and manage I&E scheduled maintenance tasks in T1.	Manager Three Waters	Jul 2018	Jun 2020
7	Check and install tagging to all plant and equipment	Manager Three Waters	Jul 2018	Jun 2020
8	Following survey in item 4, update P&IDs and layout drawings	Asset Operations Planning Lead	Mar 2018	Jun 2020





2018-2028 WASTEWATER ASSET MANAGEMENT PLAN

He Rautaki Whakahaere Rawa mō Te Wai Paranga

GENERAL VOLUME

HE PUKAPUKA MATUA