KAIPARA DISTRICT

Kaipara te Oranganui • Two Oceans Two Harbours

KAIPARA DISTRICT COUNCIL

Supplementary items to the following meeting:

Meeting	Kaipara District Council
Date	Wednesday 28 February 2018
Time	9.00am
Venue	Northern Wairoa War Memorial Hall (Dargaville Town Hall), 37 Hokianga Road, Dargaville

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Linda Osborne
Administration Manager

Membership

Chair:	Mayor Jason Smith
Members:	Deputy Mayor Peter Wethey
	Councillor Anna Curnow
	Councillor Victoria del la Varis-Woodcock
	Councillor Julie Geange
	Councillor Libby Jones
	Councillor Karen Joyce-Paki
	Councillor Jonathan Larsen
	Councillor Andrew Wade

KAIPARA DISTRICT COUNCIL

Kaipara District Council

Asset Management Plan 2018

Stormwater

November 2017

Status: Draft

QUALITY STATEMENT

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Prepared by		
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Checked by		
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Reviewed by		
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Approved for issue by		
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REVISION SCHEDULE

Rev No	Date	Description	Signature or typed name (documentation on file).			
			Prepared by	Checked by	Reviewed by	Approved by
A	05 July 2017	First Draft	MS			
B	November 2017	Review and edit	P Utting			
C						
D						
E						
F						
G						
H						

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1 Executive summary

1.1 Introduction

Kaipara District Council (KDC/Council) operates five community stormwater schemes for Baylys, Dargaville, Te Kopuru, Kaiwaka and Mangawhai in order to protect people, dwellings, private property and public areas from flooding by managing stormwater, discharges and collecting contaminants in a manner that protects the environment and public health.

As per the LGA 2002:

1. The purpose of local government is –
    a. To enable democratic local decision making and action by, and on behalf of, communities; and
    b. To meet the current and future needs of communities for good-quality local infrastructure, local public services and performance of regulatory functions in a way that is most cost-effective for households and businesses.
2. In this Act, **good-quality**, in relation to local infrastructure, local public services, and performance of regulatory functions, means infrastructure, services, and performance that are –
    a. Efficient; and
    b. Effective; and
    c. Appropriate to present and anticipated future circumstances

In line with Council's vision of "Thriving Communities Working Together", KDC thrives to ensure that it is a district with welcoming and strong communities, a Council that makes good decisions for the future and thereby provides plenty of active outdoor opportunities. In order to achieve this, infrastructure ought to be in the best condition.

The purpose of this Asset Management Plan (AMP) is to summarise Council's strategic and long term management approach for the provision and maintenance of Stormwater assets.

The AMP provides discussion of the key elements affecting management of Council's Stormwater assets, including the legislative framework, links to Community Outcomes, policies and strategy, the proposed Levels of Service (LOS) and performance measures and demand, environmental and service management.

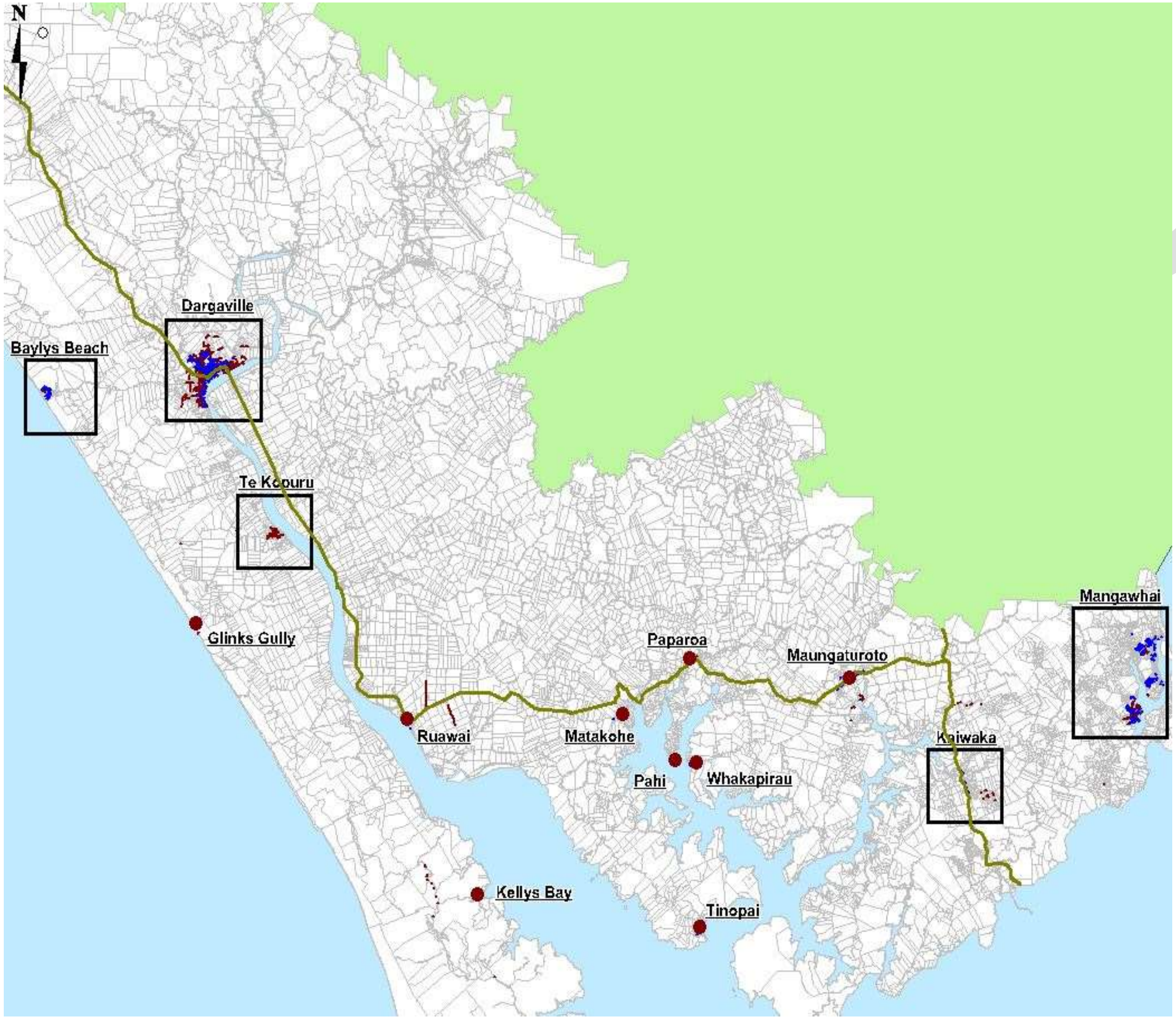
Asset performance, condition and value are examined and a Financial and Lifecycle Strategy is presented to define the investment planned to address issues and to ensure that an uninterrupted service is provided to customers now and into the future.

The provision of sustainable stormwater systems is about finding a balance between maintaining and enhancing natural watercourses and providing piping to enable urbanisation to occur while collecting and treating stormwater runoff from the effects of urbanisation prior to it entering the receiving environment waters such that they are not detrimentally affected.

With the changing climatic conditions, potentially higher intensity storms are likely to occur and thus a conservative approach to managing stormwater is considered appropriate.

With the Kaipara Harbour bounding a large proportion of the Kaipara district, this provides a significant focus for effectively managing stormwater runoff and minimising adverse effects on that major receiving environment. This also brings to focus the requirement to prepare and plan for any expected sea level rise, in line with any reports or changes to strategy from Northland Regional Council (NRC).

Figure 1-1 - Location of Stormwater Schemes



1.2 The assets

The five Council-operated community stormwater schemes in Baylys Beach, Dargaville, Te Kopuru, Kaiwaka and Mangawhai protect the communities from flooding by removing stormwater, collecting contaminants and then discharging the stormwater in a manner that protects the environment and public health. The location of each of these communities within Kaipara district is illustrated in the figure shown.

Stormwater systems predominantly incorporated into the road network are provided in Glinks Gully, Kelly's Bay, Pahi, Whakapirau, Tinopai, Paparoa, Matakohe and Maungaturoto. The Ruawai scheme is operated under the Raupo Land Drainage scheme.

An overview of the stormwater assets in the district is provided in the asset overview and asset valuation summary tables below.

Table 1-1: Extent of assets

Scheme	Cesspit Lead	No. of leads	Culvert	Drain	Gravity Main	Open Drain	Overland Flowpath	Swale	Unknown	Length of Assets
Dargaville	56	12	511	522	34,026	33,762		385		69,206
Mangawhai	663	73	441	5,664	18,760	610	266	772	20	26,533
Ruawai			194		449	4,804				5,447
Te Kopuru	14	2	62	4,760	42					4,864
Maungaturoto	26	3	647	920	1,655	231	339		50	3,842
Baylys Beach			119		3,175	10				3,304
Pahi	7	2	929	8	1,954	86				2,977
Kaiwaka	36	2	804		677	261				1,742
Tinopai	44	4			745					745
Totals	**846**	**98**	**3,707**	**11,874**	**61,483**	**39,764**	**605**	**1,157**	**70**	**118,660**

Table 1-2: Stormwater scheme valuations (2016)

Stormwater Scheme	Replacement Cost	Annual Depreciation	Implied Life
Dargaville	$ 22,967,752	$ 231,716	99
Kaiwaka	$ 436,029	$ 4,597	95
Baylys Beach	$ 1,163,395	$ 14,346	81
Maungaturoto	$ 293,842	$ 3,085	95
Pahi	$ 1,014,727	$ 12,446	82
Te Kopuru	$ 318,549	$ 798	399
Mangawhai	$ 7,874,349	$ 93,389	84
Total 2016	**$ 34,068,644**	**$ 360,378**	**95**

Figure 1-2: Stormwater relative replacement value of schemes

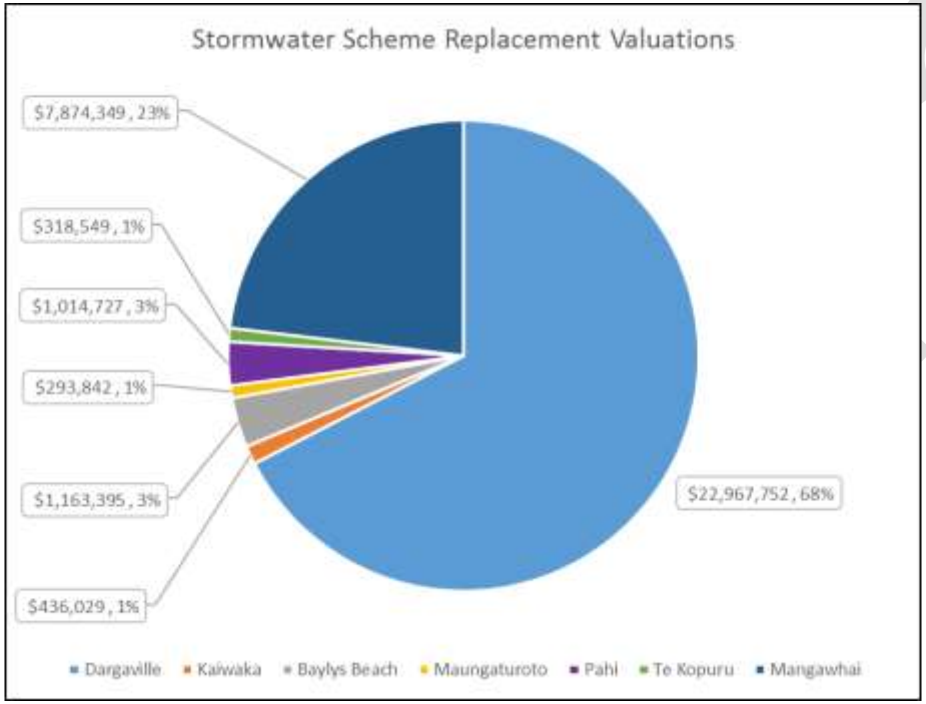
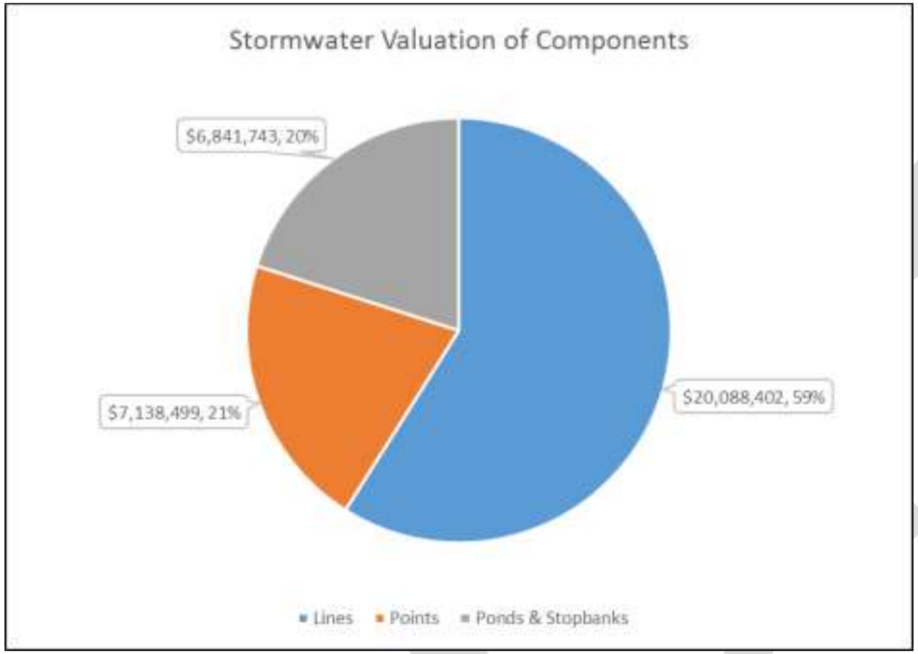


Table 1-3: Stormwater replacement value of asset types

Total Valuations	
Lines	$20,088,402
Points	$7,138,499
Ponds & Stopbanks	$6,841,743
Totals	**$34,068,644**

Figure 1-3: Stormwater relative replacement value of asset types



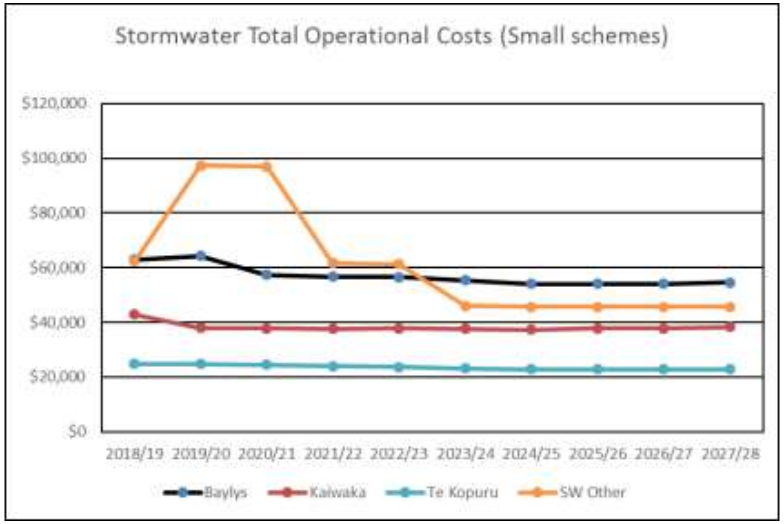
1.3 Financial and Lifecycle Strategy

The Financial and Lifecycle Strategy defines the operational, maintenance, renewal and new capital expenditure over the next 10 years. A summary of the planned operational expenditure by type and by community is shown in the following figures.

Figure 1-4: Operational expenditure by type

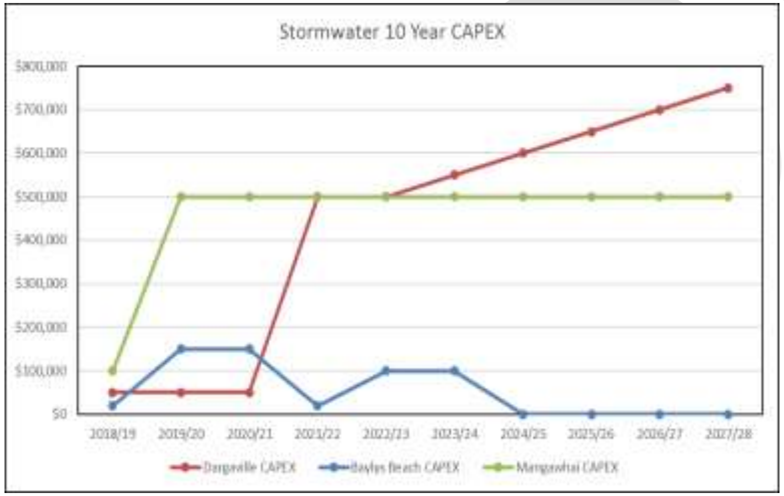
Figure 1-5: Operational expenditure for large schemes

Figure 1-6: Operational expenditure for small schemes



Proposed capital works expenditures over the next 10 years are illustrated in the following figure. Works are only proposed in the Dargaville, Baylys Beach and Mangawhai schemes. These works are focussed on renewals and Level of Service improvements.

Figure 1-7 - Stormwater Proposed Capital Works



1.4 Key issues

Key matters requiring attention for the stormwater service are summarised in the table below.

Table 1-4 – Issues to be addressed by Improvement Plan

Issue	Improvement Response
Data – Completeness and Accuracy	Ongoing programme of acquiring data where it is lacking and verifying existing data
Asset Condition	Ongoing programme of inspecting assets, determining their condition and recording this information in a usable format. This will particularly focus on critical assets
Maintenance and records	Ongoing programme of improving the pro-active planning of maintenance, recording when this is undertaken and also recording reactive responses to maintenance of assets
Asset ownership	Ongoing clarification of responsibility for management of assets where they are owned by Kaipara District Council (e.g. Transport vs Stormwater) and also clarification of whether assets are privately or publicly owned
System Capacity	Undertaking Stormwater Catchment Management Plans for main urban areas to identify current capacity of systems relative to desired levels of service (LOS) and identification of upgrades required
Levels of Service	Identification of desired Levels of Service is a key driver for Asset Management. Reviews are ongoing with a view to updating or 2012 AMP
Operations and Maintenance Manuals	These are particularly required for Detention Ponds (both current and future)
Renewal Planning	Council's current ability to undertake robust planning is constrained by limited, or unreliable, asset information and this will be addressed through a specific programme of asset condition surveys

1.5 Continuous Improvement

Council is committed to continuous improvement of its assets and systems to enable us to better service the community.

Council understands that there are areas where improvements need to be made to provide a better and more complete service to the community. An Improvement Plan has been created and will be continuously updated and revised as more issues/processes are completed and improved.

Timing for completion of the activities may vary depending on Council priorities. This may result in re-prioritisation of activities from year to year, while maintaining bottom-line budgets.

2 Strategic context

2.1 Purpose

The AMP demonstrates responsible management of the district's assets on behalf of customers and stakeholders and assists with the achievement of strategic goals and statutory compliance. The AMP combines management, financial, engineering and technical practices to ensure that the levels of service required by customers is provided at the lowest long term cost to the community and is delivered in a sustainable manner.

This AMP outlines and summarises Council's strategic long term management approach for the provision and maintenance of stormwater services to properties located in urban centres throughout the district (excluding those serviced by the Raupo Drainage District i.e. Ruawai, or communities serviced largely by roadside drains e.g. Maungaturoto, which are included under the Roads and Footpaths activity).

A list of the acronyms and abbreviations used in this AMP is included in the appendices.

2.2 Service description and scope

Council provides urban stormwater systems in Baylys Beach, Dargaville, Te Kopuru, Kaiwaka and Mangawhai. Stormwater systems predominantly incorporated into the road network are provided in Glinks Gully, Kelly's Bay, Pahi, Whakapirau, Maungaturoto, Tinopai, Paparoa and Matakohe.

Council undertakes the following with assistance from their Maintenance Contractor, and other service providers as required:

- Asset management;
- Customer services;
- Network operations and maintenance;
- Capital and renewal works programme; and
- Consent renewal, monitoring and compliance.

The scope of this AMP is to determine current and future stormwater standards, LOS and funding levels. The AMP should be used to drive and manage the stormwater service throughout the following three years, with forecasts for the next 10 years.

In providing stormwater systems, Council's aim is to protect people, dwellings, private property and public areas from flooding by providing a stormwater system that meets the LOS set out in this AMP, and to discharge stormwater and collect contaminants in a manner that protects the environment and public health.

Council's approach to stormwater management is to minimise the impacts on the built environments by reducing adverse effects from stormwater runoff on the environment. The stormwater network is progressively developing and management requirements will need to be continuously reviewed to ensure the assets are maintained appropriately.

2.3 Key issues

The key issues Council is currently managing as part of the stormwater activity are summarised in Table 2-1 below.

Table 2-1: Key issues for Council's stormwater activity

Issue	Description
Ownership of stormwater assets	Further clarification of ownership and associated operation and maintenance responsibilities is needed across the district. Currently there are discrepancies between urban, roading and private stormwater systems.
Future growth	Formal, reticulated stormwater systems may be required in the future for Kaiwaka and Maungaturoto to cater for growth and visitors due in part to proposed plans to extend the northern motorway, investigations will need to cover capacity of existing infrastructure and identify a plan to allow and facilitate future growth.
Public safety	The community wishes to pipe the deep open drains in urban areas. When concerns are raised, these should be investigated to understand the community's reasons why the drain needs to be piped and then each case assessed with regards to safety, health and water quality aspects to determine if the piping is warranted.
Water quality	Understanding and complying with the environmental requirements of NRC with respect to stormwater quality, ensuring these requirements are appropriate for the risks involved and affordable to the Kaipara community. Any requirements will need to be incorporated in the development of Stormwater Catchment Management Plans (SCWMP) for each township.
Asset data	The current asset data and asset register are unreliable and inaccurate in terms of the information contained within, it is essential that this information is gathered to increase the knowledge of our current systems to enable Council to effectively and efficiently plan future works and capital upgrades.
Climate change and sea-level rise	The impacts of climate change and sea-level rise on the existing networks and future growth needs to be investigated and any negative effects need to be mitigated as much as practicable, through design of growth network, current capacity, existing flood protection/land drainage measures, and the possibility of future flood protection/land drainage districts.

Issue	Description
Coastal discharges	A better understanding of the impact that urban stormwater discharge has on the receiving environment they discharge into is required. Across the district coastal outfalls need to be identified, ownership apportioned and the appropriate discharge consents and monitoring need to be installed.

2.4 Relationship to community outcomes, Council policies and strategies

2.4.1 Broad planning context

The Local Government Act 2002 (LGA) provides an overall planning framework that Council is obliged to comply with. In broad terms this requires Council to engage with its community and stakeholders to determine what Council is to focus on achieving for the district. This is then translated to the types of activity Council will be involved in, the resources and assets it will need to provide for those activities and how this will be funded.

2.4.2 Long Term Plan (LTP)

This is developed, consulted and adopted every three years and covers the following three financial years in detail and provides indicative direction for the following seven years (10 years total). The next LTP will become operative on 01 July 2018. This process starts at a high level and works down to individual activities and the associated budgets and required rates and charges.

Council has adopted a new Vision Statement that includes specific reference to managing (maintaining and improving) its infrastructure.

The LTP 2018/2028 is still being generated. It is not expected that the role of stormwater drainage will significantly change from the LTP 2015/2025 as repeated below.

Figure 2-1: Vision statement

The Values: Ko nga uara

Our purpose is to make a positive difference for Kaipara. We aspire to work with:

Integrity

- ✓ We will do what we say we will
- ✓ We will act with good intent
- ✓ We will do the right thing in the right way

Team Work

- ✓ We will work together
- ✓ We will support each other

Delivering Value

- ✓ We will seek to understand needs and deliver to them
- ✓ We will apply our skills and knowledge for the benefit of others

The overall approach acknowledges that the focus and priorities will vary with different geographical areas, for example:

- West Coast: Increasingly attractive to tourism and lifestyle. An area with high ecological, historical, environmental and cultural values;
- Dargaville: An attractive place to shop, visit, live and works. A service and tourist center;
- Kaipara Harbour: A taonga preserved for all to enjoy, retaining a rural atmosphere. Balancing the competing demands of commercial and recreational activities; and
- Mangawhai: Fully serviced urban centre located in an outstanding coastal environment.

This overall vision for the district provides a broad initial direction for the development of stormwater drainage priorities and how those assets may be managed. This information, along with community consultation and discussion with other interested parties contribute to the development of the community outcomes identified in the LTP. These outcomes have a direct influence on the management of the various water supply schemes.

The community outcomes that the stormwater drainage activity contributes to most are largely expected to be unchanged from the LTP 2015/2025 i.e.

What We Want To See

- *To ensure that stormwater flooding and discharge to the environment is contained and managed to minimise impacts on people, property and the environment.*

Why We Do It

- *To protect people, dwellings, private property and public areas from flooding by removing stormwater;*
- *To discharge stormwater and collect contaminants in a manner that protects the environment and public health;*
- *Council's approach to stormwater management is to minimise the impact on built environments by reducing adverse effects from stormwater runoff on the environment; and*
- *The stormwater network is subjected to high intensity rainfall events.*

The Level of Service

- *To provide stormwater drainage systems in urban areas with the capacity to drain water from normal rainfall events and cope with a 1 in 10 year rain event;*
- *Where stormwater drainage systems exist, to comply with resource consent conditions; and*
- *Services to customers from the five community drainage schemes will be reliable and dependable.*

Note: It is to be noted that Council does not manage stormwater drainage on State Highways. Stormwater drainage management does not include floodwaters from rivers or land drainage.

2.4.3 Infrastructure Strategy

As part of the LTP Council is required to produce a Long Term Financial Strategy and an Infrastructure Strategy for its major asset using activities. These documents are required to look out not less than 30 years to identify the issues and challenges that Council will face during that period, how Council would likely respond to them, what this will cost and where the funding will come from. This recognises the long lived nature of the infrastructure assets that Council utilised to provide services, the potential for technology and expectations to change considerably and the potential for expenditure to be quite 'lumpy' as assets enter their renewal cycles.

2.4.4 Asset Management Plan (this document)

There is no statutory requirement for Council to generate an AMP. However, it serves a valuable purpose in collecting relevant information about the assets and services at a level of detail that would not be appropriate for the various statutory documents described above.

2.5 Stakeholders and consultation

There are many individuals and organisations that have an interest in the management and / or operation of Council's stormwater assets. The following key external and internal stakeholders are identified for this AMP:

Table 2-2: Stakeholders

External stakeholders	Interest
Kaipara district community	• Ratepayers; • Public safety; • Public health; • Protection of private property; • Environmental protection; and • Water quality of local harbours' and ephemeral waterways for commercial and recreational activities.
Government agencies (e.g. Department of Health, Ministry for the Environment (MfE), Audit NZ)	• Adherence to Government policies and framework; • Ensuring Council is transparent and accountable; • Public safety; and • Environmental health and protection.
Local Iwi	• Protection of historical relationship of Maori and their culture and traditions with their ancestral lands, water, sites, wahi tapu and other taonga.
Civil defence and emergency management	• Understanding stormwater control and measures to ensure public safety, and to better understand flood issues within the local area.
Northland Regional Council	• Adherence to NRC policies and plans e.g. NRC – Regional Plan; • Environmental impacts and protection; • Protection and increase of water quality and water quality standards; and • Planning for climate change and sea level rise.
Maintenance contractor	• Maintain existing services; • Understand Council's LOS and their targets and requirements; and • Understand the local network and the councils' direction for the AMP period.

External stakeholders	Interest
Visitors to the district	• Public safety; • Environmental protection; • Minimal flooding and flood protection of tourist areas within the surrounding district; and • Quality of ephemeral waterways and harbours' for recreational activities.

Internal stakeholders	Interest
Mayor and Councillors	• Representing the publics' interests and those of the greater district; • Protecting the ratepayers' interests and ensuring the transparency of Council's actions and projects; • Planning of future works; • Maintaining water quality; • Allowing for future growth and the provision of services; and • Maintaining and increasing LOS to the communities.
Financial Services Manager	• Understanding the financial implications of the AMP period and how this will affect rates and ratepayers of the district; • Ensuring the completeness of asset data and how this affects current valuations and Council's Investment Confidence ratings; • Ensuring that budgets are valid and able to be adhered to; and • Protection of public interest in regards to spending on public assets.
Information Services Manager	• Ensuring that all information is recorded correctly; • Keeping track of assets and asset data; • Vested interest in completeness of asset data and value; and • Increasing the reliability of Council asset registers.
Records and Information Manager	• Ensuring Council's transparency on identified works; and • Retaining and cataloguing Council information for auditable purposes.

Internal stakeholders	Interest
Northern Transportation Alliance (NTA)	• Protection of road assets from stormwater; • Planning flow of stormwater away from road assets; • Protection of road users; and • Identifying growth, renewal and LOS projects where stormwater and road asset projects coincide.

2.6 Community engagement

Council consults with the public to gain an understanding of customer expectations and preferences. This enables Council to provide a LOS that better meets the community needs. Council's knowledge of customer expectations and preferences is based on:

- Feedback from public surveys;
- Public meetings;
- Feedback from Elected Members;
- Analysis of customer service requests and complaints; and
- Consultation via the Annual Plan and LTP process.

Council undertakes customer surveys on a regular basis, using the National Research Bureau Ltd (NRB). These customer perception surveys assess levels of satisfaction with key services, including stormwater, and the willingness across communities to pay for service improvements.

Summary of key survey results from 2014 regarding the stormwater service:

- 82% of residents that are provided with a piped stormwater system, responded with being very/fairly satisfied with the stormwater service (81% in 2016); and
- 18% were not very satisfied (19% in 2012).

Community satisfaction is a key performance measure of the stormwater service.

2.7 Potential significant negative effects

The stormwater activity is an essential service that is provided to our communities and the environment. Discharges from the urban stormwater network can impact cultural, social, environmental and economic well-being. In addition to managing the quantity of stormwater it is recognised that the activity also includes the quality of discharges to and from the network on the receiving environment. Both aspects of urban stormwater discharge have the potential to have significant negative effects on the environment and these should be mitigated as best as is practicably possible.

Guidance on the design and construction of new stormwater networks for urban and rural areas is provided in Chapter 6: Stormwater Drainage; Engineering Standards 2011, published by Council. Holistically the design of systems in accordance with the Standards will minimise the impacts of stormwater discharges on the receiving environment; however, it is acknowledged that differences in design standards between old and new systems can result in a disparity between LOS provided throughout the network.

The negative impacts identified by Council and mitigation measures in place are listed below:

Table 2-3: Identified significant negative effect

Identified significant negative effect	Cultural	Social	Economic	Environmental	Mitigation
Level of Service (LOS) versus Feasibility The construction and maintenance costs of infrastructure upgrades to meet a set level of service is beyond the means of the community to afford.		✓	✓		The provision of a set level of urban stormwater management should be assessed on a case-by-case basis. This will be managed through consultation with communities to determine the most practicable way forward, without negatively impacting on public health and the environment or creating risk to persons or property. Council is committed to improving the natural environment, but acknowledges that this will take time to make significant improvements due to the low population of the district and the type of land use within. Council will work closely with NRC to ensure that conditions of resource consents are fair and justifiable from a risk and sustainability view point.
Contamination of Urban Watercourses Urban stormwater runoff has the potential to adversely impact the receiving environment stakeholders and users. Typically runoff from urban areas has elevated temperature, heavy metals and organic/inorganic compounds. It is acknowledged that in built-up areas the	✓	✓	✓	✓	Chapter 6 of Council's Engineering Standards 2011 provides minimum standards that developers and individuals are required to meet with regard to the stormwater infrastructure. It includes guidance on both quantity and quality control to reduce the impact of development on the receiving environment. For existing developments, Council assesses the effectiveness of the existing stormwater management through the following methods: • Individual site management and monitoring for identified high risk industrial and commercial sites;

Identified significant negative effect	Cultural	Social	Economic	Environmental	Mitigation
presence of zinc, from roofing materials, is a particular concern.					• Interaction with and education of the public to make people aware of potential impacts; and Ongoing monitoring of watercourses, in conjunction with NRC, to establish contaminant profiling allowing for targeted treatment schemes where required.
Contamination of Rural Watercourses Rural stormwater runoff is likely to have a different contaminant profile than that from the urban areas. Depending on land use rural runoff potentially has elevated levels of nitrogen and phosphates than urban stormwater, due to fertiliser usage and animal husbandry.	✓	✓	✓	✓	Chapter 6 of Council's Engineering Standards 2011 provides general guidance for the management of rural stormwater runoff. The section primarily relates to quantity control of runoff, although there is a recommendation that appropriate water quality treatment options be considered in conjunction with attenuation.
Flooding Direct Impact Urban catchments create a greater amount of impervious coverage (such as roads, roofs and paved areas) than would be seen in the natural environment. Runoff is generated quicker from paved areas and can result in overland flow paths and localised flooding, which can damage property and increase the risk to life.		✓	✓	✓	Within urban areas Council's Engineering Standards 2011 consider that attenuation of discharges up to the 100-year event should be no more than the pre-development condition. This allows for protection of the receiving environment from potential erosion and flooding. The attenuation of runoff allows for flooding to be controlled locally, within the specific device. It should be acknowledged here that effects of Climate Change on the district's weather patterns can result in a reduced LOS being provided by the older parts of the stormwater network. Although these systems will be upgraded over time, priority will be given to areas where flooding as a result of capacity issues impacts upon property or life.

Identified significant negative effect	Cultural	Social	Economic	Environmental	Mitigation
Stormwater Infiltration A recent local study of the stormwater network in Dargaville identified stormwater 'leaking' into the wastewater system and this is believed to be a common problem throughout the district. Increased loading on the wastewater system has the negative effect of overloading wastewater treatment facilities, which in turn can result in increased discharges to the receiving environment. Not only does this reduce the efficiency of the treatment facility, it can also increase pathogens and other contaminant levels within the receiving environment.	✓	✓		✓	Localised studies have been carried out in Dargaville to identify the problem and target mitigation works required. The problem has been identified as originating from both the public and private stormwater systems. Although mitigation can be carried out on the public system works on the private system may need to be considered through engagement with the community and education programmes.

3 Level of Service (LOS)

3.1 Overview

Levels of Service (LOS) are attributes that Council expects of its assets to deliver the required services to stakeholders. A key objective of an AMP is to match the LOS provided by the stormwater activity with agreed expectations of customers and their willingness to pay for that LOS.

The LOS provide the basis for the lifecycle management strategies and works programmes identified in the AMP.

LOS should reflect the current industry standards and be based on:

- **Customer Research and Expectation** - information gained from stakeholders on expected types and quality of service provided;
- **Statutory Requirements** - legislation, regulations, environmental standards and Council Bylaws that impact the way assets are managed. These requirements set the minimum LOS to be provided;
- **Strategic and Corporate Goals** - guidelines for the scope of current and future services offered and manner of service delivery, and define specific LOS that the Council wishes to achieve; and
- **Best Practices and Standards** - specify the design and construction requirements to meet the LOS and needs of stakeholders.

The LOS for stormwater have been developed to contribute to the achievement of the stated Community Outcomes that were developed in consultation with the community (Section 2.4), and taking into account:

- Council's statutory and legal obligations;
- Council's policies and objectives; and
- Council's understanding of what the community is able to fund.

The LOS that Council has adopted for this AMP are derived from the LTP 2018/2028 consultation process.

The LTP performance measures are reported through the annual reporting process. Council's current actual performance will be reported in the Annual Report 2018/2019.

The AMP Improvement Plan includes an action for Council to continuously review its stormwater LOS to identify if there is further opportunity for improved efficiencies and/ or best practice that can be incorporated into the service framework.

3.2 Legislative framework and linkages

The Stormwater AMP is related to national and local legislation, regulatory and policy documents as listed in through Table 1-7 below.

The legislation and guidelines below are listed by their original title for simplicity. Amendment Acts have not been detailed in this document however are still considered in the planning process.

Table 3-1: Relevant legislation

Acts
The Health Act 1956
The Local Government Act 2002, especially: • Part 7 • Schedule 10 • The requirement to consider all options and to assess the benefits and costs of each option • The consultation requirements
The Climate Change Response Act 2002
The Civil Defence Emergency Management Act 2002 (Lifelines)
The Resource Management Act 1991
The Local Government (Rating) Act 2002
The Land Drainage Act 1908
The Rivers Boards Act 1908
The Soil Conservation and Rivers Control Act 1941
The Health and Safety at Work Act 2015
The Utilities Access Act 2010
The Building Act 2004
The Consumer Guarantees Act 1993
The Sale of Goods Act 1908
The Fair Trading Act 1986
Public Records Act 2005

Table 3-2: Relevant regulatory requirements

National policies, regulation, standards and strategies
The Government's Sustainable Development Action Plan
Code of Practice for Urban Sub-division
NAMS Manuals and Guidelines
Office of the Auditor-General's publications
Standards New Zealand • AS/NZS 2032:2006 Installation of PVC Pipe Systems • AS/NZS 2280:2004 Ductile Iron Pressure Pipes and Fittings • AS/NZS 3725:2007 Design for Installation of Buried Concrete Pipes • AS/NZS 2566.1:1998 Buried Flexible Pipe Design • AS/NZS 2566.2:2002 Buried Flexible Pipe Installation • NZS 3101.1&2:2006 Concrete Structures Standard • NZS 3910:2003 Conditions of Contract for Building and Civil Engineering Construction • NZS 4404:2010 Land Development and Subdivision Infrastructure • SNZ HB 4360:2000 Risk Management for Local Government • NZWWA New Zealand Infrastructure Asset Grading Guidelines 1999 National Guidelines • NZ Pipe Inspection Manual 2006 • QV Costbuilder Construction Handbook.

Table 3-3: Relevant Council planning and policy documents

Local policies, regulations, standards and strategies
Council District Plan
Council Long Term Plan
Stormwater Asset Management Plan (previous versions)
Northland Regional Plan
NRC Regional Policy Statement
NRC Regional Air Quality Plan
NRC Regional Coastal Plan
NRC Regional Water and Soil Plan
Council Engineering Standards and Policies 2011
Council Procurement Strategy and Policy Documents March 2012

Table 3-4: Relevant Council Bylaws

Council Bylaws
Wastewater Drainage Bylaw 2009 (Section 13.3)

Preparation and implementation of this AMP and the associated long term financial strategies aids Council compliance with these requirements.

Local Government Act 2002:

As per the LGA 2002:

1. The purpose of local government is –
   a. To enable democratic local decision making and action by, and on behalf of, communities; and
   b. To meet the current and future needs of communities for good-quality local infrastructure, local public services and performance of regulatory functions in a way that is most cost-effective for households and businesses.

2. In this Act, **good-quality**, in relation to local infrastructure, local public services, and performance of regulatory functions, means infrastructure, services, and performance that are –

    a. Efficient; and

    b. Effective; and

    c. Appropriate to present and anticipated future circumstances

This Act requires local authorities to:

- Prepare a range of policies, including Significance, Funding and Financial policies;
- Prepare a Long Term Plan (LTP formerly the Long Term Council Community Plan or LTCCP), at least every three years, which must identify:
    - Activities and assets;
    - How the asset management implications of changes to demand and service levels will be managed;
    - What and how additional capacity will be provided, and how the costs will be met;
    - How the maintenance, renewal and replacement of assets will be undertaken and how the costs will be met; and
    - Revenue levels and sources.

Regarding Significance, all local councils must adopt a policy that sets out their approach to determining the significance of proposals or decisions relating to issues, assets and other matters, and any thresholds, criteria or procedures to be used by Council in assessing whether these are significant.

The new legislation puts a stronger emphasis on strategic planning (Section 121) that encompasses:

- The systems for supply of water and disposal of waste and stormwater (cl.3(a));
- The quality of drinking water and wastewater (including stormwater) (cl.3(b));
- Current and future demands for water and wastewater (including stormwater) services and related effects on the quality of supply and the discharges to the environment. (cl.3(c)); and
- Options for meeting current and future demands with associated assessments of suitability (cl.3(d)).

Local Government (Rating) Act 2002, the funding companion to this proposed new LGA:

- Permits councils to strike a rate or charge for any activity they choose to get involved in (Section 16).

Resource Management Act 1991 and amendments:

The RMA 1991 is an established planning framework covering land designation processes and resource consents for activities that affect the environment. Northland Regional Council (NRC) is responsible for monitoring compliance with certain environmental provisions of this Act.

The RMA is key legislation influencing how stormwater is managed, in particular the effect of the stormwater discharges on the environment. Council is required to gain approval to discharge from the drainage networks under the RMA. Council is working with NRC to understand the Regional Plans for managing stormwater discharges in urban areas.

Council is also involved in the control of development and subdivisions under the RMA and the District Plan, to manage effects on the environment.

Building Act 2004:

The Building Act 2004 and its related provisions set standards for stormwater control as they relate to buildings. Under the Building Act, a territorial authority has a regulatory role in receiving and assessing building consent applications. Council is responsible for producing PIMs (Project Information Memoranda) and LIMs (Land Information Memoranda). Information on drainage plans, flood records, maintenance history, notices and correspondence should be included in these memoranda. Council may reject a building consent where there is a risk of flooding. The Building Act also stipulates the minimum level of flood protection for houses.

Health Act 1956 contains:

The Health Act requires Council to provide sanitary works, including drainage works for all lands, buildings and pipes used in connection with such works.

The stormwater network is significant as defined in Council's Significance and Engagement Policy, due to its complexity, asset value and risk to the community. This service is expected to be delivered in perpetuity and the asset is maintained and replaced as required to enable this. For significant services, the Office of the Auditor-General defines a higher level of customer consultation. This includes evaluating LOS options and undertaking consultation on LOS options with the community and other relevant stakeholders.

Health and Safety at Work Act 2015:

The Act introduces a new term, "Person Conducting a Business or Undertaking" (PCBU), which captures employers, self-employed, principals to contracts, manufacturers, designers, etcetera who have the primary health and safety duties. Workers also have duties under the Act. Workers include employees and contractors, the PCBU must ensure that it's duties are carried out as per subpart 2 – Duties of PCBUs of the Act.

Public Records Act 2005

Council is required to create and maintain full and accurate records including all matters that are contracted out to an independent contractor. This includes records which relate to property or assets owned and/or administrated by the local authority such as contract documents and as-builts of public utilities and service such as: roading, drainage, sewerage and stormwater, water supply, flood control, power generation and supply, refuse disposal and public transport.

National Environmental Standards

The Resource Management Act promotes the sustainable use of resources. Its primary vehicle for addressing the discharge of effluent to the environment is via the Regional Waste and Soil Plan at regional level; and District Plans at district level. Given these plans are controlled at their respective jurisdictive levels there are now varying, inconsistent standards across regions and districts.

One method of ensuring consistent application across New Zealand is provided in Sections 43 and 44 of the Resource Management Act. These allow the Minister for the Environment to enact regulations called National Environmental Standards. When a National Environmental Standard is enacted the same standards must be applied regardless of jurisdiction.

The following National Environmental Standards are in force:

- Air quality standards;
- Sources of human drinking water standard;
- Telecommunications facilities; and
- Electricity transmission.

The National Environmental Standards listed below are at various stages of development, ranging from initiating consultation to being legally drafted:

- Contaminants in soil;
- Ecological flows and water levels;
- Future sea-level rise; and
- Plantation forestry.

This AMP has considered the impact of those National Environmental Standards that are in force at the time of the current update.

3.3 Links with other documents

This AMP is a key component in Council's strategic planning function. This plan supports and justifies the financial forecasts and the objectives laid out in the LTP. It also provides a guide for the preparation of each Annual Plan and other forward work programmes.

3.4 Industry standards and guidelines

The Department of Internal Affairs (DIA) has generated a range of mandatory measures that must be reported on for the various water services. The KDC LOS measures align with these requirements. This requirement is intended to provide for more transparent and consistent reporting across the country. The measures are also incorporated into the Water NZ National Performance Review process. A summary of the DIA requirements follows :

Table 3-5: DIA non-financial performance measures

Stormwater Non-Financial Performance Measures Rules 2013
Performance measure one (system and adequacy): a) The number of flooding events that occur in a territorial authority district. b) For each flooding event, the number of habitable floors affected. (Expressed per 1000 properties connected to the territorial authority's stormwater system.)
Performance measure two (management of environmental impacts): Compliance with the territorial authority's resource consents for discharge from its stormwater system, measured by the number of: a) abatement notices; and b) infringement notices; and c) enforcement orders; and d) successful prosecutions, received by the territorial authority in relation those resource consents.
Performance measure three (response to stormwater system issues): The median response time to attend a flooding event, measured from the time that the territorial authority receives notification to the time that service personnel reach the site.
Performance measure four (customer satisfaction): The number of complaints received by a territorial authority about the performance of its stormwater system, expressed per 1,000 properties connected to the territorial authority's stormwater system.
Flood Protection Non-Financial Performance Measures Rules 2013
Performance measure one (maintenance of works): The major flood protection and control works that are maintained, repaired and renewed to the key standards defined in the local authority's relevant planning documents (such as its activity management plan, asset management plan, annual works programme or long term plan).

3.5 Proposed Levels of Service (LOS) – customer and technical focus

Table 3.6: LOS Measuring performance

Measuring performance		Targets			
What the community can expect from Council	**How Council measures this**	**Year 1 2018/2019**	**Year 2 2019/2020**	**Year 3 2020/2021**	**Years 4-10 2021/2028**
Stormwater drainage systems in urban areas with the capacity to drain water from normal rainfall events and cope with a 1:5 year rain event for Rural and Residential and a 1:10 year event for Industrial.	System adequacy For each flooding event, using a 1:5 year for Urban (Average Recurrence Interval 20%) and 1:10 year for Rural (ARI 10%), the number of habitable floors affected. (Expressed per 1,000 properties connected to the District's stormwater system.)	10	10	10	10
	Response time The median response time in a flooding event, measured from the time that the territorial authority receives notification to the time that service personnel reach the site.	2 hours for urgent events	2 hours for urgent events	2 hours for urgent events	2 hours for urgent events
	Customer satisfaction The number of complaints received by Council about the performance of its stormwater system, expressed per year. Expressed per 1,000 properties connected to the territorial authority's stormwater system.	18	18	18	18
Where stormwater drainage systems exist, to comply with resource consent conditions.	Discharge compliance Abatement notices, infringement notices, enforcement orders, convictions.	0	0	0	0

Table 3-7: Summary of LOS achievement from Annual Report 2016/2017

Levels of service statement	Performance measures	Status	Comments
System and adequacy			
To provide stormwater drainage systems in urban areas with the capacity to drain water from normal rainfall events and cope with a 1 in 10 year rain event.	The number of flooding events that occur in Kaipara District.		Achieved
Discharge Compliance			
Compliance with the Council's resource consents for discharge from its stormwater system.	The number of infringement notices received by the Council in relation to those Resource Consents.		Achieved
Response Times			
The median response time to attend to a flooding event.	The time from when Council receives notification to the time that service personnel reach the site.		Not achieved One request saw Council's contractor's response time of 24 hours.
Customer Satisfaction			
The total number of stormwater system complaints received by the Council.	The number of complaints received by Council about the performance of its stormwater system, expressed per year.		Not achieved The above-average amount of rain received in the last quarter of this year has contributed to the number of blocked drain requests.

3.6 Strategies for achieving service levels

To achieve the desired LOS specific improvements and management processes will be implemented.

3.7 System adequacy

This largely reflects the capacity of the system to capture and convey the flows arising from extreme weather events without damage occurring to habitable floors or business premises. This is not well defined across the district and it is intended to undertake a number of SWCMP studies in areas subject to growth or with known historical issues. This will identify capacity shortfalls, works that should be undertaken and also minimum floor levels that should be adopted for any new construction. The SWCMP will provide a level of clarity that the desired level of capacity can be achieved for each of the subject areas that is not currently available. Areas that have not been studied and/or upgraded will remain at the LOS that has been historically provided.

3.8 Discharge compliance

There are two primary elements to the discharge consent for stormwater drainage and KDC has limited capability to influence either at this time :

Water Quality – Stormwater discharges collect and convey whatever contaminants are on the ground surface into the receiving waterways. This varies from grow contaminants such as rubbish, drink bottles etcetera, biological contaminants such as e-coli, chemical contaminants such as zinc, asbestos etcetera and particle contaminants such as clay.

There is a range of technologies available to reduce these contaminants including chemical treatment, physical filters and settling ponds together with natural processes that focus on reducing flow velocities, maintaining groundcover and encouraging natural filtration by directing flow through planted areas. These tend to work best with less intense storms when volumes and flow rates are lower.

KDC has limited resourcing in this area with some detention ponds in newer areas but otherwise limited capacity to focus on water quality. However, a number of older areas still largely rely on open drains and this has some beneficial effects on water quality compared to piped systems.

While KDC supports a greater focus on water quality it can only be implemented where development is occurring within the current planning timelines and resourcing. Where development is occurring there are strict controls in place to manage the run-off of silt arising from earthworks.

Flow Rates – A discharge consent could specify flow rates arising from a storm with a particular return period, however, KDC has very limited capacity to influence this. The limited number of detention ponds in newer areas will have a beneficial effect in reducing flow rates however KDC has no plans in place at this time to expand this capacity other than through the subdivision processes.

Current consents are listed in Appendix D

3.9 Response times

There are three key steps to achieving the target service levels for this consideration :

3.9.1 Defining appropriate measures and targets

This is often defined by the following acronym and requires all elements to be in place to be successful. This applies to all targets defined by a LOS process.

3.9.2 Alignment with maintenance contracts and staff performance objectives

Response time targets are a key deliverable in maintenance contracts and there needs to be a direct alignment between the targets identified in any LOS process and the targets identified in the maintenance contract, particularly Contract 798 – 3 Waters Operations and Maintenance 2016/2019. Similarly, if customer response forms a defined part of the role of a staff member this should be reflected in the performance objectives of this person.

3.9.3 Contractor and organisational performance

The contractor must have effective measurement and reporting processes in place that allows accurate and timely reporting of actual performance against the contract specification for Response Times. For performance to be managed effectively requires regular reporting of performance and follow-up of any under-performance with a view to bringing it into compliance. This may be through bonuses and penalties built into the contract or the exercise of enforcing the contract. The latter might ultimately lead to the cancellation of the contract if the required performance is consistently not being achieved. Similarly, the performance of staff members in relation to Response Times also needs to be tracked if these measures are to be reported on be a focus for achievement.

3.10 Customer satisfaction

This is a much more difficult measure to influence as it reflects the customers overall perception of the quality of the stormwater service that they receive or experience. This will be heavily influenced by whether or not they have had a personal experience (and the outcome of that), the unpredictable frequency and magnitude of storm events that have occurred in the survey period and overall satisfaction with the conduct of the council (via personal experience, experience of others and media coverage) and their understanding of how the stormwater drainage system works and its associated limitations. Feedback (both positive and negative) is most valuable when it identifies the specific reason for that view, assuming there is one.

Notwithstanding the above, a customer satisfaction survey, or compilation of complaints, will indicate the overall alignment between community expectation and what is being achieved and this may signal the need for change. This is particularly the case if stormwater is ranking significantly lower than other Council services. A sudden change in the level of satisfaction from year to year should trigger a discussion about what has changed or occurred, during that time that could have influenced this.

4 Drivers of change

4.1 Overview

This section of the AMP analyses factors affecting demand including population growth and social changes. The impact of these trends is examined and demand management strategies are recommended to address demand and ensure:

- Existing assets' performance and utilisation are optimised;
- The need for new assets is reduced or deferred;
- Council's strategic objectives are met;
- Provision of a more sustainable service; and
- Council is able to respond to customer needs.

4.2 Growth and demand change

The process of demand management provides Council with a high level tool to identify where infrastructure growth is likely to occur over a period of time. It enables a natural structured growth of the public system to occur. Without this type of assessment ad-hoc development of localised stormwater systems occurs and can leave a burdensome, somewhat redundant legacy for Council to operate and maintain.

Demand management strategies provide alternatives to the creation of new assets in order to meet demand and look at ways of modifying customer demands so that the utilisation of existing assets is maximised and the need for new assets is deferred or reduced.

Precise demand forecasting for the management of stormwater infrastructure is a difficult undertaking. This AMP has largely been based on historical data and growth predictions provided by Statistics New Zealand in order to identify potential future demand on the public stormwater infrastructure.

The impact of growth is currently managed in multiple ways:

- Regulatory control

  Integrating the stormwater management objectives in all new developments from initial planning and design stages. This is the basic approach of Council's Engineering Standards 2011.

- District Plan

  The District Plan is the legal framework that is used for land use planning. The proposed District Plan does not allow an increase in downstream flows post development.

- Catchment management planning

  Catchment management planning is a key tool for facilitating the integrated approach to stormwater management to achieve the desired environmental outcomes. The draft catchment management plans developed to date will be updated during the 2018/2021 period then formally adopted by Council.

- Education

  Education is an important tool for providing property owners with an understanding of their role and responsibility for managing their private stormwater systems. Environmental awareness is increasing as the community realises the need to protect the environment, however at the same time property owners expect to be able to develop their property without restriction. Council has undertaken limited education to date however it is a demand management mechanism that can be considered in the future and may be added to the AMP improvement document. Education promotes environmental awareness and the effects of activities such as car washing, where contaminants may enter the stormwater system through sumps.

The components of demand management are shown in Table 4-1.

Table 4-1: Examples of stormwater demand management strategies

Demand component	Stormwater examples
Operation Looks at LOS provided by the infrastructure and the application of Best Practice Options for sustainable long term management.	Maintaining the existing stormwater network through the application of an efficient operations and maintenance contract will ensure that the current LOS is met whilst also identifying and highlighting any issues across the district, the better the network is maintained the more efficient it is. Integration of National and International standards for stormwater device design into Engineering Standards documents.
Design Constantly changing standards allow for better stormwater design and management, Low Impact Design (LID) and treatment at source.	Application of LID as per existing standards and as technology is constantly improving allow for better stormwater management, reduced peak runoff and better water quality. Integration of improved technology and increased awareness of changes to stormwater management internationally, attendance at conferences and allowing consultants to raise any improvements they feel will better suit environmental needs, will ensure that the best solution to meet the required LOS will be constructed whilst also maintaining focus on environmental improvements and water quality.

Demand component	Stormwater examples
Incentives Encourage the application of Low Impact Design throughout the community, soakage, rain gardens and other source treatment options.	Community education and interaction to promote the use of flow calming and pollutant capture devices such as rain gardens, detention/attenuation ponds and other source treatment options, this will enable the mitigation of damage from peak flows and to allow for water quality treatment prior to the discharge to the receiving environments.
Community education/interaction Develop partnerships with the communities in the district.	Production of Engineering Standards to aid development in the selection of the Best Practicable Option for stormwater management. Printed/electronic factsheets to promote stormwater and the receiving environment. Working with schools and engaging the community at an earlier level to promote water health,
Connection denial Regulation of connections to the public system to promote long term stability.	Where development lies outside of the prescribed growth zones, or where substantial increases in growth are identified Council may consider the option to force developers to treat and attenuate stormwater runoff from the development within their site boundaries.

4.3 Population growth

4.3.1 Overall Growth Scenario

Statistics New Zealand (SNZ) issued revised population *projections* on 22 February 2017, using an estimated resident population at 2013 as the new base.

The LTP 2015 assumptions used the high growth scenario with population projections of:

- 20,000 in 2016 - already exceeded by the 2013 base of 20,500;
- 21,400 in 2026 - a figure now expected to be exceeded three years earlier in 2023 by even the updated low growth scenario of 22,600; and
- 22,000 in 2031 – a figure now expected to be exceeded three years earlier in 2028 by even the updated low growth scenario of 22,800.

In moving to the latest 2017 projections data, a decision needs to be taken on whether to continue to use the high growth scenario or to use lower growth options. The annual average population increases under the three scenarios are:

- High – population increase of 8,300 over 30 years = 276 persons per annum;
- Medium – population increase of 4700 over 30 years = 157 persons per annum; and
- Low – population increase of 1,200 over 30 years = 40 persons per annum.

Even the recently updated SNZ *high* growth scenario of 276 persons per annum is below the average of 315 persons per annum seen from 2006 to 2016. If one assumes some moderation of the 2006/2016 highs due to the cyclic nature of economic development and growth, then use of the updated *high* growth scenario is reasonable. This is supported by the increasing influence of Auckland over time, particularly in the southern part of the district, which should see sustained population growth over time.

The assumption is that population growth will be in line with Statistics New Zealand's 2013 base high series projections which will see population increases of:

- 2,900 (12.5%) from 23,100 to 26,000 between 2018 and 2028; and
- 2,000 (7.7%) from 26,000 to 28,000 between 2028 and 2038.

The SNZ projections show the population growth rate slowing in all regions, cities, districts of New Zealand, including Kaipara district, between 2018 and 2038 because:

- All areas will be home to more people aged 65 years and over by 2038; and
- Deaths will increase relative to births in almost all areas as the population ages.

4.3.2 Population growth distribution

It is expected that most population growth will continue to occur in the southern part of the district.

The table shows shares of district growth over various time periods. With reference to the LTP timeframe 2018/2028, it shows:

- Dargaville taking 10.7% of district population growth, growing by 310 persons to reach a population of 5,330 by 2028;
- A 76.2% share of district population growth (2,210 persons) occurring in the southern half of the district with rural Rehia-Oneriri growing by 900 people (31.0%) and the combined Mangawhai CAU's growing by 1,160 people to reach a population close to 5,000 (40%) taking the bulk of that growth;
- Relatively low shares of growth in the smaller urban CAU's of Ruawai (0.3%), Kaiwaka (2.8%) and Maungaturoto (2.1%) totalling just 150 persons although there will be considerable growth in the rural area around them. And
- Continued low shares of district growth (14.5%) in the north and northwest, totalling 420 persons.

4.3.3 Population fluctuations

A significant proportion of unoccupied dwellings in the district become occupied during holiday periods.. At the time of the 2013 Census an average 26% of dwellings (2,764 of 10,681) were unoccupied. Rates of unoccupied dwellings in Te Kopuru (10.6%), Maungaru (6.5%), Dargaville (7.2%), Maungaturoto (10.0%), Ruawai (11.4%), and Kaiwaka (13.3%) are lower and likely reflect normal rates of vacant dwellings, at any given time of the year. By contrast, Kaipara Coastal

(27.3%), Rehia-Oneriri (24.8%) and Mangawhai (52.7%) have significantly higher vacancy rates and are likely to see population fluctuations as vacant homes are occupied in holiday periods.

In an effort to estimate the scale of population fluctuation:

- Assume occupancy of up to 100% of dwellings in Kaipara Coastal, Rehia-Oneriri and Mangawhai during holiday periods;
- For normally unoccupied dwellings in these areas, assume occupancy of 0.5 persons per dwelling above the 2013 average occupancy in Kaipara Coastal, Rehia-Oneriri and Mangawhai during holiday periods to take account of families with children and guests, which are likely to result in higher average occupancy than normally occupied dwellings; and
- Assume no change in dwelling occupancy in Maungaru, Dargaville, Te Kopuru, Ruawai, Maungaturoto and Kaiwaka during holiday periods.

Using the 2013 base data, the usually resident district population of 20,600:

- Could have risen during holiday peak times by over 7,000 persons (7,111) to 27,600, an increase of 35%; and
- Just under half of that increase was in Mangawhai, gaining 3,400 persons at peak, an increase of 131%.

If the same percentage increases are applied to the 2018 and 2028 population assumptions:

- The resident district population of 23,100 persons in 2018 could increase by 8,013 persons during peak holiday periods to over 31,000;
- The resident District population of 26,000 persons in 2028 could increase by over 9,000 persons during peak holiday periods to over 35,000.
- As Mangawhai grows from a usual resident population of around 3,700 in 2018 to around 4,890 in 2028 its population could fluctuate up to 8,610 in 2018 (an increase of 5,000 at peak) and 11,287 in 2028 (an increase of 7,200 at peak).

4.3.4 Dwelling growth

The 2015 assumption is that dwelling growth rates will be more or less consistent with rating unit growth projections. As well as using the rating data as a source and for comparison it is useful to take the SNZ generated population growth assumptions and assess:

- The number of dwellings required to accommodate the usual resident population; and
- Apply an additional unoccupied dwelling component for holiday homes and vacant dwelling stock using 2013 Census occupancy rates.

The assumption is for steady to strong dwelling growth in LTP decade 2018/2028 moderating in the 2028/2038 decade as population growth rates begin to slow with an aging population. Projections indicate:

- Nearly 2,000 (1,912) additional dwellings will be built in the district over the LTP 2018/2028 period; and
- Another 1,400 built between 2028 and 2038.

The largest amounts of dwelling growth will be in the Mangawhai CAUs with over 1,000 dwellings delivered in the LTP 2018/2028 period and another 900 dwellings by 2028. Rehia-Oneriri CAU, covering much of the southern part of the district is expected to see ongoing strong growth (450 dwellings in LTP decade 2018/2028 and over 300 more dwellings out to 2028). Dargaville is expected to gain 130 dwellings over the LTP period and 70 more homes built in the following decade to meet a modest growth in population.

4.3.5 Most Likely Scenario

The following table shows the projected scenario for population change across the larger Kaipara communities. These projections are from Statistics New Zealand using population data from the 2013 census as a base. Statistics New Zealand provides low, medium and high series projections; KDC has chosen to use high level projections.

Table 4-2: Annual rating unit growth forecasts 2012/2022:

Projected Population for Kaipara District Council 2013 (base) – 2043 Update based on HIGH Projection														
Area	Population (Actual or forecast) at 30 June							Population Change			Share of District Growth			Vacant Census 2013
	2013	2018	2023	2028	2033	2038	2043	2013-43	2018-28	2028-38	2013-43	2018-28	2028-38	
District	20500	23100	24600	26000	27100	28000	28800	8300	2900	2000				
Te Kopuru	510	540	560	580	590	610	620	110	40	30	1.3%	1.4%	1.5%	10.6%
Kaipara Cst	3190	3370	3470	3560	3610	3610	3570	380	190	50	4.6%	6.6%	2.5%	27.3%
Maunguru	1820	1950	2050	2140	2220	2280	2310	490	190	140	5.9%	6.6%	7%	6.5%
Dargaville	4610	5020	5180	5330	5440	5500	5530	920	310	170	11.1%	10.7%	8.5%	7.2%
Maungaturoto	810	920	950	980	1000	1010	1030	220	60	30	2.7%	2.1%	1.5%	10%
Ruawai	470	490	490	500	510	530	540	70	10	30	0.8%	0.3%	1.5%	11.4%
Kaiwaka	640	700	740	780	830	860	900	260	80	80	3.1%	2.8%	4%	13.3%
Rehia-Oneriri	5840	6510	6990	7410	7770	8060	8310	2470	900	650	29.8%	31%	32.5%	24.8%
Mangawhai	1430	2060	2400	2710	2990	3240	3460	2030	650	530	24.5%	22.4%	26.5%	52.7%
Mgwhai Heads	1170	1670	1930	2180	2400	2580	2750	1580	510	400	19%	17.6%	20%	
Mgwhai Hbr	0	0	0	0	0	0	0	0	0	0				
Mgwhai total	2600	3730	4330	4890	5390	5820	6210	3610	1160	930	43.5%	40%	46.5%	

There are currently no identified growth driven capital projects for stormwater over the next three years. Where infrastructure is installed, this will likely be installed by developers.

Stormwater is unique from other Council services as stormwater is not consumed or directly influenced by population growth. The level of surface permeability and the frequency and intensity of rainfall events are the two main parameters impacting future stormwater flows and demands and these are constantly changing.

Growth in the district generates an increase in impervious surfaces (driveways, buildings and roads etcetera) which places additional demand on existing stormwater assets, or requires new stormwater assets. Currently, the proportion of the district that is impervious is unknown but is a factor considered in the development of Stormwater Catchment Management Plans (SWCMP). It is acknowledged that this will increase with growth, especially in the Mangawhai development area. Council uses the below options to manage the increases in stormwater runoff:

- Tolerate the consequences with an implicit reduction in the level of service provided;
- Increase constructed soakage;
- Provide piped solutions to cater for the increased flow and/or increase the capacity of existing assets.

In general, the forecasts assume that any additional demand for services created by the increased growth levels will be absorbed by the rating base growth and by more efficient delivery of services. Costs of implementation for growth can also be reduced through developers constructing pipelines to required sizes and then vesting with Council.

4.4 National Policy Statement on Urban Development Capacity 2016

This policy statement requires all councils to provide for growth to occur in their areas such that a lack of 'development infrastructure' (which includes water services) is not an impediment to that growth.

There are no communities in Kaipara larger than 30,000 population experiencing high rates of growth and so compliance only with requirements PA1-4 is required. Broadly these can be summarised as:

- For expected growth in the period from now to three years, the land and development infrastructure has to be feasible, zoned and serviced (or able to be serviced if it is developer responsibility);
- For medium term growth (3-10 years) the land does not need to be serviced but plans to service must be included in the LTP; and
- For long term growth (10-30 years) the land does not need to be serviced but provision to do so needs to be included in the Infrastructure Strategy.

In practical terms, it is difficult for Council to predict when a particular developer might decide to proceed and what the staging of that development might be. In the absence of a specific proposal it is not cost-effective for Council to proactively install capacity for developments that 'might' proceed.

The approach adopted by Council is therefore to engage with the development community and seek a co-ordinated approach that will provide for the development on a 'just in time' basis and with confidence that any works required are financially feasible for both the developer and Council.

4.5 Increase in demand for stormwater services

As development occurs in growing coastal areas such as Mangawhai, Pahi, Tinopai, Whakapirau and Baylys, there is an increasing expectation from ratepayers for Council to provide stormwater management systems to minimise the impact of flooding, erosion and water quality degradation. This is being driven by the ratepayer's desire for an appropriate level of protection from stormwater ponding, an increasing awareness of the natural environment and a desire to minimise adverse environment impacts.

A particular characteristic of the Kaipara is that approximately 64% of the ratepayers reside within the district and 36% outside the area. For Mangawhai these figures are 38% within the district and 62% outside the area and for the balance of the district the figures are 74% and 26% respectively.

4.6 Technological change

Historically the methodology for dealing with stormwater runoff was to quickly remove it from urban and risk areas as quickly as possible through pipe networks and dedicated overland flow paths. Discharges were made direct to the receiving environment with little regard to the potential contaminants that they may contain, and the effects they could have on the stability and functioning of the ecosystems.

Over the past two decades there has been a philosophical shift in this principle as new technologies have been developed to promote Low Impact Design in the management of stormwater. This involves implementing solutions to mimic the natural environment prior to development, and managing the impacts on the receiving environments.

Such advancements in stormwater management include the application of a treatment train approach (i.e. the use of two or more treatment methods in series to provide more effective contaminant removal), such as the use of ground soakage to maximise groundwater recharge and riparian planting around watercourses.

This shift in philosophy is supported by Council and guidance for its application is provided in the Engineering Standards 2011 and supporting documentation.

Technological advances in stormwater management are leading to more economically feasible devices entering the mainstream market and becoming more widely used. Stream restoration and riparian planting is replacing the standard lined channel, whilst the general treatment train approach to water quality is being applied to greatly improve discharge quality to lessen the effect on the receiving environment.

Council considers the use of wetlands and detention basins for stormwater management are integral parts to mimicking the natural flow regime in the receiving environment, whilst providing good levels of treatment.

Council is committed to working with NRC to implement new technology for stormwater management throughout the district. A constant awareness of technology changes is necessary to most effectively predict future trends and their impact on the utility infrastructure assets. This can be achieved through Council staff attending conferences, seminars and presentations along with seeking advice from professional advisors.

4.7 Legislative change

Legislative change can significantly affect Council's ability to meet minimum levels of service, and may require improvements to infrastructure assets. Changes in environmental standards and the Resource Management Act 1991 may affect stormwater discharge requirements.

In addition, changes in legislation can influence the ease at which new resource consents are obtained or existing consents are renewed. Experience has demonstrated that resource consent conditions are becoming more stringent with increased monitoring requirements being commonplace and the likelihood of additional treatment being necessary.

The Ministry to the Environment (MfE) is promoting a series of National Environmental Standards that can be enforced as regulations under the RMA. One of the sections under development relates to Ecological Flows and Water Levels in rivers, lakes, wetlands and groundwater resources. Although the receiving environment is already assessed in resource consent applications, the impact of this Standard is likely to require greater consideration of discharge quantities and quality of stormwater into the receiving environment.

NRC is in the process of finalising the plans and policy surrounding proposed seal-level rise and climate change, once this has been formally adopted KDC will prepare and adopt any changes required to its Standards and District Plan to meet the new requirements.

4.8 Environmental considerations

4.8.1 Focus on water quality

Environmental considerations are an ever-changing issue. As such, there is a requirement for Council to provide the best service it can with the most up-to-date information.

With climate change and predicted sea-level rise KDC will need to alter its focus and the considerations around flood levels, stormwater discharge and consented discharge limits to match the requirements from NRC, the change in public expectations and the altering natural environment.

Public perception of the impact of stormwater on the natural environment has altered noticeably over the last decade and has turned towards treating stormwater at the source and maintaining the quality of the harbours and waterways.

Urban stormwater runoff contains a range of contaminants which typically include organic and inorganic materials, metals and hydrocarbons. During very intense rainfall events contamination of stormwater from the wastewater network may also be present. The quality of stormwater runoff therefore has a significant impact on the quality of the receiving environment, being streams and rivers.

There is a growing awareness of the environmental issues related to the quality of stormwater runoff on the receiving environments of our streams, rivers and ground water and its impacts on our cultural, social and economic well-being.

Council, in conjunction with NRC, and communities are dedicated to protecting receiving environments, to protect it for future generations and to improve on the existing state. This is achieved through:

- Management of silt runoff from new development earthwork areas (including silt pond requirements for developers);
- Management of point source contamination risks (through the current Engineering Standards 2011 and community education); and
- Monitoring the receiving environments.

It is likely that as time progresses and more knowledge is gained from monitoring programmes about the effects of contaminants on the receiving environments that more stringent conditions will be applied on resource consents granted by NRC, including, but not limited to:

- Targeted contaminant removal (for example reduction in zinc loads);
- Increased overall treatment efficiency of stormwater management devices; and
- Greater application of LID in the overall stormwater management on a catchment basis.

Council will promote the best practicable option for the operation of the public stormwater infrastructure on behalf of the community as a whole, implementing strategies and programmes as appropriate. Review of existing consents, engineering standards and the provisions of the District Plan will be undertaken at regular intervals to allow comprehensive development guidance to be provided.

The stormwater network discharges into either rivers, streams or the Coastal Marine Area (CMA). The following table identifies those systems that discharge directly into the CMA, which may receive increased focus by NRC.

Table 4-3: Stormwater discharge zones

Township	CMA zone	Outfall numbers
Dargaville	Not CMA	66 Floodgates
Baylys	Marine 2	Via natural watercourses
Kaiwaka	Not CMA	N/A
Mangawhai	Marine 1	34
Te Kopuru	Not CMA	N/A

NRC undertakes summer monitoring at popular swimming locations in the district, including two freshwater and eight coastal sites. Samples are taken weekly between December and April each year to ensure the water is safe for swimming. Each site is given a grading based on the results compared to MfE's "*Microbiological Water Quality Guidelines for Marine and Freshwater Recreational Area*" publication (2002).

The results of this monitoring programme can be used to identify non-compliant locations and trigger investigations into possible sources of contamination, and creation of targeted treatment programmes.

Figure 4-1: Commentary from NRC on 2016 Recreational Water Quality

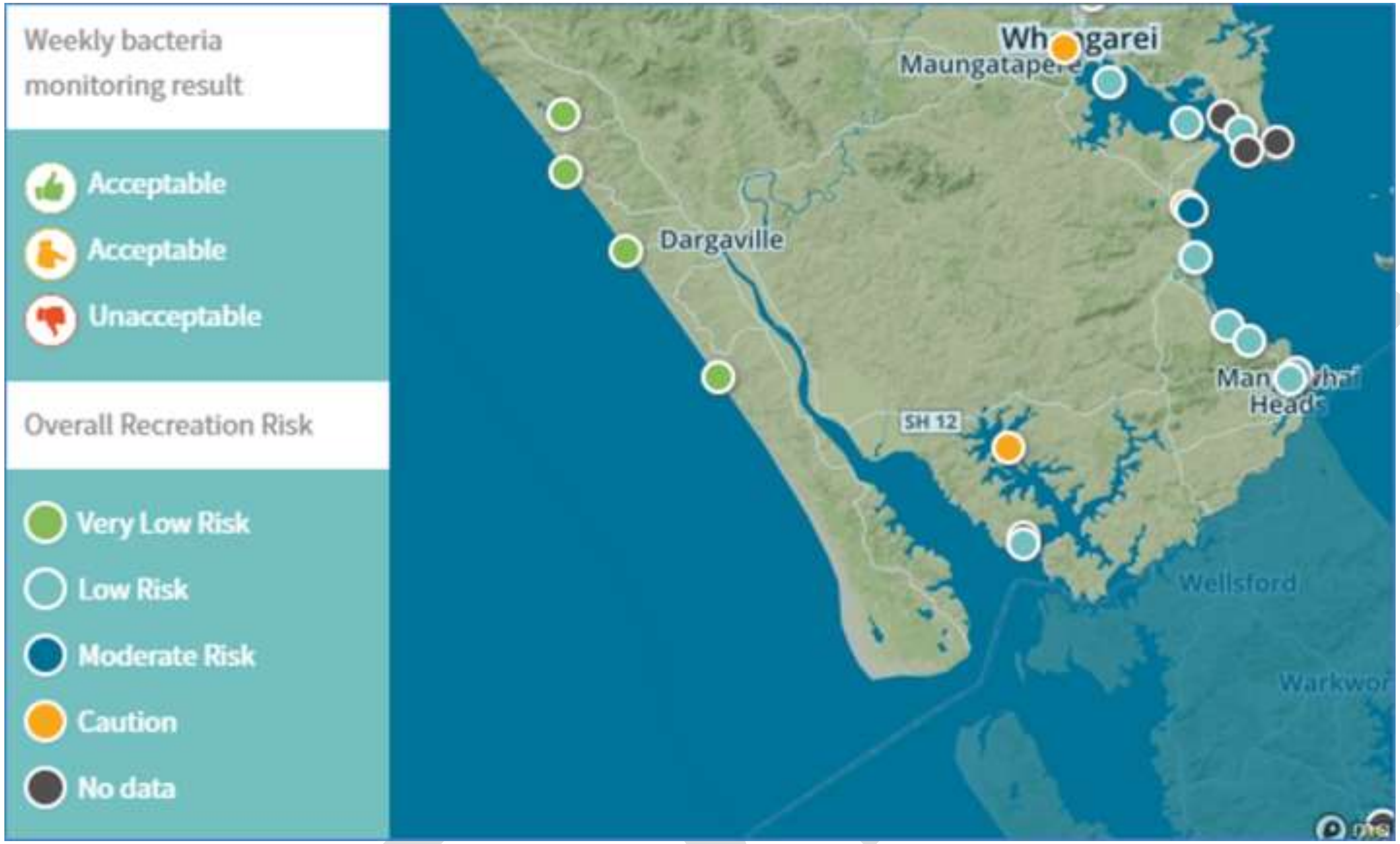
Okay to swim at most popular swim spots; NRC

The vast majority of Northland's most popular coastal swimming spots – and most of their freshwater equivalents – are suitable for swimming all or most of the time, regional council data shows.

Council Environmental Monitoring Manager Jean-Charles Perquin says hundreds of water samples were collected from 44 popular coastal and 13 freshwater summer swimming sites between late November last year and late February.

The annual water testing looks for bacteria used to gauge the risks of contracting gastrointestinal and other infections while using popular beaches, rivers and lakes for swimming, water sports and other forms of recreation.

Mr Perquin says 99.1 percent (606 out of 611) samples at coastal sites and 89.4% (161 out of 180) samples at freshwater sites over summer met national 'guideline values', meaning they were considered suitable for swimming.



4.8.2 Climate Change

The MfE advises that climate scientists estimate Northland's temperature could increase 0.9°C by 2040, and 2.1°C by 2090[1]. This compares to a temperature increase in New Zealand during last century of about 0.7°C[2]. To put this in perspective, the 1997/1998 summer, which was particularly long, hot and dry, was only about 0.9°C above New Zealand's average for the 1990s. Northland is expected to experience more frequent and intense heavy rainfall events which will increase the risk of flooding and could be four times as frequent by 2090.

[1] Ministry for the Environment, Climate Change Projections for the Northland Region. 2 August 2012: http://www.mfe.govt.nz/issues/climate/about/climate-change-affectregions/northland.html
[2] NIWA, Past Climate Variations over New Zealand: http://www.niwa.co.nz/our-science/climate/information-and-resources/clivar/pastclimate

Some of the potential impacts of climate change of stormwater and associated public infrastructure could include:

- Increased flood frequency resulting from more intense rainfall;
- Increased number of systems that do not have an appropriate LOS capacity, due to increased overall rainfall and raised groundwater tables;
- Increased coastal flooding through higher tide and surge levels;
- Increased flooding due to higher tides and rainfall breaching existing stopbanks;
- Increased flooding due to higher **low** tides retaining stormwater and inundating an existing system by removing the ability for it to drain completely;
- Potential overwhelming of existing treatment devices leading to increased contaminant loadings in the receiving environment; and
- Increased coastal and fluvial erosion resulting from increased tide variations and discharges from the stormwater system.

NRC monitors rainfall at five sites throughout the district to understand the long term effects of climate change on rainfall patterns. In addition The National Institute of Water and Atmospheric Research (NIWA) maintains rainfall monitoring through an automatic station in Dargaville.

Although the definitive effects of climate change are not known guidance is provided in a number of publications from a number of organisations. The Intergovernmental Panel on Climate Change (IPCC) releases guidance at regular intervals considering global impacts of climate change. The MfE distils the information from the IPCC publication into "*Climate change effects and impacts assessment: A guidance Manual for Local Government in New Zealand*" and the summary report "*Preparing for Climate Change: A Guide for Local Government*" which provides New Zealand specific Climate Change Data.

The following table is an extract from the MfE publication and highlights the potential effects of Climate Change on stormwater networks.

Table 4-4: Effects of climate change on stormwater network

Resource	Key climate influences	Impacts of climate change
Stormwater reticulation	Increased rainfall	• Increased frequency and/or volume of system flooding; • Increased peak flows in streams and related erosion; • Groundwater level changes; and • Changing flood plains and greater likelihood of damage to properties and infrastructure.
Rivers	Increased rainfall	• River flows likely to, on average, increase in the west and decrease in the east of New Zealand; • More intense precipitation events would increase flooding (by 2070 this could range from no change, up to a fourfold increase in the frequency of heavy rainfall events); • Less water for irrigation in northern and eastern areas; and • Increased problems with water quality.
Drainage	Increased rainfall	• Increased frequency of intense rainfall events could occur throughout New Zealand, which would lead to increased surface flooding and stormwater flows, and increased frequency of groundwater level changes.
Coastal areas	Sea-level rise Storm frequency and intensity Wave climate Sediment supply	• Effects of sea-level rise and other changes will vary regionally and locally, this will have an as yet unquantifiable effect on existing land drainage and flood protection systems; and • Coastal erosion is likely to be accelerated in areas it is already occurring. Erosion may become a problem over time in coastal areas that are presently either stable or are advancing.

The development of Council's Engineering Standards 2011 provides design rainfall for Dargaville, Tinopai, Maungaturoto and Mangawhai areas of the district, being the main population centres. The rainfall depths provided in the Engineering Standards 2011 have been estimated up to the 100 year event; 72 hour duration and include adjustment for 95% confidence.

For developments in other areas the current Engineering Standards 2011 acknowledges NIWA's High Intensity Rainfall Design System (HIRDS) version 2, which outlines rainfall depths + 1.65 standard error + 17% climate change allowance.

Council manages the impact of urban growth and development on the stormwater infrastructure and receiving environment through the application of Stormwater Catchment Management Plans (SWCMPs) and planning provisions set out in the District Plan. Council currently has SWCMPs for Dargaville and Baylys Beach areas of the district and a SWCMP is currently being developed for Mangawhai as the previous version was finalised in 2005.

The functions of an SWCMPs include the following:

- Assess stormwater management of the wider catchment and not just the development site;
- Integrate with growth plans of the district, to assess future performance of the stormwater network;
- Identify potential quality issues that could develop as a result of future development;
- Identify catchment-wide stormwater management principles to minimise ad-hoc localised solutions;
- Act as a vehicle to communicate with Iwi, the community and other stakeholders;
- Identify potential risks (both flood and flow related); and
- Identify mitigation options for the stormwater network.

The outputs from the SWCMPs can be used to define capital work's programmes and developer contributions.

4.9 Summary of drivers of change

Table 4-5 below provides a summary of how the above issues will impact on the management of stormwater assets.

Table 4-5: Summary of issues affecting stormwater assets

Issues	Impact on stormwater assets
Population growth	Increased urbanisation will lead to capital expenditure on stormwater networks. This will be through either an extension to the existing system, where development can connect into the system or through newly constructed local systems. These systems will be needed to ensure that the LOS for stormwater management is achieved.
Technical change	The changes in the technical approach to stormwater management, including regulatory and statutory requirements will impact on the future design of stormwater assets. It is unlikely that retrospective design will be required, however, the renewing of stormwater discharge consents are likely to be required to meet these standards.
Legislative changes	The proposed MfE National Environmental Standard related to flow and level is currently open for discussion. It is likely that this will come into operation and impact on the design of the stormwater network.
Customer expectations	Council's current Engineering Standards 2011 include the LOS that are committed to providing to the community. There is potential for certain developments in certain areas to require greater LOS to be provided, for example development in very flat catchments.

Issues	Impact on stormwater assets
Environmental considerations	It is likely that environmental considerations to protect the natural environment and available resources will become more important and regulated. This will also arise from technology changes and customer expectations. With increasing focus on water quality more wetlands and other water treatment options are being asked for as a design consideration.
Climate change	The potential impacts of climate change on stormwater infrastructure design to the year 2090 is provided for within the current Engineering Standards 2011. The potential impacts of climate change are not static and Council will adopt the most up-to-date information published by the IPCC and New Zealand's central government when this data is released.

5 The assets

The Assets section of the AMP is set out as follows:

- Asset details – summary of Council's five stormwater schemes and related assets;
- Critical assets – summary of Council's critical assets for stormwater and how these will be managed; and
- Asset values – summary of the stormwater asset valuation.

5.1 Asset details

5.1.1 Overview

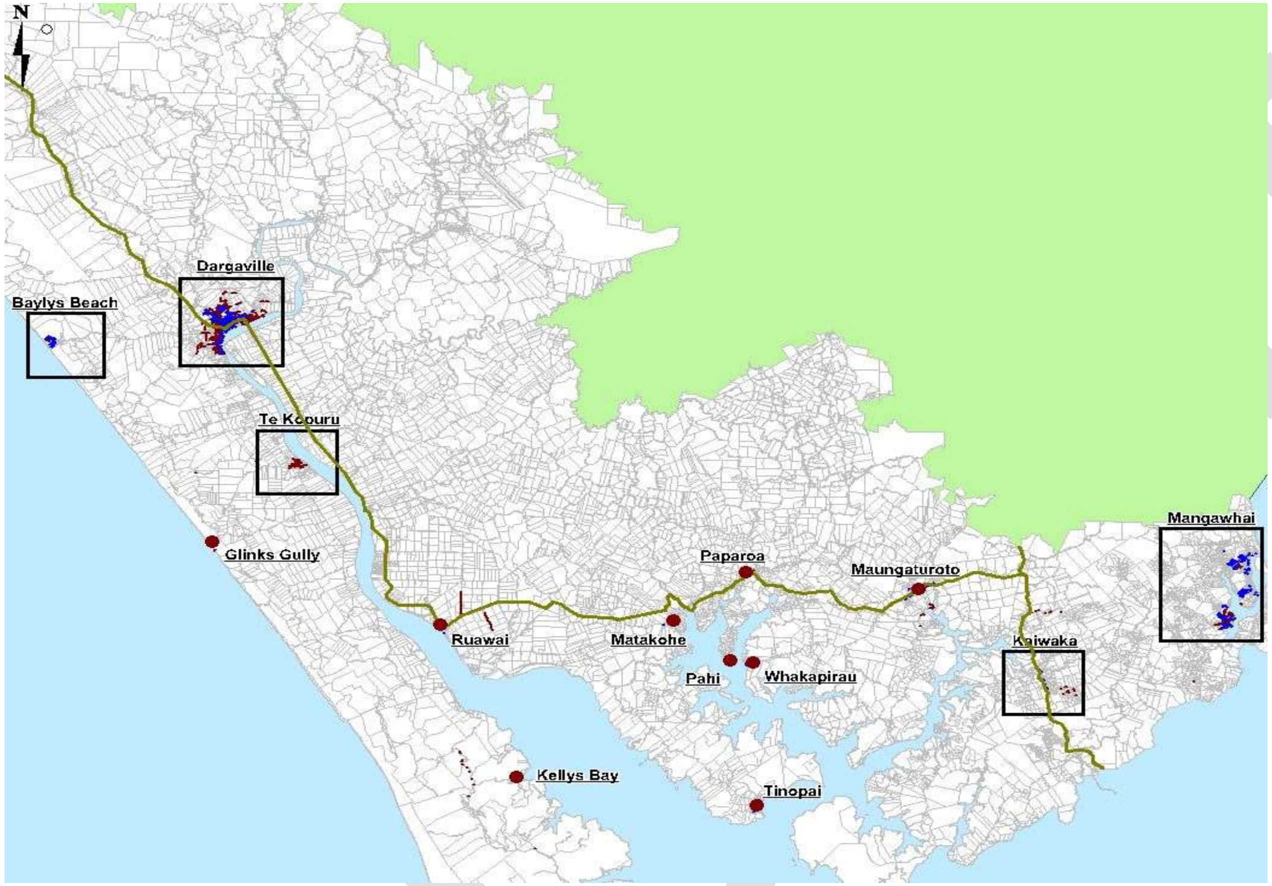
The stormwater assets that are within the scope of this AMP service residential and business areas in the following townships:

- Baylys;
- Dargaville;
- Te Kopuru;
- Kaiwaka;
- Mangawhai.

These townships all have piped urban stormwater networks of varying scales. Rural areas and the smaller townships are currently serviced primarily by the roading infrastructure department.

The location of each of these communities within Kaipara district is illustrated in the figure below.

Figure 5-1: Location of communities with stormwater schemes



An overview of the stormwater assets in the district is provided in Table 5-below.

Table 5-1: Asset overview summary

Community	Pipeline length (m)	Open drain(m)
Baylys	3,989	10
Dargaville	35,638	34,671
Te Kopuru	149	4,760
Kaiwaka	1,646	262
Mangawhai	24,806	7,311
Grand total	**66,228**	**47,014**

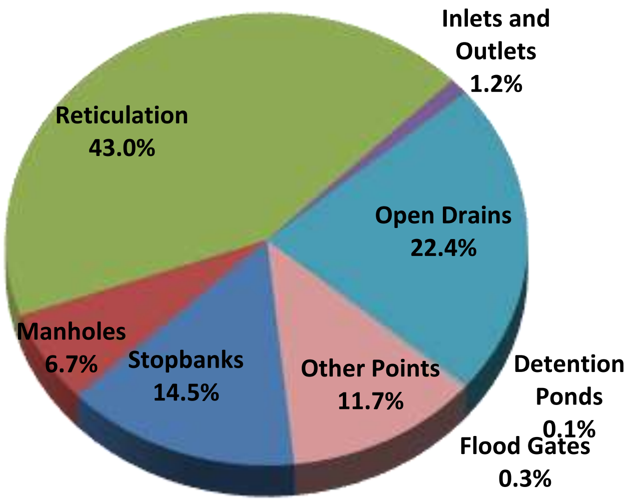
NB: Various natural assets such as overland flow paths and soft assets including riparian planting are located throughout the district.

This AMP focuses on three main asset components for stormwater, which are:

- Reticulation (including manholes and connections);
- Detention; and
- Flood Protection.

The scope of the stormwater assets (proportion of optimised replacement cost for all stormwater assets) by type is illustrated in the below figure.

Figure 5-2: Scope of stormwater assets by type



5.1.2 Asset data

Council has a number of information systems that store asset data and enables various analysis to aid in the management of the activity.

It is recognised that condition and performance data relating to the stormwater assets has not been well documented. The current asset register contains a number of unknown, incomplete and incorrectly-coded asset attributes. This affects Council's asset knowledge and asset valuations and does not provide a sound basis for determining maintenance needs and forecasting renewals of stormwater assets.

The improvement of Council's data collection and entry processes has previously been identified as a critical project, and is now currently underway with CCTV investigations of the oldest pipelines within the Kaipara district currently being investigated to improve the knowledge of our existing assets.

Following completion of the improvements, Council will continue to focus more on using previously un-utilised functions of their support tools, such as the recording of maintenance history at asset component level in AssetFinda each time a works order is completed.

As more information is recorded, an initial assessment and listing of renewal needs will be able to be created from AssetFinda. This could create a risk of significant changes to the level of expenditure required, and will need to be reviewed and assessed by Council in line with Council's Renewals Policy.

The data improvement actions included in the Improvement Plan are included under the Core portion :

- Utilise a central database and geospatial framework for recording of condition assessment information and generate renewal programme from the system
- Create a central management system for consents, compliance and monitoring
- Commence a condition assessment of critical Stormwater assets to clean up missing asset data and to produce an effective renewals programme
- Development of a renewals programme based on performance and condition ratings of critical stormwater assets
- Commence a process to clarify ownership of assets across the district (roading versus urban), including responsibilities of townships that are not serviced
- Review of data management procedures including development of system for recording maintenance and costs at asset component level in the asset register, to help develop failure curves based on actual asset condition
- Ongoing collection of data on asset attributes and condition as opportunity arises and as part of structured inspection programmes.

5.2 Pipelines

The stormwater network is made up of 56.7km of pipeline, as shown in Table 5- below.

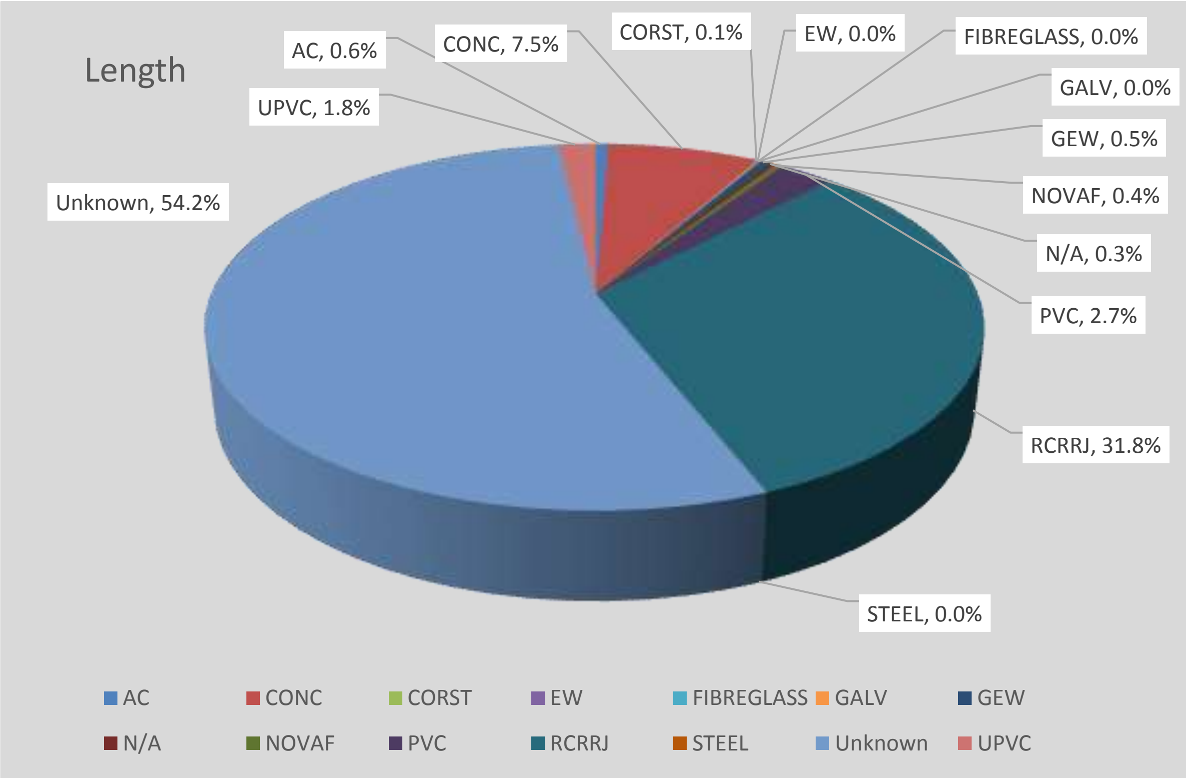
- 37% of pipe diameters are unknown (20.7km);
- 57% of pipe materials are unknown (32.4km); and
- 34% of pipes have both unknown diameters and unknown materials (19.3km). Figure 5-5 below summarises the known and unknown pipeline materials.

Table 5-3: Kaipara stormwater pipeline diameter / material summary by length (m)

Materials	AC	CONC	CORST	EW	GRP	GALV	GEW	N/A	NOVAF	PVC	RCRRJ	STEEL	Unknown	UPVC	Grand Total(m)
Unknown		580						180	34	98	715		22,478	19	24,104
100-250	89	543			11	4	96	11	237	1,063	1,494	9	4,228	1,206	8,991
251-500	337	2,931	10	20			235			528	13,732		7,444		25,237
501-900		865	64							109	4,044		1,878		6,960
901-1350		110									1,034		190		1,334
1351-1900											248				248
Grand total(m)	**426**	**5,029**	**74**	**20**	**11**	**4**	**331**	**191**	**271**	**1,798**	**21,267**	**9**	**36,218**	**1,225**	**66,874**

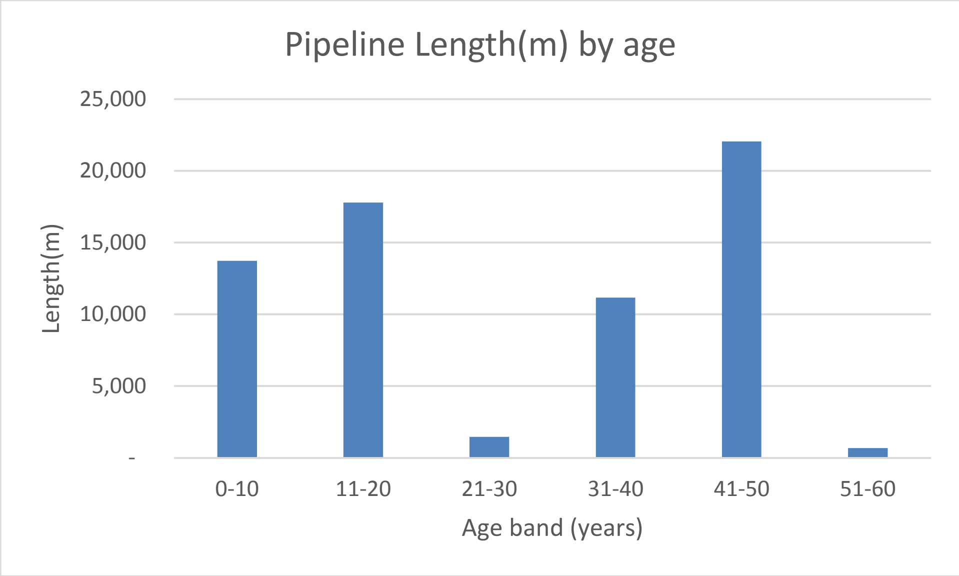
Data source: AssetFinda June 2015

Figure 5-3: Stormwater pipe by material



A review of the asset register to ensure all assets have been properly recorded has been identified as an item in the Improvement Plan, along with a data cleansing project to reduce the number of unknown asset attributes in the asset register.

Figure 5-4: Stormwater pipe by age



The graph above shows that 100% of pipe ages are known, with majority of stormwater pipelines being under 42 years old. Pipeline age has been the primary driver for assessing pipeline conditions, and determining renewals in the past. Council recognised that this approach was not best practice and have implemented a performance and condition rating determined by the risk criticality of the asset, per definitions supplied by ProjectMax. Age and criticality are now the main drivers in identifying assets for the condition assessment which provides a current condition of the target asset allowing for the creation of a renewal and growth strategy based on accurate assessments of the current condition of the asset. This will be backed up by a rigorous condition assessment programme, asset data cleansing and investigation.

5.3 Detail of Individual Schemes

5.3.1 Baylys

Baylys is located on the west coast and experiences seasonal population increase from non-residential owners of holiday homes and visitors. The Sunset West Subdivision has not reached the growth level previously expected, with many sections still empty.

Baylys township is mainly serviced by a reticulated system consisting of a piped network with manholes and kerbside sumps discharging to the receiving environment, it is also at the lowest point of a large cultivated catchment which reaches back towards Baylys Basin Road. This has the ability to add a large amount of water runoff into the existing streams and flow paths causing scouring and other issues at the lowest point which is the Baylys Township. Many properties discharge to soakage and open drains.

A summary of Baylys stormwater assets follows.

Table 5-4: Baylys asset summary

	Pipeline length (m)	Open drains (m)	Manholes	Inlets / outlets	Detention ponds
Physical quantity	3,960	10	55	-	-
Asset condition rating	2[3]	Condition assessment due 2018	Condition assessment due 2018	Condition assessment due 2018	Condition assessment due 2018
Depreciated replacement cost	$936,914				

[3] A generic condition rating of 2 has been assigned where historical data and reviews by Operations staff indicate the operational condition of the assets as being in "good condition".

Figure 5-5: Baylys asset map

Reticulation

There is approximately 3.2km of stormwater pipeline in Baylys, and 10m of open drains.

Most pipes are 300mm in diameter and the predominant known pipe material is concrete. Around 12% of pipe diameters are unknown (395m), and 7% of pipe materials are unknown (219m). This will be investigated as part of the continuing "data cleansing" project detailed in the Improvement Plan.

Table 5-5: Baylys stormwater pipeline diameter / material summary by length (m)

Diameter (mm)	AC	CONC	RCRRJ	Unknown	UPVC	Total length (m)
Unknown		143.16	82.22	172.67	1.11	399.16
100-250					539.71	539.71
251-500	68.89	542.3	1621.67	45.99		2278.85
501-900		239.96	436.36			676.32
901-1350			94.74			94.74
Grand total	68.89	925.42	2234.99	218.66	540.82	3988.78

Data source: AssetFinda June 2016

Desktop assessments and reviews by Operations staff of the Baylys reticulation show it to be in good condition operationally.

Flood Protection

An SWCMP was developed in 2003, and was only ever in draft form, this has been reviewed and revised by Opus consultants in 2016 and will be used as a basis for planning projects going forward in Baylys. This has been recognised as a future improvement in the Improvement Plan.

Historically there were flooding problems due to undersized pipes draining the catchment into Cynthia Place. These were upgraded and roadside drains deepened to increase capacity. There are other issues within the Baylys area of which Council is aware and is looking to address in the near future as per the Improvement Plan. Part of the improvement process is to complete an optioneering exercise on the projects raised in the 2016 revision of the SWCMP, these options can then be presented to gauge public feeling and ensure that the council will be providing the right service to the community, prior to setting a budget to complete the works.

Summary of issues and remedial actions

The key issues relating to the Baylys stormwater network as identified by Council, or in this AMP, along with potential remedial actions as identified in the Core portion of the Improvement Plan are listed in Table 5-6 below.

Table 5-6 - Specific Improvement Plan Issues for Baylys

Scheme Specific Issue	Improvement action	Forecast completion date
Outdated SWCMP for the Baylys stormwater network.	Undertake the development of the SWCMP for Baylys Beach to gain an understanding of capacity constraints in the system and optimal options to mitigate the risks. Includes assessment of possible lack of capacity in Cynthia Place.	June 2021

5.3.2 Dargaville

Dargaville is the main service and visitor centre for the district, and is seen as the gateway to the Kauri Forest. It is a unique town of approximately 5,020 people, positioned on the banks of the Wairoa River.

The Dargaville urban area is serviced by a piped stormwater network and is protected from river flooding by 66 floodgates and various stopbanks. A series of floodwalls were installed to protect low-lying areas in the southern-most part of Dargaville exposed to the Wairoa River and the Kaihu River (not included in asset map below). The stopbanks and floodgates located outside the urban area are part of the Land Drainage District's and do not form part of this AMP.

A summary of Dargavilles' Stormwater follows.

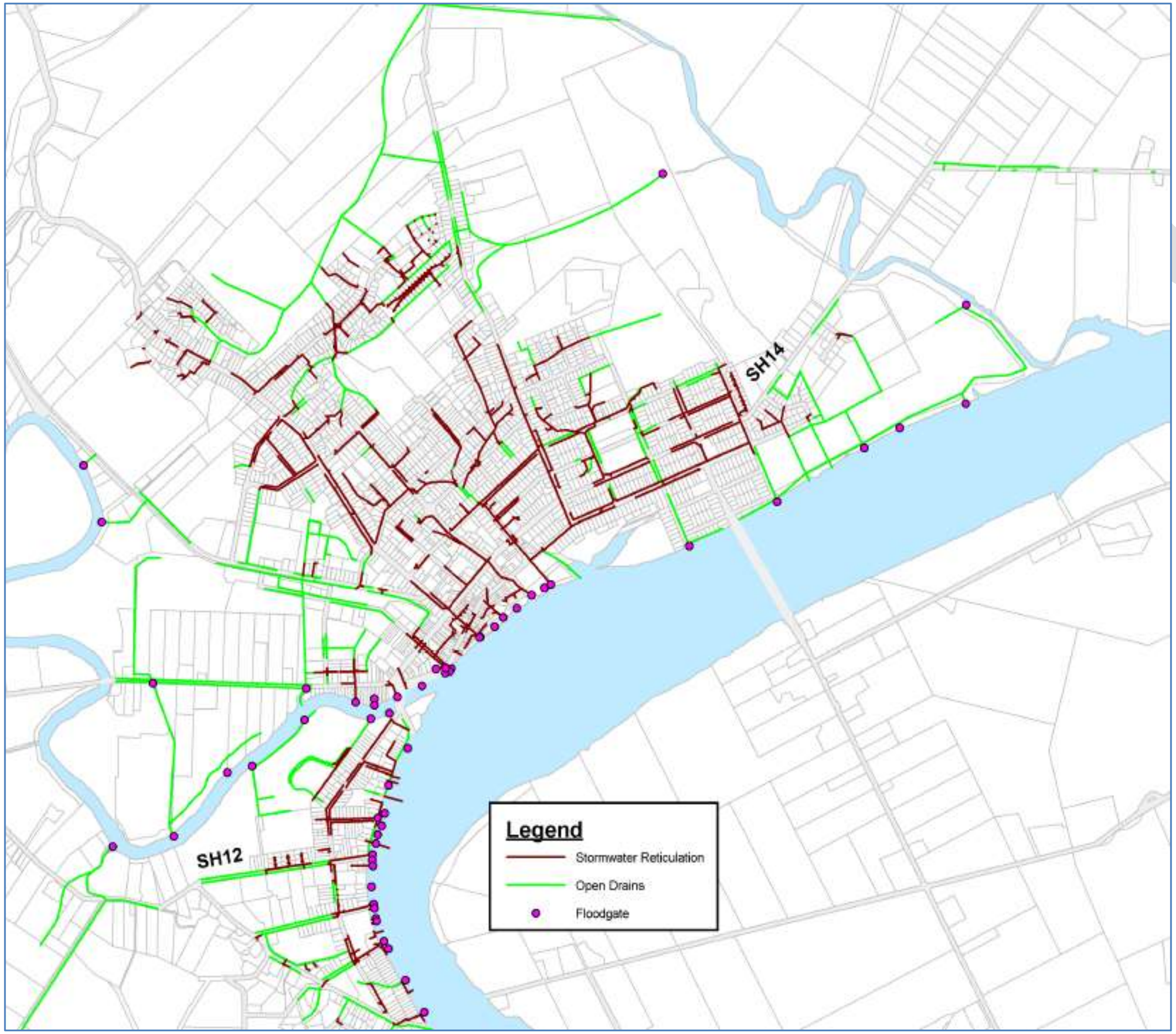
Table 5-7: Dargaville asset summary

	Pipeline length (m)	Open drains (m)	Manholes	Inlets / outlets	Detention ponds	Floodgates	Floodwalls / stopbanks (m)
Physical quantity	35,638	34,671	676	23	1	57	6,625
Asset condition rating	Unknown at present	Unknown at present	Unknown at present	Unknown at present	Unknown at present	Unknown at present	Unknown at present
Depreciated replacement cost	$12,272,407						

Table 5-8: Recently completed projects

Projects	Recently completed projects		
	Quantity	Description	Completion date
Condition assessment of critical stormwater assets	735.5m	CCTV of critical stormwater assets completed as part of a data cleansing project for Kaipara stormwater asset information, and to provide better information when identifying renewal projects.	July 2016
	1,840m	CCTV of critical stormwater assets completed as part of a data cleansing project for Kaipara stormwater asset information, and to provide better information when identifying renewal projects.	July 2017
Parore Street large diameter stormwater upgrade	355m	A planned upgrade of the Parore Street stormwater main to 825mmØ (this was identified as a critical line as part of the 2003 DWK Stormwater Catchment Management Plan (SWCMP)), this is due to the existing network being "under capacity".	July-2017

Figure 5-6: Dargaville asset map



5.3.2.1 Reticulation

The Dargaville network is comprised of a mixture of old and new infrastructure, which generally copes well with rainfall events. There is approximately 32.2km of stormwater pipeline and 15.5km of open drains identified in our asset register. The breakdown of material and size of the reticulation network is detailed in Table 5- below.

Approximately 50% of pipe diameters are unknown (16.1km) and 79% of materials are also unknown (25.3km). Of the diameters that are known, most are 300mm, and the predominant known pipe materials are concrete and RCRRJ. This will be investigated as part of the “data cleansing” project detailed in the Improvement Plan.

There is also approximately 83m of steel pipes showing in the asset register, installed in the 1970s. Investigation will be required to confirm the condition of these assets. This has been identified as a future improvement in the Improvement Plan.

Table 5-9: Dargaville stormwater pipeline diameter/material summary by length (m)

Diameter	AC	CONC	CORST	GEW	NOVAF	PVC	RCRRJ	STEEL	Unknown	UPVC	Total
Unknown		385			34		36		16,597	10	17,061
100-250	87	216		65	231	700	333	9	4,032	113	5,785
251-500	268	979	10	193		210	2,159		5,559		9,378
501-900		398	64			109	806		1,398		2,775
901-1350		58					227		106		391
1351-1900							248				248
Grand total	355	2,036	74	258	265	1,019	3,809	9	27,692	123	35,638

Data source: AssetFinda March 2017

A considerable number of deep open drains have been piped in Dargaville residential streets to address safety concerns of residents and improve performance of the stormwater network. Recent reviews of customer complaints have identified there are still areas where open drains are causing safety issues for residents. Further investigation will be required to address these areas, and this has been identified as a future improvement in the Improvement Plan.

Limited smoke testing has been conducted in Dargaville in the past to verify possible infiltration of stormwater into the wastewater network. However little assessment of the data has been undertaken and further investigation is required to understand the extent and implications of this issue on the wastewater system. A recent report on the wastewater system has identified that the wastewater flows in Dargaville increase up to 15 times during heavy rain making this an issue that needs to be sorted as soon as practically possible to avoid any overflows or discharge to the receiving environment. The development of an unplanned discharge mitigation strategy is budgeted within the lifespan of the Wastewater AMP, which will include consideration of inflow and infiltration issues.

Figure 5-2: Stopbank in Urban Dargaville

5.3.2.2 Detention

A detention pond in Awakino Road, Dargaville was recently vested to Council. This pond aids with alleviating flooding in residential areas by storing floodwaters during times of peak rainfall. Wet ponds also improve stormwater quality. More ponds are expected to be vested in Council as part of future development.

To date Council does not have Operations and Maintenance manuals for any of the ponds across the district, including Awakino Road. This has been identified as a future improvement in the Improvement Plan. A template needs to be developed with key information required to manage these ponds including wetland planting, public safety design and maintenance requirements.

5.3.2.3 Flood protection

Historically, a lack of capacity has been the major performance issue for Dargavilles' stormwater network, with flooding in low-lying areas. These capacity issues have been addressed through a targeted capital works programme that is still ongoing,

A series of floodwalls were installed more recently to protect low-lying areas in the southern-most part of Dargaville exposed to the Northern Wairoa River and the Kaihu River.

There are also 66 urban floodgates which, along with the stopbanks and floodwalls, are used to prevent the backflow of river water in times of high flows into the commercial areas of Dargaville. The industrial and commercial area adjacent to the Northern Wairoa River is an area that has historically been prone to flooding during periods of heavy rain and low barometric pressure when floodgates sometimes jam open and breaches of floodwalls and stopbanks can lead to tidal waters entering the main street.

The floodgates, stopbanks and floodwalls are considered to be critical assets. A formal criticality assessment was recognised as a future improvement in the Improvement Plan and this was implemented last year with the construction of a "Criticality Framework" in 2016.

An hydraulic model of the Dargaville stormwater network needs to be created, this study will be used to confirm the impact of upgrades recently completed and will assist in identifying any further areas where capacity may be an issue. It will also enable Council to effectively and efficiently identify future projects based on LOS and capacity.

NRC also identified flood-prone areas in the district and these are shown in the District Plan (Operative in Part). A Stormwater Development Plan for Dargaville was completed in 2003 and detailed possible upgrades required to the stormwater network. This was revised in 2016 by Opus as a desktop study and a more comprehensive plan and model will need to be created once the asset data has been updated sufficiently. The original plan also identified flood-prone areas but needs to be updated and developed into a formal Stormwater Management Plan (SWCMP) reflecting the principles of the most up-to-date Engineering Standards. This has been recognised as a future improvement in the Improvement Plan.

Possible issues with under-capacity have been identified in Dargaville. Further investigations have been recommended in the Improvement Plan to allow for greater knowledge on the current capacity of the network and to increase capacity of the network to bring it up to the minimum LOS.

5.3.2.4 Summary of issues and remedial actions

The key issues relating to the Dargaville stormwater network as identified by Council, or in this AMP, along with potential remedial actions as identified in the Core portion of the Improvement Plan, are listed in Table 5-10.

Table 5-10 - Specific Improvement Plan Issues for Dargaville

Scheme Specific Issue	Improvement action	Forecast completion date
Infiltration issues between stormwater and wastewater networks.	Investigation into any possible infiltration issues between the stormwater and wastewater networks will be carried out as part of actions identified in the Wastewater AMP Improvement Plan.	Not programmed at this time
Outdated SWCMP for the Dargaville stormwater network.	Undertake the development of the SWCMP for Dargaville to gain an understanding of capacity constraints in the system and optimal options to mitigate risks including : • Investigation of residents' safety concerns of open drains in Dargaville • Possible lack of capacity in Murdoch Street and other areas of Dargaville	June 2021
Lack of O&M manual for detention ponds, including management and safety information.	Develop a template for operations and maintenance manual for ponds with key information required for developers.	June 2020
Steel pipes installed in 1970s as shown in the asset register.	Steel pipes and their condition will be reviewed as part of the condition assessment and asset data cleansing projects.	Jun 2021

5.3.3 Te Kopuru

The township of Te Kopuru is located on a flat plateau above the Northern Wairoa River. Stormwater is primarily managed through the 4.7km of open drains which discharge to various gullies and then into the river. There is also around 43m of stormwater pipeline in Te Kopuru.

Table 5-11: Te Kopuru asset summary

	Pipeline length (m)	Open drains (m)	Manholes	Inlets / outlets	Detention ponds
Physical quantity	43	4,760	2	-	-
Asset condition rating	2[4]	Condition assessment commenced 2020	Condition assessment commenced 2020	Condition assessment commenced 2020	Condition assessments commenced 2020
Depreciated replacement cost	$304,246				

Figure 5-8: Te Kopuru asset map

[4] A generic condition rating of 2 has been assigned where historical data and reviews by Operations staff indicate the operational condition of the assets as being in “good condition”.

5.3.3.1 Reticulation

Stormwater in Te Kopuru is primarily managed through the 4.7km open drains associated with the roading network. There is also around 43m of stormwater pipeline in Te Kopuru. The asset register for Te Kopuru suggests that many assets have unknown attributes, with 100% of pipe diameters and materials both unknown. The reticulation is known to be mainly concrete pipes, although this detail is not recorded in Council's asset register. This will be investigated as part of the data cleansing project identified in the Improvement Plan.

Table 5-12: Te Kopuru pipeline diameter / material summary by length (m)

Diameter(mm)	Materials		
Diameter	PVC	Unknown	Grand total (m)
Unknown		69	69
100	31		31
300		15	15
375		35	35
Grand total (m)	31	119	150

Data source: AssetFinda March 2017

Due to the system being relatively new, and from operational knowledge, the assets are believed to be in good condition.

5.3.3.2 Flood protection

There have been some customer complaints of flooding problems with the runoff difficult to drain from the plateau. The flooding had only a minor impact.

There has been no SWCMP developed for Te Kopuru. This has been identified in the Improvement Plan

5.3.3.3 Summary of issues and remedial actions

The key issues relating to the Te Kopuru stormwater network as identified by Council, along with potential remedial actions as identified in the core portion of the Improvement Plan, are listed in are listed in Table 5-13.

Table 5-11 - Specific Improvement Plan Issues for Te Kopuru

Scheme Specific Issue	Improvement action	Forecast completion date
Lack of SMP for the Te Kopuru stormwater network.	Undertake the development of the SMP for Te Kopuru to gain an understanding of capacity constraints in the system and options to mitigate risks.	June 2021

5.3.4 Kaiwaka

Kaiwaka is a small township on State Highway 1 built on ridges, with many cafes and speciality shops. It is a stop-off point for many visitors, especially over the summer weekends. The stormwater system is mainly associated with the State Highway and the roads joining it. Kaiwaka is a potential growth area, as identified in the District Plan (Operative in Part) and also more recently with the submissions regarding the eventual extension of the Northern Motorway making this a possible satellite town for both Auckland and Whangarei.

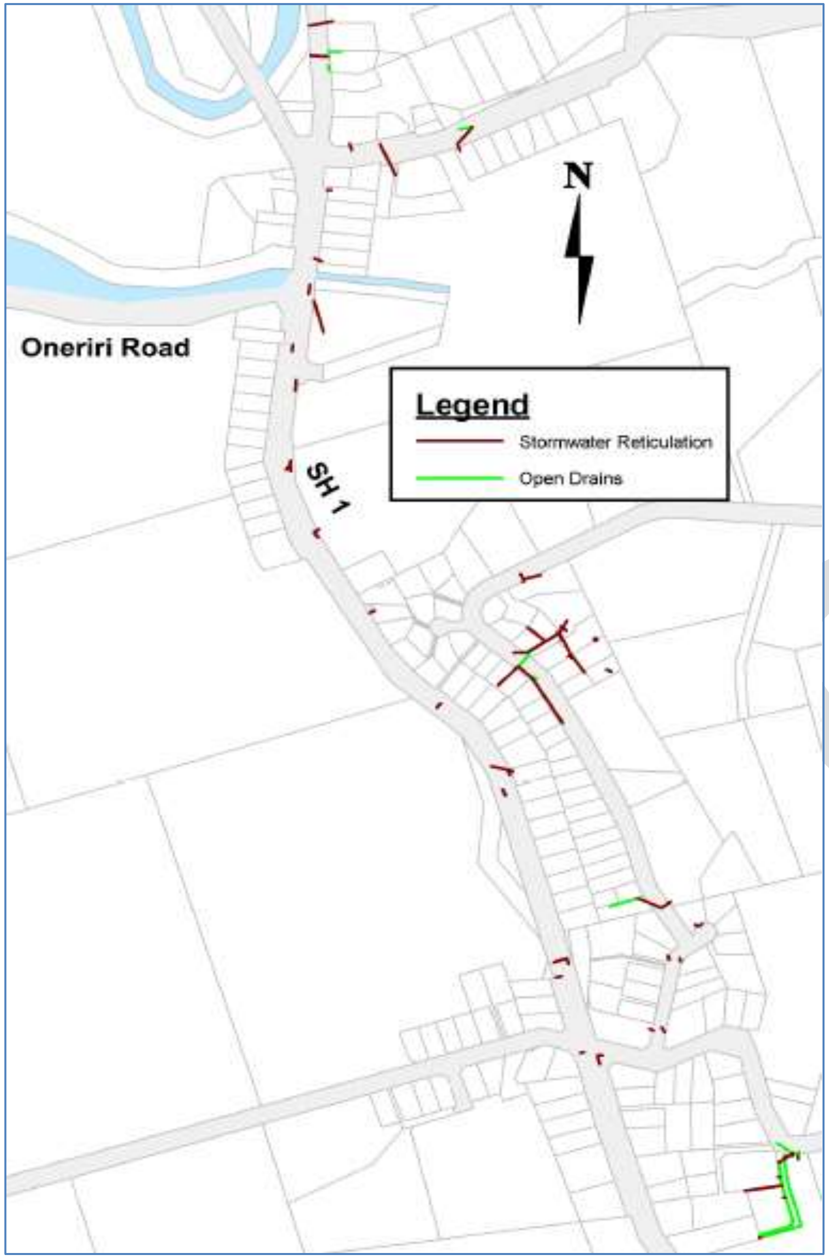
Some of the reticulation is servicing the road network only and some may be private. Clarification of the ownership and operations and maintenance responsibilities of these assets is listed as an item in the Improvement Plan.

Table 5-14: Kaiwaka asset summary

	Pipeline length (m)	Open drains (m)	Manholes	Inlets / outlets	Detention ponds
Physical quantity	1,646	262	9	106	-
Asset condition rating	2[5]	Condition assessments commenced 2018	Condition assessments commenced 2018	Condition assessments commenced 2018	Condition assessments commenced 2018
Depreciated replacement cost	$392,313				

[5] A generic condition rating of 2 has been assigned where historical data and reviews by Operations staff indicate the operational condition of the assets as being in "good condition".

Figure 5-9: Kaiwaka asset map



5.3.4.1 Reticulation

There is approximately 1,646m of stormwater pipeline in Kaiwaka, and 262m of open drains. Most pipes are 300mm in diameter and the predominant known pipe material is RCRRJ. Around 34% of pipe diameters are unknown (226m), and 34% of pipe materials are unknown (229m). This will be investigated as part of the ongoing “data cleansing” project detailed in the Improvement Plan.

Table 5-15: Kaiwaka stormwater pipeline diameter / material summary by length (m)

Diameter	CONC	EW	GEW	PVC	RCRRJ	Unknown	UPVC	Grand total(m)
Unknown	13.96				38.75	358.79		411.5
100-250			10.98	60.44	39.52	60.52	30.78	202.24
251-500	187.27	20.14	6.49	5.08	700.28	54.48		973.74
501-900					34.7			34.7
901-1350					23.34			23.34
Grand Total	201.23	20.14	17.47	65.52	836.59	473.79	30.78	1645.52

Data source: AssetFinda March 2017

Previous AMPs have stated the assets were known to be in good condition operationally, with few customer complaints.

5.3.4.2 Flood protection

The hydraulic capacity of the stormwater pipes has been determined to be satisfactory from discussions with Operations staff. To date there has been no SWCMP developed for Kaiwaka. This has been identified as a future improvement in the Improvement Plan.

5.3.4.3 Summary of issues and remedial actions

The key issues relating to the Kaiwaka stormwater network as identified by Council, or in this AMP, along with potential remedial actions as identified in the Core portion of the Improvement Plan, are listed in Table 5-16 below.

Table 5-16 - Specific Improvement Plan Issues for Kaiwaka

Scheme Specific Issue	Improvement action	Forecast completion date
Lack of SWCMP for the Kaiwaka stormwater network.	Undertake the development of the SWCMP for Kaiwaka to gain an understanding of capacity constraints in the system and options to mitigate risks.	June 2020

5.3.5 Mangawhai

Mangawhai is on the east coast and is a popular weekend retreat for residents and non-residents of the Kaipara district. Mangawhai is expected to experience the highest growth levels of the district, mostly associated with visitors and non-resident owners of holiday homes. Subdivision construction is ongoing in Mangawhai, and there is potential for more in the future as its coastal lifestyle attracts more people from outside the district, also with the eventual extension of the Northern Motorway Mangawhai will become much more accessible to holidaymakers and weekend visitors. A particular characteristic of Kaipara is that approximately 64% of ratepayers reside within the district and 36% outside the area. In Mangawhai these figures are 38% within the area and 62% outside the area.

Using figures it is evident that some of the reticulation shown is servicing the road networks only, and some may be private. Clarification of the ownership and operations and maintenance responsibilities of these assets is listed as an item in the Improvement Plan.

Table 5-17: Mangawhai asset summary

	Pipeline length (m)	Open drains (m)	Manholes	Inlets / outlets	Detention ponds	Soakpits
Physical quantity	24,806	7,311	359	31	3	72
Asset condition rating	2[6]	Condition assessment commenced 2018	Condition assessment commenced 2018	Condition assessment commenced 2018	Condition assessment commenced 2018	Condition assessment commenced 2018
Depreciated replacement cost	$6,3560,039					

[6] A generic condition rating of 2 has been assigned where historical data and reviews by Operations staff indicate the operational condition of the assets as being in "good condition".

Figure 5-10: Mangawhai village asset map

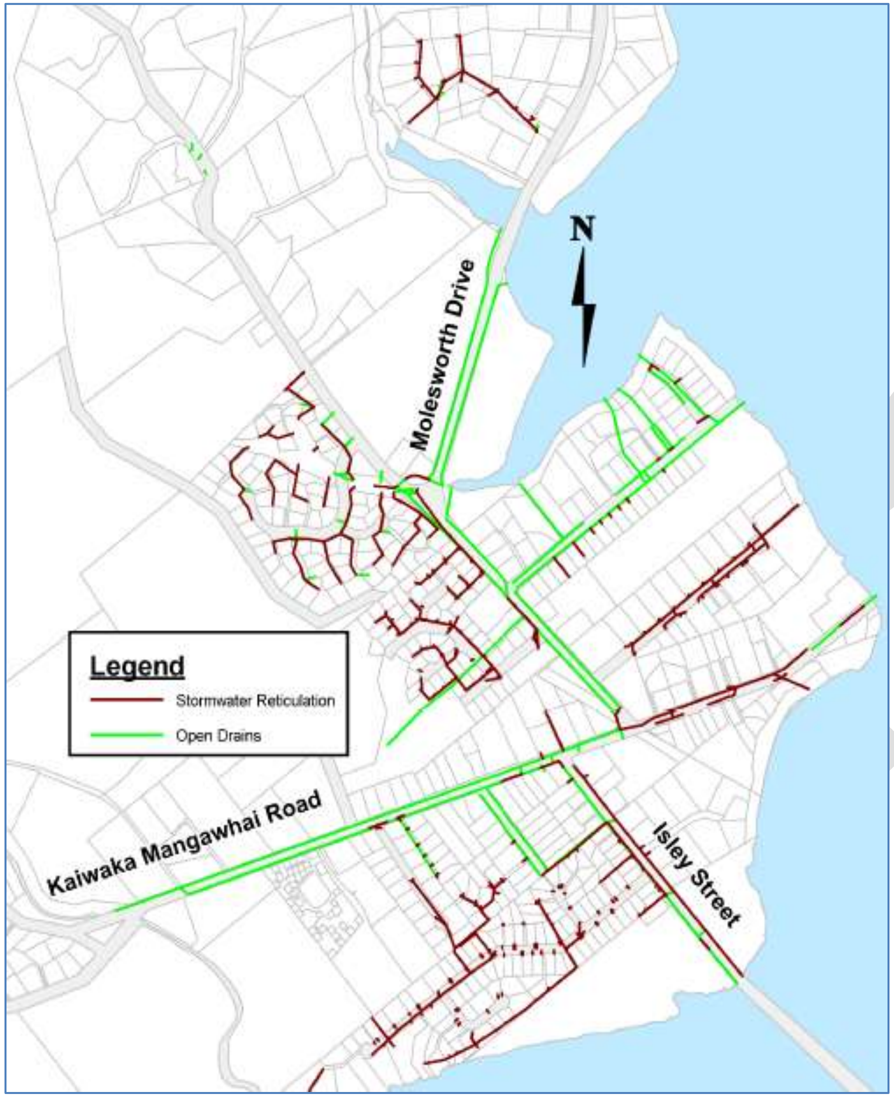
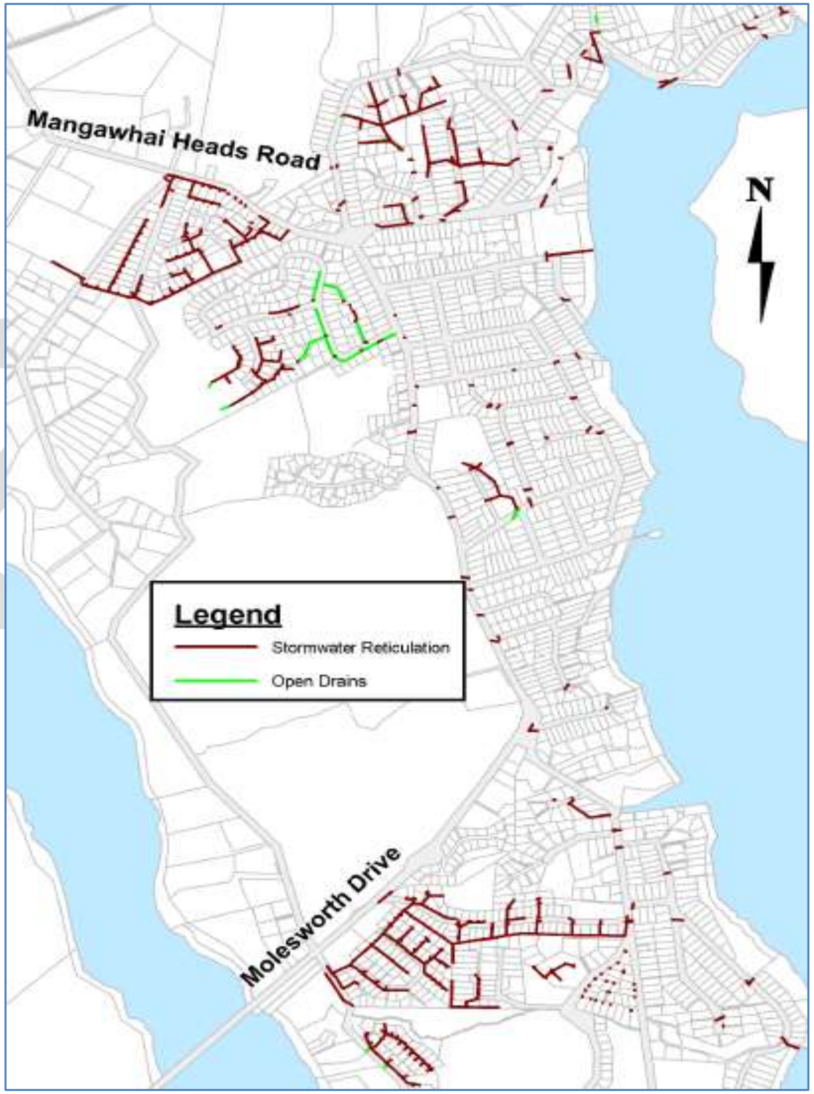


Figure 5-11: Mangawhai Heads asset map



5.3.5.1 Reticulation

There is approximately 24.8km of stormwater pipeline at Mangawhai, and 7.3km of open drains. Most pipes are 300 or 525mm in diameter and the predominant known pipe material is RCRRJ. Around 19% of pipe diameters are unknown, and 27% of pipe materials are unknown. This will be investigated as part of the ongoing data cleansing project detailed in the Improvement Plan.

Table 5-18: Mangawhai stormwater pipeline diameter / material summary by length (m)

Diameter	AC	CONC	FIBREGLASS	GEW	N/A	NOVAF	PVC	RCRRJ	Unknown	UPVC	Grand total
Unknown		33			180		98	558	5,221	8	6,098
100-250	2	236	11		11	6	262	1,122	132	523	2,304
251-500		1,005		35			299	9,251	1,698		12,288
501-900		80						2,767	480		3,327
901-1350		18						689	84		791
Grand total	**2**	**1,371**	**11**	**35**	**190**	**6**	**659**	**14,386**	**7,614**	**531**	**24,806**

Data source: AssetFinda March 2017

The majority of the piped network is relatively new as it was installed as part of recent developments in the area and as part of the capital works programme in recent years. It is known to be in very good condition through discussions with operations staff, with no previously reported capacity-related problems, though during the winter of 2017 it has identified some areas of concern which have been dealt with through the maintenance contract. There are some assets within older areas of Mangawhai where little is known about the size, material and condition of the pipes. This will be updated as part of the ongoing data cleansing and gathering project as shown in the Improvement Plan in section 8.1.

As part of previous LTPs, many deep open drains on the main roads in Mangawhai Village were progressively piped and filled in to address the safety and amenity concerns of the community. An example of this, are the piped systems that have recently been installed in Molesworth Drive and Moir Street, as shown in

Figure 5- below.

There are still some more shallow open drains remaining that may be piped in future. These will be assessed on a case-by-case basis to improve safety for the community. These new pipe lengths may still be showing as open drains in Council's asset register AssetFinda. This will be investigated as part of the ongoing "data cleansing" project detailed in the Improvement Plan

Figure 5-12: Moir Street before and after

5.3.5.2 Inspection of Detention

Three detention ponds in Mangawhai were vested to Council following developments in Pearl Street, Molesworth Drive and Fagan Place. Council also has responsibility for cleaning pond 1 in Kedge Drive. These ponds aid with alleviating flooding in residential areas by storing floodwaters during times of peak rainfall run-off. Wet ponds also improve stormwater quality before it discharges into the natural environment; more ponds are expected to be vested with Council as part of future development.

To date Council does not have Operations and Maintenance manuals for any of the ponds across the district. This has been identified as a future improvement in the Improvement Plan. A template should be developed with key information required to manage these ponds including wetland planting, public safety design and maintenance requirements.

5.3.5.3 Flood protection

Stormwater management has historically relied on soakage at Mangawhai Heads and open drains in Mangawhai village. New piped stormwater systems have recently been installed in recent subdivision areas and the open drains in the Mangawhai Village were partially piped on Insley Street, Moir Street and Molesworth Drive. Though there are still open drains within this area there is no immediate need to pipe them just yet as there are other projects that require attention. Properties in Mangawhai currently discharge to the piped network, private soakpits (which generally do not perform well) or to the road. Kaipara District Council has historically taken a stance of minimal impact through subdivision design in ensuring the stormwater flows are not increased due to development, a large part of this is insisting on the use of onsite attenuation through attenuation tanks and also on site soakage being installed during the construction of the dwellings, though for one reason or another this has often been missed. Kaipara District Council will need to retrospectively ensure that the onsite stormwater management systems meet the requirements contained within the subdivision resource consents and engineering approvals as noted in the Improvement Plan.

There is general lack of soakage at Mangawhai Heads with general clogging up of soakage systems by silt, grit and other materials causing flooding. There are also depressions that have no natural overland flow outlets. New piped systems may be required to provide positive outlets and this will be noted in the revised SWCMP. The areas around Estuary Drive, Pohutukawa Place, Wood Street and Wharfedale Crescent have been investigated following customer complaints of flooding and as such a property has been removed from the market due to the impact of localised flooding. The investigation of the other areas are ongoing and results will be outlined in the new SWCMP.

An SWCMP was prepared in 2006 to provide guidance philosophies for developers and sets out the LOS for this catchment including; water quality improvements, stabilising overland flow paths, the addition of grills on culverts inlets / outlets to improve child safety, and improved coastal outfalls. This draft SWCMP is in the process of being updated to reflect the principles of the most up-to-date Engineering Standards 2011 and be adopted formally by Council. This is currently proposed to be undertaken in 2018/2019.

An assessment conducted in 2009 recorded 34 coastal outfalls from the Mangawhai stormwater system, discharging to the Coastal Marine Area (CMA). Mangawhai is used extensively for recreational purposes and is a popular swimming beach. It has the highest protection zone in the Regional Coastal Plan and is monitored in the summer period by NRC. A survey of these assets is included as an item in the Improvement Plan, in order to facilitate discussions with NRC around consenting requirements.

Figure 5-13: Coastal outfall, Mangawhai

5.3.5.4 Summary of issues and remedial actions

The key issues relating to the Mangawhai stormwater network as identified by Council, or in this AMP, along with potential remedial actions as identified in the Core portion of the Improvement Plan, are listed in Table 5-19 below.

Table 5-19 - Specific Improvement Plan Issues for Mangawhai

Scheme Specific Issue	Improvement action	Forecast completion date
Outdated SMP for the Mangawhai stormwater network.	Undertake the development of the SMP for Mangawhai to gain an understanding of capacity constraints in the system and options to mitigate risks including : • Possible water quality issue around Norfolk Drive / Seabreeze Road area • Poor performance and lack of soakage around Mangawhai Heads leading to residential flooding. • Lack of stormwater system at Molesworth Drive near the Industrial Area.	June 2019

Scheme Specific Issue	Improvement action	Forecast completion date
Possible discharge of coastal outfalls from Mangawhai stormwater network into Coastal Marine Area.	Survey all the coastal outfalls in the five urban townships with Mangawhai as the highest priority.	June 2019

5.3.6 Townships without service

There are several small townships in the district that are currently not serviced with a public or urban stormwater system. Historically, the stormwater systems for these towns have been related to the roading network through open drainage, culverts etcetera. Recently, some minor urban reticulation has been installed in both Pahi and Ruawai as part of development in these areas. The operation, maintenance, and capital development needs for these small townships are currently provided for in the Roading AMP.

Due to the release of the proposed extension to the Northern Motorway there may be pressure in future to provide a stormwater service to other non-serviced townships such as Maungaturoto as development occurs in these and neighbouring townships. SWCMPs were created for both Pahi and Whakapirau in 2003 and though these were never actioned more consideration will need to be given to the various small communities' ability to fund such services going forward and what LOS they will require and Council will be able to commit to.

Assets for these townships have been summarised in Table 5-20 below.

Table 5-20: Unserviced townships pipeline summary by length

Unserviced townships	Piped network (m)	Open drains
Maungaturoto	2,510	1492
Pahi	2,955	95
Ruawai	645	4,805
Tinopai	789	

Data source: AssetFinda March 2017

Note: There may also be stormwater pipes in Whakapirau, Paparoa and Matakohe as indicated in previous AMPs, however AssetFinda does not record these pipes and thus they have not been included in the table above.

Figure 5-14: Open drains in Kaipara district

5.4 Critical Assets

Critical assets have been defined as being assets with a high consequence of failure.[7] They are often found as part of a network, in which, for example, their failure would compromise the performance of the entire network.

A full formal criticality assessment has not yet been undertaken for the majority of the existing stormwater assets, though a criticality assessment framework was undertaken in 2016 and an initial assessment based on the age of existing assets was conducted. The framework is shown below.

Historical evidence and local knowledge has identified the assets in Table 5-21 which could be considered to be "critical", in that failure of these assets could compromise the stormwater network. A greater level of management has been applied to some of these assets by way of planned annual inspections and sand-bagging lower lying areas along the Wairoa River in the event of heavy rain warnings.

Further understanding and definition of mitigation measures is required.

[7] National Asset Management Steering Group, Association of Local Government Engineering NZ Inc. (2006) 3rd edition (Version 3.0), *International Infrastructure Management Manual*, National Asset Management Steering Group, Association of Local Government Engineering NZ Inc. (INGENIUM)

Table 5-21: Critical stormwater assets

Asset group	Assessment of criticality	Criticality
Local stormwater retic'n <900mm	Generally small diameter mains that contractor can readily maintain and clear.	Low
Large culverts ≥ 900mm	Largest S/W pipes are approx. 1200mm in vicinity of Countdown (these were inspected in 2014). Consider pipes ≥ 900mm to be Moderate due to consequences of ground stability and/or flows taking alternative path in event of pipe failure. Capacity of these pipes is adversely impacted by high river levels associated with major rain events and/or spring tides. However this limitation is not associated with pipe condition.	Moderate
Culverts under roads	State highways are responsibility of LTNZ and local roads are with KDC Transportation.	N/A
Pipes running under buildings	Some pipes run under buildings but are not clearly identified.	High (Major)
Stormwater pumps	No stormwater pump systems within towns.	N/A
Detention ponds are 1 in Dargaville and 4 in Mangawhai.	These have a regular quarterly inspection and maintenance schedule, although more focused on plant management and clearance of blockages. None of ponds are fenced but are designed to allow easy exit.	Low
Inlet and outlet grates.	The Risk Register in the Stormwater AMP schedules 14 grates in the Dargaville area and 31 coastal outlets at Mangawhai. There are 3 potential issues with these grates i.e. • Potential for blockages of inlet grates with debris; • Potential for children to enter the drains if the grate is not in place; and • Significant scouring of the beach leading to undermining of the pipe. All are subject to quarterly inspections plus specific checks prior to major weather events.	Moderate
Piped outlets onto beaches.	There are a small number of these and subject to quarterly inspections.	Low
Open drains.	There are many open drains throughout the various communities. Generally regarded as low criticality and owners will advise Council if drains through private property require maintenance.	Low - Open drains in private property

Asset group	Assessment of criticality	Criticality
	Inspection regime in place to identify maintenance requirements but more for aesthetics than concern about capacity. The low-lying parts of Dargaville, particularly around Aratapu, Sunnynook and Ruawai are the most likely to cause concern albeit most likely due to high river levels than the limitations of the open drains.	Moderate - Open drains in lowest parts of Dargaville and Ruawai
Overland flow paths through suburban areas.	These are generally not well-defined or managed. Some have easements but this probably does not significantly change this situation. There is potential for localised flooding if inappropriate fencing, building or land development is undertaken.	Low
Stopbanks on Northern Wairoa River (Dargaville and Ruawai).	Stopbanks (earth embankment, timber and concrete) are the primary protection to prevent Dargaville and Ruawai from flooding under extreme river events. There are no flood pumps on the inland side if a breach or backup of runoff occurs. The river can be up to 1m above Dargaville CBD and Ruawai street levels. Stopbank failure would generate significant damage and disruption in Dargaville, particularly in CBD and business areas. Raupo Land Drainage Scheme includes settlement of Ruawai and State Highway 12 and has an active management committee.	High (Extreme)
Floodgates	Floodgates are required to prevent flow from river in high river level events. Impact likely to be less catastrophic than failure of stopbank but if combined with heavy rain could generate localised flooding of lower Dargaville and Ruawai.	High (Major)
Land Drainage Schemes	Other land drainage schemes (28) are mostly under control of local Management Committees who are quite hands-on in relation to willingness to commit expenditure versus level of protection required. Generally the land protected is farmland only Much of stopbank maintenance is undertaken by the landowner concerned.	Low
Access to Assets	Access to stormwater and land drainage assets can be impacted by localised flooding associated with high intensity rainfall and by wider spread flooding associated with high river levels and/or slow runoff from land drainage schemes.	Low

5.5 Asset values

5.5.1 Overview

The purpose of valuations is for reporting asset values in Council's financial statements. The Local Government Act 1974 and subsequent amendments contain a general requirement for local authorities to comply with Generally Accepted Accounting Practices (GAAP). The Financial Reporting Act 1993 sets out a process by which GAAP is established for all reporting entities and groups, including all local authorities. Compliance with the New Zealand Equivalent to International Accounting Standard 16; Property, Plant and Equipment (NZ IAS 16) and IAS 36; Impairment of Assets, is one of the current requirements for meeting GAAP.

The most recent Council asset valuation exercise was undertaken in 2016. The valuation process is summarised in the report, *Water Supply, Stormwater and Land Drainage Asset Revaluation 30 June 2016*.

5.5.2 Depreciation

Depreciation of assets must be charged over their useful life.

- *Depreciated Replacement Cost* is the current replacement cost less allowance for physical deterioration and optimisation for obsolescence and relevant surplus capacity. The *Depreciated Replacement Cost* has been calculated as:

$$\frac{\text{Remaining useful life}}{\text{Total useful life}} \times \text{replacement cost}$$

- *Depreciation* is a measure of the consumption of the economic benefits embodied in an asset. It distributes the cost or value of an asset over its estimated useful life. Straight-line depreciation is used in this valuation;
- *Total depreciation to date* is the total amount of the asset's economic benefits consumed since the asset was constructed or installed;
- The *annual depreciation* is the amount the asset depreciates in a year. It is defined as the replacement cost minus the residual value divided by the estimated total useful life for the asset;
- The *minimum remaining useful life* is applied to assets which are older than their useful life. It recognises that although an asset is older than its useful life it may still be in service and therefore have some value. Where an asset is older than its standard useful life, the minimum remaining useful life is added to the standard useful life and used in the calculation of the depreciated replacement value.

The valuation total for the district is summarised in Table 5-22 below.

Table 5-22: Summary of stormwater asset valuations

Community	Replacement cost ($)	Depreciated replacement cost ($)	Accumulated depreciation ($)	Annual depreciation ($)
Baylys	$1,163,395	$936,914	$226,481	$14,346
Dargaville	$22,967,752	$14,710,480	$8,257,273	$231,716
Te Kopuru	$318,549	$304,246	$14,303	$798
Pahi	$1,014,727	$901,520	$113,207	$12,446
Maungaturoto	$293,842	$269,494	$24,349	$3,085
Kaiwaka	$436,029	$392,313	$43,716	$4,597
Mangawhai	$7,874,349	$6,560,039	$1,314,310	$93,389
Total 2016	**$34,068,643**	**$24,075,006**	**$9,993,639**	**$360,377**

Note * =Maungaturoto, Pahi, Paparoa and Whakapirau stormwater systems form part of the Roading asset base

Figure 5-15: Relative valuation of schemes

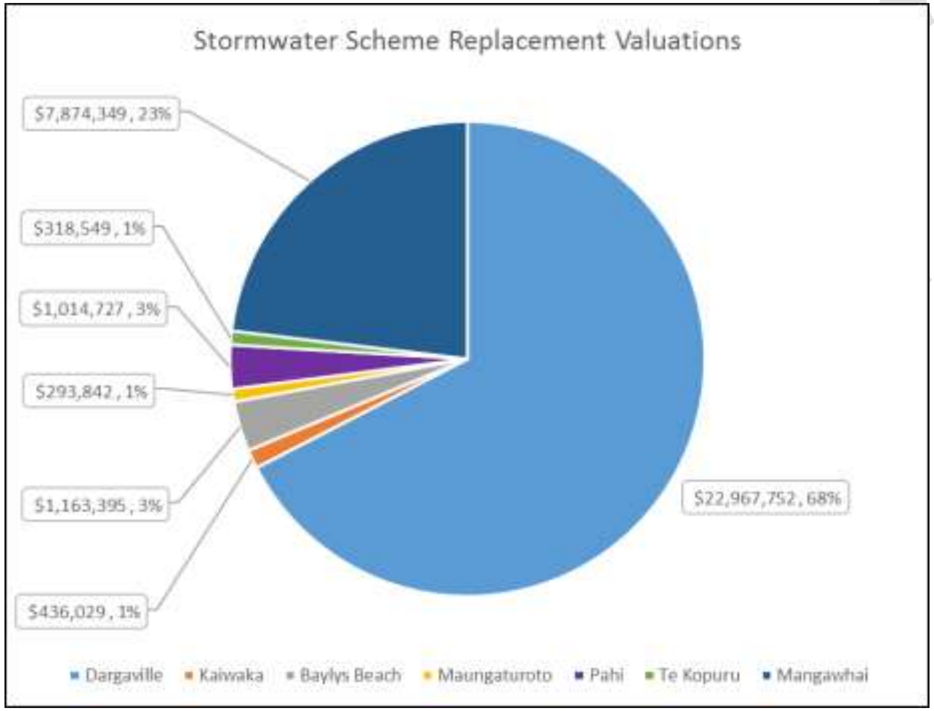


Figure 5-16: Relative valuation of components

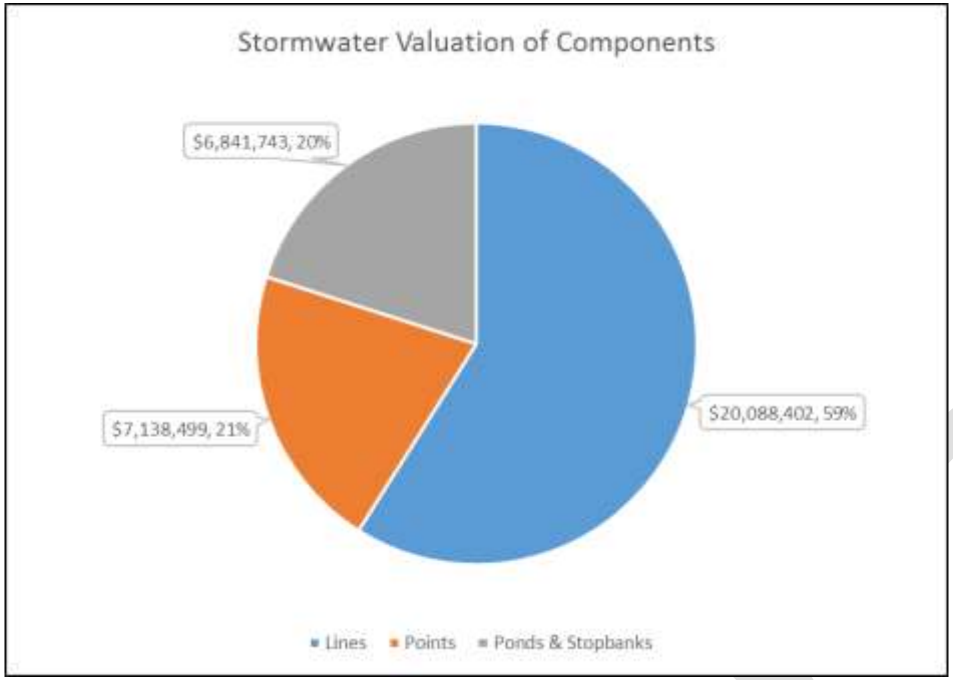


Table 5-23: 2016 Unit rates for validation

Stormwater Pipes Unit Rates

Pipe diameter (mm)	2016 Unit rate including overhead ($/m)	Pipe diameter (mm)	2016 Unit rate including overhead ($/m)
Unknown	$256	450	$320
80	$160	500	$351
100	$160	525	$351
150	$234	600	$394
160	$234	675	$447
180	$234	750	$501
200	$234	825	$607
220	$234	900	$703
225	$234	950	$703
250	$256	1050	$884
290	$256	1125	$1,118
300	$256	1200	$1,118
350	$288	1350	$1,353
375	$288	1600	$1,917
400	$320	1950	$2,865

Stormwater Points Unit Rates

Asset Type	2016 Unit Rates $/ea (including overhead)
CatchPit Type 1	$1,304
CatchPit Type 3	$2,609
Double sided MH	$3,373
Floodgate	$35,200
Inlet	$2,900
Manhole	$3,373
Outlet	$3,035
Soakpit	$2,439
Sump	

Open Drains (Not Depreciated)

Drain	$ 88
Open Drain	$ 88
Overland flowpath	$ 110
Swale Drain	$ 61

Table 5-24: 2016 Expected lives for valuation

Useful Lives for Stormwater Pipes

Material	Useful life assumption	Minimum useful life
AC	60	5
CONC	80	5
CORST	80	5
EW	80	5
FIBRO	40	5
GALV	60	5
GEW	80	5
NOVAF	50	5
Novaflex	50	5
PVC	80	5
RCRRJ	80	5
STEEL	80	5
Unknown	60	5
UPVC	80	5

Useful lives for Stormwater Points

Asset types	Useful life assumption	Minimum useful life
CatchPit Type 1	100	5
CatchPit Type 3	100	5
Double sided MH	100	5
Floodgate	50	5
Inlet	100	5
Manhole	100	5
Outlet	100	5
Soakpit	50	5

Useful lives for Stormwater Ponds and Stopbanks

Asset types	Useful life assumption	Minimum useful life
Earthworks	Non depreciable	Non depreciable
Overflow	80	5
Planting	Non depreciable	Non depreciable
Earth stopbank	Non depreciable	Non depreciable

6 Financial and Lifecycle Strategy

6.1 Overview of Lifecycle Management Plan

6.1.1 Introduction

This section identifies Council's strategy and programme for managing, maintaining and renewing assets within its stormwater schemes. The strategies described within this section have been developed to achieve the desired LOS identified in this Asset Management Plan.

Management of the lifecycle of each asset should optimise performance whilst minimising the total lifecycle costs of both the reticulation and treatment systems. The management process balances the various competing demands and investigates the capacity and performance constraints of each component to establish a regime to achieve the overall objectives.

The objectives of each Lifecycle Management Plan (LMP) are to:

- Optimise performance; and
- Minimise total lifecycle costs.

Whilst this section notes the generic strategies used by Council, it is supplemented by specific strategies for each scheme detailed in the sections that follow. The LMP for each asset component incorporates the following strategies:

- Operations and maintenance strategies, to keep the assets operational;
- Renewal strategies to replace assets as they reach the end of their useful life;
- Development strategies to address growth and demand;
- Disposal strategies, when the asset is no longer required; and
- Work programmes and the associated financial forecasts, which are developed later for each scheme.

6.1.2 Design parameters

Design parameters for all new Council stormwater assets are set out in the Kaipara District Council Engineering Standards 2011. In summary these requirements include the following:

- Flood protection requirements for habitable buildings;
- Protection of existing overland flow paths, watercourses, wetlands etcetera;

- Catchment management planning;
- Required design periods for primary and secondary design flow including rainfall depths by community;
- Minimum freeboard height to floor levels; and
- Requirements for pipe size, material, location and layout of reticulation.

6.1.3 Work categories

Council's lifecycle asset management strategies are divided into the following five work categories:

Asset Operations: The active process of utilising an asset which will consume resources such as manpower, energy, chemicals and materials. The Operations category also incorporates funding to address the AM Improvement Plan (AMIP) actions and the provision of professional services. The AMIP is generally focused on a three year timeframe with a nominal allowance for years 4-10. As the programme is addressed, new initiatives will be identified and added to the programme and budgets will be revised accordingly.

Asset Maintenance: The ongoing day-to-day work activity required to keep assets serviceable and prevent premature deterioration or failure. Three categories of maintenance are carried out:

- **Planned Maintenance** – Work carried out to a predetermined schedule, or programmed as a result of identified needs;
- **Preventative maintenance** – Work additional to scheduled inspections and maintenance identified during inspections as essential to continued operation; and
- **Responsive Maintenance** – Work carried out in response to reported problems or defects.

Asset Renewal: Major work that restores an asset to its original capacity or the required condition. This includes both planned and reactive renewals.

New Capital: This section of the AMP covers tactics for the creation of new assets (including those created through subdivision and other development) or works which upgrade or improve an existing asset beyond its existing capability or performance in response to changes in supply needs or customer expectations.

Development works fall into two separate categories as follows:

- Council funded; and
- Developer funded as part of subdivision development or by way of contributions.

Asset decommissioning/disposal: Decommissioning and disposal of assets when they are no longer needed. Assets may become surplus to requirements for any of the following reasons:

- Under-utilisation;
- Obsolescence;
- Provision exceeds required LOS;
- Uneconomic to upgrade or operate;
- Policy change;
- Service provided by other means (e.g. private sector involvement); and
- Potential risk of ownership (financial, environmental, legal, social, vandalism).

The day-to-day operational, inspection and maintenance of the stormwater network is carried out by the three waters maintenance contractor under Contract 798.. The contract start date was July 2016 and the contract is administered by Council staff.

All work is performed, and materials used, to comply with the latest edition of the following standards:

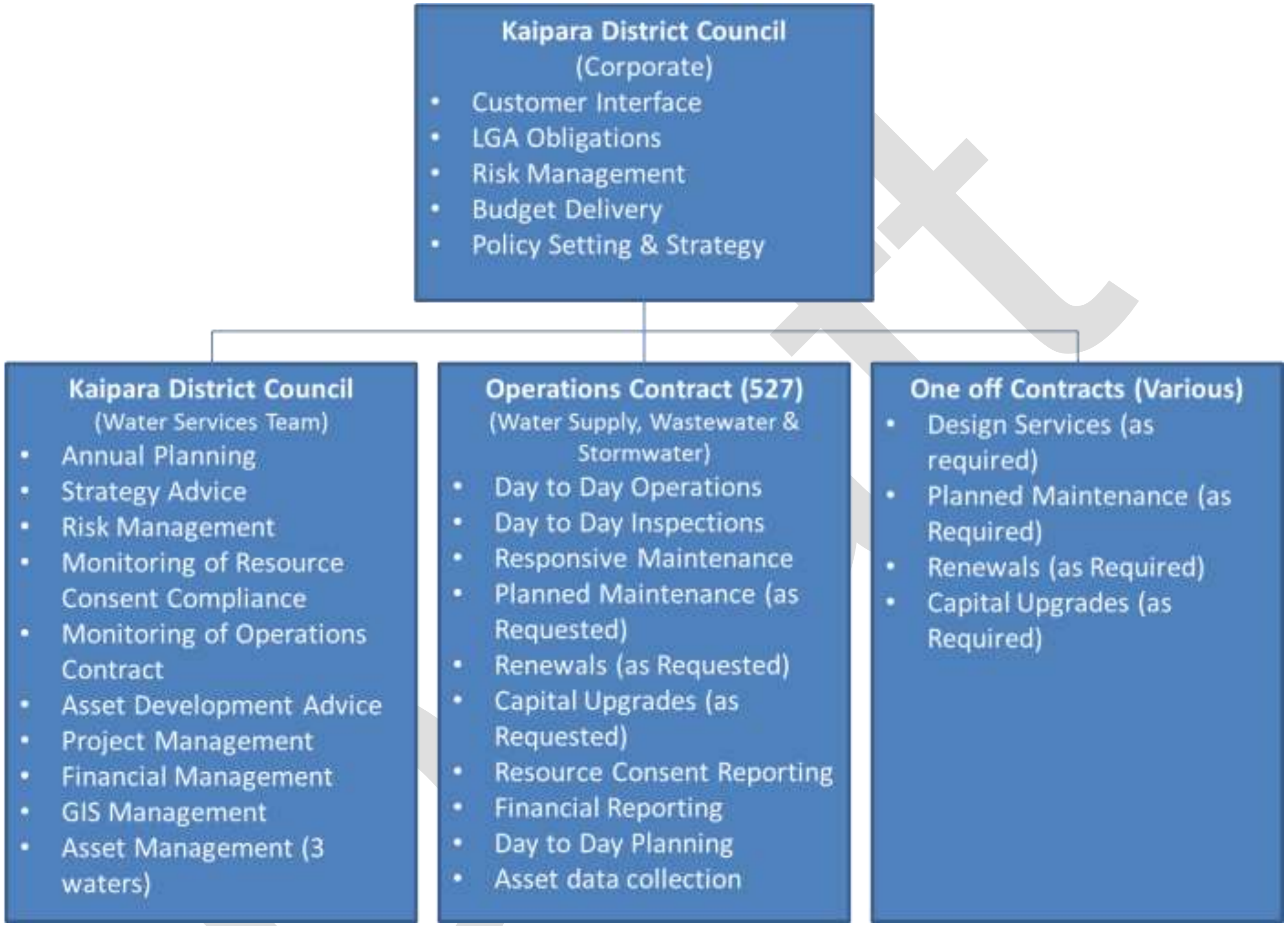
- The Stormwater AMP;
- Contract 798 – 3 Waters Operations and Maintenance 2016/2019; and
- The Kaipara District Council Engineering standards and policies.

The operation and maintenance standards for all work activities are specified in the maintenance contract, with performance measures including response times.

6.1.4 Contractual setting

Council procures the various asset management functions through the 3 Waters Operation and Maintenance Programme 2016/2019 addressing aspects of the core asset management responsibilities in-house as per the LOS put in place and monitored by Council. Recognising the importance of asset knowledge and their performance, Council has restructured and now undertakes the wider scope of asset management functions in-house. The field operations aspect is retained within Contract 798. Additional services to support the Water Services team will be procured on an as required basis and may include investigation and design services. The various functions are noted below.

Figure 6-1: Contractual setting



The Operations contract delivers the lifecycle management outcomes on a day-to-day basis. The specification of the Operations contract incorporates the various inspections that monitor asset condition/capacity and provide the basis for programmed maintenance. The frequency of the programmed inspections is established in the specification of the Operations contract. This is supplemented as required by inspections generated from Council's customer Helpdesk system.

When programmed inspections are undertaken by the Operations contractor, the act of inspection may initiate a series of responses based on the observations of the contractor. These could include:

- Programmed maintenance tasks, based on usage or time;
- Responsive maintenance based on condition or capacity;
- Planning of a Preventative Maintenance Response based on a prediction of future failure;
- Reporting for upgrading or renewal through to the Professional services provider. This occurs when the scope of the intervention is not covered with the Operations contract and requires consideration of alternatives (upgrades) or prioritisation within existing budgets (renewals);
- Ad-hoc inspections of breaks or infrastructure that allow an opportunity to inspect reticulation when responding to an incident; and
- Collection of data from inspections and interventions for incorporation into Council's GIS system.

6.1.5 Environmental compliance

A list of resource consents held by Council for stormwater activity is included in Appendix D. The compliance with these consents is monitored by the NRC. Council works closely with NRC in monitoring the performance of Kaipara's stormwater assets.

The day to day monitoring of the performance of stormwater systems is a requirement of the Operations contract. Where resource consent non-conformances are observed, the non-compliances are reported to both NRC and Council. This is, in turn, reported in the Annual Report.

6.2 Maintenance and operating strategy and cost forecast

6.2.1 Strategy

Table 6-1 shows Council's maintenance and operating strategies to ensure that the defined LOS are provided. The table shows the key service criteria affected and mode and impact of failure if the action is not carried out.

Table 6-1: Operating and maintenance strategies

Activity	Strategy	Service criteria	Impact
General maintenance	Council will manage the assets in a manner that minimises the long term overall total cost and enables delivery of the desired LOS in the most cost-effective way over the long term. Competitive pricing will be ensured by utilising our Procurement Strategy, CPP contract structures and performance-based term contracts where applicable. A register of all deferred maintenance will be maintained, the total value of which will be recognised in the financial reporting. A review and assessment of levels of deferred maintenance has been identified as a future improvement in the Improvement Plan.	Maintaining existing LOS Cost/affordability	Low – Medium Increased costs and risk of failure.
Unplanned maintenance – Disaster i.e. climatic event	Council will maintain a suitable level of preparedness for prompt and effective response to civil emergencies and system failures by ensuring the availability of suitably trained and equipped staff and service delivery contractors. Council will provide a response service for obstructions to drainage facilities that may result in flooding of buildings or urban properties.	Responsiveness	Medium Potential flooding of private property and damage to public roads and utilities.
Unplanned maintenance	Council will provide a repair service and respond to and repair / overcome broken or leaking pipes. A suitable level of preparedness for prompt and effective response to asset failures will be managed by ensuring suitably trained and equipped staff to allow prompt repair of critical assets and mitigation of any hazards. Term contracts specify response times.	Responsiveness (Response time for obstructions to drainage facilities that may result in flooding to buildings is 6 hours)	Medium Flooding of private property and damage to public roads and utilities.
Planned Inspections • Reticulation • Drains	Council will undertake scheduled inspections in accordance with good industry practice and as justified by the consequences of failure on LOS, costs, public health, safety or corporate image.	Maintaining existing LOS	Medium

Activity	Strategy	Service criteria	Impact
• Stopbanks, floodgates, floodwalls			Flooding of private property and damage to public roads and utilities.
Planned – preventative maintenance	Council will undertake a programme of planned asset maintenance to minimise the risk of critical equipment failure or where justified economically. Major maintenance needs will be identified through the scheduled asset condition inspections and those generated from the investigation of customer complaints.	Maintaining existing LOS. Cost/affordability	Medium

6.3 Operations and maintenance activities

Current operation and maintenance activities undertaken across the stormwater network include:

- Normal routine maintenance to ensure that drains including natural watercourses are kept open and functioning;
- Maintaining the capacity of the natural watercourses which collect and convey stormwater runoff from private properties, Council's stormwater systems and the roading network;
- Replace any broken pipes, inlets, or collapsed manholes or catchpits;
- Repair any scouring due to flooding or malfunctioning of a stormwater drain;
- Spraying of stormwater drains annually;
- Inspection of the stormwater stopbanks, floodgates and floodwall annually;
- Inspection of floodgates located in low spots in Dargaville before high rainfall and high tide events (Note these inspections are currently undertaken by the Roading Contractor);
- Investigations with CCTV survey if necessary when reactive maintenance cannot resolve the network problem; and
- Record faults and maintenance undertaken (a future improvement has been identified to begin recording maintenance history and costs at asset component level in AssetFinda.

6.3.1 Expenditure forecast

The 10 year forecast for operations and maintenance costs for stormwater assets in the Kaipara district are shown in the tables below.

The Operational Expenditure forecast covers:

- All control and operation activities
- Actions resulting from improvement planning during preparation of this AMP, see the Improvement Plan; and
- The Professional Services Contract.

Table 6-2: Operational expenditure forecasts by scheme

Baylys Stormwater

For the year ended:	Annual Plan	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget
30 June	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025	2025-2026	2026-2027	2027-2028
	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000
Operating funding											
Sources of operating funding											
General rates	8	8	9	10	12	13	14	15	15	15	15
Targeted rates	76	69	77	89	107	113	125	136	133	132	134
Subsidies and grants - operational	0	0	0	0	0	0	0	0	0	0	0
User fees and charges	0	0	0	0	0	0	0	0	0	0	0
Internal recoveries	0	0	0	0	0	0	0	0	0	0	0
Investments and other income	0	0	0	0	0	0	0	0	0	0	0
Total sources of operating funding	**85**	**77**	**85**	**99**	**119**	**125**	**139**	**151**	**148**	**147**	**149**
Application of operating funding											
Contractors costs	3	3	3	3	3	3	3	3	3	3	3
Professional services	16	14	16	12	12	13	14	14	14	15	16
Repairs and maintenance	7	7	7	7	8	8	8	8	8	9	9
Other operating costs	0	0	0	0	0	0	0	0	0	0	0
Employee benefits	0	0	0	0	0	0	0	0	0	0	0
Internal charges	11	12	13	12	13	14	15	16	16	17	17
Finance costs	15	14	13	20	27	27	31	34	33	32	31
Total applications of operating funding	**51**	**50**	**52**	**55**	**63**	**65**	**71**	**75**	**75**	**75**	**77**
Surplus (deficit) of operating funding	**33**	**28**	**33**	**44**	**56**	**60**	**69**	**75**	**72**	**72**	**72**

Dargaville Stormwater

For the year ended:	Annual Plan	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget
30 June	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025	2025-2026	2026-2027	2027-2028
	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000
Operating funding											
Sources of operating funding											
General rates	94	100	107	114	96	96	96	101	106	111	116
Targeted rates	848	902	965	1,022	868	862	868	906	950	996	1,044
Subsidies and grants - operational	0	0	0	0	0	0	0	0	0	0	0
User fees and charges	0	0	0	0	0	0	0	0	0	0	0
Internal recoveries	0	0	0	0	0	0	0	0	0	0	0
Investments and other income	0	0	0	0	0	0	0	0	0	0	0
Total sources of operating funding	**942**	**1,003**	**1,072**	**1,135**	**964**	**958**	**965**	**1,007**	**1,055**	**1,107**	**1,160**
Application of operating funding											
Contractors costs	20	21	21	21	22	22	23	23	24	24	25
Professional services	95	206	213	224	70	72	74	76	78	81	83
Repairs and maintenance	148	159	165	171	178	179	186	188	197	205	215
Other operating costs	5	5	5	6	6	6	6	6	6	6	7
Employee benefits	0	0	0	0	0	0	0	0	0	0	0
Internal charges	136	194	200	208	165	170	176	182	190	199	208
Finance costs	95	84	73	64	57	63	71	79	92	107	125
Total applications of operating funding	**499**	**669**	**678**	**694**	**497**	**512**	**537**	**555**	**587**	**622**	**663**
Surplus (deficit) of operating funding	**443**	**334**	**395**	**442**	**467**	**446**	**428**	**451**	**468**	**485**	**497**

Te Kopuru Stormwater

For the year ended: 30 June	Annual Plan 2017-2018 $'000	Budget 2018-2019 $'000	Budget 2019-2020 $'000	Budget 2020-2021 $'000	Budget 2021-2022 $'000	Budget 2022-2023 $'000	Budget 2023-2024 $'000	Budget 2024-2025 $'000	Budget 2025-2026 $'000	Budget 2026-2027 $'000	Budget 2027-2028 $'000
Operating funding											
Sources of operating funding											
General rates	3	3	3	3	4	4	3	3	3	3	3
Targeted rates	27	28	30	31	32	32	27	25	26	27	27
Subsidies and grants - operational	0	0	0	0	0	0	0	0	0	0	0
User fees and charges	0	0	0	0	0	0	0	0	0	0	0
Internal recoveries	0	0	0	0	0	0	0	0	0	0	0
Investments and other income	0	0	0	0	0	0	0	0	0	0	0
Total sources of operating funding	**30**	**31**	**33**	**34**	**36**	**36**	**29**	**28**	**29**	**29**	**30**
Application of operating funding											
Contractors costs	3	3	3	3	3	3	3	3	3	3	3
Professional services	8	8	8	8	8	8	9	9	9	9	10
Repairs and maintenance	4	4	4	4	4	4	4	4	4	4	5
Other operating costs	0	0	0	0	0	0	0	0	0	0	0
Employee benefits	0	0	0	0	0	0	0	0	0	0	0
Internal charges	5	6	6	6	6	6	7	7	7	7	7
Finance costs	3	2	2	2	1	1	0	0	0	0	0
Total applications of operating funding	**22**	**22**	**22**	**22**	**22**	**22**	**23**	**23**	**24**	**24**	**25**
Surplus (deficit) of operating funding	**9**	**10**	**11**	**12**	**13**	**14**	**7**	**5**	**5**	**5**	**5**

Kaiwaka Stormwater

For the year ended: 30 June	Annual Plan 2017-2018 $'000	Budget 2018-2019 $'000	Budget 2019-2020 $'000	Budget 2020-2021 $'000	Budget 2021-2022 $'000	Budget 2022-2023 $'000	Budget 2023-2024 $'000	Budget 2024-2025 $'000	Budget 2025-2026 $'000	Budget 2026-2027 $'000	Budget 2027-2028 $'000
Operating funding											
Sources of operating funding											
General rates	4	5	4	4	5	5	5	4	5	5	5
Targeted rates	36	43	38	40	42	43	44	40	42	44	46
Subsidies and grants - operational	0	0	0	0	0	0	0	0	0	0	0
User fees and charges	0	0	0	0	0	0	0	0	0	0	0
Internal recoveries	0	0	0	0	0	0	0	0	0	0	0
Investments and other income	0	0	0	0	0	0	0	0	0	0	0
Total sources of operating funding	**40**	**47**	**43**	**45**	**46**	**48**	**49**	**45**	**47**	**48**	**51**
Application of operating funding											
Contractors costs	3	2	2	2	2	2	2	2	2	2	2
Professional services	15	20	15	16	16	17	18	18	19	19	20
Repairs and maintenance	7	8	8	8	8	8	9	9	10	10	10
Other operating costs	0	0	0	0	0	0	0	0	0	0	0
Employee benefits	0	0	0	0	0	0	0	0	0	0	0
Internal charges	8	10	9	9	10	10	10	10	11	11	12
Finance costs	2	1	1	1	1	1	0	0	0	0	0
Total applications of operating funding	**34**	**41**	**35**	**36**	**37**	**38**	**39**	**40**	**42**	**43**	**45**
Surplus (deficit) of operating funding	**5**	**6**	**7**	**9**	**10**	**10**	**10**	**5**	**5**	**6**	**6**

Mangawhai Stormwater

For the year ended: 30 June	Annual Plan 2017-2018 $'000	Budget 2018-2019 $'000	Budget 2019-2020 $'000	Budget 2020-2021 $'000	Budget 2021-2022 $'000	Budget 2022-2023 $'000	Budget 2023-2024 $'000	Budget 2024-2025 $'000	Budget 2025-2026 $'000	Budget 2026-2027 $'000	Budget 2027-2028 $'000
Operating funding											
Sources of operating funding											
General rates	42	39	55	44	47	52	58	64	66	75	78
Targeted rates	381	347	492	396	426	472	521	580	594	675	705
Subsidies and grants - operational	0	0	0	0	0	0	0	0	0	0	0
User fees and charges	0	0	0	0	0	0	0	0	0	0	0
Internal recoveries	0	0	0	0	0	0	0	0	0	0	0
Investments and other income	0	0	0	0	0	0	0	0	0	0	0
Total sources of operating funding	**424**	**385**	**546**	**440**	**473**	**524**	**579**	**644**	**660**	**750**	**784**
Application of operating funding											
Contractors costs	5	5	5	6	6	6	6	6	6	6	7
Professional services	66	22	125	24	24	25	26	29	3	31	32
Repairs and maintenance	55	80	82	84	86	89	91	99	102	105	109
Other operating costs	19	3	3	3	3	3	3	3	3	4	4
Employee benefits	0	0	0	0	0	0	0	0	0	0	0
Internal charges	66	65	99	69	71	75	79	86	82	95	100
Finance costs	74	69	64	61	58	74	90	102	118	133	151
Total applications of operating funding	**285**	**245**	**379**	**246**	**249**	**272**	**295**	**326**	**315**	**375**	**402**
Surplus (deficit) of operating funding	**139**	**140**	**167**	**194**	**224**	**252**	**284**	**318**	**344**	**375**	**382**

Other Stormwater

For the year ended:	Annual Plan	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget
30 June	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025	2025-2026	2026-2027	2027-2028
	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000
Operating funding											
Sources of operating funding											
General rates	55	68	106	108	73	75	59	53	54	56	58
Targeted rates	0	0	0	0	0	0	0	0	0	0	0
Subsidies and grants - operational	0	0	0	0	0	0	0	0	0	0	0
User fees and charges	0	0	0	0	0	0	0	0	0	0	0
Internal recoveries	0	0	0	0	0	0	0	0	0	0	0
Investments and other income	0	0	0	0	0	0	0	0	0	0	0
Total sources of operating funding	**55**	**68**	**106**	**108**	**73**	**75**	**59**	**53**	**54**	**56**	**58**
Application of operating funding											
Contractors costs	0	0	0	0	0	0	0	0	0	0	0
Professional services	0	15	51	53	16	17	0	0	0	0	0
Repairs and maintenance	30	30	30	31	32	33	34	34	35	37	38
Other operating costs	0	0	0	0	0	0	0	0	0	0	0
Employee benefits	0	0	0	0	0	0	0	0	0	0	0
Internal charges	0	0	0	0	0	0	0	0	0	0	0
Finance costs	2	2	2	1	1	1	0	0	0	0	0
Total applications of operating funding	**32**	**46**	**83**	**85**	**49**	**50**	**34**	**34**	**35**	**37**	**38**
Surplus (deficit) of operating funding	**24**	**22**	**23**	**24**	**24**	**25**	**26**	**18**	**19**	**19**	**20**

Figure 6-2: Operational expenditure - large

Figure 6-3: Operational expenditure - small

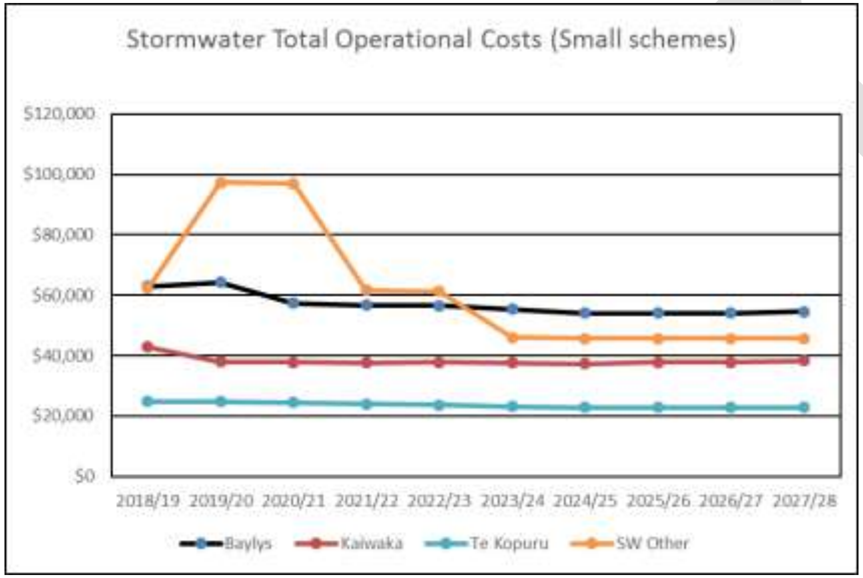


Figure 6-4: Operational expenditure by type

7 Capital works expenditure

7.1 Overview

The proposed stormwater capital works programme over the next 10 years, and illustrated below, is a blend of renewals and LOS improvements.

The LOS improvements are dominated by proposed works arising out the Mangawhai Community Plan and are still subject to further definition and consultation. The balance of the LOS improvements are focused on improving stormwater coverage of Baylys.

Renewals have a nominal start and then build up rapidly in following years in the Dargaville system only. This is an indicative programme that reflects the lack of good quality condition information on the system.

Table 7-1 shows capital works expenditure by scheme

Table 7-1: Capital works expenditure forecasts by scheme

Baylys

For the year ended:	Annual Plan	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget
30 June	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025	2025-2026	2026-2027	2027-2028
	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000
Capital funding											
Sources of capital funding											
Subsidies and grants - capital	0	0	0	0	0	0	0	0	0	0	0
Development contributions	0	1	1	1	1	1	1	1	1	1	1
Financial contributions	0	0	0	0	0	0	0	0	0	0	0
Increase(decrease) in debt	-13	-2	122	119	-15	65	61	-50	-46	-44	-44
Sale of assets	0	0	0	0	0	0	0	0	0	0	0
Total sources of capital funding	**-13**	**-1**	**123**	**120**	**-14**	**66**	**62**	**-49**	**-45**	**-43**	**-43**
Applications of capital funding											
Capital Expenditure - Growth	0	1	9	9	1	7	7	0	0	0	0
Capital Expenditure - LoS	0	19	145	148	20	103	106	0	0	0	0
Capital Expenditure - Renewal	20	0	0	0	0	0	0	0	0	0	0
Increase (decrease) in reserves	0	7	2	7	20	16	18	27	27	28	29
Total applications of capital funding	**20**	**27**	**156**	**164**	**42**	**126**	**131**	**27**	**27**	**28**	**29**
Surplus (deficit) of capital funding	**-33**	**-28**	**-33**	**-44**	**-56**	**-60**	**-69**	**-75**	**-72**	**-72**	**-72**
Funding Balance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Dargaville

For the year ended:	Annual Plan	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget
30 June	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025	2025-2026	2026-2027	2027-2028
	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000
Capital funding											
Sources of capital funding											
Subsidies and grants - capital	0	0	0	0	0	0	0	0	0	0	0
Development contributions	3	0	0	0	0	0	0	0	0	0	0
Financial contributions	0	0	0	0	0	0	0	0	0	0	0
Increase(decrease) in debt	-193	-194	-212	-214	51	90	154	181	217	257	305
Sale of assets	0	0	0	0	0	0	0	0	0	0	0
Total sources of capital funding	**-190**	**-194**	**-212**	**-214**	**51**	**90**	**154**	**181**	**217**	**257**	**305**
Applications of capital funding											
Capital Expenditure - Growth	0	0	0	0	0	0	0	0	0	0	0
Capital Expenditure - LoS	0	25	26	26	268	275	310	347	386	426	470
Capital Expenditure - Renewal	250	25	26	26	268	275	310	347	386	426	470
Increase (decrease) in reserves	3	90	131	175	-19	-14	-38	-61	-86	-111	-137
Total applications of capital funding	**253**	**140**	**183**	**227**	**518**	**535**	**582**	**633**	**686**	**742**	**803**
Surplus (deficit) of capital funding	**-443**	**-334**	**-395**	**-442**	**-467**	**-446**	**-428**	**-451**	**-468**	**-485**	**-497**
Funding Balance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Te Kopuru

For the year ended: 30 June	Annual Plan 2017-2018 $'000	Budget 2018-2019 $'000	Budget 2019-2020 $'000	Budget 2020-2021 $'000	Budget 2021-2022 $'000	Budget 2022-2023 $'000	Budget 2023-2024 $'000	Budget 2024-2025 $'000	Budget 2025-2026 $'000	Budget 2026-2027 $'000	Budget 2027-2028 $'000
Capital funding											
Sources of capital funding											
Subsidies and grants - capital	0	0	0	0	0	0	0	0	0	0	0
Development contributions	0	0	0	0	0	0	0	0	0	0	0
Financial contributions	0	0	0	0	0	0	0	0	0	0	0
Increase(decrease) in debt	-7	-8	-8	-9	-10	-10	-3	-1	-1	-1	-1
Sale of assets	0	0	0	0	0	0	0	0	0	0	0
Total sources of capital funding	**-7**	**-8**	**-8**	**-9**	**-10**	**-10**	**-3**	**-1**	**-1**	**-1**	**-1**
Applications of capital funding											
Capital Expenditure - Growth	0	0	0	0	0	0	0	0	0	0	0
Capital Expenditure - LoS	0	0	0	0	0	0	0	0	0	0	0
Capital Expenditure - Renewal	0	0	0	0	0	0	0	0	0	0	0
Increase (decrease) in reserves	1	2	2	3	4	4	4	4	4	4	5
Total applications of capital funding	**1**	**2**	**2**	**3**	**4**	**4**	**4**	**4**	**4**	**4**	**5**
Surplus (deficit) of capital funding	**-9**	**-10**	**-11**	**-12**	**-13**	**-14**	**-7**	**-5**	**-5**	**-5**	**-5**
Funding Balance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Kaiwaka

For the year ended: 30 June	Annual Plan 2017-2018 $'000	Budget 2018-2019 $'000	Budget 2019-2020 $'000	Budget 2020-2021 $'000	Budget 2021-2022 $'000	Budget 2022-2023 $'000	Budget 2023-2024 $'000	Budget 2024-2025 $'000	Budget 2025-2026 $'000	Budget 2026-2027 $'000	Budget 2027-2028 $'000
Capital funding											
Sources of capital funding											
Subsidies and grants - capital	0	0	0	0	0	0	0	0	0	0	0
Development contributions	0	0	0	0	0	0	0	0	0	0	0
Financial contributions	0	0	0	0	0	0	0	0	0	0	0
Increase(decrease) in debt	-4	-4	-4	-5	-5	-5	-5	0	0	0	0
Sale of assets	0	0	0	0	0	0	0	0	0	0	0
Total sources of capital funding	**-4**	**-4**	**-4**	**-5**	**-5**	**-5**	**-5**	**0**	**0**	**0**	**0**
Applications of capital funding											
Capital Expenditure - Growth	0	0	0	0	0	0	0	0	0	0	0
Capital Expenditure - LoS	0	0	0	0	0	0	0	0	0	0	0
Capital Expenditure - Renewal	0	0	0	0	0	0	0	0	0	0	0
Increase (decrease) in reserves	1	2	3	4	5	5	5	5	5	5	6
Total applications of capital funding	**1**	**2**	**3**	**4**	**5**	**5**	**5**	**5**	**5**	**5**	**6**
Surplus (deficit) of capital funding	**-5**	**-6**	**-7**	**-9**	**-10**	**-10**	**-10**	**-5**	**-5**	**-6**	**-6**
Funding Balance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

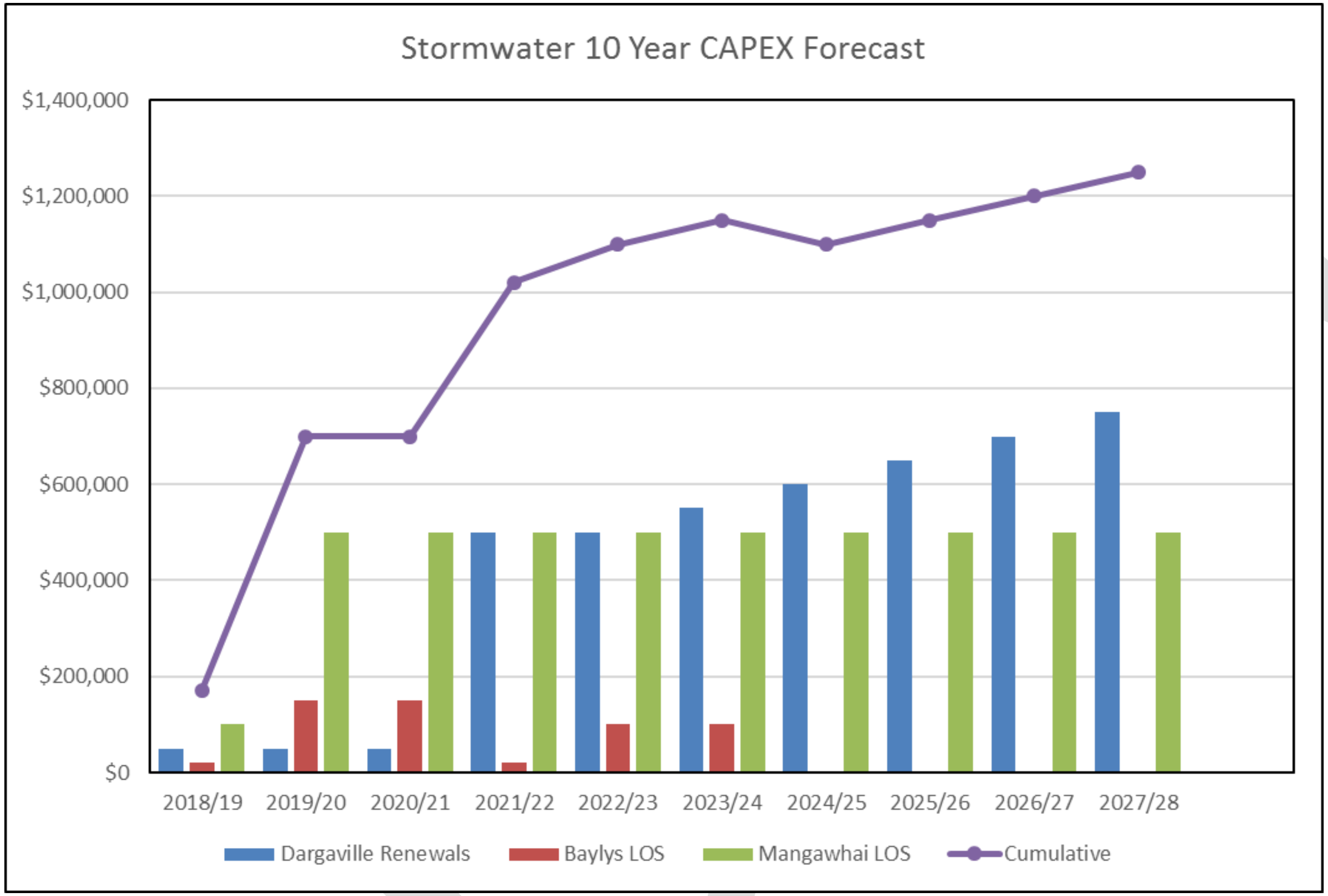
Mangawhai

For the year ended:	Annual Plan	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget
30 June	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025	2025-2026	2026-2027	2027-2028
	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000
Capital funding											
Sources of capital funding											
Subsidies and grants - capital	0	0	0	0	0	0	0	0	0	0	0
Development contributions	11	6	6	6	6	6	6	6	6	6	6
Financial contributions	0	0	0	0	0	0	0	0	0	0	0
Increase(decrease) in debt	-89	-89	-97	-104	264	254	242	229	223	215	232
Sale of assets	0	0	0	0	0	0	0	0	0	0	0
Total sources of capital funding	**-78**	**-83**	**-92**	**-98**	**270**	**260**	**248**	**234**	**229**	**220**	**238**
Applications of capital funding											
Capital Expenditure - Growth	90	0	0	0	32	33	34	35	36	37	38
Capital Expenditure - LoS	0	0	0	0	376	385	394	405	415	426	438
Capital Expenditure - Renewal	50	0	0	0	129	132	135	139	142	146	150
Increase (decrease) in reserves	-79	57	76	95	-43	-38	-32	-26	-20	-14	-7
Total applications of capital funding	**61**	**57**	**76**	**95**	**494**	**512**	**532**	**552**	**573**	**596**	**619**
Surplus (deficit) of capital funding	**-139**	**-140**	**-167**	**-194**	**-224**	**-252**	**-284**	**-318**	**-344**	**-375**	**-382**
Funding Balance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Other

For the year ended: 30 June	Annual Plan 2017-2018 $'000	Budget 2018-2019 $'000	Budget 2019-2020 $'000	Budget 2020-2021 $'000	Budget 2021-2022 $'000	Budget 2022-2023 $'000	Budget 2023-2024 $'000	Budget 2024-2025 $'000	Budget 2025-2026 $'000	Budget 2026-2027 $'000	Budget 2027-2028 $'000
Capital funding											
Sources of capital funding											
Subsidies and grants - capital	0	0	0	0	0	0	0	0	0	0	0
Development contributions	0	0	0	0	0	0	0	0	0	0	0
Financial contributions	0	0	0	0	0	0	0	0	0	0	0
Increase(decrease) in debt	-8	-6	-6	-7	-7	-8	-8	0	0	0	0
Sale of assets	0	0	0	0	0	0	0	0	0	0	0
Total sources of capital funding	**-8**	**-6**	**-6**	**-7**	**-7**	**-8**	**-8**	**0**	**0**	**0**	**0**
Applications of capital funding											
Capital Expenditure - Growth	0	0	0	0	0	0	0	0	0	0	0
Capital Expenditure - LoS	0	0	0	0	0	0	0	0	0	0	0
Capital Expenditure - Renewal	0	0	0	0	0	0	0	0	0	0	0
Increase (decrease) in reserves	16	16	16	17	17	18	18	18	19	19	20
Total applications of capital funding	**16**	**16**	**16**	**17**	**17**	**18**	**18**	**18**	**19**	**19**	**20**
Surplus (deficit) of capital funding	**-24**	**-22**	**-23**	**-24**	**-24**	**-25**	**-26**	**-18**	**-19**	**-19**	**-20**
Funding Balance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Figure 7-1: Stormwater 10 year CAPEX forecast



7.2 Renewals

7.2.1 Overview

Renewal expenditure is major work that does not increase asset design capacity but restores, rehabilitates, replaces or renews an existing asset to its original capacity. Work over and above restoring an asset to original capacity is 'new works' expenditure.

Council reviewed its renewal strategy during 2017/2018 and is moving towards a "just in time" approach; to rehabilitate or replace assets when justified by condition and where there is a significant reduction in performance.

The current asset data situation affects Council's ability to accurately forecast necessary renewals. The current lack of data relating to asset condition, performance and/or maintenance history prevents Council from developing a renewal strategy based on these criterion. Consequently, the current renewals programme is broadly based on asset lives, further modified through local knowledge and experience gained from the maintenance contract staff and local resources on asset performance. Council's risk management and criticality assessment procedures are currently being reviewed, the outcome of which may affect Council's renewal strategy. Council's current renewal strategy is presented below.

Assets are considered for renewal as they near the end of their effective working life or where the cost of maintenance becomes uneconomical and when the risk of failure of critical assets is sufficiently high.

The Council renewal programme has been developed by:

- Taking asset age and remaining life predictions from the valuation database, calculating when the remaining life expires and converting that into a programme of replacements based on valuation replacement costs; and
- Reviewing and justifying the renewals forecasts using the accumulated knowledge and experience of asset operations and asset management staff. This incorporates the knowledge gained from tracking asset failures through the customer services system, known location of pipe breaks and overflows, and contractor knowledge.

When justifying renewals the following factors are considered:

- **Asset performance:** Renewal of an asset when it fails to meet the required LOS. Non-performing assets are identified by the monitoring of asset reliability, efficiency and quality during routine inspections and operational activity. Indicators of non-performing assets include repeated and/or premature asset failure, inefficient energy consumption and inappropriate or obsolete components.
- **Risk:** The risk of failure and associated financial and social impact justifies action (e.g. probable extent of damage, safety risk, community disruption);

- **Economics:** It is no longer economic to continue repairing the asset (i.e. the annual cost of repairs exceeds the annualised cost of renewal). An economic consideration is the co-ordination of renewal works with other planned works such as road reconstruction; and
- **Efficiency:** New technology and management practices relating to increased efficiencies and savings will be actively researched, evaluated and, where applicable, implemented.

The current level of condition and/or performance data relating to the stormwater assets is not well documented. The future collection of this data and entry into the AssetFinda database has been identified as an activity to be completed within the AMIP. Over time, as more information is recorded, an initial assessment and listing of renewals needs will be able to be created from AssetFinda for subsequent review and verification.

Other mechanisms are available to assess renewals requirements. These include:

Extrapolating the theoretical asset life based on the installed date of the asset and the effective life of the specific asset type or component. Under this scenario, all assets should be renewed when they meet the end of their effective life. We understand that a number of factors will impact the life of the asset and in most cases the effective life of the asset may be considerably longer. Such lists are useful, but should be supported by additional operational knowledge to validate that the asset actually requires renewal, or be subject to field inspection to verify its actual condition as part of reviewing and developing the renewals programme.

- Conducting a structured interview of operations staff with specific knowledge and familiarity with the stormwater networks to identify areas of the network which are not performing to the required LOS. With typical assets having effective lives ranging from 60-80 years, this method provides only a snapshot of the network based on the period of time which the operations staff may have been working on the network. In most cases this is likely to be less than 10 years of accumulated knowledge and will be biased towards where problems have occurred historically; and
- Reviewing and analysing customer complaints regarding flooding or other asset related faults to determine if the assets are not performing to the required LOS and may need replacement or rehabilitation.

Renewals needs will be identified through the operational or maintenance activities completed on the assets and the investigation of customer complaints. Renewal works will be prioritised and programmed in accordance with the following criteria or, in urgent cases, undertaken immediately:

- Public safety risk;
- Criticality of assets to network operation;
- Criticality of assets to achievement of service standards and community outcomes;
- Financial risk of deferring work;
- Intensity of usage;

- Environmental risk; and
- Political preference.

A number of assessments were completed as part of this AMP development including:

- Reviewing the previous AMP renewal programme. Two aspects were considered:
  - A baseline renewals budget of $50,000 per annum has been assumed for the initial three years for Dargaville network and then increasing as more, and better, information becomes available;
  - Specific projects identified in previous versions of the Stormwater AMP have been removed as there was insufficient knowledge and / or project data to substantiate the need for these projects. The focus is now on identifying and scoping new projects for subsequent design and implementation. Renewals forecasts will be reviewed following on from this identification and scoping phase;
- Reviewing customer service requests to ascertain the type and frequency of stormwater network issues; and
- Conducting a structured interview with relevant operations staff to review the urban stormwater networks within each of the communities to understand potential network issues which will likely require asset renewals and to reconcile issues identified from the customer service requests.

Ongoing renewals needs will be identified through:

- strategic studies such as the Dargaville Flood Study or development of SWCMPs;
- as critical stormwater assets are identified and data from proactive management and inspections is analysed and then uploaded into AssetFinda; and
- field information is captured from maintenance activity and inspections and uploaded into the AssetFinda system for analysis.

The development of a renewals programme based on performance and condition ratings of critical stormwater assets has been identified as a future improvement in the Improvement Plan.

7.3 Deferral of renewals

Renewal works identified in accordance with Council's renewal strategy may be deferred if the cost is beyond the community's ability to fund it. This can occur when higher priority works are required on other infrastructure assets, there are short term peaks in expenditure or if an inadequate rating base exists.

When renewal works are deferred, the impact of the deferral on economic efficiencies and the asset's ability to achieve or contribute to the required standards of service, will be assessed. Although the deferral of some renewal works may not impact significantly on the short-term operation of assets, repeated deferral will create a liability in the longer term.

Figure 7-2: Stormwater installation and renewal dates

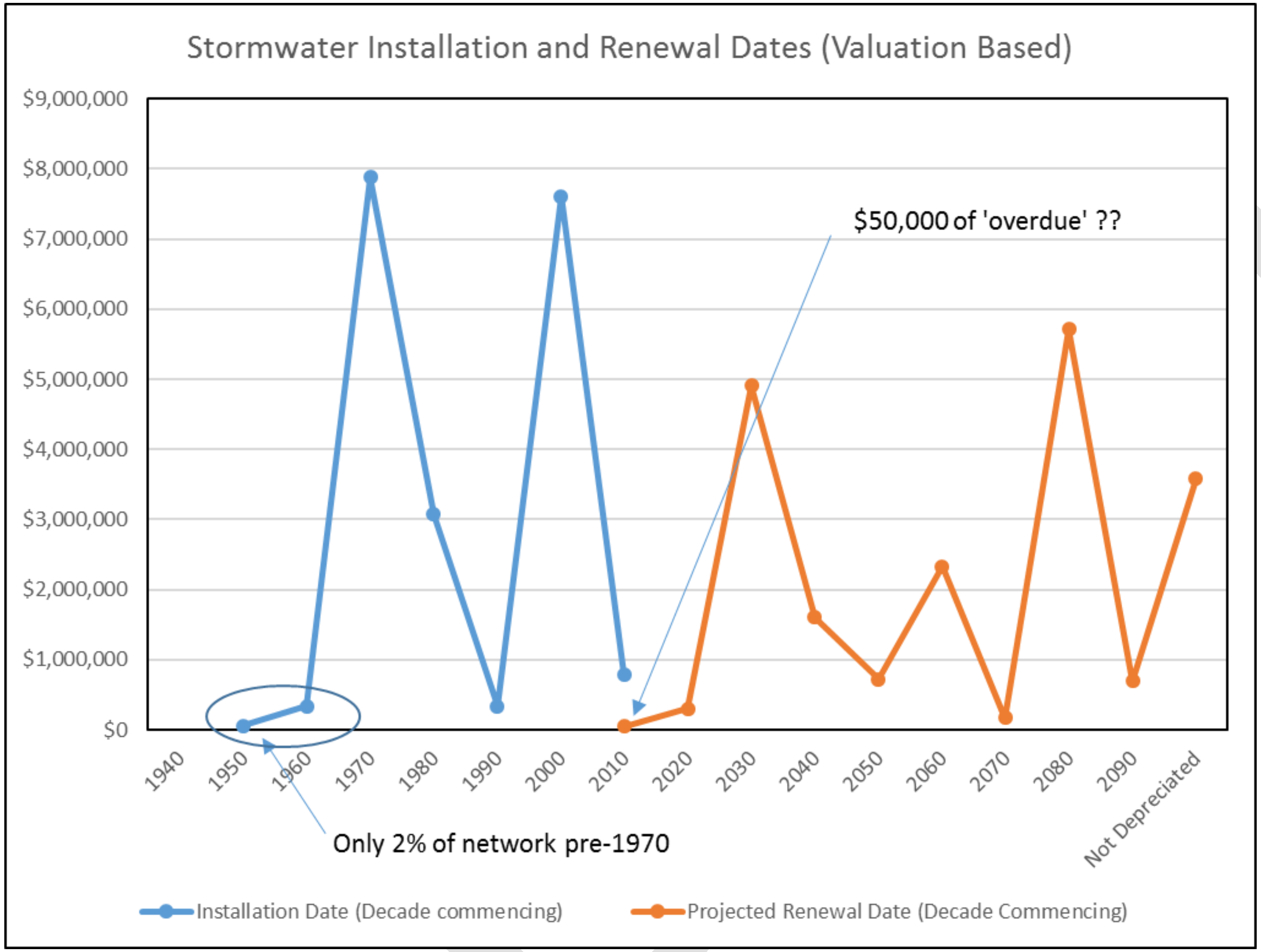


Figure 7-3: Stormwater projected pipe renewals

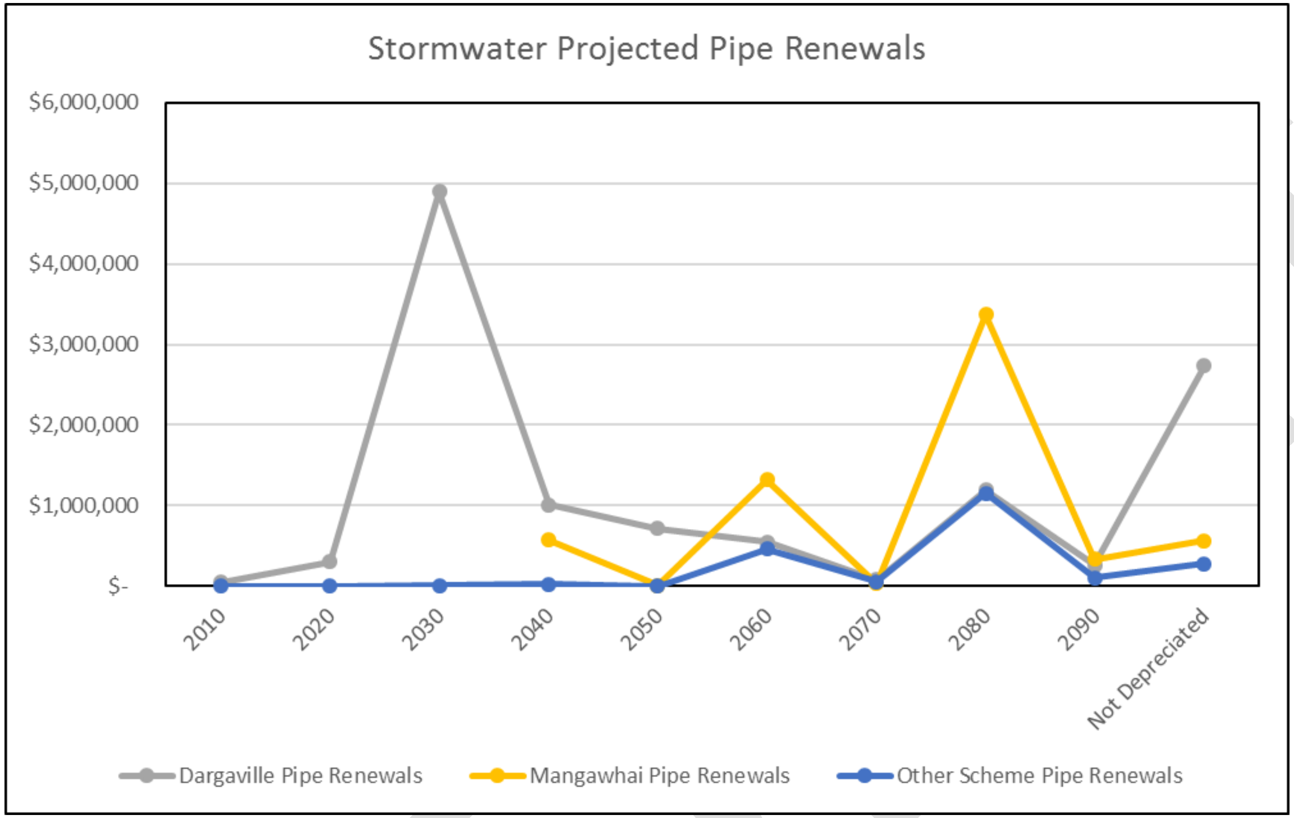
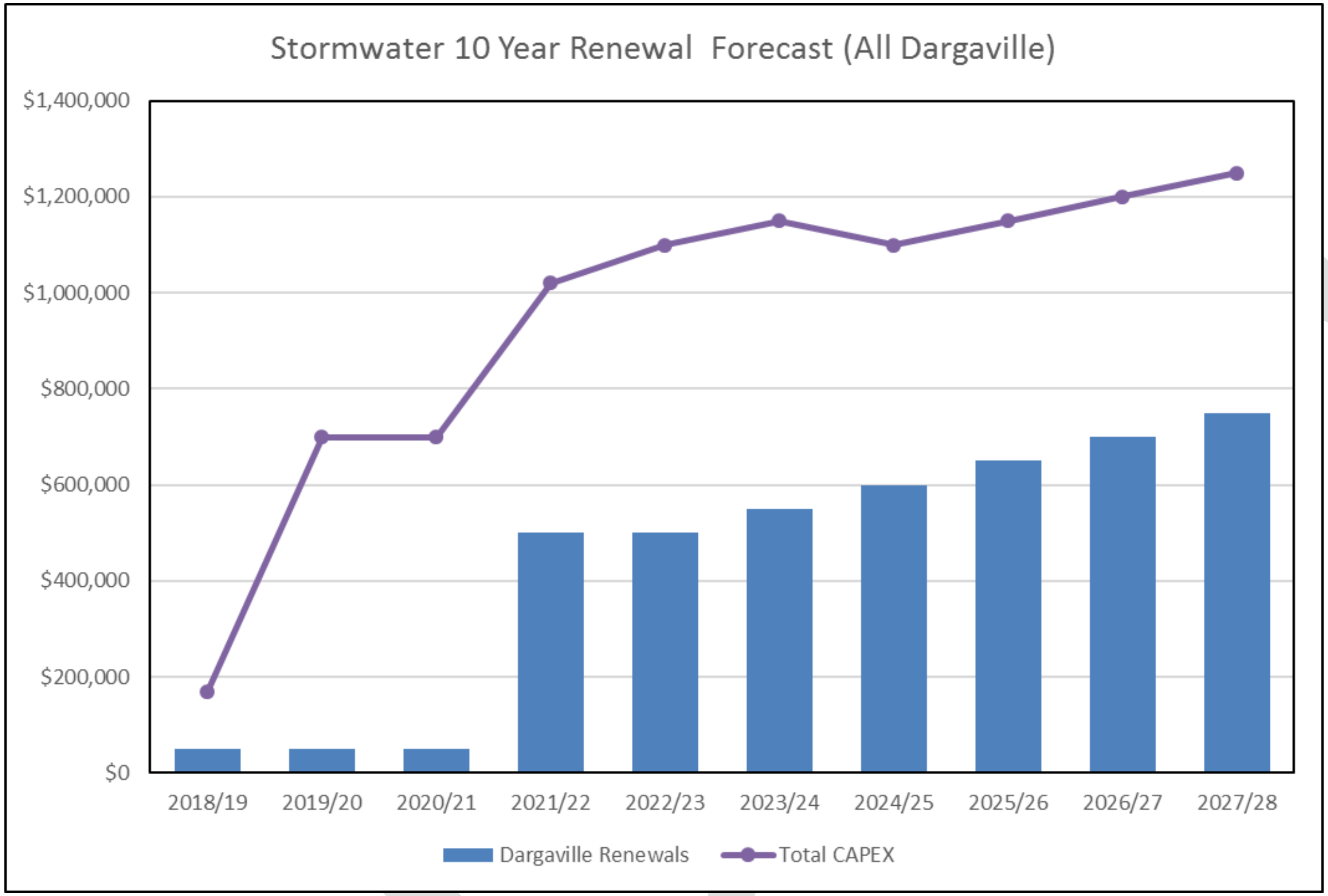


Figure 7-4: Stormwater 10 year renewal forecast (all Dargaville)



7.4 New capital (asset creation, acquisition, enhancement) Strategy and Expenditure Forecast

7.4.1 Strategy

New capital works will be planned in response to identified service gaps, growth and demand issues, risk issues and economic considerations.

When evaluating significant new capital proposals, the following issues will be considered:

- The contribution the new or improved assets will make to the current and anticipated future levels of service and community outcomes;
- The risks and benefits anticipated to be made from the investment;
- The risks faced by not proceeding with the development works. These could include safety risks, social risks and political risks;
- Ability and willingness of the community to fund the works; and
- Future operating and maintenance cost implications.

Significant new capital works will be prioritised and programmed with contributions from:

- Targeted user groups (e.g. special interest groups, industry groups, adjacent residents);
- The general community (through public consultation)
- Council staff and consultants that may be engaged to provide advice to the Council;
- The LTP / Annual Plan process; and
- The Elected Council (significant proposals are subject to a Council decision and available funding).

There are currently no growth-driven capital projects identified for stormwater over the next three years. Where infrastructure is installed, this will likely be installed by developers. No provision has currently been made within the capital works budget for Council to contribute towards increasing the capacity of stormwater infrastructure installed by developers if it will benefit the wider community, this will be assessed as a case-by-case basis.

We have completed a number of assessments as part of this round of the AMP development including:

- Reviewing the previous AMP New Capital programme. The following aspect was considered:
  - Specific projects identified in previous versions of the stormwater AMP have been removed as there was insufficient knowledge or project data to substantiate the need for the project. The focus is now on identifying and scoping new projects for subsequent design and implementation. New capital forecasts will be subsequently reviewed following on from this identification and scoping phase.
- Reviewing customer service requests to ascertain the type and frequency of stormwater network issues; and

- Conducting a structured interview with relevant operations staff to review the urban stormwater networks within each of the communities to understand potential network issues which will likely require upgrades of old assets / installation of new assets, and to reconcile issues identified from the customer service requests.

Criterion used in assessing if an asset should be renewed or not is primarily related to:

- **Levels of Services** – if the designed LOS is not being provided and as a consequence flooding of properties is occurring, the severity and nature of flooding will be used to determine if it should be simply renewed or upsized.
- **Safety** – if the presence of an asset i.e. open drain, is in such a condition that it poses a safety risk to the community i.e. erosion or deep-sided drains, the risk will be assessed to determine the appropriate form of treatment i.e. piping, fencing or increased maintenance.
- **Health** – if the presence of an asset i.e. open drain, is in such a condition that it poses a health risk to the community i.e. due to stagnant water, the risk will be assessed to determine the appropriate form of treatment i.e. piping or increased maintenance.

This information was then compiled in Table 7-2 below, and will be used as a basis for developing scoping documents, concept designs, and construction cost estimates in year 1 to feed into the detailed design phase in year 2 and subsequent construction in year 3 and beyond.

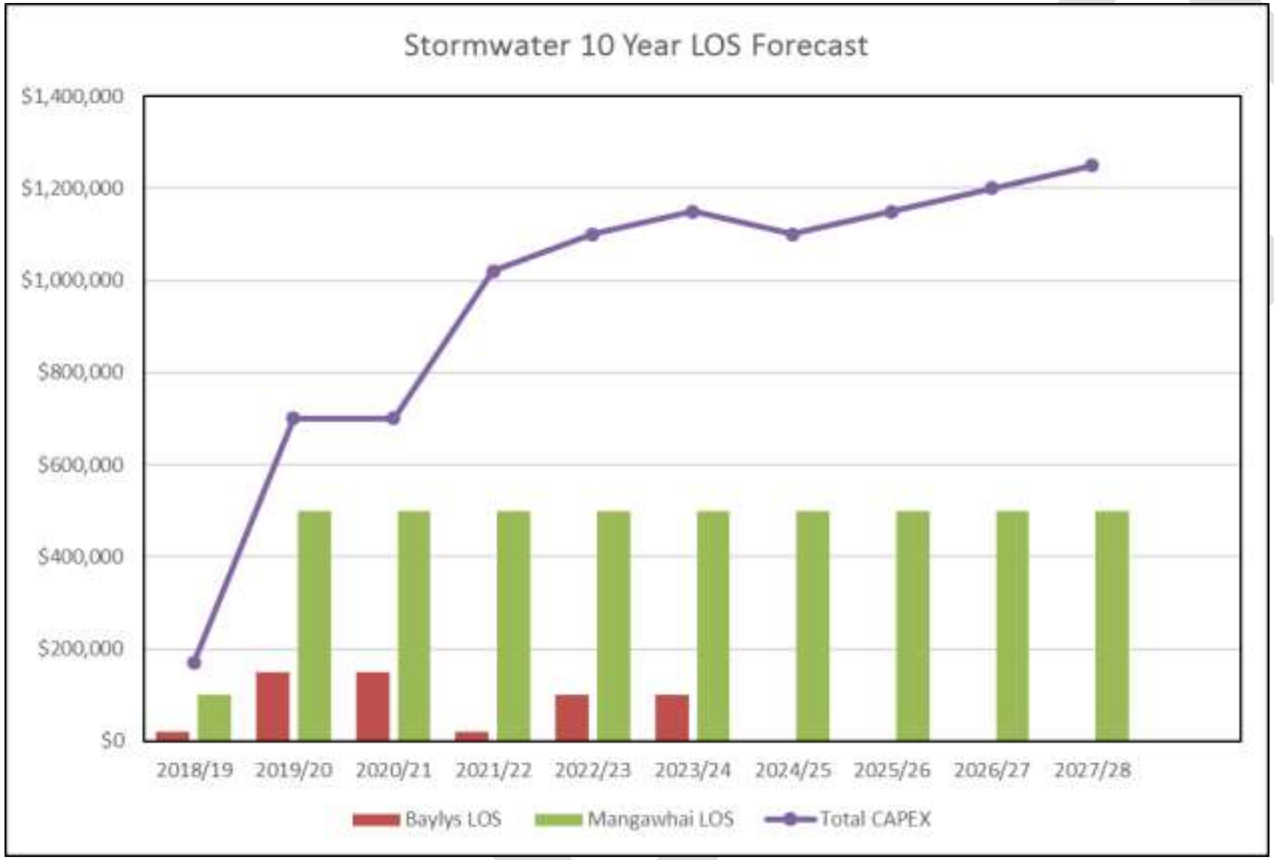
Table 7-2: Dargaville current network issues (new capital)

Area	Description
Colville Road (from Park Road to Logan Street)	New piped reticulation to replace open drains
Gordon Street (from Grey Street to Bowen Street)	New piped reticulation to replace open drains
Montgomery Avenue (Nº 33 – 51)	New piped reticulation to replace open drains
Murdoch Street (from Logan Street to River Road)	Extension of existing pipe to the river to ease possible capacity issue
Logan Street (from Murdoch Street to Basset Street)	New pipe reticulation to replace open drains
Carrington Street (from Victoria Street to Jervois Street)	New piped reticulation to replace open drains
Onslow Street (from Victoria Street to Gordon Street)	New piped reticulation to replace open drains
River Road (from Murdoch Street to Campbell Terrace; and Nº 3 – 15)	New piped reticulation to replace open drains
Station Road	New piped reticulation to replace open drains
Awakino Road	New piped reticulation to replace open drains

7.4.2 Growth and LOS expenditure forecast – district-wide

The 10 year forecast for Growth and LOS capital expenditure for stormwater assets in the Kaipara District is shown in Figure 7-5 below. The forecast expenditure information is based on the projected growth discussed in the following sections of this AMP.

Figure 7-5 - LOS Expenditure Forecasts



There are currently no growth-driven capital projects identified for Mangawhai over the next 10 years. However revision of growth figures from Census data could have an impact on this.

A provision was made within Council's renewals budget for developing scoping documents, concept designs, and construction cost estimates with the detailed design phase in 2018/2019 and subsequent construction in 2020/2021 and beyond.

7.5 Asset decommissioning and/or disposal strategy and financial forecast

Council does not have formal strategy documents relating to asset disposals. When any such assets reach a state where disposal needs to be considered Council will treat each case individually.

There are no current, or planned areas of operation that Council wishes to divest itself of. Asset disposal therefore is a by-product of renewal or upgrade decisions that involve the replacement of assets.

Assets may also become surplus to requirements for any of the following reasons:

- under-utilisation;
- obsolescence;
- provision exceeds required LOS;
- uneconomic to upgrade or operate;
- policy change;
- service provided by another means (e.g. private sector involvement); and
- potential risk of ownership (financial, environmental, legal, social, vandalism).

Depending on the nature and value of the assets they are either:

- made safe and left in place;
- removed and disposed to landfill; and
- removed and sold.

Council follows a practice of obtaining best available return from the disposal or sale of assets within an infrastructural activity and any net income is credited to that activity.

7.6 Depreciation (loss of service potential)

Service potential is defined as the economic benefit embodied in assets that over time declines as the assets age and deteriorate. Depreciation is charged annually to recover from the users of services the equivalent annual decline in service potential and renewals are undertaken to restore it. The loss (or gain) in service potential over time can therefore be described as the difference between the annual renewal and depreciation provisions.

If this figure is negative, the renewals undertaken in that year are lower than the financial depreciation. This would be expected when assets are young, but over the life of all assets the accumulated figure would be expected to be close to zero if the assets were being sustained indefinitely. Service potential is restored through renewals and is effectively funded through the annual depreciation charge.

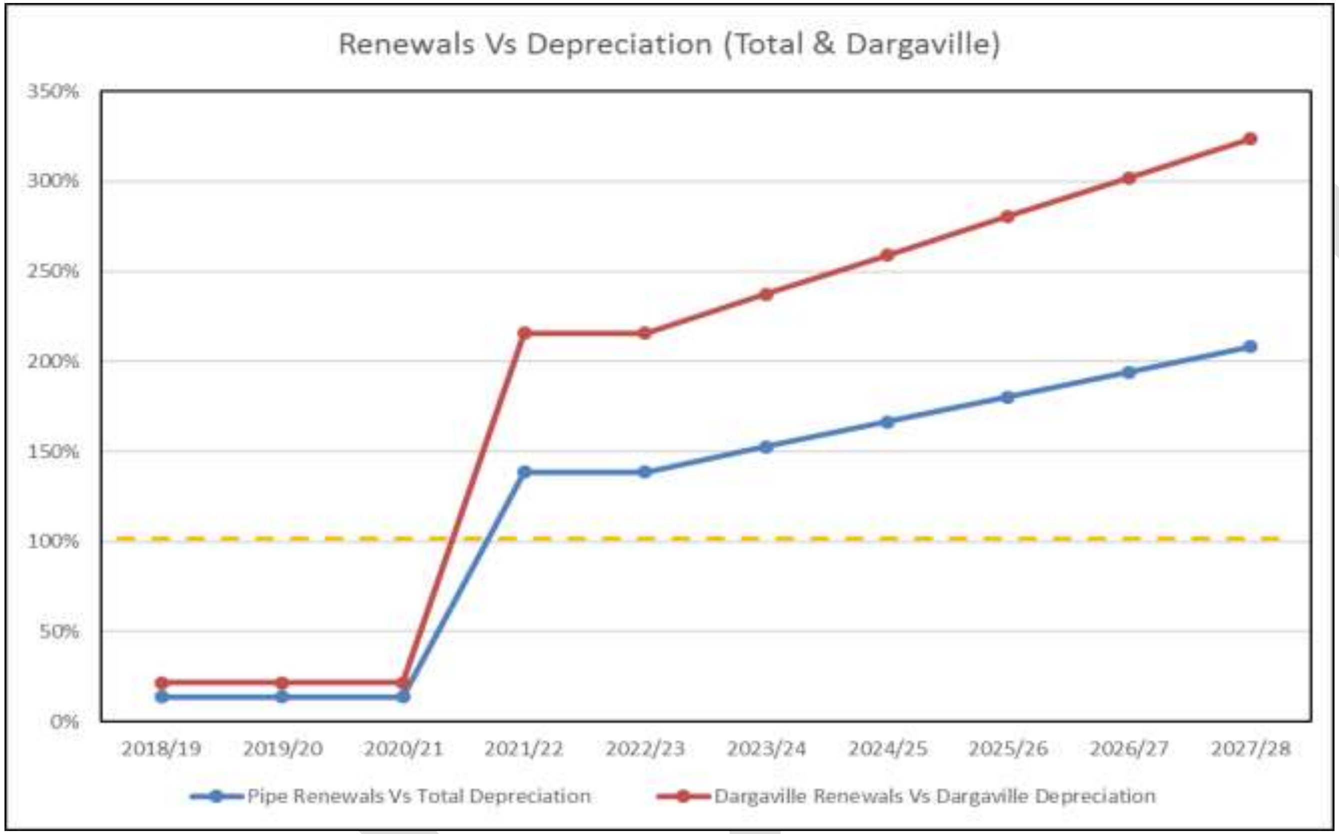
The table and figure below illustrate the expenditure on pipeline renewals Vs depreciation charges for each of the 10 years. As renewal expenditure is only indicated for the Dargaville scheme this is the only one shown. This also reflects the large proportion of overall expenditure and depreciation collection that is associated with the Dargaville scheme compared to the total. All other schemes are effectively 0% over this period but this is likely to change in subsequent LTPs as more and better information is gathered about these systems..

Previously, Kaipara District rates have not included a component for depreciation, meaning current users of the asset were not contributing to the its upkeep or replacement costs. Council is now progressively moving towards a position whereby it is fully rate-funding depreciation.

Table 7-3: Comparison of renewal works and depreciation

Depreciation	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28
Annual Depreciation	360,378	360,378	360,378	360,378	360,378	360,378	360,378	360,378	360,378	360,378
Total Renewals Vs Total Depreciation	14%	14%	14%	139%	139%	153%	166%	180%	194%	208%
Dargaville Depreciation	231,716	231,716	231,716	231,716	231,716	231,716	231,716	231,716	231,716	231,716
Dargaville Renewals Vs Dargaville Depreciation	22%	22%	22%	216%	216%	237%	259%	281%	302%	324%

Figure 7-6: Comparison of planned renewal activity to financial depreciation



8 Assumptions

Council has made a number of assumptions in preparing the AMP, which are described below.

Table 8-8-1: Key assumptions

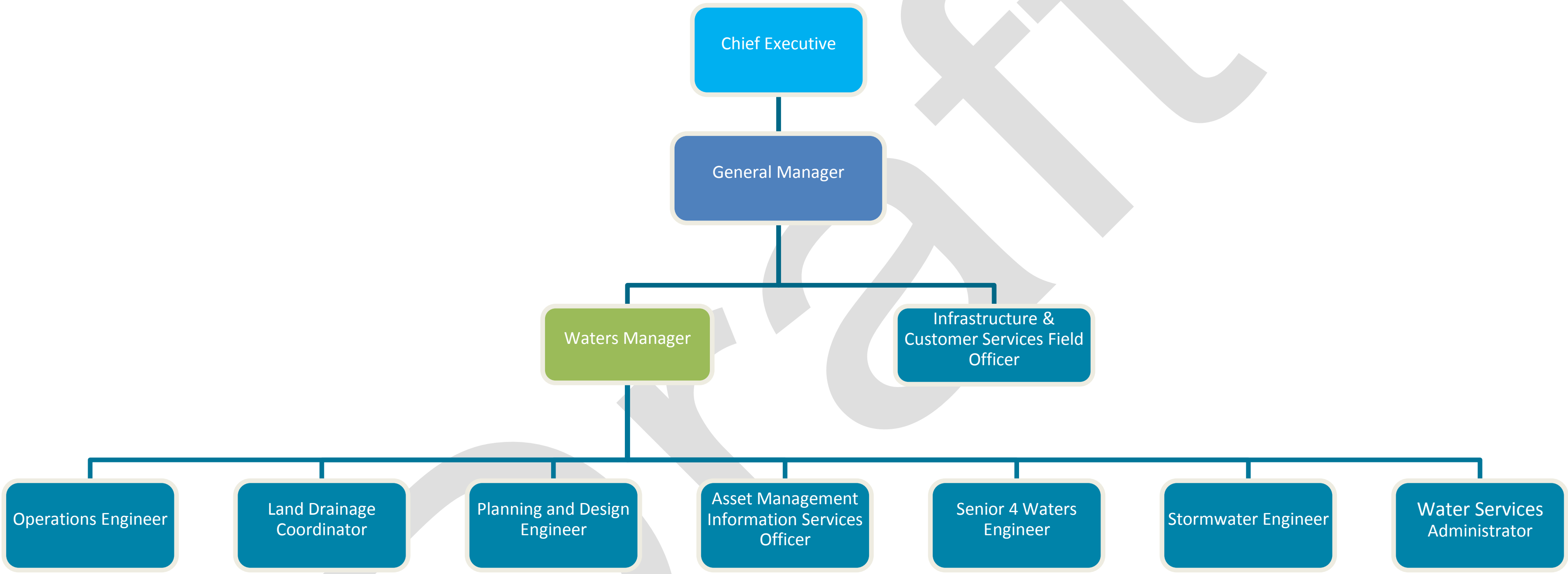
Assumption type	Assumption	Discussion
Financial assumptions	That all expenditure has been stated in 01 July 2017 dollar values (GST exclusive) and no allowance has been made for inflation.	The LTP will incorporate inflation factors. This could have a significant impact on the affordability of the plans if inflation is higher than allowed for, however Council is using the best information practicably available from Business and Economic Research Limited (BERL).
Growth forecasts	A reasonable degree of reliability can be placed on the population and other growth projections that have been used as forecast assumptions. However, these are projections and need to be carefully tracked to ensure that they continue to be a reliable indicator of likely future trends.	If the growth is significantly different it will have a significant impact. If higher, Council may need to advance capital projects. If it is lower, Council may have to defer planned works.
Network capacity	That Council's knowledge of network capacity is sufficient enough to accurately programme capital works.	If the network capacity is lower than assumed, Council may be required to advance capital works projects to address congestion. The risk of this occurring is low; however the impact on expenditure could be large. If the network capacity is higher than assumed, Council may be able to defer works. The risk of this occurring is low and is likely to have little impact.
Changes in legislation and policy	That there will be no major changes in legislation or policy.	The risk of major change is high due to the changing nature of government and politics. If significant changes occur it is likely to have a significant impact on the required expenditure. Council has not mitigated the effect of this.
Resource consents	That Council will be granted necessary resource consents for key projects.	If these consents are not granted, Council will need to consider alternative arrangements for these projects which may impact the budget and timeframe of the projects. If existing consents are not renewed, a new asset may be required to replace the existing asset, through a new capital project.

9 Service Management

9.1 Organisation

Figure 9-1 illustrates the organisation structure utilised to deliver the Stormwater service.

Figure 9-1: Kaipara District Council organisational structure



9.2 Asset management systems and processes

9.2.1 Asset management systems

Effective information systems are essential for asset management. Ease of information storage and analysis enables good asset management decisions. Council uses the support tools listed below :

Table 9-1: Asset management systems

System name	System purpose	Purpose
MapInfo (GIS)	Asset location	The location of assets are stored within tables and represented spatially via a series of points, lines or regions.
AssetFinda	Asset register	Details on the assets size, material, date of installation and other related information for water supply, wastewater and stormwater assets are recorded within AssetFinda.
NCS (Napier Computer System)	Accounting	Council accounting and financial systems are based on NCS software and GAAP Guidelines.
KITE (Kaipara Information Technology Environment)	Customer service tracking	To record customer enquiries and to register and track tasks allocated to the Maintenance Contractor for follow up investigation and resolution within appropriate timeframes. Also includes Exponare, an inquiry tool into GIS to enable easy viewing of asset information.
Aquavision	Telemetry	The performance of the wastewater pumping stations is monitored via the Aquavision telemetry system.
Advanced Information	Telemetry	The performance of the treatment plants and water supply pumping stations is monitored via the advanced information telemetry system.

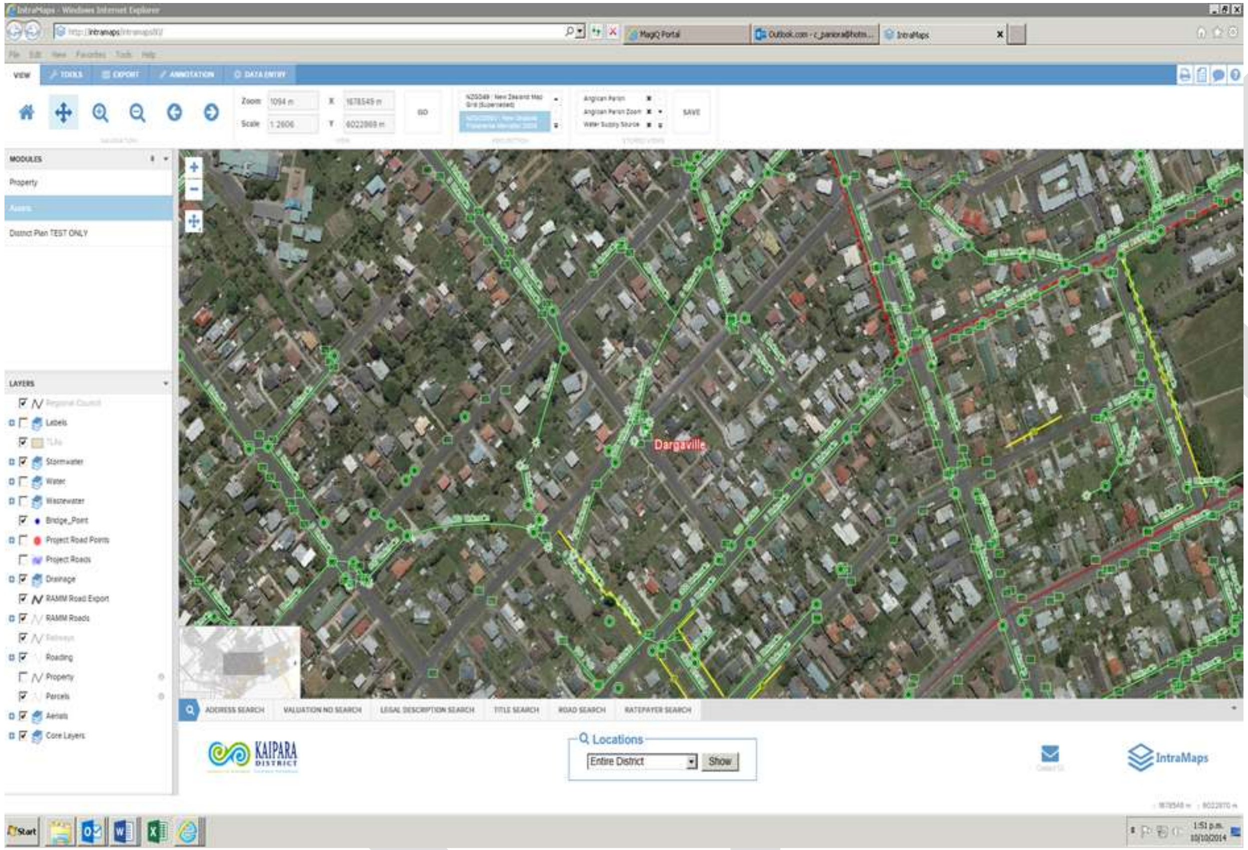
9.2.2 IntraMaps

The IntraMaps system is the core system used to house the spatial data related to Council's stormwater, wastewater and water supply assets.

The MapInfo system provides the information supporting the IntraMaps, which is widely used within Council as a user-friendly interface to the GIS asset data, enabling quick access to asset location and asset attribute information.

A screenshot of the IntraMaps system is shown in Figure 9-1 below:

Figure 9-1: IntraMaps screenshot



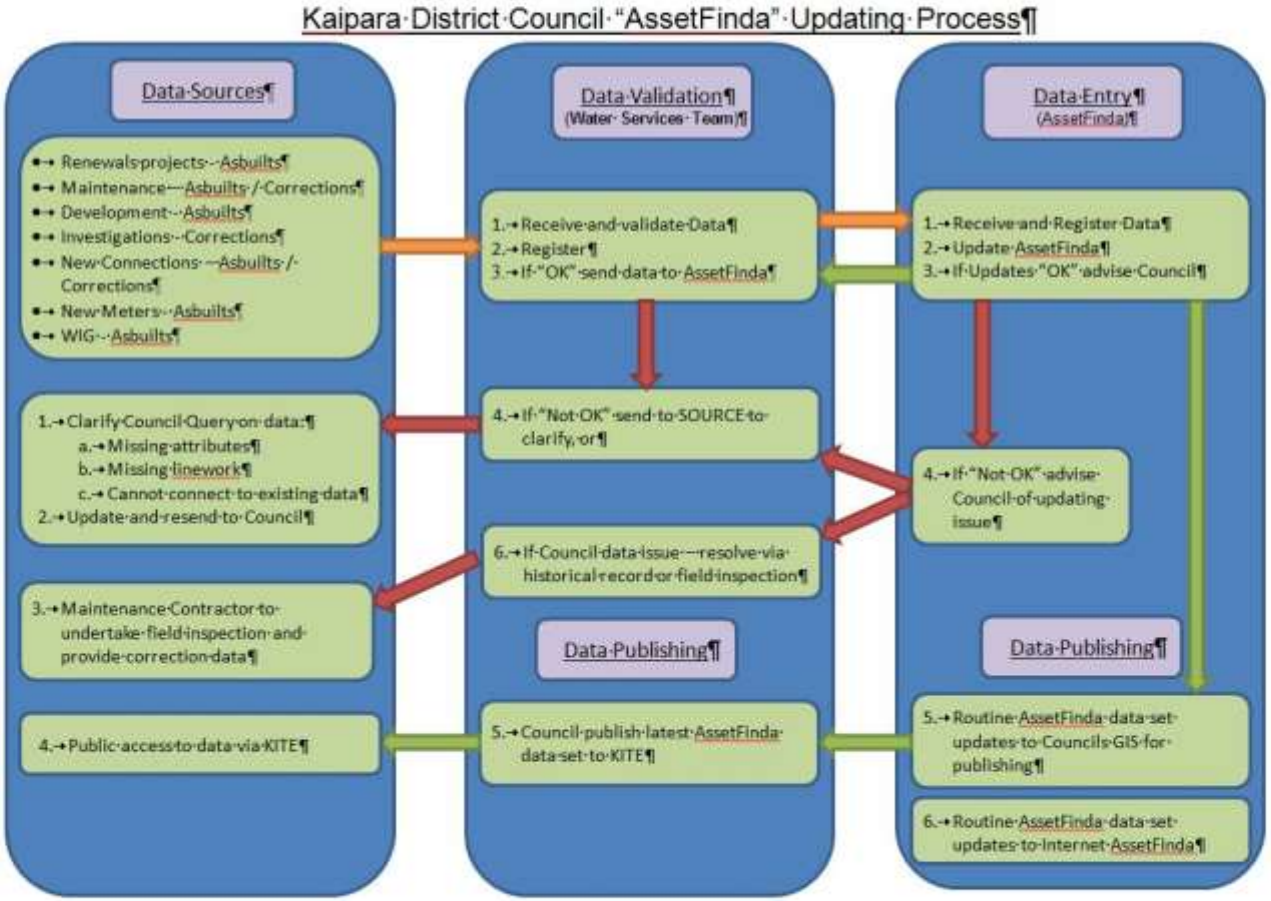
The representation of the assets within this system is believed to be reasonably comprehensive, although gaps and inaccuracies in the data are known to exist. A data improvement task has been identified and included in the AMIP to fix the known anomalies.

Ongoing data improvement and identification and resolution of data anomalies will be resolved primarily through the maintenance contract and projects, as works are completed on the network.

The IntraMaps system is externally hosted and is updated as as-built information is received then passed on via the data maintenance process. As-built data is sourced from new development, capital works projects and from the Maintenance Contractor.

The data maintenance process is represented in Figure 9-2 below.

Figure 9-2: Data maintenance process



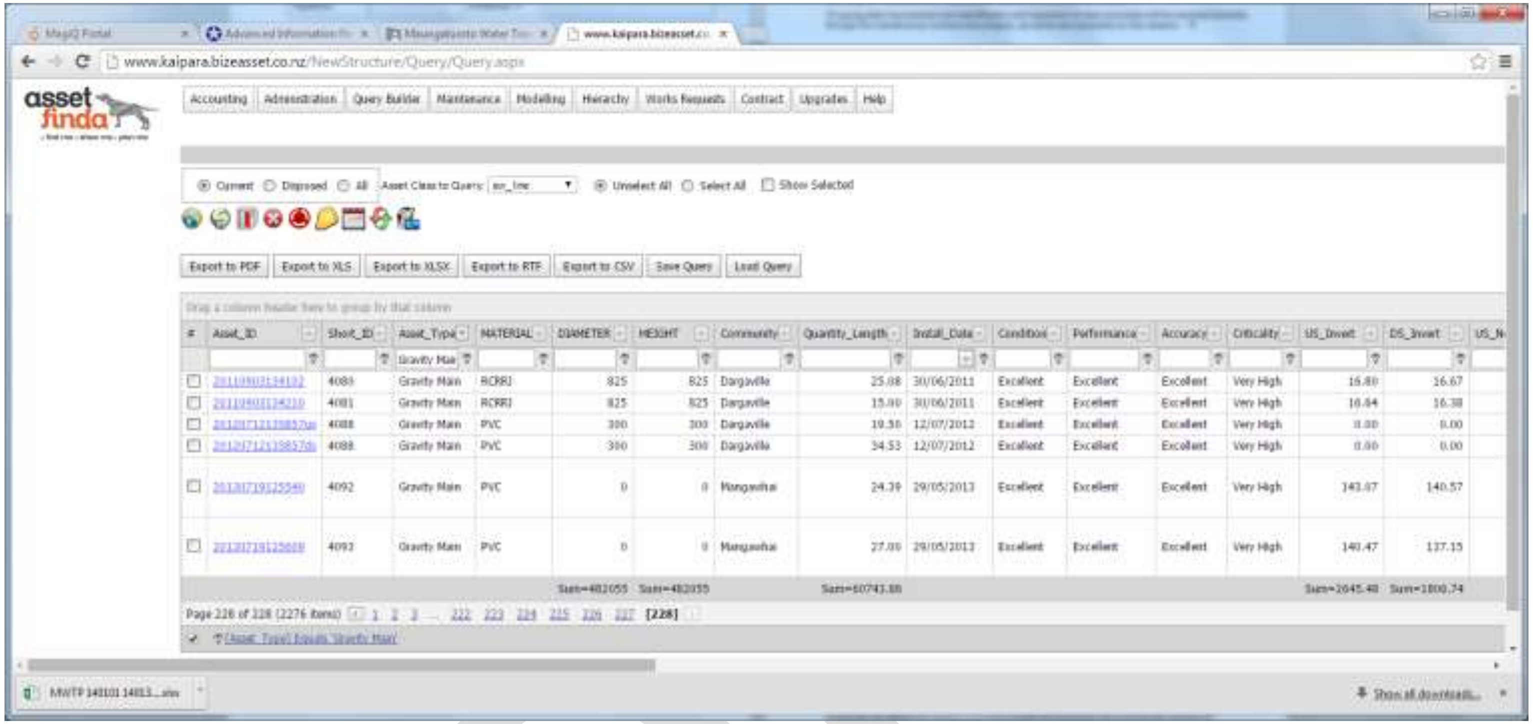
9.2.3 AssetFinda

The AssetFinda system is a MapInfo based tool used to record asset related information. This currently includes basic asset descriptors including; asset name, size, material, install date, invert levels, condition and performance. The completeness of the data within these fields is highly variable and the accuracy cannot be currently qualified.

The system was recently upgraded from a table based system to web enabled. The system is externally hosted and maintained.

A screenshot of the AssetFinda system is included in Figure 9-3 below:

Figure 9-3: AssetFinda screenshot



The system has the ability to:

- Undertake asset valuations and depreciation calculations for the stormwater, wastewater and water supply assets, however, this functionality has yet to be implemented on Councils data; and
- Record various maintenance activities against the asset; however this capability has yet to be fully defined and implemented.

There is a need for this system to be further enabled and the supporting processes implemented to ensure appropriate maintenance activity data and condition and performance data collected from the field, can be uploaded in the system and used for monitoring the decline in asset serviceability and determination of timing for asset renewal.

An improvement item has been identified to enable the AssetFinda system to be modified for the recording of this information.

10 Risk management (including health and safety)

Council's Risk Management Policy and Framework was adopted in December 2012.

Risk management is undertaken to identify specific business risks associated with the ownership and management of stormwater assets and to determine the direct and indirect costs associated with these risks.

Council is familiar with the risks associated with each stormwater scheme, as per earlier improvement plans Council developed a strategy during the 2012/2013 financial year to systematically identify, assess and manage asset risks. The risk management strategy should hold a pivotal role in the prioritisation of asset funding.

A Council-wide approach to risk management is very valuable allowing a comparison of risk across different asset types. This allows risks that impact on the stormwater network to be compared against those impacting Water Supply and Roading assets for example. In this way it is possible to balance all of Council's risks in a way that optimises expenditure and minimises Council's total risk exposure.

Council uses risk registers and action plans to monitor and control specific key risks.

Table 10-1 identifies Council's high and extreme risks, together with potential impact, current controls and an action plan to mitigate, minimise or manage the risk.

Table 10-10-1: Summary of extreme and high risk for Council

LOS failure indicator	Asset group	Asset sub-group	Caused by	Risk severity	Controls	
					Existing	To develop
Flooding, slips, accidents and injuries.	Open Drain Network.	Public open drains	Liability from third party accident in open drains.	H	The piping of open drains is considered on a case-by-case basis.	
Unavailability of urban roads, flooding.	Piped Network.	Inlets and outlets	Vandalism.	H	Routine and reactive inspections.	
	Flood Alleviation Infrastructure.	Stopbanks	Extensive damage (earthquake or other natural hazard).	H	Response planning	
		Flood detention systems	Extensive damage (earthquake or other natural hazard).	H	Response planning	
	Managerial and governance risks.	Corporate risk	Inadequate Corporate Risk Policy.	H	Council Corporate Risk Policy developed 2012.	.
Inefficient management of assets, significant asset or service failure occurs with no management plan.	Asset design and construction risks.	Asset records	Asset records not up-to-date.	H	Asset records from physical works projects and maintenance activities are updated into AssetFinda.	To include all asset changes in asset register.

10.1 Health and Safety

Council has a Health and Safety (2016) Policy aimed at providing and maintaining a safe and healthy working environment to Council employees, contractors and members of the public. With respect to asset management activities it is particularly important to protect staff, contractors and the public from hazards associated with Council assets. *"At the Kaipara District Council (Council) we will all keep everyone safe and healthy at work, and get better at being safe every year, by doing these things".*

11 Continuous improvement

The AMPs have been developed as a tool to help Council manage their assets, deliver the LOS and identify the expenditure and funding requirements of the activity. Continuous improvements are necessary to ensure Council continues to achieve the appropriate (and desired) level of activity management practice; delivering services in the most sustainable way while meeting the community's needs.

Council has demonstrated its commitment to asset management improvement over the last few years and wishes to meet core requirements as defined by the Office of the Auditor-General for the Stormwater AMP.

A generic approach to improvement is included in Appendix A.

11.1 Improvement Plan

The Stormwater Asset Management Improvement Plan (AMIP) is intended to address current issues and provide for continuous improvement.

Timing for completion of the activities may vary depending on Council priorities. This may result in re-prioritisation of activities from year to year.

The Improvement Plan is split between Core activities intended to be applied to all assets, or to improve the overall process, and Specific activities intended to relate to a specific improvement action or a particular scheme.

Table 11-1 - Improvement Plan

Improvement Plan 2018/2028	
Year 1 **2018/2019**	**Core** • Utilise a central database and geospatial framework for recording of condition assessment information and generate renewal programme from the system • Create a central management system for consents, compliance and monitoring • Commence a condition assessment of critical stormwater assets to clean up missing asset data and to produce an effective renewals programme • Development of a renewals programme based on performance and condition ratings of critical stormwater assets • Commence a process to clarify ownership of assets across the district (roading versus urban), including responsibilities of townships that are not serviced • Review of data management procedures including development of system for recording maintenance and costs at asset component level in the asset register, to help develop failure curves based on actual asset condition • Ongoing collection of data on asset attributes and condition as opportunity arises and as part of structured inspection programmes **Specific** • Develop an understanding of Infrastructure capacity required to support urban development in accordance with the NPS Urban Development Capacity • Complete and adopt an updated Stormwater Catchment Management Plan (SWCMP) for Mangawhai • Survey all the coastal outfalls in the five urban townships with Mangawhai as the highest priority • Review adequacy of developers handover requirements contained within Engineering Standards 2011, Identify programme to enhance – include for asset schedules and capital cost recording for each asset created

Improvement Plan 2018/2028	
Year 2 **2019/2020**	**Core** • Continue with development of capability, asset information capture and AMIS population of items in CORE for 2018/19 **Specific** • Complete and adopt an updated Stormwater Catchment Management Plan for Kaiwaka and Maungaturoto • Develop a template for operations and maintenance manual for ponds with key information required for developers • Development of Soakage Design Manual including engineering design standards and SMP references • Review and assessment of levels of deferred maintenance
Year 3 **2020/2021**	**Core** • Continue with development of capability, asset information capture and AMIS population of items in CORE for 2018/19 **Specific** • Complete and adopt the Stormwater Management Plan for the remaining serviced stormwater districts • Conduct a modelling exercise and update the Stormwater Catchment Management Plan (SWCMP) for Dargaville based on the formal condition assessment and data cleansing of the existing assets • Steel pipes installed in Dargaville and their condition will be reviewed as part of the condition assessment and asset data cleansing projects • Review of Levels of Service for incorporation into 2021 AMP

Improvement Plan 2018/2028	
Years 4-10 **2021/2028**	**Core** • Continue with development of capability, asset information capture and AMIS population of items in CORE for 2018/19 **Specific** • Review completed and adopted stormwater plans and ensure they are up-to-date, revise where required • Continue to review and assess assets and the asset data, clean and inspect stormwater assets to keep up with maintenance and retain efficiency within the assets • Continue to review data management procedures and systems to ensure that maintenance is recorded and costs are accurately recorded • Update records of assets and review asset renewal and growth strategies to prepare for future AMPs and LTP updates • Continue to improve asset condition, data and management to provide the most efficient and effective maintenance and renewal strategies for Kaipara and the ratepayers

Appendices

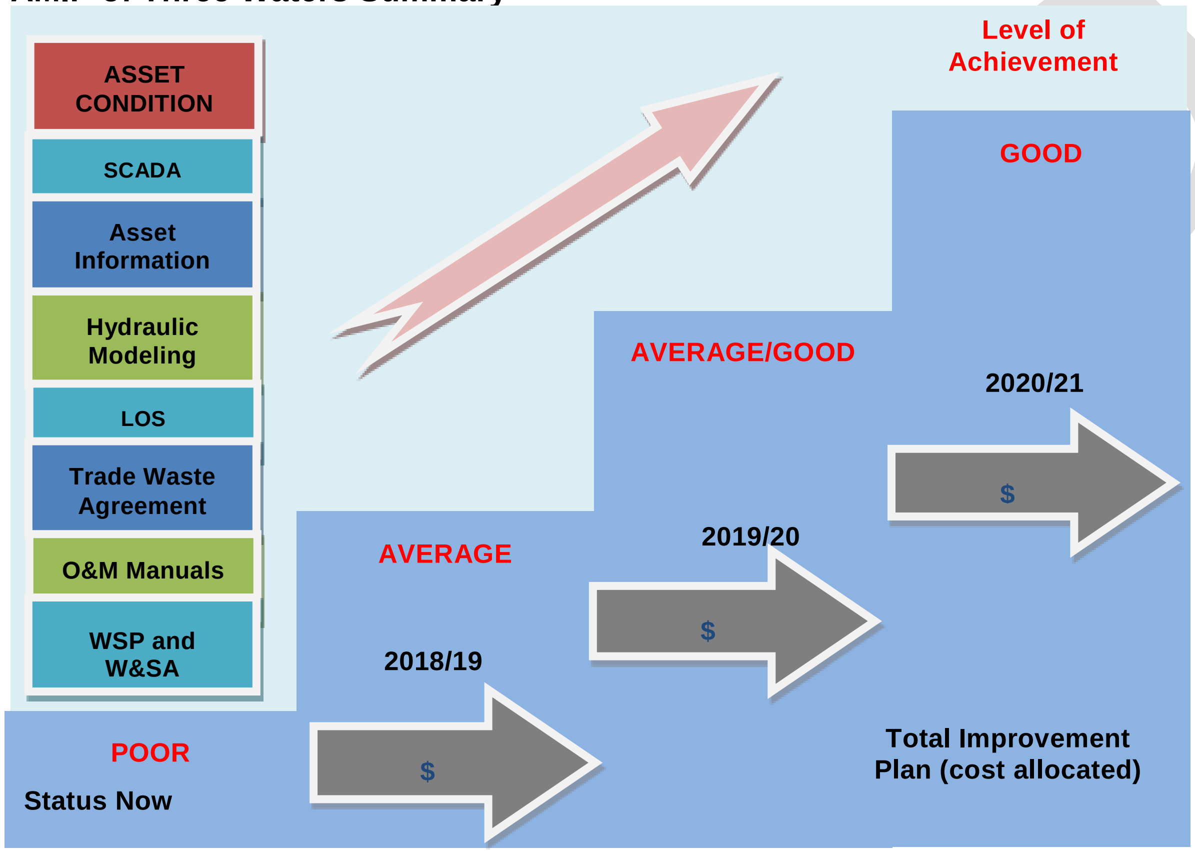
Appendix A: Asset Management Improvement Plan

Continuous improvements are necessary as Kaipara District Council continues to achieve the appropriate (and desired) level of activity management practice; delivering services in the most sustainable way which meeting the community's needs.

of the project cost against the available funding. Most probably the costing would go up and therefore it is good to have a contingency sum in the budget.

A firm commitment is needed to deliver this programme as it would elevate the present "Poor" status of the above activities to a "Good" status in three years' time as demonstrated in the diagram below.

AMIP of Three Waters Summary



Appendix B: Risk Register

The following register is historical and pre-dates the recently generated Criticality Framework. It is included as it highlights key risks at that time and will still have some relevance.

	Category/name	Length/count	Consequence of failure	Likelihood of failure	Risk
DARGAVILLE STORMWATER					
Stopbanks/Flood Walls Total 6,625m					
Kaihu River bridge - sand yard private concrete	Wall	**114m**	Minor	Possible	Significant
River Road sand yard - Murdoch Street	Bank	**136m**	Severe	Possible	Significant
River Road Murdoch Street - Basset Street	W/Wall	**220m**	Severe	Possible	Significant
River Road Bassett Street - Liverpool Street	W/Wall	**175m**	Severe	Possible	Significant
River Road Liverpool Street - end River Road	W/Wall	**350m**	Severe	Possible	Significant
Kaihu River bridge - Memorial Park Logan Street floodgate	Bank	**156m**	Severe	Possible	Significant
Memorial Park - Memorial Park centre floodgate	Bank	**337m**	Minor	Possible	Significant
Memorial Park centre floodgate - Rugby Club outlet	Bank	**318m**	Minor	Possible	Significant
Dargaville Marae Station Road	Bank	**290m**	Severe	Possible	Significant
Floodgates	**No**	**Dia**	**Consequence**	**Likelihood**	**Risk**
Taha Awa Gardens Countdown	1	**2.0m**	Major	Possible	High
Taha Awa Gardens Countdown	2	**600**	Major	Possible	High
NW Boating Club small marina	3	**600**	Severe	Possible	Significant
NW Boating Club large marina (Frost Mooring)		**375**	Severe	Possible	Significant
Kapia Street outlet beside large boat marina	5	**375**	Severe	Possible	Significant
Parenga Street carpark opposite accountants	6	**450**	Severe	Possible	Significant
Hokianga Road wharf	7	**900**	Severe	Possible	Significant
Hokianga Road wharf	8	**450**	Severe	Possible	Significant
Edward Street outlet old	9	**600**	Severe	Possible	Significant
Edward Street outlet new	9	**600**	Severe	Possible	Significant
Victoria Street opposite central	10	**300**	Severe	Possible	Significant
Victoria Street opposite Dargaville Club	11	**300**	Severe	Possible	Significant
Victoria Street opposite De Bruin	12	**300**	Severe	Possible	Significant
Victoria Street manhole ball type	12	**225 ?**	Severe	Possible	Significant
Victoria Street manhole ball type	13	**225 ?**	Severe	Possible	Significant
Victoria Street manhole ball type	14	**225 ?**	Severe	Possible	Significant
Victoria Street manhole ball type	15	**225 ?**	Severe	Possible	Significant
Victoria Street manhole ball type	16	**225 ?**	Severe	Possible	Significant
Victoria Street opposite Caltex	17 ?	**375**	Severe	Possible	Significant
Brian's Gym (Laurie thinks floodgate here)	17 ?		Severe	Possible	Significant

Floodgates	No	Dia	Consequence	Likelihood	Risk
Farmlands River Road	18	**300**	Severe	Possible	Significant
Bryant River Road		**300**	Minor	Possible	Significant
River Road Dairy		**150**	Minor	Possible	Significant
Kings Court manhole ball type	19	**450**	Minor	Possible	Significant
Campbell Terrace manhole ball type	20	**600**	Minor	Possible	Significant
55 River Road manhole	21	**225**	Minor	Possible	Significant
Murdoch Street north	22	**600**	Severe	Possible	Significant
River Road PO Box	23	**300**	Severe	Possible	Significant
River Road commercial manhole	24	**300**	Severe	Possible	Significant
River Road commercial	25	**300**	Severe	Possible	Significant
River Road opposite commercial	26	**300**	Severe	Possible	Significant
83 River Road	27	**450**	Severe	Possible	Significant
River Road off Bassett Street	28	**300**	Severe	Possible	Significant
Old Dairy Company	29	**600**	Severe	Possible	Significant
River Road Dairy Co Office	30	**300**	Severe	Possible	Significant
River Road Dairy Co Office	31	**300**	Severe	Possible	Significant
River Road Liverpool Street	32	**375**	Minor	Possible	Significant
113 River Road	33	**330**	Minor	Possible	Significant
115 River Road	34	**300**	Minor	Possible	Significant
River Road Bund wall	35	**300**	Minor	Possible	Significant
131 River Road	36	**600**	Minor	Possible	Significant
139 River Road	37	**300**	Minor	Possible	Significant
River Road park	38	**600**	Minor	Possible	Significant
Memorial Park/Rugby Club	40	**600**	Minor	Possible	Significant
Memorial Park centre	41	**600**	Minor	Possible	Significant
Memorial Park Logan Street	42	**750**	Severe	Possible	Significant
Logan Street/Kaihu River bridge	43	**450**	Severe	Possible	Significant
Beach Road/Kaihu River bridge No.44	44	**450?**	Severe	Possible	Significant
Aztec man hole	45	**300**	Severe	Possible	Significant
Beach Road/Gillespie No.47	47	**900**	Severe	Possible	Significant
Beach Road/Day Street/Franicevich No 48	48	**900**	Minor	Possible	Significant
Beach Road Flood wall outlets Sweeney		**300**	Minor	Possible	Significant
Beach Road Flood wall Juretich, Nyboer/Aztec		**300**	Minor	Possible	Significant
Beach Road Flood wall outlet Doug Grant		**300**	Minor	Possible	Significant

Floodgates	No	Dia	Consequence	Likelihood	Risk
Beach Road Flood wall outlet Grant Taylor yard		**300**	Minor	Possible	Significant
Beach Road Flood wall outlet Taylor building		**300**	Minor	Possible	Significant
Beach Road Peter McKenzie property	49	**?**	Minor	Possible	Significant
Beach Road internal floodgate Yates property	50	**?**	Minor	Unlikely	**MODERATE**
Beach Road Morgan – Yates - Kaihu	51	**?**	Severe	Possible	Significant
Station Road Nesbit	52	**?**	Minor	Possible	Significant
Victoria Street outlet Lawrie	53	**?**	Minor	Possible	Significant
Dargaville Little Theatre	54	**?**	Minor	Possible	Significant
Finlayson Park /Delta outlet	55	**?**	Minor	Possible	Significant
West of Gun Club	56	**?**	Major	Possible	High
Oxidation pond	57	**?**	Major	Possible	High
Flett property	58	**?**	Major	Possible	High
Duck Creek	59	**?**	Severe	Possible	Significant
Station Road Te Houhanga	60	**150**	Severe	Possible	Significant
Station Road houses 500 Station Road		**150**	Minor	Possible	Significant
Oxidation pond north side Awakino River	61	**?**	Severe	Possible	Significant
Flett property 2 @ 100 east of No.58	62	**?**	Minor	Possible	Significant
River Road man hole floodgate	63	**300**	Severe	Possible	Significant
River Road reserve man hole ball type	64	**225**	Minor	Possible	Significant
River Road/Kings Court man hole ball type	65	**225**	Minor	Possible	Significant
Beach Road flood wall outlets	67	**300**	Minor	Possible	Significant
Off Day Street RMT yard	68	**300**	Minor	Possible	Significant
Off Day Street Western Blasters	69	**300**	Minor	Possible	Significant
Off Day Street Kevin Reid	70	**300**	Minor	Possible	Significant
Off Day Street Wilson	71	**300**	Minor	Possible	Significant
Sunny Nook		**?**	Minor	Possible	Significant
Inlet/outlet/grates	No		**Consequence**	**Likelihood**	**Risk**
Gordon Street - Gladstone Street – Taha Awa Inlet	15a		Severe	Possible	Significant
Onslow Street - open drain Lawrie	16a		Minor	Possible	Significant
Onslow Street - open drain Lawrie inlet	16b		Severe	Possible	Significant
Warehouse floodgate - car park	17b		Minor	Possible	Significant
Phoenix Place detention dam	23a		Minor	Possible	Significant
Clyde Street catchment Selby inlet	26a		Severe	Possible	Significant

Inlet/outlet/Grates	No		**Consequence**	**Likelihood**	**Risk**
Phoenix Place outlet - Huia Crescent inlet	26b		Severe	Possible	Significant
Montgomery outlet Carter	26c		Minor	Possible	Significant
Bel Bird Crescent outlet Smith	28		Minor	Possible	Significant
Kaka Place outlet House	29		Minor	Possible	Significant
Meadow Park outlet Munn	30a		Minor	Possible	Significant
Meadow Park outlet Rakich	30b		Minor	Possible	Significant
First, Second and Third Avenue outlets	31a		Minor	Possible	Significant
Selwyn Park School field outlet	31b		Minor	Possible	Significant
Reticulation			**Consequence**	**Likelihood**	**Risk**
Pipe line length 32,190m					
Victoria Street flood/tidal			Severe	Possible	**MODERATE**
Parenga/Kapia/Totara Streets flood/tidal			Severe	Possible	**MODERATE**
Victoria/Edward/Normanby Streets flood/tidal			Severe	Possible	**MODERATE**
Victoria/Normanby/Gladstone Streets flood/tidal			Major	Moderate	High
Pipes under buildings Countdown			Major	Moderate	High
Warehouse/Countdown flood/tidal			Severe	Possible	Significant
Beach Road/Pukeko/Day Streets flood/tidal			Severe	Possible	**MODERATE**
Memorial park flood/tidal			Minor	Possible	**MODERATE**
River Road - Logan Street - Kaihu River bridge			Severe	Possible	**MODERATE**
River Road - Logan Street – Murdoch Street - Sale yards			Severe	Possible	**MODERATE**
River Road - Dairy Factory - Liverpool Street			Severe	Possible	**MODERATE**
Detention Ponds					
Phoenix Place	1		Minor	Possible	Low
Open Drains	No	**Length**	**Consequence**	**Likelihood**	**Risk**
Colville Road Curac - Segedin	1	**225m**	Minor	Possible	Significant
Colville Road Segedin State Highway 12 - Drain No.3	2	**125m**	Minor	Possible	Significant
Segedin Road - State Highway 12	3	**718m**	Minor	Possible	Significant
Okahu Creek State Highway 12 Tier/Curac	4	**277m**	Minor	Possible	Significant
Okahu Creek - State Highway 12 Tiller/Stott	5	**260m**	Minor	Possible	Significant
Beach Road - Morgan property Kaihu River	6	**608m**	Minor	Possible	Significant
Beach Road floodgate No.51 - Stopbank drain	7	**365m**	Minor	Possible	Significant
Dargaville Rugby Club - Kaihu River floodgate No.40	8	**155m**	Minor	Possible	Significant
Memorial Park No.8 - floodgate No.41	9	**275m**	Minor	Possible	Significant
Memorial Park - Logan Street – floodgate No.42	10	**120m**	Minor	Possible	Significant
Memorial Park - Logan Street	11	**20m**	Minor	Possible	Significant

Open Drains	No	Length	Consequence	Likelihood	Risk
Beach Road floodgate - Edward Street	12	**175m**	Severe	Possible	Significant
Edward Street - rail crossing - Day Street sections	12	**180m**	Severe	Possible	Significant
Station Road rail side - Edward Street	13	**400m**	Severe	Possible	Significant
Day Street – Pukeko Street - Edward Street timber yard	14	**315m**	Severe	Possible	Significant
Tirarau Street - Gordon Street - Gladstone Street inlet	15	**141m**	Severe	Possible	Significant
Onslow Street/Selwyn Park School - Lawrie	16	**610m**	Minor	Possible	Significant
Warehouse –floodgate No.53 – Onslow - floodgate No.53	17	**1191m**	Minor	Possible	Significant
NW Bridge State Highway12 - floodgate 54 Finlayson Park	18	**660m**	Minor	Possible	Significant
Northland Boating - Kumara pack house	19	**425m**	Minor	Possible	Significant
Kumara pack house Drain No.19 – floodgate No.54	20	**555m**	Minor	Possible	Significant
Floodgates Nos.54, 55 and 56 – Gun Club	21	**560m**	Minor	Possible	Significant
Drain No.21 – Silver Fern meat works	22	**430m**	Minor	Possible	Significant
Phoenix Place from No.29 - detention pond	23	**42m**	Severe	Possible	Significant
Colville/Basset Road corner – Logan Street	24	**445m**	Minor	Possible	Significant
116 Station Road – Kaihu River floodgate outlet	25	**210m**	Minor	Possible	Significant
Phoenix Place detention – High School – Huia Crescent	26	**284m**	Severe	Possible	Significant
Harrison yard – Lok – Station Road	27	**272m**	Severe	Possible	Significant
Floodgate No.56 – Gun Club – sewage pond – Awakino	79		Severe	Possible	Significant
Floodgate No.61 to Silver Fern meat works	78		Minor	Possible	Significant
BAYLYS BEACH STORMWATER					
Asset Condition 2/7 Good condition					
Reticulation		**3847m**	Minor	Possible	**MODERATE**
Manholes	61		Minor	Possible	**MODERATE**
Open Drains		**10m**	Minor	Possible	**MODERATE**
TE KOPURU STORMWATER					
Asset Condition 2 Good condition					
Floodgate (one house involved)	1		Severe	Possible	Significant
Floodgate Risk of failure debris/age			Severe	Possible	Significant
Reticulation		**27,781m**	Minor	Possible	Significant
Manholes	357		Minor	Possible	Significant
Open Drains		**2486m**	Minor	Possible	Significant
Western Boundary drain			Severe	Possible	Significant

KAIWAKA STORMWATER	No	Length	Consequence	Likelihood	Risk
Asset condition 2 Good condition					
Reticulation Pipe line length 320m		320	Severe	Possible	Significant
Manholes Total 9	9		Severe	Possible	Significant
Open drains total length 262m		262	Minor	Possible	Significant
Inlets / outlets total 5		5	Minor	Possible	Significant
MANGAWHAI STORMWATER					
Asset Condition 2 Good condition					
Reticulation pipe line		27,781m	Minor	Possible	Significant
Open drains		1,400m	Minor	Possible	Significant
Manholes	357		Minor	Possible	Significant
Inlets / outlets Coastal Outlet	31		Minor	Possible	Significant
Detention ponds	4		Minor	Possible	Significant
Soakpits	72		Minor	Possible	Significant
RUAWAI STORMWATER					
Open Drain Freyberg Road drain to Marina F/gate			Major	Moderate	High

Appendix C: Resource Consent Register

Kaipara District Council Resource Consent Register – Stormwater

Consent number	Type code	Details	Expiry date
784301	CST	Council: Rock groynes, Mangawhai Harbour	28/02/2023
906301	LUC	Council: Flood protection Works	30/04/2035
935401	CST	Council: Works in the CMA	30/06/2034
952601	CTD	Council: Discharge of Stormwater, Wintle Road, Mangawhai Heads	30/09/2036
986001	LUC	Council: Stopbank construction - Stage 3 – Kaihu River	30/04/2035
1332901	CST	Council: Use and occupy space in Crown owned CMA	30/06/2035
1853901	CST	Council: Floodgate and floodway maintenance in Kaipara District	31/05/2027
2036201	LUC	Council: Relocate floodgate	30/06/2013
2122001	DIL	Council: Stormwater works	30/09/2043
2284101	LUC	Council: Floodgated culvert installation	30/06/2013
002111.01.03	CTD	Council: Stormwater discharge structure -	01/06/2052
002111.01.03		Council: Stormwater diversion– Mangawhai	
002111.02.02		Council: Stormwater diversion and discharge outside CMA – Mangawhai	
002111.03.02		Council: Stormwater diversion and discharge inside CMA - Mangawhai	

CST – Coastal Permit
CTD – Coastal Discharge
LUC – Land Use
DIL – Discharge to Land

Appendix D: Historical LOS

LOS 2010 AMP – Quality

Core Value: Quality							
Key Community Outcome: **Sustainable economy:** Kaipara District has a diversified and sustainable economy that supports the well-being of its communities and residents.							
Level of Service	**Performance Measure**	**Past performance**	**Current Year Target**	**Future Year Targets**			
		2008/2009	**2009/2010**	**2010/2011**	**2011/2012**	**2012/2013**	**2014/2020**
The stormwater systems are designed and maintained to minimise surface flooding so that no storm events of less than 10% AEP in urban areas.	Urban roads are not closed for more than two hours due to flooding.	New	New	90%	90%	95%	100%
Stormwater networks are operated and maintained to minimise the effects of flooding on communities.	Develop and deliver a programme to remove steep sided drains in 20 years in Mangawhai, Dargaville, Baylys and Te Kopuru.	New	Complete assessments	100% success	100% success	100% success	100% success
	Results of a customer survey to be that the percentage of respondents who are satisfied or very satisfied with the Levels of Service (measured annually).	81%	75%	76%	77%	77%	78%
Stormwater flooding incidences are responded to promptly.	Percentage of stormwater blocked drain incidents attended on site and made safe within four hours.	New	New	75%	75%	75%	75%
	Percentage of stormwater service for clearing blocked drains achieved within two hours	New	New	90%	90%	90%	90%

Levels of Service 2010 AMP – Safety

Core Value: Safety							
Key Community Outcome: **Safety and a good quality of life**: Kaipara District is a safe place to live and raise a family, where people enjoy a good quality of life.							
Level of Service	**Performance Measure**	**Past performance**	**Current Year Target**	**Future Year Targets**			
		2008/2009	**2009/2010**	**2010/2011**	**2011/2012**	**2012/2013**	**2014/2020**
Flood protection for the community.	Stormwater reticulation in new developments is fully compliant with Council's Engineering Standards 2011 for design storm events.	New	New	100%	100%	100%	100%

Appendix E: List of acronyms and abbreviations

The following key acronyms and abbreviations are used in this document:

Term	Definition
AC	Asbestos concrete (pipe type)
AEP	Annual Exceedance Probability (e.g. 10% is once in 10 years)
AM	Asset management
AMIP	Asset Management Improvement Plan
AMP	Asset Management Plan
AMS	Asset management systems
CAPEX	Capital expenditure
CCTV	Closed circuit television
CDEM	Civil Defence Emergency Management
CMA	Costal Marine Area
CON	Concrete (pipe type)
CORST	Corrugated steel (pipe type)
Council	Kaipara District Council
CPP	Competitive Pricing Procedures
DP	District Plan
EW	Earthenware (pipe type)
Fibro	Fibrolite (pipe type)
Galv	Galvanised (pipe type)
GEW	Glazed earthenware (pipe type)
GIS	Geographical Information System
HIRDS	High Intensity Rainfall Design System
IIMM	International Infrastructure Management Manual
IPCC	Intergovernmental Panel on Climate Change

Term	Definition
IPCC	Intergovernmental Panel on Climate Change
KITE	Kaipara Information Technology Environment
LGA	Local Government Act 2002
LID	Low Impact Designs
LIM	Land Information Memoranda
LOS	Level of Service
LTP	Long Term Plan
MfE	Ministry for the Environment
NCS	Napier Computer System
NIWA	The National Institute of Water and Atmospheric Research
NOVAF	Novaflex (trade name for a pipe type)
NRC	Northland Regional Council
OPEX	Operational expenditure
PIM	Project Information Memoranda
PVC	Polyvinylchloride (pipe type)
RCRRJ	Reinforced concrete rubber ring joint (pipe type)
RMA	Resource Management Act 1991
SWCMP	Stormwater Catchment Management Plan
SWCMP	Stormwater Management Plans
UPVC	Un-plasticised polyvinylchloride (pipe type)
URP	Usual Resident Population
WSSA	Water and Sanitary Services Assessment

KAIPARA DISTRICT COUNCIL

Kaipara District Council

Asset Management Plan 2018

Wastewater

November 2017

Status: Draft

Kaipara te Oranganui

KAIPARA DISTRICT

Two Oceans Two Harbours

Quality Statement

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APPROVED FOR ISSUE BY		
	………………………………..............	……/……/……

Revision Schedule

Rev No	Date	Description	Signature or typed name (documentation on file)			
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1 Executive summary

1.1 Introduction

KDC operates six community wastewater schemes for Dargaville, Glinks Gully, Kaiwaka, Te Kopuru, Mangawhai and Maungaturoto.

The wastewater systems focus on protecting public and environmental health by collecting and treating wastewater prior to release into receiving environments.

As per the LGA 2002:

1. The purpose of local government is –
   a. To enable democratic local decision making and action by, and on behalf of, communities; and
   b. To meet the current and future needs of communities for good-quality local infrastructure, local public services and performance of regulatory functions in a way that is most cost-effective for households and businesses.
2. In this Act, **good-quality**, in relation to local infrastructure, local public services, and performance of regulatory functions, means infrastructure, services, and performance that are –
   a. Efficient; and
   b. Effective; and
   c. Appropriate to present and anticipated future circumstances

The purpose of this Asset Management Plan (AMP) is to summarise in one place Kaipara District Council's (Council) strategic and long term management approach for the provision and maintenance of its wastewater assets.

The AMP provides discussion of the key elements affecting management of Council's wastewater assets, including the legislative framework, links to community outcomes, policies and strategy, the proposed Levels of Service (LOS) and performance measures and demand, environmental and service management.

Asset performance, condition and value are examined and a financial and lifecycle strategy is presented to define the investment planned to address issues and to ensure that an uninterrupted service is provided to customers now and into the future.

The provision of sustainable wastewater systems requires all those connected to take on a degree of responsibility towards various aspects of the system operation. Just because a public system exists does not mean those connected can have a ‘flush and forget’ mentality.

In wastewater systems certain sanitary wastes should not be flushed down toilets as they cause blockages in pipes and pumps which leads to system overflows and adversely affect the environment. Costs are incurred when maintenance staff respond to such incidents which are ultimately passed back to the users who have concerns regarding rising costs.

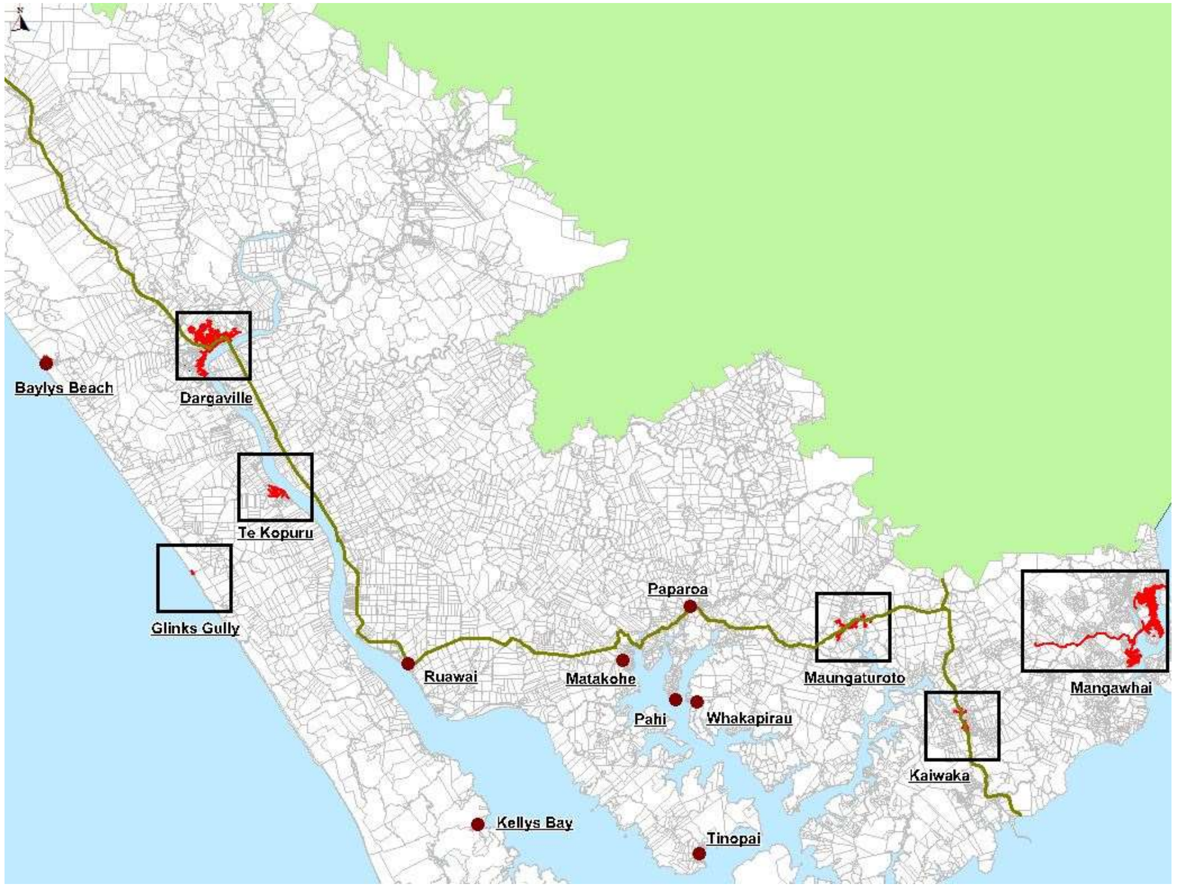
Allowing surface water to access the wastewater system causes overflows from the wastewater system in rain events. System providers are required to prevent such overflows which can require huge storage facilities for wet weather events. These come at significant cost and the preferred solution is to prevent entry of surface water in the first place. Again, individuals can assist with this by taking on board a degree of responsibility and noting where surface water flooding may be entering their house wastewater system and preventing this. Another area that causes system overflows is allowing roof water downpipes to be directed into the wastewater gully traps.

Council looks forward to working with the community in the provision of sustainable wastewater systems.

1.2 The assets

Council operates six community wastewater schemes for Dargaville, Glinks Gully, Kaiwaka, Maungaturoto, Te Kopuru and Mangawhai in order to protect public health by providing Kaipara district with reliable wastewater service in a manner that minimises adverse effects on the environment. The location of each of these communities within Kaipara district is illustrated in the figure below.

Figure 1-1: KDC WW schemes



An overview of the wastewater assets in the district is provided in the Asset Overview and Asset Valuation summary tables below.

1.3 Asset overview

Table 1-1: Asset overview

Community	Treatment plants	Pump stations	Rising mains (m)	Gravity lines (m)	Manhole	Connections	Condition
Dargaville	1	15	5,942	39,435	714	2,278	Started 2015, ongoing assessment
Glinks Gully	1	1	340	155	8	26	Largely unknown, Capacity study to start 2019
Kaiwaka	1	1	1,266	4,090	71	192	Assessment to start 2019
Maungaturoto	1	3	1,301	11,295	198	423	Assessment commenced, to continue 2018
Te Kopuru	1	0	0	6,669	89	222	Commenced 2013/2014
Mangawhai	1	12	23,214	46,794	509	2,473	Commenced 2013/2014
TOTAL	6	32	32,063	108,438	1,589	5,614	

Note: These quantities are sourced from 2017 valuation using the most direct identifier. The number of connections has not been reconciled with the rating database.

Table 1-2: Summary WW revaluation

Wastewater Renewal Value						
	Gravity Lines	Connections	Points	Rising Mains	Plants	Total
Dargaville	$8,308,365	$4,412,781	$2,567,258	$1,897,130	$4,062,242	$21,247,775
Glinks Gully	$23,839	$50,365	$28,156	$53,355	$123,752	$279,467
Kaiwaka	$790,194	$371,929	$252,642	$205,225	$370,175	$1,990,165
Maungaturoto	$2,268,078	$819,406	$730,839	$243,644	$2,206,073	$6,268,040
Te Kopuru	$1,290,484	**$430,043**	$341,796		$296,697	$2,359,019
TOTAL Excl Mangawhai	$12,680,960	$6,084,523	$3,920,691	$2,399,354	$7,058,939	$32,144,467
Mangawhai	$9,384,940	$4,790,521	$4,470,300	$9,812,103	$17,910,065	$46,367,928
TOTAL Incl Mangawhai	$22,065,900	$10,875,044	$8,390,991	$12,211,457	$24,969,003	$78,512,395

(Source 2017 Wastewater Revaluation)

1.4 Financial strategy

1.4.1 Capital cost projections

A summary of the planned CAPEX expenditure by community and by category is shown in the charts below. The graphs illustrate (in order) :

- Total renewals predicted over the next 30 years;
- Total CAPEX by driver over the next 10 years;
- Total CAPEX by driver for Mangawhai over the next 10 years;
- Total CAPEX by driver for Dargaville over the next 10 years; and
- Total CAPEX by driver for the small schemes over the next 10 years

Figure 1-2: WW total renewals

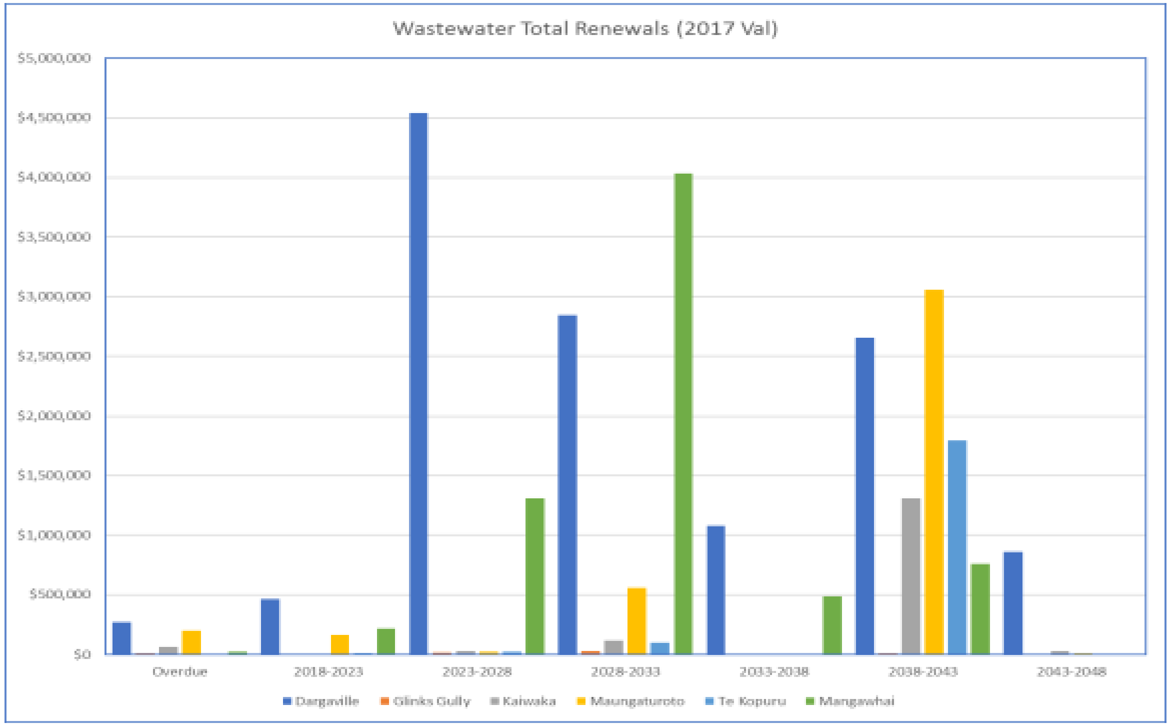


Figure 1-3: WW total CAPEX

Fig 1-3

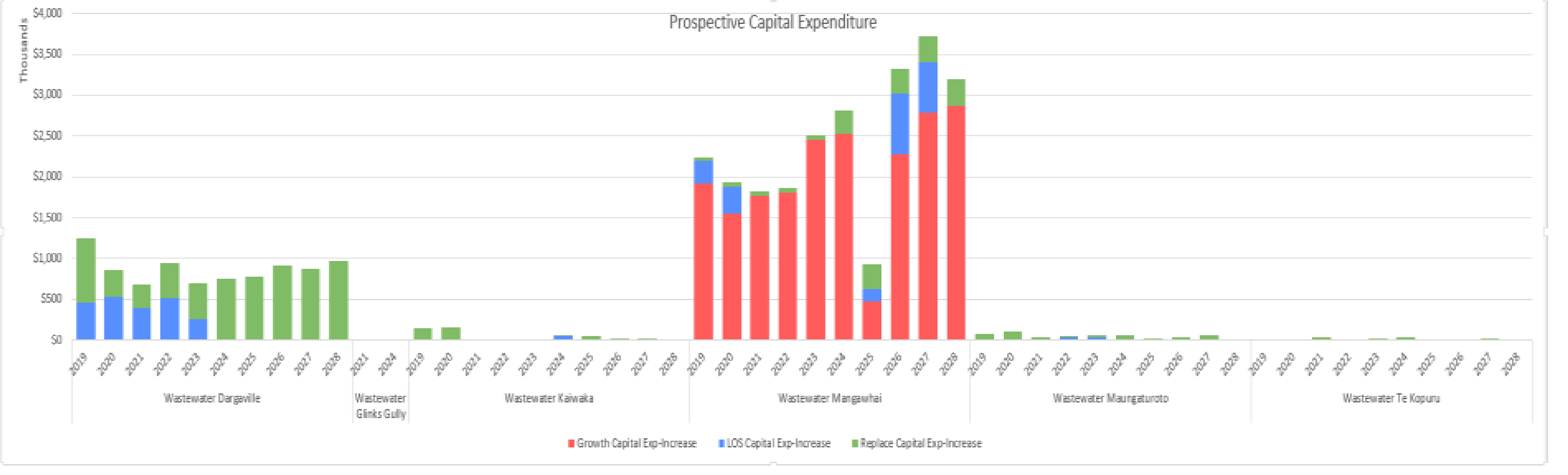


Figure 1-4: Mangawhai CAPEX

Fig 1-4

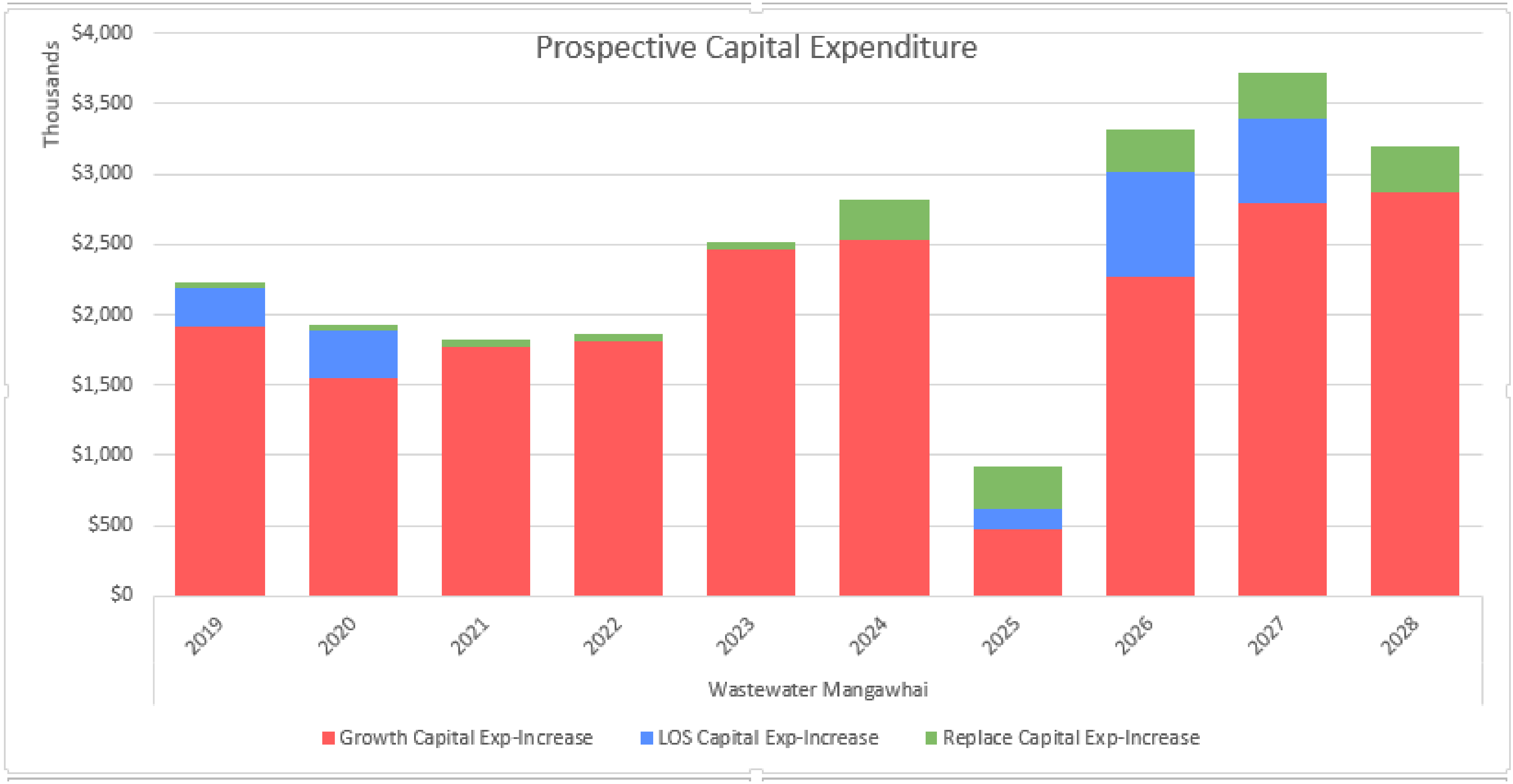


Figure 1-5: Dargaville CAPEX

Fig 1-5

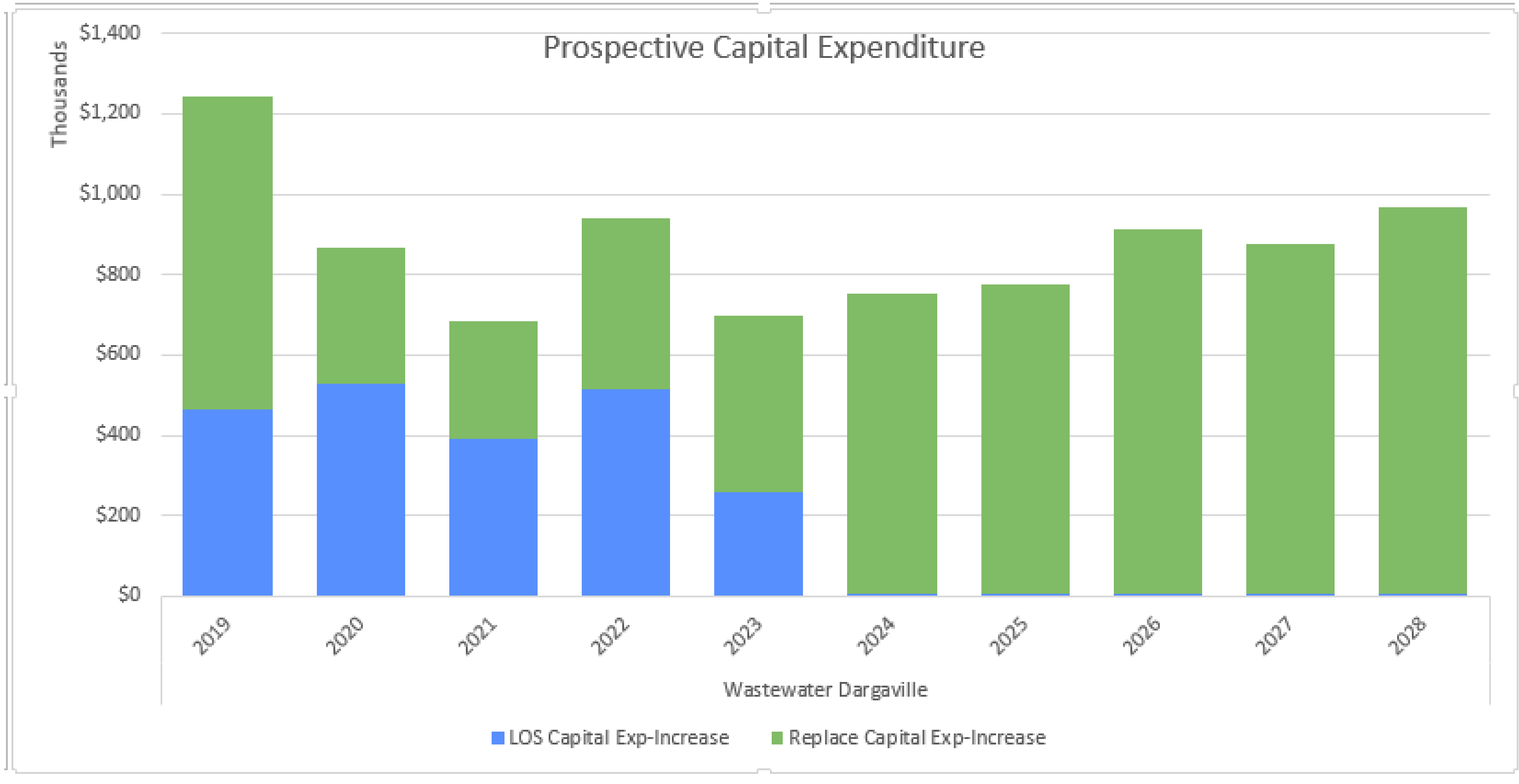
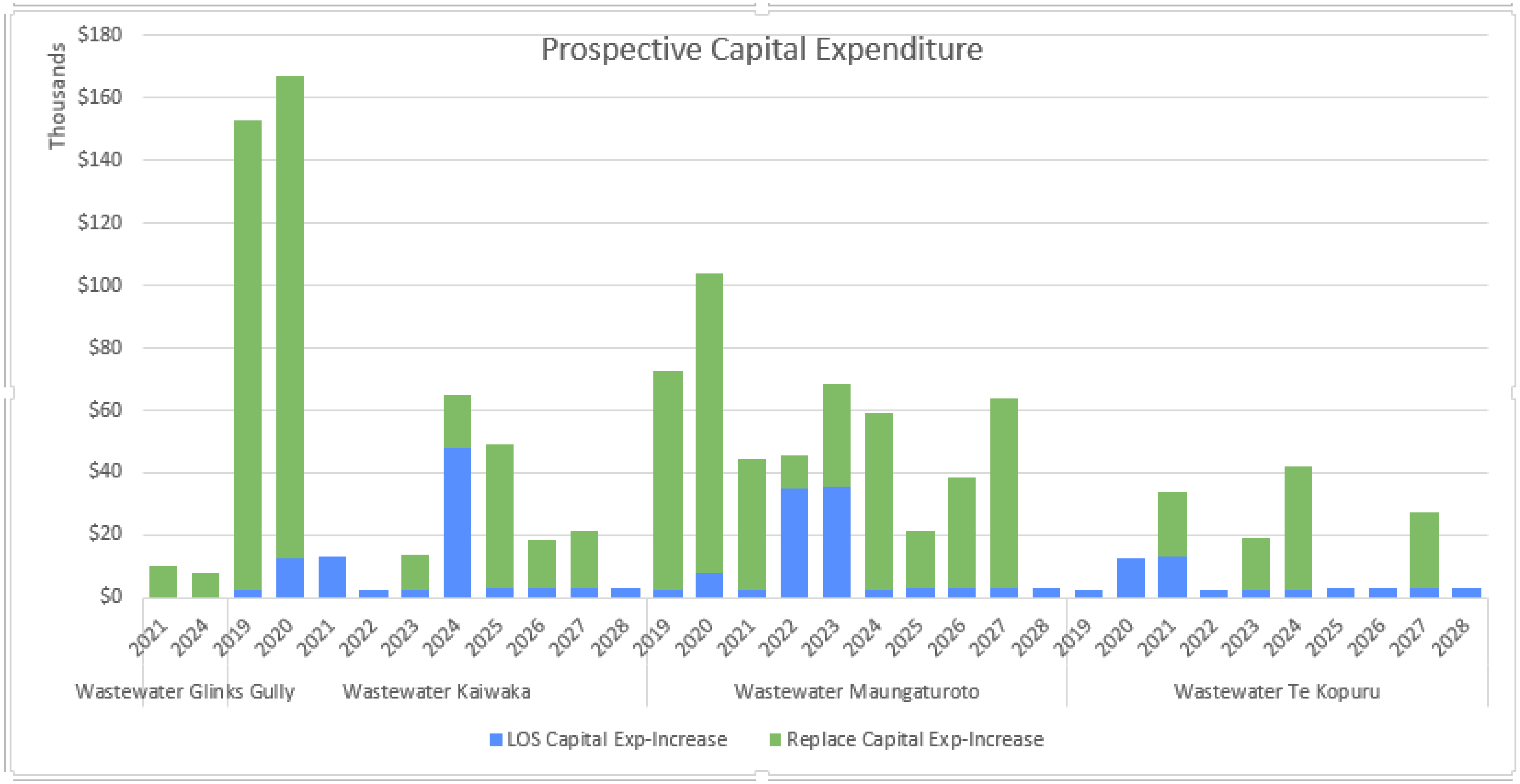


Figure 1-6: KDC Small WW scheme CAPEX

Fig 1-6



1.5 Operating costs

Projected operating costs over the next 10 years are presented below. These include operating and maintenance costs plus Database Management and Management Services. Excluded are finance-related costs such as depreciation and interest and rates charged on land. Also excluded are the staff costs associated with the Water Services department.

Key variables that are evident include :

- De-sludging of Dargaville ponds over two years;
- Expected reduction in operating costs for Mangawhai scheme in 2019; and
- Other minor variations largely relate to changes in Management Services costs.

Figure 1-7: Projected op costs Dville/Mwhai

Fig 1-7

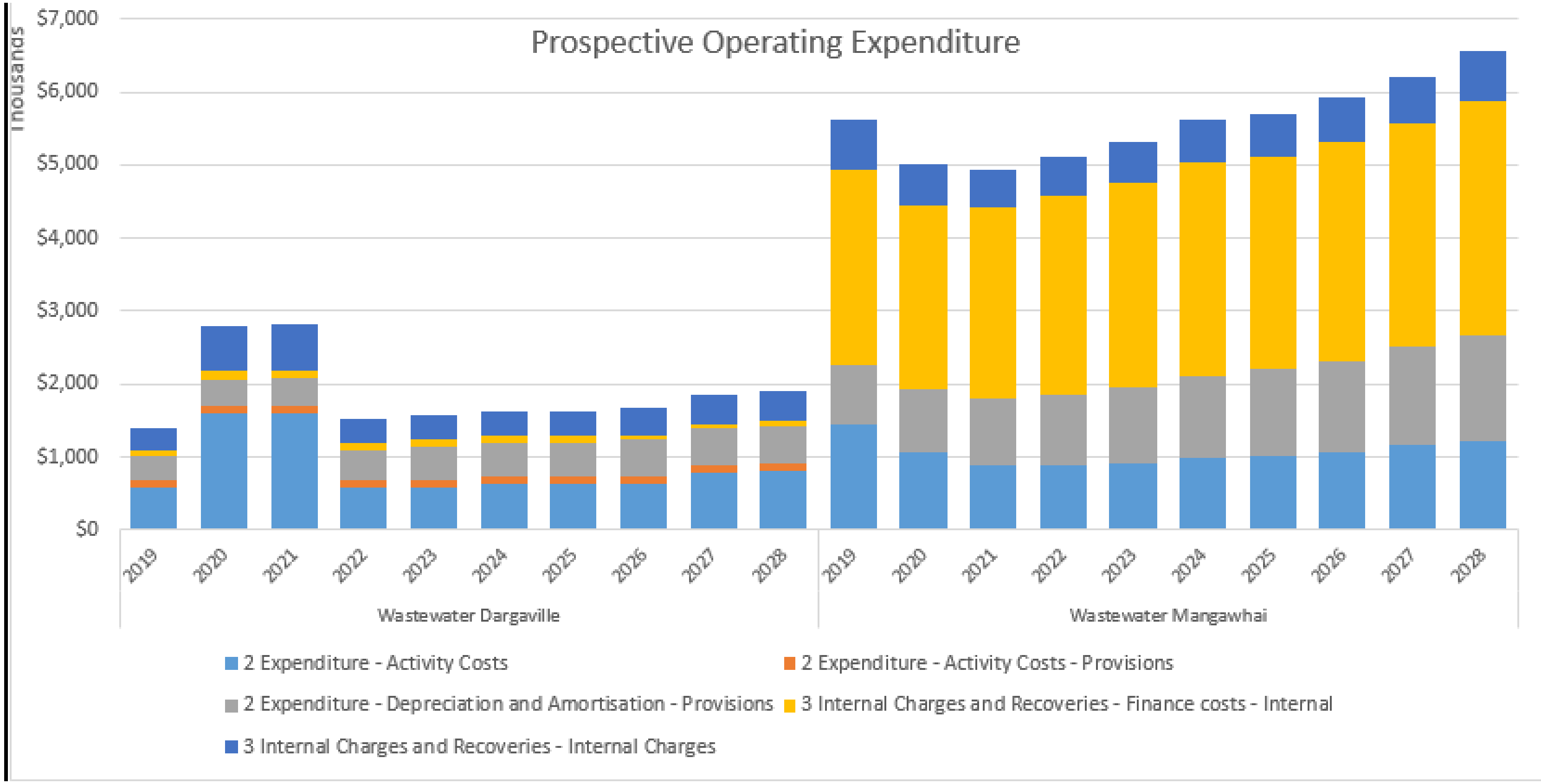
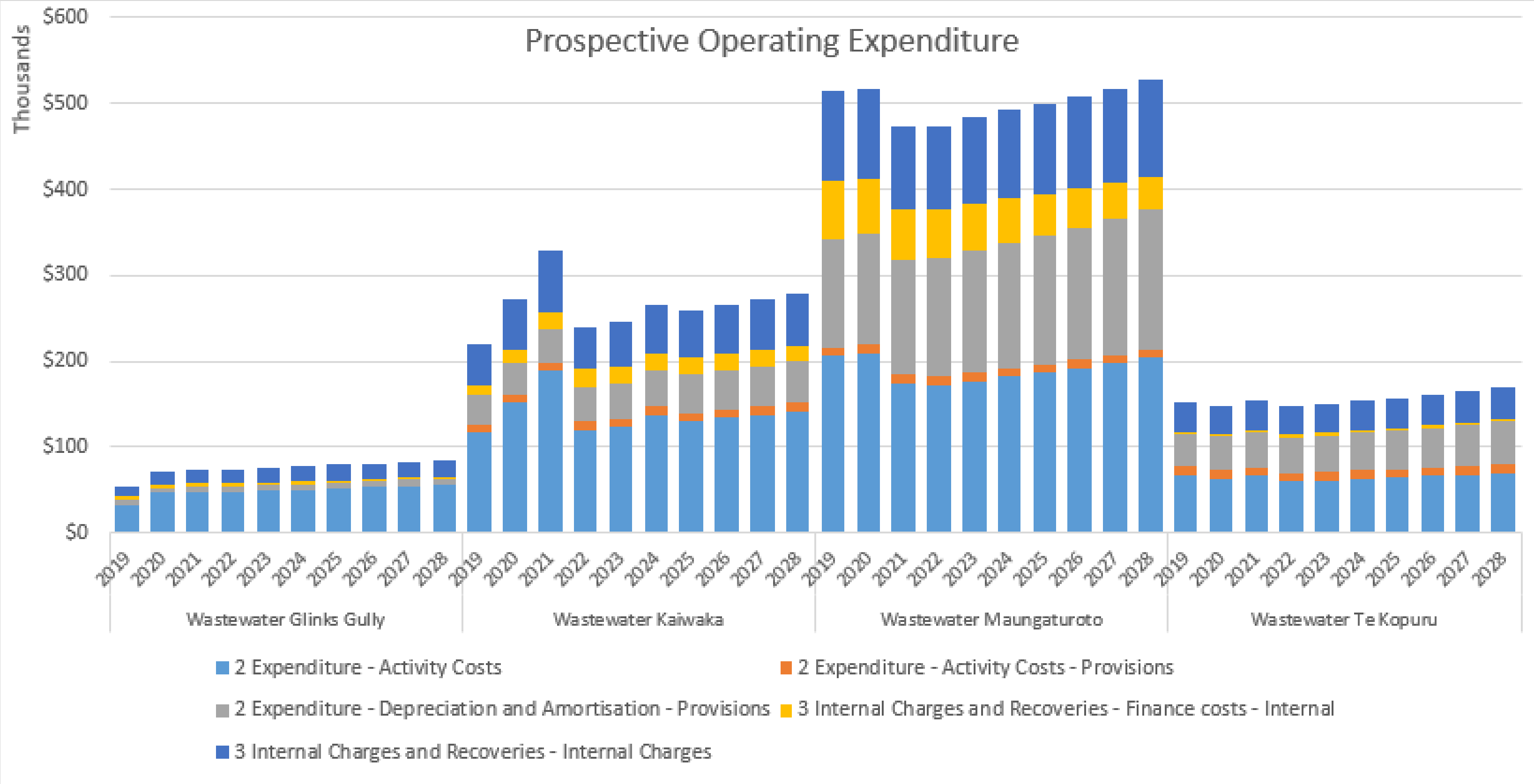


Figure 1-8: Projected op costs other

Fig 1-8



1.6 Continuous improvement

The continuous improvement activity is largely captured within the management services budget line. Previously the Engineering Services budget line was also used but this has been discontinued.

Over the next three years the focus will be on the following major improvement initiatives:

- **Capacity studies**

  The various Council wastewater systems have evolved over time and none have defined hydraulic models. As varying degrees of growth occur and as Council moves into a period of more intense renewal activity it is important to know that the work that is being done is appropriately sized for future demand.

  The studies will identify the current demand being generated by the systems and the current capacity of the various elements. Provision will be made for future growth and key constraints on the system identified together with proposed remedies. This will cover reticulation, pumping and treatment. Also included in the capacity studies will be an assessment of the degree of infiltration and inflow that is occurring and this will be used to define the extent of control measures that are required.

  Over the three years studies are proposed for Dargaville, Mangawhai, Maungaturoto, Glinks Gully and Kaiwaka.

- **Condition assessment**

  Provision is included for ongoing CCTV inspection and assessment of the gravity drains plus provision for sampling of pressure wastewater pipes (rising mains). The extent of this activity aligns with the ProjectMax recommendations of 2016.

- **Mangawhai plant renewal review**

  The Mangawhai WWTP is a complex and sophisticated system with a large number of electro-mechanical components. Many of these have relatively short economic life expectations and this reflects in a significant predicted need for renewals. This study will assess the actual condition and life expectancy of this equipment and generate a more robust forecast. This will be combined with an assessment of equipment criticality and will also serve to assess the condition of the equipment as Trility potentially ends its operation and maintenance contract.

2 Strategic context

2.1 Purpose

The purpose of this AMP is to summarise in one place Kaipara District Council's (KDC/Council) strategic and long term management approach for the provision and maintenance of its wastewater assets.

The AMP demonstrates responsible management of the district's assets on behalf of customers and stakeholders and assists with the achievement of strategic goals and statutory compliance. The AMP combines management, financial, engineering and technical practices to ensure that the LOS required by customers are provided at the lowest long term cost to the community and is delivered in a sustainable manner.

Territorial authorities have numerous responsibilities relating to the supply of wastewater services. One such responsibility is the duty under the Health Act 1956 to provide 'sanitary works for villages, towns and cities', which amongst other things are defined as 'drainage works, sewerage works, and works for the disposal of sewage'. This implies that, in the case of the provision of wastewater services, councils have the obligation to identify where such a service is required, and to provide it either directly themselves or to maintain an overview of the service if it is provided by others.

This AMP outlines and summarises Council's strategic and long term management approach for the provision and maintenance of wastewater collection and treatment infrastructure throughout the district (excluding properties serviced by septic tanks).

A list of the acronyms used in this document is included in Appendix D.

2.2 Service description and scope

Council operates six community wastewater schemes for Dargaville, Glinks Gully, Kaiwaka, Maungaturoto, Te Kopuru and Mangawhai in order to protect public health by providing Kaipara district with reliable wastewater service in a manner that minimises adverse effects on the environment.

In addition to these community schemes, there are a number of smaller wastewater treatment facilities owned, operated or managed by Council. These facilities generally service camp grounds and other community facilities:

- Taharoa Domain – Kai Iwi Lakes camp grounds;
- Pahi Domain camp ground;
- Tinopai camp ground; and
- Ruawai public toilet wastewater system.

The above facilities are not included in this AMP as the costs related to the operations and maintenance of these assets are funded from the community facilities budgets and they are managed under separate service agreements.

Extension of connections, disconnections to Council systems and exit from a scheme will be progressed where a business case shows benefits are in line with costs.

The key objectives of this AMP are to determine standards, LOS and funding levels for Council to maintain sustainable and affordable wastewater schemes. The AMP is used to manage and plan throughout the year and is a living document requiring progressive updating to reflect the changing situation.

The wastewater activity focuses on protecting public and environmental health by collecting and treating wastewater prior to release into receiving environments. Growth and the need to provide for visitors in peak periods, especially in coastal communities, have resulted in Council's ongoing commitment to significant wastewater infrastructure development. The increasing cost of wastewater infrastructure and environmental compliance is placing a considerable amount of pressure on smaller communities. However, ensuring waste does not threaten people or the environment they live in is of high importance to communities.

2.3 Key issues

Key matters requiring attention for the wastewater service are summarised in Table 2.1 below. These matters are further addressed in sections 3.1 (Asset Details) and 10 (Continuous Improvement) of this AMP.

Table 2.1: Key matters requiring attention

Issue	Location
System capacity and constraints	Dargaville, Mangawhai, Maungaturoto, Kaiwaka, Glinks Gully
Stormwater inflow and infiltration	Dargaville, Kaiwaka, Maungaturoto
Unplanned discharges	Dargaville, Kaiwaka, Maungaturoto
Instances of discharge consent non-compliance	Kaiwaka, Te Kopuru
Treatment pond de-sludging	Dargaville
Significant deferred renewals	Dargaville
Telemetry control system	All
Asset information • Condition • Lack of maintenance history	All

2.4 Assumptions

Council has made a number of assumptions in preparing this AMP, which are described in Table 2-2 below.

Table 2-2: Key assumptions

Assumption type	Assumption	Discussion
Financial assumptions.	That all expenditure has been stated in 01 July 2018 dollar values and no allowance has been made for inflation.	The LTP will incorporate inflation factors. This could have a significant impact on the affordability of the plans if inflation is higher than allowed for, however Council is using the best information practicably available from Business and Economic Research Limited (BERL).
Growth forecasts.	A reasonable degree of reliability can be placed on the population and other growth projections that have been used as forecast assumptions. However, these are projections and need to be carefully tracked to ensure that they continue to be a reliable indicator of likely future trends.	If the growth is significantly different it will have a significant impact. If higher, Council may need to advance capital projects. If it is lower, Council may have to defer planned works.
Network capacity.	That Council's knowledge of network capacity is sufficient enough to accurately programme capital works.	If the network capacity is lower than assumed, Council may be required to advance capital works projects to address congestion. The risk of this occurring is low; however the impact on expenditure could be large. If the network capacity is higher than assumed, Council may be able to defer works. The risk of this occurring is low and is likely to have little impact.
Changes in legislation and policy.	That Council will be granted the necessary resource consents for key projects.	If these consents are not granted, Council will need to consider alternative arrangements for these projects which may impact the budget and timeframe of the projects. If existing consents are not renewed, a new asset may be required to replace the existing asset, through a new capital project.

2.5 Relationship to community outcomes, council policies and strategies

Council has adopted a new Vision Statement that includes specific reference to managing (maintaining and improving) its infrastructure.

The Long Term Plan 2018/2028 (LTP) is still being generated. It is not expected that the role of wastewater will significantly change from the LTP 2015/2025 i.e. Council's mission is to ensure that the district's wastewater is collected, treated and disposed of in a cost-effective, sustainable and environmentally friendly manner.

Figure 2-1: KDC Vision Statement

The Values: Ko nga uara

Our purpose is to make a positive difference for Kaipara. We aspire to work with:

Integrity

- ✓ We will do what we say we will
- ✓ We will act with good intent
- ✓ We will do the right thing in the right way

Team Work

- ✓ We will work together
- ✓ We will support each other

Delivering Value

- ✓ We will seek to understand needs and deliver to them
- ✓ We will apply our skills and knowledge for the benefit of others

The overall approach acknowledges that the focus and priorities will vary with different geographical areas, for example:

- West Coast: Increasingly attractive to tourism and lifestyle. An area with high ecological, historical, environmental and cultural values;
- Dargaville: An attractive place to shop, visit, live and works. A service and tourist centre;
- Kaipara Harbour: A taonga preserved for all to enjoy, retaining a rural atmosphere. Balancing the competing demands of commercial and recreational activities; and
- Mangawhai: Fully serviced urban centre located in an outstanding coastal environment.

This overall vision for the district provides a broad initial direction for the development of wastewater priorities and how those assets may be managed. This information, along with community consultation and discussion with other interested parties contribute to the development of the community outcomes identified in the LTP. These outcomes have a direct influence on the management of the various wastewater schemes.

The community outcomes that the wastewater activity contributes to most are shown in Table 2-3 below. These are from the LTP 2015/2025.

Table 2-3: Wastewater services and community outcomes

Wastewater services contribute to the following Community Outcomes	How this service contributes
Safety and good quality of life	To maintain a good standard of health
Strong communities	Treatment of pollutants to reduce the impact on the environment
Sustainable economy	To process the wastewater generated from industry and commercial activities

A more detailed interpretation of the above in relation to wastewater services translates to the following goals and activities :

- To collect and treat wastewater in a cost-effective manner;
- To dispose of treated effluent in an environmentally sustainable manner; and
- To prevent wastewater spills.

In order to achieve this Council undertakes the following activities:

- Customer services;
- Network operations and maintenance;
- Capital and refurbishment programme; and
- Consent monitoring.

2.6 Stakeholders and consultation

There are many individuals and organisations that have an interest in the management and/or operation of Council's assets. The following key external and internal stakeholders are identified for this AMP:

External

- Kaipara district's community, including citizens and ratepayers;
- Government agencies (e.g. Department. of Health, Ministry for the Environment, Audit New Zealand);
- Local Iwi;
- NRC;
- Service contractors;
- Industry;

- Environmental groups;
- Visitors to the district; and
- Developers.

Internal

- Mayor and Councillors
- Council's Chief Executive;
- Policy Manager;
- Regulatory Manager;
- Asset Manager and AM staff;
- Finance Manager;
- Information Services Manager; and
- Records and Information Manager.

Council consults with the public to gain an understanding of customer expectations and preferences. This enables Council to provide a LOS that better meets the community's needs.

Council's knowledge of customer expectations and preferences is based on:

- feedback from surveys;
- public meetings;
- feedback from Elected Members, advisory groups and working parties;
- analysis of customer service requests and complaints; and
- consultation via the Annual Plan and LTP process.

2.7 Legislative framework and linkages

This AMP is related to a range of national and local legislation, regulatory and policy documents as listed in Tables 2-4 to 2-7.

The legislation and guidelines below are listed by their original title for simplicity. Amendment Acts have not been detailed in this document, but are still considered in the planning process. For the latest Act information refer to http://www.legislation.govt.nz/

Table 2-4: Relevant legislation

National policies, regulation, standards and strategies
The Health Act 1956
The Local Government Act 2002
The Climate Change Response Act 2002
The Civil Defence Emergency Management Act 2002 (Lifelines)
The Resource Management Act 1991
The Local Government (Rating) Act 2002
The Health and Safety in Employment Act 1999
The Building Act 2004
The Consumer Guarantees Act 1993
The Sale of Goods Act 1908
The Fair Trading Act 1986
Public Records Act 2005

Table 2-5: Relevant regulatory requirements

National policies, regulation, standards and strategies
The Government's Sustainable Development Action Plan
Code of Practice for Urban Subdivision
NAMS Manuals and Guidelines http://www.nams.org.nz
Office of the Auditor-General's publications http://www.oag.govt.nz
Standards New Zealand • AS/NZS ISO 31000:2009 Risk Management Principles and Guidelines; • NZS 4404:2010 Land Development and Subdivision Infrastructure; • AS/NZS ISO 9001:2008 Quality Management Systems; and • AS/NZS 4801:2001 Occupational Health and Safety Management Systems.

Table 2-6: Relevant KDC planning and policy documents

Local policies, regulations, standards and strategies
KDC District Plan
Northland Regional Plan
KDC Engineering Standards and Policies 2011
KDC Procurement Strategy

Table 2-7: Relevant KDC Bylaws

Council Bylaws
Wastewater Drainage Bylaw 2016

Preparation and implementation of this AMP and associated long term financial strategies aids Council compliance with these requirements.

Local Government Act 2002:

As per the LGA 2002:

1. The purpose of local government is –
    a. To enable democratic local decision making and action by, and on behalf of, communities; and
    b. To meet the current and future needs of communities for good-quality local infrastructure, local public services and performance of regulatory functions in a way that is most cost-effective for households and businesses.
2. In this Act, **good-quality**, in relation to local infrastructure, local public services, and performance of regulatory functions, means infrastructure, services, and performance that are –
    a. Efficient; and
    b. Effective; and
    c. Appropriate to present and anticipated future circumstances

This Act requires local authorities to:

- Prepare a range of policies, including significance and engagement, funding and financial policies;

- Prepare an LTP (formerly the Long Term Council Community Plan or LTCCP), at least every three years or as required due to significant changes in asset management practices or budget. The LTP must identify:
  - Activities and assets;
  - How the AM implications of changes to demand and service levels will be managed;
  - What and how additional capacity will be provided, and how the costs will be met;
  - How the maintenance, renewal and replacement of assets will be undertaken and how the costs will be met; and
  - Revenue levels and sources.

Regarding significance, all local councils must adopt a policy that sets out their approach to determining the significance of proposals or decisions relating to issues, asset or other matters, and any thresholds, criteria or procedures to be used by Council in assessing whether these are significant.

Schedule 10 of the Act provides further detail for the LTP, which is relevant to this AMP. This Act supersedes the 1996 Local Government Amendment Act, which required the adoption of a long term financial strategy, prudent AM and formal accounting for the “loss of service potential” of assets.

The new legislation puts a stronger emphasis on strategic planning (s121) that encompasses:

- The systems for supply of water and disposal of wastewater and stormwater (cl.3(a));
- The quality of drinking water and wastewater (including stormwater) (cl.3(b));
- Current and future demands for water and wastewater (including stormwater) services and related effects on the quality of supply and the discharges to the environment (cl.3(c)); and
- Options for meeting current and future demands with associated assessments of suitability (cl.3(d)).

The definition of “wastewater services” includes sewerage, sewage treatment and disposal.

As set out in Council’s 2014 Significance and Engagement Policy wastewater assets discussed within the AMP are deemed Strategic Assets and come under Council ownership.

Section 261B now includes non-financial performance measures rules 2013.

These came into effect on 30 July 2014 and affect Water, Wastewater and Stormwater. The measures have been incorporated into this AMP.

Trade Waste Bylaw

Following public consultation under the special consultative procedures of the Local Government Act 2002, Council adopted a Policy for the Discharge and Acceptance of Wastewater and an associated Wastewater Drainage Bylaw in June 2016.

The Policy sets out the manner in which Council will address issues surrounding wastewater, including, but not limited to how applications for new connections are to be made, maintenance responsibilities and other general customer and Council roles and responsibilities. The bylaw sets out the specific conditions and quality parameters that must be met in order to discharge into the wastewater system. The bylaw standards are legally enforceable and breaches of these standards could lead to disconnection and/or prosecution.

Where a discharge into the wastewater system cannot meet the requirements of the bylaw, a separate trade waste agreement must be entered into. This agreement identifies the maximum allowable values that establish an acceptable quality of the wastewater being discharged into the system. These parameters are based on the existing schedule contained within the bylaw. In addition, specific conditions can be included to ensure the discharge can be more easily accommodated at Council's WWTP.

Local Government (Rating) Act 2002, the funding companion to this proposed new LGA:

- Removes the prohibition on charging for domestic wastewater discharge by flow that was a feature of the Rating Powers Act 1988
- Permits councils to strike a rate or charge for any activity they choose to get involved in (s16).

Resource Management Act 1991 (RMA) and amendments:

- Governs the discharge of contaminants to the environment (s15 and s107)

Building Act 2004:

- Sets the minimum standards for buildings (including the provision of sanitary appliances) necessary for public health and safety through the associated codes (G13 of the New Zealand Building Code covers foul water).

Health Act 1956 contains:

- Measures for the prevention or management of outbreaks of disease;
- A requirement (s25) for territorial authorities to provide "Sanitary works for villages, towns and cities" which amongst other things are defined as:
    - Drainage works, sewerage works, and works for the disposal of sewage;
    - Works for the collection and disposal of refuse, night soil and other offensive matter;
    - Sanitary conveniences for the use of the public;

- Any other works declared by the Governor General by Order in Council to be sanitary works, and includes all lands, buildings, machinery, tanks, pipes, and appliances used in connection with any such sanitary works; and
- Authority for the raising of loans to build such works (s27).

Health and Safety at Work Act 2015:

- The Act introduces a new term, “Person Conducting a Business or Undertaking” (PCBU), which captures employers, self-employed, principals to contracts, manufacturers, designers, etcetera who have the primary health and safety duties. Workers also have duties under the Act. Workers include employees and contractors, the PCBU must ensure that it’s duties are carried out as per subpart 2 – Duties of PCBUs of the Act.

Civil Defence Emergency Management Act 2002:

- Requires utility lifelines (such as wastewater) to function to the fullest possible extent during and after an emergency and to have plans for such functioning (business continuity plans);
- Crown Public Health has prepared a Response Manual for Accidental Wastewater Discharges, which is a basic set of procedures to prevent threats to public health; and
- NRC regulates the discharge of wastewater and wastewater solids in the Kaipara area. Resource consents issued by NRC are a significant driver of the AM programme. Key NRC documents are noted below:
  - NRC Regional Policy Statement;
  - NRC Regional Water and Soil Plan;
  - NRC Regional Coastal Plan; and
  - NRC Regional Air Quality Plan.

Public Records Act 2005

Council is required to create and maintain full and accurate records including all matters that are contracted out to an independent contractor. This includes records which relate to property or assets owned by and/or administered by the local authority such as: roading, drainage, sewerage and stormwater, water supply, flood control, power generated and supply, refuse disposal and public transport.

National Environmental Standards

The RMA promotes the sustainable use of resources. Its primary vehicle for addressing the discharge of effluent to the environment is via the Regional Waste and Soil Plan at Regional Level; and District Plans at District level. Given these plans are controlled at their respective jurisdictive levels, there are now varying, inconsistent standards across the regions and districts.

One method of ensuring consistent application across New Zealand is provided in s43 and s44 of the RMA. These allow the Minister for the Environment (MfE) to enact regulations called National Environmental Standards. When a National Environmental Standard is enacted the same standard must be applied regardless of jurisdiction.

The following National Environmental Standards are in force:

- Air quality standards;
- Sources of human drinking water standard;
- Telecommunications facilities;
- Electricity transmission; and
- Assessing and managing contaminants in soil to protect human health.

The National Environmental Standards listed below are at various stages of development, ranging from initiating consultation to being legally drafted.

- Ecological flows and water levels;
- Future sea level rise; and
- Plantation forestry.

The proposed National Environmental Standard for onsite wastewater systems has been withdrawn. These would have developed a warrant of fitness regime for onsite wastewater systems and had the potential to impose significant costs on ratepayers although it was argued that this would have benefited the environment.

This AMP has considered the impact of those National Environmental Standards that are in force at the time of the current update.

Links with other documents

This AMP is a key component in Council's strategic planning function. This AMP supports and justifies the financial forecasts and the objectives laid out in the LTP. It also provides a guide for the preparation of each Annual Plan and other forward work programmes.

2.8 Demand management

This section of the AMP analyses factors affecting demand including population growth, social and technology changes. The impact of these trends is examined and demand management strategies are recommended to address demand and ensure:

- Existing assets' performance and utilisation are optimised;
- The need for new assets is reduced or deferred;
- Council's strategic objectives are met;
- Provision of a more sustainable service; and
- Council is able to respond to customer needs.

Demand forecasting for this AMP has been based on forecast population growth for each community applied to measured or theoretical per capita flow rates and has included discussion with key discharges where relevant (for example Silver Fern Farms (SFF)).

No allowance has been included for infiltration or inflow reduction.

Loading reduction refers to the reduction of raw material entering the treatment plant. This is not achieved by simply reducing the flow volume (for example by households using less water), as this results in the same amount of raw material being transported by less water and can lead to an increase in blockages with more concentrated waste. Such a scenario can also result in an increase in reticulation system odour as the more concentrated material is transported less efficiently to the treatment plant and decays in the pipes.

A more effective means of achieving loading reduction may be to eliminate food scraps entering the network via under sink waste disposal grinders, implementing a Trade Waste Bylaw or having agreements with major dischargers requiring pre-treatment.

Demand management strategies provide alternatives to the creation of new assets in order to meet demand and look at ways of modifying customer demands so that the utilisation of existing assets is maximised and the need for new assets is deferred or reduced.

The components of demand management are shown in Table 2-8.

Table 2-8: Examples of WW demand management strategies

Demand component	Wastewater examples
Operation	• Infiltration/inflow reduction, reduction in trade waste loads; and • Reduction in the number of public wastewater systems.

Demand component	Wastewater examples
Incentives	Wastewater collection and treatment pricing.
Education	Public education on water conservation and efficiency.
Demand substitution	Promote grey water re-use for toilets etcetera.
Connection denial	Where treatment plants are at maximum capacity it is necessary to refuse connection to new users.
Low flow fixture and fittings	Promoting the installation of six by three dual flush toilet suites and low flow taps in bathrooms and kitchens.

Loading reduction principles currently practiced include:

- Infiltration inflow reduction – Council has developed a strategy for resolving infiltration issues previously.

Council has adopted a Wastewater Bylaw that provides greater control on wastewater discharges. Silver Fern Farms is operating under a Trade Waste Agreement and their effluent quality has improved significantly such that the Dargaville WWTP is receiving much lower loading.

There is uncertainty in forecasting demands. The key assumptions are:

- Growth will be low and restricted to certain communities; and
- No major changes to industrial usage.

If the growth significantly exceeds that expected there is a risk that capacity of the infrastructure will be exceeded sooner than anticipated. To minimise this risk Council will need to review capacity requirements based on actual demand growth as new assets are planned.

2.8.1 Population growth

The last Census undertaken in 2013 recorded the population at 18,960 of the district. This is an increase of 825 or 4.5% since 2006. Prior to this there was a growth increase of 5.6% following the 2006 Census.

Historically, population growth figures have been much lower than currently with a 2.8% increase in population for the Kaipara district over the 10 year period from 1996 to 2006.

The focus of growth recently has been Mangawhai with most other areas experiencing little growth and for Dargaville and Maungaturoto the populations have retracted.

The LTP 2015/2025 predicted little or no growth in the long term and that outlook has not changed. A key consideration is how this growth is split across the district, with significantly less growth in western and northern areas of the district. The predicted level of growth as set out in the LTP 2015/2025 is presented in Table 2-9. There has not been another census since these growth forecasts were generated and no changes have been made.

Table 2-9: Annual rating unit growth forecasts 2015/2025

Area	Census population (2013)	Years 1 – 3 2015/16 –2017/18	Years 4 – 10 2018/19 – 2024/25
Dargaville	4,251	0.4%	0.4%
Kaiwaka	576	1.00%	1.00%
Maungaturoto	895	0.50%	0.50%
Te Kopuru, Glinks Gully and Ruawai	920 (approx.)	0.00%	0.00%
Mangawhai	2,415	3.00%	1.30%
District (including all other areas)	18,960	1.00%	1.00%

While the above growth predictions are relatively low, the district is growing in other ways as an increasing number of visitors are in the district during the summer season from October to April, particularly during the weekends. The large number of non-residential owners of holiday homes in the district is one of the main contributors to growth, especially in Mangawhai and its surrounding areas, but also Maungaturoto, Pahi, Tinopai, Baylys Beach, Kai Iwi Lakes and Paparoa.

In general, the forecasts assume that any additional demand for services created by the increased growth levels will be absorbed by the rating base growth and by more efficient delivery of services.

2.8.2 Silver Fern Farms (SFF)

The Silver Fern Farms (SFF) meat processing plant in Dargaville generates effluent as a by-product of day-to-day processing activities and is the largest contributor of effluent to the Dargaville WWTP. Excluding SFF, the current average treatment plant inflow is approximately 550m^3 per day. Water consumption figures from 2015 for SFF indicate a wastewater flow rate of 750 to 1,000m^3 per day (six days per week) or around 650m^3 per day on average over seven days. SFF indicate that this flow is unlikely to change and that a long term planning figure for capacity assessments would be a peak of 1,000m^3 per day.

SFF currently treat their own wastewater prior to discharging it into the Dargaville WWTP. Their effluent quality now generally conforms to the trade waste consent issued to SFF in 2009.

2.8.3 Increase in demand for wastewater services

As the population increases in the growing coastal areas such as Pahi, Tinopai, Whakapirau and Baylys, there is an increasing expectation from ratepayers for Council to provide wastewater collection and disposal services for these areas. This is being driven by the ratepayers increasing awareness of the natural environment and the desire to minimise the adverse impacts of activities upon the environment. There is also a need to monitor demand in smaller rural communities such as Ruawai and Paparoa due to the potential inability of the environment to cope with growth.

2.9 Operational efficiencies

The cost of operating and maintaining public wastewater systems, and achieving compliance with ever increasing environmental standards, needs to be considered in the overall assessment of the schemes viability to continue as a public wastewater scheme, and with consideration of the financial demand on ratepayers contributing to the ongoing operability of the system.

For schemes serving larger populations the costs are shared across a larger population base. The system is usually cost-effective, with a greater emphasis on health and safety via the provision of adequate treatment to ensure effluent discharges meet consent requirements and minimise impacts on the receiving environment.

For schemes serving smaller populations, the costs per ratepayer may be disproportionately larger, as the same quality standards should be provided. An example could be the Glinks Gully system, which is currently serving a population of approximately 72 people and consists of a gravity collection system, single pump station and rising main to transfer the wastewater to an evapotranspiration soakage field. The operational costs of the system may not be cost-effective from a Council perspective, but requirements contained in the LGA make transfer back to a community-based scheme, or individual onsite systems, difficult to progress unless the community itself is advocating for this. Such arrangements still hold risks for Council as the 'provider of last resort' should alternative arrangements fail to meet environmental and/or health targets.

2.10 A changing environment

2.10.1 Technological change

Changes in technology have a significant potential to alter the demand placed on the utility services and also have the potential to provide techniques and processes for the more efficient provision of wastewater services. For example, low pressure wastewater systems eliminate the need for deep pipe systems in order to establish minimum flushing grades. The further development of membrane filtration in waste treatment process means very high treatment levels can be achieved for less cost than previously expected.

The recent improvement in the cost of membrane filtration technology has allowed its adoption at Maungaturoto as an addition to the pond treatment system. This technology produces a very high quality effluent that provides good removal of viruses. Accordingly, it is ideally suited for discharges into the Kaipara Harbour where shellfish gathering is undertaken.

Monitoring of the Maungaturoto scheme should prove instructive and allow assessment of its application to both larger and smaller schemes. The key point of interest will be the running costs in terms of both power and filter unit replacement rates. In addition, the current scheme allows a staged development that is well suited to a staged scheme development due to the uncertain rate of growth in Maungaturoto. Recent developments in pipeline rehabilitation techniques such as grouting, patch lining and replacement with pipes of better material and with more watertight jointing have been shown to be valuable tools in managing the infiltration problem. Whilst the use of modern pipelines in urban growth areas are able to significantly reduce infiltration, by themselves these technologies will not prevent a long term increase in groundwater intrusion due to the deterioration of jointing in older catchments. There is also emerging evidence that achieving targets for flow reduction may not be possible without including the complete length of service laterals in rehabilitation programmes.

A constant awareness of technology changes is necessary to effectively predict future trends and their impact on the utility infrastructure assets.

2.10.2 Economic trends

New Zealand is currently experiencing a significant growth in various sectors and areas of the country. The area from Tauranga to Auckland is experiencing considerable growth and outlying areas such as Mangawhai are beginning to see the positive effects of this growth with increased interest in building and property sales.

Extension of the Northern Motorway to Warkworth may see more commuters prepared to settle in Mangawhai and/or growth of the retired population.

2.10.3 Legislative change

Legislative change can significantly affect Council's ability to meet minimum LOS and may require improvements to infrastructure assets. Changes in environmental standards and the RMA 1991 may affect wastewater treatment options. In addition, changes in legislation can influence the ease at which new consents are obtained or existing consents are renewed. Experience demonstrated that consent conditions are becoming more stringent with increased monitoring requirements being commonplace and the likelihood of additional treatment necessary.

The MfE is promoting a series of National Environmental Standards that can be enforced as regulations under the RMA. Whilst the Onsite Wastewater Systems National Environmental Standard has been withdrawn, other standards have the potential to impose costs on ratepayers including those not connected to a Council wastewater system. One such standard is the proposed standard for Ecological Flows and Water Levels. Whilst this will have a greater impact on water supply services it has potential to impact on wastewater services by imposing conditions on receiving water quality requirements.

2.10.4 Customer expectations

Customers are demanding a higher standard of wastewater services and will need to be kept informed as to the impact of changes in the legislative requirements for wastewater treatment and the subsequent impact on individual schemes. The cost of maintaining or improving treated wastewater quality standards will need to be clearly communicated to the communities.

This increased customer demand has been witnessed in the Far North and Whangarei districts where tolerance for unplanned wastewater discharges, such as during storm events, has reduced. Improving the management of unplanned discharges is a LOS and key task under this AMP.

2.10.5 Environmental considerations

Where the absence of a reticulated wastewater collection and treatment scheme could result in continued adverse effects on the environment, Council may be required to extend existing schemes or provide a new scheme to mitigate such impacts. Where such issues are identified a full range of solutions will be investigated with preference given to privately managed solutions.

2.10.6 Changes in weather pattern

The MfE advises that climate scientists estimate Northland's temperature could increase 0.9°C by 2040, and 2.1°C by 2090. This compares to a temperature increase in New Zealand during last century of about 0.7°C. To put this in perspective, the 1997/1998 summer, which was particularly long, hot and dry, was only about 0.9°C above New Zealand's average for the 1990s. Northland is expected to experience more frequent and intense heavy rainfall events which will increase the risk of flooding and could become up to four times as frequent by 2090.

The effects of this on the wastewater activity are that high intensity rainfalls causing overflows may occur more frequently. Also, wastewater assets near sea level may be affected by higher sea levels or tidal surges.

The development of Council's Engineering Standards 2011 provides design rainfall for Dargaville, Tinopai, Maungaturoto and Mangawhai areas of the district, being the main population centres. The rainfall depths provided in the Engineering Standards have been estimated up to the 100-year event; 72-hour duration and include adjustment for 95% confidence.

For developments in other areas the Engineering Standards acknowledges NIWA's High Intensity Rainfall Design System (HIRDS) version 2, which outlines rainfall depths + 1.65 standard error + 17% climate change allowance.

The impact of long term changes in weather patterns have not been built into this AMP given the lack of detailed information available, although development of an unplanned discharge mitigation plan has been included. Inclusion of possible risk imposed by global warming to the wastewater assets will need to be included as the AMP is developed in future.

2.10.7 Changes in water discharge volumes

Changes in water consumption patterns can affect wastewater assets. This can occur by an increase in per capita usage resulting in more wastewater or decreases in water usage which may result in more concentrated and possibly corrosive wastewater. It is considered unlikely that there will be significant changes in per capita water use throughout the planning period of this AMP, although loss or gain of a commercial discharger is possible.

The current economic climate forces businesses to reconsider how and where they operate. Council works with both Fonterra in Maungaturoto and SFF in Dargaville to provide mutual beneficial arrangements. Fonterra takes water from Council's water supply system but discharges wastewater through its own treatment system, whereas SFF is supplied water by Council and discharges wastewater that is partially treated into Council's system. Council is currently working with SFF to introduce a trade waste agreement.

Any changes to these arrangements with commercial users will have impacts on the cost structure of each scheme. If Council is to be successful in developing and growing business within the district it will be necessary to work with the existing and new businesses to provide sufficient wastewater treatment capacity. Providing economic wastewater treatment will be a key benefit to encourage business growth and development in Kaipara.

2.10.8 Summary of changes

Table 2-10 below shows a summary of how the above issues will impact on the management of wastewater assets.

Table 2-10: Summary of issues affecting WW assets

Issues	Impact on wastewater assets
Population growth	Potential future new schemes for the high growth communities would have a large impact.
Technical change	Little or no impact.
Economic trends	Potential high impact for Dargaville and Mangawhai. Currently little or no impact for other schemes.
Legislative changes	Unknown impact. Resource consent conditions could have a significant impact, particularly where wastewater is discharged direct to water.
Customer expectations	Unknown impact, drive towards a reduction in unplanned discharges.
Environmental considerations	Potentially high impact in reticulated communities such as Ruawai.
Weather changes	Possibly an increasingly important impact. As weather changes are likely to be gradual, in terms of medium term asset management planning timeframes, these effects are raised here and need to be reviewed as the AMPs are developed in the future.

Issues	Impact on wastewater assets
Water discharge volumes	Potentially significant if large discharger leaves or enters a reticulated area. The effect of this occurrence would need to be assessed on a case-by-case basis.

The main impact of the above trends is the expectation for Council to design, construct and operate wastewater collection, treatment and disposal systems in coastal communities to meet the growing demands of population growth and urban development or to upgrade treatment facilities for existing serviced areas in order to discharge treated effluent to land. The immediate and long term costs associated with these possible schemes is presently unknown.

Thorough investigation of all options to provide wastewater solutions will be required and any decision for Council to become involved in the creation of additional systems would only proceed where a business case supports the financial sustainability of the scheme funded entirely by the users.

2.11 Environmental management

An important aspect of the wastewater activity is ensuring that any discharge of contaminants to the district's land, air and natural water resources is managed responsibly. The statutory framework defining what activities require resource consent is the RMA 1991. The RMA deals with:

- The control of the use of land;
- Structures and works in riverbeds and in the CMA; and
- The control of the taking, use, damming and diversion of water, and the control of the quantity, level and flow of water in any water body, including:
    - The setting of any maximum or minimum levels or flows of water;
    - The control of the range, or rate of change, of levels or flows of water; and
    - The control of discharges or contaminants into water and discharges of water into water.

Council's wastewater reticulation and treatment plants (including oxidation ponds) have an essential role in ensuring that wastewater produced across the district is properly collected, treated and disposed of in ways that meet community and cultural expectations and avoid causing significant adverse effects on the environment.

The RMA requires resource consents in the form of discharge permits for all discharges of treated wastewater. Other resource consents may also be required for installation and operation of wastewater infrastructure (e.g. pipelines across rivers and streams, and in coastal areas, monitoring of water supply bores for wastewater activities). Council holds a number of resource consents for its wastewater activities. A summary of current wastewater consents held by Council is presented in Appendix B.

Environmental and treatment plant performance monitoring is required by many of the consents held by Council. A new measure was recently introduced by NRC to limit the number of annual discharge events into local rivers or streams from Council's reticulation, to a maximum level of 5. Recent studies in the Dargaville wastewater network have identified issues with infiltration from the stormwater network. This increased loading on the wastewater system could potentially create overloading at wastewater treatment facilities and increased discharges to the receiving environment.

Infiltration issues have also been identified in the Maungaturoto wastewater system with flows during heavy rainfall events likely to exceed the allowed maximum daily discharge consented for Maungaturoto. A small sub-catchment within the Maungaturoto network was selected to undergo smoke testing to identify potential sources of inflow/infiltration during 2012/2013. The findings of this survey identified that it was the private connections and roof guttering connections to the wastewater reticulation that were the primary sources of inflow/infiltration. These instances were to be forwarded to the Regulatory department of Council to follow up and to get rectified. Whilst in this instance, the public wastewater network was not found to be contributing significantly to the inflow/infiltration issue, it is still being considered to extend the exercise to the wider Maungaturoto network and possible other communities.

Significantly the WaterNZ National Performance Review for 2015/2016 identified that the Dargaville wastewater system was the worst of the 44 councils in New Zealand who contributed data. Wet weather overflows were reported at approximately nine events per 1,000 properties with the median for 'small' councils being around three. This data is based on self-reporting and incomplete information and should not be taken too literally. However, it does indicate that the Dargaville system is performing, or being reported, significantly differently to other communities.

The extent of inflow and infiltration is one of the desired outcomes from the Capacity Studies that are proposed in this AMP.

The oxidation pond in use at Te Kopuru is also monitored through sampling by NRC. Recent samples have indicated instances of non-compliance with consent conditions, thought to be due to sludge accumulation in the pond. De-sludging of the oxidation pond at Te Kopuru has been completed as a step toward improving the performance of the system.

NRC undertakes summer monitoring at popular swimming locations in the district, two freshwater and eight coastal sites. Samples are taken weekly between December and April each year to ensure the water is safe for swimming. Each site is given a grading based on the results compared to the MfEs "*Microbiological Water Quality Guidelines for Marine and Freshwater Recreational Area*" publication (2002).

The results of this monitoring programme can be used to identify non-compliant locations and instigation of investigations into possible sources of contamination which may include contamination of stormwater from the wastewater network during intense rainfall events.

There is a growing awareness of the environmental issues related to wastewater discharge on the receiving environments and its impact on our cultural, social and economic well-being.

2.12 Proposed LOS and performance measures

A key objective of this AMP is to match LOS associated with the wastewater collection/treatment activity to agreed expectations of customers and their willingness to pay for that LOS. LOS provide the basis for the lifecycle management strategies and works programmes identified in the AMP.

With wastewater assets, there are often higher levels of maintenance and renewal requirements proposed (increased LOS) than the resources allow for. Trade-offs then have to be made as to what impacts on the ability of an asset to provide a service against the 'nice to have' aspects.

LOS can be strategic, tactical, operational or implementation and should reflect the current industry standards and be based on:

- **Customer research and expectation** Information gained from stakeholders on expected types and quality of service provided.
- **Statutory legislation**, regulations, environmental standards and Council bylaws that impact the way assets are managed. These requirements set the minimum LOS to be provided.
- **Strategic and corporate goals guidelines** for the scope of current and future services offered and manner of service delivery, and define specific LOS that Council wishes to achieve.
- **Best practices and standards** Specify the design and construction requirements to meet LOS and needs of stakeholders.

Council's current LOS and associated performance measures for the wastewater activity are presented in Table 2-11 below. These have now had the non-financial performance measure rules 2013 incorporated. The current LOS have been developed to contribute to the achievement of the stated Community Outcomes that were developed in consultation with the community and taking into account:

- Council's statutory and legal obligations;
- Council's policies and objectives; and
- Council's understanding of what the community is able to fund.

LOS that Council has adopted for this AMP are those included in the measures reported in the Annual Report 2016/2017 as follows:

Table 2-11: Adopted LOS

Sewerage and the Treatment and Disposal of Sewage – Performance Measures (Measures 1 to 4 are statutory requirements)

Performance indicator/service level	LTP Year 2 Target 2016/2017	Actual 2015/2016	Actual 2016/2017	Comments
1 *System and adequacy* *Legal compliance with all Resource Consents for discharges into the environment from Council systems. The exception, provided for in the consent, is severe weather events and power failure.* **Measured by:**				
The number of dry weather sewage overflows from Council's sewerage systems, expressed per 1,000 sewerage connections to that sewerage system. The resource consent provides for severe weather events and power failure exceptions.	0	2	2	Not achieved Both failures were attributed to non-weather events. One was from stock entering a pond and the other a broken rising main.
2 *Discharge compliance* *Compliance with the Council's Resource Consents for discharge from its sewerage system.* **Measured by:**				
The number of abatement notices received by the Council in relation to its resource consents for discharge from its sewerage system.	0	0	0	Achieved
The number of infringement notices received by the Council in relation to its Resource Consents for discharge from its sewerage system.	0	0	1	Not achieved Hay bales were in place to filter the wetland discharge, stock had entered the pond and disrupted the process, and hay ended up blocking an outlet causing overflows, which in turn resulted in an infringement notice.

Performance indicator/service level	LTP Year 2 Target 2016/2017	Actual 2015/2016	Actual 2016/2017	Comments
The number of enforcement orders received by the Council in relation to its Resource Consents for discharge from its sewerage system.	0	0	0	Achieved
The number of convictions received by the Council in relation to its Resource Consents for discharge from its sewerage system.	0	0	0	Achieved
3 Fault response times *Where the Council attends to sewerage overflows resulting from a blockage or other fault in the Council's sewerage system.* **Measured by:**				
Attendance time: from the time that the Council receives notification to the time that service personnel reach the site.	1 hour	34 minutes	50 minutes	Achieved
Resolution time: from the time that the Council receives notification to the time that service personnel confirm resolution of the blockage or other fault.	4 hours for minor blockages 3 days for significant blockages	2 hours 33 minutes	30 hours 29 minutes	Not achieved Resolution time data was not distinguished between minor blockages / significant blockages. Therefore a median of the total resolution time has been calculated.

Performance indicator/service level	LTP Year 2 Target 2016/2017	Actual 2015/2016	Actual 2016/2017	Comments
4 *Customer satisfaction* *The total number of sewerage system complaints received by the Council.* **Measured by**				
The total number of complaints received by the Council about sewage odour. *Expressed* per 1,000 sewerage connections to that sewerage system.	16	2.3	3.7	Achieved
The total number of complaints received by the Council about sewerage system faults. *Expressed* per 1,000 sewerage connections to that sewerage system.	16	3.4	9.8	Achieved
The total number of complaints received by the Council about sewerage system blockages. *Expressed* per 1,000 sewerage connections to that sewerage system.	15	6.2	15	Achieved
Council's response time to complaints regarding its sewerage system.	1 hour	34 minutes	6 hours	Not achieved Due to a one odour complaint attendance time being two days - Maungaturoto. Median based on third and fourth quarter results as no measures were available for first two quarters.

The AMIP includes an item for Council to review its wastewater system LOS to identify if there is further opportunity for improved efficiencies and/or best practice that can be incorporated into Council's LOS framework.

3 The assets

The assets section of the AMP is set out as follows:

- Asset Details – summary of Council's six wastewater schemes, their condition and performance;
- Critical Assets – summary of Council's critical wastewater assets and how these will be managed; and
- Asset Values – summary of the wastewater asset valuation.

3.1 Asset details

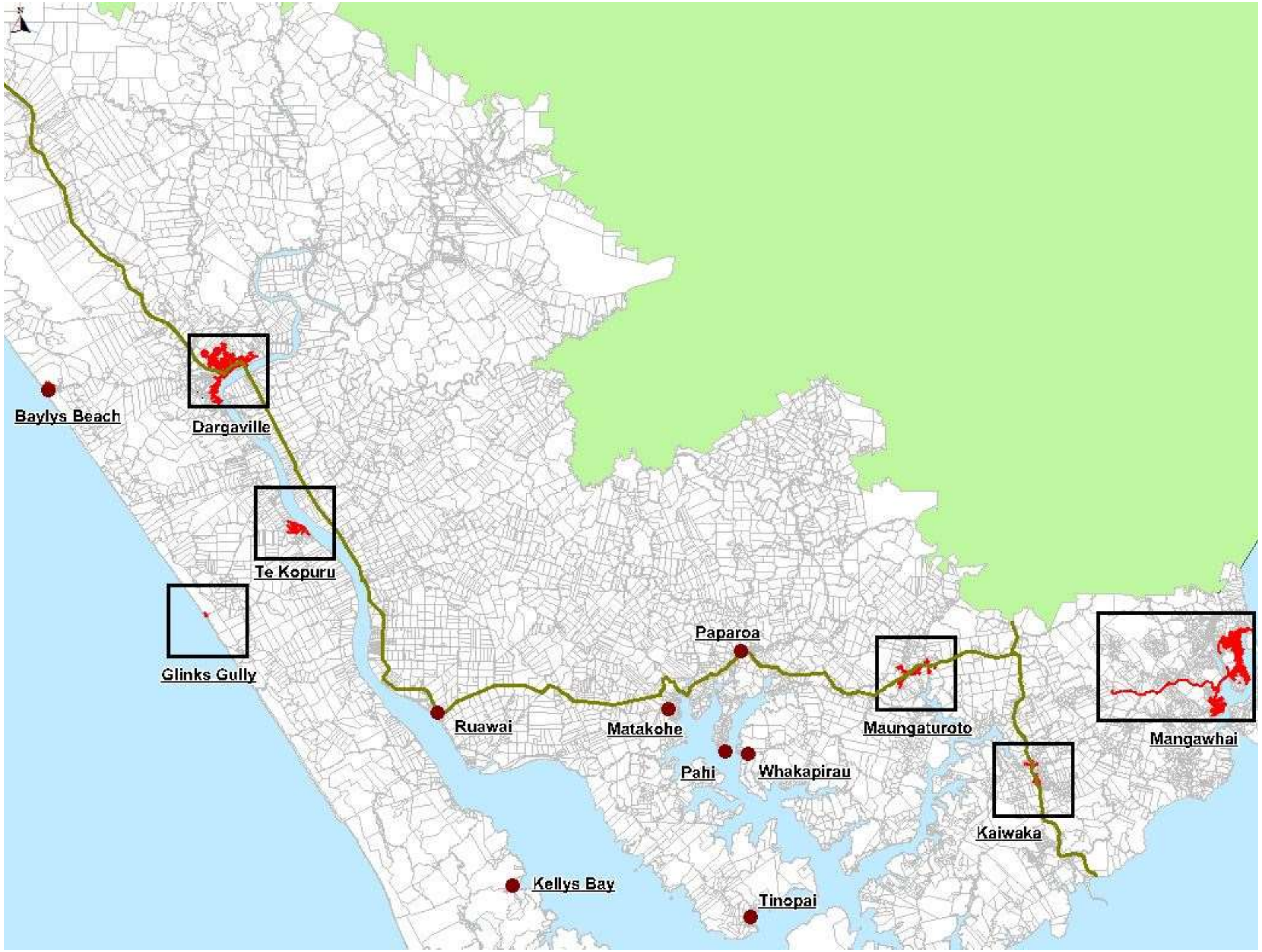
3.1.1 Overview

The wastewater assets that are within the scope of this AMP are spread throughout the district with six separate wastewater collection and treatment schemes in operation:

- Dargaville;
- Glinks Gully;
- Kaiwaka;
- Maungaturoto;
- Te Kopuru; and
- Mangawhai.

The location of each of these communities within the Kaipara district is illustrated in Figure 3-1 below.

Figure 3-1: Location of communities with WW schemes



An overview of the wastewater assets in the district is provided in Table 3-1 below. See Section 0 for discussion of the asset valuations.

Table 3-1: Asset overview summary

Community	Treatment plants	Pump stations	Rising mains (m)	Gravity lines (m)	Manhole	Connections	Condition
Dargaville	1	15	5,942	39,435	714	2,278	Partially known
Glinks Gully	1	1	340	155	8	26	Partially known
Kaiwaka	1	1	1,266	4,090	71	192	Partially known
Maungaturoto	1	3	1,301	11,295	198	423	Partially known
Te Kopuru	1	0	0	6,669	89	222	Partially known
Mangawhai	1	12	23,214	46,794	509	2,473	Partially known
TOTAL	**6**	**32**	**32,063**	**108,438**	**1,589**	**5,614**	

Note: These quantities are sourced from 2017 valuation using the most direct identifier. The number of connections has not been reconciled with the rating database.

3.1.2 Asset data

Council has a number of systems and processes in place where they are able to store and analyse asset information data to assist with management of the wastewater business. Details of each system and its capabilities are included in Section 8 (Asset Management Systems and Processes).

It is recognised that the current level of condition and performance data relating to the wastewater assets is not well documented. The current asset register contains a number of unknown, incomplete and incorrectly coded asset attributes. This affects Council's asset knowledge, asset valuations and data confidence, and does not provide a sound basis for determining maintenance needs and forecasting renewals of wastewater assets.

The improvement of Council's data collection and entry processes has been identified as an activity to be completed within the AMIP, along with a "data cleansing" project to reduce the number of unknown/incorrect asset attributes currently in the asset register.

Following completion of the above activities, Council will move towards using previously un-utilised functions of their support tools, such as the recording of maintenance history at asset component level in Assetfinda each time a works order is completed.

As more information is recorded, an initial assessment and listing of renewal needs will be able to be created from Assetfinda. This could create a risk of significant changes to the level of expenditure required, and will need to be reviewed and assessed by Council in line with Council's Renewals Policy.

The data improvement actions included in the AMP are listed in Table 4.1.

Advice has been received regarding an ongoing CCTV inspection programme for gravity wastewater pipes together with a sampling and testing programme for pressure pipes (rising mains). This is included in the Management Services budget.

Ongoing data cleansing will also be undertaken in the Assetfinda database to provide more robust information on which to base asset valuation and renewal forecasts.

3.2 Dargaville

Dargaville has a population of approximately 5,000 and is serviced by 40 kilometres of pipeline, 15 pump stations, 6 kilometres of rising main and a single treatment plant. Wastewater is collected from the urban area, apart from a section of the Beach Road industrial area that has onsite treatment.

Most recent census data indicates Dargaville's population has declined 4.6% from 2006 to 2013.

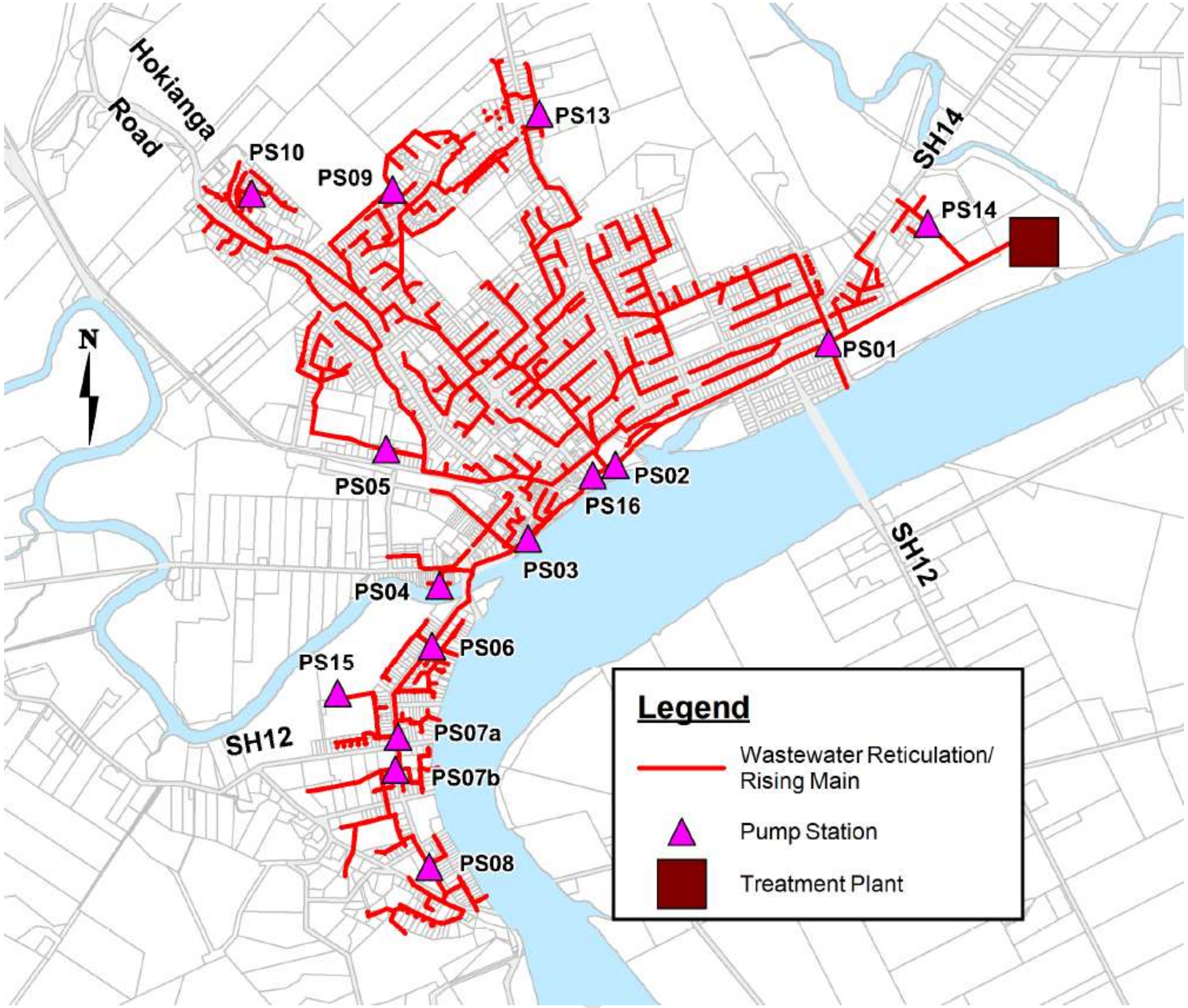
A summary of Dargaville's wastewater assets is included in Table 3-2.

The layout and location of Dargaville's wastewater assets are illustrated in the Asset Map in Figure 3-x.

Table 3-2: Dargaville asset summary

	Treatment plants	Pump stations	Rising mains (m)	Gravity lines (m)	Manholes	Connections
Physical quantity	1	15	5,942	39,435	714	2,278 From valuation
Asset condition rating	Assessment programme commenced	Assessment programme commenced	Unknown at present	Assessment programme commenced	Assessment programme commenced	Unknown at present
Replacement cost		$21,247,775				
Depreciated replacement cost		$6,898,026				
Annual depreciation		$336,543				

Figure 3-2: Dargaville asset map



The Sunset West development installed at Baylys (Dargaville) was originally to be vested to Council as a public system. Due to downturn in development and a change in the owner of the subdivision, as of June 2013, the scheme will be retained as a privately-owned and operated scheme.

3.2.1 Reticulation

Dargaville was first reticulated in the 1940s when the major residential area of town was connected to a network that discharged directly into the river. The majority of the original (pre-1940) network was replaced from 1978 to 1983. Figure 3-3 and Figure 3-4 illustrate the breakdown of material and size of the reticulation network respectively.

Figure 3-3: Dargaville reticulation material composition

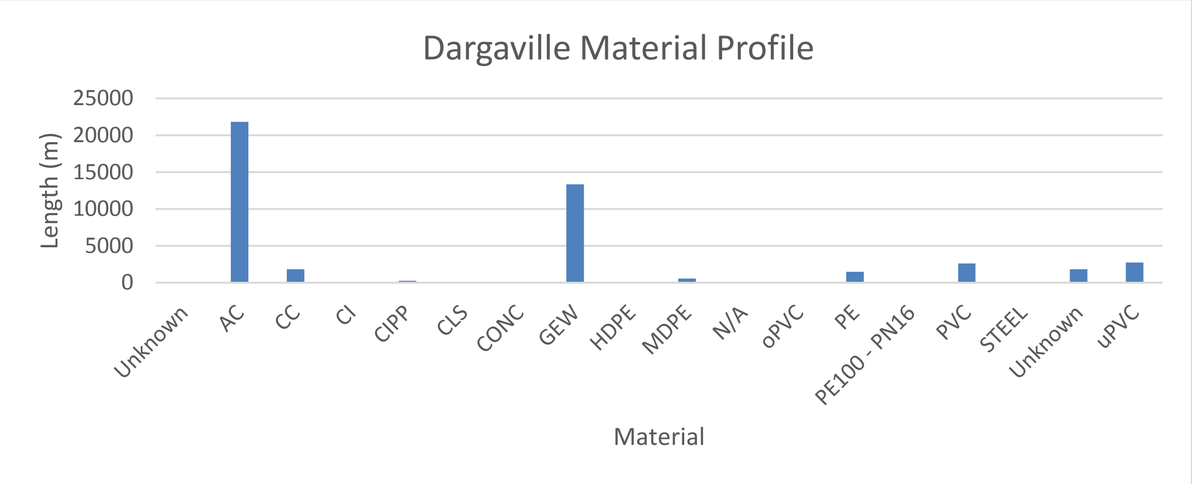
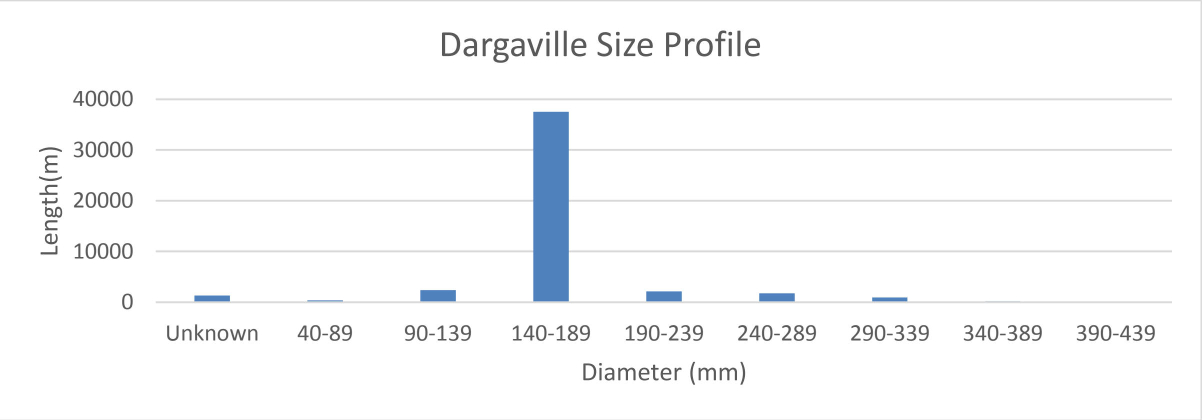


Figure 3-4: Dargaville reticulation diameter breakdown



The condition of the Dargaville wastewater pipes is now being assessed through an ongoing programme of CCTV inspection and specialist assessment by ProjectMax.

Inspection records from previous CCTV programmes were assessed and these covered 47 mains with installation dates ranging from 1944 to 1970.

Of these, 24 were considered to have a Likelihood of Failure (LOF) of 1 or 2 translating to pipes that are in good condition. Nine pipes had a LOF of three and the remaining 14 had a LOF of 4 or 5. This last group is almost entirely comprised of GEW pipes from 1944 and is considered to need renewal or repair in the near future. Of the 14 graded LOF 4 and 5 there were four that were considered to have useful remaining life if a structural repair was undertaken and this would be considerably cheaper than rehabilitating the entire line.

The results to date of the assessment indicate that 70% of the pipes surveyed are in good to reasonable condition (LOF 1-3) and this is a favourable outcome in relation to long term renewal predictions. It would also seem to confirm that a life prediction of 40 years for AC pipes is unduly pessimistic.

Dargaville's reticulation suffers from a significant level of stormwater/groundwater infiltration. The hydraulic modelling and analysis of pump station telemetry will assist in identifying the source of the infiltration.

3.2.2 Pump stations

The Dargaville wastewater scheme incorporates 15 pump stations that have been built as the network has expanded. These pump stations either pump wastewater into neighbouring catchments or other pump stations and as a result a number of stations are connected in a 'daisy-chain' series. For example, flow from all pump stations, with one exception, enters pump station 1 (PS1) before being pumped to the WWTP.

Generally, all of the pumps and electric equipment in Dargaville's pump stations are considered to be in average to excellent condition. Most pump stations received significant upgrades in 2004. This included the installation of telemetry to aid data acquisition and remote control of pumps.

The telemetry system is fully operational and adequate for controlling the pumps and generating alarms if target levels are reached. However, the system does not readily generate information about system operation for analysis. There are also significant information gaps about how and when overflows occur and the volumes that might be involved.

Recent inspections have indicated significant rags in some stations and more proactive management of the system has been proposed.

As a health and safety measure the installation of grills under the lids is also proposed.

Dargaville's pump stations are believed to have sufficient peak capacity to cater for dry weather flows. However, during rainfall events, inflow can exceed the combined pumping capacity at any station and the capacity of the station depends on the storage volume within the wet well and net inflow.

A number of investigations have been proposed to determine the best way to manage unplanned discharges, which may include additional storage, back-up power generation, increase in pumping capacity, or other methods such as overflow treatment, increase in redundancy, improved control and pipeline rehabilitation. The proposed Dargaville Capacity Study will identify constraints within the system and possible remedies.

3.2.3 Pump Stations 1 and 2 upgrade

Concerns about the number of overflows occurring from the system led to investigations into upgrading PS1 which brings all of the flow to the WWTP (other than SSF which pumps independently).

The design of the upgrade was progressed and new pumps and switchboards were purchased.

A review of this proposal led to a change of approach and the revised proposal is to upgrade PS2 instead as this also pumps most of the flow that is subsequently pumped by PS1. The intent is to then downgrade PS1 to a local pump station rather than a bulk transmission station. Some upgrading of the rising mains will also be required to achieve this.

A conceptual design has been generated by consultant Harrison Grierson and at December 2017, Calibre Consulting are working on the detailed design of the proposal. At this time the following timeline and budgets are envisaged for the project.

Table 3-3: PS1 and PS2 upgrade

Year	Item	Budget
2017/2018	Investigation and design	$105,600
2018/2019	PS2 to 1 rising main upgrade	$1,056,000
2019/2020	PS2 upgrade	$506,000
2020/2021	PS1 reconstruction	$363,000
2021/2022	Emergency storage at PS2	$473,000
2022/2023	Emergency storage at PS1 Treatment pond upgrade	$143,000 $88,000
Total		**$2,734,600**

3.2.4 Treatment

Dargaville is served by a single WWTP situated adjacent to the Northern Wairoa and Awakino Rivers. The site comprises a 4.7 hectare (47,000m²) facultative oxidation pond, with aerators, in the western part of the site and a 20,000m² maturation pond in the eastern part of the site. Figure 3-5

illustrates the layout of the WWTP (source: Google maps). A photograph of the oxidation pond is included as Figure 3-6.

Effluent enters the oxidation pond for initial treatment and is then pumped into the maturation pond where it circulates over a seven day period (varies according to infiltration level) for further polishing of the effluent, particularly with regard to pathogen reduction. The treated effluent discharges via a spray irrigation field onto the riparian strip bordering the Northern Wairoa River.

The Dargaville WWTP was partially upgraded in 2007 by converting the originally constructed wetlands to a maturation pond and constructing an effluent land dispersal system along the banks of the Northern Wairoa River. Then in early 2009 the maturation pond was desludged to remove an historical build-up of sludge carried over from the main oxidation pond. It is now believed that the main pond is 80% full of sludge and desludging is urgently required. An Oxidation Pond Management Study is proposed for 2018/2019 which will provide the information required to progress the desludging over two years in 2012/2021 and 2021/2022.

Figure 3-5: Dargaville WWTP layout

Figure 3-6: Dargaville WWTP oxidation pond

Dry weather flows from Dargaville are typically in the range 600 to 1000m^3 per day. However, flow from the urban area is significantly affected by stormwater infiltration, with flows well over 5000m^3 per day occurring in heavy rainfall conditions. Average flows were assessed (CPG Report November 2009 “Report on Dargaville Wastewater Treatment Plant Performance and Trade Waste Review”) to be around 1,340m^3 per day.

The Dargaville sale yards operate weekly through the year and generate stock effluent from runoff from hard standing areas. The volumes of effluent produced by the stockyards are typically low, however the effluent exhibits a high Biological Oxygen Demand (BOD) loading.

The SFF meat processing plant generates effluent as a by-product of day-to-day processing activities and is the largest contributor of effluent to the Dargaville pond. The SFF plant operates seasonally, with a shutdown period during October. During the peak season the plant operates six days per week killing for 16 hours a day, with an eight hour per day washdown period. Water consumption figures for SFF indicate a wastewater flow rate of 750 to 1,000m^3 per day (six days per week) or around 600m^3 per day on average over seven days. SFF indicate that this flow is unlikely to change and that a long term planning figure for capacity assessments would be a peak of 1,000m^3 per day.

The Dargaville oxidation pond was constructed in 1978/1979 and was designed for a population of 5,500, the projected population of Dargaville in 2003. Dargaville’s population is approximately 5,000; however the combined loading from the non-industrial wastewater and SFF effluent is equivalent to a population significantly higher than the design population.

In an assessment of WWTP performance undertaken by Waste Solutions Ltd in 1996, it was found that the loading on the oxidation pond was high when compared with conventional design criteria; however, the system was identified as operating successfully. The capacity to treat higher flows and loads was restricted.

Pre-treatment of waste, or the use of other treatment options was identified as possibly being required to accommodate wastewater flows generated by further population or industrial growth within Dargaville’s reticulated area.

Going forward the installation of a step screen is a possibility to deal with the excessive rags that the wastewater system receives but is not included in detailed CAPEX proposals at this time.

There are a number of factors or projects currently underway that have an effect on the current and future capacity of the Dargaville treatment system. These include:

- The desludging of the oxidation pond and the potential for Bioremediation to manage sludge in the whole system continually;
- The ongoing performance and management of the SFF discharge;
- The effect of pipeline renewals on inflow and infiltration; and

- New connections (growth or other communities).

3.2.5 Asset renewals

The following graph shows the predicted asset renewals and is based on the Installation Date and Base Life included in the 2017 Asset Valuation. Errors and assumptions included in that valuation will be reflected in the renewals forecast.

Current overdue renewals of $273,000 are primarily for pump stations and that aligns with general observations about their condition.

The spike of gravity main renewals in the 2023/2028 period mainly arises from pipes laid in the 1940s with an 80 year life expectancy. This is predominantly earthenware pipe and this is considered to be a realistic life expectancy assessment. In reality the pipes will not all need renewing in this five year window and the renewals will be spread over a longer period. However, some of these renewals may be required before this period to maintain an acceptable LOS.

In total terms, it is expected that some 60% of the Dargaville wastewater system (by value) will be renewed over the next 30 years.

Figure 3.7: Projected Dargaville renewals (30 years)

Table 3-2: Projected Dargaville renewals (30 years)

Dargaville	Overdue	2018-2023	2023-2028	2028-2033	2033-2038	2038-2043	2043-2048
Gravity pipes incl points and connections	$77,698	$92,885	$4,289,641	$1,913,698	$1,028,152	$1,958,222	$862,137
Rising Mains				$204,971	$52,656	$694,042	
WWTP	$60,118	$171,148	$20,110	$344,938		$3,645	
Pumpstations	$135,184	$196,972	$227,228	$381,089			
Total	$273,000	$461,005	$4,536,979	$2,844,696	$1,080,808	$2,655,909	$862,137

Dargaville	Total Renewals	2017 Replacement Value	% of Total Replace
Gravity pipes incl points and connections	$10,222,433	$15,288,403	67%
Rising Mains	$951,669	$1,897,130	50%
WWTP	$599,959	$1,371,817	44%
Pumpstations	$940,473	$2,690,426	35%
Total	$12,714,534	$21,247,776	60%

3.3 Glinks Gully

Glinks Gully is a small holiday community located 20km southwest of Dargaville on the west coast of Northland. The wastewater scheme servicing Glinks Gully is designed to service a peak period population of 72.

A summary of Glinks Gully's wastewater assets is included in Table 3.5. The layout and location of Glinks Gully's wastewater assets are illustrated in the Asset Map in Figure 3.8.

Table 3.5: Glinks Gully asset summary

	Treatment plants	Pump stations	Rising mains (m)	Gravity lines (m)	Manholes	Connections
Physical quantity	1	15	340	155	8	26 From valuation
Asset condition rating	Assessment programme commenced	Assessment programme commenced	Unknown at present	Assessment programme yet to commence	Assessment programme yet to commence	Unknown at present

	Treatment plants	Pump stations	Rising mains (m)	Gravity lines (m)	Manholes	Connections
Replacement Cost		$279,467				
Depreciated Replacement Cost		$121,279				
Annual Depreciation		$6,158				

Figure 3-8: Glinks Gully asset map

3.3.1 Reticulation

Glinks Gully is serviced by 150 metres of gravity reticulation and eight manholes constructed in 1989, one pump station, 300 metres of rising main and a single WWTP constructed in 1990.

The piped reticulation connects to 18 septic tanks serving 24 houses, located on private property but maintained by Council. Effluent from the septic tanks is gravity fed through the pipe network to the pump station before being pumped to the WWTP.

The condition of Glinks Gully's reticulation is generally unknown due to a lack of data. As discussed in s 3.1.2, Council has committed to improving its knowledge of asset condition and condition assessments commenced in 2014. Comparing average daily discharge volume with average daily rainfall indicates that flows are not significantly affected by rainfall, which is an indication that the condition of the network is reasonably good.

Appendix E shows the age, material and size profiles of the Glinks Gully reticulation

3.3.2 Pump stations

The Glinks Gully pump station is a typical small pump station that includes the following components:

- A 1,200mm diameter wet well that stores incoming wastewater;
- Dry mounted duty/assist progressive cavity pumps;
- An additional 2,300mm diameter chamber that stores 2.7m^3 of wastewater gives a combined storage of 4.0m^3 (approximately 24 hours storage of current off-peak flow);
- Pipes and valves associated with the pump and rising main;
- A large cabinet housing electrical equipment, pump control devices and telemetry; and
- Connections to incoming gravity pipe and outgoing riser mains.

A photograph of the pump station is included in Figure 3-9 and Figure 3-10.

The pump station pumps domestic wastewater from the coastal margin up to the WWTP located near the camp ground.

Council does not have a clear picture of the pump station's capacity at times of peak flow as instantaneous peak flow information is not readily available. When data is available it will be necessary for Council to assess in detail the capacity of the pump station.

As the number of permanent residents increase in Glinks Gully, so too will the off-peak volume of wastewater and additional capacity for 12 hour storage may be required in the future.

Figure 3.9: Glinks Gully PS

Figure 3.10: Glinks Gully WWTP effluent Field

Fig 3-9

Fig 3-10

3.3.3 Treatment

The Glinks Gully WWTP is a simple 320m^3 evapotranspiration soakage field located adjacent to the Glinks Gully camp ground. The soakage fields consist of 50mm uniformly graded aggregate 225mm deep, overlain with filter cloth and sand. The field consists of two equal beds that are alternatively rested. A photograph of the effluent field is included in Figure 3-10.

The soakage fields have been assessed as performing well. Their asset life is to be revisited in the next valuation planned for 2014 and a major flushing and replacement of blocked pipes together with the installation of cleaning risers and reinstatement of media is planned for 2023. The soakage fields were originally designed to service a total of 18 properties. There are now a total of 24 properties connecting to the system which is designed for a peak flow of 15m^3 per day at a loading rate of 50mm per day.

While regular flow data has been intermittent due to issues with the telemetry system records indicate the peak flow has only been exceeded once over the past six years. Peak flow occurs at about New Year with approximately 20 days of the year where the flow is in double digits. The free-draining soils and nature of the loading combine to reflect a low loading rate and should mean the field's life should be approximately 50 years with no justification for a substantial reserve area.

An application to renew the Discharge Resource Consent for Glinks Gully treatment was lodged with NRC in January 2014.

A commitment to implement the conditions will be required, these include upgrading the telemetry so that appropriate flow data can be gathered and compliant reports produced.

One condition the NRC is keen to see enacted that has been identified previously is the installation of effluent filters on each septic tank. This aspect will be consulted with the community with a view to arranging the upgrades in association with the desludging of the tanks.

3.3.4 Asset renewals

The following graph shows the predicted asset renewals and is based on the Installation Date and Base Life included in the 2017 Asset Valuation. Errors and assumptions included in that valuation will be reflected in the renewals forecast.

No pipe renewals are due within the next 30 years. There is a small amount of overdue renewals for the pump stations of $13,000 but this is a nominal amount that would require further investigation to confirm an actual requirement.

Figure 3.11- Glinks Gully projected renewals (30 years)

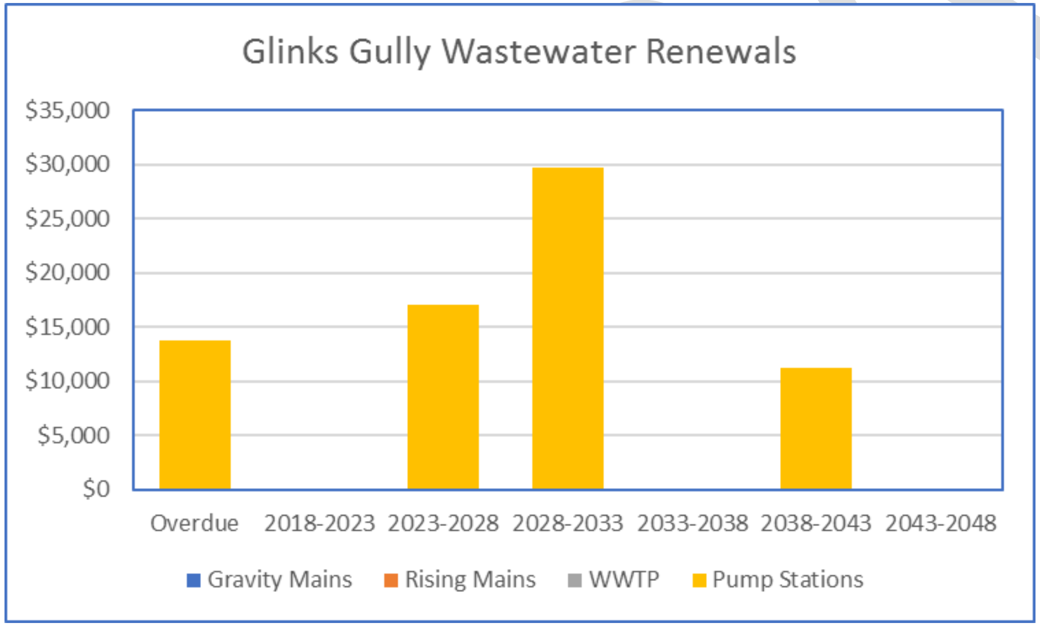


Table 3-6: Glinks Gully projected renewals (30 years)

Glinks Gully	Overdue	2018/2023	2023/2028	2028/2033	2033/2038	2038/2043	2043/2048
Gravity pipes incl. points and connections							
Rising mains							
WWTP							
Pump stations	$13,779		$17,099	$29,711		$11,179	
Total	**$13,779**	**$0**	**$17,099**	**$29,711**	**$0**	**$11,179**	**$0**

Glinks Gully	Total renewals	2017 replacement value	% of total replace
Gravity pipes including points and connections		$103,362	
Rising mains		$53,355	0%
WWTP			
Pump stations	$71,768	$123,752	58%
Total	**$71,768**	**$280,469**	**26%**

3.4 Kaiwaka

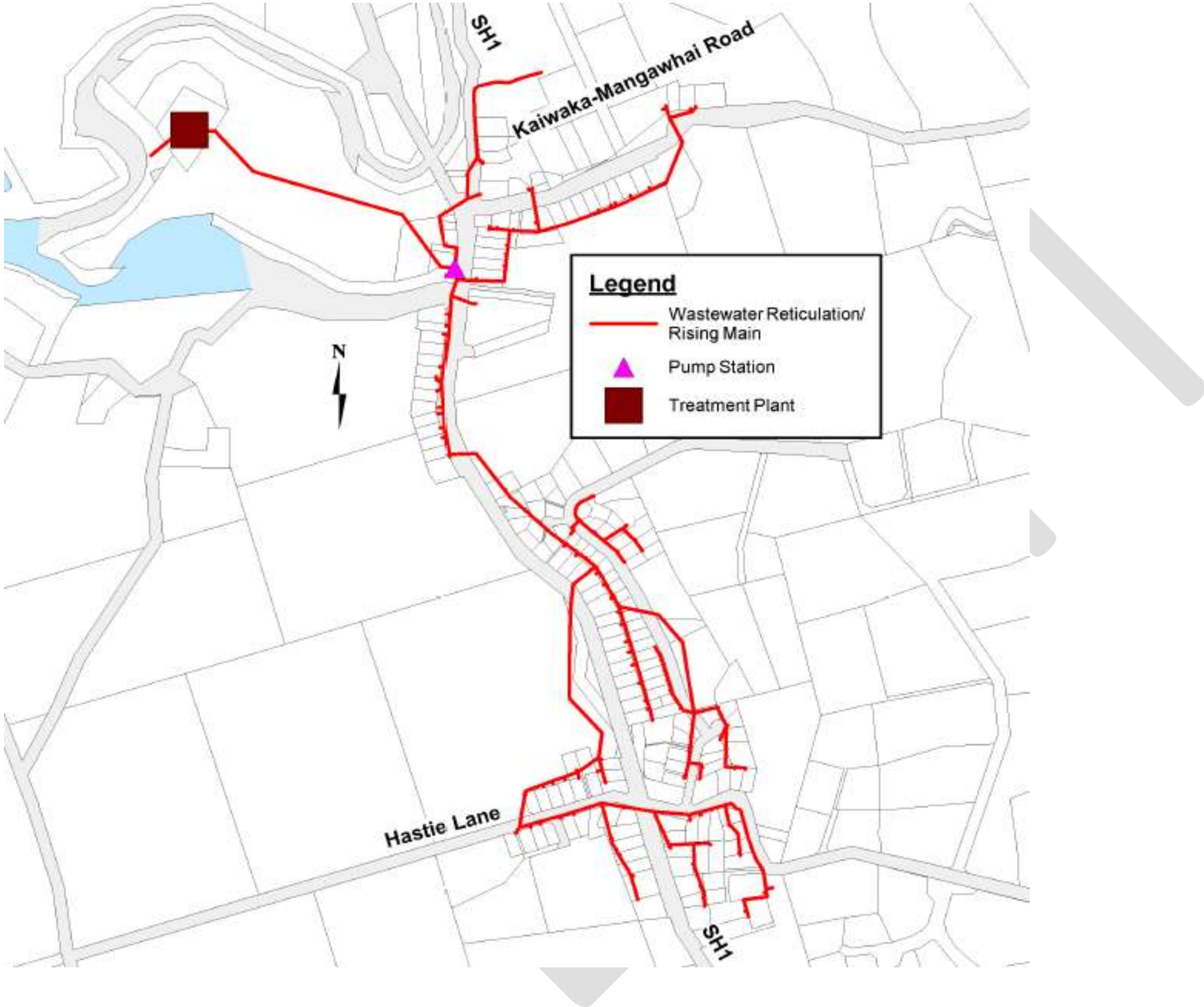
Kaiwaka is a small community located on State Highway 1 (SH1) in the southern part of the Kaipara district. The population as of 2013 was approximately 640 and is expected to be 700 by 2018. Kaiwaka is serviced by four kilometres of gravity pipeline, 69 manholes, one pump station and a single WWTP. Most recent Census data indicates Kaiwaka's population has grown from 537 usually resident population in 2006 to 640 in 2013. This is according to the latest revised calculations by Statistics New Zealand, published on 22 February 2017.

A summary of Kaiwaka's wastewater assets is included in Table 3-7. The layout and location of Kaiwaka's wastewater assets are illustrated in the asset map in Figure 3-12.

Table 3-7: Kaiwaka asset summary

	Treatment plants	Pump stations	Rising mains (m)	Gravity lines (m)	Manholes	Connections
Physical quantity	1	1	1,266	4,090	71	192 From valuation
Asset condition rating	Assessment programme commenced	Assessment programme commenced	Unknown at present	Assessment programme yet to commence	Assessment programme yet to commence	Unknown at present
Replacement cost		$1,990,165				
Depreciated replacement cost		$570,559				
Annual depreciation		$30,676				

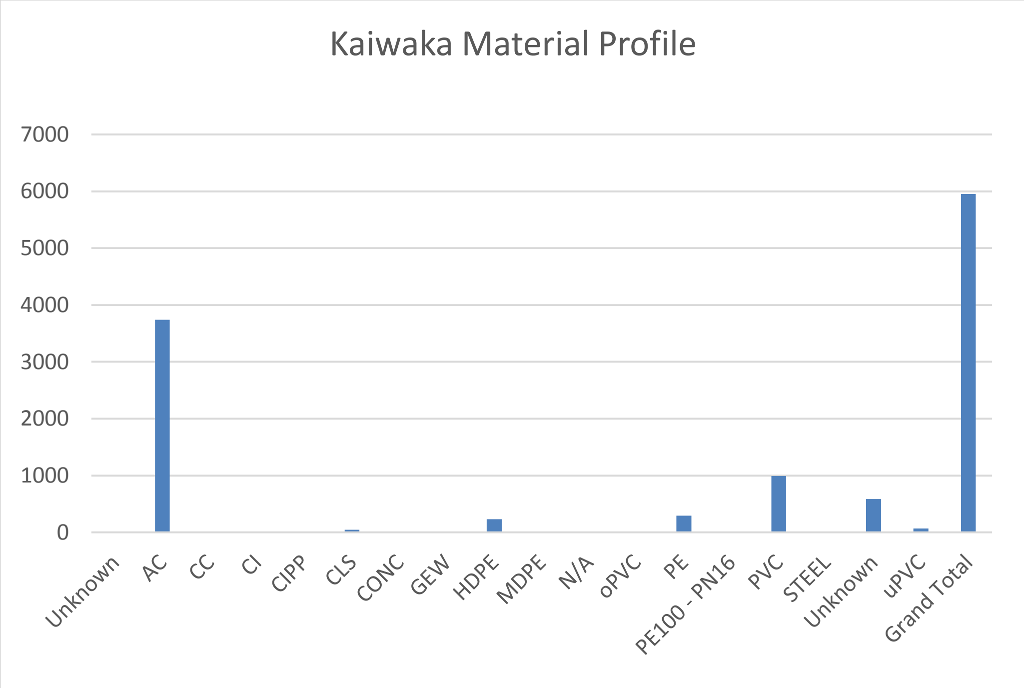
Figure 3-12 : Kaiwaka asset map



3.4.1 Reticulation

Kaiwaka's wastewater scheme was constructed in one contract let in 1990 and the original network is still in place. A breakdown of the reticulation by material is shown in Figure 3-13.

Figure 3-13: Kaiwaka reticulation material breakdown



The condition of Kaiwaka's reticulation is generally unknown due to a lack of data. As discussed in s3.1.2, Council has committed to improving its knowledge of asset condition and a strategy for data capture and assessment will be developed during the lifespan of this AMP.

Appendix E shows the age and size profiles of the Kaiwaka reticulation.

3.4.2 Pump stations

The Kaiwaka pump station is a typical small pump station that includes the following components:

- A wet well that stores incoming wastewater;
- One duty and one standby pump;
- Pipes and valves associated with the pump and rising main;
- A large cabinet housing electrical equipment, pump control devices and telemetry; and
- Connections to incoming gravity pipe and outgoing rising main.

The pump station pumps domestic wastewater from the lowest point in the network up to the WWTP located northwest of the township.

The electrical and control components of the Kaiwaka pump station were replaced in 2005 and are in good condition. Mechanical and civil/structure components are of average condition.

An estimate of capacity has been based on run hours and comparison with rainfall for 2008. The maximum pump run time in 2008 was 15 hours per day, with a median run time of 1.1 hours. Although the diurnal pump pattern is not available this data indicates that the pumps have more than sufficient capacity to pump the average daily flows and have spare capacity. It is unknown if the pumps have sufficient capacity to meet peak wet weather flows experienced at the station.

An assessment of pump station emergency storage was undertaken for compliance with the Regional Water and Soil Plan.

The investigation findings need to be considered with an assessment of the storage volume available in the reticulation before the final additional storage volume allowance for compliance is identified. It is likely that some additional storage will be required and an allowance of 25m^3 has been included in future budgets.

The installation of safety grills under all pump station lids is proposed across the district and this sum is included in the maintenance budgets.

3.4.3 Treatment

The Kaiwaka WWTP consists of a single 6,500m^3 oxidation pond constructed in 1988 with aerator, and a 2,600m^2 wetland constructed in 1995. The wetland discharges into a diffused discharge trench via a v-notch weir before final release into the upper reaches of the Kaipara Harbour. A photograph of the WWTP is included in Figure 3-34.

The quality of effluent being discharged from the Kaiwaka system is generally of good quality for a treatment plant of this type however the discharge quality can be variable, with levels of faecal coliforms exceeding consent limits. A report undertaken in 2013 has identified that short-circuiting is contributing to this based on theoretical analysis using first order kinetic equations.

A proposal to install a curtain across the pond is suggested as a means to address this.

Sludge levels have been identified as low.

The wetland is considered to be in generally good condition and has had recent maintenance works undertaken.

Questions around whether wildlife is contributing to the raised faecal coliform levels shall be investigated with brief testing regime.

Figure 3-3: Kaiwaka WWTP

3.4.4 Asset renewals

The following graph shows the predicted asset renewals and is based on the Installation Date and Base Life included in the 2017 Asset Valuation. Errors and assumptions included in that valuation will be reflected in the renewals forecast.

The renewal profile reflects that the system was largely constructed in 1980. The large spike in pipe renewals results from the 60 year life expectancy of the AC pipes that were used for much of the system. This is not an immediate concern and as the time approaches there will be more, and better, information about the actual condition and life expectancy of these pipes. However, it cannot be assumed that this will defer this renewal requirement as the 60 year life expectancy is considered to be reasonable.

Overdue renewals relate to the WWTP and pump stations (($36,000 and $29,000 respectively) and require further investigation to confirm the actual works required. It is expected however that some work will be required but can be spread over the next five years.

Figure 3-15: Kaiwaka projected renewals (30 years)

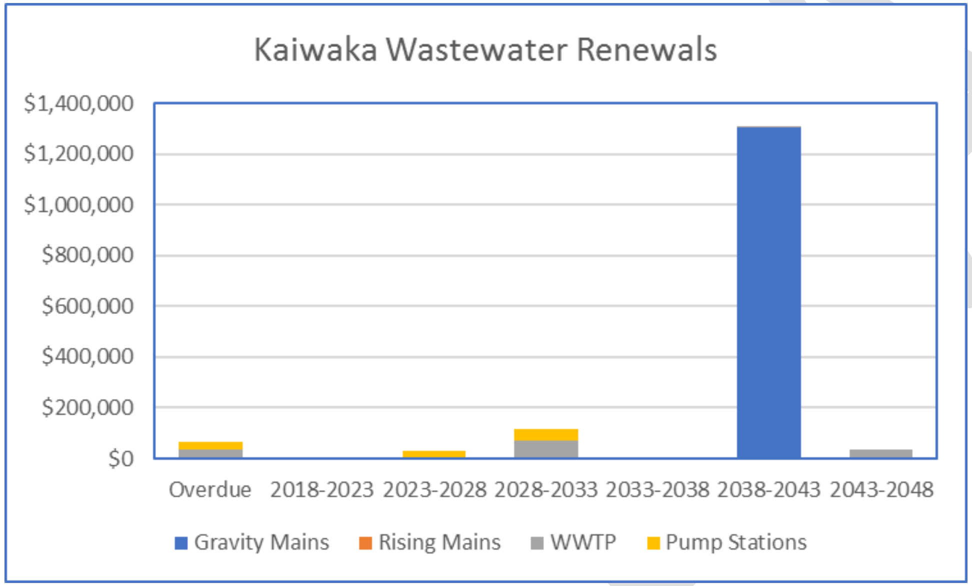


Table 3-8: Kaiwaka projected renewals (30 years)

Kaiwaka	Overdue	2018-2023	2023-2028	2028-2033	2033-2038	2038-2043	2043-2048
Gravity pipes incl points and connections						$1,305,556	
Rising Mains							
WWTP	$36,240		$6,349	$71,777		$6,379	$32,965
Pumpstations	$29,032		$22,952	$46,175			
Total	$65,272	$0	$29,301	$117,952	$0	$1,311,935	$32,965

Kaiwaka	Total Renewals	2017 Replacement Value	% of Total Replace
Gravity pipes incl points and connections	$1,305,556	$1,414,765	92%
Rising Mains	$0	$205,225	0%
WWTP	$153,710	$272,016	57%
Pumpstations	$98,159	$98,159	100%
Total	$1,557,425	$1,990,165	78%

3.5 Maungaturoto

Maungaturoto and the Maungaturoto Rail Village have a population of 895 and are situated on State Highway 12 (SH12), approximately 10kms west of the intersection between SH1 and SH12. The main township straddles the ridgelines which fall towards the fringes of the Kaipara Harbour and the Wairau River.

Maungaturoto is serviced by 11kms of gravity reticulation pipelines, 3 pump stations and 1.2kms of rising main and a single WWTP constructed in 1992.

Most recent Census data indicates Maungaturoto's population has growth 7.2% from 537 resident population in 2006 to 576 in 2013.

A summary of Maungaturoto's wastewater assets is included in

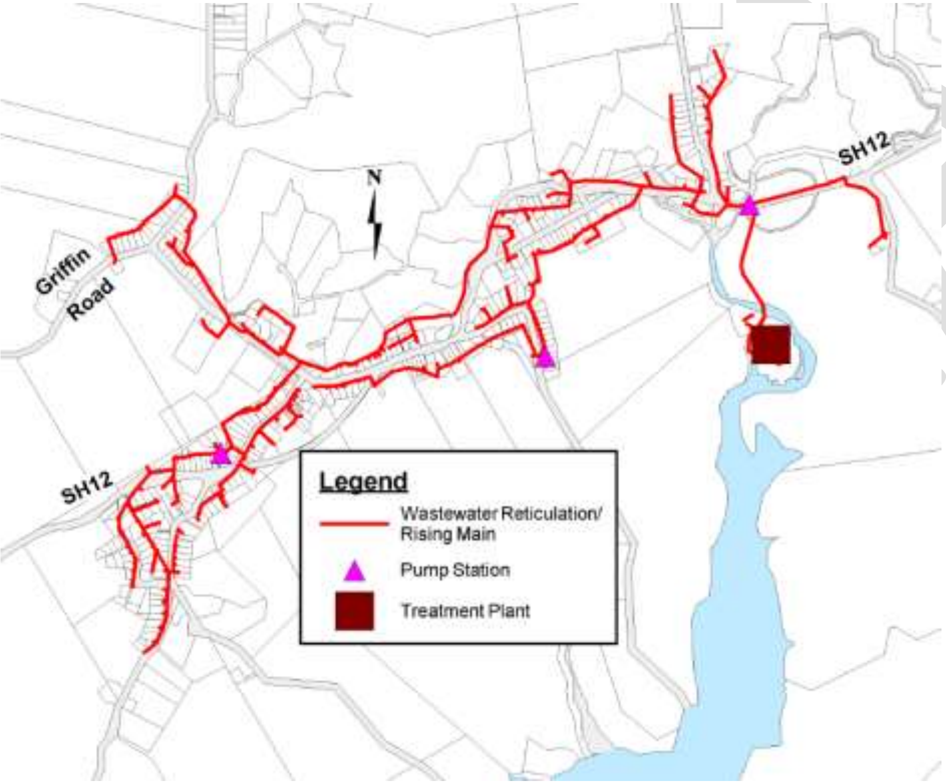
Table 3-9.

The layout and location of Maungaturoto's wastewater assets are illustrated in the asset map in Figure 3-166.

Table 3-9: Maungaturoto Asset Summary

	Treatment plants	Pump stations	Rising mains (m)	Gravity lines (m)	Manholes	Connections
Physical quantity	1	3	1,301	11,295	198	423 From valuation
Asset condition rating	Assessment programme commenced	Assessment programme commenced	Unknown at present	Assessment programme yet to commence	Assessment programme yet to commence	Unknown at present
Replacement cost	$6,268,040					
Depreciated replacement cost	$2,424,518					
Annual depreciation	$117,884					

Figure 3-16 : Maungaturoto asset map



In addition to the main collection and treatment system in Maungaturoto there is a small stand-alone system for seven houses in the Railway Village to the west. This system drains to a communal septic tank and drainage field. The assets are included in the main Maungaturoto valuation.

The disposal field has a new resource consent running through to 2025 and there are no specific issues with the system.

Figure 3-17 - Railway Village reticulation

3.5.1 Reticulation

The condition of Maungaturoto's reticulation is generally unknown due to a lack of data. As discussed in s3.1.2, Council has committed to improving its knowledge of asset condition and condition assessment have commenced in 2014.

Little is known on the capacity of Maungaturoto's wastewater pipe network. It is necessary to identify the capacity of the reticulated pipe network in order to aid decision-making processes and identify growth constraints. With the current level of growth in Maungaturoto this has become a pressing issue.

Appendix E shows the age, material and size profiles of the Maungaturoto reticulation

3.5.2 Pump stations

Maungaturoto has three pump stations that are typical small pump stations and include the following components:

- A wet well that stores incoming wastewater;
- Submersible pumps (one duty, one standby);
- Pipes and valves associated with the pump and rising main;
- A cabinet housing electrical equipment, pump control devices and telemetry;
- Connections to incoming gravity pipe and outgoing rising mains; and
- Lifting gantries.

The pump stations pump domestic wastewater from the low points of each catchment area over to the next catchment or in the case of PS1 to the WWTP located on Council land adjacent to the Maungaturoto Country Club.

From discussion with the operators all components of the Maungaturoto pump stations have been assessed as being of average to very good condition. The pumps in PS1 were replaced in 2009 and the pumps in PS3 are also reasonably new. PS2 still has the old Flygt pumps, installed in 1980. These were reconditioned in 2007. All pumps stations had new electrical components installed circa 2005.

The recent upgrade of the pumps at PS1 has resolved a historical overflow issue. This indicates that pump capacity was an issue prior to the upgrade.

3.5.3 Treatment

The Maungaturoto WWTP consists of a single 8,300m³ oxidation pond constructed in 1980 and located adjacent to the Country Club. The oxidation pond is protected by a waveband and dissolved oxygen levels are maintained by an aerator. Photographs of the oxidation pond/membrane building and the aerator and included in Figure 3-9 and

Figure 3- respectively.

The WWTP was upgraded in 2009 to provide a higher level of effluent treatment to comply with new resource consent conditions. This work included: Installation of an influent step-screen, new membrane filtration plant and construction of a new 650m^3 treated effluent storage pond and new rock discharge structure into the Wairoa River. As per the previous consent requirement, wastewater is discharged into the upper reaches of the Wairoa River via a tidal discharge immediately after high tide.

Stormwater infiltration into the Maungaturoto wastewater system is a significant issue. Present dry weather flows are around 180-250m^3 per day. In heavy rainfall conditions inflows to the WWTP have exceeded 2,500m^3 per day and with rainfall on the pond reached a total daily flow of nearly 3,500m^3 per day. As the resource consent provides for a maximum daily discharge of only 1,200m^3 per day (which is the design flow for the new membrane filtration plant), excess flows are taken into storage in the pond and released over subsequent days. The treated effluent storage pond also helps with flow buffering. The flow buffering facilities at the WWTP are however pushed to their limits during heavy rainfall events and could well be exceeded without further work completed to reduce stormwater infiltration within the reticulation system.

Since commissioning of the membrane plant in mid-2009 algal levels in the pond have tended to be higher than historically observed. This could be aggravated by dryer summers however could be related to the backwash return from the membrane plant. The main effect higher algal populations have is an increased cleaning requirement of the membrane plant, which has caused maintenance costs to be significantly higher than expected. Further work is required to understand the operation efficiency and a capacity study has been budgeted for in 2018 to 2020

3.5.4 Asset renewals

The following graph shows the predicted asset renewals and is based on the Installation Date and Base Life included in the 2017 Asset Valuation. Errors and assumptions included in that valuation will be reflected in the renewals forecast.

The spike in pipe renewals relates to AC pipe laid in the 1980s with a 60 year life expectancy. Overdue renewals mainly relate to pumps stations at $199,000 and this would be credible. Further work is required to identify the particular assets that would generate the greatest benefits from renewal and this work could be spread over a number of years.

Figure 3-18: Maungaturoto projected renewals (30 years)

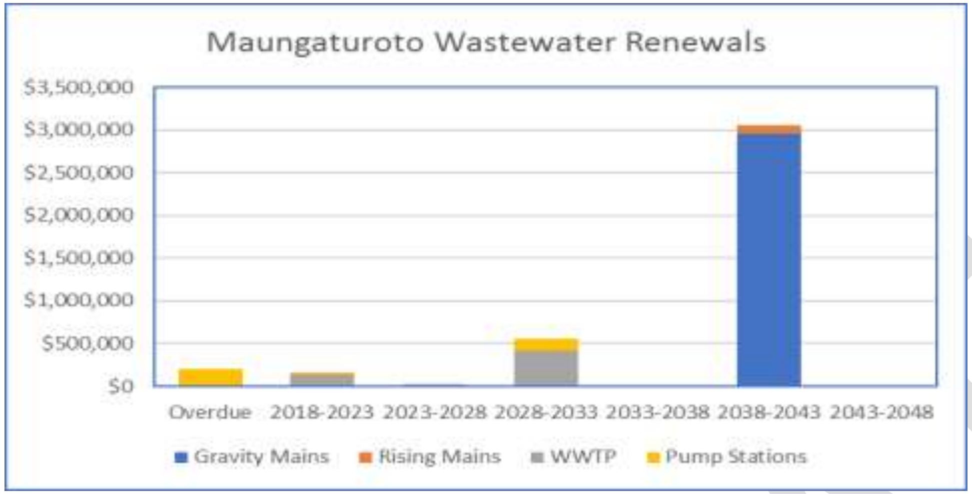


Table 3-10: Maungaturoto projected renewals (30 years)

Maungaturoto	Overdue	2018-2023	2023-2028	2028-2033	2033-2038	2038-2043	2043-2048
Gravity pipes incl points and connections						$2,965,013	
Rising Mains						$83,581	
WWTP	$2,017	$133,959	$26,025	$415,447		$6,379	$10,139
Pumpstations	$199,098	$31,897		$144,040			
Total	$201,115	$165,856	$26,025	$559,487	$0	$3,054,973	$10,139

Maungaturoto	Total Renewals	2017 Replacement Value	% of Total Replace
Gravity pipes incl points and connections	$2,965,013	$3,818,322	78%
Rising Mains	$83,581	$243,644	34%
WWTP	$593,966	$1,831,039	32%
Pumpstations	$375,035	$375,035	100%
Total	$4,017,595	$6,268,040	64%

Figure 3-19: Maungaturoto WWTP oxidation pond and membrane building

Figure 3-20 : Maungaturoto WWTP aerator

3.6 Te Kopuru

Te Kopuru lies 10km south of Dargaville on the Pouto Peninsula. The township has been built on a revetment above the Northern Wairoa River. The wastewater system uses the benefit of the elevation of the revetment to develop a reticulation network that discharges to the treatment plant without the need for pump stations or rising mains.

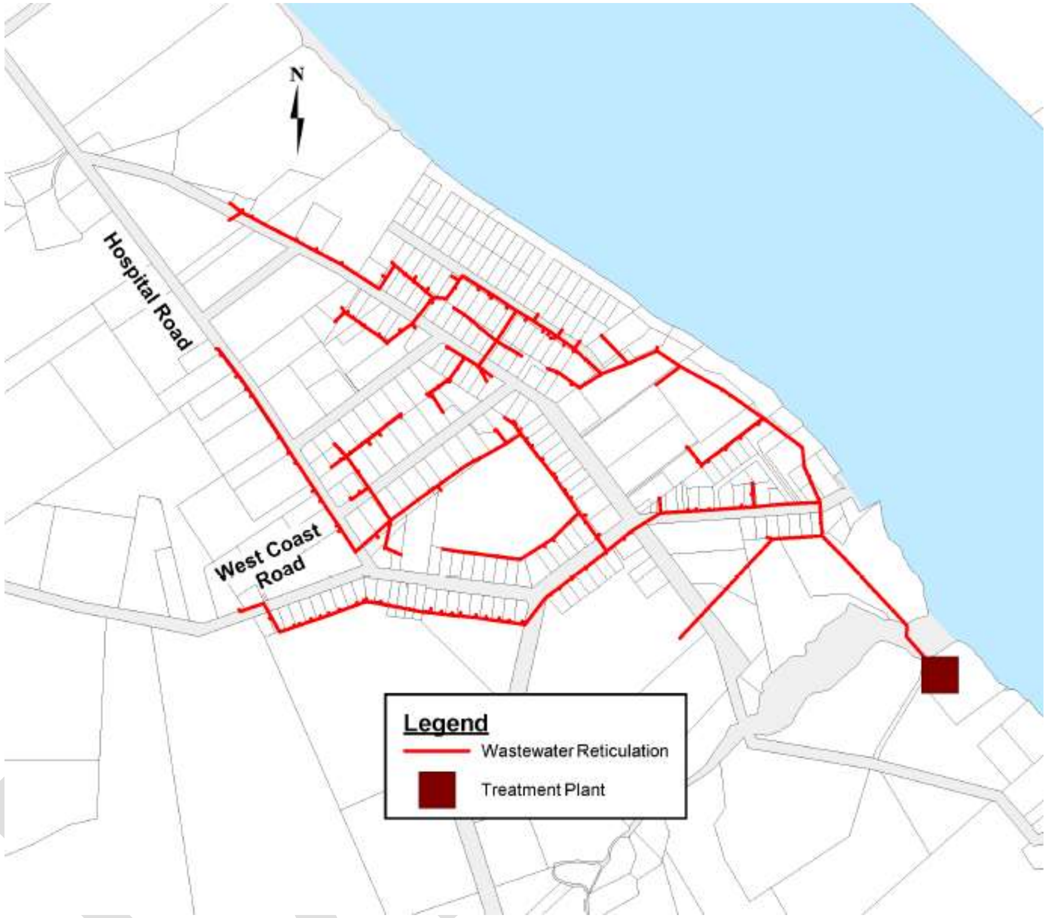
A summary of Te Kopuru's wastewater assets is included in Table 3-.

The layout and location of Te Kopuru's wastewater assets are illustrated in the Asset Map in Figure 3-214.

Table 3-11: Te Kopuru asset summary

	Treatment plants	Pump stations	Rising mains (m)	Gravity lines (m)	Manholes	Connections
Physical quantity	1	0	0	6,669	89	222 From valuation
Asset condition rating	Assessment programme commenced	Assessment programme commenced	Unknown at present	Assessment programme yet to commence	Assessment programme yet to commence	Unknown at present
Replacement cost		$2,359,019				
Depreciated replacement cost		$614,397				
Annual depreciation		$34,827				

Figure 3-214: Te Kopuru asset map



3.6.1 Reticulation

Te Kopuru is serviced by 6,300m of gravity wastewater pipelines constructed in 1981 and a single oxidation pond constructed in 1980. A wetland was constructed in 2001 to provide additional treatment to effluent before it is discharged.

The condition of Te Kopuru's reticulation is generally unknown due to a lack of data. As discussed in s3.1.2, Council has committed to improving its knowledge of asset condition and condition assessments of assets is commencing in 2014.

The network is located in an area with sandstone close to the surface which provides a stable platform for the network, although there is a tendency for tree roots to grow along pipe trenches and into manholes. Some pipe fractures have occurred at the joints as a result.

Information on the Te Kopuru network indicates that the system was designed for an equivalent population (adjusting for school attendees) of 570 people, producing 140 litres per person per day. With the current population of Te Kopuru area at approximately 500 (and not all connected to the scheme) the system will be at 88% of its capacity. No capacity issues relating to the reticulation network have been experienced to date.

Recent census data indicates the population of Te Kopuru increased 2.65% from a usually resident population in 2006 of 453 to 465 in 2013.

Appendix E shows the age, material and size profiles of the Te Kopuru reticulation

3.6.2 Pump stations

There are no pump stations in Te Kopuru.

3.6.3 Treatment

The Te Kopuru WWTP consists of a single stage oxidation pond and wetlands area located immediately adjacent to the Northern Wairoa River, south of Makaka Creek. The oxidation pond has a surface area of 0.52 hectares and a nominal depth of 1m and is protected by a concrete waveband. The wetlands have a surface area of 1.5 hectares. A photograph of the oxidation pond is included in Figure 3-2.

The Te Kopuru network was originally designed to service a total population of 570. The Environmental Effects prepared for the resource consent renewal assessed the current population of the Te Kopuru area discharging to the scheme as 487 (including the school). This is less than the design capacity and it is considered that the scheme has sufficient capacity for the next 20 year period.

Both the oxidation pond waveband and wetland plantings are considered to be in average condition. Sampling of the effluent has indicated that there are instances of non-compliance with consent conditions. The cause of the breaches was understood to be the high level of accumulated sludge in the oxidation pond and desludging of the pond has been completed in 2013.

3.6.4 Asset renewals

The following graph shows the predicted asset renewals and is based on the Installation Date and Base Life included in the 2017 Asset Valuation. Errors and assumptions included in that valuation will be reflected in the renewals forecast.

As with Maungaturoto the spike in pipe renewals relates to AC pipe laid in the 1980s with a 60 year life expectancy.

Minor renewal of the treatment plant is indicated over the next 10 years and requires only a nominal response.

Figure 3-22: Te Kopuru projected renewals (30 years)

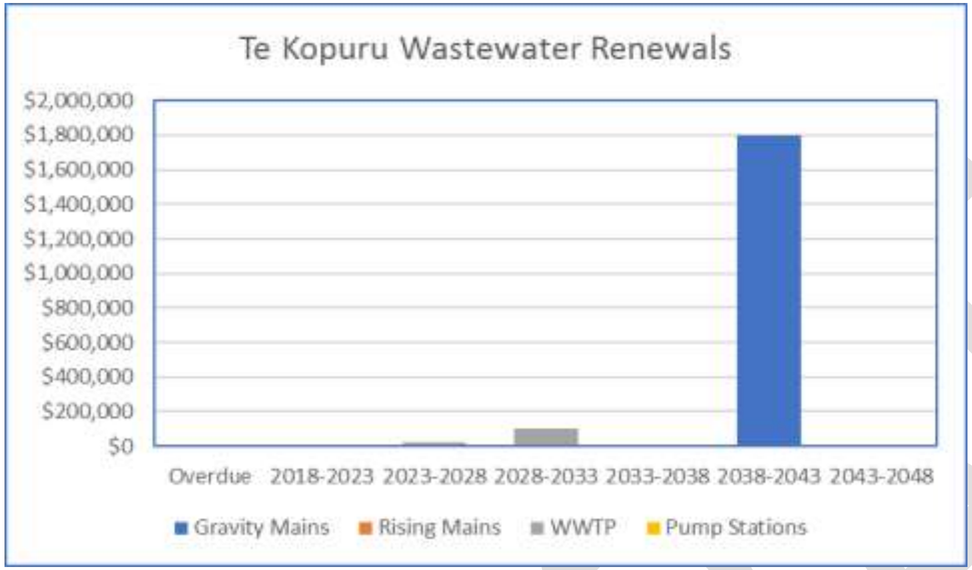


Table 3-32: Te Kopuru projected renewals (30 years)

Te Kopuru	Overdue	2018-2023	2023-2028	2028-2033	2033-2038	2038-2043	2043-2048
Gravity pipes incl points and connections						$1,797,341	
Rising Mains							
WWTP	$5,786	$10,277	$23,145	$101,336			
Pumpstations							
Total	$5,786	$10,277	$23,145	$101,336	$0	$1,797,341	$0

Te Kopuru	Total Renewals	2017 Replacement Value	% of Total Replace
Gravity pipes incl points and connections	$1,797,341	$2,602,322	69%
Rising Mains			
WWTP	$140,544	$296,697	47%
Pumpstations			
Total	$1,937,885	$2,899,019	67%

Figure 3-23 : Te Kopuru WWTP oxidation pond

3.7 Mangawhai

The majority of the wastewater scheme in Mangawhai is operated by the Water Infrastructure Group (WIG) under a Build Operate Transfer procurement scheme (named ‘EcoCare’) that commenced operation in the 2010 financial year. The operation and maintenance contract for Mangawhai will expire in 2019 although it has a renewal option. No decision has been made at this time about extending the contract, extending the recently let operation and maintenance contract with Broadspectrum or going to market.

Recent census data indicates the usually resident population of Mangawhai increased 36.2% from 1,773 in 2006 to 2,415 in 2013.

This AMP does not include the EcoCare wastewater scheme other than to present the financial forecasts, as the scheme is operated and maintained by WIG under the MCWWS O&M Project Management Plan.

A small portion of the Mangawhai wastewater assets (sections of the original gravity wastewater reticulation) are not part of the EcoCare scheme. These assets are maintained by WIG under a separate arrangement with Council.

A summary of Mangawhai's wastewater assets is included in Table 3-13.

The layout and location of Mangawhai's wastewater assets are illustrated in the asset maps in Figure 3-5 and Figure 3-5.

Table 3-13: Mangawhai asset summary

	Treatment plants	Pump stations	Rising mains (m)	Gravity lines (m)	Manholes	Connections
Physical quantity	1	12	23,214	46,794	509	2,473 From valuation
Asset condition rating	Assessment programme proposed	All assets are largely new in 2009				
Replacement cost	$46,367,928					
Depreciated replacement cost	$34,733,334					
Annual depreciation	$893,359					

3.7.1 Mangawhai wastewater system

The MCWWS is a state of the art collection treatment and reuse system.

The collection system is a mix of low pressure and traditional gravity system built to minimise the potential for infiltration.

As at March 2017 the Mangawhai wastewater system had 1,862 properties (including commercial) connected and 533 properties capable of connecting.

The new District Plan published in 2013 identified a new urban boundary and a study was under taken to identify what network extensions were required to maximise the number of properties classed as connectable for Mangawhai.

The WWTP utilises a CASS system with two CASS tanks followed by pressure filtration and disinfection. Sludge is dewatered via belt press and disposed of in the landfill.

The treated wastewater is sent to a Council-owned farm in Browns Road some 10 km from the WWTP where the water is stored in a buffer dam and irrigated to a portion of the farm land. The farm runs drystock and the grass is managed by a contractor.

Appendix E shows the age, material and size profiles of the Mangawhai reticulation.

Figure 3-54 : Mangawhai asset map – Mwhai Heads

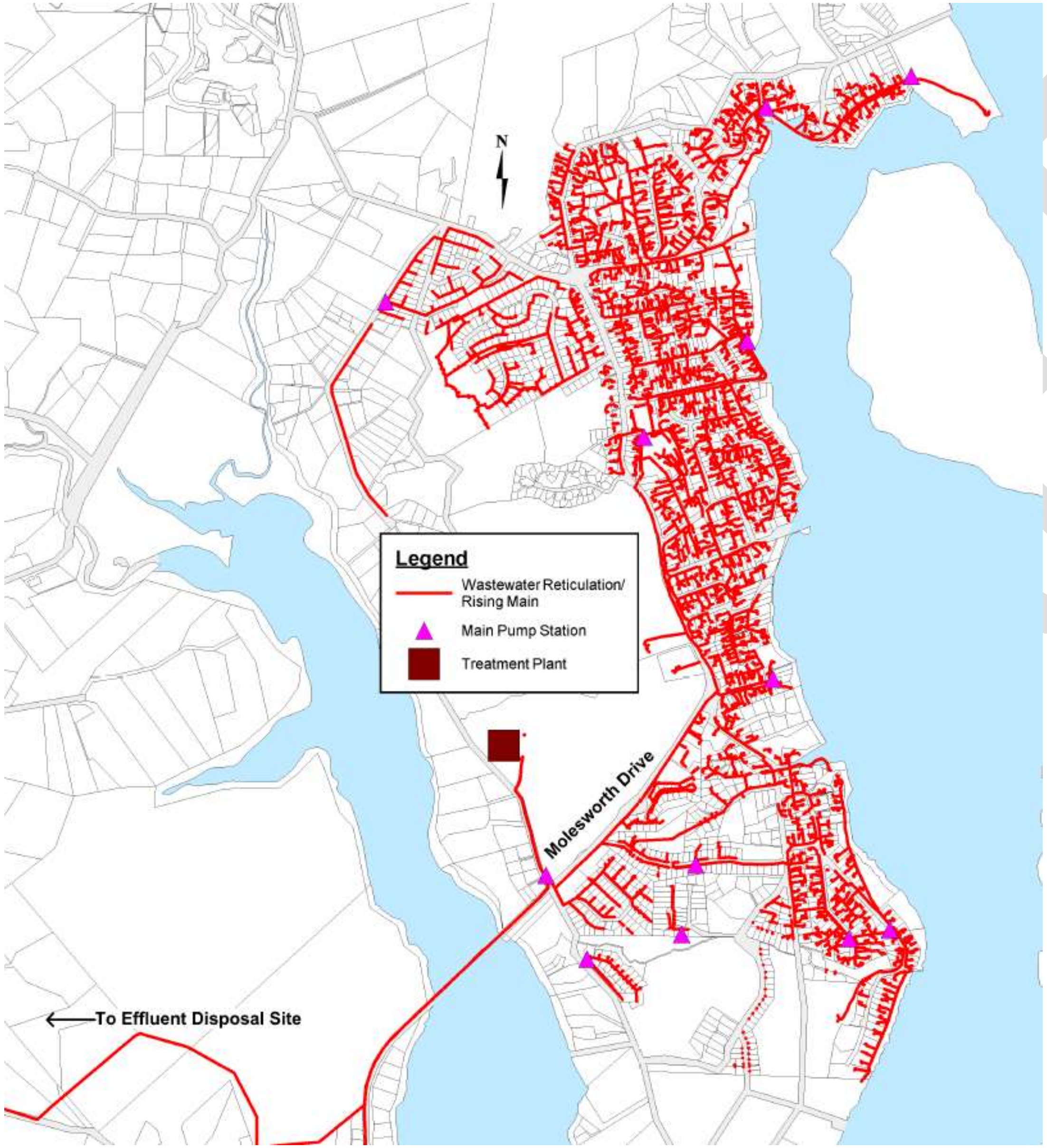
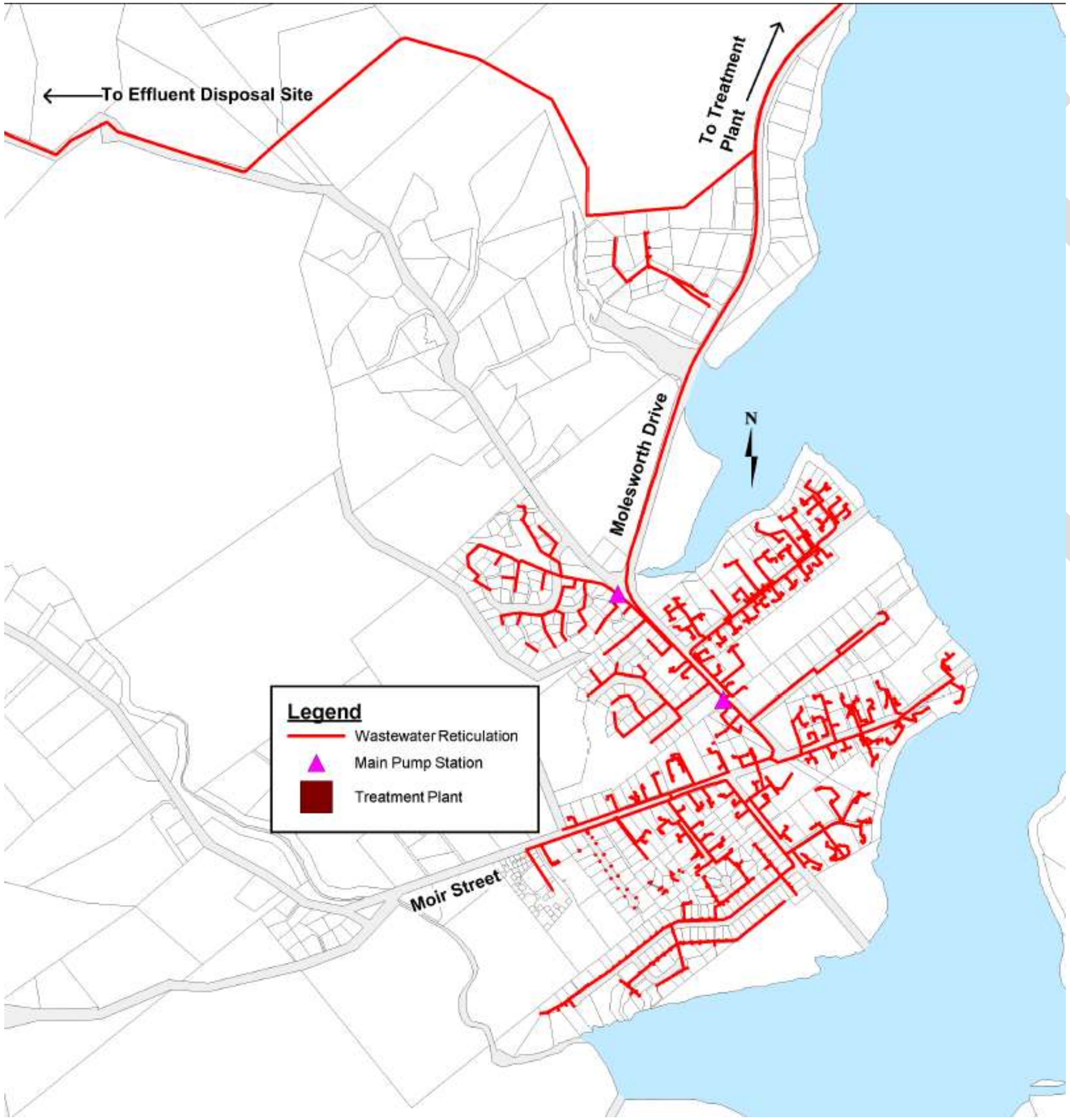


Figure 3-25: Mangawhai asset map – Mwhai Village



3.7.2 Growth and extension

Reuse system expansion options

As the connected population grows expansion of the irrigation system at the farm will be required. Experience gained in operating the system has highlighted practical constraints combining irrigation and stock and also the conservative loading rate that the consent imposes. Before committing additional funds to extending the irrigation system a review of options was undertaken to develop a sustainable wastewater reuse strategy going forward.

This included looking at alternative reuse options to local golf course, farmland, other developments and to water as well as renegotiating the application rate at the farm.

Reticulation system extensions

To maximise the return on the investment made establishing the MCWWS a reticulation expansion plan has been developed that maximises the number of properties classed as serviceable and also encourages developers to connect.

A supporting policy to encourage connections and provide a level playing field for all, irrespective of what type of connection to a property, was also developed.

The ultimate yield from the DP defined urban area is estimated to be in the order of 4,500 properties.

Assessment of growth projections was undertaken and high and low growth projections were developed which indicated up take of the 4,500 properties between 2045 and 2058.

The system extensions were presented as two projects with a combined value of $3 million. An investment of $2 million would however see the majority of land classed as serviceable.

In addition, upgrades to the WWTP, pump stations and land application area are estimated to cost a further $1 million.

A prioritisation assessment for the extensions combining economic, environmental, social, strategic and cultural assessment criteria was prepared and the community consulted for feedback.

In addition, financial modelling was undertaken to align with LTP programmes.

At this time a proposal known as Option 2 has been adopted for planning purposes and is detailed below. Council's ability to implement this proposal is very dependent on funding from development as it occurs and/or the construction of some of these works by developers as part of their development.

Figure 3-66: Proposed upgrade of MCWWS

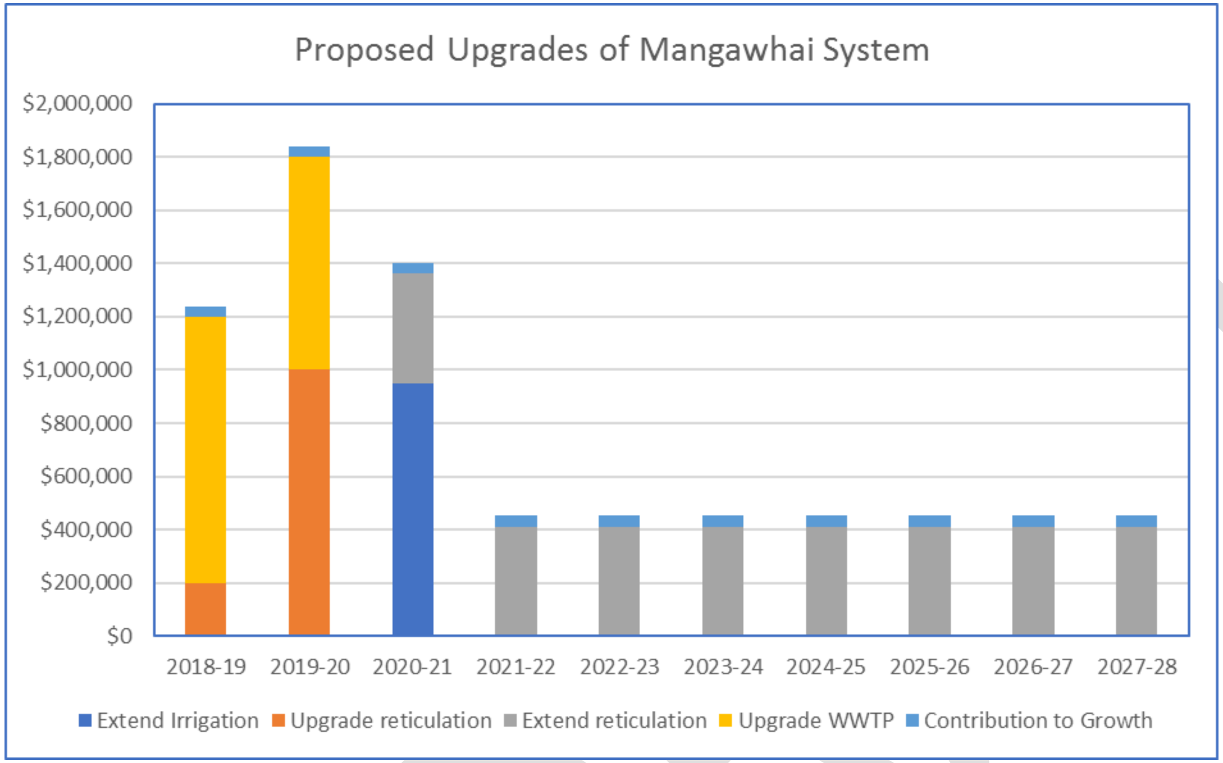


Table 3-44: Proposed upgrade of MCWWS in $‘000s

Option 4 - Golf Course ($000s)	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33	203 3-34	2034-35	2035-36	2039-40
Extend irrigation system			950																
New disposal system																	1,485		742.5
Upgrade existing reticulation	200	1,000																	
Extend reticulation (13 years)			1,400	1,400	1,400	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300				
Augment WWTP	1,000	800								500	2,000	2,500				500	2,500	3,000	
Additional Capacity for Growth - Council Contribution	40	40	40	40	40	40	40	40	40	40									
Totals	1,240	1,840	2,390	1,440	1,440	1,340	1,340	1,340	1,340	1,840	3,300	3,800	1,300	1,300	1,300	500	3,985	3,000	742.5

3.7.3 Asset renewals

The following graph shows the predicted asset renewals and is based on the Installation Date and Base Life included in the 2017 Asset Valuation. Errors and assumptions included in that valuation will be reflected in the renewals forecast.

The Mangawhai system is largely very new with most assets having an install date of 2009.

No reticulation pipe renewals are indicated over the next 30 years.

The treatment system is much more sophisticated and mechanised than any of the other plants with many components having relatively short lives e.g. pumps and electrical equipment. This is reflected in a significant expenditure forecast in the period 2018/2033 of $2.7 m on the plant. This may be somewhat pessimistic and the assets may remain serviceable for longer than this. However it is the nature of such assets that they do have relatively short lives compared to pipes and manholes and this potential expenditure needs to be provided for.

Figure 3-77: Mangawhai projected renewals (30 years)

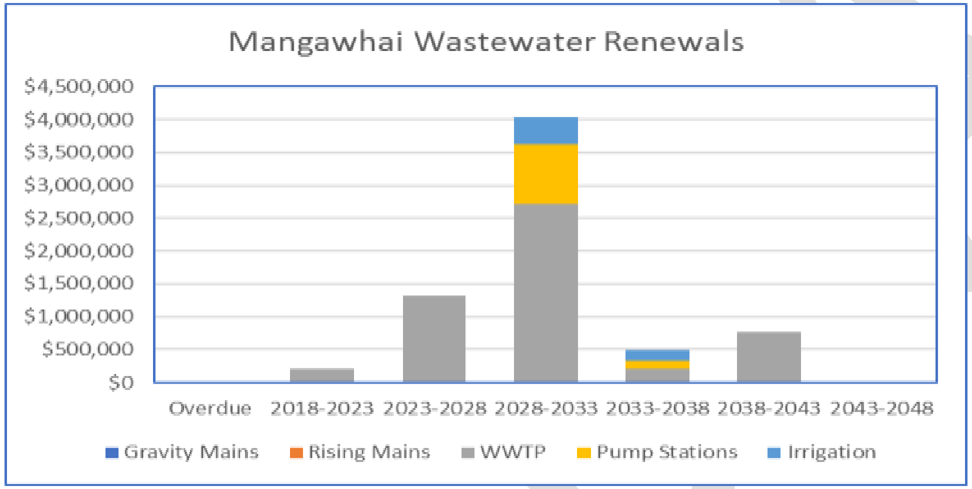


Table 3-55: Mangawhai projected renewals (30 years)

Mangawhai	Overdue	2018-2023	2023-2028	2028-2033	2033-2038	2038-2043	2043-2048
Gravity pipes incl points and connections							
Rising Mains							
WWTP	$6,115	$218,535	$1,311,691	$2,712,327	$218,535	$760,563	
Pumpstations	$17,702			$921,704	$100,961		
Irrigation				$402,248	$166,877		
Total	$23,817	$218,535	$1,311,691	$4,036,279	$486,373	$760,563	$0

Mangawhai	Total Renewals	2017 Replacement Value	% of Total Replace
Gravity pipes incl points and connections	$0	$18,645,760	0%
Rising Mains	$0	$9,812,103	0%
WWTP	$5,227,766	$11,965,782	44%
Pumpstations	$1,040,367	$1,227,382	85%
Irrigation	$569,125	$4,716,901	12%
Total	$6,837,258	$46,367,928	15%

3.8 Critical assets

Critical assets have been defined by the NAMS Group as being ‘assets with a high consequence of failure’.[1] They are often found as part of a network, in which, for example, their failure would compromise the performance of the entire network.

A formal criticality assessment was undertaken for Kaipara’s wastewater assets in 2016. The assessment incorporated local knowledge and identified the assets listed in Table 3-66 as being “critical”. Failures of the items on this list would lead to serious impacts on the ability of Council to meet its customer LOS.

The assessment also included a range of recommendations on how assets with elevated criticality should be managed and this is incorporated into the AMIP.

Table 3-66: Critical WW assets

Critical wastewater assets		
Local wastewater reticulation	Local wastewater reticulation for • Pipes ≥ 200mm in residential areas • Pipes in CBD of Dargaville • Pipes within, or crossing, State Highways – unless otherwise defined by Business and Community Customers.	Moderate
Local wastewater reticulation	Bridge crossings of streams.	Moderate
Pump stations	Stations other than Dargaville PS 1, 2, 3, and 4 and major Mangawhai stations.	Moderate
Rising mains	Rising mains other than large mains at Mangawhai and lower end of 'Daisy Chain' at Dargaville.	Moderate
Treatment plants	Maungaturoto.	Moderate
Local wastewater reticulation	Pipes running under buildings.	High (Major)
Pump stations	• Dargaville main collection and transmission stations i.e. PS 1,2,3 and 4; • Mangawhai major effluent and treated effluent pump stations.	High (Major)
SCADA system		High (Major)
Rising mains – specific large mains	• Mangawhai Heads – under management of Build/Operate scheme; • Lower end of 'Daisy Chain' at Dargaville.	High (Major)
Treatment plants	Mangawhai – under management of Build/Operate scheme.	High (Major)

4 Issues and remedial actions

A review of the issues associated with the KDC wastewater schemes reveals a number of common themes that are discussed below. Funding for the various projects is included in the Management Services Operational budget.

Table 4-1: Projects associated with issues

Issue	Discussion
System capacity	None of the KDC wastewater systems have hydraulic models or an overall assessment of the capacity of the various key elements that make up the systems. This generates a number of issues including: • Unknown capacity for growth to occur and difficulty approving extensions when impact on downstream system is unknown; • With the extent of renewals increasing it is critical to ensure that correct capacity is provided for future growth through that process; • Extent to which infiltration and inflow is present, what issues are associated with excessive Inflow and Infiltration (I/I) and how growth can be accommodated if I/I is reduced; • Pump station capacity relative to demand, ability to manage peak flows and what, if any, emergency capacity would optimally be required; • Capacity constraints within reticulation system, particularly pipes that are serving an arterial role; • Treatment capability relative to consent requirements and growth capacity. This also highlights fundamental limitations of the simple pond systems relative to likely future consent requirements; and • Ability to charge development contributions when balance of current and growth capacity not known. The proposed system capacity studies are to obtain an overview of these issues for the subject schemes. This may lead to future more detailed studies being required. Given the relatively small size of most of the schemes the actual extent of the network needing to be properly modelled is expected to be relatively small with large parts of the network able to be simply specified by minimum pipe sizes. The studies will therefore focus on key elements and identifying the main constraints. To be effective these studies will require reliable flow measurement in both dry and wet weather flow situations and this may require the installation of temporary flow gauging. Schemes proposed for inclusion in first three years are Dargaville, Kaiwaka, Maungaturoto, Glinks Gully and Mangawhai.

Issue	Discussion
	Dargaville is driven mainly by renewal considerations and management of pump stations and WWTP. Kaiwaka is driven partially by growth considerations but also by consent renewal in 2022. Maungaturoto is driven by growth considerations. Glinks Gully is driven by consent renewal in 2024 and consideration of whether the scheme should be extended and potential for needing to renew the seepage beds. Mangawhai is driven by growth considerations.
Infiltration and Inflow Management	Many of the KDC schemes experience containment issues during wet weather and this is a clear indicator that Inflow and Infiltration (I/I) is present. This will be contributed to by the age of the networks and the low-lying nature of several of them. NRC is known to be concerned about the extent and frequency of wastewater overflows. The WaterNZ National Performance Review indicates that the Dargaville system has the highest number of overflows per 1,000 properties of any reported. The accuracy and validity of this measure is however highly suspect. Some of the problem may be caused by pipes and pump stations simply being too small for the connected demand and the system capacity studies above will provide some indication of such situations.
Oxidation Pond Study	Dargaville, Te Kopuru, Maungaturoto and Kaiwaka all utilise oxidation ponds in various formats. These systems are cheap and simple to operate however have their limitations in relation to the extent and type of treatment that they can provide. While daily costs are low the periodic desludging costs can be considerable and are considered to be an Operational cost. The proposed study will align with the system capacity study with a specific focus on providing a view on the ongoing viability of oxidation ponds as a treatment process, what can be done to optimise their performance and providing a future outlook on necessary maintenance and upgrading. It is intended that this be undertaken before the desludging of the Dargaville oxidation ponds.
Kaiwaka Consent Renewal	The Kaiwaka discharge consent expires in 2022. This funding provides for initial scoping of the process for renewal and gathering of information that will contribute to that process.
Specific Discharge Non-compliance	Some of the WWTPs regularly have periods of non-compliance with specific requirements of their discharge consents. With oxidation ponds this can be difficult to manage as they are biological systems with key adjustable controls other than aeration. A specific issue at this time is ammoniacal nitrogen at Te Kopuru and a study is provided for to identify the cause and propose remedies.

Issue	Discussion
Condition Assessment	The KDC systems comprise a mix of pipes of varying diameters, gravity/pressure, materials, ages, criticalities and operating environments. All of these factors influence that effective working life of the pipe and the drivers for renewal. Given the costs involved in renewals as the major driver of capital expenditure it is important that KDC has good information to both predict when renewal might be required (long term planning) and justifying the actual renewals to be undertaken (short term planning). Condition assessment is a key tool for both these disciplines and for gravity pipes it typically CCTV-based while pressure pipes utilise a range of technologies. KDC now has a structured CCTV inspection process in place that is essentially driven by criticality, age and size.
Mangawhai WWTP Renewals	The Mangawhai WWTP is very different to all other KDC WWTPs in relation to the extent and nature of the technology utilised. Much of this equipment has a relatively short life expectancy and therefore renewal expenditure is both large and frequent. A valuation base renewal forecast indicates renewal of $1.5 million being required over the next 10 years, including overdue renewal of $6,000 even with the plant only eight years old. The study is intended to focus on the renewal profile of the plant and review the actual condition of the subject equipment to determine if the life expectancy used for valuation purposes can effectively be utilised for renewal planning. It is hoped that lives can be extended but the WWTP is a hostile environment for much of this equipment and this cannot be a guaranteed outcome.
Advice on Mangawhai Operations Contract Renewal	The current Trility contract for the operation of the Mangawhai scheme expires in 2019, although it has a renewal option that Council could utilise. The current operating cost is over $1 million per year, excluding power. It would be appropriate as this time approaches that KDC considers what options it has going forward and whether the required levels of resourcing and performance can be achieved at a lower cost. This funding provides for advice that may be required during this process but is not intended to provide for a full open tender for the service.
Valuation, AMP updating and LOS Review	These are time-bound processes that need to be provided for during the three years of the LTP.

Table 4-2: Budget provisions for issues

Project	Total budget	2018-19	2019-20	2021-21	Short description (see detail above)
Dargaville Capacity Study	$120,000	$60,000	$60,000	0	Study of current flows, Inflow and Infiltration (I/I), current capacity, growth forecast and main constraints.
Kaiwaka Capacity Study	$60,000	0	$30,000	$30,000	Study of current flows, I/I, current capacity, growth forecast and main constraints. Kaiwaka forecast to grow.
Kaiwaka preparation for consent renewal	$20,000	0	0	$20,000	Consent renewal required in 2022. Further funding will need to be provided in 2021/2022
Maungaturoto Capacity Study	$70,000	$35,000	$35,000	0	Study of current flows, I/I, current capacity, growth forecast and main constraints. Maungaturoto forecast to grow.
Mangawhai Capacity Study	$120,000	$60,000	$60,000	0	Study of current flows, I/I, current capacity, growth forecast and main constraints. Mangawhai growing rapidly.
Condition assessment	$249,000	$83,000	$83,000	$83,000	Ongoing CCTV inspections plus sampling of rising mains per report.
Review Mangawhai plant renewal predictions	$25,000	$25,000	0	0	Valuation indicates large current backlog of renewals. This needs to be assessed in detail to determine actual need and future profile.
Advice on Mangawhai Operations contract	$20,000	$20,000	0	0	Current contract will expire in June 2019. There is a renewal option but also option to award to maintenance contractor. Potentially large dollars involved.
Oxidation pond management options	$40,000	$40,000	0	0	KDC has a number of oxidation ponds. Seek initial advice on aeration management, desludging and future upgrading.
Te Kopuru ammoniacal nitrogen study	$30,000	$30,000	0	0	Te Kopuru ponds are non-compliant for ammoniacal nitrogen. Initial advice on cause and remedy.
Asset Revaluation	$25,000	0	$25,000	0	Wastewater revalued every three years.

Project	Total budget	2018-19	2019-20	2021-21	Short description (see detail above)
Glinks Gully Capacity Study	$25,000	0	$12,500	$12,500	Study of current flows, Inflow and Infiltration (I/I), current capacity, growth forecast and main constraints. Glinks Gully has issues about connection of additional properties and capacity of current system.
AMP and LOS Review	$70,000	0	$35,000	$35,000	Preparation for next LTP.
Other (unspecified)	$80,000	$20,000	$0	$60,000	Unknown projects at this time allocated across all schemes.

5 Asset valuation

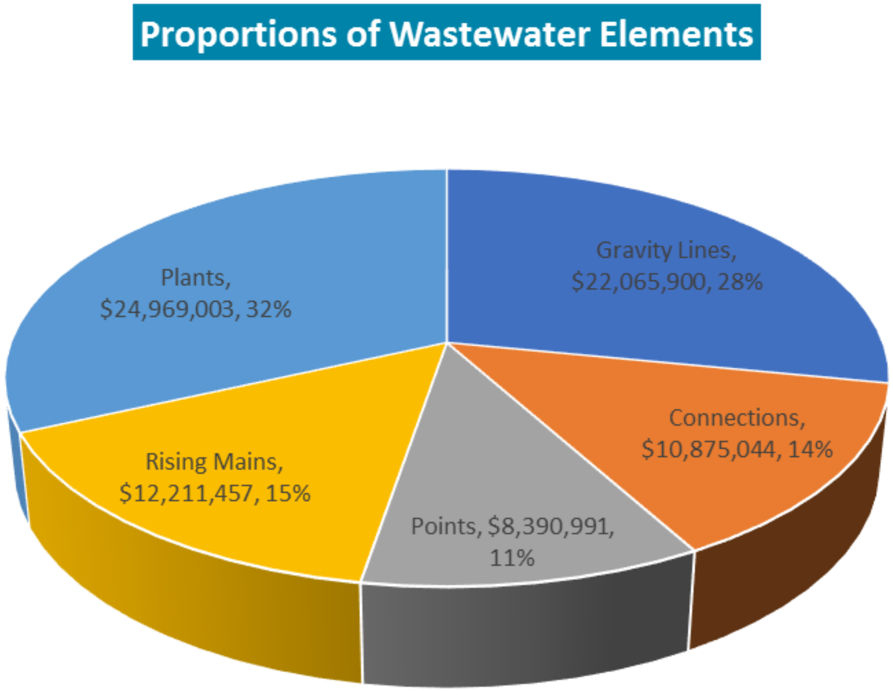
The 2017 wastewater valuation for the district is summarised in the tables below.

5.1 Asset renewal valuation

Table 5-1: 2017 wastewater valuation

Wastewater Renewal Value						
	Gravity Lines	Connections	Points	Rising Mains	Plants	Total
Dargaville	$8,308,365	$4,412,781	$2,567,258	$1,897,130	$4,062,242	$21,247,775
Glinks Gully	$23,839	$50,365	$28,156	$53,355	$123,752	$279,467
Kaiwaka	$790,194	$371,929	$252,642	$205,225	$370,175	$1,990,165
Maungaturoto	$2,268,078	$819,406	$730,839	$243,644	$2,206,073	$6,268,040
Te Kopuru	$1,290,484	**$430,043**	$341,796		$296,697	$2,359,019
TOTAL Excl Mangawhai	$12,680,960	$6,084,523	$3,920,691	$2,399,354	$7,058,939	$32,144,467
Mangawhai	$9,384,940	$4,790,521	$4,470,300	$9,812,103	$17,910,065	$46,367,928
TOTAL Incl Mangawhai	$22,065,900	$10,875,044	$8,390,991	$12,211,457	$24,969,003	$78,512,395

Figure 5-1: Proportions of WW elements based on 2017 valuation



5.2 Asset current depreciated value

Table 5-2: 2017 Wastewater depreciated valuation

Current Depreciated Value from 2017 Valuation					
	Pipes (Gravity, Rising & Connections)	Points	Plants	Total	% of Renewal
Dargaville	3,533,713	949,185	2,415,128	6,898,026	32%
Glinks Gully	50,176	18,302	52,801	121,279	43%
Kaiwaka	255,286	139,183	176,090	570,559	29%
Maungaturoto	669,183	439,089	1,316,246	2,424,518	39%
Te Kopuru	239,962	190,024	184,411	614,397	26%
TOTAL Excl Mangawhai	4,748,320	1,735,783	4,144,676	10,628,779	33%
Mangawhai	17,114,141	3,634,709	13,984,484	34,733,334	75%
TOTAL Incl Mangawhai	21,862,461	5,370,492	18,129,160	45,362,113	58%

5.3 Asset annual depreciation

Table 5-3: 2017 Wastewater annual depreciation

Annual Depreciation from 2017 Valuation					
	Pipes (Gravity & Rising)	Connections	Points	Plants	Total
Dargaville	146,304	55,160	32,222	102,857	336,543
Glinks Gully	965	630	352	4,211	6,158
Kaiwaka	15,556	4,649	3,158	7,313	30,676
Maungaturoto	39,593	10,243	9,301	58,747	117,884
Te Kopuru	21,031	5,376	4,272	4,148	34,827
TOTAL Excl Mangawhai	223,449	76,057	49,305	177,277	526,088
Mangawhai	243,816	59,882	100,997	488,665	893,359
TOTAL Incl Mangawhai	467,265	135,938	150,302	665,942	1,419,447

5.3.1 Implied average asset life from valuation

Table 5-4: 2017 Wastewater implied average asset life

Implied Average Life (Years) from Renewal/Annual Depreciation					
	Pipes (Gravity & Rising)	Connections	Points	Plants	Total
Dargaville	70	80	80	39	63
Glinks Gully	80	80	80	29	45
Kaiwaka	64	80	80	51	65
Maungaturoto	63	80	79	38	53
Te Kopuru	61	80	80	72	68
TOTAL Excl Mangawhai	67	80	80	40	61
Mangawhai	79	80	44	37	52
TOTAL Incl Mangawhai	73	80	56	37	55

5.4 Changes in valuation 2014 to 2017

The following extract is from the 2017 asset valuation by OPUS and details the valuation changes that have occurred.

Table 5-5: Extracts from OPUS valuation report

5.2. Wastewater Valuation

The wastewater asset group comparison with 2014 valuation is shown in Table. 5.5. The total change and percentage change for each asset group is shown in Table 5.6 and the change in asset register quantities is shown in Table 5.7. A breakdown of wastewater assets by region and a breakdown of wastewater points by asset type is supplied in appendix A.

Table 5.5: Comparison with the Previous Valuations (2014-17)

ASSET	2017 ($)			2014 ($)		
	ORC	ODRC	AD	ORC	ODRC	AD
Gravity Pipes	$22,065,899	$13,416,658	$308,883	$24,597,503	$15,724,887	$377,347
Non-Gravity Pipes	$12,211,457	$10,322,295	$158,381	$4,940,200	$3,539,540	$76,092
Service Connections	$10,875,044	$5,437,522	$135,938	$0	$0	$0
Subtotal Pipes	**$45,152,400**	**$29,176,476**	**$603,203**	**$29,537,703**	**$19,264,426**	**$453,439**
Wastewater Points	$8,390,991	$5,370,491	$150,302	$15,725,562	$9,898,096	$223,309
Wastewater Plant	$24,827,382	$18,043,569	$659,172	$24,783,126	$19,601,896	$654,004
Total for Wastewater	**$78,370,773**	**$52,590,536**	**$1,412,678**	**$70,046,391**	**$48,764,418**	**$1,330,752**

Table 5-6: Extracts from OPUS valuation report

Table 5.6: Change in Wastewater Valuation (2014-17)

ASSET	CHANGE 2014-17 ($)			CHANGE 2014-17 (%)		
	ORC	ODRC	AD	ORC	ODRC	AD
Gravity Pipes	-$2,531,604	-$2,308,228	-$68,463	-10%	-15%	-18%
Non-Gravity Pipes	$7,271,257	$6,782,756	$82,289	147%	192%	108%
Service Connections	$10,875,044	$5,437,522	$135,938	-	-	-
Subtotal Pipes	**$15,614,696**	**$9,912,049**	**$149,764**	**53%**	**51%**	**33%**
Wastewater Points	-$7,334,571	-$4,527,605	-$73,007	-47%	-46%	-33%
Wastewater Plant	$44,257	-$1,558,326	$5,168	0%	-8%	1%
Total for Wastewater	**$8,324,382**	**$3,826,118**	**$81,925**	**12%**	**8%**	**6%**

The valuation of KDC's wastewater assets has increased overall since 2014 by **$8.324M (12%)** Replacement Cost and **$3.826M (8%)** Depreciated Replacement Cost. The Annual Depreciation has increased by **$81.925k (6%).**

ASSET	REASON FOR CHANGE
Gravity Pipes	Gravity pipes has seen a decrease in quantity of 6%. The reasons for this may be because of a transfer of assets from gravity pipes to non-gravity. Overall the quantity of gravity and non-gravity pipes has increased 4.3%. The other reason for the change in value of gravity pipes is because of the increase lives of AC pipes from 40 to 60 years. This change changes an increase in ODRC by $1.6M and a decrease in AD of $45K
Non-Gravity Pipes	Increase in quantity of non-gravity pipes by 63%.
Connection Services	Connection services were valued in wastewater points in 2014 valuation.
Wastewater Points	The cause for the decrease in WW points is the shift in service connections from WW points to WW pipes. This has offset the increase in unit rates for manholes and general cost increase for WW points.
WWTP and Pump Stations	A new dataset for WWTP has been used in the 2017 valuation. This has resulted in a group of asset IDs, making it difficult to completely transfer values used in 2014 to the 2017 valuation. It has also made it impossible to fully compare or explain reasons for change. Through the site inspections, it became apparent that several assets for the Mangawhai WWTP were grossly overvalued in the 2014 valuation. Revaluing these assets and giving them a more reasonable replacement cost has decreased ODRC by $1.8m. These changes are included in the WW points spreadsheets under the tab major unit rate changes.

5.5 Pipeline unit rates and expected life from valuation

Table 5-7: Pipeline unit rates and life expectancy

Pipe Life Expectancy		2017 Unit Rates $/m (excluding overhead)		
Pipe Material	Base Life (Yrs)	Diameter (mm)	Gravity Pipes	Non-Gravity Pipes
AC	60	25	$90.00	$94.88
CC	80	32	$93.00	$94.88
CI	60	40	$93.00	$94.88
CIPP	40	50	$102.52	$104.59
CLS	60	63	$111.58	$113.84
CONC	60	75	$119.96	$122.38
GEW	80	80	$123.44	$125.94
HDPE	80	90	$130.42	$133.05
MDPE	80	100	$137.39	$140.17
PE	80	110	$144.16	$147.07
PE100 - PN16	80	125	$154.30	$157.42
PN	80	150	$175.00	$180.00
PN9	80	160	$200.81	$204.86
PVC	80	180	$259.99	$265.24
STEEL	80	200	$305.00	$315.00
Unknown	60	225	$327.63	$335.00
oPVC	80	250	$394.57	$402.54
uPVC	80	300	$528.44	$539.11
		315	$570.00	$580.00
		375	$665.83	$679.28
		400	$720.00	$725.65

Table 5-8: WW points unit rates and life expectancy

Point Assets	2017 Unit Rates $/ea (without overhead)	2017 Useful Life Assumption
Boundary Kit	$228.29	80
Connection	$1,697.28	80
Dummy Node	$0.00	80
FlushPoint	$228.29	80
Grinder Pump	$6,500.00	25
Inspection Shaft	$1,527.11	80
Isolation Kit	$228.29	80
Lamp hole	$525.50	80
Maintenance Shaft	$3,142.45	80
Manhole - < 1m	$3,000.00	80
Manhole - > 4m	$3,650.00	80
Manhole - 1m-2m	$3,100.00	80
Manhole - 2m-3m	$3,350.00	80
Manhole - 3m-4m	$3,500.00	80
Manhole - Surface	$3,142.45	80
Meter	$1,985.12	20
Outlet	$420.40	80
Rodding Eye	$1,780.66	80
Sand Filter	$525.50	40
Storage Chamber	$1,051.00	40
Storage Tank	$1,051.00	40
Valve - Air	$1,238.80	40
Valve - Check Valve	$840.80	40
Valve - Flushing	$264.38	30
Valve - Heavy Duty Cover	$1,051.00	50
Valve - Isolation & Scour	$6,194.02	30
Valve - Non Return	$840.80	30
Valve - Scour	$6,194.02	30
Valve - Unkown	$6,194.02	30
Valve - Valve Chamber	$1,051.00	40
Valve Chamber	$1,051.00	40

Table 5-9- Electro-mechanical life expectancy

Pump Station and WWTP Life Expectancy	
Element	**Base Life (Yrs)**
Control telemetry	20-25
Electrical	20-25
Mechanical (pumps)	12-25
P/S structurual / civil	50
Oxidation Pond	50-80
Waveband	50
Magflow	20
Aerators	20-25
Telemetry	20
Note : The above relate to non-Mangawhai sites. Specific valuation data should be reviewed for Mangawhai.	

5.6 Notes on asset valuation

5.6.1 Replacement value

The replacement value is the cost of building the asset "today". In arriving at the value, it is assumed that modern construction techniques and modern equivalent materials are used but that the physical result replaces the asset as it exists.

Included costs

The replacement rates calculated include the following:

- Material supply and delivery;
- Labour;
- Plant costs;

- Contractor preliminary and general costs; and
- Engineering costs have been added to the estimated base rate to cover such things as detailed design, surveying, project management and construction supervision based on ACENZ guidelines.

Excluded costs

The replacement rates used in the revaluation exclude the following:

- GST;
- Council corporate overheads;
- Investigation and feasibility costs; and
- Borrowing costs during construction (these costs generally apply to large projects having a construction period of over one year. KDC projects are generally small and have maximum construction periods of only two to three months). In addition, Public Benefit Entities are given the option, under IAS 23 (borrowing costs), whether to exclude or include borrowing costs. KDC has opted to exclude borrowing costs.).

5.6.2 Depreciated replacement cost

Depreciated replacement cost is the estimate of the current replacement cost of assets less allowance for physical deterioration, optimisation for obsolescence and relevant surplus capacity.

5.6.3 Depreciation

Depreciation is a systematic allocation of the depreciable amount of an asset over its estimated useful life. Thus, depreciation only applies to those assets with finite lives. Assets with indefinite lives e.g. earthworks and wetlands are not depreciated. Straight-line depreciation is used in this revaluation.

5.6.4 Annual depreciation

The annual depreciation is the amount the asset depreciates in a year. It is defined as the replacement cost divided by the adjusted total useful life for the asset.

5.6.5 Residual value

The residual value is the value of the asset when it reaches the end of its life. For the purposes of this revaluation it is assumed that all assets (except land) have no residual value.

5.6.6 Useful lives

Useful lives are explained and detailed in the individual component revaluations.

5.6.7 Minimum remaining useful life

The minimum remaining useful life is applied to assets that are near or have past than their useful life. It recognises that although an asset is near or older than its standard useful life it may still be in service and therefore have some value. Where an asset is near or older than its standard useful life (i.e. remaining useful life is less than the minimum remaining useful life), the minimum remaining useful life used in the calculation of the depreciated replacement cost.

5.6.8 Data confidence

The following tables were extracted from the 2017 OPUS Valuation report regarding the data confidence limits of the valuation.

Table 5-10: Data confidence extract from OPUS report

4.2. Confidence Ratings

Confidence ratings were assigned to the source data and unit cost rates and to other items as appropriate. The confidence ratings used are summarised in Table 4.2 below.

Table 4.2: Confidence Ratings

GRADE	LABEL	DESCRIPTION	ACCURACY
A	Accurate	Data based on reliable documents	±5%
B	Minor inaccuracies	Data based on some supporting documentation	±15%
C	Significant data estimated	Data based on local knowledge	±30%
D	All data estimated	Data based on best guess of experienced person	±40%

4.3. Confidence Levels

The major above ground water utilities asset registers were checked by an onsite asset inspection as part of this valuation. With consideration of this and the other data used for this valuation, an overall confidence rating of A-B (±10%) has been assigned to the 2017 valuation.

The breakdown of this is set out in the following table.

Table 5-6: OPUS data confidence rating

Asset group	Asset	Quantity	Replacement cost	Life expectancy	ODRC
Wastewater	Pipes	A-B	B	B	B
	Points	A-B	B	B	B
	Plant	B	B	A	B

6 Financial and lifecycle strategy and management

6.1 Lifecycle management plan

6.1.1 Introduction

This section identifies Council's strategy for managing, maintaining and renewing its wastewater assets. The strategies described within this section have been developed to achieve the LOS identified in Proposed LOS and performance measures s2.12 of this AMP.

Management of the lifecycle of each asset should optimise performance whilst minimising the total lifecycle costs of both the reticulation and treatment systems. The management process balances the various competing demands and investigates the capacity and performance constraints of each component to establish a regime to achieve the overall objectives.

The objectives of each Lifecycle Management Plan are to:

- Optimise performance; and
- Minimise total lifecycle costs.

Whilst this section notes the generic strategies used by Council, it is supplemented by specific strategies for each scheme detailed in the sections that follow.

This section identifies Council's strategies and programmes for managing, maintaining and renewing assets within its wastewater schemes. The programme described within this section has been developed to deliver the LOS identified in s2.12 of this AMP.

The Lifecycle Management Plan for each asset component incorporates the following strategies:

- Operations and maintenance strategies to keep the assets operational;
- Renewal strategies to replace assets as they reach the end of their useful life;
- New asset strategies to address growth and demand;
- Decommissioning/disposal strategies for when the asset is no longer required; and
- Work programmes and the associated financial forecasts for each scheme.

6.1.2 Design parameters

The design parameters for all new Council wastewater assets are set out in Council's Engineering Standards 2011. The key design assumptions include the following:

- Number of persons per household equivalent – 4;
- Average dry weather flow – 210 litres per day per person;
- Industrial flow and trade waste shall be calculated as follows:
  - When the industrial waste and trade waste from a particular industry are known, these shall be used for the reticulation design; and
  - When this information is not available, the dry weather flow rates shown in Table 6-1 may be used as a design basis for industrial area.

Table 6-1: Default Dry Weather Flows from Industrial Areas

Minimum design flow	Flow rates (l/s/ha)
Light water usage	0.4
Medium water usage	0.7
Heavy water usage	1.3

6.1.3 Work categories

The lifecycle management strategies are divided into the following five work categories:

Asset operations: These are the active processes of utilising an asset which will consume resources such as manpower, energy, chemicals and materials. The Operations category also incorporates funding to address the AMIP actions and the provision of professional services. The AMIP is generally focused on a three year timeframe (covering the lifespan of this AMP) with a nominal allowance for years 4-10. As the actions in the programme are addressed, and the AMP reviewed, new initiatives will be identified and added to the programme and budgets will be revised accordingly.

Asset maintenance: The ongoing day-to-day work activity required to keep assets serviceable and prevent premature deterioration or failure. Three categories of maintenance are carried out:

- **Planned maintenance**: Work carried out to a predetermined schedule (e.g. pump station inspection, mains scouring) or programmed as a result of identified needs (e.g. pump overhaul);
- **Preventative maintenance**: Work additional to scheduled inspections and maintenance identified during inspections as essential to continued operation; and
- **Responsive maintenance**: Work carried out in response to reported problems or defects (e.g. repair burst rising main).

Asset renewal: Major work that restores an asset to its original capacity or the required condition. This includes both planned and reactive renewals.

New capital: This section of the AMP covers tactics for the creation of new assets (including those created through subdivision and other development) or works which upgrade or improve an existing asset beyond its existing capacity or performance in response to changes in supply needs or customer expectations.

Development works fall into two separate categories as follows:

- Council funded; and
- Developer funded as part of subdivision development or by way of contributions.

Asset decommissioning/disposal: Decommissioning and disposal of assets when they are no longer needed. Assets may become surplus to requirements for any of the following reasons:

- Under-utilisation;
- Obsolescence;
- Provision exceeds required LOS;
- Uneconomic to upgrade or operate;
- Policy change;
- Service provided by other means (e.g. private sector involvement); and
- Potential risk of ownership (financial, environmental, legal, social, vandalism).

Council currently obtains the day-to-day operational services for Wastewater through Contract 527 Water Supply and Wastewater Operations and Maintenance Services. This is managed by Council staff. The day-to-day operation work categories include:

- Routine work;
- Ordered work;
- Priority work; and
- Emergency work.

The relationship of each of these categories to the lifecycle management strategies together with a description of the work involved is shown in Table 6-2.

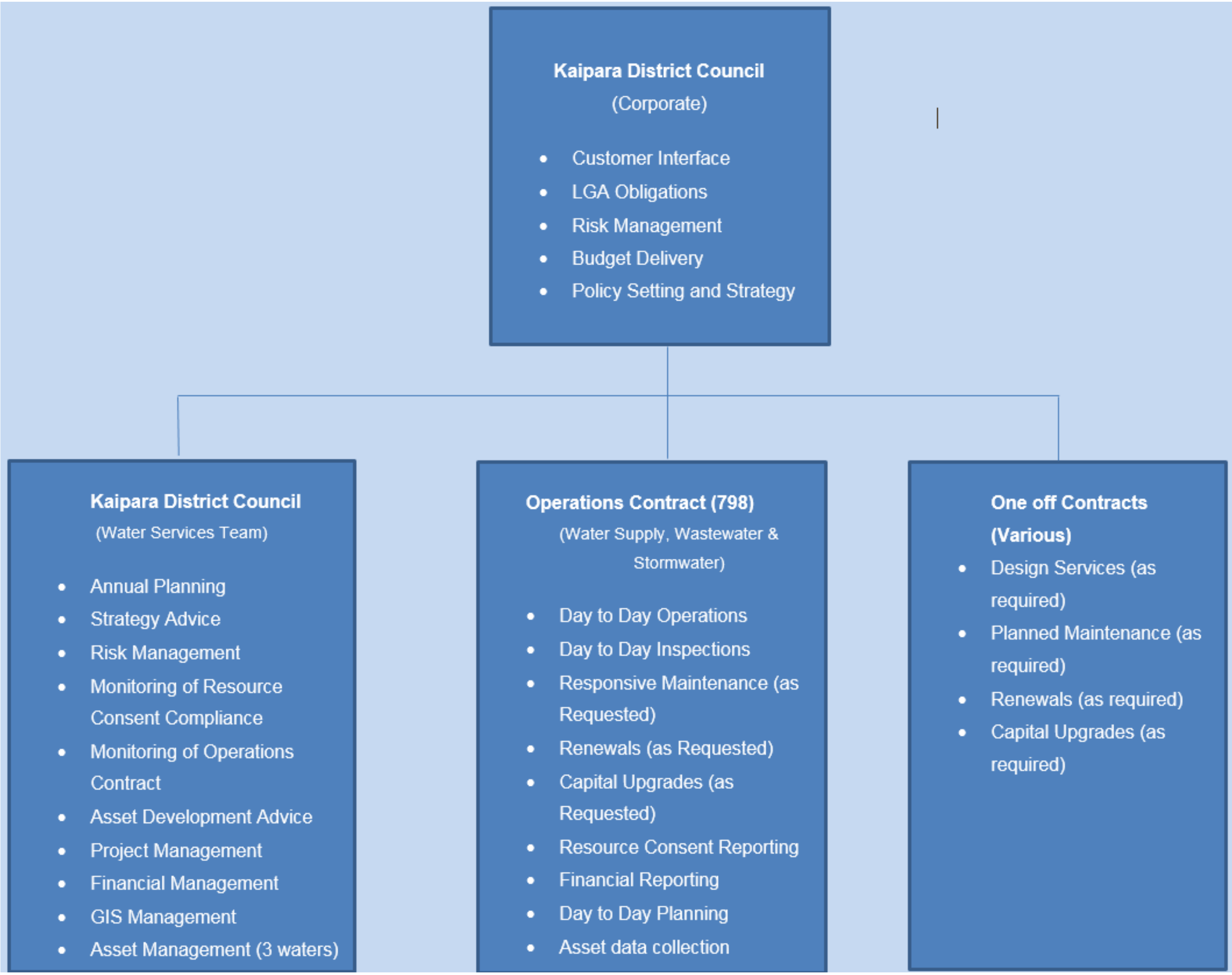
Table 6-2: Contract work group relationship with lifecycle management strategies

Contract work category	Description of works	Planned Maintenance	Preventative Maintenance	Responsive Maintenance	Asset Renewals Reactive
Routine work	Work carried out on cyclical basis.	X			
Ordered work	Specific order issued by Engineer.		X	X	X
Priority work	Urgent routine or ordered work to address operational issues.	X	X	X	X
Emergency work	System malfunction, service disrupted.			X	X

6.1.4 Contractual setting

Council continues to build its internal capacity to act as a 'smart buyer' in relation to AM and the overall operation of the water services. In July 2017, a new operations and maintenance contract commenced with Broadspectrum. Additional services to support the Water Services team will be procured on an 'as required' basis and may include investigation and design services. The various functions are noted in Figure 6-1 below. The figure refers to the previous Contract 527 but has not otherwise changed.

Figure 6-1: Contractual setting



The Operations contract delivers the lifecycle management outcomes on a day-to-day basis. The specification of the Operations contract incorporates the various inspections that monitor asset condition/capacity and provide the basis for programmed maintenance. The frequency of the programmed inspections regime is established in the specification of the Operations contract. This is supplemented as required by inspections generated from Council's customer Help Desk system.

When programmed inspections are undertaken by the Operations contractor, the act of inspection may initiate a series of responses based on the observations of the contractor. These could include:

- Programmed maintenance tasks, based on usage or time;
- Responsive maintenance based on condition or capacity;
- Planning of a Preventative Maintenance Response based on a prediction of future failure;
- Reporting for upgrading or renewal through to the professional services provider. This occurs when the scope of the intervention is not covered by the Operations contract and requires consideration of alternatives (upgrades) or prioritisation within existing budgets (renewals;
- Ad-hoc inspections of breaks or infrastructure that allow an opportunity to inspection reticulation when responding to an incident; and
- Collection of data from inspections and interventions for incorporation into Council's GIS system

The inspections are recorded in either onsite logs or the monthly report that is forwarded to Council. Any key actions are discussed at monthly contract meetings between Council, the professional service contractor and the operations contractor.

These monthly meetings are also supplemented with quarterly Utility Improvement meetings where the performance of the system is reviewed and a more strategic review of performance is undertaken to aid the annual planning process for the next financial year. These meeting will review issues that have arisen over the past period and assess current programmes and budgets. This may lead to the re-evaluation of the following years Annual Plan or, in extreme cases, initiate a review within the current financial year to address critical infrastructure issues.

6.1.5 Environmental compliance

Council holds resource consents for all its wastewater treatment facilities. A list of the consents is included in Appendix B. The discharges from these facilities are monitored by NRC. KDC works closely with NRC in monitoring the performance of wastewater assets.

The day-to-day monitoring of performance of wastewater systems is a requirement of the operations contract. This is in turn monitored by the professional services contract. Where resource consent non-conformances are observed by either supplier, the non-compliances are reported to both NRC and KDC. This will in turn be reported in the Annual Report.

6.2 Maintenance and operating strategy and expenditure forecast

6.2.1 Strategy

Table 6-3 shows the Council maintenance and operating strategies to ensure that the defined LOS are provided. The table shows the key service criteria affected and mode and impact of failure if the action is not carried out.

Table 6-3: Maintenance and operating strategies for WW assets

Activity	Strategy	Service criteria	Impact
General maintenance.	Council will maintain assets in a manner that minimises the long term overall total cost while ensuring efficient day-to-day management.	Maintaining existing LOS. Cost/affordability.	Low – Medium Increased overall costs and risk of failure.
Unplanned maintenance – disaster i.e. climatic event, major spillage, system malfunction.	Council will maintain a suitable level of preparedness for prompt and effective response to civil emergencies or system failures by ensuring the availability of suitably trained and equipped suppliers. Specifically: electrical contractors and water/wastewater works contractors.	Responsiveness.	Potential wastewater overflows to private property.
Unplanned maintenance – pump stations – blockages WWTPs and pump stations – mechanical or electrical failure	Provide a 24-hour repair service and respond to and repair or overcome broken or leaking pipes, power outages, and equipment or system failures.	Responsiveness. (Response time for unplanned priority works is 30 minutes in the Dargaville central business area and 1 hour for all other areas)	Medium – Wastewater Overflows.
Unplanned maintenance – pipelines – blockages, odour, pipe breaks	Sufficient spares to be stocked (by contractor) to address regular failures.	Responsiveness. (Response time for unplanned priority works is 30 minutes in the Dargaville central business area and 1 hour for all other areas)	Medium – Wastewater Overflows

Activity	Strategy	Service criteria	Impact
Planned inspections Pump stations, WWTP, pipelines	Council will undertake scheduled inspections in accordance with good industry practice and as justified by the consequences of failure on LOS, costs, public health, safety or corporate image.	Maintaining existing LOS Pump stations are inspected twice weekly (Dargaville PS01 daily) and oxidation ponds are inspected as follows: • Dargaville – twice weekly; • Glinks Gully and Kaiwaka – weekly; • Maungaturoto and Te Kopuru – twice weekly (summer) and weekly (winter).	Medium – Wastewater Overflows
Planned inspections	Modify the inspection programme as appropriate in response to maintenance trends.	Maintaining existing LOS.	
Planned – preventative maintenance pump stations, WWTPs, pipelines	Council will undertake a programme of planned asset maintenance to minimise the risk of critical equipment failure (e.g. pump overhaul) or where justified economically (e.g. Access Road re-seal).	Maintaining existing LOS. Cost/affordability.	Medium – Wastewater Overflows

Reticulation

The maintenance and operating strategy for wastewater reticulation is to retain the current LOS and acceptable level of risk while minimising costs. The strategies designed to meet the objectives of this AMP are described in Table 6-4.

Table 6-4: Pipeline maintenance and operating strategies

Asset failure mode	Action	Service criteria	Impact
Pipes – blockages,	Blockages to wastewater pipes cleared by rodding, root cutting or water blasting,	System capacity/reliability.	Medium – Reduced network capacity Wastewater Overflows
Reduced capacity,	Regular flushing by water blasting as identified by visual or video inspection.		
	Use of a suction truck to remove accumulations of material and raw wastewater.		

Asset failure mode	Action	Service criteria	Impact
Stormwater infiltration,	Video and smoke testing to identify illegal connections, breakages, obstructions and infiltration,		
Manholes infiltration, degradation,	All manholes inspected over a six year period to identify structural or infiltration problems.	System capacity/reliability.	Medium – Reduced capacity

Pump stations

The operating and maintenance strategy for pump stations is that all reasonable measures will be taken to ensure a continuous service is provided. The maintenance and operating strategies are summarised in Table 6-5.

Table 6-5: PS maintenance and operating strategies

Asset failure mode	Action	Service criteria	Impact
Pump stations – Mechanical or electrical failure.	Pump stations will be operated so that real time knowledge of flows and pumping hours can be obtained through the telemetry system.	Availability/reliability	Medium – Wastewater Overflows
	The pump stations will be inspected twice weekly to ensure pumps are operating satisfactorily.	System capacity	
	Annual mechanical overhaul, electrical check and general operational check of facilities.	Availability/reliability	
Pump stations complaints of odour.	Check ozone units for odour control (where applicable), twice weekly (daily for PS1) pump out wet wells and hose down grease and sludge.	Customer service	Low – Complaints on odour

The inspection requirements for pump stations required by the maintenance contract are detailed below, with the frequency noted as twice weekly, with the exception of the Dargaville PS1 which has a daily inspection frequency:

- Log book completed including pump hours and AMPs drawn while running;
- Check operation of all pumps and clear blockages;
- Check ozone units and/or odour control devices;
- Pump out and clean wet wells, remove all grease and sludge;
- Record evidence of overflows and advise of damage or impact, advise NRC;
- Test alarms; and
- Download telemetry data and record any relevant information for monthly report.

This inspection programme is supplemented by more detailed annual inspection that is used to determine any renewal or upgrading requirements. The timing of the annual inspection is undertaken to enable the results of the inspection to be incorporated into the annual planning round.

The annual inspection includes:

- Detailed mechanical check of all pumps, motors and valve gear;
- Electrical check of all electrical equipment;
- Review of all telemetry;
- Maintenance of accesses, water-blasting of the wet well and removal of accumulated debris;
- Preparation of a report to note maintenance, renewal and upgrading requirements;
- To date maintenance of pump stations has been restricted largely to where a problem obviously exists. Diagnosis of problems other than by cursory inspection has been very restricted; and
- Pump station maintenance is currently conducted only on ‘essential’ or ‘critical’ equipment on a contract basis. All maintenance work is carried out by the Utilities Contractor. Emergency work is also undertaken under this contract and is commenced upon notification received from the Help Desk or SCADA-GSM alarm. Other upgrades are contracted separately in accordance with the technical demands of the work.

Treatment

Each WWTP is operating under a resource consent approved by NRC. This considers the various legislative requirements along with the views of the community. During the consent application process, Council will liaise with the various affected parties and particularly the Department of Conservation and relevant Iwi groups.

The Operational Plan will be driven by resource consent conditions in the first instance and then the technical requirements of each system. Typical considerations include:

- Monitoring the quality of effluent discharge;
- Control of the quantity of discharge;
- Monitoring the operation of the plant in terms of odour or appearance;
- Control of vegetation;
- Amenity issues relating to operation; and
- Reporting performance to NRC.

With the negotiation of trade waste agreements it will be necessary to add requirements to monitor the quality of the effluent coming into WWTPs from various commercial users.

The majority of the WWTPs in the Kaipara district are very simple operations and require only periodic inspection to ensure continuous operation. Human input is limited to:

- Cleaning and calibrating equipment;
- Remove floating debris from the oxidation pond;
- Regulate the operation of the aerators to achieve desired levels of dissolved oxygen;
- Remove any build-up of weeds;
- Testing oxidation pond parameters; and
- Unblocking spray system.

The exception is the Maungaturoto membrane filtration plant, which requires a number of additional operation/maintenance tasks.

The maintenance and operating strategies for WWTPs are summarised in Table 6-6.

Table 6-6: WWTP maintenance and operating strategies

Asset failure mode	Action	Key service criteria	Impact
WWTP – treatment process not effective.	Regulate dissolved oxygen levels through use of the aerators.	System effectiveness.	Medium/High.
	Monitor effluent pH levels.		Abatement notice for non-complying discharge.
Cost efficiency.	The plant will be operated to minimise electricity and maintenance costs while achieving effluent quality standards.	Cost/affordability.	Low – increased costs.
Mechanical equipment.	Regularly check the operation of mechanical assets and on monthly basis, service the aerators and arrange repairs as required by the contract. Monitor spray irrigation system and unblock as required.	Reliability	Medium/High.
Premature failure.			Abatement notice for non-complying discharge.

6.2.2 Expenditure forecast

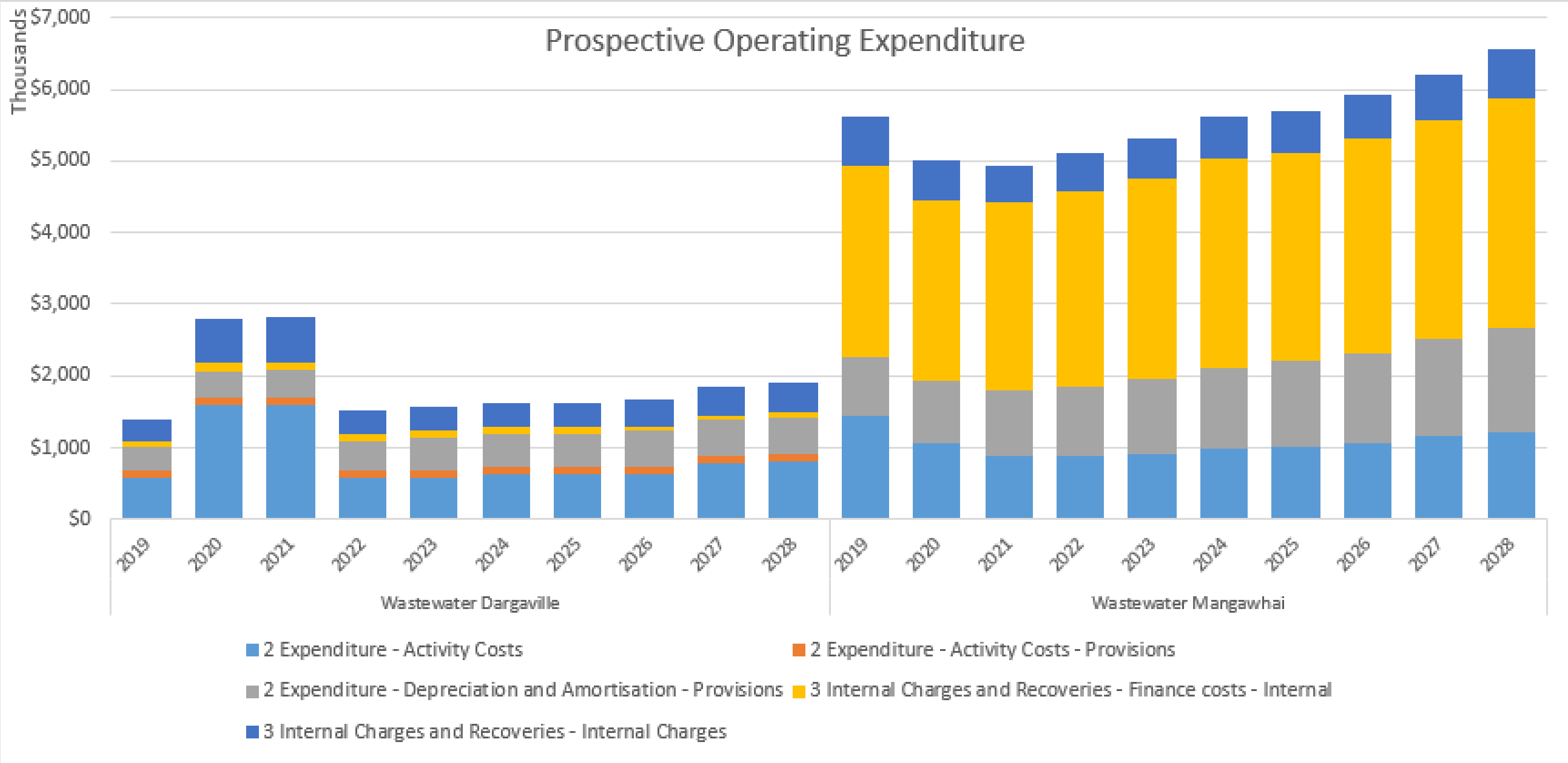
The 10 year forecast for operations and maintenance costs for wastewater assets in the Kaipara District are shown in the following graphs.

They do not provide for inflation over the 10 year period and do not include the following :

- Costs that would be allocated by Finance including depreciation, interest charges, write-offs and land rates payable for land occupied by facilities
- Costs associated with Water Services staff

The graphs do not differentiate between operational and maintenance costs as this distinction is somewhat arbitrary and does not provide useful information.

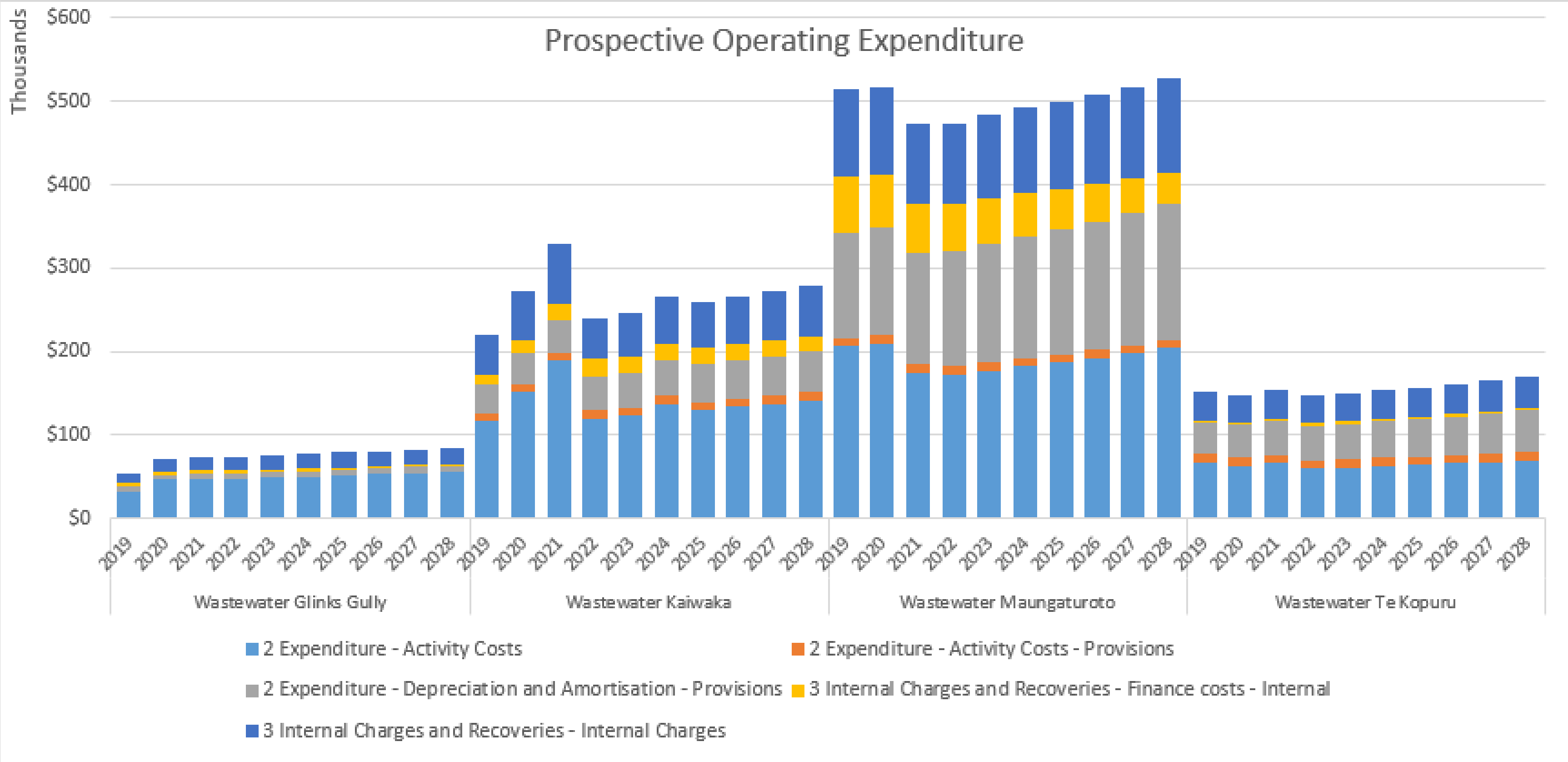
Figure 6-2: 10yr operating cost projections for Dargaville and Mangawhai



The cost spike for Dargaville as shown above relates to funds allocated over two years for pond desludging.

The gradual increase for Mangawhai reflects population growth influence on maintenance and operating costs and growth in power costs reflecting population growth and recent increases in power cost above the rate of inflation.

Figure 6-3: 10yr operating cost projections for small schemes



Variations over the first three years for all the small systems reflect activity in Management Services budgets for asset condition investigations and capacity assessments.

Details of the 10 year operational cost forecasts are included in Appendix A.

6.3 Renewals strategy and expenditure forecast

6.3.1 Strategy

Renewal expenditure is major work that does not increase asset design capacity but restores, rehabilitates, replaces or renews an existing asset to its original capacity. Work over and above restoring an asset to original capacity is 'new works' expenditure.

Council's renewal strategy is focused on a "just in time" approach; to rehabilitate or replace assets when justified by condition and where there is a significant reduction in performance or where justified by the asset's criticality.

The current lack of data relating to asset condition, performance and/or maintenance history prevents Council from developing a renewal strategy based on these criteria. Consequently, the current renewals programme is broadly based on asset life, further modified through local knowledge and experience gained from the maintenance contract staff and local resources on asset performance. Council's current renewal strategy is presented below.

Assets are considered for renewal as they near the end of their effective working life or where the cost of maintenance becomes uneconomical and when the risk of failure of critical assets is sufficiently high.

Council's renewal programme has been developed by:

- Taking asset age and remaining life predictions from the valuation database, calculating when the remaining life expires and converting that into a programme of replacements based on valuation replacement costs; and
- Reviewing and justifying the renewals forecasts using the accumulated knowledge and experience of asset operations and AM staff. This incorporates the knowledge gained from tracking asset failures through the customer services system, known location of pipe breaks and overflows, and contractor knowledge.

When justifying renewals the following factors are considered:

- **Asset performance**: Renewal of an asset when it fails to meet the required LOS. The monitoring of asset reliability, capacity and efficiency during planned maintenance inspections and operational activity identifies non-performing assets. Indicators of non-performing assets include repeated and/or premature asset failure, inefficient energy consumption, and inappropriate or obsolete components.
- **Risk:** The risk of failure and associated financial and social impact justifies action (e.g. probable extent of damage, safety risk, community disruption);
- **Economics**: It is no longer economic to continue repairing the asset (i.e. the annual cost of repairs exceeds the annualised cost of renewal). An economic consideration is the co-ordination of renewal works with other planned works such as road reconstruction; and

- **Efficiency:** New technology and management practices relating to increased efficiencies and savings will be actively researched evaluated and, where applicable, implemented.

The renewal programme is reviewed in detail at each AMP update (three yearly) and every year the annual renewal programme is reviewed and planned with the input of the maintenance contractor.

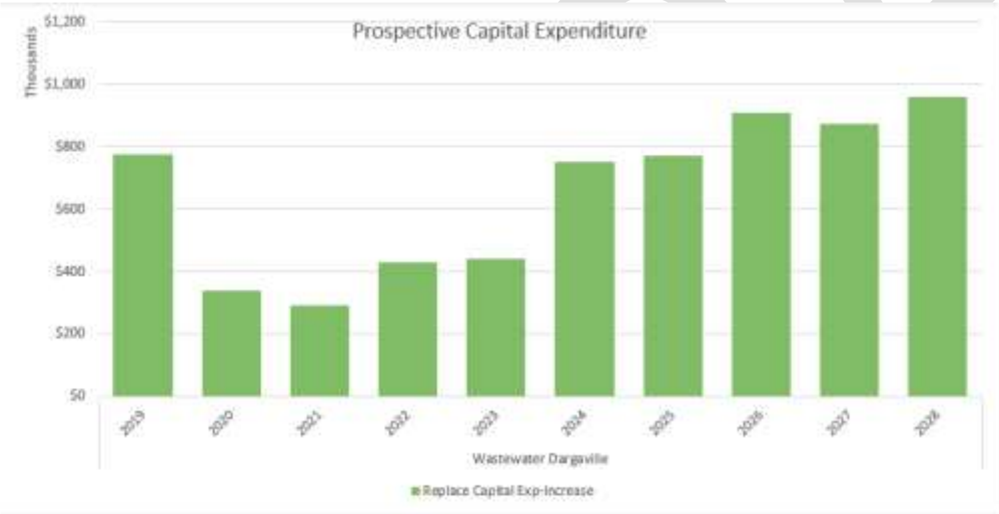
If work is deferred for any reason, this work will be re-prioritised alongside the next year's renewal projects and a revised programme established.

Renewal works identified by way of the above renewal strategies may be deferred if the cost is beyond the community's ability to fund it. This situation may arise if higher priority works are required on other infrastructure assets; short term peaks occur in expenditure or if an inadequate rating base exists.

When renewal works are deferred, the impact of the deferral on economic inefficiencies and the scheme's ability to achieve the defined service standards will be assessed. Although the deferral of some renewal works may not impact significantly on the short term operation of assets, repeated deferral will create a liability in the longer term.

6.3.2 Dargaville renewals

Figure 6-4: 10yr Dargaville projected renewals



Dargaville projected renewals over 10 years are visually represented above and in more detail in the financial tables in Appendix A of this document.

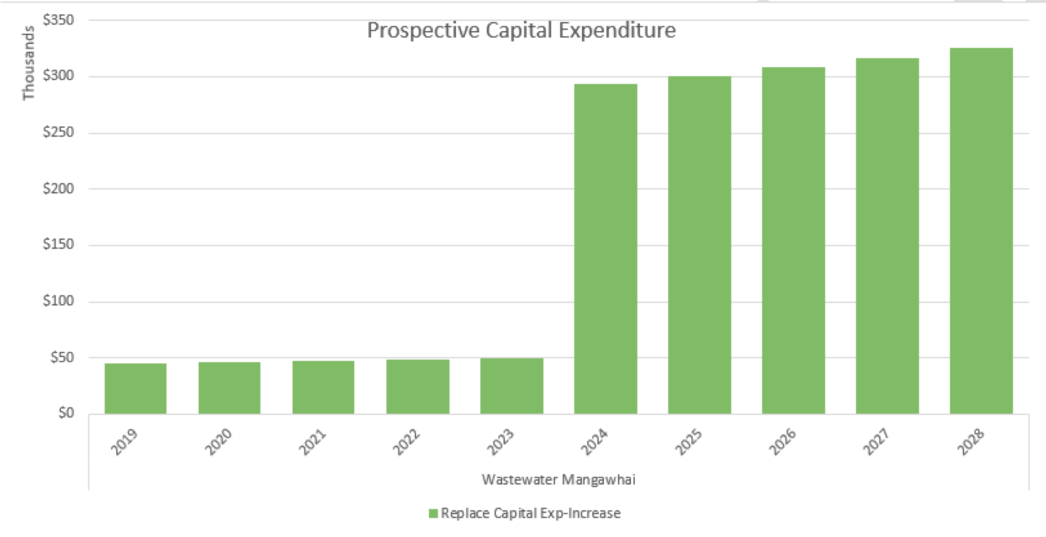
Reticulation –Reflects the expected need to renew the oldest GW pipes in the system with an expected life of 80 years. Revising the expected life of AC pipes to 60 years, from 40 years, has pushed the renewal expectation for these pipes out beyond the 10 year forecast.

Pump stations and rising mains – Dargaville has a large number of pump stations and renewal expenditure is forecast over 10 years. The major upgrade of PS1 and PS2 is included as a LOS project. Renewal expenditure is to provide for ongoing minor renewals as required.

Treatment –Desludging of the ponds is provided for in operational expenditure. Renewal expenditure is to provide for ongoing minor renewals as required.

6.3.3 Mangawhai renewals

Figure 6-5: 10yr Mangawhai projected renewals



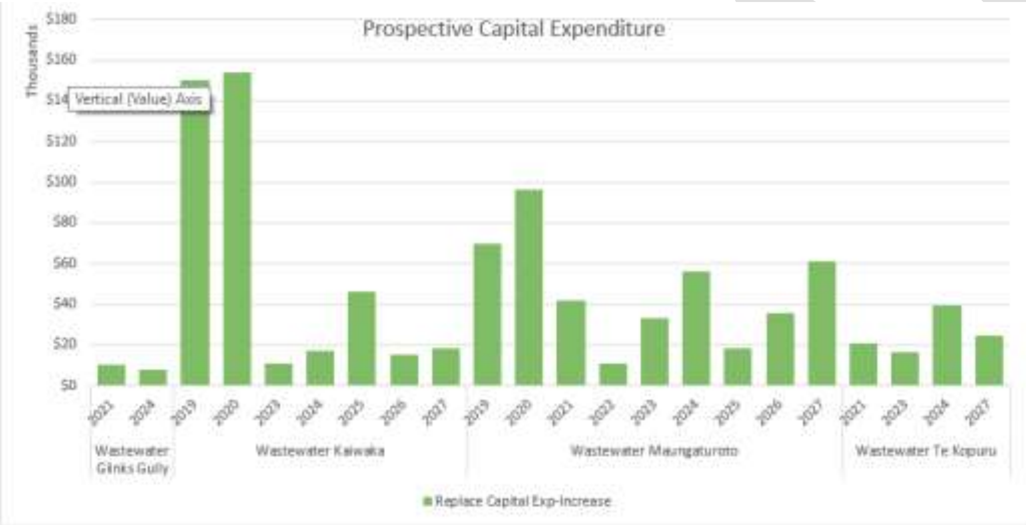
Mangawhai renewals are visually represented above and in more detail in the financial tables in Appendix A of this document.

Household pumps – Whilst the extent of this work is difficult to predict at this time. The work relates to the small pumps installed on properties for the pressure collection system which is believed to provide for some 300 households. Renewals are currently some $4,000 each and life expectancy is expected to be between 10 and 25 years. Many of the households connected to these pumps are holiday homes and it is not known if this will extend or shorten the expected life.

WWTP –Primarily relates to relatively short lived equipment that is part of the treatment process; some of which is already nominally overdue. This forecast is based on information contained in the asset valuation. A project is planned to look at this equipment in more detail and re-evaluate that likely renewal profile, and associated life expectancy of this equipment.

6.3.4 Small scheme renewals

Figure 6-6: 10yr small scheme projected renewals



Small scheme renewals are visually represented above and in more detail in the financial tables in Appendix A of this document:

Table 6-7: 10yr Small scheme renewal detail

Scheme	10 year renewals	Breakdown
Glinks Gully	As per table	Nominal provision for pump station and rising main renewals.
Kaiwaka	As per table	Nominal provisions for reticulation, pump station and treatment plant renewals.
Maungaturoto	As per table	Nominal provisions for reticulation, pump station and treatment plant renewals.
Te Kopuru	As per table	Nominal provisions for reticulation and treatment plant renewals.

6.4 New capital (asset creation, acquisition, enhancement) strategy and expenditure forecast

6.4.1 Strategy

New capital works are planned in response to identified service gaps, growth and demand issues, risk issues and economic considerations.

When evaluating significant development proposals, the following issues will be considered:

- The contribution the new or improved assets will make to the current and anticipated future LOS and community outcomes;
- The risks and benefits anticipated to be made from the investment;
- The risks faced by not proceeding with the development works. These could include safety risks, social risks and political risks;
- Ability and willingness of the community to fund the works; and
- Future operating and maintenance cost implications.

Significant development works will be prioritised and programmed with contributions from:

- Targeted user groups (e.g. special interest groups, industry groups, adjacent residents);
- The general community (through public consultation);
- Council staff and consultants that may be engaged to provide advice to Council;
- The LTP/Annual Plan process; and
- The elected Council (significant proposals are subject to Council decision and available funding).

When change within a community dictates changes to the infrastructure that services that community, Council will initiate preliminary studies to determine demand for a service or a change to the LOS provided to a community. To date the development of wastewater assets has largely been undertaken on a community by community basis.

Growth-related capital works are undertaken to extend the system to new properties or to provide additional capacity that is required to service those properties. It is important to separate out these costs as a portion of them may be recoverable as development contributions and it is also desirable that there is a degree of transparency in relation to what is being contributed by new residents versus existing residents.

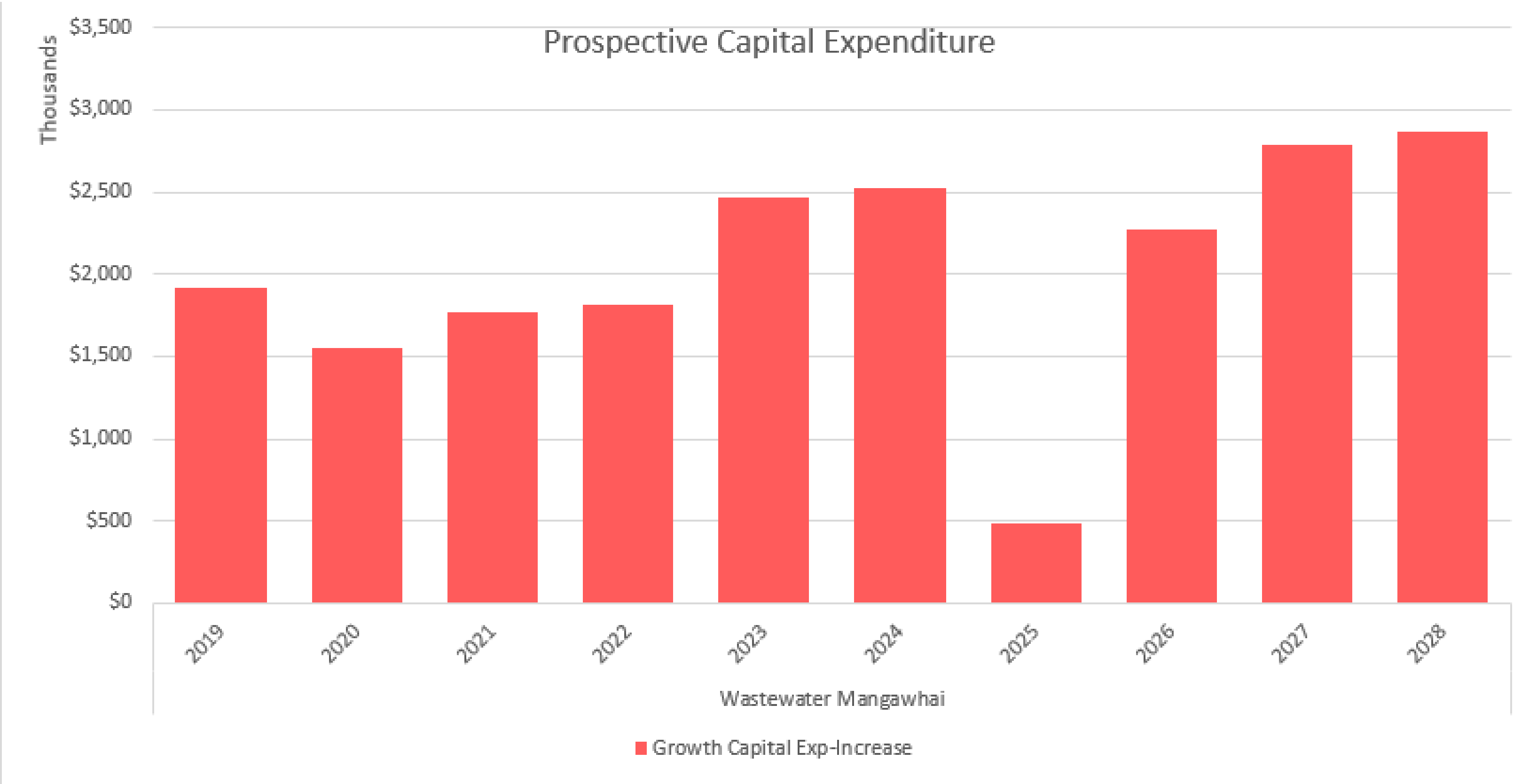
LOS capital works are undertaken when the current asset is not able to provide/perform the desired LOS. This may relate to capacity, capability, safety, appearance etcetera. This may be driven by legislation change, resource consent requirements or customer aspiration. Continuing with the existing asset will generate a LOS gap.

In some cases a particular project may have elements of growth, LOS change and renewal. For instance a WWTP upgrade may increase capacity (to provide for growth), improve the level of treatment to comply with consent requirements (LOS change) and renew equipment that is reaching the end its economic life (renewal). Council’s accounting rules will determine how this cost should be allocated as Council is required to report against these three drivers.

6.4.2 Growth CAPEX

The reported growth figures indicate that growth within reticulated communities in the Kaipara district will be low. There is no significant growth related projects in the district apart from Mangawhai.

Table 6-8: 10yr Mangawhai growth



It is anticipated that in the next 10 years, reticulation network of Mangawhai will grow significantly to cater for the growth. An investigation to identify the extensions necessary to the wastewater system to enable it to service most of the urban zoned area has been undertaken.

Various options were considered and **Option 2 : Reticulate pockets** is being pursued.

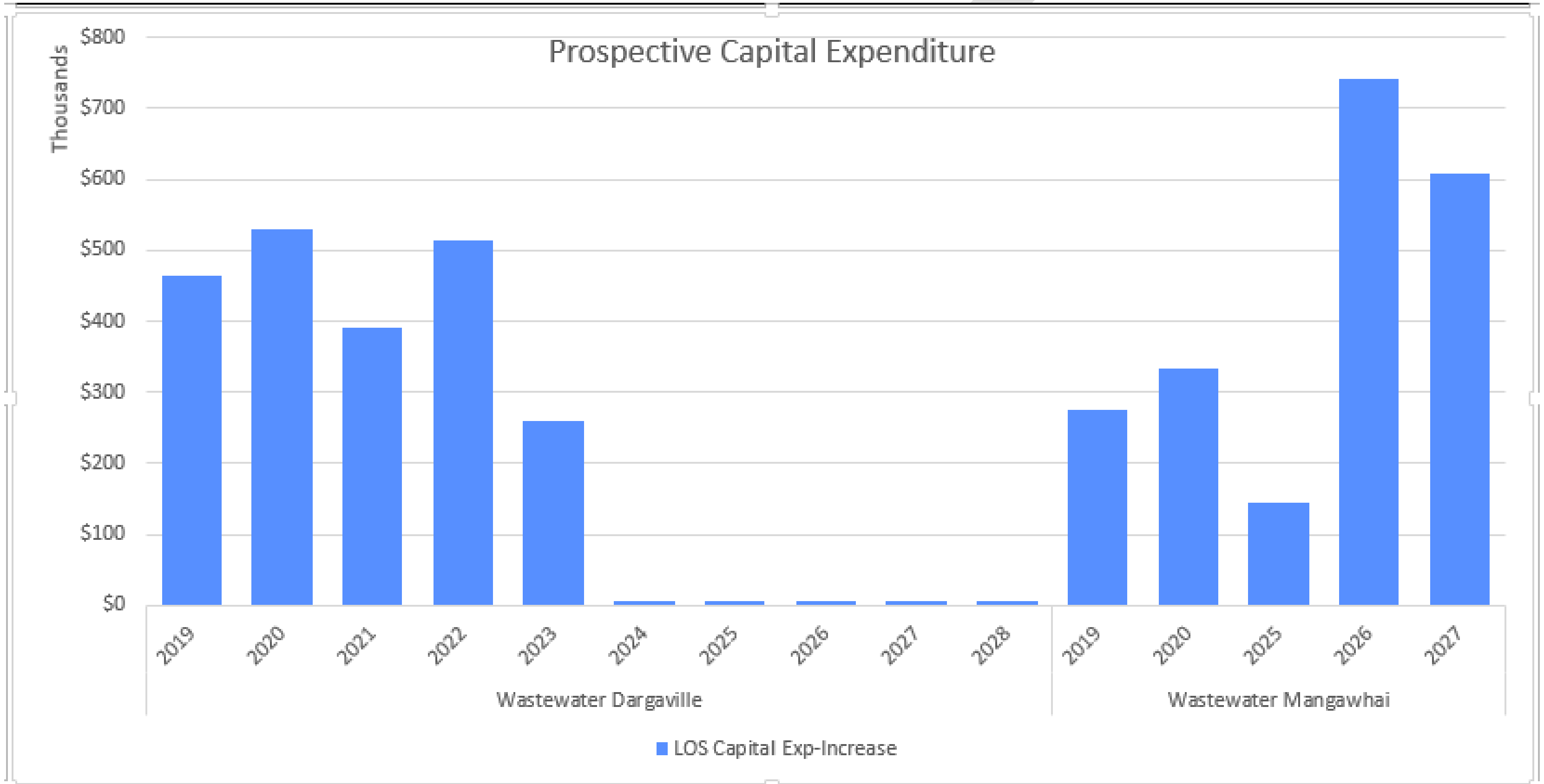
Table 6-9: 10yr Mangawhai growth detail

Item	Budget	Period
Extend irrigation system	As per table	2020/2021
Upgrade existing reticulation	As per table	Mostly 2019/2020
Extend reticulation	As per table	Evenly over 2020/2021 to 2030/2031
Upgrade WWTP	As per table	2018/2019 and 2019/2020
Additional capacity for growth – Council contribution	As per table	Evenly over 10 years

6.4.3 Level of Service (LOS) CAPEX

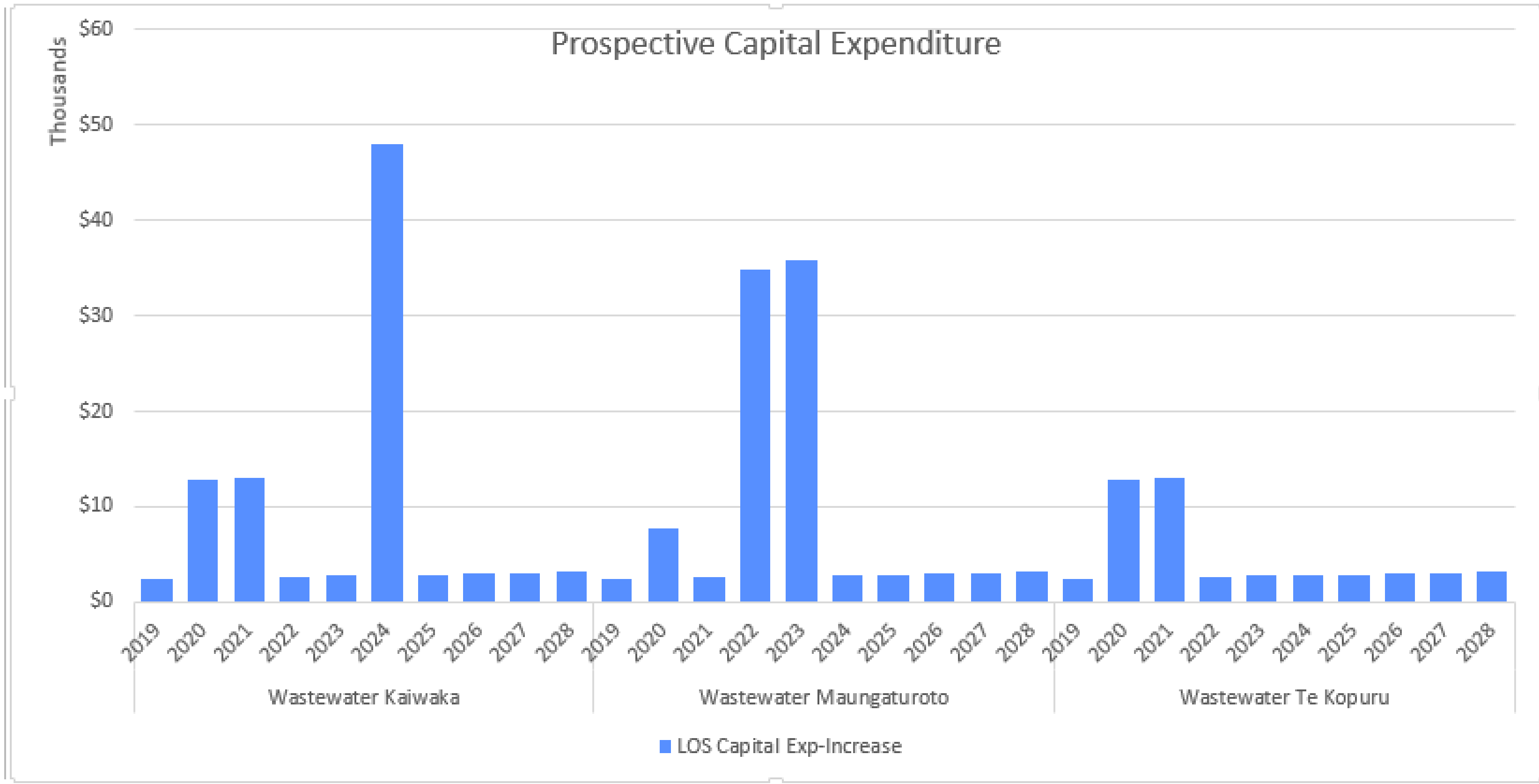
CAPEX related to LOS change is detailed below.

Figure 6-2: 10yr Dargaville and mangawhai LOS CAPEX



Dargaville and Mangawhai LOS CAPEX is shown above spread over 10 years. This is primarily associated with the upgrading of PS1 and PS2 and associated rising mains in Dargaville, and connecting current residents in Mangawhai to the existing WW scheme. While some of this can be associated with renewals the timing and nature of this project is primarily associated with reducing the number of wet weather overflows and this is a LOS driver. An amount of is also provided for installation of safety grilles on pump stations which is a safety enhancement.

Figure 6-3: 10yr small scheme LOS CAPEX



Small scheme LOS CAPEX over 10 years is shown above and in more detail in the tables in Appendix A :

Table 6-10: 10yr small scheme LOS detail

Scheme	10 year renewals	Breakdown
Kaiwaka	As per tables	SCADA upgrade for pump station Pond curtain for WWTP improvement Environmental compliance
Maungaturoto	As per tables	Pump station storage to improve wet weather containment (subject to capacity study Environmental compliance Grills on pump stations
Te Kopuru	As per tables	WWTP modifications (improve ammoniacal nitrogen removal) Environmental compliance

6.5 Asset decommissioning and/or disposal strategy and financial forecast

Council does not have formal strategy documents relating to asset disposals. When any such assets reach a state where disposal needs to be considered, Council will treat each case individually.

There are no current or planned areas of operation that Council wishes to divest itself of. Asset disposal therefore is a by-product of renewal or upgrade decisions that involve the replacement of assets.

Assets may also become surplus to requirements for any of the following reasons:

- under-utilisation;
- obsolescence;
- provision exceeds required LOS;
- uneconomic to upgrade or operate;
- policy change;
- service provided by another means (e.g. private sector involvement); and
- potential risk of ownership (financial, environmental, legal, social, vandalism).

Depending on the nature and value of the assets they are either:

- made safe and left in place;
- removed and disposed to landfill; and/or
- removed and sold.

Council follows a practice of obtaining best available return from the disposal or sale of assets within an infrastructural activity and any net income is credited to that activity.

As AC mains are replaced, they will often become an abandoned service, which then become the property of the roading authority and can be used as ducting for telecoms and other services.

Council propose to review the layout and hydraulic characteristics of the Dargaville wastewater network in order to identify opportunities to reduce the number of pump stations within the network. If any such opportunities do arise, the disposal of the pump stations will be considered at that time.

6.6 Depreciation (loss of service potential)

Service potential is defined as 'the economic benefit embodied in assets that over time declines as the assets age and deteriorate'. Depreciation is charged annually to recover from the users of services the equivalent annual decline in service potential. Renewals are undertaken to restore it. The loss (or gain) in service potential over time can therefore be described as the difference between the annual renewal and depreciation provisions.

If this figure is negative, the renewals undertaken in that year are lower than the financial depreciation. This would be expected when assets are young, but over the life of all assets the accumulated figure would be expected to be close to zero if the assets were being sustained indefinitely. Service potential is restored through renewals and is effectively funded through the annual depreciation charge.

The following graphs illustrate the renewal versus depreciation over 30 years based on the indicative extent of renewals indicated by the valuation information and then over 10 years based on actual renewals envisaged for this period (including the three years of the LTP).

They illustrate that over the next 10 years the depreciation charge exceeds that extent of renewals required over that period. Over 30 years the concentrated renewals associated with some of the smaller systems appears on the renewal profile and there will likely be five year periods where renewal expenditure exceeds the depreciation charges during that time. This illustrates the somewhat tenuous connection between renewals and depreciation. What is important is ensuring that Council has the financial capacity (from all funding sources) to undertake the necessary works as the need arises. This includes both operational and capital expenditure.

Previously, Kaipara district rates have not included a component for depreciation, meaning users of the asset were not contributing to the asset's eventual replacement costs. Council is now progressively moving towards a position whereby it is fully rate- funding depreciation.

Figure 6-4: 30yr depreciation vs projected renewals based on valuation data

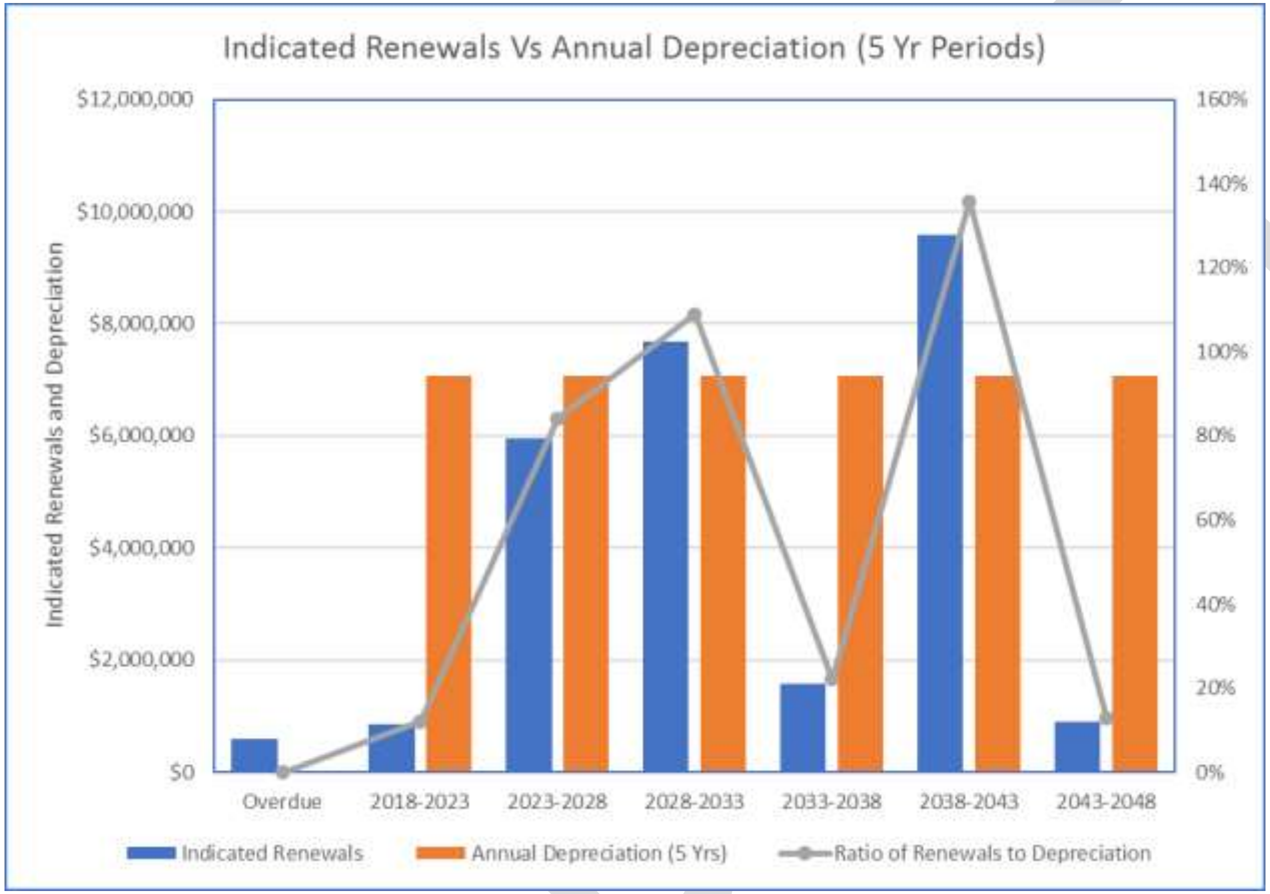
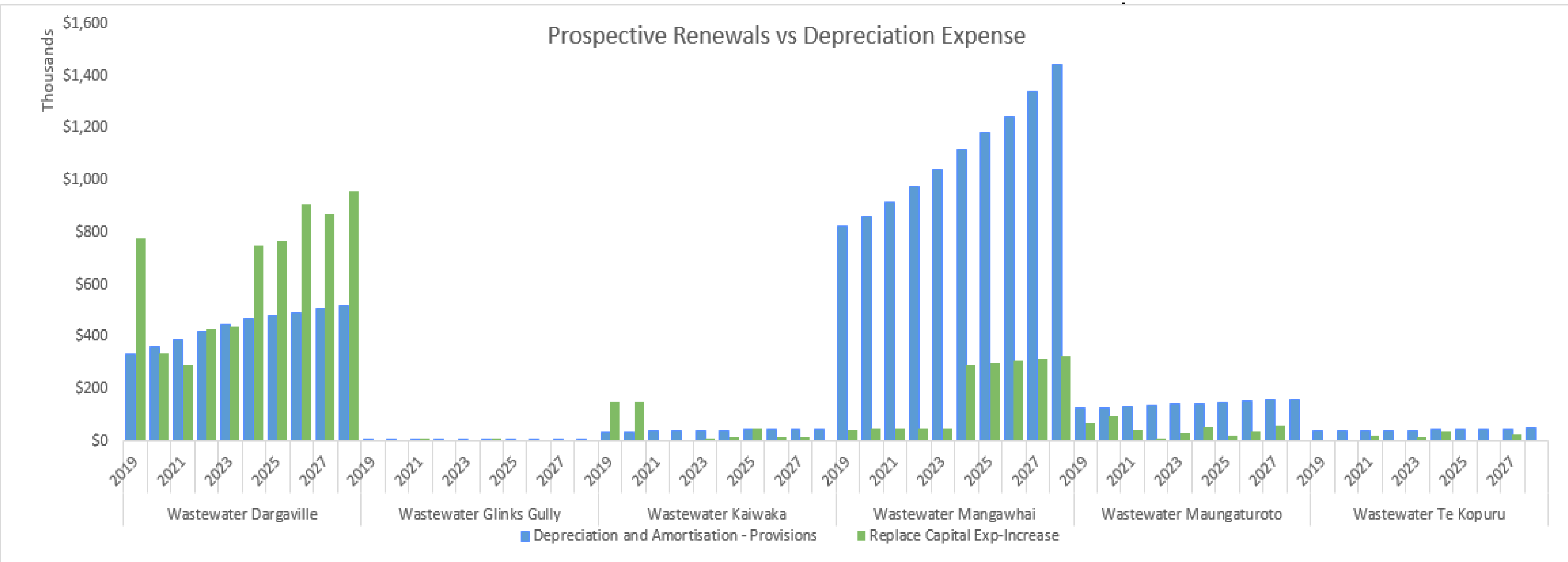
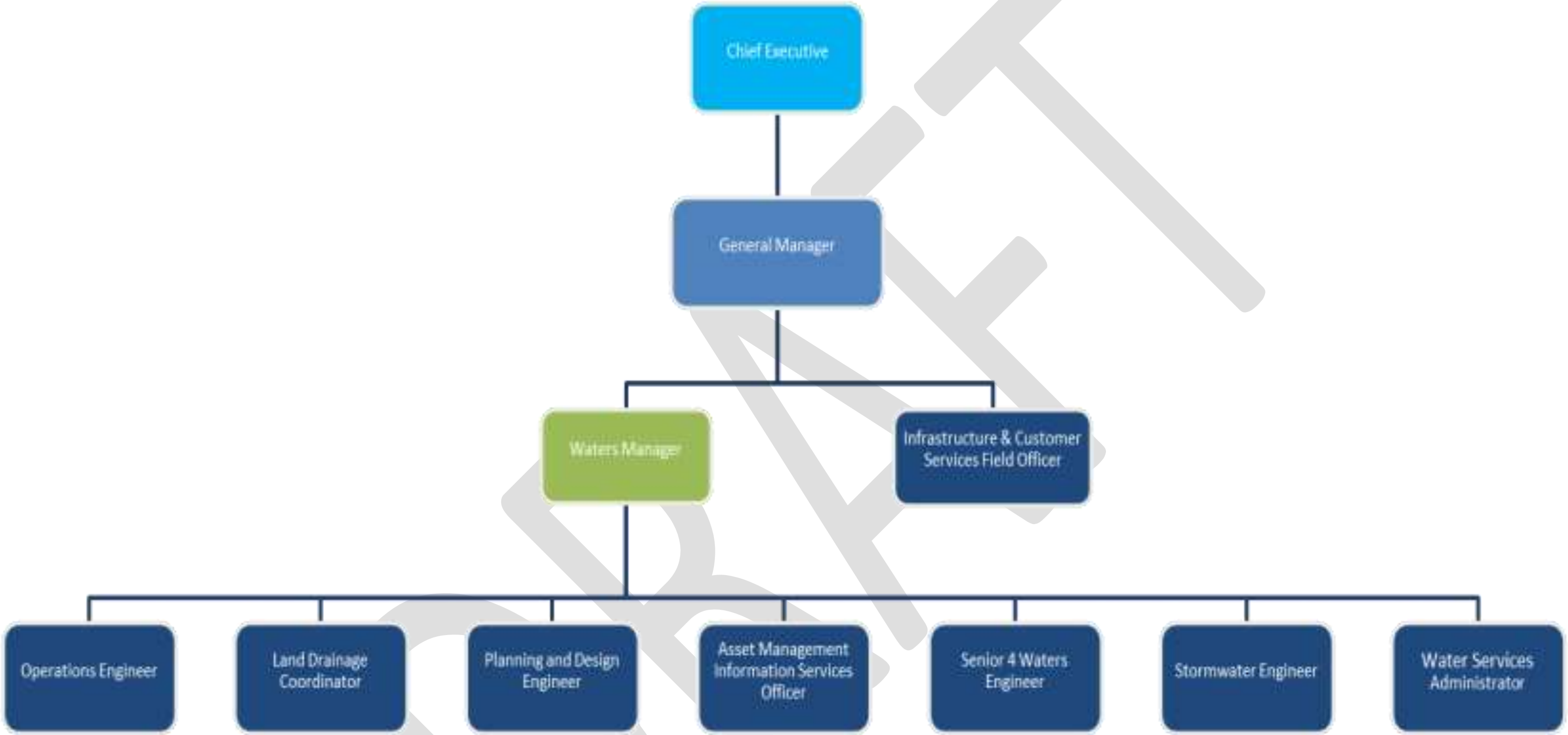


Figure 6-5: 10yr depreciation vs projected renewals



7 Organisation

Figure 7-1: Water Services Organisational structure



8 Asset management systems and processes

8.1.1 Asset management systems

Access to effective information systems is essential for asset managers to help them store and analyse asset information to make good AM decisions. Council uses the support tools listed in Table 8-1 to manage the wastewater business:

Table 8-1: AM support tools

System name	System purpose	Purpose
MapInfo (GIS)	Asset location	The location of assets are stored within tables and represented spatially via a series of points, lines or regions.
AssetFinda	Asset register	Details on the assets size, material, date of installation and other related information for water supply, wastewater and stormwater assets are recorded within AssetFinda.
NCS	Accounting	Council accounting and financial systems are based on NCS software and GAAP Guidelines.
Aquavision	Telemetry	The performance of the wastewater pumping stations is monitored via the Aquavision telemetry system.
Advanced information	Telemetry	The performance of the treatment plants and pumping stations is monitored via the advanced information telemetry system.
SCADA	Telemetry	Newly installed SCADA at various wastewater assets helps in daily operations of WWTPs and pump stations and also helps in meeting resource consent requirements.

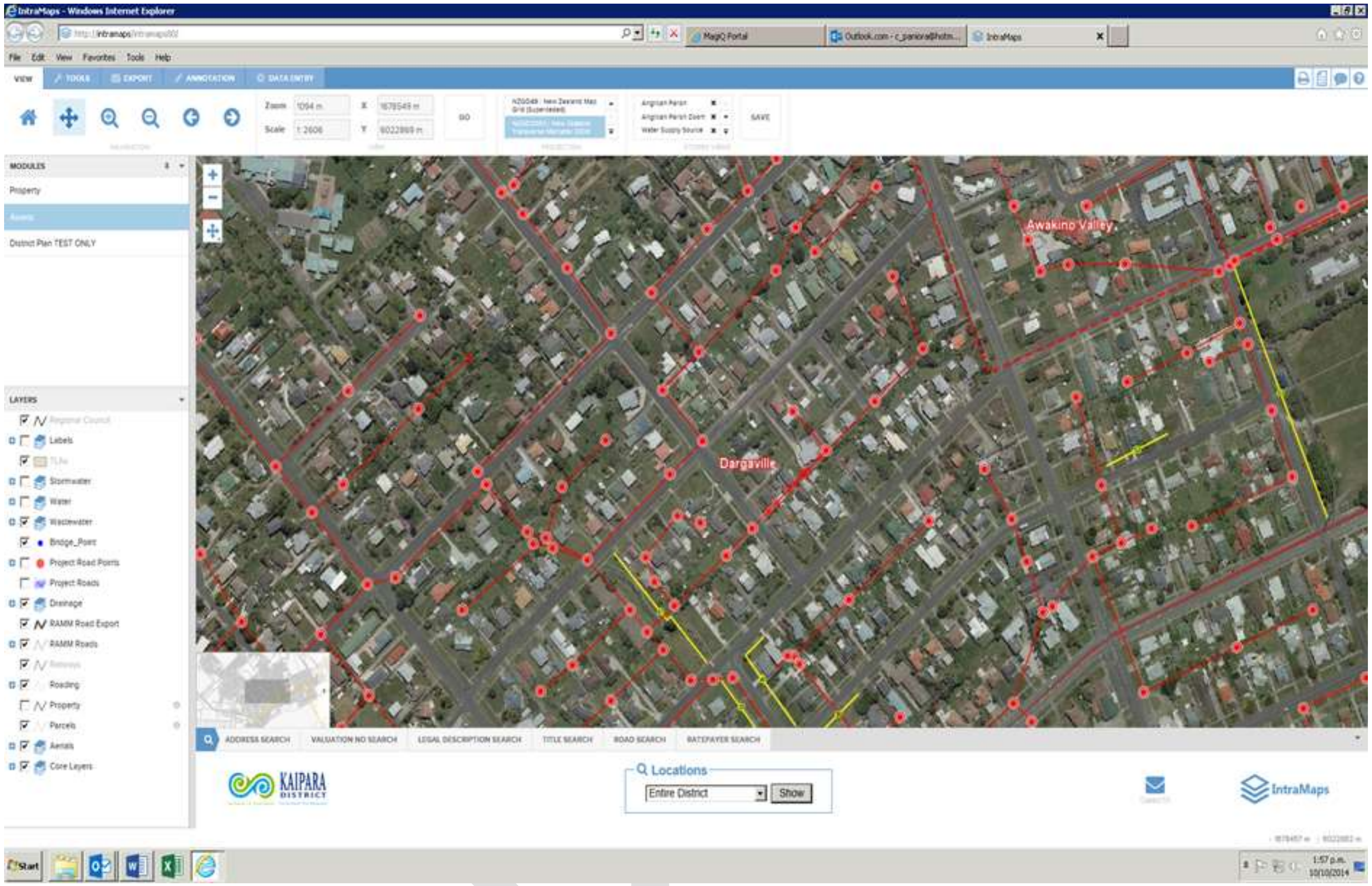
8.1.2 IntraMaps

The IntraMaps GIS system is the core system used to store and display the spatial data related to Council's water services assets i.e. water supply, wastewater and stormwater.

The MapInfo system provides the information supporting the IntraMaps system, which is widely used within Council as a user friendly interface to the GIS asset data, enabling quick access to asset location and asset attribute information.

A screenshot of the IntraMaps system is shown in Figure 8-1 below:

Figure 8-1: IntraMaps screenshot



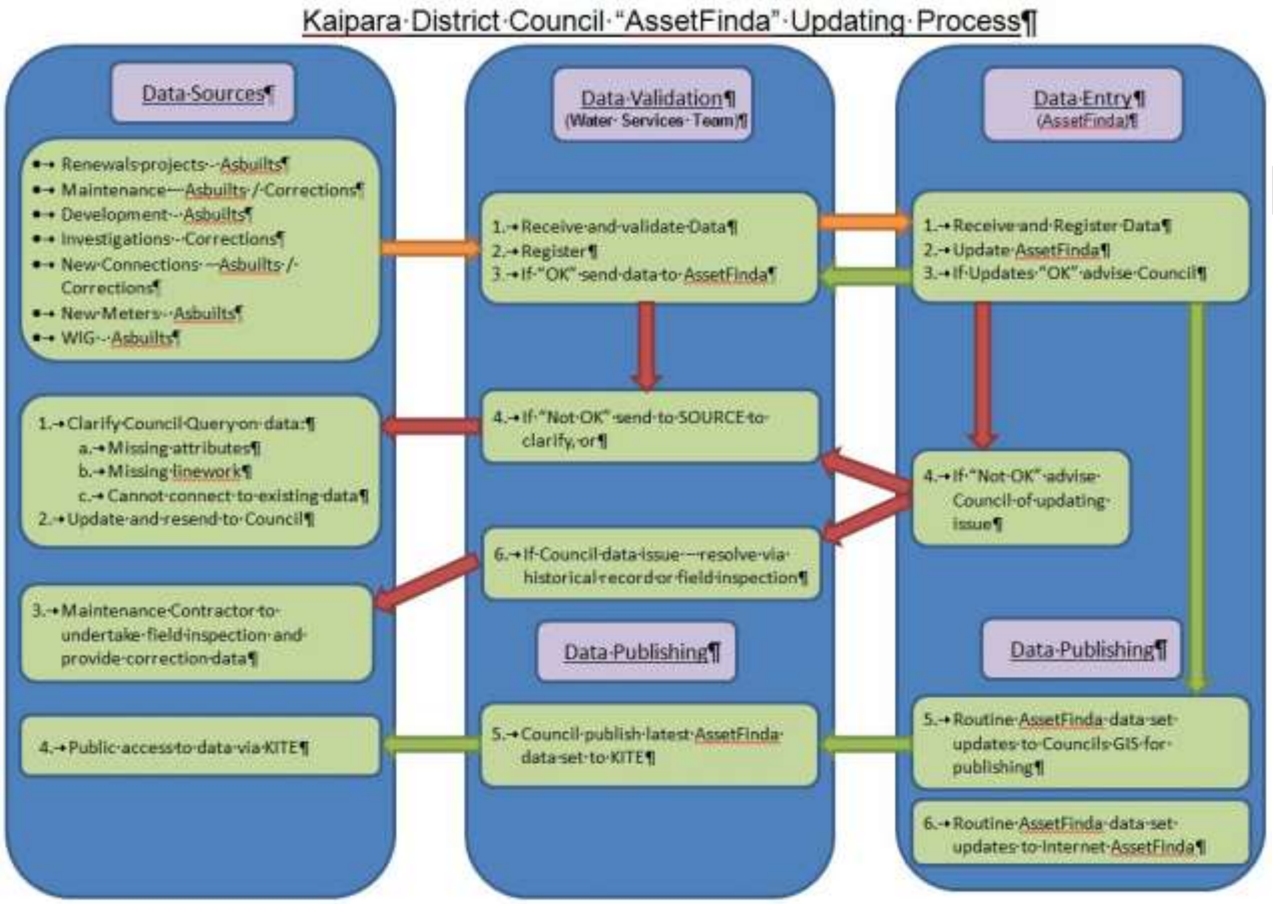
The representation of the assets within this system is believed to be reasonably comprehensive although gaps and inaccuracies in the data are known to exist. A data improvement task has been identified and included in the AMIP to investigate and resolve the known anomalies where possible.

Ongoing data improvement and identification and resolution of data anomalies will be resolved primarily through the maintenance contract and projects as works are completed on the network.

The MapInfo system is externally hosted and is updated as as-built information is received, and passed on via the data maintenance process. As-built data is sourced from new development, capital works projects and from the Maintenance Contractor.

The data maintenance process is represented in Figure 8-2 below.

Figure 8-2: Data maintenance process



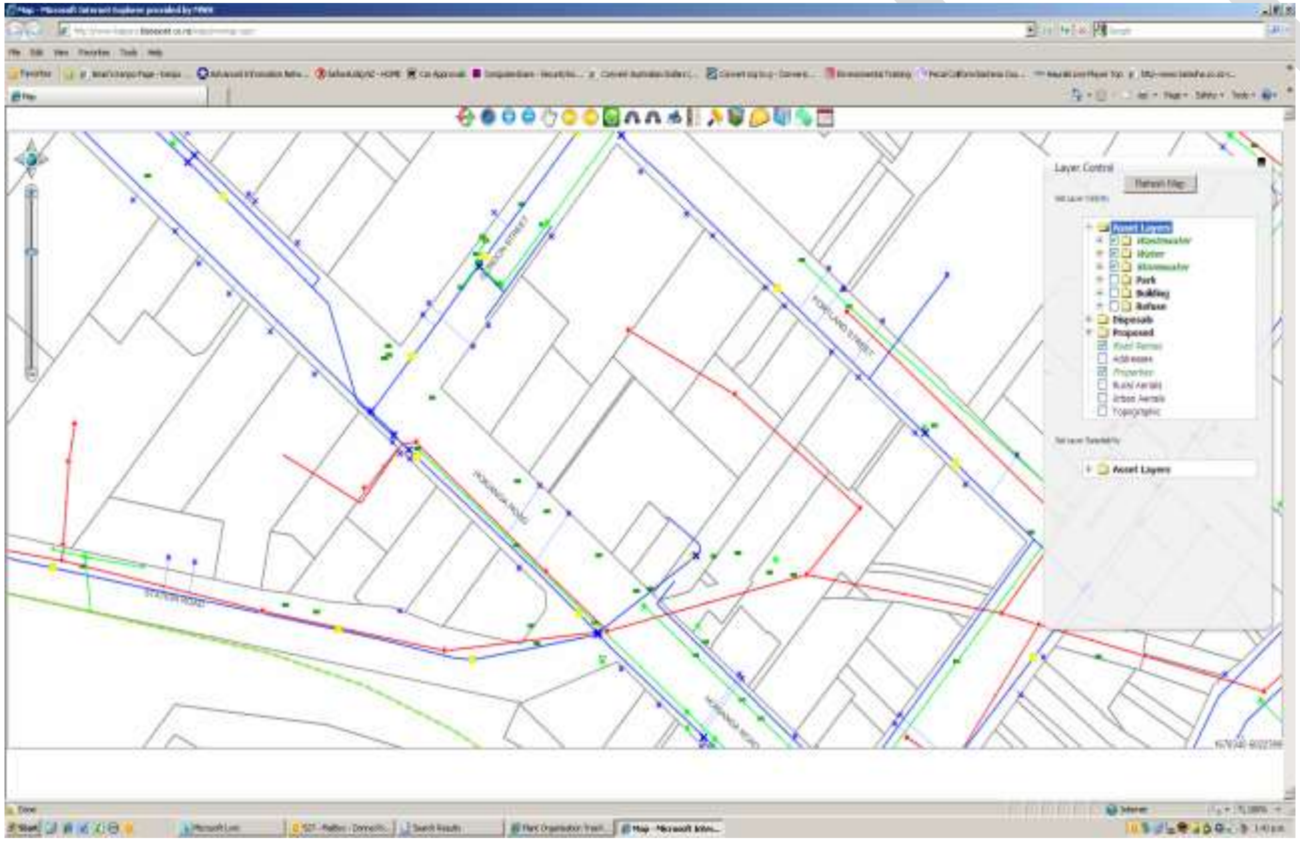
8.1.3 AssetFinda

The Assetfinda system is a MapInfo-based tool used to record asset-related information. This currently includes basic asset descriptors including asset name, size, material, install date, invert levels, condition and performance. The completeness of the data within these fields is highly variable and the accuracy cannot be currently qualified.

The system was recently upgraded from a table-based system to web enabled. The system is externally hosted and maintained.

A screenshot of the Assetfinda system is included in Figure 8-3 below:

Figure 8-3: AssetFinda screenshot



The system has the ability to:

- undertake asset valuations and depreciation calculations for the water supply, wastewater and stormwater assets, however, this functionality has yet to be implemented on Council's data; and
- record various maintenance activities against the asset. This capability has yet to be fully defined and implemented.

There is a need for this system to be further enabled and the supporting processes implemented to ensure appropriate maintenance activity data and condition and performance data collected from the field, can be uploaded in the system and used for monitoring the decline in asset serviceability and determination of timing for asset renewal.

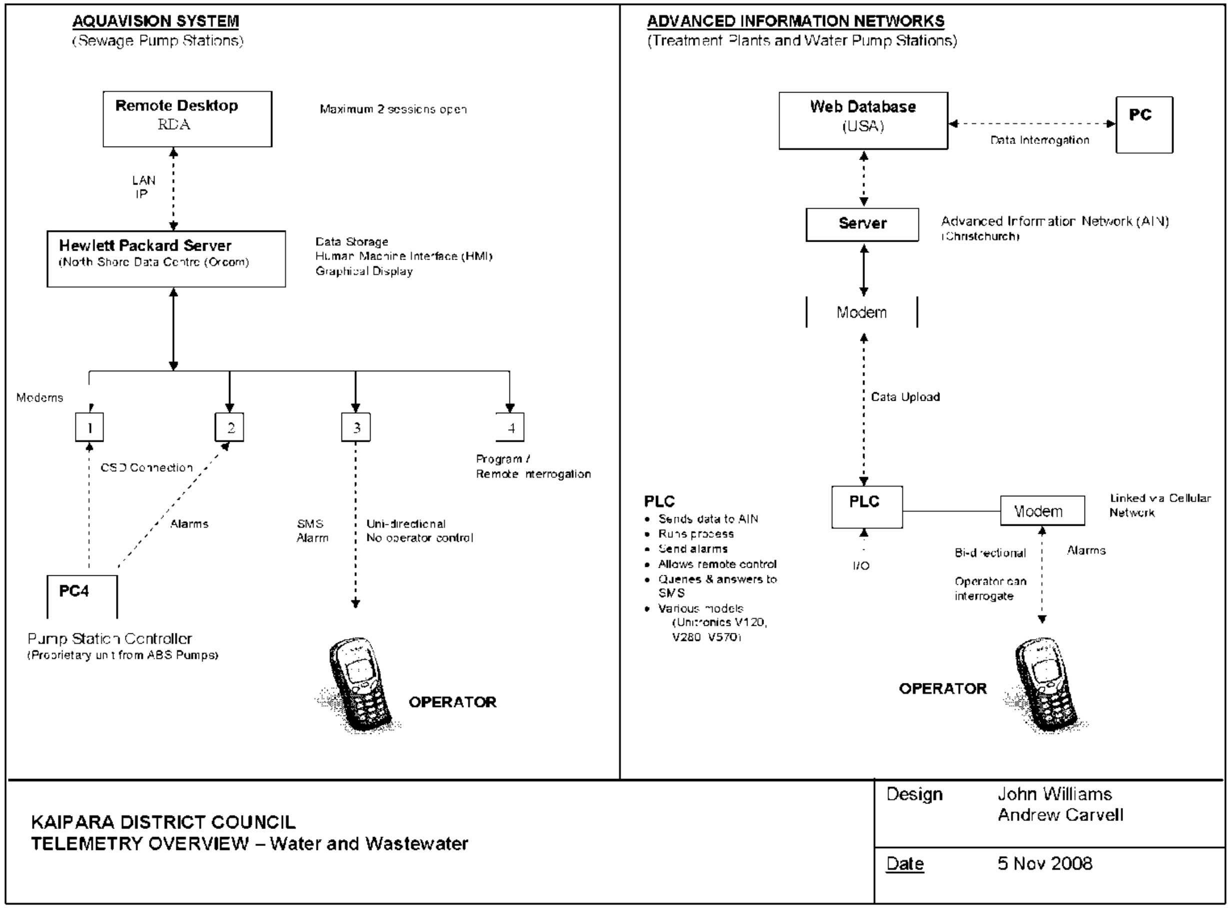
An improvement item has been identified to enable the AssetFinda system to be modified for the recording of this information.

8.1.4 Telemetry

Council operates a GSM telemetry system that monitors various characteristics (flows, levels, pH and turbidity) via daily email and SMS texts to operator's mobile phone. Council is in the process of upgrading the telemetry system to a full-blown SCADA system which will be rolled out to all sites progressively and will provide control, alarm notification, reporting and access to data.

An overview of the current system is provided in Figure 8-4 below.

Figure 8-4: Aquavision telemetry system overview



Data generated through telemetry monitoring is used to demonstrate compliance of treatment plants with the NZDWS, resource consent compliance and to monitor the performance of the treatment systems, reservoir levels and pumping station levels.

The current telemetry system has developed over a number of years and whilst initially providing adequate operational assistance, the Operators are frustrated at the lack of access to the monitoring system and data to assist with operational decisions and consent reporting.

The robustness and cost-effective nature of the service is now being questioned, and a more open web-based system is considered necessary. The development of a telemetry upgrade and implementation plan has been undertaken in 2013 and is being implemented in 2014.

It is anticipated that the system will be upgraded in a prioritised manner over 2014/2016.

8.2 Potential negative effects

The wastewater management activity is an essential service that we provide to our communities and the environment. Discharges from the wastewater network via system failures or pipeline breakages could result in contamination of waterways and environmental or public health risk and can impact upon cultural, social, environmental and economic well-being.

Guidance on the design and construction of new wastewater networks is provided in Chapter 7: Wastewater Reticulation and Onsite Treatment; Engineering Standards 2011, published by Council. Holistically the design of systems in accordance with the Standards will minimise the impacts of wastewater discharges on the receiving environment; however, it is acknowledged that differences in design standards between old and new systems can result in a disparity between LOS provided throughout the network.

This AMP describes Council's wastewater assets and details the practices used to manage those assets which helps to reduce possible negative effects and risks. Council mitigates these potential negative effects by a mix of asset management planning activities including:

- Asset development work;
- Monitoring and testing;
- Demand management initiatives; and
- Public education, including water conservation programmes.

9 Risk management

Risk Management is undertaken to identify specific business risks associated with the ownership and management of wastewater assets and to determine the direct and indirect costs associated with these risks.

Council has adopted a Risk Framework at a corporate level and this is included below.

Council is familiar with the risks associated with each wastewater scheme, however it has not formalised a risk management strategy. A Criticality Framework was defined in 2016 and this is summarised above. This utilises slightly different, but nonetheless aligned, definitions to the corporate Framework. However, this is only half of the risk equation with the other portion being the LOF. The highest risks are associated with assets that have elevated criticality and a relatively high LOF, typically generated by deterioration of the asset due to aging or environmental attack.

A detailed assessment of the LOF has not been undertaken for each of the wastewater assets considered to have Moderate or High criticality and generally these criticalities were assigned to types of assets, or specific circumstances, rather than specific assets.

While a particular type of asset will be assigned a criticality group e.g. pipes under buildings are 'High' the actual risk level of a particular pipe under a building could vary considerably. If the pipe was relatively new, or recently confirmed to be in good condition by CCTV survey, the risk might be appropriately described and managed, as Moderate. Conversely if the pipe is approaching the end of its expected working life and/or confirmed to be in poor condition then the Risk would elevate to High and a quite different management response would be required.

Generally, criticality relates to the impact of failure and this does not usually change during the life of the asset i.e. the vertical column that the asset is in does not change. LOF is closely aligned with asset condition and typically the likelihood of failure will increase as the asset ages i.e. the asset will move up the vertical column on the risk matrix to a higher risk level. Therefore risk management relies on ongoing review of the status of particular assets with the Criticality Framework providing a useful guide to which assets warrant the most attention.

Figure 9.1: KDC risk framework

Kaipara District Council Risk Framework for Water Services - November 2015

			Low Criticality		Moderate Criticality	High Criticality	
			Impact				
Likelihood		Inserted *AEP & Return Period (Yrs) ?*	**1 Insignificant** Little of no effect	**2 Minor** Some effects but well within tolerable limits	**3 Moderate** Will have effects but within tolerable limits	**4 Major** Will have effects beyond tolerable limits. Remedial action required.	**5 Extreme** Will have effects. Too late of costly to take remedial actions
Score	Name						
5	**Almost Certain** Event is a frequent occurrence and will generally have an established history of occurrence	***0.5*** *2 years*	**M** ***This could be L to align with approach***	**H** ***This could be M to align with approach***	**H**	**E**	**E**
4	**Likely** Event is a regular event that is predictable	***0.2*** *5 years*	**M** ***This could be L to align with approach***	**M**	**H**	**H**	**E**
3	**Moderate** Event occurs occasionally but is not reliably predictable	***0.1*** *10 years*	**L**	**M**	**M**	**H**	**H**
2	**Unlikely** Event occurs infrequently and is difficult to predict	***0.05*** *20 years*	**L**	**L**	**M**	**M**	**H**
1	**Rare** **Event will only occur in exceptional circumstances and timeframe is usually unpredictable**	***0.01*** *100 yrs*	**L**	**L**	**L**	**M**	**M**

Management of Risk Approach	**Primary Response**	**Considered to be -**	**Action Required**
(dark red)	Avoid	Intolerable	Stopping the activity completely or replace with an alternative activity
(red)	Reduce	Not tolerable	Take action to reduce the impact and/or likelihood of the event occurring
(light pink)	Share	Tolerable	Transfer the risk
(green)	Accept	Acceptable	Recognise that the risk exists but continue the activity

9.1 Potential alternative methods of service delivery

KDC is trying to explore options of shared services with the neighbouring districts and this could potentially reduce costs for both KDC and Kaipara ratepayers by lowering operational and maintenance costs through consolidation of contractor staff between the two or three councils and could also assist in providing a broader cross-section of skilled in-house resources to support the organisation going forward.

In 2019 Council will have the opportunity to consider how it manages the operation of the Mangawhai WWTP, irrigation system and collection system.

9.2 Health and safety

Council has a Health and Safety (2016) Policy aimed at providing and maintaining a safe and healthy working environment to Council employees, contractors and members of the public. With respect to asset management activities it is particularly important to protect staff, contractors and the public from hazards associated with Council assets. *"At the Kaipara District Council (Council) we will all keep everyone safe and healthy at work, and get better at being safe every year, by doing these things".*

10 Continuous improvement

The AMPs have been developed as a tool to help Council manage their assets, deliver the LOS and identify the expenditure and funding requirements of the activity. Continuous improvements are necessary to ensure Council continues to achieve the appropriate (and desired) level of AM practice; delivering services in the most sustainable way while meeting the community's needs.

Council has demonstrated its commitment to AM improvement over the last few years and wishes to meet core requirements as defined by the Office of the Auditor-General for the Wastewater AMP.

The following table is presented in Section 4 and contains a schedule of issues and proposed responses.

Contained within this list are significant improvements in Council's ability to manage its wastewater assets.

In particular, the capacity studies will provide Council with an overview of its main wastewater systems in relation to current capacity, the level of Inflow and Infiltration, capacity to absorb growth and key constraints. This will significantly influence future renewals and system upgrades.

The other significant element is the condition assessment programme. The investment in this programme is significant and will run over a number of years. This will provide the necessary justification for the renewal of assets that need to be renewed. For assets that are considered to have useful life remaining it will provide detailed information about the overall state of the asset, the rate of deterioration that is occurring (potentially split by size, material, operating environment) and arising from this information a more robust understanding of the extent and timing of future renewals. Some revision of asset valuation might also occur out of this but this is a somewhat academic improvement.

The detailed condition assessment of the Mangawhai WWTP will provide insight into the management of relatively short-lived assets which require quite a different approach to long lived assets such as pipes.

Table 10-1: Continuous Improvement Summary

Project	Short description (See detail above)
Dargaville Capacity Study	Study of current flows, Inflow and Infiltration (I/I), current capacity, growth forecast and main constraints.
Kaiwaka Capacity Study	Study of current flows, Inflow and Infiltration I/I, current capacity, growth forecast and main constraints. Kaiwaka forecast to grow.
Kaiwaka preparation for consent renewal	Consent renewal required in 2022. Further funding will need to be provided in 2021/2022.

Project	Short description (See detail above)
Maungaturoto Capacity Study	Study of current flows, Inflow and Infiltration I/I, current capacity, growth forecast and main constraints. Maungaturoto forecast to grow.
Mangawhai Capacity Study	Study of current flows, Inflow and Infiltration I/I, current capacity, growth forecast and main constraints. Mangawhai growing rapidly.
Condition assessment	Ongoing CCTV inspections plus sampling of rising mains per report.
Review Mangawhai plant renewal predictions	Valuation indicates large current backlog of renewals. This needs to be assessed in detail to determine actual need and future profile.
Advice on Mangawhai Operations contract	Current contract will expire in June 2019. There is a renewal option but also option to award to maintenance contractor. Potentially large dollars involved.
Oxidation pond management options	KDC has a number of oxidation ponds. Seek initial advice on aeration management, desludging and future upgrading.
Te Kopuru ammoniacal nitrogen study	Te Kopuru ponds are non-compliant for ammoniacal nitrogen. Initial advice on cause and remedy.
Asset revaluation	Wastewater revalued every three years.

Appendices

Appendix A: Detailed financial tables – operational and capital costs

Operational costs

Wastewater Dargaville

For the year ended: 30 June	Annual Plan 2017-2018 $'000	Budget 2018-2019 $'000	Budget 2019-2020 $'000	Budget 2020-2021 $'000	Budget 2021-2022 $'000	Budget 2022-2023 $'000	Budget 2023-2024 $'000	Budget 2024-2025 $'000	Budget 2025-2026 $'000	Budget 2026-2027 $'000	Budget 2027-2028 $'000
Operating funding											
Sources of operating funding											
General rates	0	0	0	0	0	0	0	0	0	0	0
Targeted rates	1,320	1,492	1,914	1,860	1,710	1,786	1,854	1,850	1,804	1,995	2,027
Subsidies and grants - operational	0	0	0	0	0	0	0	0	0	0	0
User fees and charges	8	8	9	9	9	9	9	10	10	10	10
Internal recoveries	0	0	0	0	0	0	0	0	0	0	0
Investments and other income	0	0	0	0	0	0	0	0	0	0	0
Total sources of operating funding	**1,329**	**1,501**	**1,922**	**1,869**	**1,719**	**1,795**	**1,864**	**1,860**	**1,813**	**2,005**	**2,037**
Application of operating funding											
Contractors costs	9	8	8	8	9	9	9	9	9	10	10
Professional services	100	190	182	130	68	70	94	74	76	78	80
Repairs and maintenance	286	310	1,347	1,379	426	437	449	462	475	613	633
Other operating costs	92	69	70	72	73	75	77	78	80	82	84
Employee benefits	0	0	0	0	0	0	0	0	0	0	0
Internal charges	227	292	618	622	318	332	350	351	361	409	421
Finance costs	92	84	117	111	105	98	89	77	71	66	62
Total applications of operating funding	**806**	**953**	**2,343**	**2,322**	**999**	**1,020**	**1,067**	**1,051**	**1,072**	**1,258**	**1,290**
Surplus (deficit) of operating funding	**522**	**548**	**-421**	**-453**	**720**	**775**	**796**	**808**	**742**	**748**	**747**

Wastewater Glinks Gully

For the year ended:	Annual Plan	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget
30 June	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025	2025-2026	2026-2027	2027-2028
	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000
Operating funding											
Sources of operating funding											
General rates	0	0	0	0	0	0	0	0	0	0	0
Targeted rates	60	57	76	80	81	83	85	87	89	92	94
Subsidies and grants - operational	0	0	0	0	0	0	0	0	0	0	0
User fees and charges	0	0	0	0	0	0	0	0	0	0	0
Internal recoveries	0	0	0	0	0	0	0	0	0	0	0
Investments and other income	0	0	0	0	0	0	0	0	0	0	0
Total sources of operating funding	**60**	**57**	**76**	**80**	**81**	**83**	**85**	**87**	**89**	**92**	**94**
Application of operating funding											
Contractors costs	1	1	1	1	1	1	1	1	1	1	1
Professional services	13	0	13	14	13	13	13	14	14	15	15
Repairs and maintenance	22	30	31	32	32	33	34	35	36	37	38
Other operating costs	2	2	2	2	2	2	2	2	2	2	2
Employee benefits	0	0	0	0	0	0	0	0	0	0	0
Internal charges	11	12	16	17	17	17	18	18	19	19	20
Finance costs	4	4	4	4	4	3	3	3	3	2	2
Total applications of operating funding	**53**	**49**	**67**	**68**	**68**	**69**	**71**	**72**	**74**	**76**	**78**
Surplus (deficit) of operating funding	**7**	**8**	**10**	**12**	**13**	**14**	**14**	**14**	**15**	**16**	**16**

Wastewater Kaiwaka

For the year ended:	Annual Plan	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget
30 June	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025	2025-2026	2026-2027	2027-2028
	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000
Operating funding											
Sources of operating funding											
General rates	0	0	0	0	0	0	0	0	0	0	0
Targeted rates	167	235	294	350	272	280	304	287	296	303	303
Subsidies and grants - operational	0	0	0	0	0	0	0	0	0	0	0
User fees and charges	0	0	0	0	0	0	0	0	0	0	0
Internal recoveries	0	0	0	0	0	0	0	0	0	0	0
Investments and other income	0	0	0	0	0	0	0	0	0	0	0
Total sources of operating funding	**167**	**235**	**294**	**350**	**272**	**280**	**304**	**287**	**296**	**303**	**303**
Application of operating funding											
Contractors costs	0	1	0	0	0	0	0	0	0	0	0
Professional services	12	8	41	75	4	4	15	4	4	4	4
Repairs and maintenance	63	100	102	105	108	110	113	117	120	124	127
Other operating costs	9	8	8	8	9	9	9	9	9	10	10
Employee benefits	0	0	0	0	0	0	0	0	0	0	0
Internal charges	33	48	59	71	50	51	57	55	56	58	60
Finance costs	12	11	16	21	21	21	20	20	20	19	18
Total applications of operating funding	**129**	**176**	**227**	**281**	**192**	**195**	**214**	**205**	**210**	**215**	**220**
Surplus (deficit) of operating funding	**38**	**60**	**67**	**69**	**81**	**85**	**90**	**82**	**86**	**89**	**83**

Wastewater Mangawhai

For the year ended: 30 June	Annual Plan 2017-2018 $'000	Budget 2018-2019 $'000	Budget 2019-2020 $'000	Budget 2020-2021 $'000	Budget 2021-2022 $'000	Budget 2022-2023 $'000	Budget 2023-2024 $'000	Budget 2024-2025 $'000	Budget 2025-2026 $'000	Budget 2026-2027 $'000	Budget 2027-2028 $'000
Operating funding											
Sources of operating funding											
General rates	2,050	1,337	1,346	1,412	1,490	823	893	949	1,032	1,096	1,207
Targeted rates	3,308	3,690	3,373	3,347	3,573	3,853	4,241	4,574	4,807	5,154	5,450
Subsidies and grants - operational	0	0	0	0	0	0	0	0	0	0	0
User fees and charges	1	1	1	1	1	1	1	1	1	1	1
Internal recoveries	0	0	0	0	0	0	0	0	0	0	0
Investments and other income	0	0	0	0	0	0	0	0	0	0	0
Total sources of operating funding	**5,359**	**5,028**	**4,720**	**4,760**	**5,065**	**4,677**	**5,134**	**5,525**	**5,840**	**6,251**	**6,658**
Application of operating funding											
Contractors costs	1,141	1,146	776	637	653	670	745	765	788	873	901
Professional services	68	114	89	44	15	15	16	16	35	36	37
Repairs and maintenance	60	60	62	63	70	72	74	82	84	87	96
Other operating costs	104	129	133	137	141	146	151	156	164	171	179
Employee benefits	0	0	0	0	0	0	0	0	0	0	0
Internal charges	576	687	573	524	529	543	575	592	615	653	675
Finance costs	2,675	2,414	2,291	2,394	2,501	2,599	2,720	2,705	2,793	2,854	3,033
Total applications of operating funding	**4,624**	**4,550**	**3,924**	**3,799**	**3,910**	**4,045**	**4,280**	**4,317**	**4,478**	**4,674**	**4,921**
Surplus (deficit) of operating funding	**735**	**479**	**796**	**961**	**1,155**	**632**	**854**	**1,208**	**1,362**	**1,578**	**1,737**

Wastewater Maungaturoto

For the year ended:	Annual Plan	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget
30 June	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025	2025-2026	2026-2027	2027-2028
	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000
Operating funding											
Sources of operating funding											
General rates	0	0	0	0	0	0	0	0	0	0	0
Targeted rates	496	543	577	543	572	583	597	587	601	618	633
Subsidies and grants - operational	0	0	0	0	0	0	0	0	0	0	0
User fees and charges	0	0	0	0	0	0	0	0	0	0	0
Internal recoveries	0	0	0	0	0	0	0	0	0	0	0
Investments and other income	0	0	0	0	0	0	0	0	0	0	0
Total sources of operating funding	**496**	**543**	**577**	**543**	**572**	**583**	**597**	**587**	**601**	**618**	**633**
Application of operating funding											
Contractors costs	2	1	1	2	2	2	2	2	2	2	2
Professional services	37	58	57	20	14	14	15	15	15	16	16
Repairs and maintenance	118	118	121	124	127	131	134	138	142	146	151
Other operating costs	40	29	29	30	30	31	32	32	33	34	35
Employee benefits	0	0	0	0	0	0	0	0	0	0	0
Internal charges	87	104	105	96	96	99	102	105	108	111	114
Finance costs	73	68	62	60	58	56	52	48	45	42	38
Total applications of operating funding	**357**	**378**	**377**	**331**	**328**	**332**	**336**	**339**	**345**	**350**	**356**
Surplus (deficit) of operating funding	**140**	**165**	**200**	**212**	**245**	**251**	**261**	**248**	**256**	**267**	**277**

Wastewater Te Kopuru

For the year ended:	Annual Plan	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget
30 June	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025	2025-2026	2026-2027	2027-2028
	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000
Operating funding											
Sources of operating funding											
General rates	0	0	0	0	0	0	0	0	0	0	0
Targeted rates	110	133	136	151	153	158	163	162	166	171	174
Subsidies and grants - operational	0	0	0	0	0	0	0	0	0	0	0
User fees and charges	0	0	0	0	0	0	0	0	0	0	0
Internal recoveries	0	0	0	0	0	0	0	0	0	0	0
Investments and other income	0	0	0	0	0	0	0	0	0	0	0
Total sources of operating funding	**110**	**133**	**136**	**151**	**153**	**158**	**163**	**162**	**166**	**171**	**174**
Application of operating funding											
Contractors costs	1	1	1	1	1	1	1	1	1	1	1
Professional services	16	15	9	10	2	2	2	2	2	2	2
Repairs and maintenance	31	44	45	46	47	49	50	51	53	55	56
Other operating costs	12	8	9	9	10	10	10	10	10	11	11
Employee benefits	0	0	0	0	0	0	0	0	0	0	0
Internal charges	27	34	33	34	32	33	34	35	36	37	38
Finance costs	3	3	3	3	3	3	3	3	3	3	3
Total applications of operating funding	**89**	**104**	**99**	**104**	**95**	**97**	**100**	**102**	**105**	**108**	**111**
Surplus (deficit) of operating funding	**21**	**29**	**38**	**47**	**57**	**60**	**63**	**60**	**62**	**63**	**62**

Capital works forecasts

Wastewater Dargaville

For the year ended:	Annual Plan	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget
30 June	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025	2025-2026	2026-2027	2027-2028
	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000
Capital funding											
Sources of capital funding											
Subsidies and grants - capital	0	0	0	0	0	0	0	0	0	0	0
Development contributions	0	0	0	0	0	0	0	0	0	0	0
Financial contributions	0	0	0	0	0	0	0	0	0	0	0
Increase(decrease) in debt	-67	728	-218	-212	-227	-242	-233	-222	-143	-135	-120
Sale of assets	0	0	0	0	0	0	0	0	0	0	0
Total sources of capital funding	**-67**	**728**	**-218**	**-212**	**-227**	**-242**	**-233**	**-222**	**-143**	**-135**	**-120**
Applications of capital funding											
Capital Expenditure - Growth	0	0	0	0	0	0	0	0	0	0	0
Capital Expenditure - LoS	0	465	529	391	513	259	6	6	6	6	6
Capital Expenditure - Renewal	499	776	338	294	429	440	749	769	908	871	960
Increase (decrease) in reserves	-44	35	-1,506	-1,349	-450	-166	-192	-189	-315	-265	-339
Total applications of capital funding	**455**	**1,276**	**-639**	**-664**	**493**	**533**	**563**	**586**	**599**	**613**	**627**
Surplus (deficit) of capital funding	**-522**	**-548**	**421**	**453**	**-720**	**-775**	**-796**	**-808**	**-742**	**-748**	**-747**
Funding Balance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Wastewater Glinks Gully

For the year ended:	Annual Plan	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget
30 June	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025	2025-2026	2026-2027	2027-2028
	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000
Capital funding											
Sources of capital funding											
Subsidies and grants - capital	0	0	0	0	0	0	0	0	0	0	0
Development contributions	0	0	0	0	0	0	0	0	0	0	0
Financial contributions	0	0	0	0	0	0	0	0	0	0	0
Increase(decrease) in debt	-5	-5	-6	-2	-7	-7	-8	-7	-8	-9	-9
Sale of assets	0	0	0	0	0	0	0	0	0	0	0
Total sources of capital funding	**-5**	**-5**	**-6**	**-2**	**-7**	**-7**	**-8**	**-7**	**-8**	**-9**	**-9**
Applications of capital funding											
Capital Expenditure - Growth	0	0	0	0	0	0	0	0	0	0	0
Capital Expenditure - LoS	0	0	0	0	0	0	0	0	0	0	0
Capital Expenditure - Renewal	0	0	0	10	0	0	8	0	0	0	0
Increase (decrease) in reserves	2	3	4	0	6	7	-1	7	7	7	7
Total applications of capital funding	**2**	**3**	**4**	**10**	**6**	**7**	**7**	**7**	**7**	**7**	**7**
Surplus (deficit) of capital funding	**-7**	**-8**	**-10**	**-12**	**-13**	**-14**	**-14**	**-14**	**-15**	**-16**	**-16**
Funding Balance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Wastewater Kaiwaka

For the year ended: 30 June	Annual Plan 2017-2018 $'000	Budget 2018-2019 $'000	Budget 2019-2020 $'000	Budget 2020-2021 $'000	Budget 2021-2022 $'000	Budget 2022-2023 $'000	Budget 2023-2024 $'000	Budget 2024-2025 $'000	Budget 2025-2026 $'000	Budget 2026-2027 $'000	Budget 2027-2028 $'000
Capital funding											
Sources of capital funding											
Subsidies and grants - capital	0	0	0	0	0	0	0	0	0	0	0
Development contributions	0	0	0	0	0	0	0	0	0	0	0
Financial contributions	0	0	0	0	0	0	0	0	0	0	0
Increase(decrease) in debt	-20	97	104	-19	-32	-34	9	-25	-27	-29	-21
Sale of assets	0	0	0	0	0	0	0	0	0	0	0
Total sources of capital funding	**-20**	**97**	**104**	**-19**	**-32**	**-34**	**9**	**-25**	**-27**	**-29**	**-21**
Applications of capital funding											
Capital Expenditure - Growth	0	0	0	0	0	0	0	0	0	0	0
Capital Expenditure - LoS	43	3	13	13	3	3	48	3	3	3	3
Capital Expenditure - Renewal	0	150	154	0	0	11	17	46	15	18	0
Increase (decrease) in reserves	-25	4	5	37	46	37	34	8	40	39	58
Total applications of capital funding	**17**	**157**	**172**	**50**	**49**	**51**	**99**	**57**	**58**	**60**	**61**
Surplus (deficit) of capital funding	**-38**	**-60**	**-67**	**-69**	**-81**	**-85**	**-90**	**-82**	**-86**	**-89**	**-83**
Funding Balance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Wastewater Mangawhai

For the year ended: 30 June	Annual Plan 2017-2018 $'000	Budget 2018-2019 $'000	Budget 2019-2020 $'000	Budget 2020-2021 $'000	Budget 2021-2022 $'000	Budget 2022-2023 $'000	Budget 2023-2024 $'000	Budget 2024-2025 $'000	Budget 2025-2026 $'000	Budget 2026-2027 $'000	Budget 2027-2028 $'000
Capital funding											
Sources of capital funding											
Subsidies and grants - capital	0	0	0	0	0	0	0	0	0	0	0
Development contributions	350	1,885	1,909	2,436	2,413	2,409	2,409	2,409	2,409	2,409	2,235
Financial contributions	0	0	0	0	0	0	0	0	0	0	0
Increase(decrease) in debt	-559	-799	-848	-762	-840	-180	-236	-107	422	217	-566
Sale of assets	0	0	0	0	0	0	0	0	0	0	0
Total sources of capital funding	**-209**	**1,086**	**1,061**	**1,674**	**1,574**	**2,229**	**2,174**	**2,303**	**2,831**	**2,626**	**1,670**
Applications of capital funding											
Capital Expenditure - Growth	521	1,915	1,553	1,772	1,815	2,463	2,524	480	2,272	2,790	2,868
Capital Expenditure - LoS	19	275	333	0	0	0	0	145	741	609	0
Capital Expenditure - Renewal	0	45	46	47	48	49	293	301	308	317	326
Increase (decrease) in reserves	-14	-670	-75	816	866	349	211	2,585	871	487	212
Total applications of capital funding	**526**	**1,565**	**1,857**	**2,635**	**2,729**	**2,861**	**3,028**	**3,510**	**4,193**	**4,204**	**3,406**
Surplus (deficit) of capital funding	**-735**	**-479**	**-796**	**-961**	**-1,155**	**-632**	**-854**	**-1,208**	**-1,362**	**-1,578**	**-1,737**
Funding Balance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Wastewater Maungaturoto

For the year ended:	Annual Plan	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget
30 June	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025	2025-2026	2026-2027	2027-2028
	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000
Capital funding											
Sources of capital funding											
Subsidies and grants - capital	0	0	0	0	0	0	0	0	0	0	0
Development contributions	0	0	0	0	0	0	0	0	0	0	0
Financial contributions	0	0	0	0	0	0	0	0	0	0	0
Increase(decrease) in debt	-62	-88	-91	-93	-99	-99	-103	-86	-90	-97	-101
Sale of assets	0	0	0	0	0	0	0	0	0	0	0
Total sources of capital funding	**-62**	**-88**	**-91**	**-93**	**-99**	**-99**	**-103**	**-86**	**-90**	**-97**	**-101**
Applications of capital funding											
Capital Expenditure - Growth	0	0	0	0	0	0	0	0	0	0	0
Capital Expenditure - LoS	33	3	8	3	35	36	3	3	3	3	3
Capital Expenditure - Renewal	20	70	96	42	11	33	56	19	36	61	0
Increase (decrease) in reserves	25	4	5	75	100	83	98	141	128	107	172
Total applications of capital funding	**78**	**77**	**109**	**119**	**146**	**152**	**157**	**162**	**166**	**171**	**175**
Surplus (deficit) of capital funding	**-140**	**-165**	**-200**	**-212**	**-245**	**-251**	**-261**	**-248**	**-256**	**-267**	**-277**
Funding Balance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Wastewater Te Kopuru

For the year ended:	Annual Plan	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget
30 June	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025	2025-2026	2026-2027	2027-2028
	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000
Capital funding											
Sources of capital funding											
Subsidies and grants - capital	0	0	0	0	0	0	0	0	0	0	0
Development contributions	0	0	0	0	0	0	0	0	0	0	0
Financial contributions	0	0	0	0	0	0	0	0	0	0	0
Increase(decrease) in debt	-6	-4	6	5	-6	-7	-7	-2	-2	-2	0
Sale of assets	0	0	0	0	0	0	0	0	0	0	0
Total sources of capital funding	**-6**	**-4**	**6**	**5**	**-6**	**-7**	**-7**	**-2**	**-2**	**-2**	**0**
Applications of capital funding											
Capital Expenditure - Growth	0	0	0	0	0	0	0	0	0	0	0
Capital Expenditure - LoS	0	3	13	13	3	3	3	3	3	3	3
Capital Expenditure - Renewal	0	0	0	21	0	16	39	0	0	24	0
Increase (decrease) in reserves	15	23	31	19	49	34	13	55	57	34	59
Total applications of capital funding	**15**	**25**	**44**	**53**	**51**	**53**	**56**	**58**	**60**	**61**	**63**
Surplus (deficit) of capital funding	**-21**	**-29**	**-38**	**-47**	**-57**	**-60**	**-63**	**-60**	**-62**	**-63**	**-62**
Funding Balance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Appendix B: Resource consent register

Consent No	Details	Status	Expiry Date	Conditions / limits applied	Monitoring required	Reporting required
3666	Dargaville WWTP Discharge Consent	Current	2048	Y	Y	Y
7231	Glinks Gully WWTP Discharge Consent	Current	2024	Y	Y	Y
1116	Kaiwaka WWTP Discharge Consent	Current	2022	Y	Y	Y
1115	Maungaturoto WWTP Discharge Consent	Current	2032	Y	Y	Y
5087	Maungaturoto Railway Discharge Consent	Current	2025	Y	N	Y
1102	Te Kopuru Discharge Consent	Current	2044	Y	Y	Y
1383	Maungaturoto Backwash Discharge Consent	Current	Being reviewed	N	Y	N

Appendix C: Historical LOS

Performance measures	2009 AMP – 2009 target	2009/10 AR - Actual	2010/11 AP - Target	2010/11 AR - Actual	2011/12 AP - Target	2011/12 AR - Actual	2012/22 LTP – 2016/2022 Target
Customer LOS							
Percentage of customers satisfied with wastewater (NRB).	40%	45%	41%	41%	41%	?	60%
Commencement of containment and clean-p of notified spills.	2 hours	2 hours	2 hours	90%	2 hours	?	-
Percentage of beaches and rivers available for swimming and shellfish gathering during summer monitoring period.	80%	95%	80%	96%	80%	?	-
Percentage of urgent request (emergency overflows) responded to within 1 day (Councils Help Desk).	90%	100%	90%	100%	90%	?	-
Number of requests for service regarding odours.	-	-	-	-	-	-	32
Number of requests for service regarding blockages.	-	-	-	-	-	-	95
Technical LOS							
Continuity of the wastewater service to KDC's customers that meets community expectations.	Less than two wastewater reticulation incidents per km of public drain reported in any 12 month period.	-	-	-	-	-	-

Performance measures	2009 AMP – 2009 target	2009/10 AR - Actual	2010/11 AP - Target	2010/11 AR - Actual	2011/12 AP - Target	2011/12 AR - Actual	2012/22 LTP – 2016/2022 Target
Restore private property disturbed by wastewater service activities to a standard at least as good as before the work was carried out.	No unresolved complaints. 80% of contracts performed without justifiable complaints.	-	-	-	-	-	-
Zero wastewater overflows into habitable buildings due to faults in the public wastewater system.	Zero overflows into habitable buildings any 12 month period.	-	-	-	-	-	-
Zero dry weather overflows in any 12 month period.	Zero overflows in any 12 month period.	-	-	-	-	-	-
KDC takes all practicable steps to ensure that no avoidable harm is suffered by any person because of any action, or any failure to act, by a worker ('Worker' as defined in HASIE Act).	All contractors to KDC are registered as Health and Safety compliant.	-	-	-	-	-	-
No abatement notices issued for any Council operated wastewater treatment facility in the district.	Zero abatement notices in any 12 month period.	-	-	-	-	-	-
All wastewater spills investigated and any necessary disinfection works completed within 24 hours of the spill occurring.	90% compliance.	-	-	-	-	-	-
Develop an emergency management plan for all wastewater schemes.	Emergency management plan developed in 2009/2010 financial year.	-	-	-	-	-	-
Compliance with outfall waste consent conditions.	-	-	-	-	-	-	90%

Performance measures	2009 AMP – 2009 target	2009/10 AR - Actual	2010/11 AP - Target	2010/11 AR - Actual	2011/12 AP - Target	2011/12 AR - Actual	2012/22 LTP – 2016/2022 Target
The annual number of events where wastewater is discharged from Council's reticulation into rivers and streams.	-	-	-	-	-	-	5

Appendix D: List of acronyms

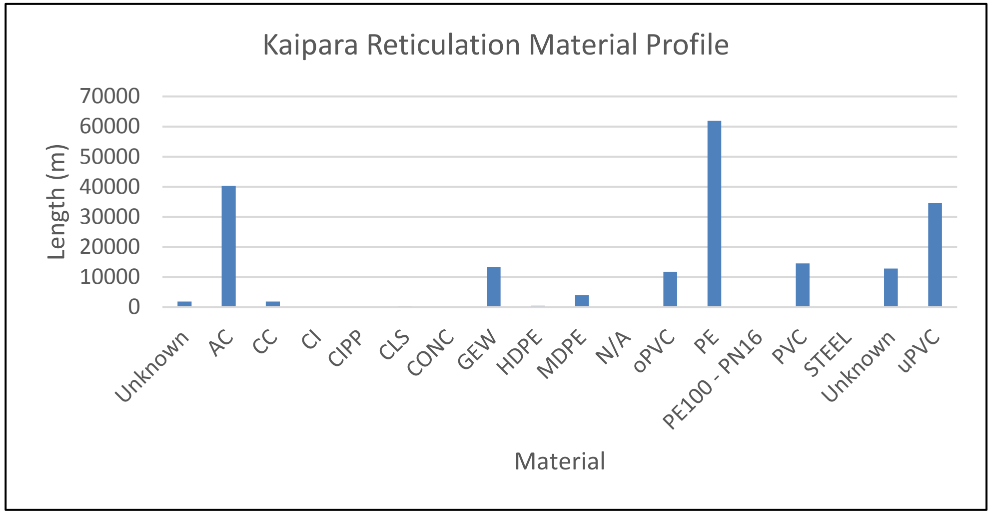
The following lists key acronyms and abbreviations used in this document:

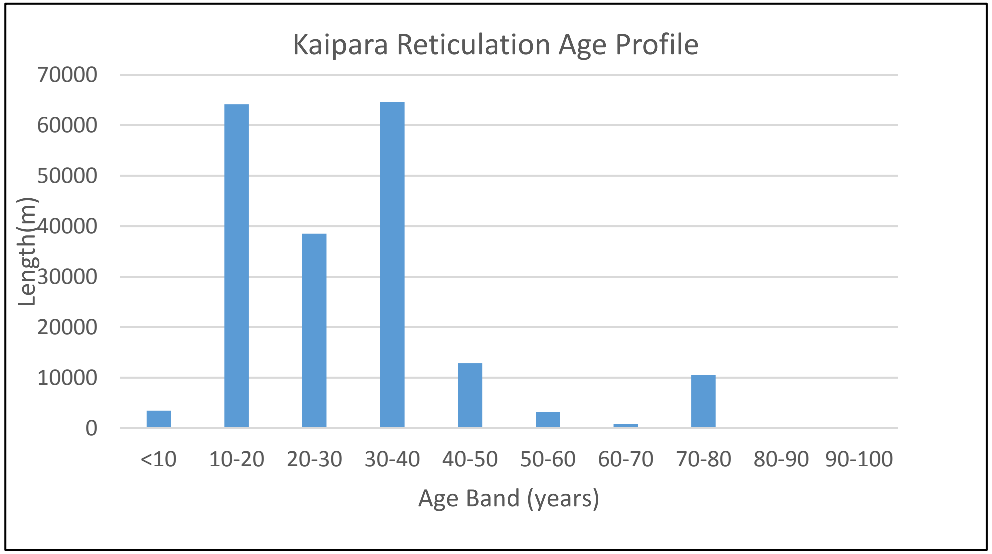
Term	Definition
AC	Asbestos concrete (pipe type)
AM	Asset Management
AMIP	Asset Management Improvement Plan
AMP	Asset Management Plan
AMS	Asset Management Systems
BERL	Business and Economic Research Limited
CAPEX	Capital expenditure
CCTV	Closed Circuit Television
CDEM	Civil Defence Emergency Management
CMA	Costal Marine Area
CON	Concrete (pipe type)
CORST	Corrugated steel (pipe type)
Council/KDC	Kaipara District Council
CPP	Competitive Pricing Procedures
DP	District Plan
EW	Earthenware (pipe type)
GIS	Geographical Information System
IPCC	Intergovernmental Panel on Climate Change
IIMM	International Infrastructure Management Manual
KDC/Council	Kaipara District Council
KITE	Kaipara Information Technology Environment

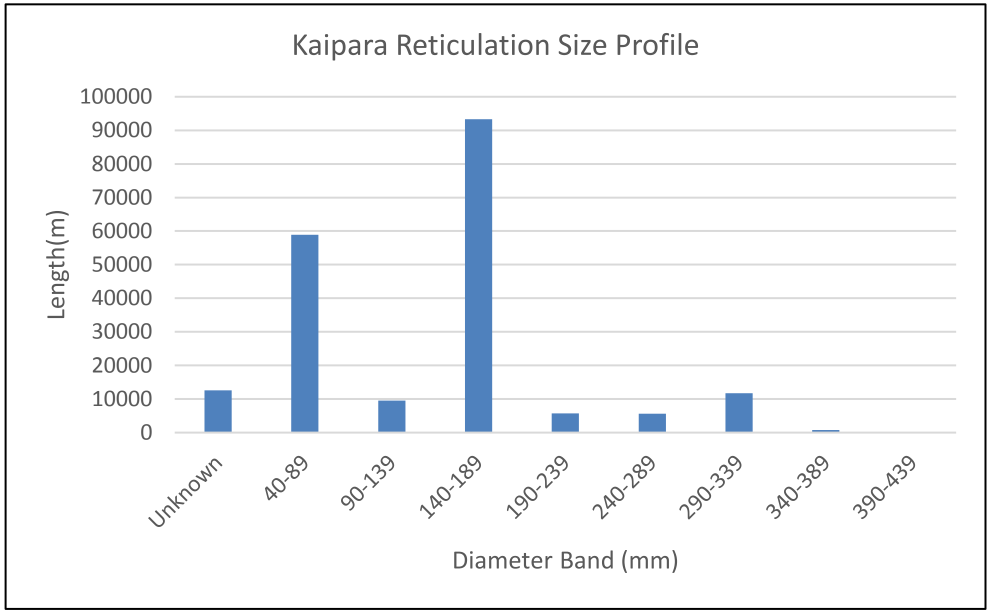
Term	Definition
LGA	Local Government Act 2002
LIM	Land Information Memoranda
LOF	Likelihood of Failure
LOS	Level of Service
LTP	Long Term Plan
MCWWS	Mangawhai Community Wastewater Scheme
MfE	Minister for the Environment
NRC	Northland Regional Council
OPEX	Operational expenditure
PIM	Project Information Memoranda
PVC	Polyvinylchloride (pipe type)
RCRRJ	Reinforced concrete rubber ring joint (pipe type)
RMA	Resource Management Act 1991
UPVC	Unplasticised polyvinylchloride (pipe type)
URP	Usual Resident Population
WIG	Water Infrastructure Group
WSSA	Water and Sanitary Services Assessment
WWTP	Wastewater Treatment Plant

Appendix E: Asset profiles

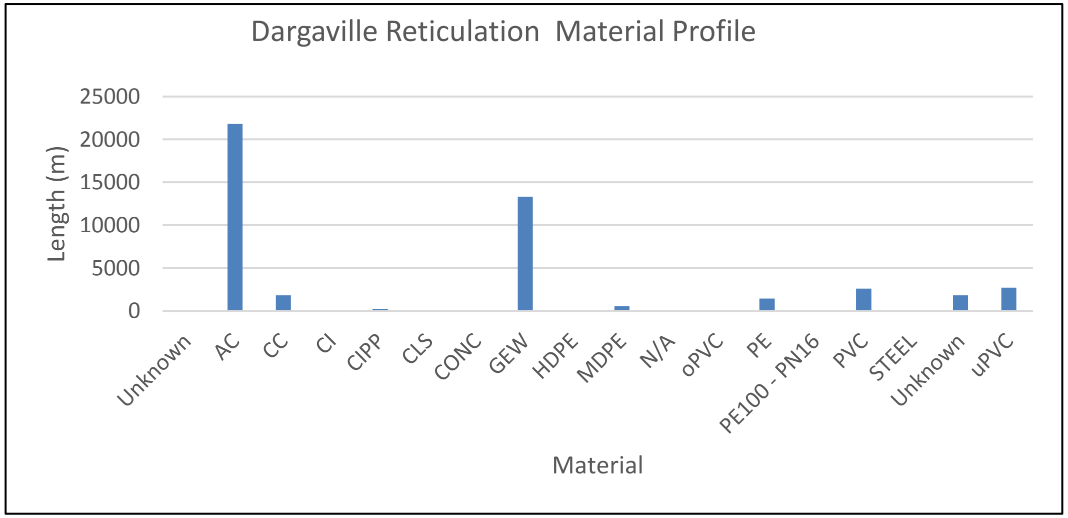
Asset profiles – All schemes

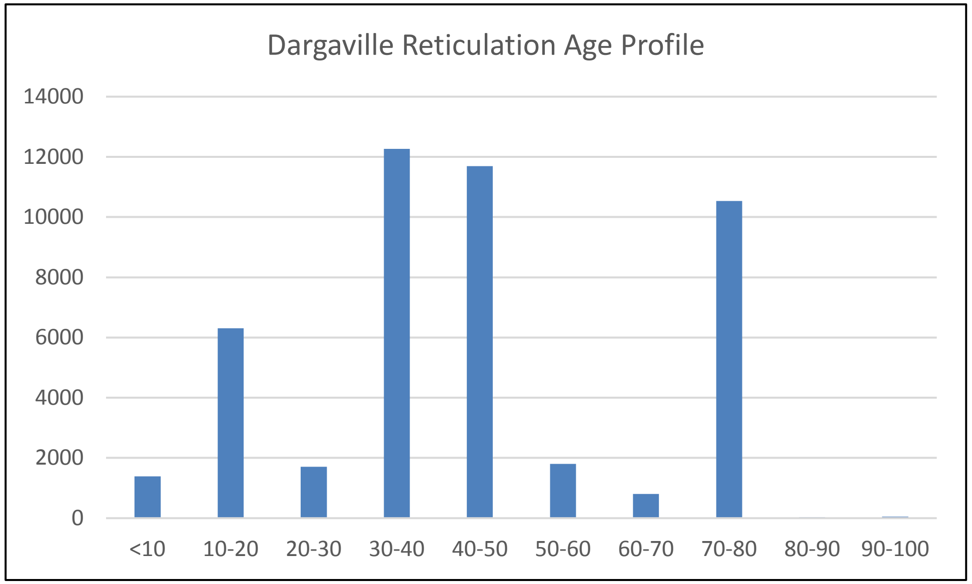


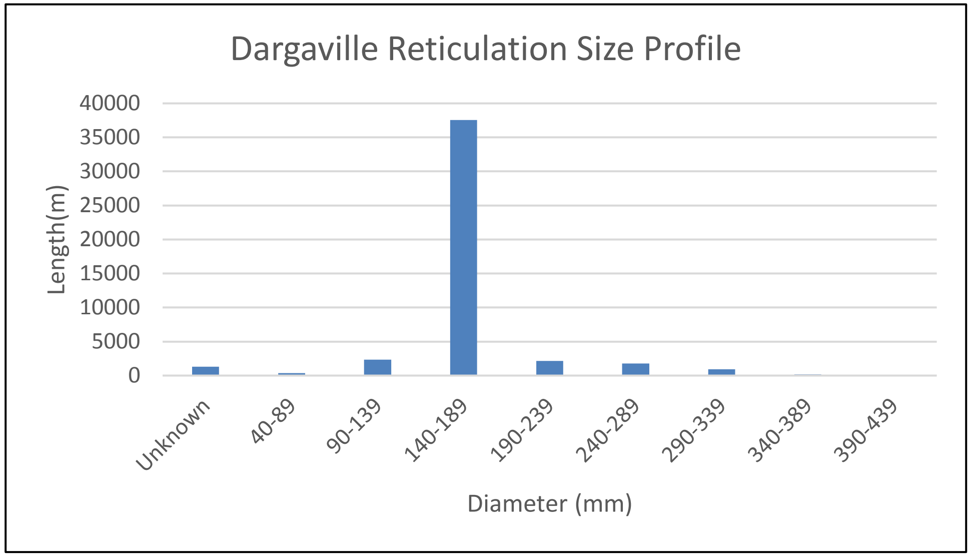




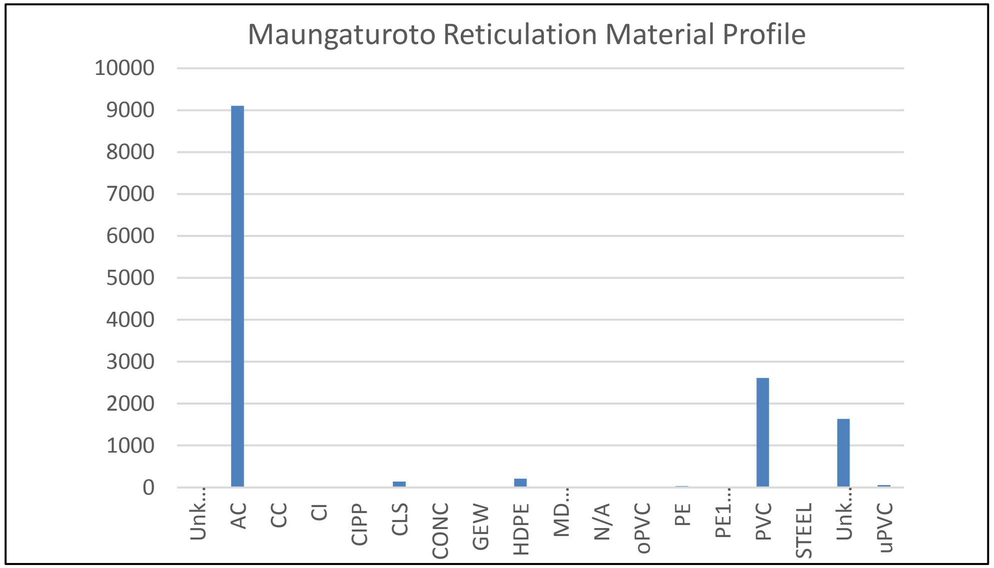
Asset profiles – Dargaville

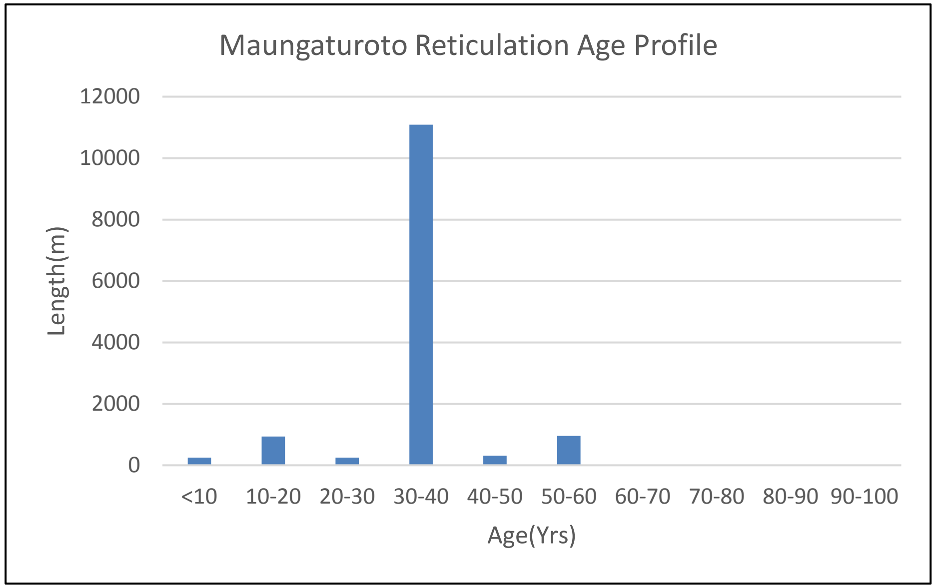


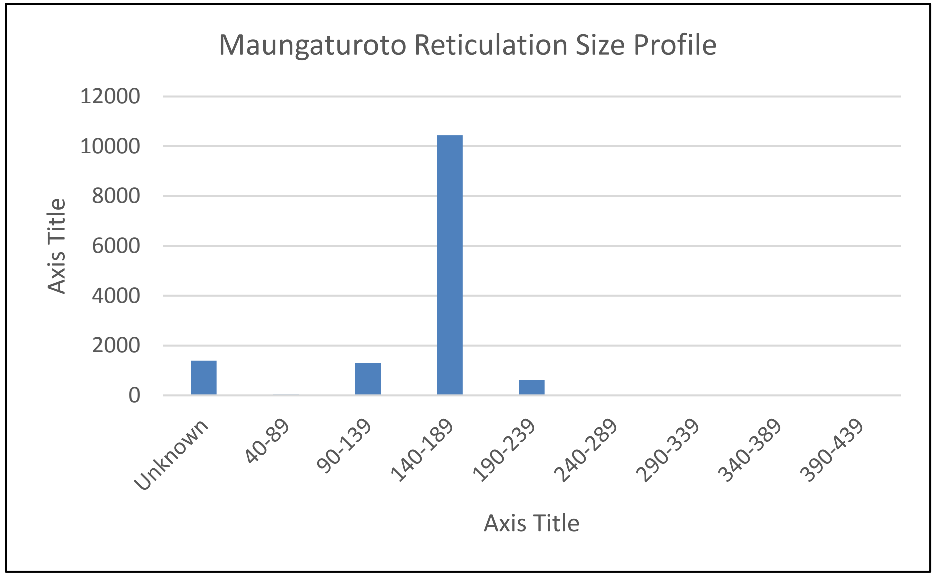

Dargaville Reticulation Age Profile
14000
12000
10000
8000
6000
4000
2000
0
<10
10-20
20-30
30-40
40-50
50-60
60-70
70-80
80-90
90-100


Dargaville Reticulation Size Profile
Length(m)
40000
35000
30000
25000
20000
15000
10000
5000
0
Unknown
40-89
90-139
140-189
190-239
240-289
290-339
340-389
390-439
Diameter (mm)

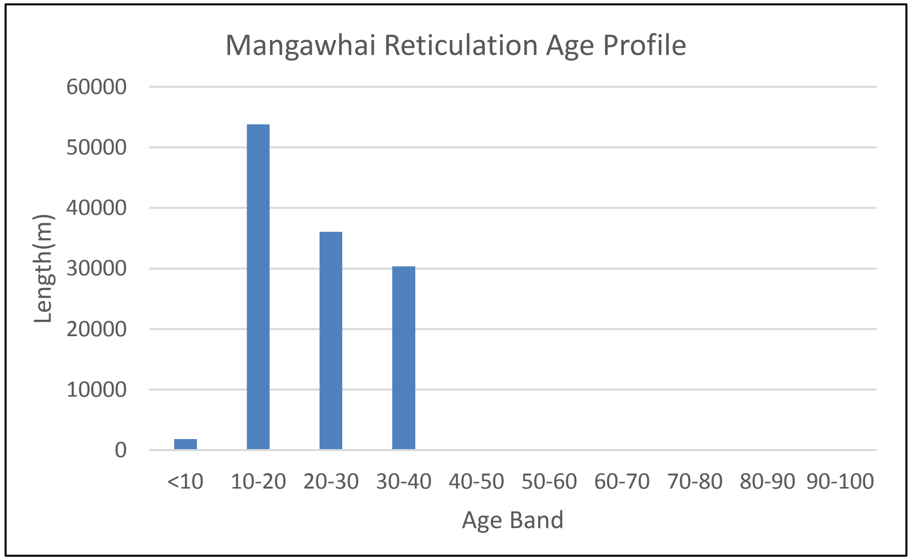
Asset profiles – Maungaturoto

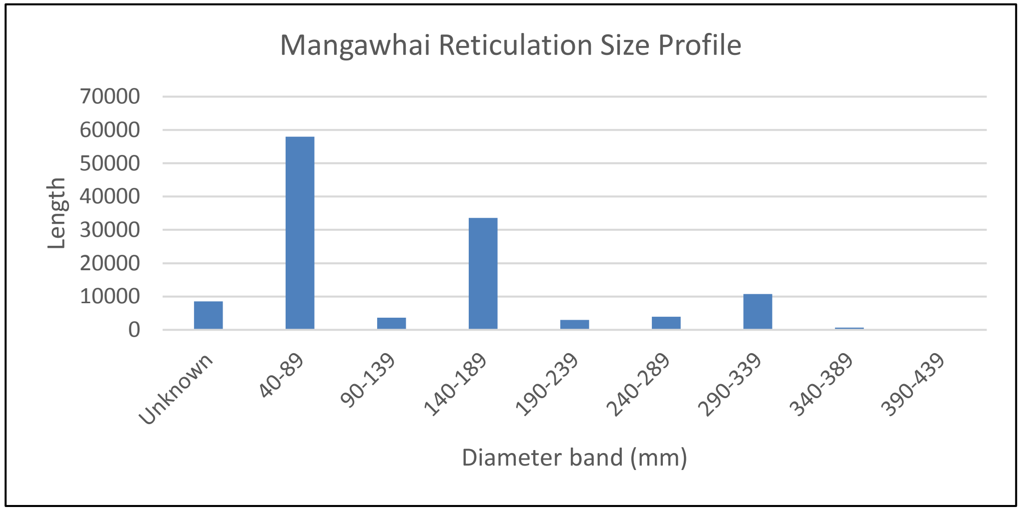


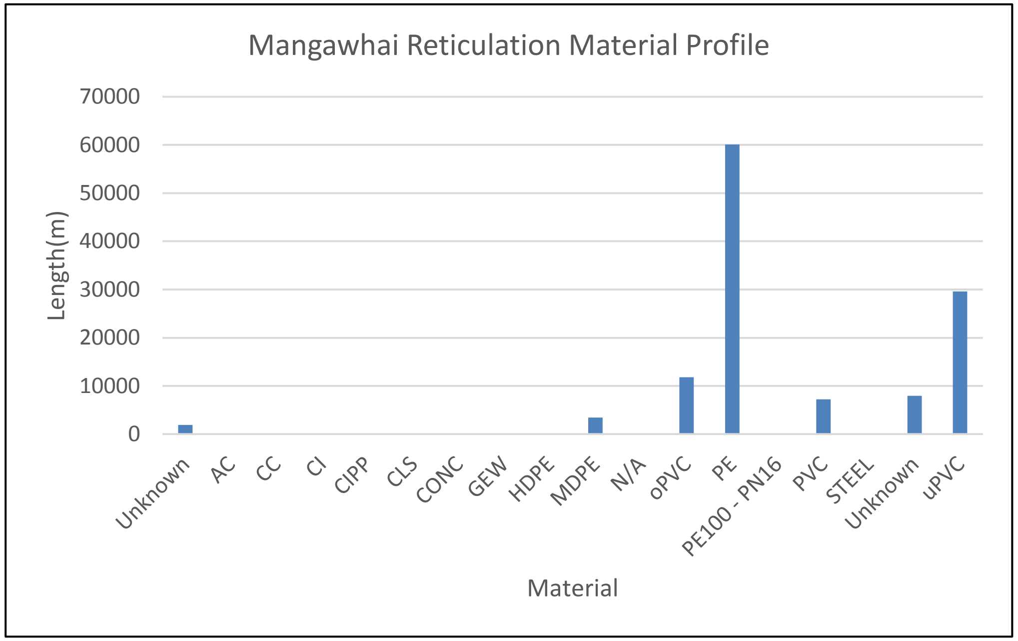




Asset profiles – Mangawhai




Mangawhai Reticulation Size Profile
70000
60000
50000
40000
30000
20000
10000
0
Length
Unknown
40-89
90-139
140-189
190-239
240-289
290-339
340-389
390-439
Diameter band (mm)


Mangawhai Reticulation Material Profile
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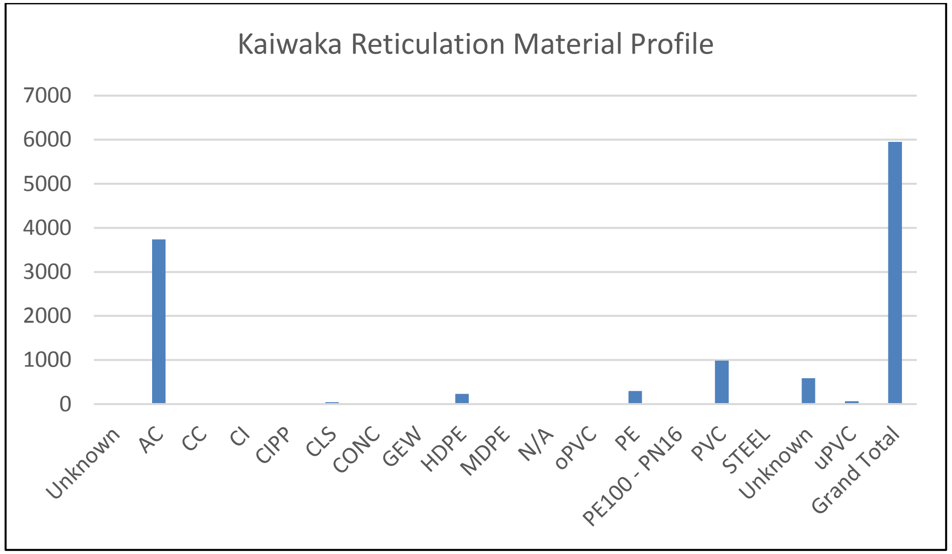
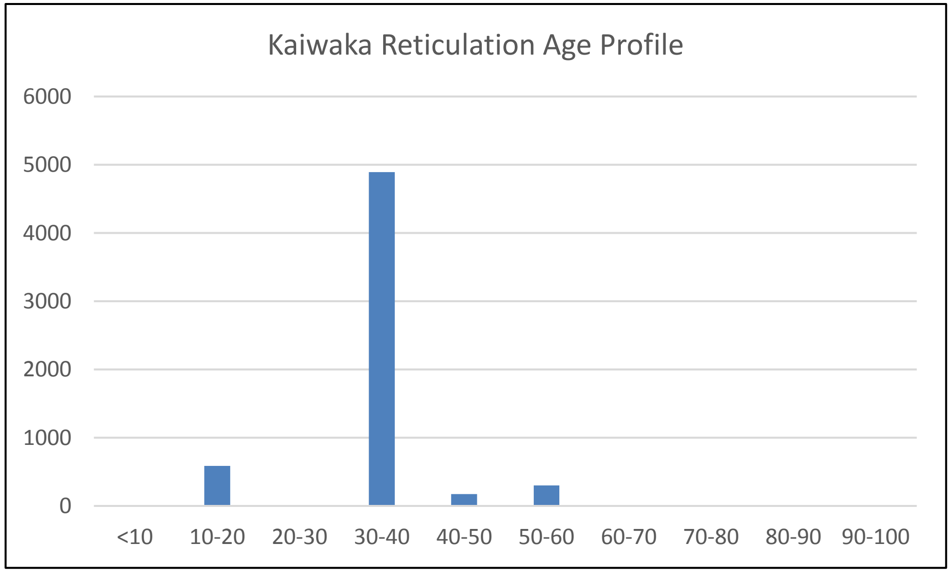
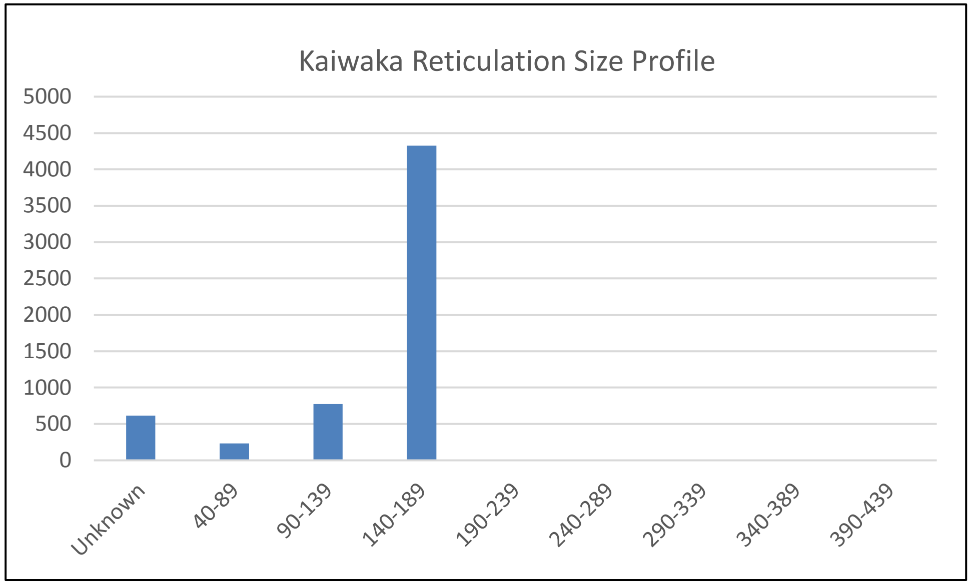
60000
50000
40000
30000
20000
10000
0
Length(m)
Unknown
AC
CC
CI
CIPP
CLS
CONC
GEW
HDPE
MDPE
N/A
oPVC
PE
PE100 - PN16
PVC
STEEL
Unknown
uPVC
Material

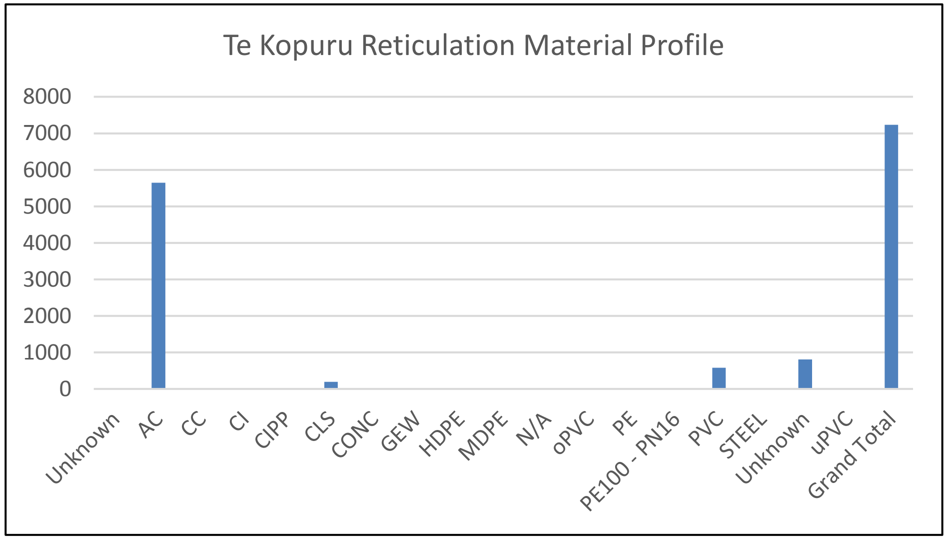
Asset profiles – Kaiwaka

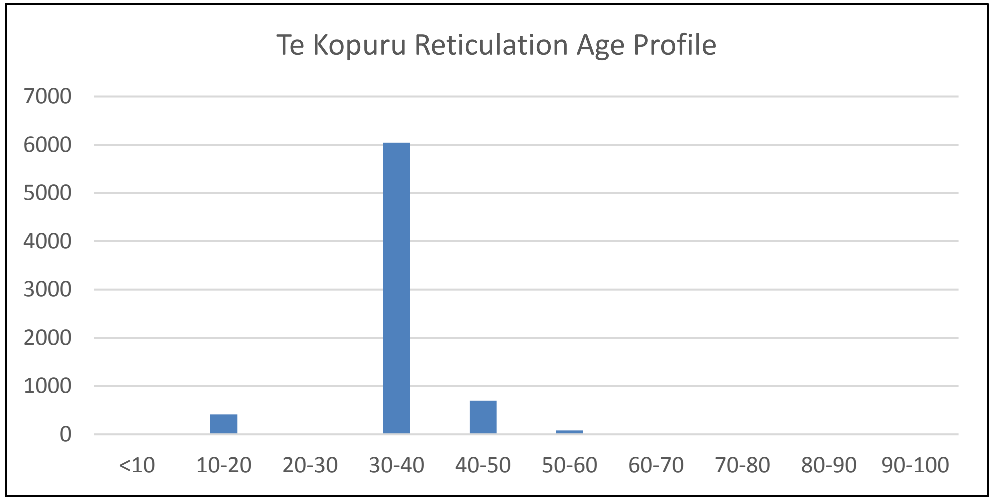


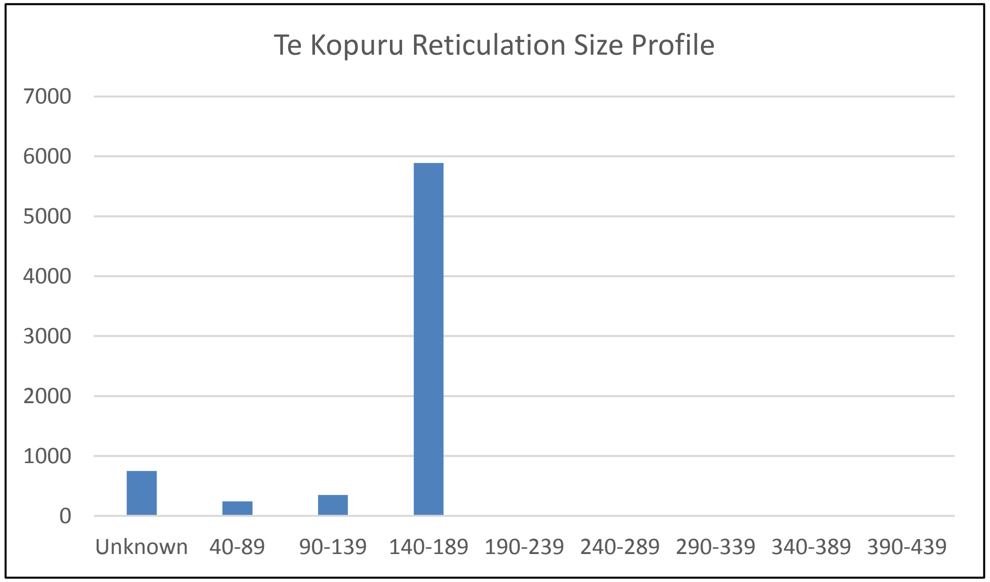




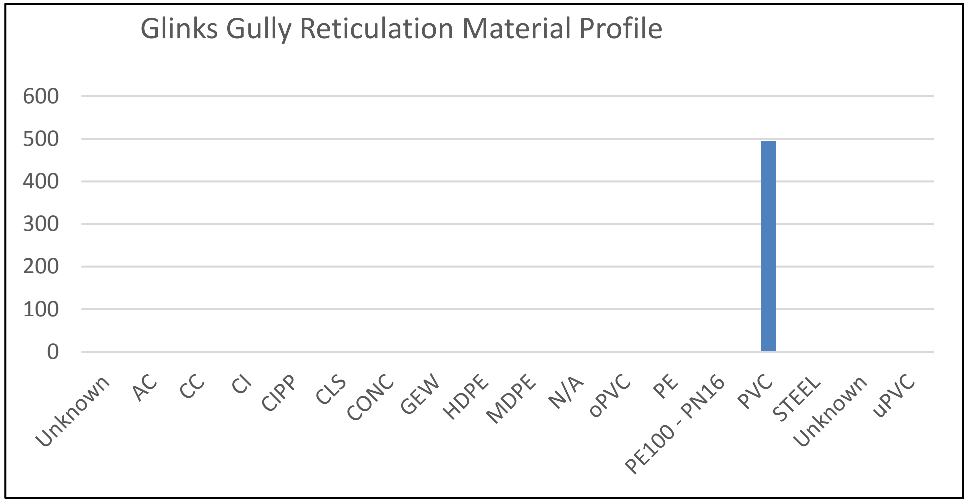
Asset profiles – Te Kopuru

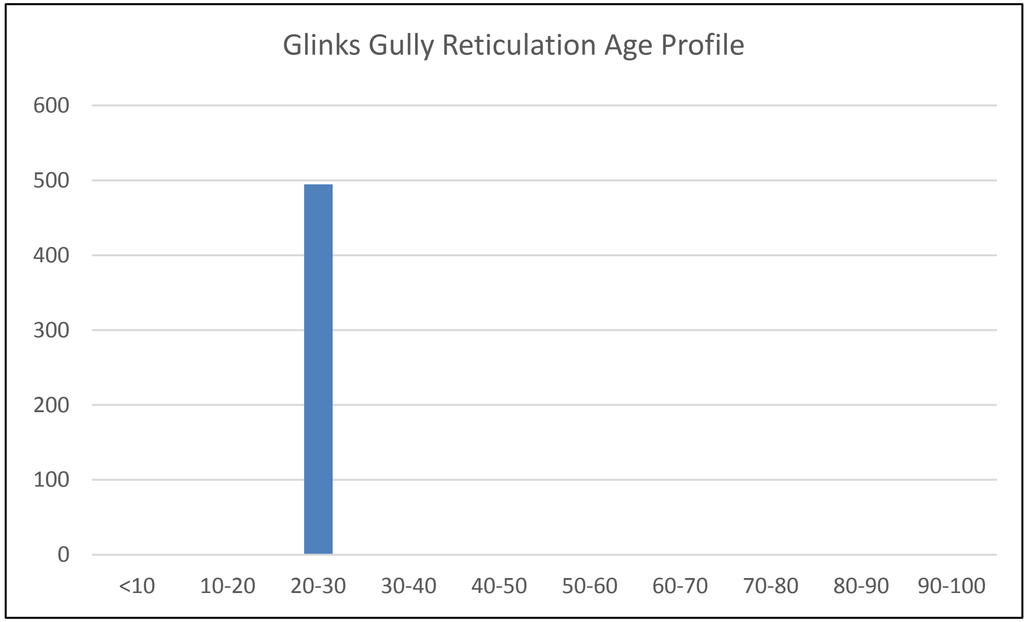


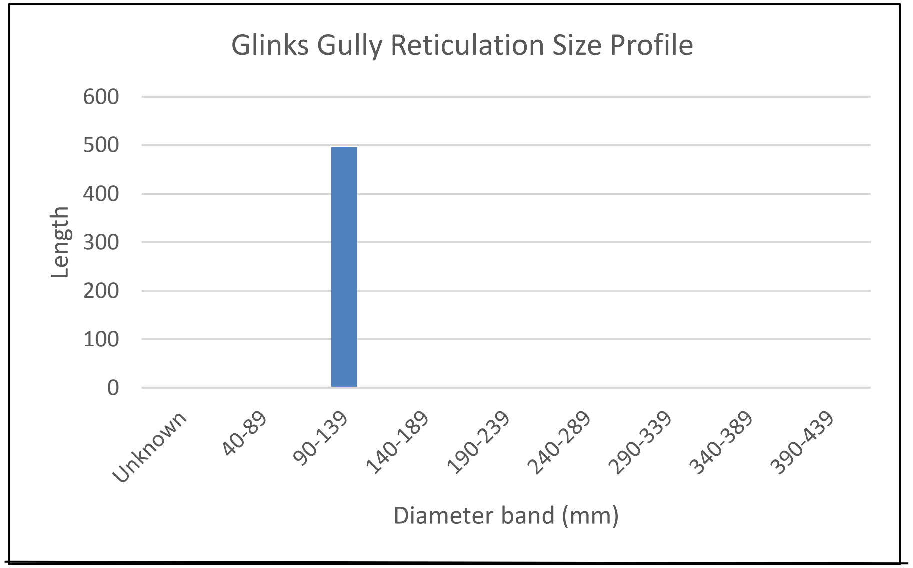

Te Kopuru Reticulation Age Profile
7000
6000
5000
4000
3000
2000
1000
0
<10
10-20
20-30
30-40
40-50
50-60
60-70
70-80
80-90
90-100


Te Kopuru Reticulation Size Profile
7000
6000
5000
4000
3000
2000
1000
0
Unknown
40-89
90-139
140-189
190-239
240-289
290-339
340-389
390-439

Asset profiles – Glinks Gully






Glinks Gully Reticulation Size Profile
Length
600
500
400
300
200
100
0
Unknown
40-89
90-139
140-189
190-239
240-289
290-339
340-389
390-439
Diameter band (mm)