Kaipara District Council

Asset Management Plan 2018

Stormwater

November 2017

Status: Draft

QUALITY STATEMENT

Project Manager		PROJECT TECHNICAL LEAD
Matthew Smith		Matthew Smith
Prepared by		
Matthew Smith	…….....	……/……/……
Checked by		
	…….....	……/……/……
Reviewed by		
	…….....	……/……/……
Approved for issue by		
Curt Martin	…….....	……/……/……

42 Hokianga Road, Dargaville 0310

Private Bag 1001, Dargaville 0340, New Zealand

TEL +64 09 439 3123, FAX +64 09 439 6756

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						

CONTENTS

List of Tables

List of Figures

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.

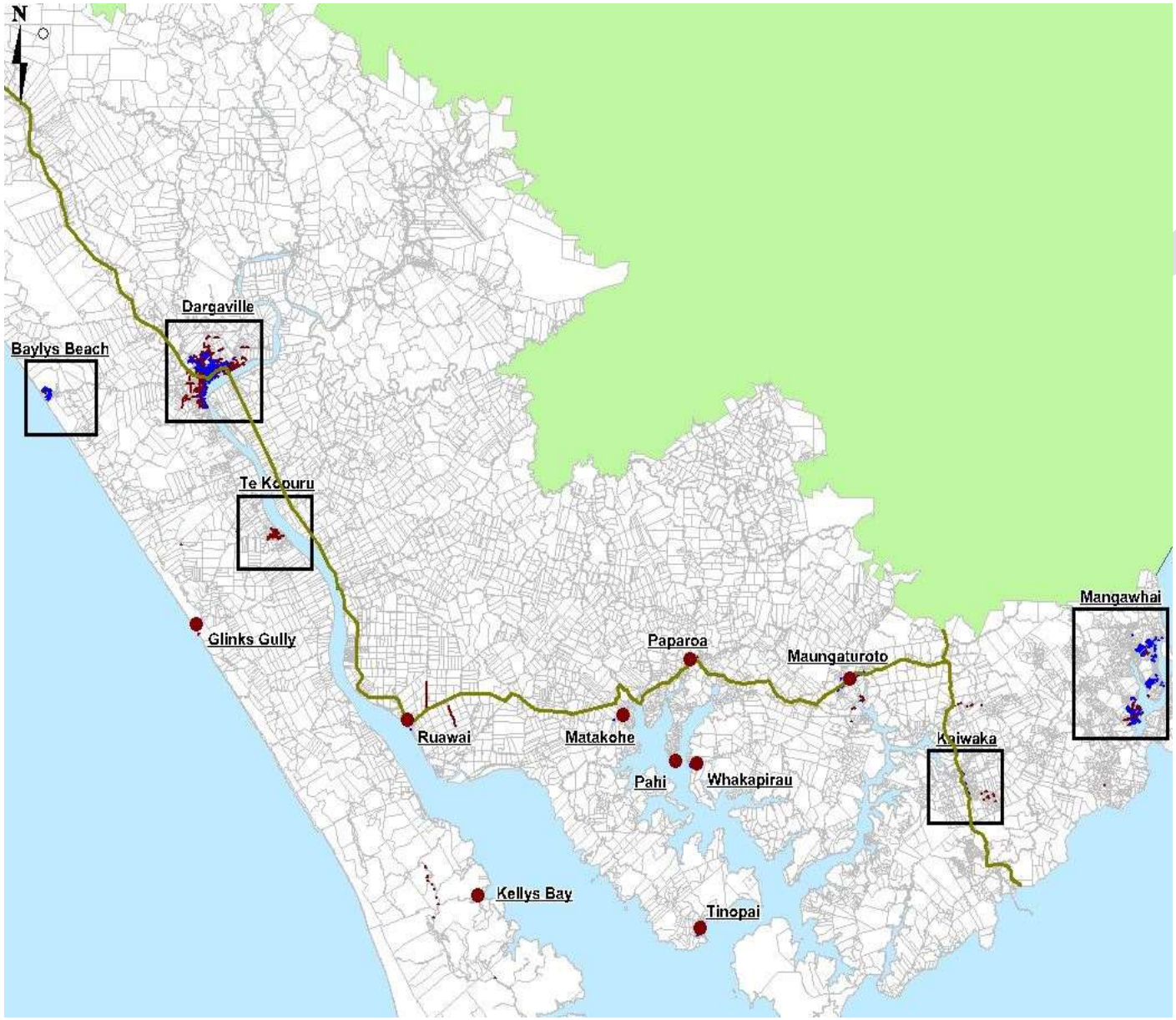
Asset performance, condition and value are examined and a Financial and Lifecycle Strategy is presented to define the investment planned to address issues and to ensure that an uninterrupted service is provided to customers now and into the future.

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

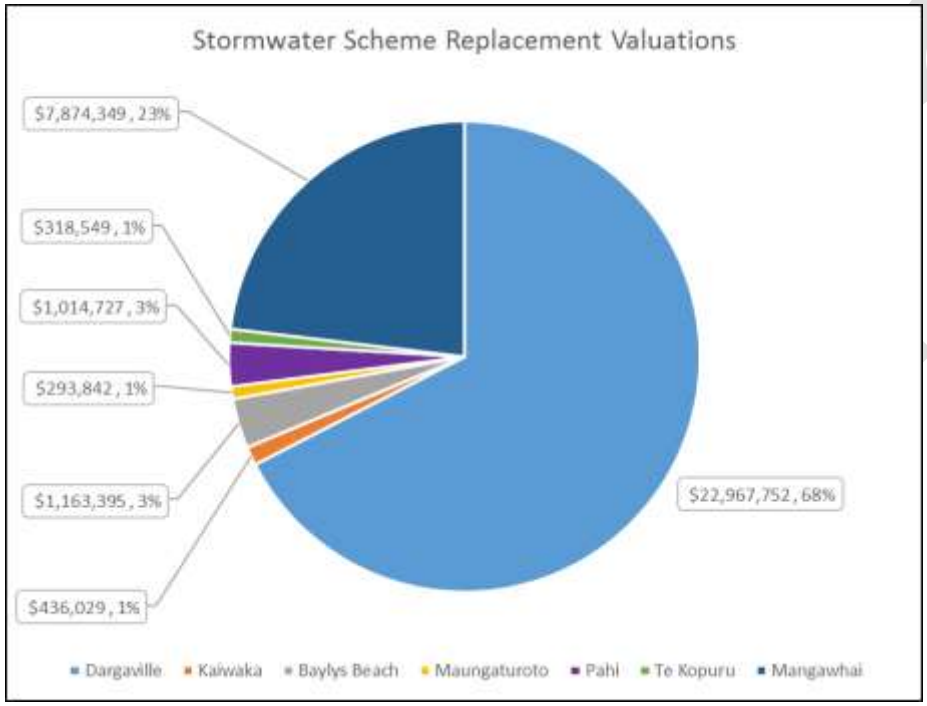
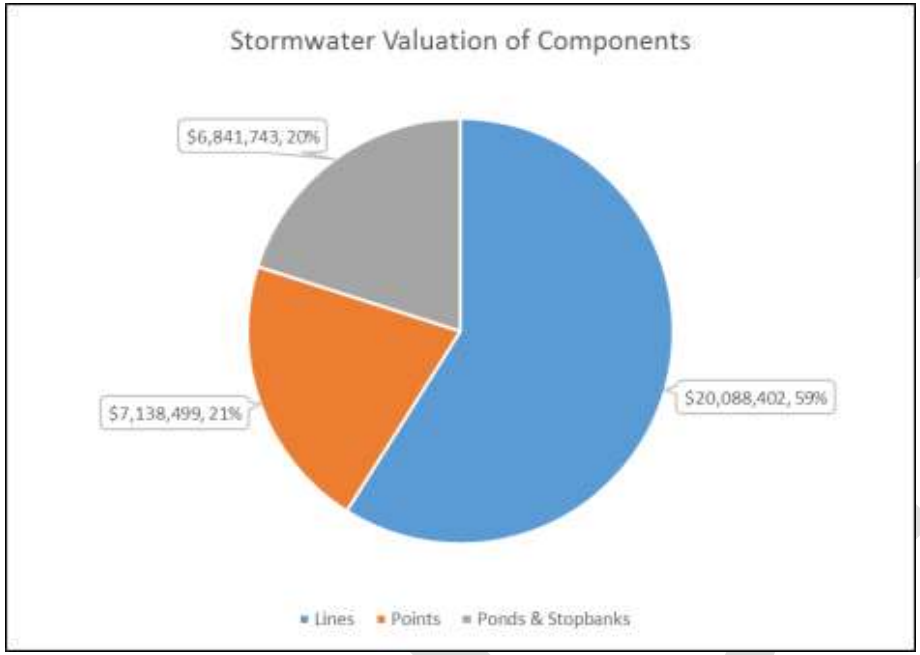


Table 1-3: Stormwater replacement value of asset types

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



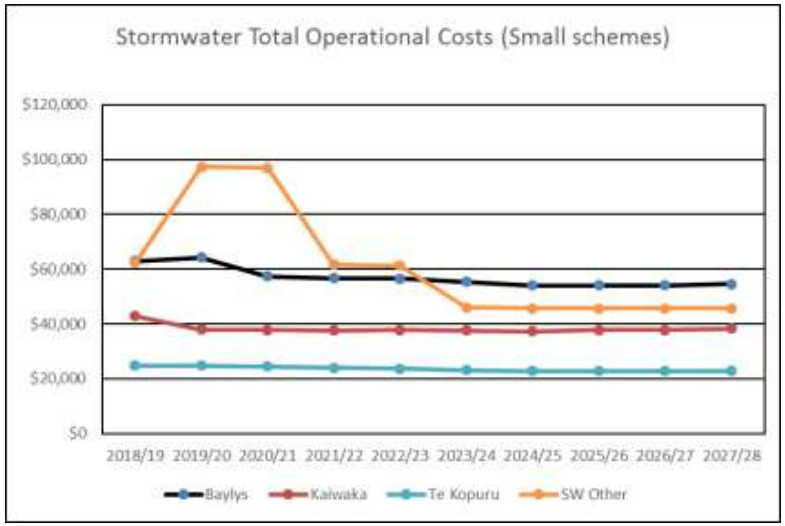
1.3 Financial and Lifecycle Strategy

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

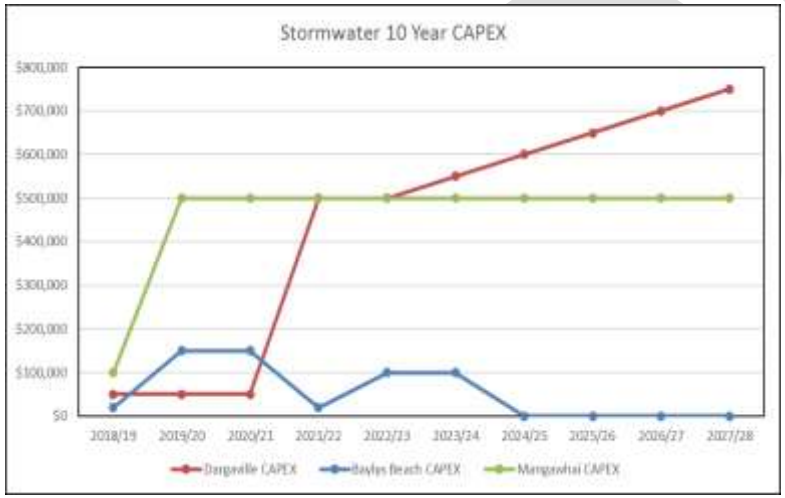
Figure 1-5: Operational expenditure for large schemes

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

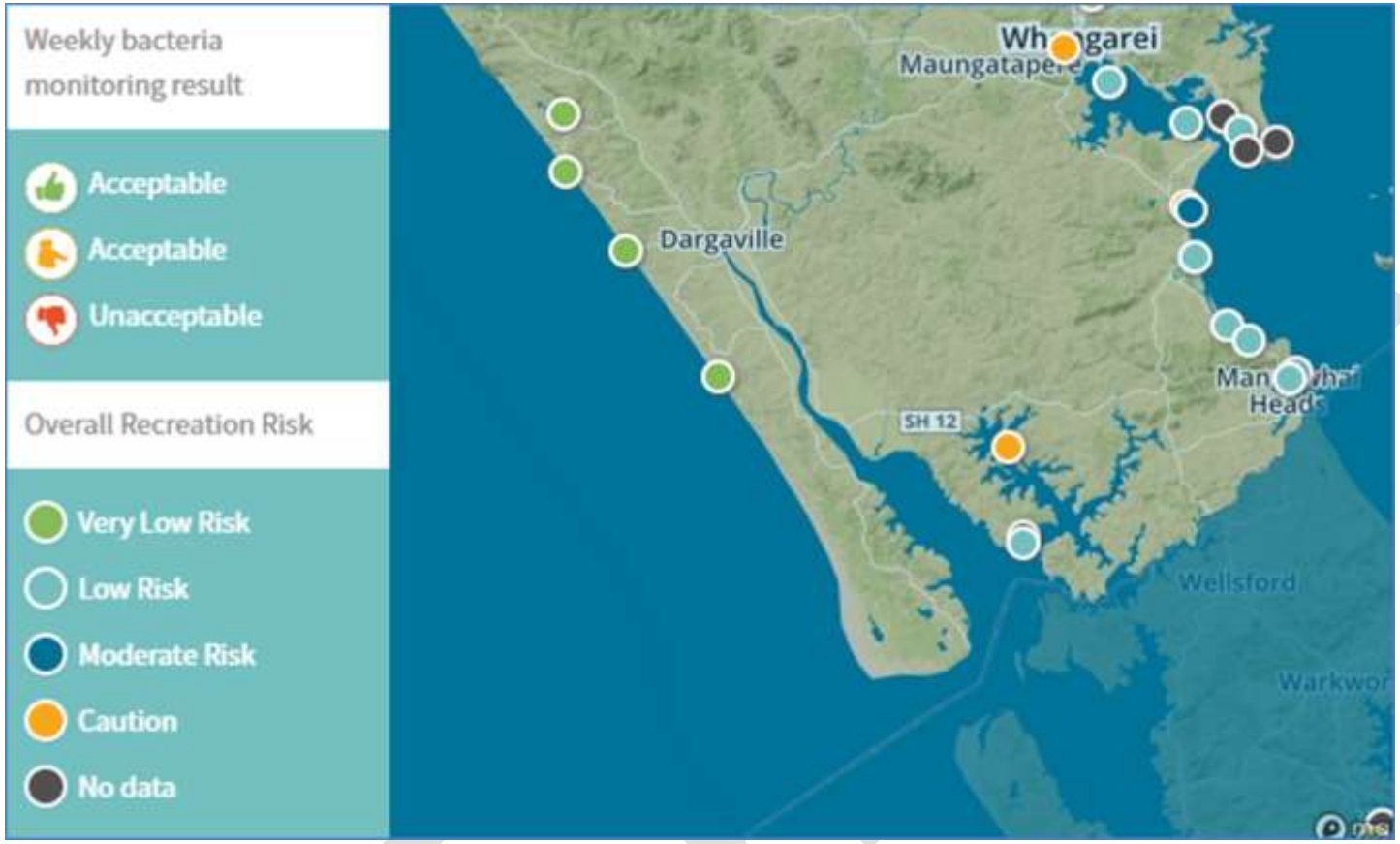
Okay to swim at most popular swim spots; NRC

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

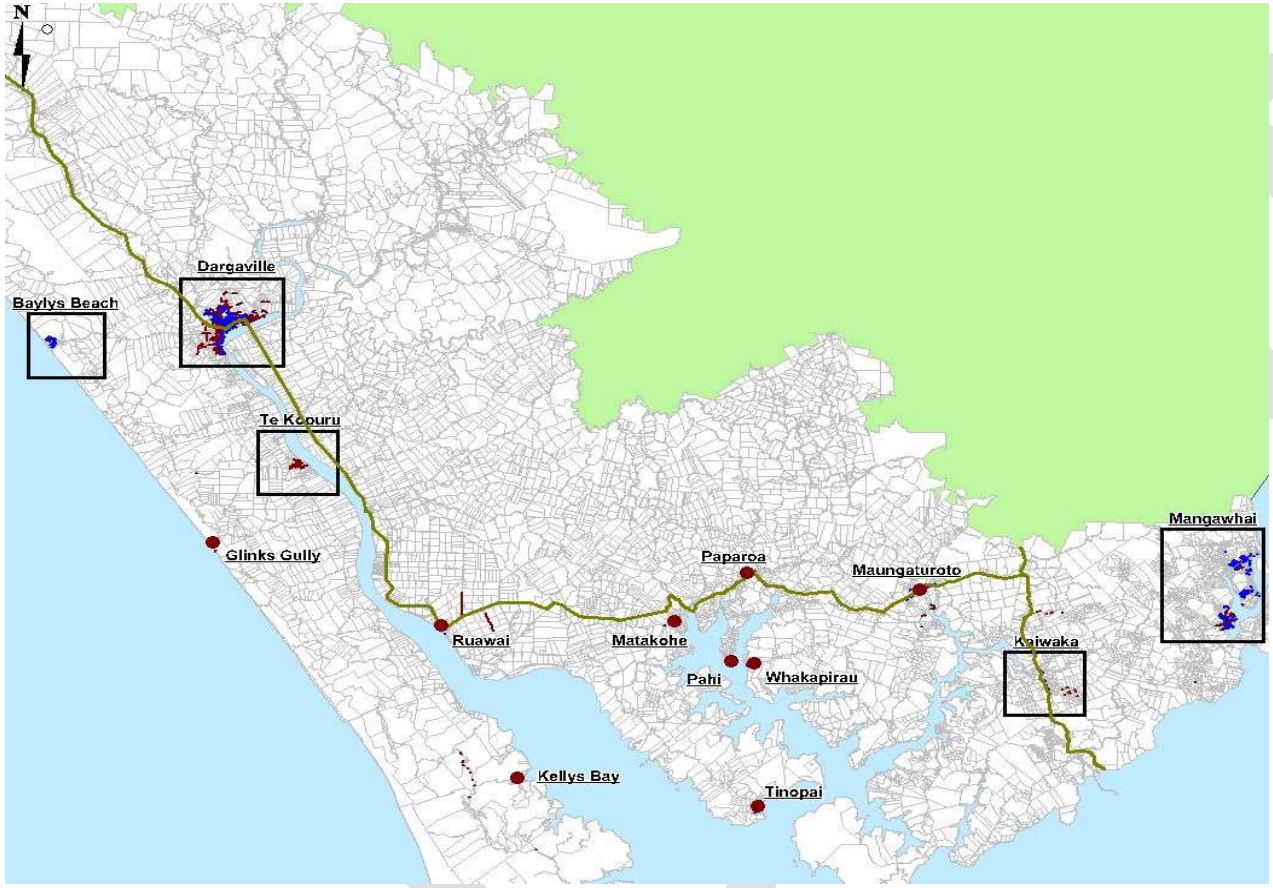
The stormwater assets that are within the scope of this AMP service residential and business areas in the following townships:

- 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**

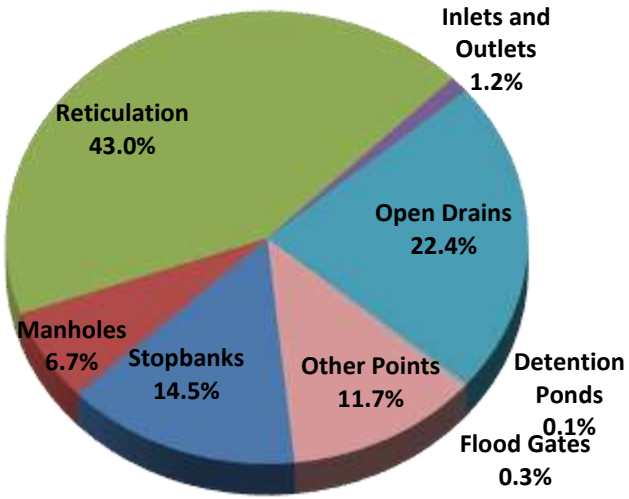
NB: Various natural assets such as overland flow paths and soft assets including riparian planting are located throughout the district.

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.

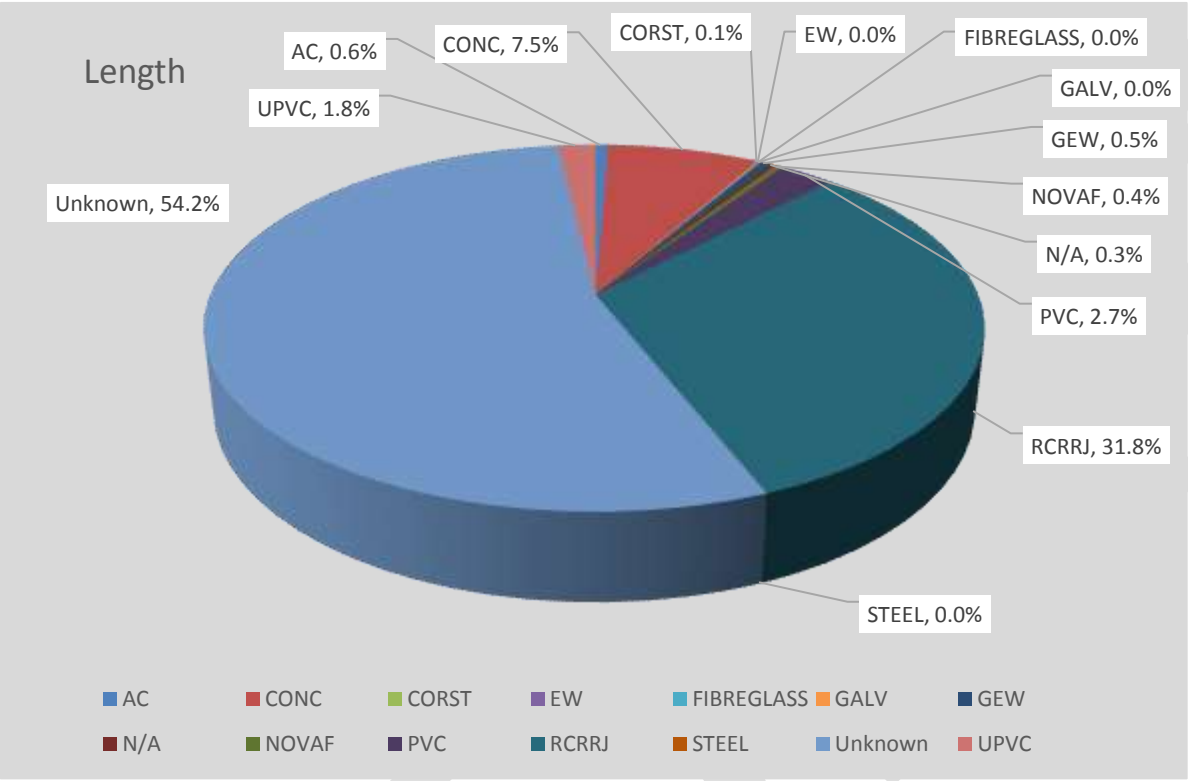
- 37% of pipe diameters are unknown (20.7km);
- 57% of pipe materials are unknown (32.4km); and
- 34% of pipes have both unknown diameters and unknown materials (19.3km). Figure 5-5 below summarises the known and unknown pipeline materials.

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**

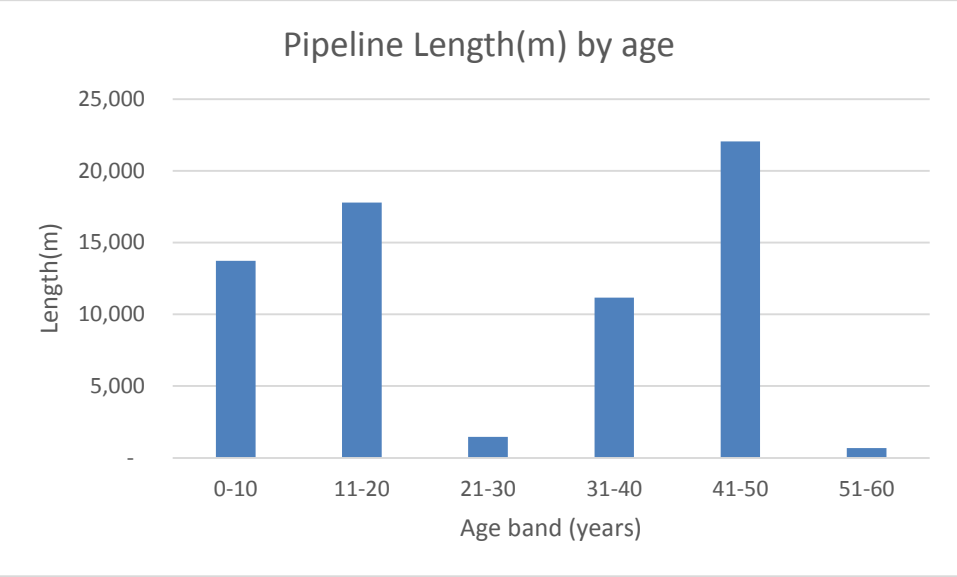
Data source: AssetFinda June 2015

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.

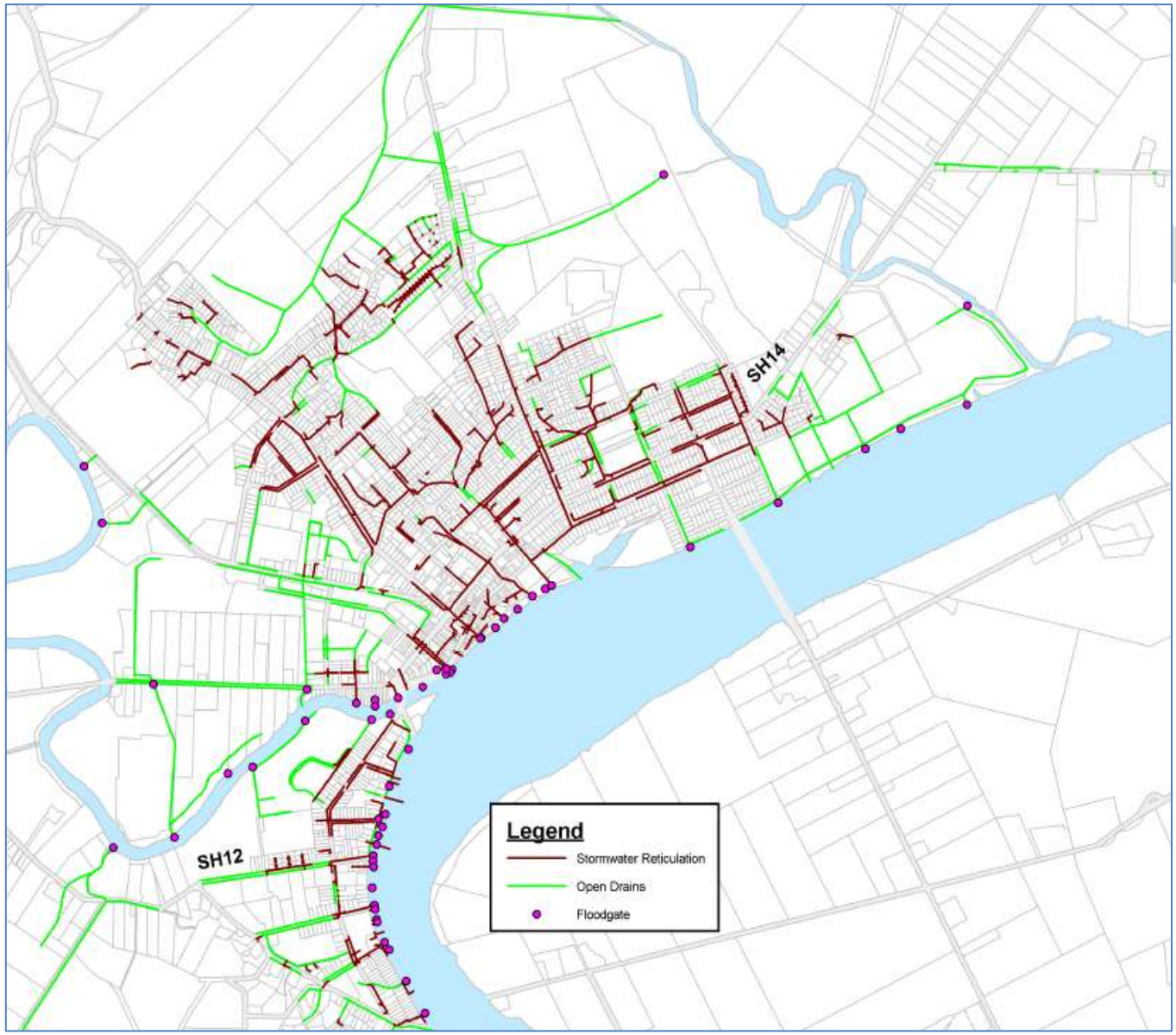
Table 5-7: Dargaville asset summary

	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

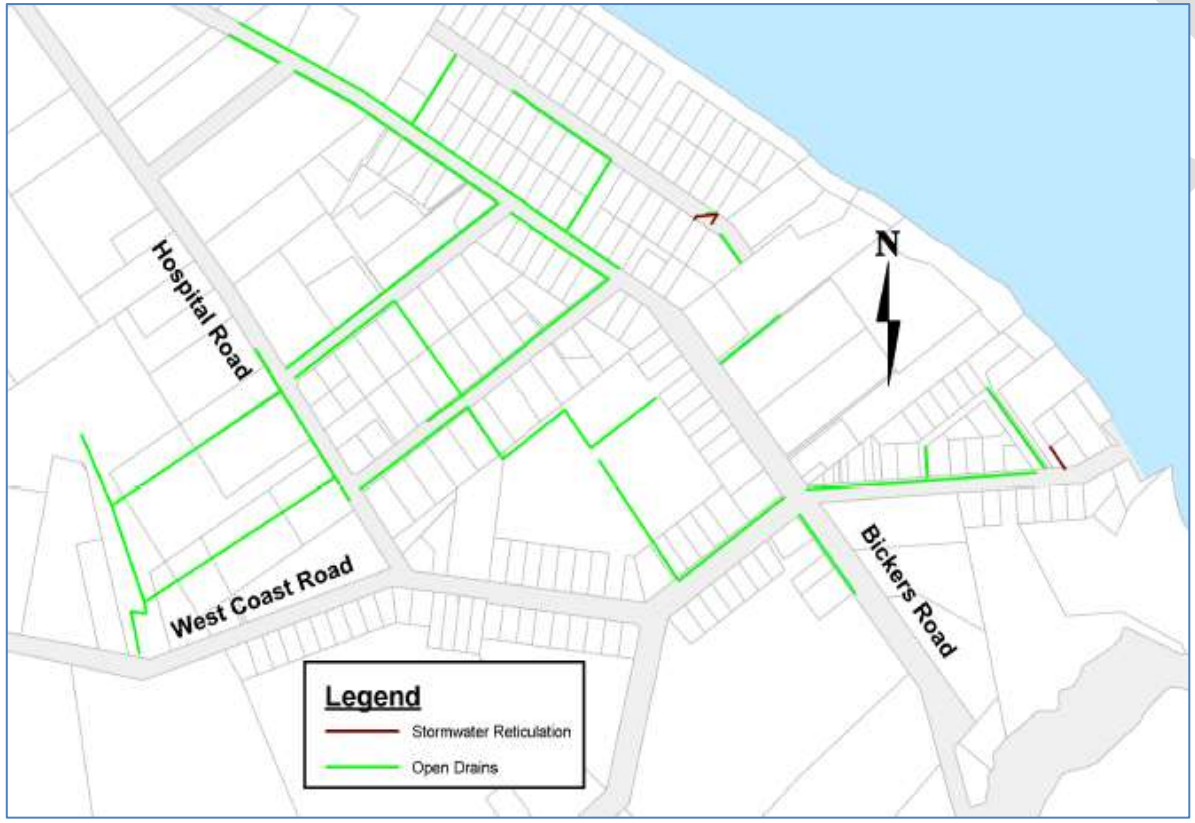
5.3.3 Te Kopuru

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.

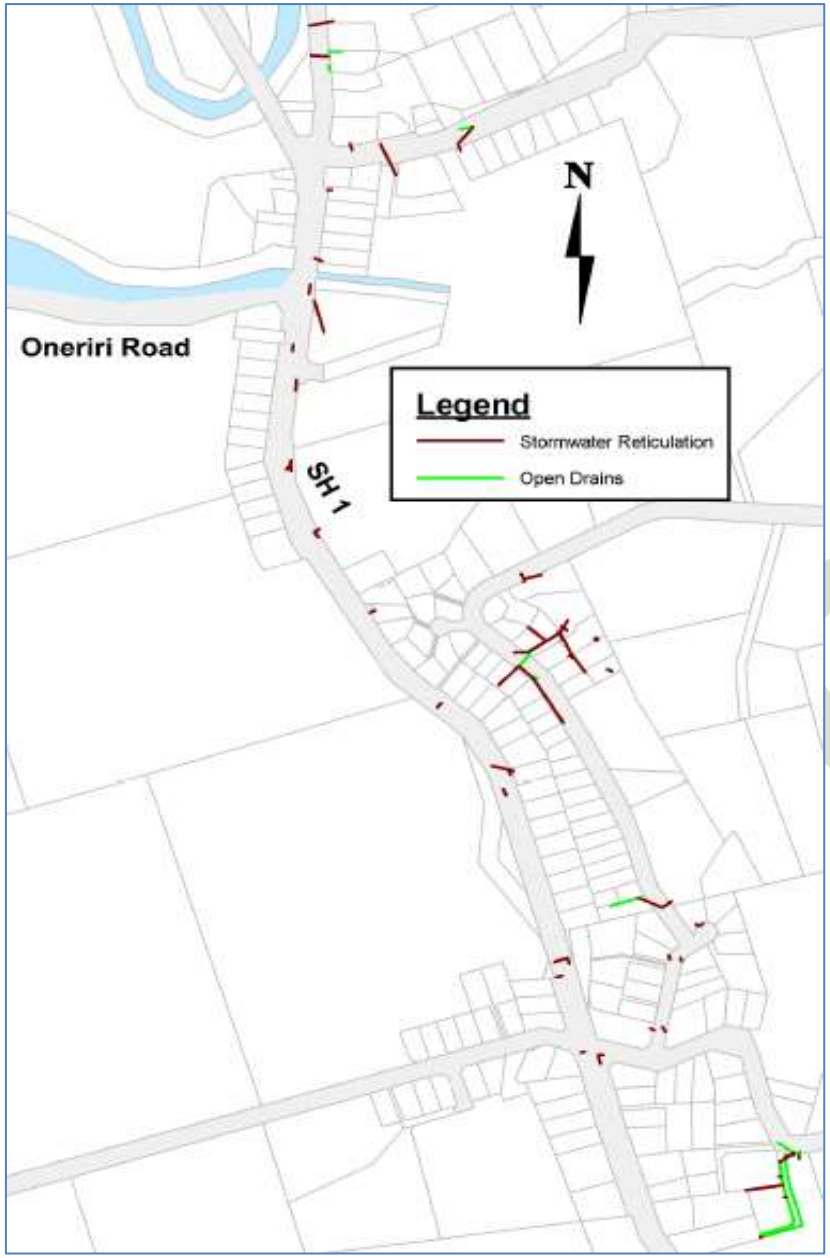
Some of the reticulation is servicing the road network only and some may be private. Clarification of the ownership and operations and maintenance responsibilities of these assets is listed as an item in the Improvement Plan.

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

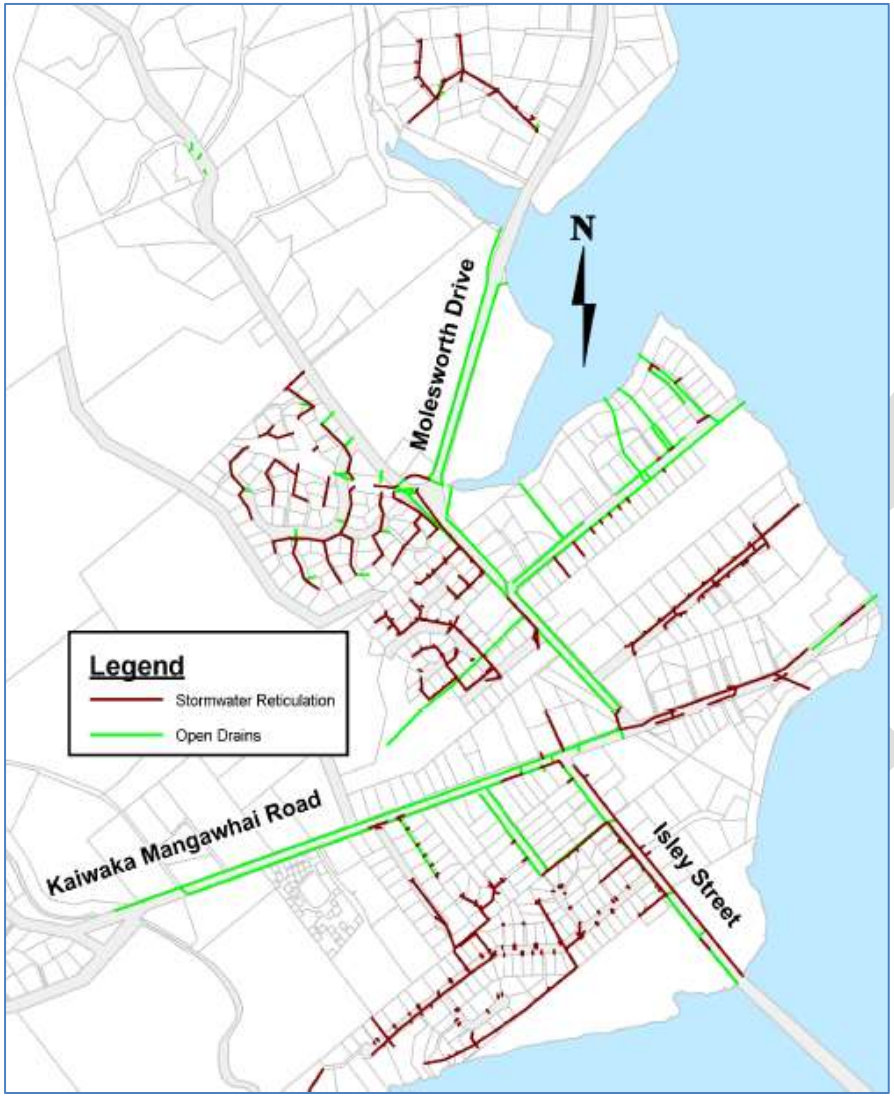
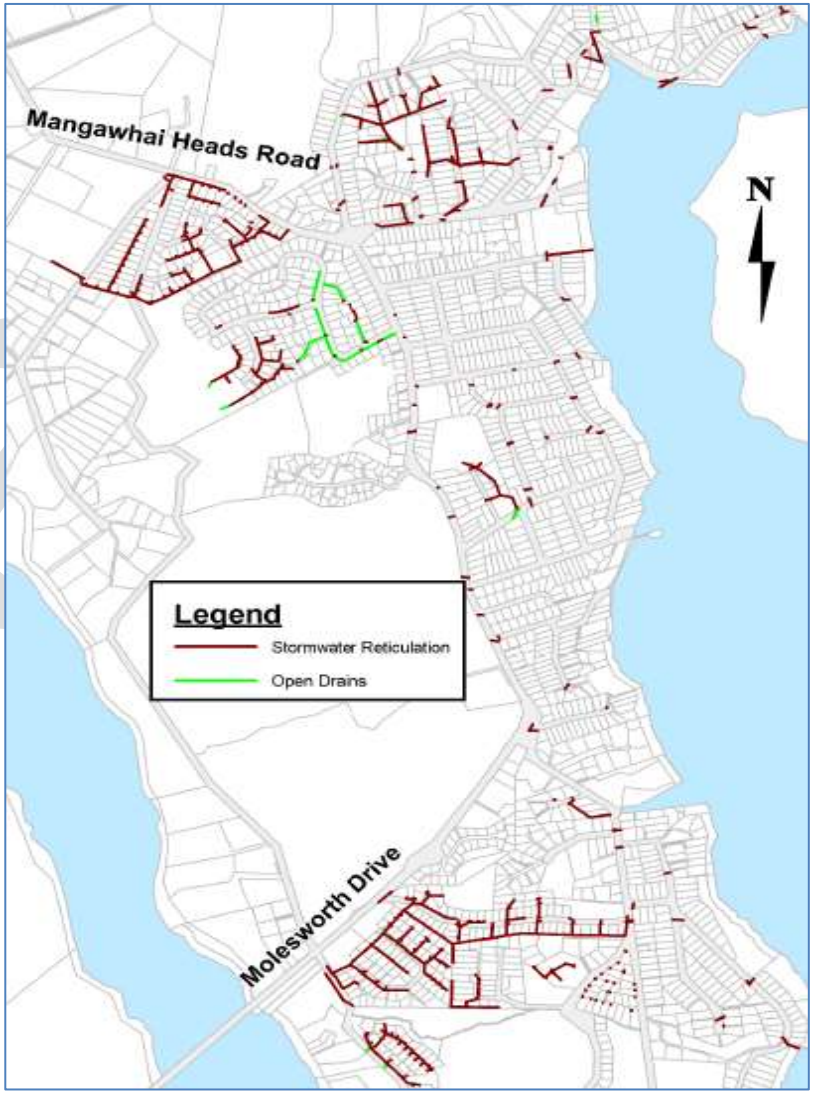


Figure 5-11: Mangawhai Heads asset map



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

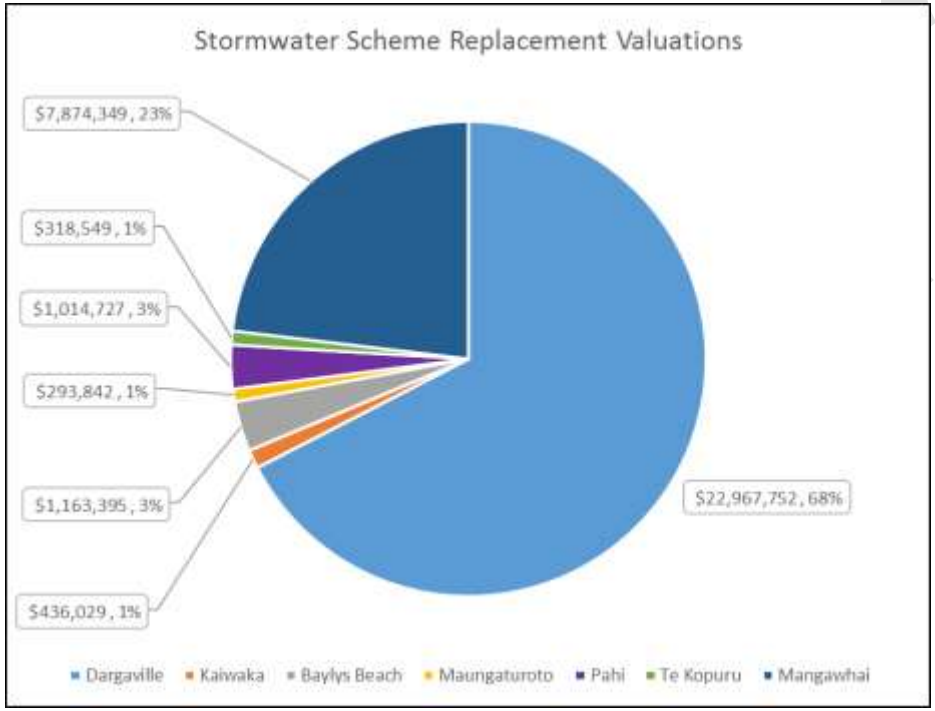


Figure 5-16: Relative valuation of components

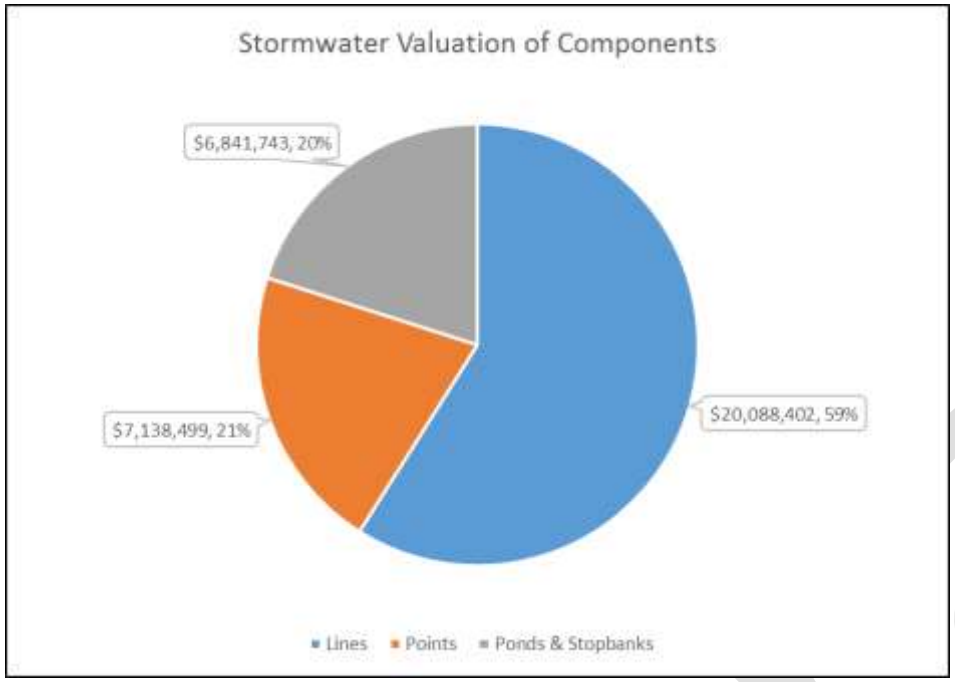


Table 5-23: 2016 Unit rates for valuation

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 $'000	2018-2019 $'000	2019-2020 $'000	2020-2021 $'000	2021-2022 $'000	2022-2023 $'000	2023-2024 $'000	2024-2025 $'000	2025-2026 $'000	2026-2027 $'000	2027-2028 $'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:	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	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:	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	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:	Annual Plan	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget
30 June	2017-2018 $'000	2018-2019 $'000	2019-2020 $'000	2020-2021 $'000	2021-2022 $'000	2022-2023 $'000	2023-2024 $'000	2024-2025 $'000	2025-2026 $'000	2026-2027 $'000	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 $'000	2018-2019 $'000	2019-2020 $'000	2020-2021 $'000	2021-2022 $'000	2022-2023 $'000	2023-2024 $'000	2024-2025 $'000	2025-2026 $'000	2026-2027 $'000	2027-2028 $'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

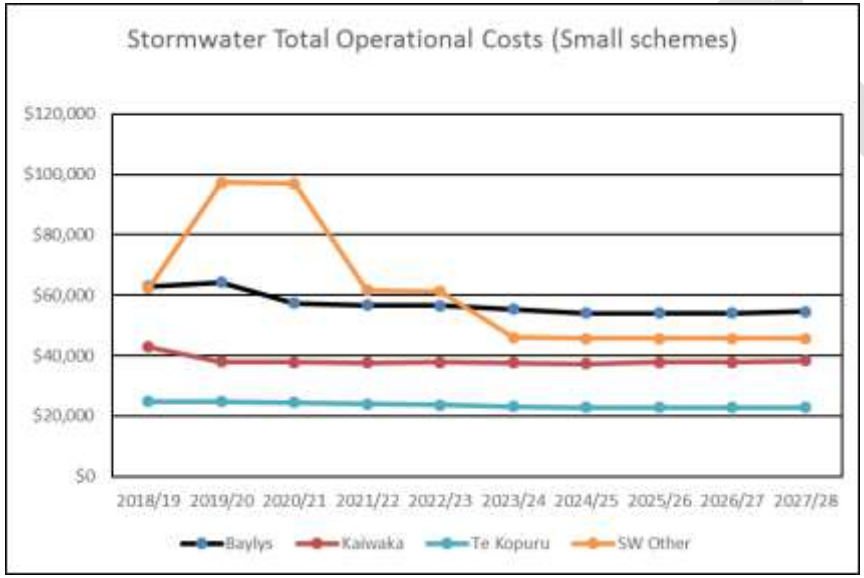


Figure 6-4: Operational expenditure by type

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:	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	-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:	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	-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**

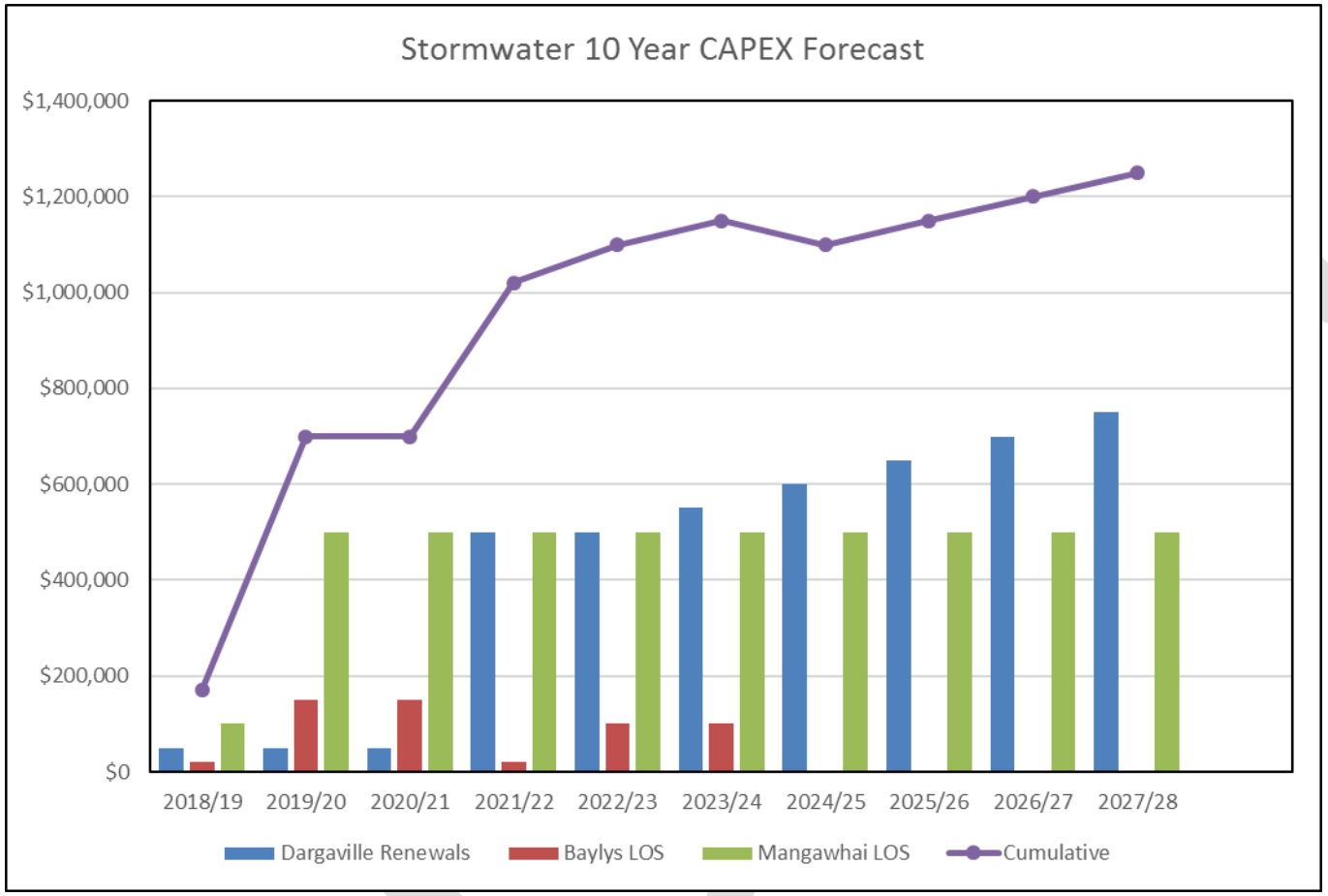
Mangawhai

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:	Annual Plan	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget	Budget
30 June	2017-2018 $'000	2018-2019 $'000	2019-2020 $'000	2020-2021 $'000	2021-2022 $'000	2022-2023 $'000	2023-2024 $'000	2024-2025 $'000	2025-2026 $'000	2026-2027 $'000	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

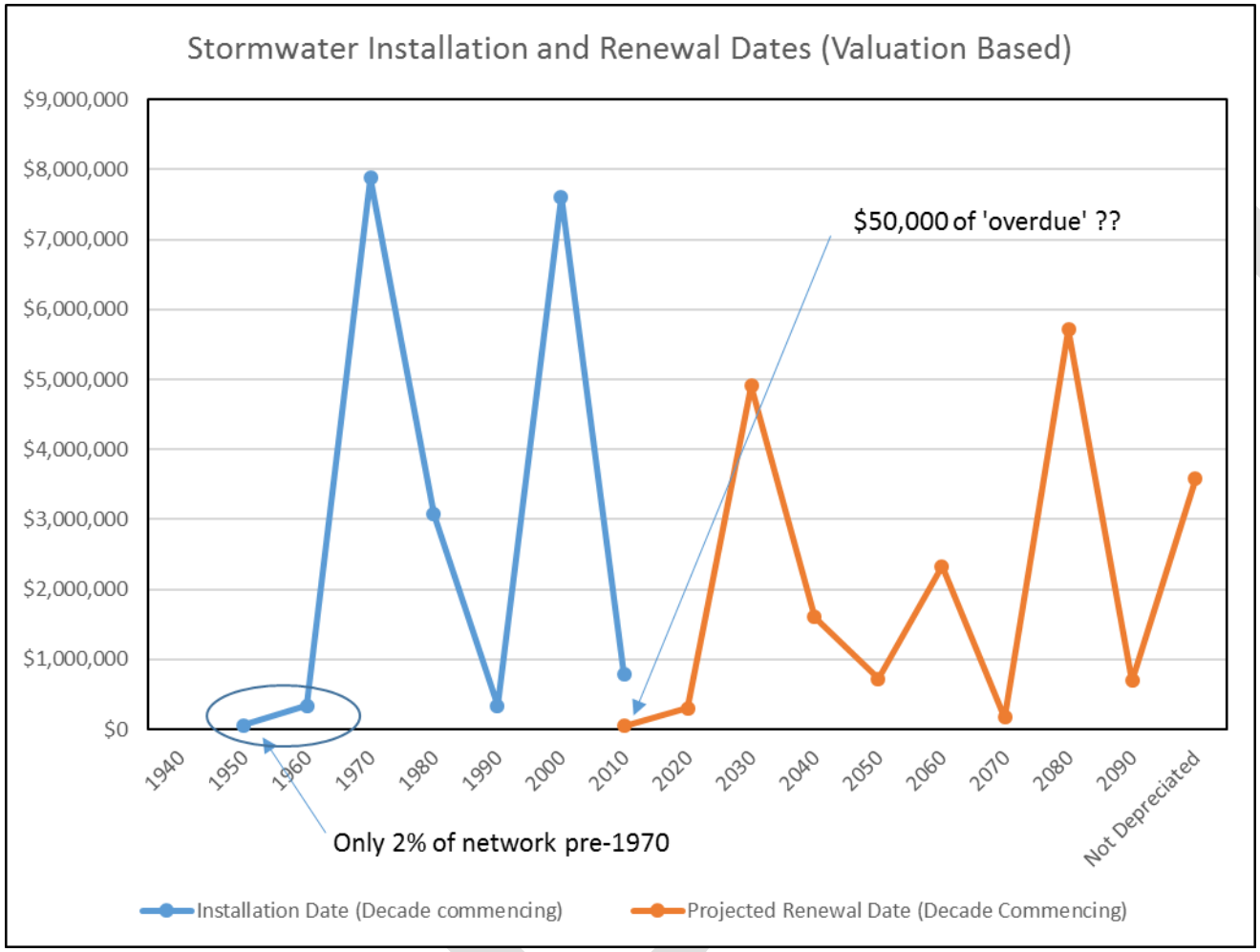


Figure 7-3: Stormwater projected pipe renewals

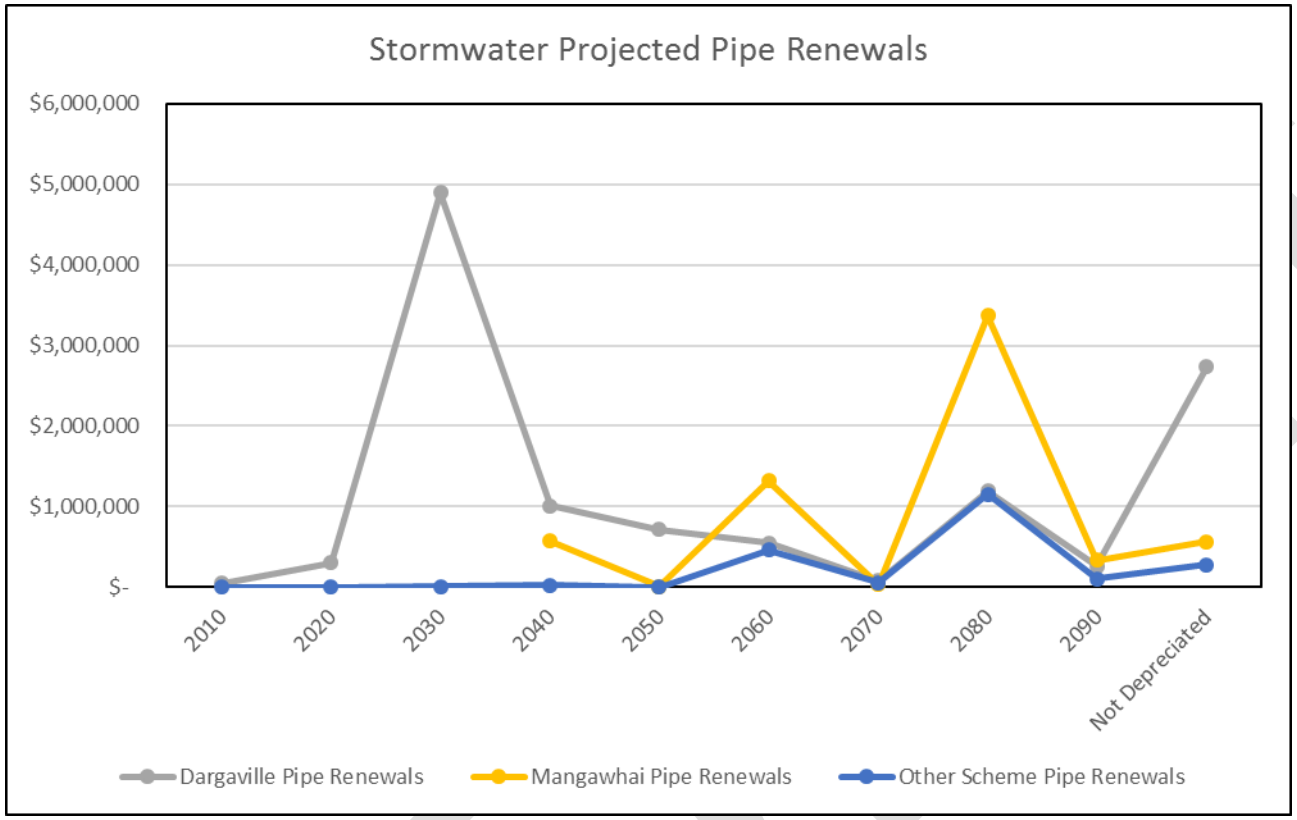
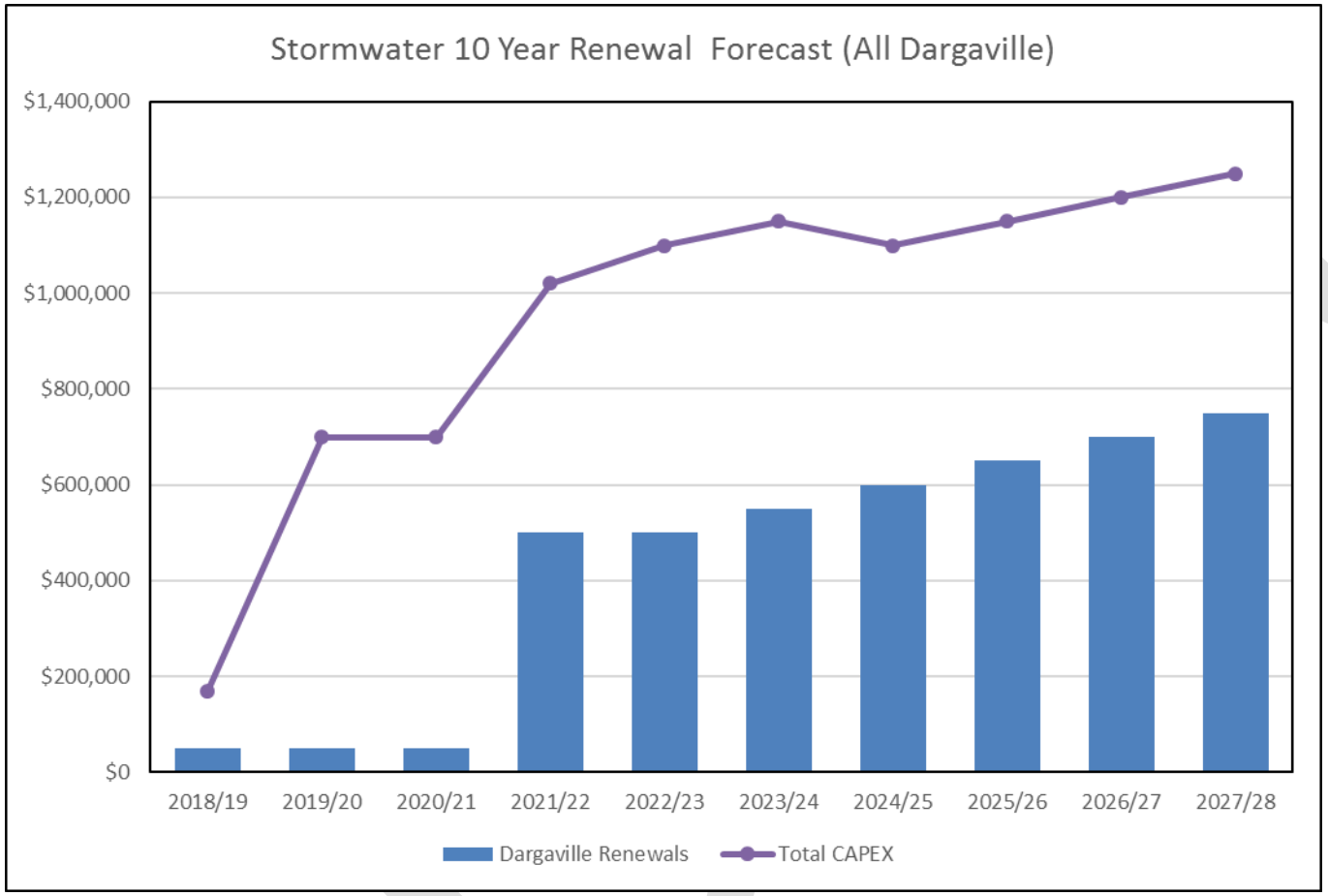


Figure 7-4: Stormwater 10 year renewal forecast (all Dargaville)



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.

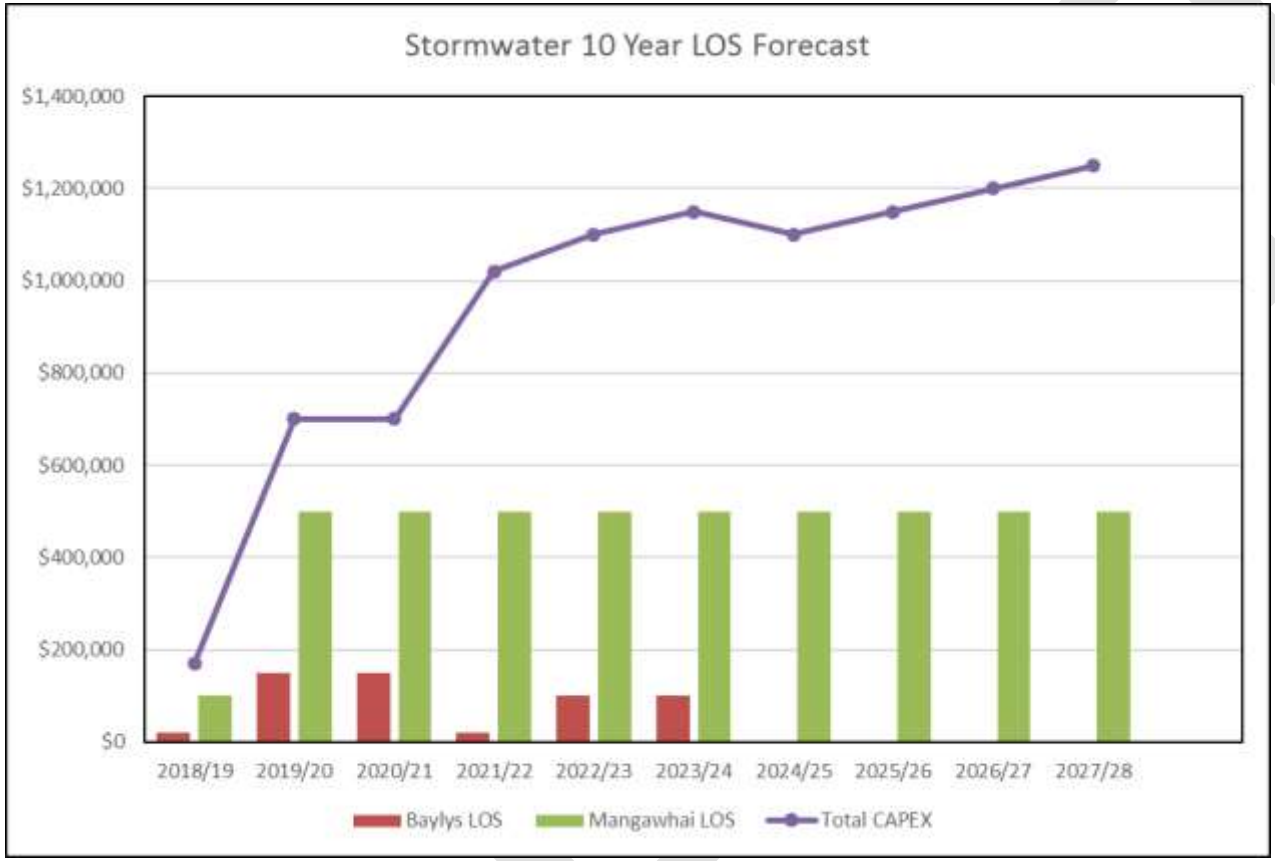
Table 7-2: Dargaville current network issues (new capital)

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.

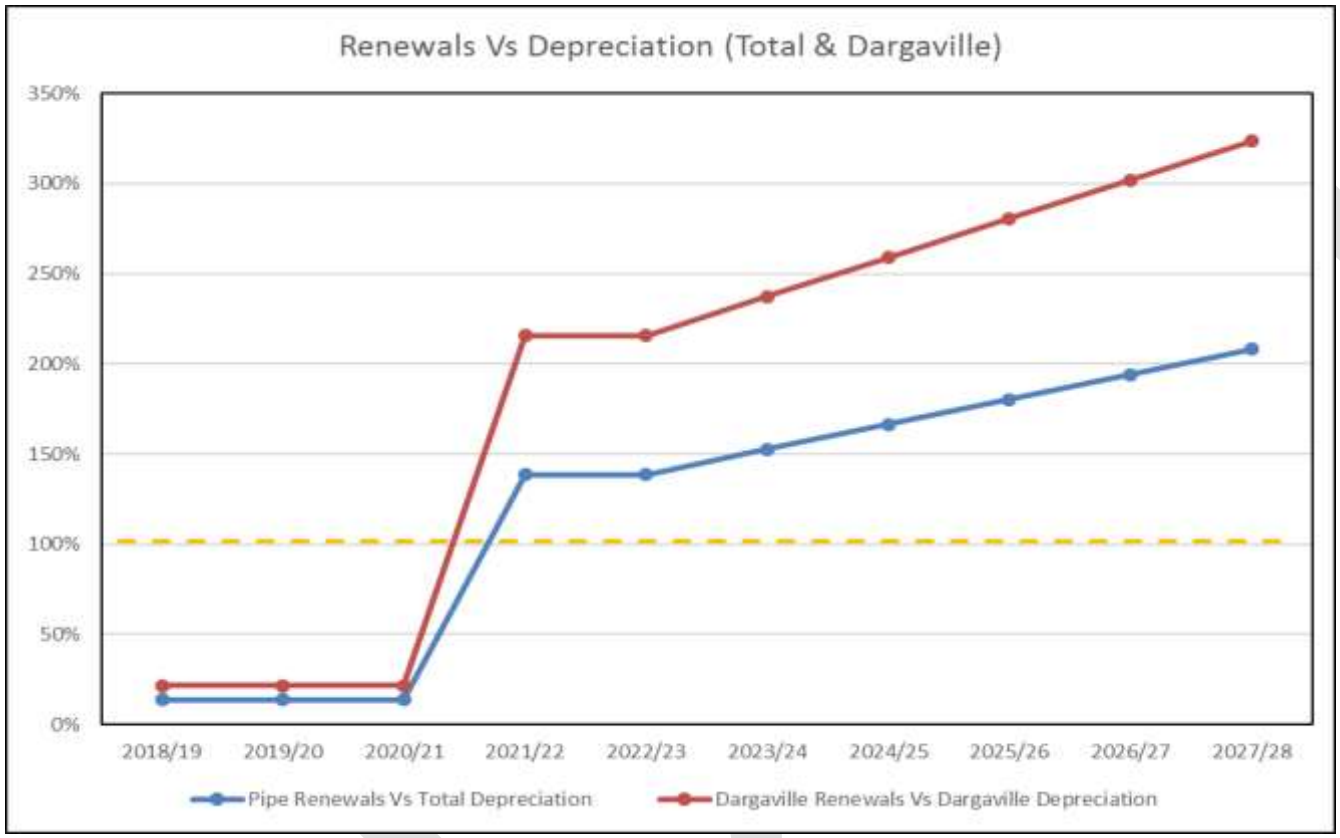
The table and figure below illustrate the expenditure on pipeline renewals Vs depreciation charges for each of the 10 years. As renewal expenditure is only indicated for the Dargaville scheme this is the only one shown. This also reflects the large proportion of overall expenditure and depreciation collection 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

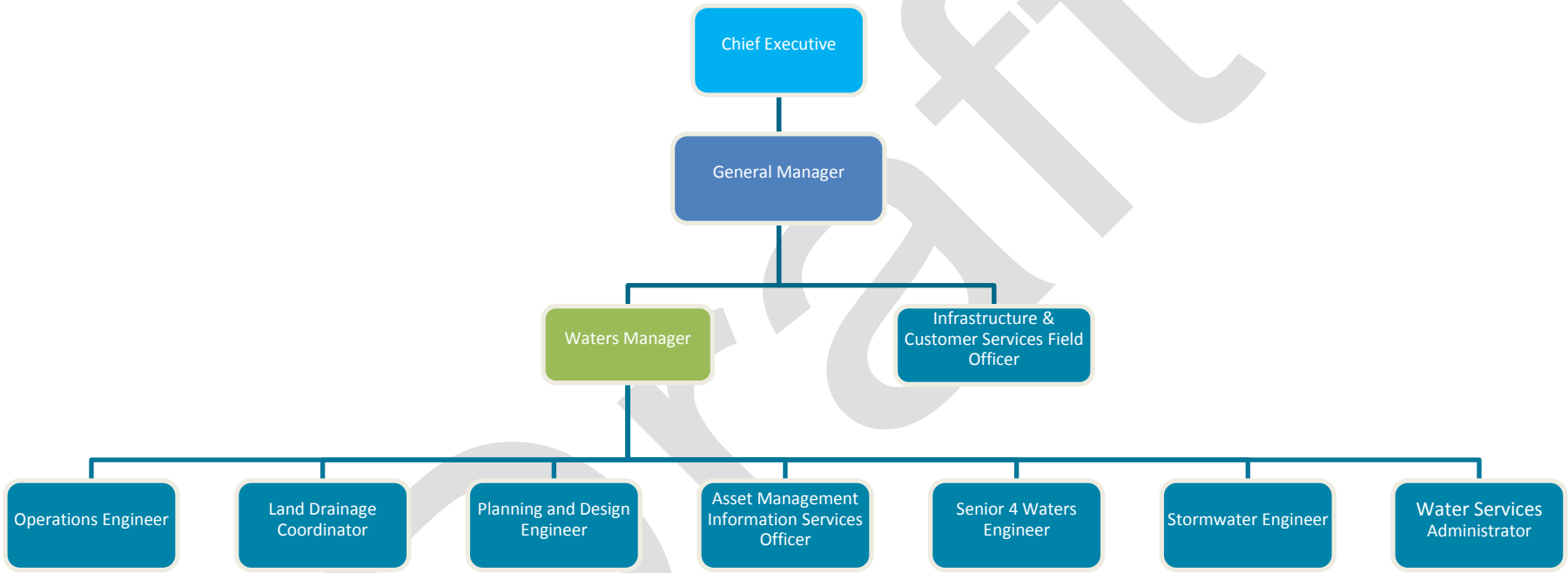
Assumption type	Assumption	Discussion
Financial assumptions	That all expenditure has been stated in 01 July 2017 dollar values (GST exclusive) and no allowance has been made for inflation.	The LTP will incorporate inflation factors. This could have a significant impact on the affordability of the plans 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.

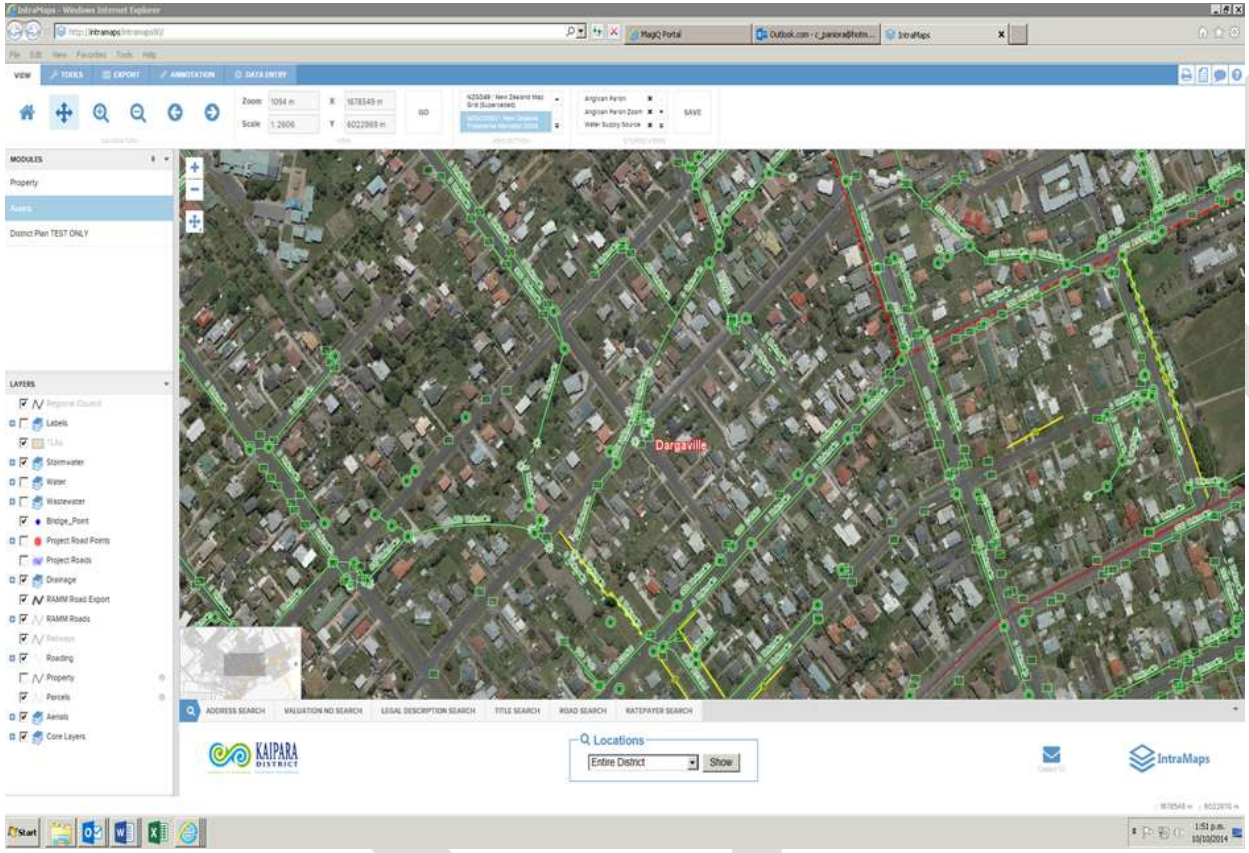
9.2.2 IntraMaps

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



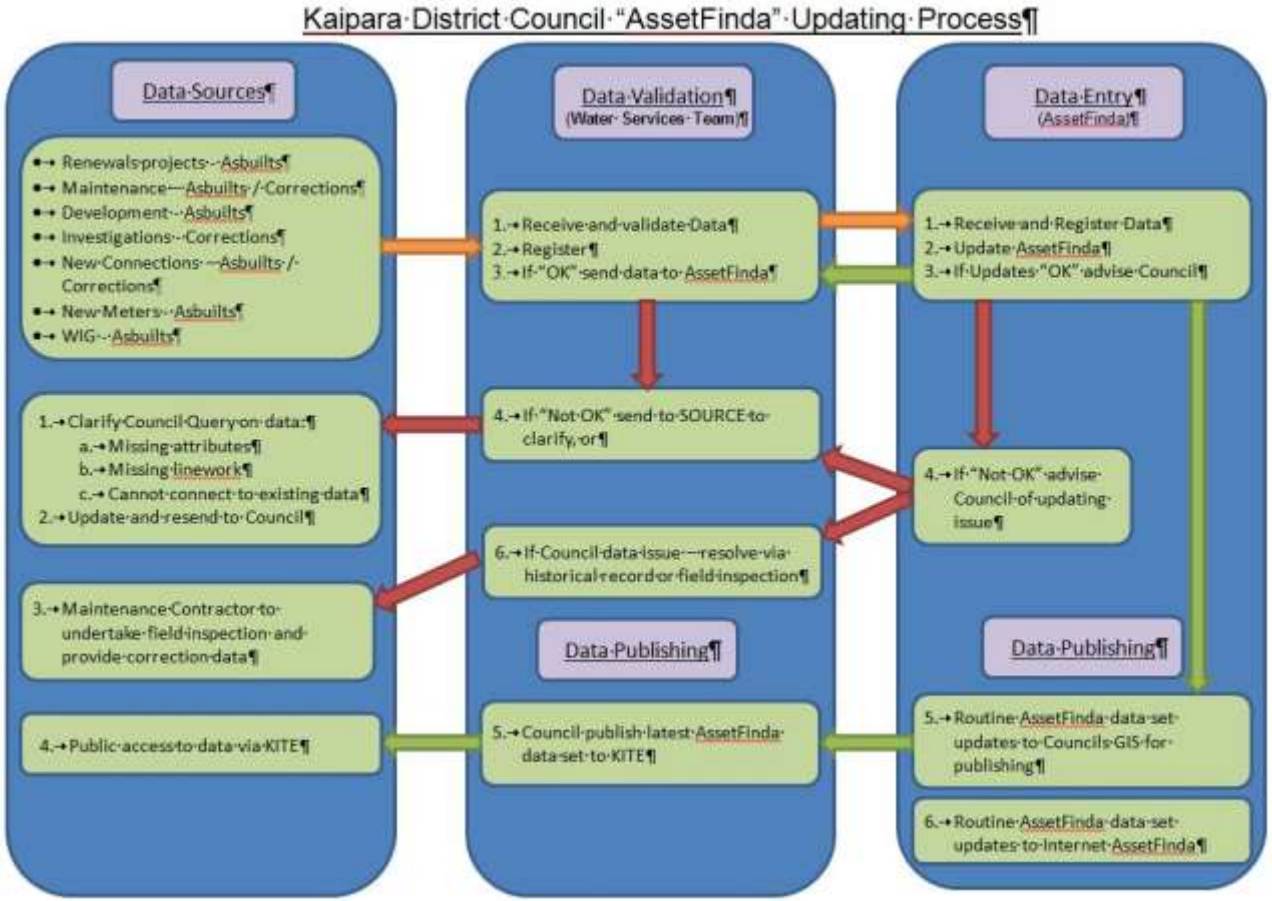
The representation of the assets within this system is believed to be reasonably comprehensive, although gaps and inaccuracies in the data are known to exist. A data improvement task has been identified and included in the AMIP to fix the known anomalies.

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



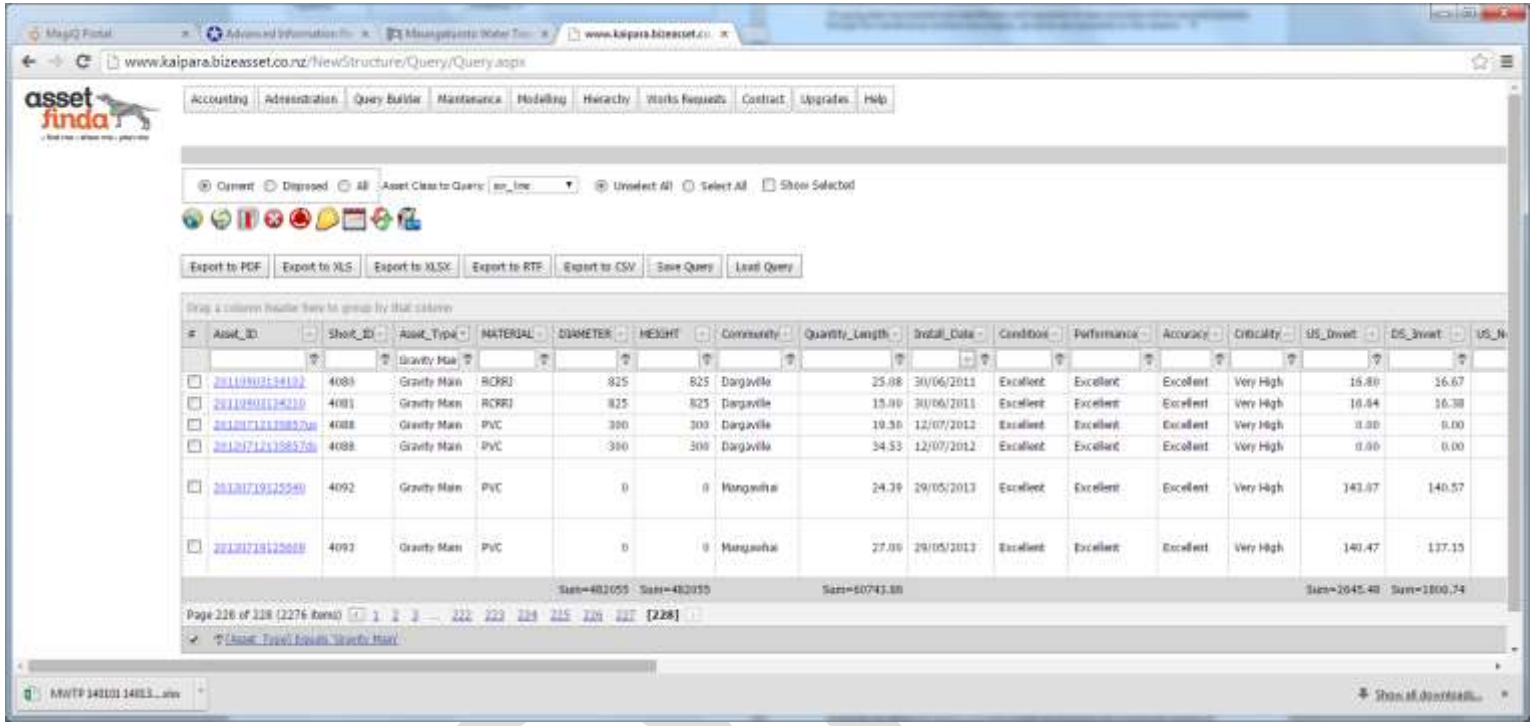
9.2.3 AssetFinda

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

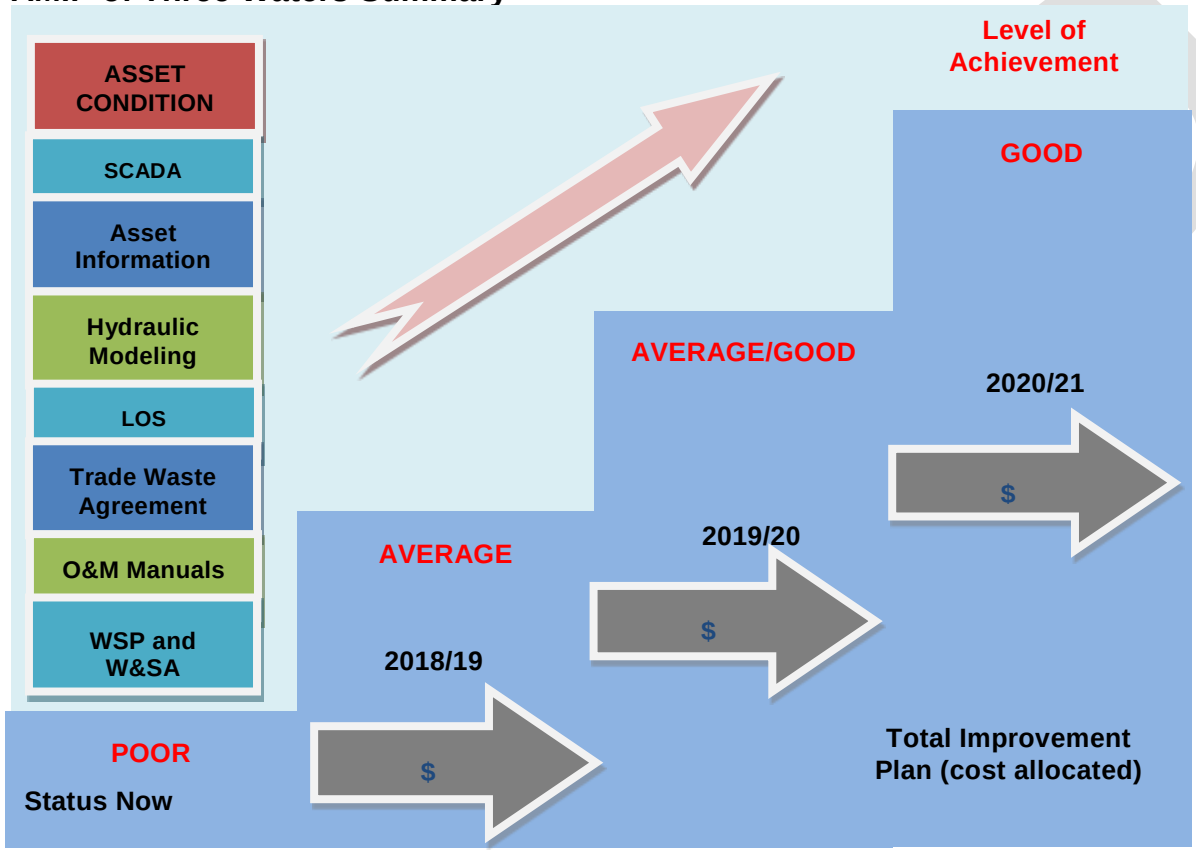
Appendix A: Asset Management Improvement Plan

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