

2011/12 Rivers and Drainage Asset Management Plan



Acronyms

AEE	Assessment of Environmental Effects
AM	Asset Management
AMIP	Asset Management Improvement Programme
AMIS	Asset Management Information System
AMP	Asset Management Plan
AS/NZ	Australia and New Zealand Standards
BAP	Best Appropriate Practice
BRE	Business Risk Exposure
CDEM	Civil Defence Emergency Management
CEO	Chief Executive Officer
CPP	Competitive Pricing Procedure
DRC	Depreciated Replacement Cost
CDEM	Civil Defence Emergency Management
GIS	Geographic Information System
GRC	Gross Replacement Cost
H&S	Health and Safety
IIMM	International Infrastructure Management Manual
IPCC	Intergovernmental Panel on Climate Change
IT	Information Technology
KPI	Key Performance Indicator
LCM	Life Cycle Management
LGA 2002	Local Government Act 2002
LoS	Levels of Service
LTP	Long Term Plan (referred to as a Ten Year Plan (TYP) by Bay of Plenty Regional Council)
MCA	Multiple Criteria Analysis
MMI	Maintenance Management Item
NAMS	National Asset Management Steering (Group)
NPV	Net Present Value
NRB	National Research Bureau

NZIAS16	New Zealand International Accounting Standard
OAG	Office of the Auditor General
ODM	Optimised Decision Making
ORDM	Optimised Renewal Decision Making
O&M	Operations and Maintenance
OSH	Occupational Safety and Health
QA	Quality Assurance
QBL	Quadruple Bottom Line (reporting)
RMA	Resource Management Act 1991
RUL	Remaining Useful Life
SNZ HB	Standards New Zealand Handbook (Risk)
SWOT	Strengths, Weaknesses, Opportunities and Threats
TEAMQF	Total Enterprise Asset Management Quality Framework
TYP	Ten Year Plan

Scope of this Plan

This Asset Management Plan (AMP) intends to describe how Bay of Plenty Regional Council manages the region's rivers and drainage assets on behalf of the community. It aims to present this information in an accessible, appropriate way for its readers, which includes executive management and elected members of the Council, interest groups, business partners and members of the Bay of Plenty Regional Council community. This Plan covers the services that are provided, the assets and the long term planning and management goals that are taken into account when delivering the service. The Plan format shown below outlines the sections contained within this AMP.



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Asset Management Team

Bay of Plenty Regional Council Rivers and Drainage Asset Management Team

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Approved for issue:

Signed _____ Date _____
Ken Tarboton

Approved for issue:

Signed _____ Date _____
Roger Waugh

Prepared by GHD

This is the first review of the Rivers and Drainage Schemes combined Asset Management Plan. The original plan was produced using a framework developed by GHD Limited in conjunction with staff from Bay of Plenty Regional Council.

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Rivers and drainage at a glance

Bay of Plenty Regional Council major river and drainage schemes within its regional boundaries include:

Table 1 Overview of the Rivers and Drainage Schemes

	Total catchment area (km ²)	Total number of stakeholders
Kaituna Catchment Control Scheme	1,246	36,600
Rangitāiki Drainage Scheme	290	4,323
Rangitāiki-Tarawera Rivers Scheme	3,995	8,100
Waioeka-Otara Rivers Scheme	1,175	3,300
Whakatāne-Waimana Rivers	1,540	7,635
Totals	8,246	59,958

In addition to the schemes mentioned above there are a number of minor rivers and drainage schemes that complete the rivers and drainage network in the Bay of Plenty. These minor schemes are not part of the Rivers and Drainage AMP. Bay of Plenty Regional Council do not own these assets, although they do manage them. Each scheme has the discretion to use Council or others to manage their scheme.

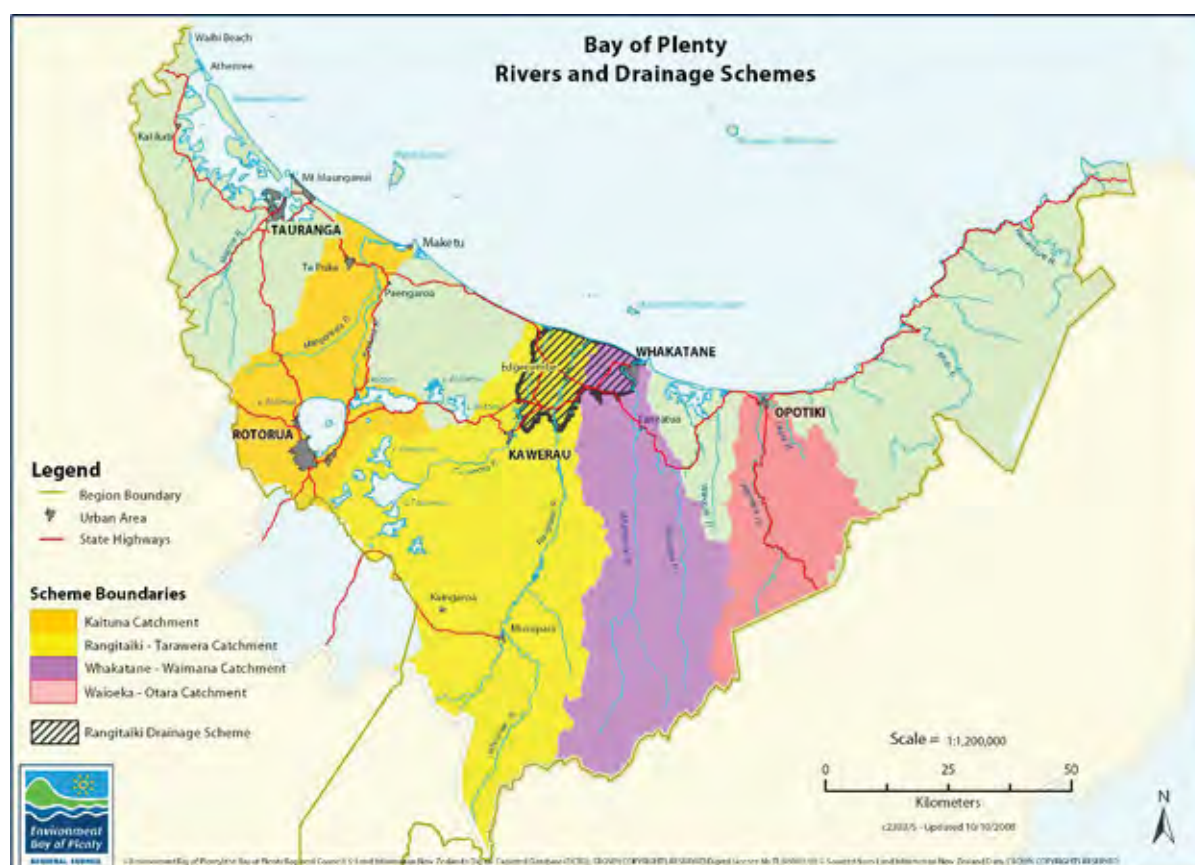


Figure 1 Map of Rivers and Drainage Schemes

Rivers and Drainage overview

Kaituna Catchment Control Scheme

The Kaituna Catchment Control Scheme includes the Kaituna River, Lake Rotorua and Lake Rotoiti catchments. The scheme consists of two discrete areas divided at Okere; the Upper Kaituna and Lower Kaituna schemes.

Rangitāiki Drainage Scheme

The Rangitāiki Drainage Scheme provides gravity drainage to the Rangitāiki Plains, an area of approximately 29,000 ha. The scheme has 88 km of major canals (arterial) and 240 km of drains, which divert excess water from the Rangitāiki Plains into the Tarawera, Rangitāiki and Whakatāne Rivers.

Rangitāiki-Tarawera Rivers Scheme

Rangitāiki-Tarawera Rivers Scheme provides flood protection and channel edge stability to land within the Rangitāiki and Tarawera catchments. It has the largest catchment area of all the schemes.

Waioeka-Otara Rivers Scheme

The Waioeka-Otara Rivers Scheme provides flood protection, channel edge stability and some drainage and pumping to Opotiki and the surrounding land on the flood plain.

Whakatāne-Waimana Rivers Scheme

The Whakatane-Waimana Rivers Scheme provides flood protection, channel edge stability and drainage to the Whakatane River and Waimana River catchments.

Activity strategic outcomes (Levels of Service)

This AMP is developed by setting a range of goals/outcomes to ensure the assets are aligned with Council's wider direction. The outcomes framework used to develop this AMP is illustrated on page 17 of this document.

The customer values identify the key attributes that residents want the assets to provide. These values form the basis of the service statements (activity strategic outcomes) that Council will strive to deliver in managing the assets. The level of service statements in Rivers, Drainage and Flood Protection Activity in the Ten Year Plan summarise these strategic outcomes.

Table 2 Customer values (NAMS) and activity strategic outcomes

Customer value (NZMS)	Activity strategic outcomes (LoS)
Affordability quality	<ul style="list-style-type: none"> ▶ Provide flood protection in river and drainage scheme areas to agreed design levels. ▶ Flood protection is affordable and predominantly paid for by targeted ratepayers.
Safety	<ul style="list-style-type: none"> ▶ Health and safety risks are minimised.
Sustainability (whole community benefits)	<ul style="list-style-type: none"> ▶ Community is <i>informed</i> of potential widespread flooding allowing them to take <i>actions</i> to avoid the hazard. ▶ <i>Effects</i> on the environment are <i>minimised</i> in operations, works and asset maintenance.
Community engagement	<ul style="list-style-type: none"> ▶ Decision-making processes are transparent and easily understood and enables participation.
Reliability/responsiveness	<ul style="list-style-type: none"> ▶ Response to service requests, complaints and events timely and appropriate solutions are provided.

Key issues and strategies

The key issues relating to the management of the rivers and drainage activity are as follows:

Table 3 Rivers and drainage key issues and strategies

Key issue	Strategies to address key issues
▶ Sea level rise.	▶ Some provision included in some schemes.
▶ Increased frequency and magnitude of flooding due to climate change.	▶ Some provision is provided with the effect quantified through future capacity reviews.
▶ Interdecadal Pacific Oscillation.	▶ To be considered in any future review of flood protection assets.
▶ Stock damage to stopbanks.	▶ Monitoring to assess condition.
▶ Stopbank alignment - too close to river channel increasing risk of undermining.	<ul style="list-style-type: none"> ▶ Additional edge protection works. ▶ Maintenance of existing edge protection works and buffer zones. ▶ Improved design in river edge protection.
▶ Stopbank narrowness in some rural locations.	<ul style="list-style-type: none"> ▶ Undertaking opportunities to widen stopbanks to design requirements through renewals. ▶ Geotechnical assessments where risk is identified.
▶ Aggradation of river bed through the natural movement of river metal.	<ul style="list-style-type: none"> ▶ Monitoring. ▶ Promotion for increased gravel extraction. ▶ Directing extractors to areas of aggradation

▶ Water takes for irrigation purposes.	▶ Regulatory controls and monitoring.
▶ Increased requirement to waterways for recreational purposes.	▶ Identify and develop existing and potential access points.
▶ Increased flood damage to river banks.	▶ Improved design in river edge protection.
	▶ Additional funding to repair damages.
	▶ Repair sites before additional damage occurs.

Asset summary

All of the assets owned and managed as part of the rivers and drainage activity can be grouped under five asset group headings as shown in the table below.

Asset group	Asset	Value (ORC 30 June 2011)
Erosion protection	▶ Buffer zone	\$160,694
	▶ Edge planting	\$997,757
	▶ Fencing	\$439,501
	▶ Groyne	\$289,964
	▶ Rock work	\$20,566,636
	▶ Rubble	\$410,018
	▶ Trenched willows	\$2,560,621
Pump stations	▶ Pumps	\$2,383,196
	▶ Pump station	\$5,919,590
	▶ Pump - electrical	\$127,473
	▶ Pump - electronics	\$308,641
Stopbanks	Stopbanks	\$141,951,370
Structures	▶ Culvert	\$4,594,965
	▶ Concrete structure	\$1,975,341
	▶ Concrete wall	\$1,580,640
	▶ Drop structure	\$324,494
	▶ Flood gate	\$2,367,965
	▶ Radial gate	\$229,424
	▶ Sluice gate	\$50,905
	▶ Stop log	\$82,783
	▶ Timber wall	\$22,481
Waterways	▶ Canals	\$15,578,164
	▶ Drains	
Resource Consents	▶ Consent35	\$1,557,985
Total		\$204,482,608

Figure 2 below provides a summary of the Optimised Replacement Cost (ORC) for the main rivers and drainage asset groups as at 30 June 2011.

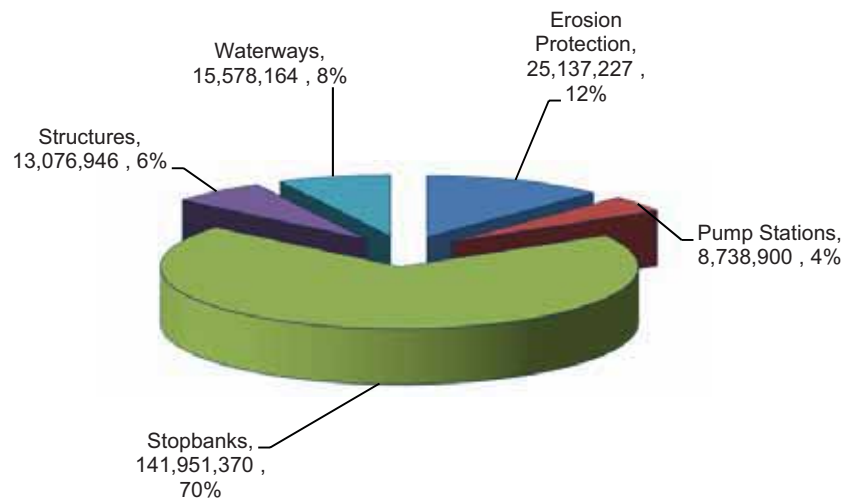


Figure 2 ORC Rivers and Drainage infrastructure

Foreword by the Chief Executive



This Rivers and Drainage Schemes Asset Management Plan and the underlying asset management planning processes are fundamental to ensuring the regions needs are met in a timely and cost effective manner.

Asset management planning allows Bay of Plenty Regional Council to manage our physical assets, their performance and maintenance expenditures, and the associated risk over their lifecycles. It commits us to a framework to sustainably manage our infrastructural assets.

This Rivers and Drainage Schemes Asset Management Plan covers management of the assets in the Kaituna Catchment Control Scheme, Rangitāiki-Tarawera Rivers Scheme, Whakatane-Waimana Rivers Scheme, Waioeka-Otara Rivers Scheme and Rangitāiki Drainage Scheme.

Together these schemes have a combined current value of \$204 million. This Asset Management Plan represents the main driver for expenditure on flood protection and drainage in the Bay of Plenty region. Operating expenditure for the five schemes is projected to be \$93 million during the next 10 years and approximately \$90 million for each 10-year period for the following 40 years.

Capital expenditure on the schemes is projected to be \$39 million during the next 10 years, and between \$10 - \$20 million for each 10-year period for the following 40 years.

The Rivers and Drainage Schemes Asset Management Plan has been developed in accordance with best practice, in particular the International Infrastructure Asset Management Manual. This plan is aimed to meet the requirements of an intermediate to advanced level of asset management.

This Rivers and Drainage Schemes Asset Management Plan includes chapters on the Strategic Environment, a Business Overview, Business Processes, Environmental Stewardship and Risk Management of the schemes. Key information which has been updated from earlier asset management plans is included in chapters on LoS (LoS) and Life Cycle Management, which contains schedules of asset maintenance and capital works. As in earlier AMPs there is an Improvement Plan chapter, since the AMP is a “living” document and will be constantly improved.

Assets are integrated into both the corporate financial and Geographical Information Systems (GIS) so information can be accessed in a spatial environment with up to date financial details. For example, the value of a pump in the financial system is linked to the pump’s physical location in the GIS.

The Rivers and Drainage AMP assumes that river scheme asset maintenance and capital works are funded 80% from targeted scheme ratepayers and 20% from general funds. The Rangitāiki Drainage Scheme is funded 100% by targeted ratepayers.

Through this Rivers and Drainage Schemes Asset Management Plan, Bay of Plenty Regional Council is adopting a systematic approach to long-term sustainable management of our region’s key rivers and drainage assets.

.....
Mary-Anne McLeod
Chief Executive

Introduction

The place

The Bay of Plenty is located on the east coast of the North Island of New Zealand. The region incorporates the full extent of the coastline from Cape Runaway in the east, to Waihi Beach in the west captures the coastal townships of Tauranga and Whakatane. On the landward side, the region is mostly bounded by the watersheds of the catchments that flow into the Bay of Plenty; this includes the lakes in the Rotorua district. On the ocean side, the region includes 18 offshore islands including the volcanically active White Island, and the sea extending out to the 12-nautical-mile boundary.

The natural environment

The region is volcanically active with the Taupo Volcanic Zone crossing the area between White Island and Lake Taupo. The two major features of this zone include a number of extensive geothermal areas (for example those found in Rotorua) and a number of earthquake fault lines that run parallel to each other within this zone.

Eight major rivers empty into the Bay - these are the Wairoa, Kaituna, Tarawera, Rangitāiki, Whakatane, Waioeka, Motu and Raukokore rivers. In addition, there are seven large estuaries - the Maketu, Little Waihi, Whakatane, Waiotahi, Waioeka/Otara, Tauranga and Ohiwa estuaries. The abundance of waterways in the area combine to enhance the active lifestyle opportunities for the Bay's residents and visitors and also presents a number of challenges regarding provision of access to waterways whilst protecting the surrounding areas from extreme flooding events.

Climate

The Bay of Plenty generally has one of the sunniest climates in New Zealand, especially in coastal areas where dry spells have been traditionally quite common place. Annual rainfall follows variations in topography and varies from 1,400 mm near the coast to 4,000 mm on the highest parts of the Raukumara Ranges. Indications of climate change by the IPCC are that the Bay of Plenty region may receive less rainfall in future, however the intensity and frequency of high rainfall events is likely to increase. Sea level is predicted to rise and the magnitude of tidal storm surge will also increase.

Purpose of this Plan

The purpose of this Plan is to formally document the management philosophy that is applied to the rivers and drainage infrastructure assets and services. This approach ensures that acceptable LoS are provided in the most cost effective manner and contribute to the achievement of the Bay of Plenty Regional Council Ten Year Plan (TYP).

This long-term planning approach is considered necessary given the large capital and operating expenditure, the long lives of the assets and the lead times in planning for upgrades of new assets when required. The sequencing and timing of works are developed through discussions with key stakeholders and this Plan is prepared in consultation with them.

The key purposes of this Plan are to:

- ▶ Convey the long-term strategy for the management of the rivers and drainage assets and services;
- ▶ Improve understanding of service level standards, options and costs to smooth peak funding demands, while improving customer satisfaction and organisational image;
- ▶ Manage the environmental, service delivery and financial risks of asset failure;
- ▶ Identify lifecycle (long term) costs to provide agreed level of service over the long term;
- ▶ Explain how the long term works programmes have been developed and how they will be funded; and,
- ▶ Demonstrate that the service potential of the rivers and drainage assets is being maintained.

Asset management objectives

Bay of Plenty Regional Council recognises that the Rivers and Drainage AMP is the fundamental driver of flood protection and drainage. This AMP represents the first revision of the combined AMP for all of the rivers and drainage schemes. The first Rivers and Drainage AMPs were completed in 1996 – 1998 and updated in subsequent years on a five yearly cycle for each scheme.

In order to fulfil the Outcomes, vision, goals and objectives of these assets (outlined in the Strategic Environment Section of the AMP), the Bay of Plenty Regional Council have adopted a systematic approach to the long-term management of its assets and services by preparing this AMP.

Bay of Plenty Regional Council is committed to best appropriate practice asset management in order to achieving the following key objectives:

- ▶ Meet the service expectations of the community ('customer values').
- ▶ Ensure capital projects and maintenance activities achieve efficient results with optimal benefits.
- ▶ Demonstrate Council's approach to managing risk and meeting growth requirements towards a sustainable future.
- ▶ Comply with all statutory requirements.

Plan timeframe

This AMP covers a 50-year timeframe. The Plan assumes that the rivers and drainage assets as a whole have an indefinite life and the main focus of the plan is determining the strategies required for maintaining, rehabilitating and renewing components over the next 10 years. This AMP provides the detail underlying the Ten Year Plan, and will be revised every three years.

Limitations of the AMP

This intermediate-advanced level AMP has been prepared based on:

- ▶ Currently available information and data;
- ▶ Existing LoS; and
- ▶ Forecasts completed for 50 years.

Scope of this Plan

The Plan format shown below outlines the sections contained within this Executive Document (AMP).

- ▶ Introduction
- ▶ Strategic Environment
- ▶ Business Overview
- ▶ Levels of Service
- ▶ Community Engagement
- ▶ Growth and Demand
- ▶ Environmental Stewardship
- ▶ Risk Management
- ▶ Life Cycle Management
- ▶ Project and Financial Forecasts
- ▶ Business Processes
- ▶ Improvement Plan

This Executive Document provides a summary for the rivers and drainage activity. Significant detail on each of these areas is contained within the main document.



Strategic environment

Purpose

Bay of Plenty Regional Council's work guides and supports the sustainable development of the Bay of Plenty, to ensure the region grows and develops in a way that keeps its values safe for future generations.

"Our work guides and supports the sustainable development of the Bay of Plenty. We want to make sure our region grows and develops in a way that keeps its values safe for future generations."

Mission

The Bay of Plenty Regional Council's mission is:

"Working with our communities for a better environment"

Strategic assets

Council's Policy on Significance lists the rivers and drainage assets as strategic assets. This means that any transfer of ownership of the assets would be a significant decision and would require a full analysis of options and consideration of community views and preferences in Council's decision-making process.

How the Rivers, Drainage and Flood Management Activity contributes to Council Outcomes

The Ten Year Plan (TYP) outlines the Council Outcomes that set out how Council's work will make a difference to the community. There are 13 Council Outcomes that set the direction for Council's 12 activities as set out in the TYP. The Rivers, Drainage and Flood Management Activity contribute to two Council Outcomes as set out below:

Council Outcome	Contribution to Council Outcomes	Objectives	Section of AMP it is addressed in
Resilience and Safety: We are resilient to flooding and natural disaster events and our water ways are safe for a wide variety of users.	<ul style="list-style-type: none"> ▶ Maintain flood protection schemes to agreed levels for major rivers and floodplains across the region. 	<ul style="list-style-type: none"> ▶ Identify potential hazards and develop ways to mitigate flood risks to protect people, property and their livelihoods. ▶ Manage the effect of development upon the existing rivers and drainage schemes and provides a sustainable solution for future requirements. ▶ Provide protection of public health and property by providing flood protection and mitigation. ▶ Protecting the environment from flood damage using flood protection measures. 	<ul style="list-style-type: none"> ▶ Strategic Environment. ▶ Growth and Demand, Risk. ▶ Levels of Service. ▶ Community Engagement. ▶ Environmental Stewardship. ▶ Risk Management. ▶ Projects and Financial Forecasts.
Council Outcome	Contribution to Council Outcomes	Objectives	Section of AMP it is addressed in
Resource Development: We harness our region's natural resources with care so they benefit us.	<ul style="list-style-type: none"> ▶ Providing protection to the region's floodplains to enable resources to be used efficiently and effectively so the community can benefit. 	<ul style="list-style-type: none"> ▶ Provide sustainable, safe, ongoing, and cost effective rivers and drainage schemes. ▶ Create safe conditions for new business through the management of potential rivers and drainage hazards. ▶ Provide robust maintenance, renewal and capital programmes. ▶ Provide protection of critical public infrastructure and regionally significant industries by providing flood protection and mitigation. 	<ul style="list-style-type: none"> ▶ Strategic Environment. ▶ Environmental Stewardship. ▶ Levels of Service, ▶ Life Cycle Management ▶ Growth and Demand, Risk. ▶ Risk Management.

Rationale for Council's involvement

Council carries out its Rivers, Drainage and Flood Management Activity to:

- ▶ Protect important infrastructure (such as roading networks, hospitals, sewage treatment facilities, water supplies and other utilities) and urban areas from flooding;
- ▶ Provide security to existing economic and social developments from flooding;
- ▶ Protect productive soils from stream and river erosion;
- ▶ Protect natural, physical and cultural heritage sites from the adverse effects of flooding and erosion;
- ▶ Provide drainage and pumping to low lying properties within scheme areas for flood protection; and
- ▶ Manage water levels in Lakes Rotorua and Rotoiti to obtain optimum benefit for lakeside residents, and lake and river recreational/commercial users.

If Council was to stop its involvement in the management of the schemes it is unlikely there would be another public body able to take on the role in the short-term.

Key partnerships and stakeholders

In order to achieve the goals set out in the Council Outcomes, there is a need for Council to work with other public agencies, community groups, businesses, individual landowners, iwi/hapu and non-governmental organisations.

Key partnerships

- ▶ Scheme residents through Scheme Liaison Groups and ratepayer associations.
- ▶ Volunteer community groups (e.g. Care Groups).
- ▶ Iwi and hapū through the Maori Committee.
- ▶ Central government.
- ▶ Non-government organisations through Council's processes such as the Environmental Enhancement Fund and regional plans.
- ▶ Industry groups and representatives.
- ▶ Regional development partnerships.
- ▶ Local authorities in the region under the Bay of Plenty triennial agreement.
- ▶ Emergency service providers (Police, Ambulance, Fire, Civil Defence).
- ▶ Utility companies – power (generation, transmission, distribution), communication, gas.
- ▶ Internal stakeholders:
 - ▶ Bay of Plenty Regional Council – councillors, CEO, committees and managers.
 - ▶ Asset Management staff.
 - ▶ Policy and Planning staff.
 - ▶ Regulatory services.
 - ▶ Financial and Corporate staff.
 - ▶ Information Services and GIS team.
 - ▶ Human Resources.

Business drivers

The key business for rivers and drainage are:

- ▶ Health and safety
- ▶ Statutory requirements:
 - Local Government Act 2002
 - Resource Management Act 1991 and (Climate Change and Energy) Amendment Act 2004
 - Civil Defence Emergency Management Act (CDEM) 2002
 - Health and Safety in Employment Act 1992
 - Rating Powers Act 1988
 - Building Act 2004

- Land Drainage Act 1906
- Soil Conservation and Rivers Control Act 1941
- Health Act 1956
- Specific requirements for asset management planning:
 - Demand
 - Levels of Service
- National standards:
 - National Policy Statement for Flood Hazard Risk Management (NZS9401:2008)
 - Government Policy Statements and Guidelines

Table 4 Cyclic planning relationships with other plans, reports and documents

Plans/documents	Description	Frequency
Long Term Plan (LTP)	The LTP sets out an agreed vision and Council outcomes for the Bay of Plenty region. The framework of this Plan is in line with the requirements of the Local Government Act 2002 (LGA 2002). This Plan will assist the Council in promoting sustainable practices as well as assisting the community to determine over time what 'outcomes' could and should be.	LTPs must be produced every three years.
Annual Plan	The works identified in the AMP should automatically become the basis on which future Annual Plans are prepared.	Must be produced in the intervening years between LTPs. The first year of every LTP is also the annual plan for that year. .
Annual Report	The Annual Report is the mechanism to report back to the community, showing Council's achievement against the Annual Plan and LTP levels of service targets.	Must be produced every year to report progress.
Asset Management Plans (AMP)	Levels of service, growth, risk, maintenance, renewal and development works and strategies are identified and budgeted for within this Plan. This information automatically feeds into the LTP.	Is reviewed and aligned every year prior to the LTP and Annual Plan process.
Regional Plans and Strategies	Bay of Plenty Regional Council plans and strategies.	Reviewed as and when appropriate, in consultation with the community and reviewed in alignment with the LTP, as appropriate.
Contracts	The service levels, strategies and information requirements contained in AMPs are translated into contract specifications and reporting requirements.	Contract performance should be reviewed on a monthly basis.
District Plans	Policies and objectives for land use and water supply infrastructure, including designations of future works to be reflected in the AMP.	As applicable.

Business overview

Extent of rivers and drainage schemes

Bay of Plenty Regional Council is responsible for the provision and management of five rivers and drainage schemes.

- ▶ Kaituna (upper and lower) Catchment Control Scheme.
- ▶ Rangitāiki-Tarawera Rivers Scheme.
- ▶ Whakatane-Waimana Rivers Scheme.
- ▶ Waioeka-Otara Rivers Scheme.
- ▶ Rangitāiki Drainage Scheme.

These schemes contain a mix of stopbanks, floodways, level control structures, erosion control structures, pump stations, canals and drains.

The management of the rivers and drainage schemes activity involves:

- ▶ Capital works and restoration projects as required.
- ▶ Undertaking an ongoing programme of maintenance in accordance with the AMP.
- ▶ Design and investigation projects.
- ▶ Administering and enforcing the Bay of Plenty Regional Council Floodway and Drainage Bylaw 2002.
- ▶ Revaluing the assets annually
- ▶ Reviewing the scheme AMP every three years.

Physical works on the schemes are carried out in accordance with the Environmental Code of Practice for River and Drainage Maintenance Activities that was adopted in consultation with the community.

Funding and expenditure

Funding

The rivers and drainage schemes are managed under the Soil Conservation and Rivers Control Act 1941. The Act allows for separately rated river schemes on a catchment-by-catchment basis.

Bay of Plenty Regional Council manages the Rangitāiki Drainage Scheme under the Rangitāiki Land Drainage Act 1956.

Funding for the schemes is predominantly from the scheme ratepayers, identified under each separate rating area, with the proportional funding distribution varying across each scheme.

Regional general funds contribute to 20% of the scheme rates (except Rangitāiki Drainage) to acknowledge the broader benefits (e.g. environmental) that the schemes provide. Rangitāiki Drainage Scheme is funded 100% from targeted scheme rates over the area of benefit, mainly dairying, some 29,200 ha. Rates on any property are calculated on the bases of land area and benefit classification of that property.

Expenditure

Expenditure on the rivers and drainage activities represents a significant Council investment as shown in Table 5 below.

Table 5 Income and expenditure 2011/2012

	Annual Plan 2012
Sources of operating funding	
General rates, uniform annual general charges, rates penalties	396,417
Targeted rates (other than a targeted rate for water supply)	5,385,151
Subsidies and grants for operating purposes	0
Fees, charges and targeted rates for water supply	0
Internal charges and overheads recovered	0

Local authorities fuel tax, fines, infringement fees and other receipts	889,334
Total operating funding	6,670,902
Applications of operating funding	
Payments to staff and suppliers	2,005,792
Finance costs	1,270,051
Internal charges and overheads applied	2,765,451
Other operating funding applications	0
Total applications of operating funding	6,041,294
Surplus (deficit) of operating funding	629,608
Sources of capital funding	
Subsidies and grants for capital expenditure	965,580
Development and financial contributions	0
Increase (decrease) in debt	6,822,256
Gross proceeds from sale of assets	0
Lump sum contributions	0
Total sources of capital funding	7,787,836
Applications of capital funding	
Capital expenditure	
- to meet additional demand	0
- to improve levels of service	5,710,000
- to replace existing assets	3,299,416
Increase (decrease) in reserves	(591,972)
Increase (decrease) in investments	0
Total applications of capital funding	8,417,444
Surplus (deficit) of capital funding	(629,608)

Table 6 shows the gross replacement cost for each scheme. These costs are represented pictorially in Figure 3.

Table 6 Summary of gross replacement costs (GRC)

Scheme	Gross replacement cost
Kaituna	48,476,781
Rangitāiki-Tarawera	62,927,869
Waioeka-Otara	28,159,454
Whakatāne-Waimana	48,846,767
Rangitāiki Drainage	16,071,737
Total	204,482,608

(Based on 2011 valuation)

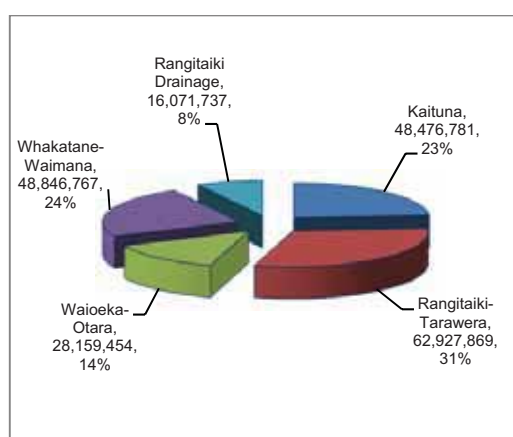


Figure 3 Gross replacement costs (GRC)

Significant negative effects of this activity

Schedule 10 of the Local Government Act covers the information required to be included in the LTP. Part 2 (1) (c) states that a LTP must, in relation to each group of activities of the local authority:

(c) Outline any significant negative effects that any activity within the group of activities may have on the social, economic, environmental, or cultural wellbeing of the local community.

This sub-section provides information in accordance with this legislative requirement.

The purpose of identifying significant negative effects is to ensure that Council activities are conducted in accordance with the principles of sustainability. The rivers and drainage activity has the potential to have negative effects on community wellbeing. The possible negative effects are outlined in Table 7.

Table 7 Significant negative effects

Significant negative effects	Cultural	Social	Economic	Environmental	Mitigation of negative effects	Addressed in
Lack of infrastructure to convey runoff safely and to prevent flooding.		✓	✓	✓	Consult with the community on all costs and options for LoS through the LTP process.	<ul style="list-style-type: none"> ► Projects and Financial Forecasts ► Risk Management
Inadequacy of existing assets to cope with large rainfall events causing flooding, which could result in social and economic hardship.		✓	✓	✓	Compliance with Council's Hydrological and Hydraulic Guidelines.	<ul style="list-style-type: none"> ► Life Cycle Management ► Risk Management
Health and safety risks associated with the operation, maintenance, or construction of infrastructure.		✓	✓		Ensure compliance with legislation and Health & Safety Management Plans. Maintain an Incidents Register.	<ul style="list-style-type: none"> ► Risk Management
Economically, the cost of desired infrastructure improvements may exceed the community's ability to pay.		✓	✓		Consult with the community on all costs and options for LoS through the LTP process.	<ul style="list-style-type: none"> ► Levels of Service ► Project and Financial Forecasts ► Risk Management
Potential impacts on customer satisfaction due to service failure/delays/responsiveness.		✓	✓		Monitor and report on LoS and in Service provider contracts. Seek to resolve customer complaints "close the loop".	<ul style="list-style-type: none"> ► Levels of Service ► Community Engagement
Access to waterways.		✓	✓		Monitor requirements for access and liaise with the community as appropriate.	<ul style="list-style-type: none"> ► Levels of Service ► Community Engagement
Destruction of wetlands.	✓		✓	✓	Set area aside as reserve Installation of weir controls (e.g. Tumurau Lagoon and Kohika). Secure funding for mitigation measures from regional rates.	<ul style="list-style-type: none"> ► Environmental Stewardship ► Community Engagement

					Identify opportunities to enhance the condition and value of the remaining wetland habitat when programming upgrading or refurbishment works.	
Disruption to wildlife.				✓	Programme works to minimise wildlife disruption avoiding fish spawning and bird nesting seasons.	► Environmental Stewardship
Damage due to de-silting etc.		✓		✓		► Life Cycle Management
Gravel extraction.			✓	✓	Cross-section monitoring process.	► Life Cycle Management
Over drainage.			✓	✓	Regular monitoring of channel capacity and drainage standards. Regular review of design standards and economically optimum levels of drainage.	► Life Cycle Management

The significant negative effects identified above can be managed and/or mitigated by effective risk management, options assessments, asset management and operational procedures.

Levels of service

Linking LoS to Council outcomes

As outlined in the Strategic Environment Section Council's rivers and drainage activity primarily contributes to the following Council Outcomes:

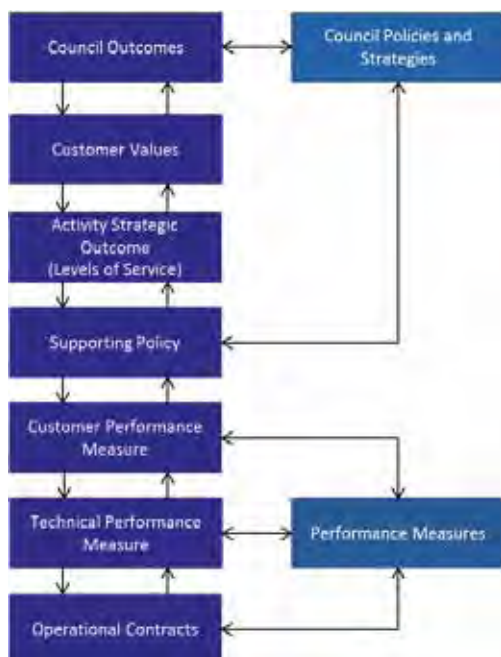
Resilience and Safety:

We are resilient to flooding and natural disaster events and our water ways are safe for a wide variety of users.

Resource Development:

We harness our region's natural resources with care so they benefit us.

In order to deliver these outcomes, it is important that the rivers and drainage technical and customer services and operational and maintenance contracts are clearly linked to achieve this.



Overview

Asset Management (AM) planning enables the relationship between LoS and the cost of the service (the price/quality relationship) to be determined. This relationship is then evaluated in consultation with the community to determine the LoS they are prepared to pay for.

Defined LoS can then be used to:

- ▶ Inform customers of the proposed LoS.
- ▶ Develop AM strategies to deliver LoS.
- ▶ Measure performance against defined LoS.
- ▶ Identify the costs and benefits of services offered.
- ▶ Enable customers to assess core values as accessibility, quality, safety, and sustainability.

In this context LoS define the quality of delivery for a particular activity or service against which service performance can be measured.

LoS relationship to asset management planning

One of the basic cornerstones of sound asset management is:

To provide the levels of service that the current and future community want and are prepared to pay for.

LoS therefore provide the platform for all decisions relating to infrastructure management. Before developing detailed asset management strategies, Council needs to agree the LoS with the community with consideration given to the following:

- ▶ Required planned outcomes
- ▶ Minimum legislative requirements
- ▶ Technical constraints

LoS delivery process

Bay of Plenty Regional Council has some key service providers for the maintenance of rivers and drainage.

- ▶ Internal maintenance staff
- ▶ External contractors (e.g. earthworks, electrical)
- ▶ Internal sections (e.g. data services)
- ▶ Various consultants
- ▶ Government and other agencies (e.g. DoC, NIWA, Fish and Game)

This is detailed in the Business Overview section.

LoS development process

Council develops the levels of service for the Rivers, Drainage and Flood Management Activity through the previous Ten Year Plan and AMP processes. The AMP establishes the detail that informs the strategic LoS in the TYP.

The process that Council uses to review the LoS is set out in the following three parts:

Part 1 – Defining needs

The purpose of Part 1 is to investigate and understand the components that contribute to the LoS as shown by

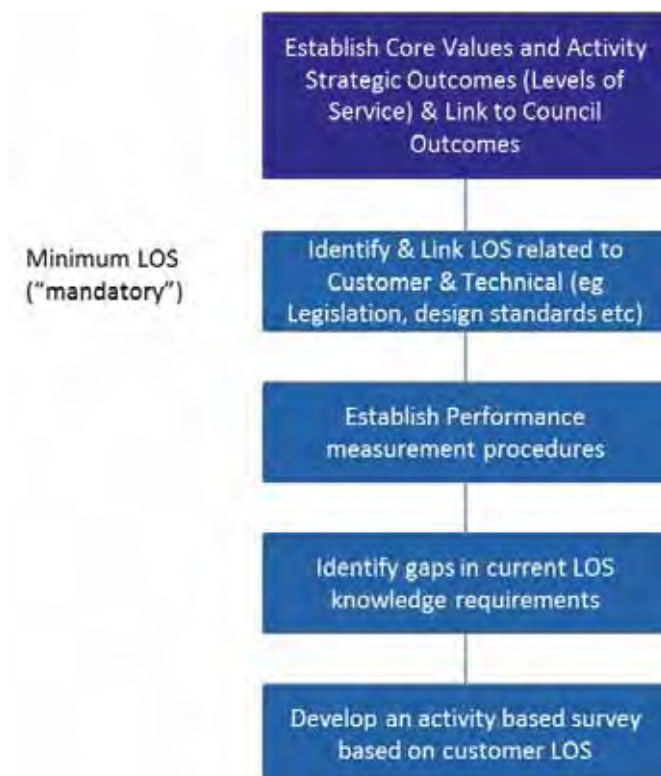


Figure 4 below.

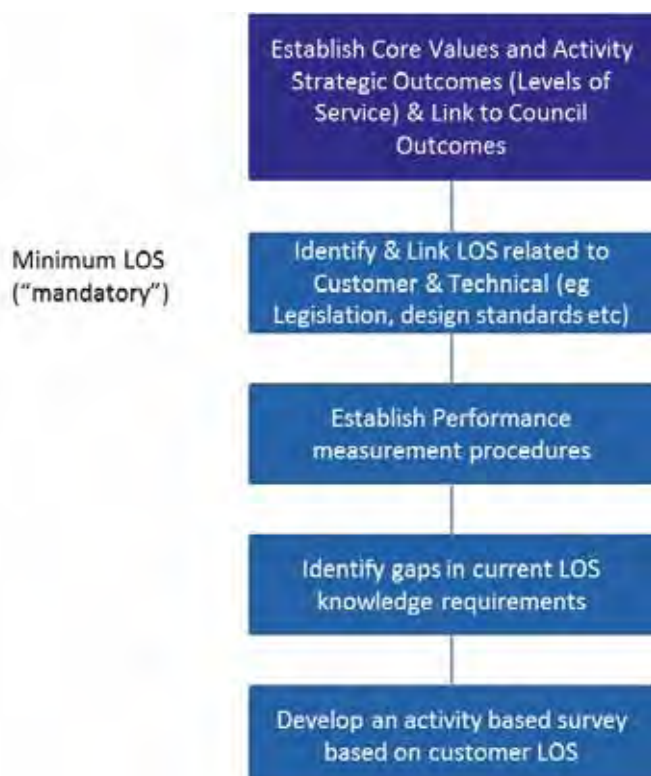


Figure 4 LoS process (Part 1)

Part 2 - Benchmarking

Council has consulted with its communities of interest through the Ten Year Plan and previous Customer Satisfaction surveys (see Community Consultation section for detailed analysis).

The next step is to establish LoS benchmarks for the rivers and drainage activity by way of risk analysis, surveys, focus groups etc. as shown in Figure 5.

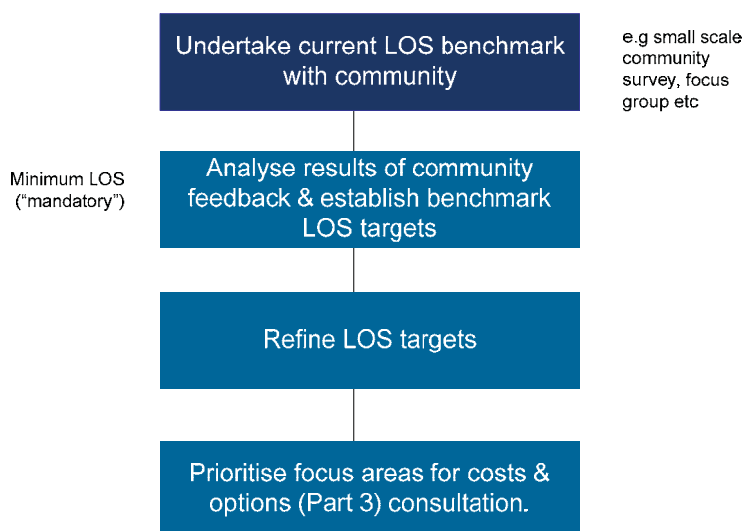


Figure 5 LoS process (Part 2)

Part 3 - Consultation

Part 3 establishes the benchmark survey and then consults the community on service delivery options and their associated costs (as required under Schedule 10, Section 2(a)).

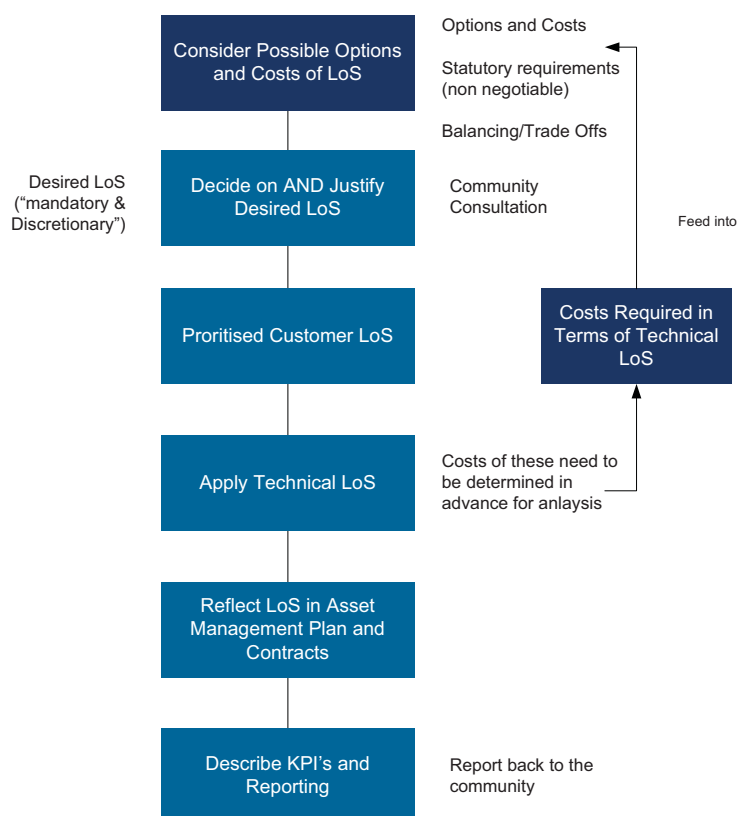


Figure 6 LoS process (Part 3)

It should be noted that this process may be repeated in its entirety or specific parts updated such as technical levels of service in contracts.

Activity strategic outcomes (Levels of Service)

This AMP is developed by setting a range of goals/outcomes to ensure the assets are aligned with Council's wider direction. The outcomes framework used to develop this AMP is illustrated on page 17.

The customer values identify the key attributes that residents want the assets to provide. These values form the basis of the service statements (activity strategic outcomes) that Council will strive to deliver in managing the assets. The level of service statements in Rivers, Drainage and Flood Protection Activity in the Ten Year Plan summarise these strategic outcomes.

Table 8 Customer values (NAMS) and activity strategic outcomes

Customer value (NAMS)	Activity strategic outcomes (levels of service)
Affordability Quality	<ul style="list-style-type: none"> ▶ Provide flood protection in river and drainage scheme areas to agreed design levels. ▶ Flood protection is affordable and predominantly paid for by targeted ratepayers.
Safety	<ul style="list-style-type: none"> ▶ Health and safety risks are minimised.
Sustainability (whole community benefits)	<ul style="list-style-type: none"> ▶ Community is <i>informed</i> of potential widespread flooding allowing them to take <i>actions</i> to avoid the hazard. ▶ <i>Effects</i> on the environment are <i>minimised</i> in operations, works and asset maintenance.
Community engagement	<ul style="list-style-type: none"> ▶ Decision-making processes are transparent and easily understood and enables participation.
Reliability/responsiveness	<ul style="list-style-type: none"> ▶ Response to service requests, complaints and events is timely and appropriate solutions are provided.

How actions in this plan contribute to Council Outcomes

As mentioned in the Strategic Environment section, the Council Outcomes describe what Council wants to achieve as a regional leader in the Bay of Plenty across the four elements of wellbeing (social, cultural, economic, and environmental).

The operational programmes set out in this plan are managed by technical performance framework as shown in the following Table 9. The technical measures are interpreted into performance measures that are relevant to the values that are important for the customers (e.g. residents).

The levels of service statements align the customer values with the Council Outcomes to ensure the services are aligned to the wider aspirations of Council and the community.

Activity / Strategic outcomes of the project (vice versa)	Customer Value	Customer Performance Measure			Technical Performance Measure					Performance measures / processes
		Measure	Current target	Proposed target	Factors of influence	Measure	Current target	Current performance	Proposed target	
Food and water security in river basins and coastal areas to be improved	Safety Quality Reliability	No failure of flood protection system below specified design levels	Zero failures	Zero failures	▲ Security from flooding ▲ Where possible incorporate sustainability principles into the designs	▲ Systems designed for annual exceedance levels for each scheme as per Tables 21, 24, 27, 30 and 33.	▲ 100% compliance	▲ 100% compliance	▲ As for current	▲ Reports on events more than 50 years annual exceedance levels ▲ Inspection capacity ▲ Monthly operational checks ▲ Scheduled maintenance checks ▲ Maintenance records (database)
					▲ Maintenance	▲ Programmed maintenance for each scheme	▲ 100% compliance	▲ 100% compliance	▲ As for current	
					▲ Asset condition	▲ Programmed works for each scheme as per Table 22, 25, 28, 31 and 34.	▲ 100% compliance	▲ 100% compliance	▲ As for current	
					▲ Targeted rates ▲ Land values	▲ Ratio of targeted rate to land values for each scheme ▲ Targeted rate increases agreed to with schemes	▲ To be determined	▲ To be determined	▲ Consistent or decreasing trend in ratio with time	▲ Annual Year Plan processes ▲ Scheme system ▲ Economic analysis
Flood safety minimised	Safety				▲ Competitive and fair full-cost pricing of scheme maintenance and works	▲ Compliance with the Council Contracts Manual	▲ 100% compliance (including approved exceptions)	▲ 100%	▲ As for current	▲ Contract and documents ▲ Annual Council
		No health and safety incidents attribute to lack of management of rivers and drainage assets	Zero	Zero	▲ Activity on assets	▲ Report on all health and safety incidents	▲ New measure	▲ N/A	▲ 100% reporting and compliance	▲ Report to Council
					▲ Maintain a health and safety system to record and investigate incidents involving staff and contractors	▲ 100% of known incidents are recorded and investigated	▲ 100% compliance	▲ 100% compliance	▲ As for current	▲ Report to Human Resources ▲ Health & safety
					▲ Contractors compliance with Health and Safety Regulations	▲ Comply with Council Contract Manual and Health and Safety Policy, and legislation	▲ 100% compliance	▲ 100% compliance	▲ As for current	▲ Contract ▲ Health & safety
Activity is of public and allowing the	Sustainability Safety	All flood warnings at predetermined levels are given in accordance with the Flood Warning Manual	100%	100%		▲ All flood warnings at predetermined levels are given in accordance with the Flood Warning Manual	▲ 100% compliance	▲ 100% compliance	▲ As for current	▲ Flood e and flood warning

Key Objectives of the Scheme (vice)	Sustainability	Measure	Current target	Proposed target	Influence	Measure	Current target	Performance	Target	Proposed measure
Ensuring that the scheme is designed and implemented in a way that minimises adverse effects on the environment, works	Sustainability	All operations, works and asset maintenance undertaken according to current legislation policy	100%	100%	<ul style="list-style-type: none"> ▲ Designed for the long-term, including climate change, structural integrity etc 	<ul style="list-style-type: none"> ▲ Compliance with adopted design guidelines(e.g. BOPRC hydrological and hydraulic guidelines, updated Ministry for Environment Climate Change releases) 	<ul style="list-style-type: none"> ▲ 100% compliance 	<ul style="list-style-type: none"> ▲ 100% 	<ul style="list-style-type: none"> ▲ 100% compliance 	<ul style="list-style-type: none"> ▲ Peer review internal ▲ Internal external
					<ul style="list-style-type: none"> ▲ Minimise adverse effects ▲ Use of sustainable practices (e.g. bio-engineering alternatives, material re-use, fish-friendly floodgates) 	<ul style="list-style-type: none"> ▲ Compliance with Environmental Code of Practice and Guidelines 	<ul style="list-style-type: none"> ▲ 100% compliance 	<ul style="list-style-type: none"> ▲ 100% 	<ul style="list-style-type: none"> ▲ 100% compliance 	<ul style="list-style-type: none"> ▲ Environmental Code of Practice ▲ Work condition reports
					<ul style="list-style-type: none"> ▲ Minimise negative environmental effects on assets from surrounding land and water ▲ Appropriate consultation 	<ul style="list-style-type: none"> ▲ Obtain all necessary consents and compliance with consent conditions 	<ul style="list-style-type: none"> ▲ 100% compliance 	<ul style="list-style-type: none"> ▲ 100% 	<ul style="list-style-type: none"> ▲ 100% compliance 	<ul style="list-style-type: none"> ▲ Resource consent ▲ Land use agreement ▲ Contract
Ensuring that the scheme is designed and implemented in a way that minimises adverse effects on the environment, works	Community engagement	Scheme stakeholders and community are informed and consulted in decisions related to schemes	100%	As for current	<ul style="list-style-type: none"> ▲ Significant proposed changes/enhancements or additions to the rivers and drainage services/infrastructure 	<ul style="list-style-type: none"> ▲ Carry out the special consultative procedure through the Annual Plan and Ten Year Plan (or separately as required) including options, issues and costs 	<ul style="list-style-type: none"> ▲ 100% compliance 	<ul style="list-style-type: none"> ▲ 100% 	<ul style="list-style-type: none"> ▲ 100% compliance 	<ul style="list-style-type: none"> ▲ Ten Year Annual Council Operational Commitment reports
					<ul style="list-style-type: none"> ▲ The regional community is well informed about the Bay of Plenty Regional Council's activities and the environment 	<ul style="list-style-type: none"> ▲ Provide appropriate feedback to the community 	<ul style="list-style-type: none"> ▲ 100% compliance 	<ul style="list-style-type: none"> ▲ 100% 	<ul style="list-style-type: none"> ▲ 100% compliance 	<ul style="list-style-type: none"> ▲ Liaison minutes scheme ▲ Annual newsletter stakeholder
					<ul style="list-style-type: none"> ▲ Information on rivers and drainage accessible via website and brochures 	<ul style="list-style-type: none"> ▲ Website and brochures contain information on rivers and drainage and key issues 	<ul style="list-style-type: none"> ▲ 100% compliance 	<ul style="list-style-type: none"> ▲ 100% compliance 	<ul style="list-style-type: none"> ▲ 100% compliance 	<ul style="list-style-type: none"> ▲ Website newsletter brochures
Ensuring that the scheme is designed and implemented in a way that minimises adverse effects on the environment, works	Reliability/responsiveness	Initial response to non-urgent complaints and service requests within five working days	100%	100%	<ul style="list-style-type: none"> ▲ Service request/complaints recording and reporting system with response timeframes to be implemented (e.g. job tracker system) 	<ul style="list-style-type: none"> ▲ Report on response times for all complaints and requests 	<ul style="list-style-type: none"> ▲ 100% 	<ul style="list-style-type: none"> ▲ 88% compliance 	<ul style="list-style-type: none"> ▲ 100% 	<ul style="list-style-type: none"> ▲ Document response ▲ Document investigation
		24 hour phone line for more urgent	100% availability	As per current	<ul style="list-style-type: none"> ▲ External service provision of 	<ul style="list-style-type: none"> ▲ Respond to all urgent flooding and drainage 	<ul style="list-style-type: none"> ▲ 100% compliance 	<ul style="list-style-type: none"> ▲ Undetermined 	<ul style="list-style-type: none"> ▲ 100% compliance 	<ul style="list-style-type: none"> ▲ Record request

Growth and demand

Introduction

The Bay of Plenty area contains a number of communities with different population densities, varying topography and geomorphology, varying flood protection requirements and consulted LoS.

Planning for future growth and demand is imperative to provide an economically sustained pathway to meet the needs of the region and visitors to the region. The provision of the River and Drainage activity and its management is considered an essential element in the provision of collective community outcomes, particularly Healthy and Safe Communities.

Growth and Demand planning allows for the identification and quantification of areas within the region that are likely to experience significant pressures, or other situations that will impact upon the demand for services.

Overview of key growth and demand drivers

The key demand drivers influencing the Growth and Demand on Council's rivers and drainage activity are summarised in the sub-sections below, which are:

- ▶ Demographic considerations
- ▶ Environmental factors
- ▶ Community expectations/risk
- ▶ Hazards and safety
- ▶ Reliability
- ▶ Legislation

Growth vs demand

Growth, in relation to the rivers and drainage activity, mainly refers to the growth in population, or areas that are growing due to new residential or business developments. These changes are likely to create greater demand in two areas; firstly, for the provision of protection from waterways in times high flows and secondly for greater and easier access to waterways for recreational and conservation use.

Demand for rivers and drainage infrastructure, protection works and facilities can be influenced by growth, changes in trends, climate, seasonal fluctuations and changes in demographics etc. (e.g. people place a greater demand on land utilisation and/or become interested in recreational activities based around water ways).

Demographic overview

At the 2006 Census, the region had a population of 257,379 with the largest urban area being Tauranga. A total of 82% of the population live in the urban areas of Tauranga City, Rotorua district, and Western Bay of Plenty.

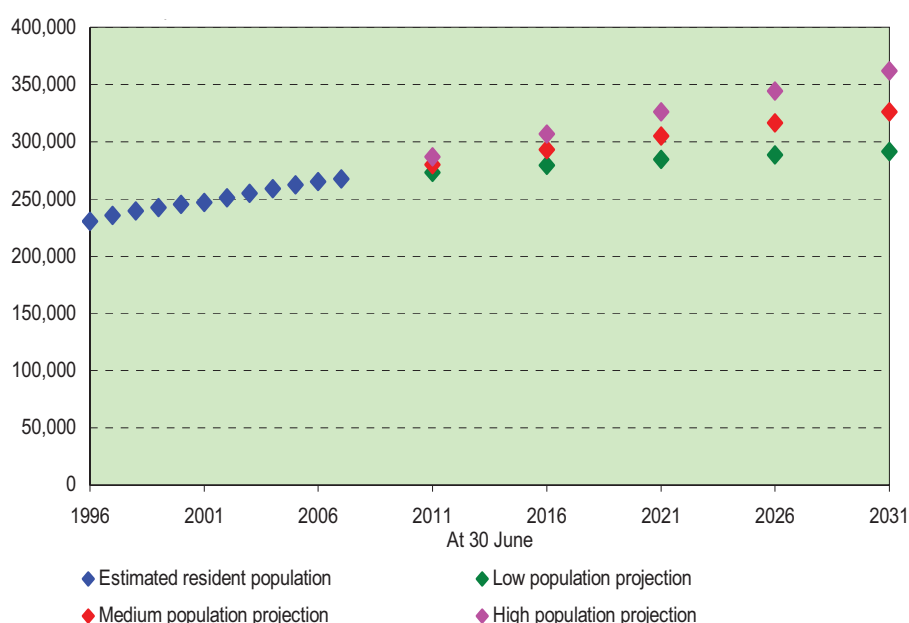


Figure 7 Bay of Plenty region population projections

Demand management planning

The objective of demand management planning is to actively seek to modify customer demands for services, in order to maximise utilisation of existing assets or to reduce or defer the need for new assets or services, including non-asset solutions. Future scenarios need to be investigated. Examples of new and improved services to meet customer demand include:

- ▶ Monitoring development and providing incentives to develop in less flood prone areas.
- ▶ Incorporating alternative designs into new subdivisions etc, for example setting minimum floor levels.

Management strategies

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

Demand management is practiced continuously to maintain the total demand at reasonable and sustainable levels. The five key components of demand management when promoted as a package or strategy rather than in isolation can dramatically reduce the demand on the activity. The key components with examples are provided in the following table.

Table 10 Demand management strategies

Demand component	Rivers and drainage examples
Legislation/regulation	▶ Manage resources and supporting infrastructure in line with legislation e.g. regulating and monitoring of gravel extraction rates and water take quantities.
Education	▶ Educating the community around River and Drainage related activities in order to manage expectations and reasons for undertaking activities.
Incentives	▶ Provision of small landowner environmental grants to promote minor works activities that complement council activities, i.e. out of scheme channel improvements.
Operation	▶ Continual improvements to assets through stakeholder ownership of assets, i.e. landowners who have assets on their land are more likely to look after them when that asset benefits them either directly or indirectly.
Demand substitution	▶ Maximum use of alternative and/or "soft" materials (i.e. tree plantings) for erosion protection and channel training activities.

Capital works programme and funding

Key projects identified in the plan relating to growth and demand as key drivers for capital investment.

Expenditure for the next 10 years has been estimated at \$43.5 million for capital and renewal works.

A summary of the projects related to growth and demand over the next 10 years is listed below:

Table 11 Capital works – growth and demand summary

Works related to growth and demand	Project cost estimate (million)	Scheme	Loans (million)	Transfer from asset replacement reserve (million)	Other (subsidies or vested) (million)	Completion
Flood Damage Repairs	\$12.7	All (except Rangitāiki Drainage)	\$12.7			2015
Maketū pump station retaining wall	\$0.1	Kaituna		\$0.1		2013
Ford Road pump station	\$1.45	Kaituna	\$1.45			2015
Okere Gates lifting mechanism renewal	\$0.16	Kaituna	\$0.16			2015
Stopbank renewals	\$6.10	Kaituna	\$6.10			2020
Pump replacements	\$0.37	Kaituna	\$0.37			2020
Pump station electrical renewals	\$0.18	Kaituna	\$0.18			2020
Geotechnical strengthening	\$0.5	Rangitāiki Tarawera	\$0.33		\$0.17	2013

Works related to growth and demand	Project cost estimate (million)	Scheme	Loans (million)	Transfer from asset replacement reserve (million)	Other (subsidies or vested) (million)	Completion
Edgecumbe flood mitigation	\$5.19	Rangitāiki Tarawera	\$3.46		\$1.73	2019
Te Teko School stopbank	\$0.12	Rangitāiki Tarawera	\$0.12			2015
Tarawera stopbank renewals	\$1.44	Rangitāiki Tarawera	\$1.44			2016
Rangitāiki stopbank renewals	\$4.00	Rangitāiki Tarawera	\$4.00			2022
Culvert renewals	\$1.9	Rangitāiki Drainage	\$1.9			2022
Whakatāne geotechnical works (Quay Street)	\$0.27	Whakatāne Waimana	\$0.27			2013
Te Rahu Canal stopbank renewals	\$0.22	Whakatāne Waimana	\$0.22			2014
Whakatāne River stopbank renewals	\$0.72	Whakatāne Waimana	\$0.72			2016
Culvert Renewals	\$0.03	Whakatāne Waimana		\$0.03		2019
Canal Renewals (including climate change mitigation)	\$1.22	Whakatāne Waimana	\$1.22			2020
Stopbank renewals (rural banks)	\$0.38	Waioeka Otara	\$0.38			2013
Duke Street Pumpstation electronics	\$0.01	Waioeka Otara		\$0.01		2020
Urban stopbanks renewals (including climate change mitigations)	\$1.91	Waioeka Otara	\$1.91			2021

Community engagement

Overview

This Community Engagement section provides details of the consultation and research that Bay of Plenty Regional Council has undertaken to establish how the regional community perceives the rivers and drainage activity and how it may better deliver LoS. Following the development of the 2009/2010 AMP, Bay of Plenty Regional Council was identified by Audit New Zealand for leading in best practice across New Zealand with consultation in developing LoS with stakeholders.

Consultation methods

Council has engaged in a variety of consultation approaches to gauge public opinion and to communicate its decisions and programmes to residents across the region, including

- ▶ Bay of Plenty Regional Council Attitudes and Perceptions Surveys (1992-2010).
- ▶ Customer service requests and complaints (informally).
- ▶ Scheme Liaison Groups.
- ▶ Consultation carried out as part of the Ten Year Plan 2009-2019 and Annual Plan (10/11 and 11/12) processes.
- ▶ The Maori Committee actively invites participation and engagement from local Maori. These meetings take place at various venues in each sub-region to capture local issues and concerns.

Consultation links

Consultation processes undertaken with the community help to underpin the overall direction and goals that Council will follow. The figure below shows the ways in which the local community has been consulted with regarding the districts rivers and drainage activity over the last five years and how this consultation links into outcomes developed as part of this AMP.

Consultation policy

Bay of Plenty Regional Council follows the special consultative procedure as outlined in the Local Government Act 2002 when consulting with the public.

Bay of Plenty Regional Communications team has produced a “Working with Communities” “how to” tool kit for council to engage with communities, Maori, and other stakeholders. This is accessible to all staff.

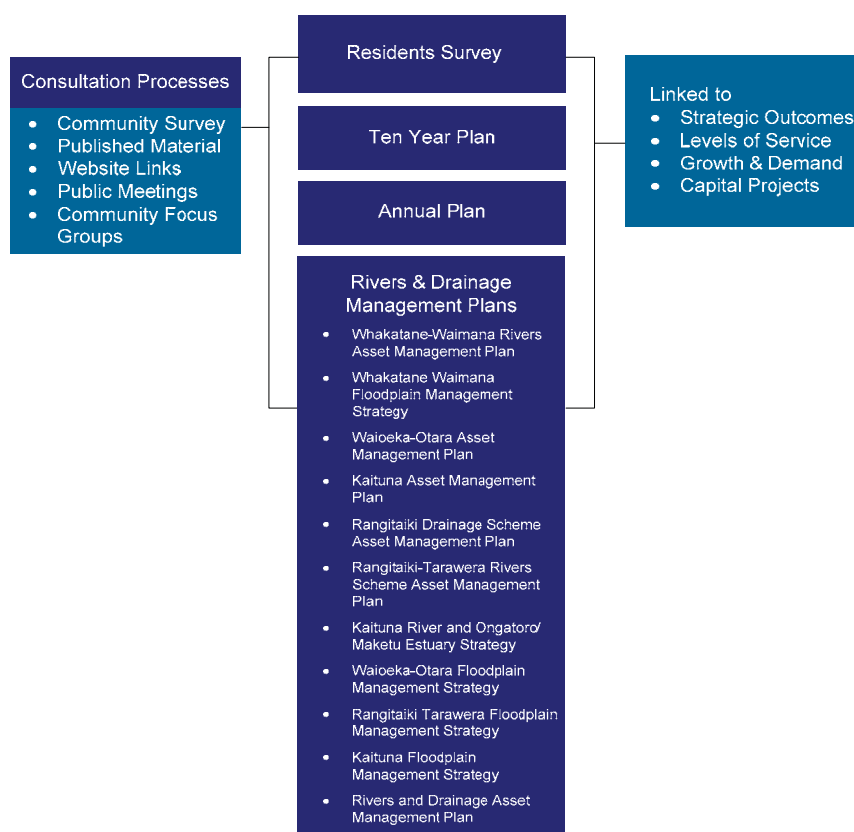


Figure 8

Consultation with the Bay of Plenty regional community

Māori consultation

The Bay of Plenty has a long and proud Maori heritage with more than one quarter (26%) of the population of the region identifying themselves as Maori at the 2006 Census. Bay of Plenty Regional Council has a dedicated Maori Policy Section to support Maori and Bay of Plenty Regional Council to engage in effective consultation and effective decision-making.

Council established a Maori committee in 2006. The objectives of the Committee are to consider governance issues in relation to the principles of the Treaty of Waitangi and Council's legislative obligations to Maori. It also oversees Council's work to build the capacity of Maori to contribute to decision-making.

Hapū/Iwi Resource Management Plans (developed and approved by hapu and/or iwi) outline resource management issues of importance to hapu and/or iwi from which "tangata whenua interests can be considered in council in decision-making".

The Local Government Act also sets out further requirements for Council to consult with Māori.

Council has developed a Treaty of Waitangi Toolbox containing:

- ▶ The various versions of the Treaty.
- ▶ Statutory obligations pertaining to the Treaty.
- ▶ Initiatives promoting the sustainable social, economic, environmental and cultural wellbeing of the regional community.

Council sub-regional residents' survey

The Bay of Plenty Regional Council conducts Attitudes and Perceptions Surveys every three years (since 1992). The most recent survey took place in 2010 and has been publicly released..

In 2007, for the first time a Community Outcomes Survey was also undertaken and run concurrently with the Attitudes and Perceptions Survey.

Current and future stakeholder consultation

The LGA 2002 has given Council the mandate to ensure it adequately engages the regional community in its decision-making processes.

The Act also sets the purpose of local government to enable local decision-making and action with and on behalf of the community. This means the final decision is made by Council after considering the community views.

Consultation record

The following table outlines the recent consultation that Bay of Plenty Regional Council has engaged in regarding the rivers and drainage activity.

Table 12 Historical consultation record

Date	Issue	Consultation approach taken
2007/2008	Waioeka Otara Floodplain Management Strategy (Review)	<ul style="list-style-type: none"> ▶ Strategic Policy Committee ▶ Waioeka Otara Rivers Scheme Liaison Group meeting ▶ Meeting with major stakeholders namely ŌDC
2007/2008	Whakatāne Waimana Floodplain Management Strategy Consultation Record (Stage 2 document)	<ul style="list-style-type: none"> ▶ Strategic Policy Committee ▶ Whakatāne Waimana Rivers Scheme Liaison Group Meeting ▶ Major stakeholders invited to review and make submissions (including WDC, LTNZ etc)
2007/2008	Rangitāiki Tarawera Floodplain Management Strategy (Stage 1 document)	<ul style="list-style-type: none"> ▶ Strategic Policy Committee ▶ Rangitāiki Tarawera Rivers Scheme Liaison Group meeting ▶ Major stakeholders invited to review and make submissions (including WDC, LTNZ etc)
March 2008	Scheme management	<ul style="list-style-type: none"> ▶ Waioeka Otara Scheme Liaison Group meeting ▶ Whakatāne Waimana Scheme Liaison Group meeting ▶ Rangitāiki Tarawera Scheme Liaison Group meeting ▶ Kaituna Scheme Liaison Group meeting

Date	Issue	Consultation approach taken
November 2008	Scheme management	<ul style="list-style-type: none"> ▶ Waioeka Otara Scheme Liaison Group meeting ▶ Whakatāne Waimana Scheme Liaison Group meeting ▶ Rangitāiki Tarawera Scheme Liaison Group meeting ▶ Kaituna Scheme Liaison Group meeting
April 2008	Edgecumbe flood mitigation	▶ Community Board and public meetings
April 2008	Edgecumbe flood mitigation	▶ Community Board and public meetings
August 2008	Edgecumbe flood mitigation	▶ Community Board and public meetings
June 2008	Floodplain Management Strategy Whakatāne Waimana Floodplain Management Strategy Stage 1 Report send out for comment	▶ Draft Stage 2 Report sent to key stakeholders
September 2007	Whakatāne Waimana Floodplain Management Strategy 2 Report send out for comment	<ul style="list-style-type: none"> ▶ Draft Stage 1 Report send to key stakeholders ▶ Rangitāiki Tarawera Scheme Liaison Group Stage 1 Report send out for comment
2008/2009	Rangitāiki Tarawera Floodplain Management Strategy (draft Stage 2 document)	<ul style="list-style-type: none"> ▶ Strategic Policy Committee ▶ Rangitāiki Tarawera Rivers Scheme Liaison Group meeting ▶ Major stakeholders invited to review and make submissions (including WDC, LTNZ etc) ▶ Meetings with iwi representatives
27/03/2009 09/03/2009 12/03/2009 05/03/2009	Scheme management	<ul style="list-style-type: none"> ▶ Waioeka Otara Scheme Liaison Group meeting ▶ Whakatāne Waimana Scheme Liaison Group meeting ▶ Rangitāiki Tarawera Scheme Liaison Group meeting ▶ Kaituna Scheme Liaison Group meeting
2010	2009-2019 Ten Year Plan	▶ Consultation process
March 2010	Scheme management	<ul style="list-style-type: none"> ▶ Waioeka Otara Scheme Liaison Group meeting ▶ Whakatāne Waimana Scheme Liaison Group meeting ▶ Rangitāiki Tarawera Scheme Liaison Group meeting ▶ Kaituna Scheme Liaison Group meeting
October-November 2010	Scheme management	<ul style="list-style-type: none"> ▶ Waioeka Otara Scheme Liaison Group meeting ▶ Whakatāne Waimana Scheme Liaison Group meeting ▶ Rangitāiki Tarawera Scheme Liaison Group meeting ▶ Kaituna Scheme Liaison Group meeting
March 2011	Scheme management	<ul style="list-style-type: none"> ▶ Waioeka Otara Scheme Liaison Group meeting ▶ Whakatāne Waimana Scheme Liaison Group meeting ▶ Rangitāiki Tarawera Scheme Liaison Group meeting ▶ Kaituna Scheme Liaison Group meeting
November 2011	Scheme management	<ul style="list-style-type: none"> ▶ Waioeka Otara Scheme Liaison Group meeting ▶ Whakatāne Waimana Scheme Liaison Group meeting ▶ Rangitāiki Tarawera Scheme Liaison Group meeting ▶ Kaituna Scheme Liaison Group meeting

Proposed future consultation

Table 13 outlines upcoming rivers and drainage activity proposals that Council will consult on with the regional community.

Table 13 Future proposed consultation

Year	Issue	Proposed consultation approach
March 2012	Scheme management	<ul style="list-style-type: none"> ▶ Waioeka Otara Scheme Liaison Group meeting ▶ Whakatāne Waimana Scheme Liaison Group meeting ▶ Rangitāiki Tarawera Scheme Liaison Group meeting ▶ Kaituna Scheme Liaison Group meeting
November 2012	Scheme management	<ul style="list-style-type: none"> ▶ Waioeka Otara Scheme Liaison Group meeting ▶ Whakatāne Waimana Scheme Liaison Group meeting ▶ Rangitāiki Tarawera Scheme Liaison Group meeting ▶ Kaituna Scheme Liaison Group meeting

Environmental stewardship

Overview

This section describes the environmental legislative obligations that Council has in undertaking the rivers and drainage Activity including requirements specified as part of legislative requirements. It also demonstrates Bay of Plenty Regional Council's commitment to environmental stewardship through the inclusion of environmental impact assessment and mitigation as a key Council consideration.

National

The role of Central Government is one of setting policy for environmental management across New Zealand. This is achieved through the following key statutes:

- ▶ The Resource Management Act (1991)
- ▶ The Resource Management (Climate Change and Energy) Amendment Act 2004
- ▶ Local Government Act 2002 (LGA 2002)
- ▶ Local Government (Rating) Act
- ▶ Land Drainage Act 1908
- ▶ Soil Conservation and Rivers Act (SCRCA) 1941
- ▶ Civil Defence and Emergency Management (CDEM) Act 2002

Role as Regional Council

Bay of Plenty Regional Council has a key role under the RMA 1991 in developing regional policy statements and regional plans to ensure the integrated and sustainable management of the region's resources. These policies and plans guide the management of water related activities that form part of the Regional Council's jurisdiction. Council also has used its ability under the LGA 2002 to develop Bylaws to manage the risks of human activities from negativity affecting the integrity of scheme infrastructure.

These roles are supported with the following responsibilities in relation to rivers and drainage management:

- ▶ Control the use and development activities for the purposes of soil conservation.
- ▶ Maintain or enhance water quality.
- ▶ Maintain and enhance aquatic ecosystems.
- ▶ Maintaining water quantity.
- ▶ Avoid or mitigate natural hazards.

Consents

Consents are a requirement for most rivers and drainage works due to the potential impact on receiving environments. Consent is required for activities that are not permitted by a Rule in a regional plan, as outlined in Part III of the RMA 1991. Bay of Plenty Regional Council's consent requirements are specified in the Proposed Regional Water and Land Plan.

Both Regional and District Councils provide advice to perspective applicants and facilitate the consenting process within their regional or territorial boundaries. Part of the consenting process involves the applicant developing an Assessment of Environmental Effects.

Potential issues

There are a number of adverse environmental effects that can occur in the process of undertaking the rivers and drainage activity. These are mainly related to development, particularly major construction projects and the impacts associated with discharges. These include:

- ▶ Water quantity effects
- ▶ Water quality effects
- ▶ Sediment runoff
- ▶ Landscape values
- ▶ Ecological values
- ▶ Ecological effects
- ▶ Cultural heritage
- ▶ Climate change

Hazards

The Bay of Plenty region is exposed to a number of natural hazards. From an activity point of view hazards have the potential to cause major disruption and damage and therefore need to be taken into account.

Key impacts that are relevant to the rivers and drainage activity have been outlined below.

Flooding

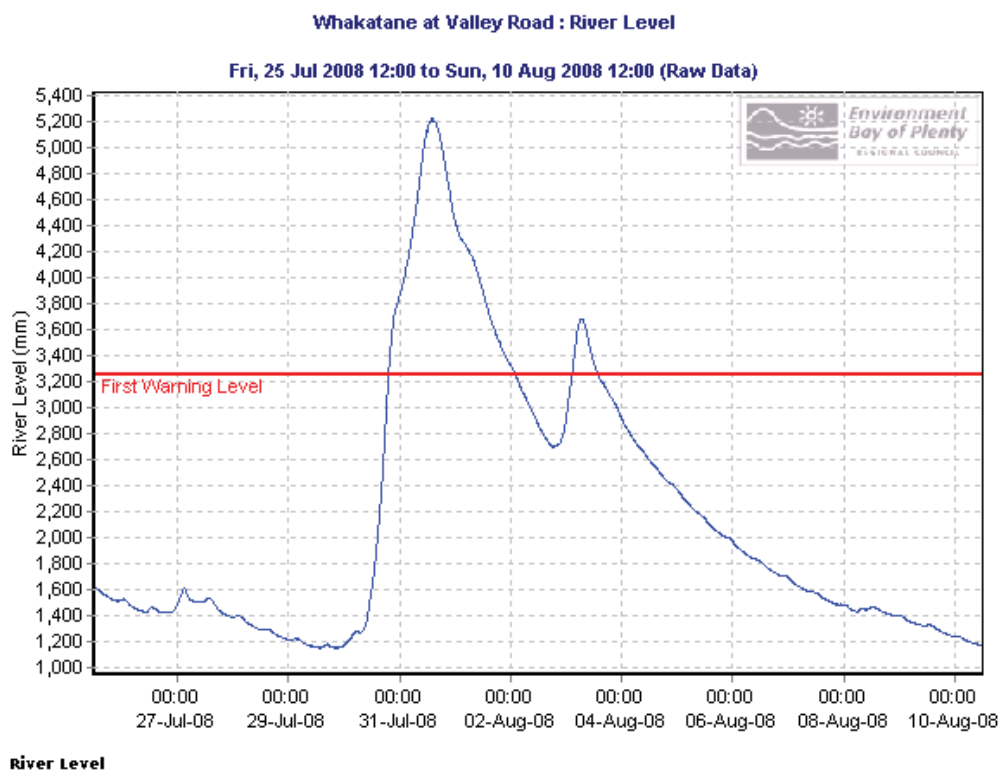
Flooding is a commonly occurring major natural hazard that results when the natural and modified drainage systems fail in a particular rainfall event. The risk of flooding is influenced by a number of factors such as:

- ▶ Weather systems (intensity, low pressure, duration)
- ▶ Hydrological factors (catchment size, rainfall intensity and infiltration)
- ▶ Hydraulic factors
- ▶ Soil type
- ▶ Land use
- ▶ Ground saturation

Storm events and the resulting flooding can result in significant adverse effects on both residents and the environment. These effects may include:

- ▶ Personal injury or loss of life, property and possessions or livelihood.
- ▶ Disruption of utilities and transportation networks.
- ▶ Impacts on the environment may include vegetation and habitat loss, erosion and sedimentation in waterways, and soil and water contamination.

The Bay of Plenty Regional Council undertake ongoing monitoring of river levels and river flows and has alarms in place to identify rivers at risk of flooding. An example of this monitoring information is shown below for the Waimana River.



The region has been regularly affected by severe flooding. Severe river bank damage has occurred as a result of the August 2010 and January 2011 flood events. Mitigation works are currently underway at many sites to repair the damage. It has been estimated that over \$14 million dollar is required to undertake these repairs.

During the July 2004 event, floodwaters covered much of the Rangitāiki Plains and part of the Whakatane township. Work was undertaken to repair the consequential damage to stopbanks, streams and rivers throughout the region.

In 2005, Matata and Tauranga were particularly badly hit by extreme storms. Works are still ongoing in conjunction with Whakatane District Council to mitigate against potential future events. The following photograph provides an indication of the extent debris flows and resultant damage in Matata.



Photo courtesy of Whakatāne Beacon

Flood management was traditionally based around river controls; this has changed now to incorporate softer non-asset solutions such as flood plain management, education and development restrictions in flood plain areas.

Bay of Plenty Regional Council is developing flood plain management strategies for its major floodplains and these will incorporate traditional measures in combination with flood warnings and flood hazard awareness and preparedness.

Additional measures that can be incorporated to help mitigate against flooding include:

- ▶ Catchment land use management.
- ▶ River gravel extraction to increase capacity.
- ▶ Modelling to determine capacity, sediment deposition and maintenance strategies.
- ▶ Planning rules to prevent developments in high risk flood prone areas.

Earthquakes

New Zealand is considered amongst the most seismically active places on earth, as it is located on an active boundary of two tectonic plates.

The Bay of Plenty is a zone of active tectonics with earthquakes occurring on a regular basis although most are not strong enough to be felt. However the region has experienced significant earthquakes in the past that have resulted in widespread damage and serious injury such as the Edgecumbe Earthquake in 1987.

The average return interval for moderate to strong ground shaking for all major communities in the region is less than 50 years.

Volcanic eruption

The Bay of Plenty region is located in a highly important area of volcanic activity, the Okataina Volcanic Centre. Southwest of the Bay of Plenty is the Taupo Volcanic Centre, this links with Mount Ruapehu and Mt Tongairiro, active volcanoes in the central plateau. The zone from Mt Ruapehu in the south to White Island in the east incorporates the Taupo Volcanic zone and this runs through the centre of the Bay of Plenty region.

On average, major eruptions from the Okataina Volcanic Centre occur every 2,000 years. A major recent event from this volcanic centre was the 1886 Mt Tarawera eruption.

Recent activity in the Taupo Volcanic Zone includes several eruptions from Mt Ruapehu over the last decade. In addition White Island is in close proximity to the region and could potentially result in a tsunami if it erupted.

Tsunamis

There have been eleven recorded tsunamis in the Bay of Plenty region since 1840 and they have not generally been considered a major threat to the region. Further research has highlighted the fact that tsunami risk to the region may be greater than initially thought.

There have been two major regional and four localised paleo-tsunami events recorded over the last 4,000 years. All of these have been equal or greater than the five-metre resolution level that is required for detection in the paleo record.

Some potential sources for Tsunamis in the Bay of Plenty region can be categorised as follows:

- ▶ Local volcanic eruption (e.g. Mayor Island or White Island, or fault movement within the offshore Taupo Volcanic Zone.
- ▶ Regional origin, such as a landslide in the Hikurangi Trough.
- ▶ Distal origin, for example an earthquake in South America.
- ▶ The local Bay of Plenty CDEM Group works alongside the Bay of Plenty Regional Council and local authorities and emergency services to determine the likely threat of a tsunami in the region and also the response required to minimise impacts and also to prepare the community for such an event.

Future requirements

The main item that needs to be addressed from an Environmental Stewardship perspective will be how the Bay of Plenty Regional Council addresses climate change and how it manages the non-asset solution side of the rivers and drainage activity to minimise potential impacts on the environment.

Understanding the current capacity of the rivers and drainage assets and the existing risks, particularly around flooding and resultant damage, will need to be investigated further to be fully understood.

Ongoing interaction with local authorities to identify hazard risks on flood plains, establish habitable floor levels, and the protection of public and to ensure environmental health and safety are key. In addition to this, a constant monitoring of natural hazards and their impacts will need to be ongoing.

When the Bay of Plenty Regional Council propose to undertake activities as noted above, a consent is required under the Regional Water and Land Plan and potentially the relevant District Plan. The environmental stewardship section provides information on recent consents that have been issued relating to the rivers and drainable activity.



Risk management

This asset specific risk management planning for the Bay of Plenty Regional Council will provide the basis for future risk analysis and improvement planning.

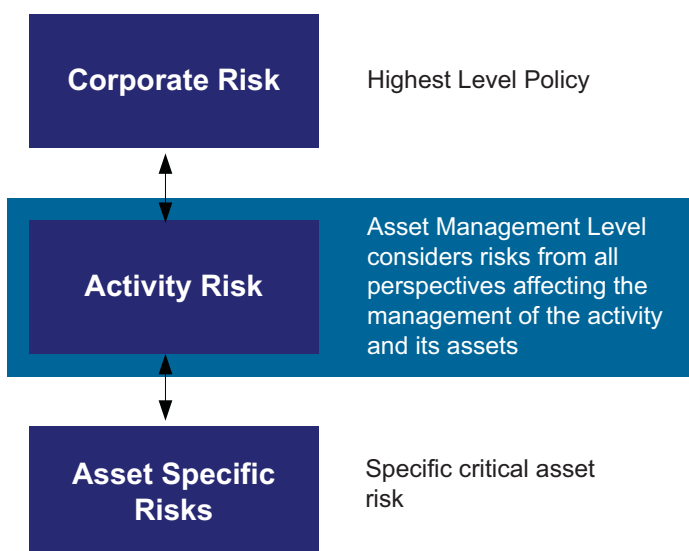
This section covers the risk management implemented by the Bay of Plenty Regional Council and how these apply to the current and future activities.

Level of risk

The purpose of this risk plan is to identify the risks associated with the activity and assets. This requires approaching the risks from many perspectives including financial, operational, organisational and public health and safety.

These risks are pertinent to both a higher, corporate level, and to a more detailed asset – specific level, but do not substitute for more specific risk analysis at those levels (see diagram).

The next step beyond this risk analysis is to develop more detailed risk plans where the criticality of specific assets is assessed and an action plan developed as appropriate.



Current situation

Corporate policy

Bay of Plenty Regional Council has introduced risk management initiatives across the organisation, but do not have an adopted risk framework for the assessment of risk consequences and a risk priority treatment matrix. Accordingly, the risk criteria and matrices have been proposed as the basis for risk evaluation in this section developed from the NZS 4360 National Risk Management Standard.

Risk management process

The following flowchart and text details the key elements of the Risk Management Process undertaken for the rivers and drainage activity.

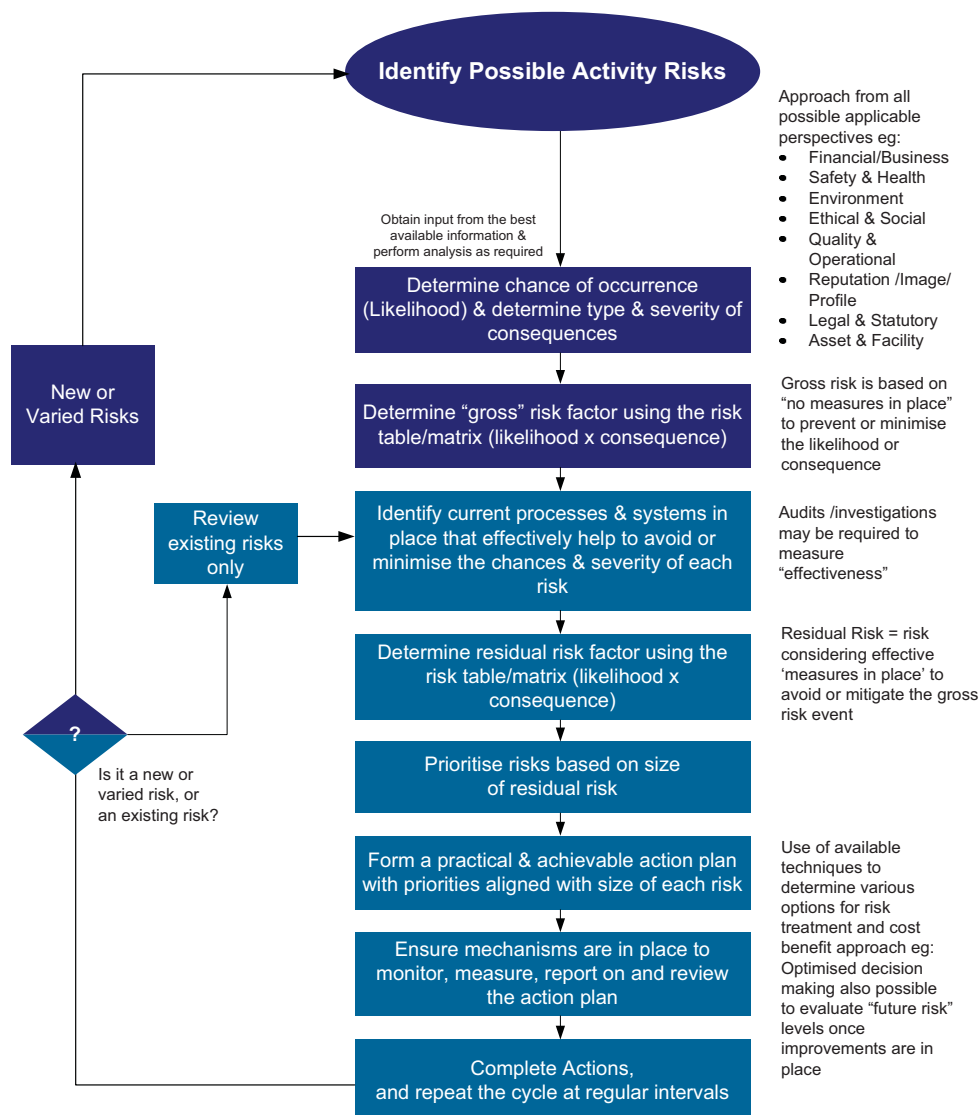


Figure 9 Risk management process

The risk assessment process has been generally based upon the Australian New Zealand Risk Management Standard 4360:2004 to establish a Risk Matrix. This matrix provides a tool to quantify a risk by identifying the likelihood of the risk occurring and the outcomes, or consequences should the risk occur.

Determine likelihood and consequence for gross risk factor

Table 14 and Table 15 demonstrate the scales used to determine the likelihood and consequence levels, which are input into the risk calculation to consider the effect of a risk event.

The likelihood of occurrence and severity of consequences should be based on as much real data as possible, for example local knowledge or recorded events such as maintenance records, weather events etc. Some analysis may be required for verification.

The likelihood scales identify how likely, or often, a particular event is expected to occur, these are shown in the table below:

Table 14 Likelihood of occurrence

Likelihood	Description	Probability
Frequent	Continuous or will happen frequently. Major risk: will most certainly occur in the foreseeable future.	5
Often	5-12 times per year. Major risk: will possibly occur in the foreseeable future.	4
Likely	1-5 times per year. Major risk: there is always a change it will occur in the foreseeable future.	3
Possible	Once every 2 to 5 years. Major risk: there is little change of occurrence in the foreseeable future.	2
Rare	Less than once every 5 years. Major risk: occurrence is unlikely in the foreseeable future.	1

The consequence descriptors in Table 15 indicate the level of possible consequences for a risk.

Table 15 Consequence rating

Consequence	Descriptor	Score
Catastrophic	Loss of life, major financial loss, prolonged national media and political attention.	5
Major	Major financial impact, widespread damage, serious harm, national media.	4
Moderate	Moderate financial impact, potential litigation, loss of image, regional media.	3
Minor	Minor financial impact, involves management time.	2
Insignificant	Negligible effects	1

After the likelihood and consequence factors have been determined, the level of risk is calculated by multiplying the Likelihood of Occurrence (Table 14) and Consequence Rating (Table 15) together. **Risk = the likelihood of an event occurring X the consequence of such an event.**

The final outcome is a risk rating. The risk rating enables definition between those risks that are significant and those that are of a lesser nature. Having established the comparative risk level applicable to individual risks, it is possible to rank those risks. Four risk categories have been used: Extreme, High, Moderate, and Low.

Table 16 Risk assessment matrix

Likelihood	Consequence				
	Insignificant (1)	Minor (2)	Moderate (3)	Major (4)	Catastrophic (5)
Frequent (5)	5	10	15	20	25
Often (4)	4	8	12	16	20
Likely (3)	3	6	9	12	15
Possible (2)	2	4	6	8	10
Rare(1)	1	2	3	4	5

Once the impact has been ranked according to the relative risk level it poses, it is then possible to target the treatment of the risk exposure, by beginning with the highest risks and identifying the potential mitigation measures.

Table 17 Comparative levels of risk

12-25	Extreme risk	Requires immediate remedial action.
8-12	High risk	Requires remedial planning and action via the AMP.
4-6	Moderate risk	Address via new procedures and/or modification of existing practices and training.
1-3	Low risk	No formal requirement for further action, unless escalation of risk is possible.

Initially, the gross risk needs to be calculated, so likelihood and consequences need to be considered as if there were no measures in place to prevent or mitigate the risk occurrence. Essentially gross risk is an exercise to determine “What is the worst that could happen?” Once the gross risk is determined it is possible to investigate the current systems and processes to identify the residual risk and then formulate an action plan to further reduce the likelihood or consequences of identified risks occurring.

Identify current systems and processes and their effectiveness

Identifying current systems and processes are identified, and as far as resources allow, their effectiveness measured. It is often practical to identify these processes and systems initially, and rank the effectiveness conservatively until the audits and actual practice prove otherwise. Audits can be identified as part of the improvement process.

Effectiveness of existing systems and processes is expressed in the following categories:

Excellent	Fulfils requirements thoroughly, very robust and positive measurable effects.
Good	Fulfils requirements, robust and measurable, room for improvement.
Fair	Barely fulfils requirements, effects hard to measure (or haven't been audited or measured), improvement required.
Poor	Not fulfilling requirements, little measurement or effect on overall risk.
Very Poor	Totally ineffective in avoiding or mitigating associated risk events.

Determine residual risk

The residual risk is the actual risk that exists considering the effective measures implemented. The measures in place reduce either, or both, the consequence and the likelihood of a risk occurrence. The revised factors are input into the same risk matrix to obtain the Residual Risk Factor.

Prioritise residual risks and formulate action plan for risk management

A priority order of issues to be addressed is obtained by sorting Residual Risk Factors by risk level. The most suitable actions are determined considering available options and resources. The costs and benefits of these actions need to be analysed. The best available techniques are required to analyse the options e.g. optimised decision-making (ODM).

Application of ODM applies a ‘value chain’ to the proposed actions rather than just working from the highest risk down regardless of cost, for example:

- ▶ A high risk may have to remain due to the inhibitive costs associated with avoidance or mitigation.
- ▶ A medium risk event could be easily and cost-effectively avoided within resources available.

From an Asset Management perspective, the options for mitigating risks considered to reduce the cause, probability or impact of failure, are typically:

Do nothing	Accept the risk
Management strategies	Implement enhanced strategies for demand management, contingency planning, quality processes, staff training, data analysis and reporting, reduce the target service standard, etc.
Operational strategies	Actions to reduce peak demand or stresses on the asset, operator training, documentation of operational procedures, etc.
Maintenance strategies	Modify the maintenance regime to make the asset more reliable or to extend its life.
Asset renewal strategies	Rehabilitation or replace assets to maintain service levels.
Development strategies	Investment to create a new asset or augment an existing asset.
Asset disposal/ rationalisation	Divestment of assets surplus to needs because a service is determined to be a non-core activity or assets can be reconfigured to better meet needs.



Monitor, measure, report, review plan and actions

The management structure needs to be in place to ensure that actions are monitored, reported on and reviewed regularly. It is important to identify and constantly review the following:

Responsibility	Nominated person responsible for ensuring the risks are managed and improvements carried out in accordance with the programme
Best appropriate practice	The practices that should ideally be carried out to manage risks to an acceptable level
Audit trail	Date of entries and revisions, target date for actions to be taken and actual task completion dates

In addition, management options should be ranked via benefit/cost analysis using Net Present Value (NPV) calculations. The inputs considered in the NPV calculation are:

- ▶ Capital investment costs
- ▶ Changes in operating and maintenance costs
- ▶ Reduction in business risk exposure (BRE)
- ▶ Increase in effective asset life/value
- ▶ Increase in level of service

All capital development projects should be ranked corporately for inclusion in the Ten Year Plan/Annual Plan consultation process using benefit/cost analysis plus the following additional criteria:

- ▶ Contribution to Council's Strategic Plan objectives.
- ▶ Contribution to the region's business objectives.
- ▶ Level of project commitment (contractual and legal issues).

The resulting action plan for risk treatment needs to be practical and achievable such that the necessary resources and time frames are realistically met. The actions also need to be able to be monitored and measured. Table 16 provides more detail with regard to future actions/tasks required for future stages of Risk Management, which include the ranking outlined above.

Review risks

Most of the time, the risks identified will remain the same and reviews will occur in the context of these risks. However, it will be important to recognise when a new risk arises, or an existing risk changes in nature. In the latter case, the gross risk also needs to be re-evaluated.

Risk action plan

The following table is compiled from the Risk Register and highlights the most significant residual risks faced by the rivers and drainage activity. The main risks are listed in order of severity (Residual Risk) as assigned in consultation with key Council officers.

Actions that are required to achieve the desired improvements are indicated along with how progress on these actions will be monitored and reported. Where applicable, action tasks will detail timeframes for achievement, and responsibility for these actions.

Table 18 Asset Management Risk Action Plan – rivers and drainage

Risk reference	Risk description	Risk type	Residual risk	Action	Responsibility	Monitoring/reporting	Timeframe
DR14	General: Unexpected Asset Depreciation (Cost Escalations to maintain level of service) – greater loss of service (e.g. more rapid than expected stopbank settlement). Inability to afford renewals	Operational Financial	16	<ul style="list-style-type: none"> Change design Increase depreciation rates Plan for more frequent renewal Public education Increasing efficiency Rationalise spending – prioritise activities 	<ul style="list-style-type: none"> GM R&D Operations Manager 	<ul style="list-style-type: none"> Asset condition assessment valuation 	<ul style="list-style-type: none"> Annually
DR20	Rivers and drainage: Increased Frequency and/or Size of Adverse Weather Effects – rendering flood control and drainage schemes unsustainable	Operational Public Health & Safety Financial	16	<ul style="list-style-type: none"> Catchment modelling (land use changes etc) Recommend relocation and retreat of at-risk dwellings and industry Increased awareness and education of flood hazards Increased flood protection 	<ul style="list-style-type: none"> GM R&D Operations Manager 	<ul style="list-style-type: none"> Capacity review using updated records 	<ul style="list-style-type: none"> 10 yearly
DR21	Rivers and drainage: Rise in Sea Level and Storm Surges – rendering flood control and drainage schemes unsustainable	Operational Public Health & Safety Financial	16	<ul style="list-style-type: none"> Dredging coastal marine areas Recommend relocation and retreat of dwellings and industry from coastal inundation and erosion zones Increased awareness and education of coastal flood hazards 	<ul style="list-style-type: none"> GM R&D Operations Manager 	<ul style="list-style-type: none"> Capacity review using updated sea level rise and storm surge 	<ul style="list-style-type: none"> 10 yearly
DR22	Rivers and drainage: Stopbank Deterioration, Weakness and Failure – (including foundation) resulting in ineffective flood control, flooding	Operational Public Health & Safety Financial Reputation/ Image	15	<ul style="list-style-type: none"> As per current practice Recommend relocation and retreat of dwellings and industry from flood prone areas Increased awareness and education Increased geotechnical investigations Monitor improvements in geotechnical advancements Upstream catchment management to reduce flood levels 	<ul style="list-style-type: none"> GM R&D Operations Manager 	<ul style="list-style-type: none"> Stopbank stability assessment 	<ul style="list-style-type: none"> 10 yearly renewal cycle
DR13	General: External Economic Influences (Cost Escalations) – rising costs (e.g. materials, fuel), due to economic circumstances and worldwide incidents. Inability to afford maintenance and repair	Economic Financial	12	<ul style="list-style-type: none"> Recycling initiatives Increase contingencies if necessary Improve efficiencies Investigate alternative resources 	<ul style="list-style-type: none"> GM R&D Operations Manager 	<ul style="list-style-type: none"> Valuations Council Reports 	<ul style="list-style-type: none"> Annually Ongoing

Risk reference	Risk description	Risk type	Residual risk	Action	Responsibility	Monitoring/reporting	Timeframe
DR06	General: Inadequate Condition/Performance Assessments reliable data for maintenance/renewals/replacements and valuations	Operational	9	<ul style="list-style-type: none"> Staff training and continuity regarding assessments Develop condition assessment programme and methodology for all assets Develop a process to ensure that knowledge is transferred, stored and accessible. Define champions and successors. External backup 	<ul style="list-style-type: none"> GM R&D Operations Manager 	<ul style="list-style-type: none"> AMP Improvement Plan Valuations 	<ul style="list-style-type: none"> 3 yearly Annually
DR09	General: Moderate Natural Hazard Damage – (slips/flooding/coastal erosion/wind) causing damage to assets and or hindering development	Public and Environmental Health Organisational	9	<ul style="list-style-type: none"> As per current practice Liaise with Regional policy makers to identify hazards and ensure emergency response mechanisms are in place in the event of a hazard occurring Increase public awareness of residual risk 	<ul style="list-style-type: none"> GM R&D Operations Manager 	<ul style="list-style-type: none"> Council report following event 	Ongoing
DR17	General: Public Health and Safety Incident – causing injury and or damage to residents/visitors/staff or property resulting in claims and or negative publicity (e.g. poorly designed or maintained assets etc)	Public Health Reputation/ Image	9	<ul style="list-style-type: none"> Review Council's liability and H & S policy Design standards maintained Asset Management Planning LoS determined from community consultation (Ten Year Plan process) Local Government networking Ensure BOPRC is carrying out appropriate renewals and managing the budget correctly Review and develop safe working methods and practices where necessary 	<ul style="list-style-type: none"> GM R&D Operations Manager GM P&P 	<ul style="list-style-type: none"> Health and Safety Annual Audit 	Annually
DR01	Lack of internal resources – the ability to attract key staff and or retain skilled staff. High workload vs. lifestyle	Organisational	8	<ul style="list-style-type: none"> Continue current practice and review flexibility within individual contracts and working hours. Family/lifestyle friendly policies Review and monitor work levels of staff Instigate cadetship programme in conjunction with wider industry Review and improve succession planning Improve team approach, backup roles 	<ul style="list-style-type: none"> GM P&P GM R&D 	<ul style="list-style-type: none"> Human Resources reports to management Remuneration system reports – market data 	Annually
DR10	Extreme Natural Hazards Damage – (earthquake/tsunami/volcanic/major storm event/ over design event) causing damage to assets and or hindering development	Environmental Public Health Organisational Financial	8	<ul style="list-style-type: none"> Liaise with national and regional policy makers to identify hazards and ensure emergency response mechanisms are in place in the event of a hazard occurring Staff training, awareness of roles Implementation of policies and Emergency Civil Defence Management Plan Increase public awareness of residual risk 	<ul style="list-style-type: none"> GM R&D Operations Manager 	<ul style="list-style-type: none"> Council report following extreme event 	Ongoing

Lifecycle management

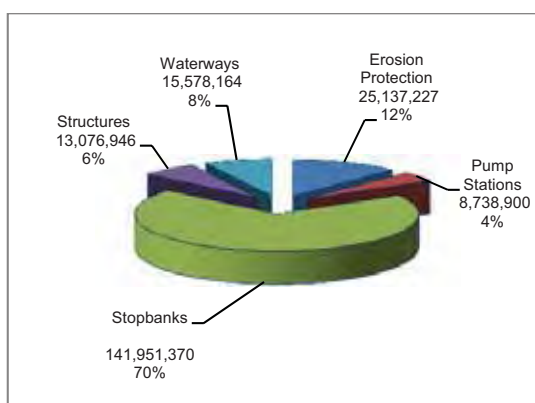
The Lifecycle Management (LCM) Section provides the broad strategies and work programmes required to achieve the goals and objectives set out earlier in this AMP.

The lifecycle management section covers the following asset groups:

- ▶ Erosion protection
- ▶ Pump stations
- ▶ Stopbanks
- ▶ Structures
- ▶ Waterways

Optimised Replacement Cost (ORC) and Age vs Life

The total ORC for the rivers and drainage infrastructure is \$204,482,608. A breakdown for each asset type is shown below.



The figure below shows a comparison between the average age of the asset groups and the remaining useful life (RUL). The stopbank, waterways and erosion protection asset groups have an expected life of perpetuity.

Work category definitions

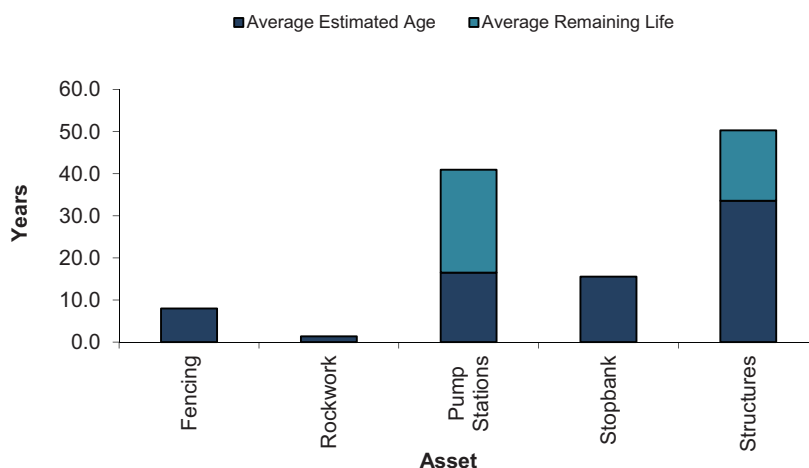
Expenditure on infrastructure assets can be categorised into four main areas:

Operations and maintenance

Operations and Maintenance expenditure is that required for the day-to-day operation of the network whilst maintaining the current LoS.

Replacement (renewals)

Renewal expenditure includes rehabilitation and replacement of assets to restore an asset to its original level of service, i.e. capacity or the required condition. Renewals expenditure forecasts cover the cost of asset renewal through its whole lifecycle through to disposal of the asset.



Capital works (new works)

Capital works (new works) involves the creation of new assets, or works, which upgrade or improve an existing asset beyond its current capacity or performance in response to changes in usage or customer expectations.

These categories are described in more detail in Section 11 Projects and Financial Forecasts of the detailed AMP.

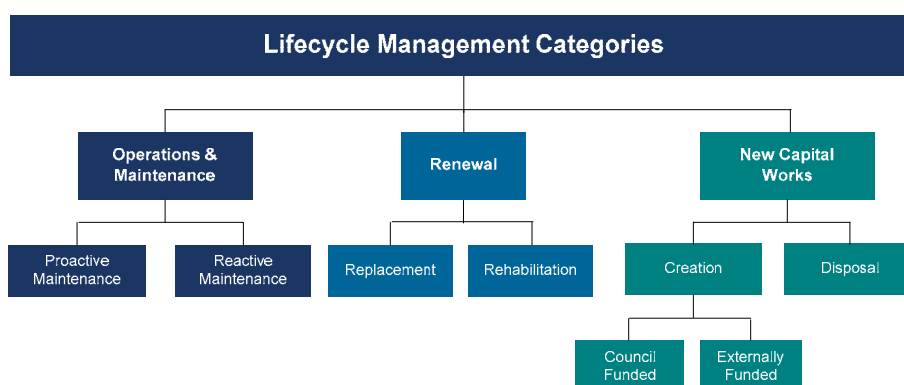


Figure 10 Recreation lifecycle management categories

Key issues and strategies

The key issues relating to the management of the rivers and drainage activity are as follows:

Table 19 Rivers and drainage key issues and strategies

Key issue	Strategies to address key issue
▶ Sea level rise.	▶ Some provision included in some schemes.
▶ Increased frequency and magnitude of flooding due to climate change.	▶ No current policy or provision.
▶ Interdecadal Pacific Oscillation.	▶ To be considered in any future review of flood protection assets.
▶ Stock damage to stopbanks.	▶ Monitoring to assess condition.
▶ Stopbank alignment – too close to river channel increasing risk of undermining.	▶ Additional edge protection works. ▶ Maintenance of existing edge protection works and buffer zones.
▶ Stopbank narrowness in some rural locations.	▶ Stability analysis.
▶ Aggradation of river bed through the natural movement of river metal.	▶ Monitoring.
▶ Degradation of river beds through extraction of metal.	▶ Regulatory controls and monitoring.
▶ Water takes for irrigation purposes.	▶ Regulatory controls and monitoring.
▶ Increased requirement to waterways for recreational purposes.	▶ Identify and develop existing and potential access points.

Asset description

All the assets associated with the rivers and drainage activity can be grouped under five asset group headings as shown below.

Erosion protection	<ul style="list-style-type: none"> ▶ Buffer zone ▶ Edge planting ▶ Fencing ▶ Groyne ▶ Rock work ▶ Rubble ▶ Trenched willows 	Structures	<ul style="list-style-type: none"> ▶ Culvert ▶ Concrete structure ▶ Concrete wall ▶ Drop structure ▶ Flood gate ▶ Radial gate ▶ Sluice gate ▶ Stop log ▶ Timber wall
Pump stations	<ul style="list-style-type: none"> ▶ Pumps ▶ Pump station ▶ Pump – electrical ▶ Pump - electronics 	Waterways	<ul style="list-style-type: none"> ▶ Canals ▶ Drains
Stopbanks	<ul style="list-style-type: none"> ▶ Stopbanks 		

Asset summary

The table below is a summary of the rivers and drainage assets currently owned by Bay of Plenty Regional Council, including average age, condition and expected useful life. The Optimised Replacement Cost (ORC), Optimised Depreciated Replacement Cost (ODRC), annual depreciation as at 30 June 2011.

Table 20 Asset inventory

Asset	Asset Group	Base Life (Years)	Average Age (Years)	Optimised Replacement Cost (ORC) (\$)	Optimised Depreciated Replacement Cost (ODRC) (\$)	Annual Depreciated (\$)
Buffer Zone	Erosion Protection	Perpetuity	-	160,694	160,694	0
Concrete Structure	Structures	70	25.5	1,975,341	1,338,755	23,990
Concrete Wall	Structures	50	20.7	1,580,640	939,798	31,613
Culvert	Structures	50	36.5	4,594,965	2,022,580	80,195
Drop Structure	Structures	40	19.7	324,494	169,696	6,896
Edge Planting	Erosion Protection	Perpetuity	-	999,757	999,757	0
Fencing	Erosion Protection	Perpetuity	8.0	439,501	439,501	0
Flood Gate	Structures	70	31.7	2,367,965	1,396,201	27,696
Groyne (mole)	Erosion Protection	70	54.0	289,964	99,804	3,521
Pump – Electrical	Pump Stations	30	17.3	127,473	96,460	4,012
Pump –Electronics	Pump Stations	15	6.4	308,641	216,527	17,819
Pump Station	Pump Stations	70	16.6	2,383,196	1,556,738	57,068
Pumps	Pump Stations	35	23.8	5,919,590	4,371,643	72,979
Radial Gate	Structures	40	21.0	229,424	119,174	5,250
Rockwork	Erosion Protection	Perpetuity	1.4	20,566,636	20,566,636	0
Rubble	Erosion Protection	Perpetuity	0.3	410,018	410,018	0
Sluice Gate	Structures	70	23.0	50,905	37,231	594
Stop Log	Structures	40	7.0	82,783	70,940	1,692
Stopbank	Stopbanks	Perpetuity (with settlement)	15.5	141,951,370	134,605,845	425,854
Timber Wall	Structures	40	13.0	22,481	16,270	478
Trenched Willows	Erosion Protection	Perpetuity	0.4	2,560,621	2,560,621	0
Waterway	Waterways	Perpetuity	-	15,578,164	15,578,164	0
Consent35	Consents	35	0.0	1,557,985	1,557,985	44,512
Total				204,482,608	189,331,036	804,169

Asset capacity and reliability

Reliability (performance)

In the rivers and drainage activity, a small asset failure (namely in the stopbanks or erosion protection asset groups) can lead to inundation of a large area of the flood plain resulting in disproportionate damage to the initial failure.

The erosion protection assets can also be subject to substantial damage themselves from flows less than design level.

Reactive maintenance is expended on repairing flood damage resulting from moderate sized floods.

Preventative maintenance, regular inspection, monitoring and hydraulic modelling all contribute to ensuring service reliability standards are met.

Erosion protection

Erosion protection is used to:

- ▶ Protect stopbanks and natural channel banks from erosion
- ▶ Maintain channel stability
- ▶ Reduce sediment deposition

The erosion protection asset comprises of:

- ▶ Buffer zone
- ▶ Edge planting
- ▶ Fencing
- ▶ Groyne
- ▶ Rock work
- ▶ Rubble
- ▶ Trenched willows

Erosion Protection comprises 12.3% of the Optimised Replacement Cost (ORC) for all the assets, with a total value of \$25,137,227.

The Figure that follows shows the comparison of Erosion Protection ORC for each scheme. The Rangitāiki-Tarawera Scheme accounts for 51% of the overall Erosion Protection ORC with a value of \$12.9 million.

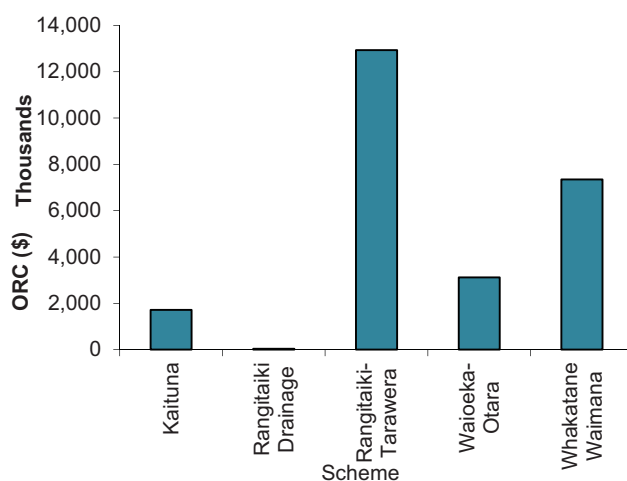


Figure 11 Erosion protection ORC by scheme

The erosion protection assets are not depreciated.

Figure 12 shows the ORC of the individual Erosion Protection assets totalled for all schemes. Rockwork accounts for the majority (82%) of the ORC at \$20.6 million. Trenched Willows are next at 10% with \$2.6 million with the remaining assets all accounting for less than \$1 million.

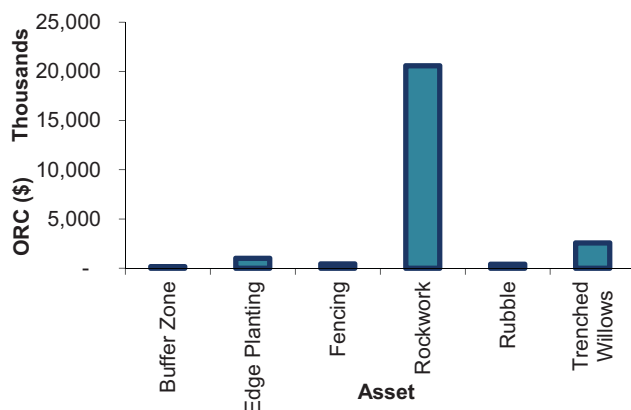


Figure 12 ORC by individual erosion protection asset

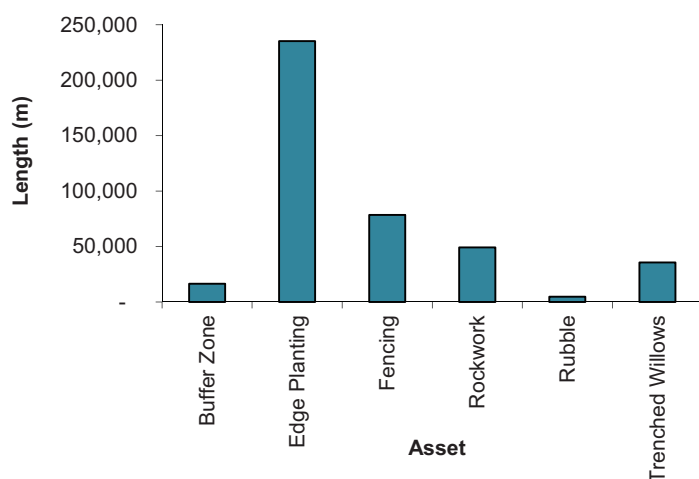


Figure 13 Lengths of erosion protection assets

Pump stations

Pump stations for the rivers and drainage activity are used to discharge drainage and flood flows when gravity outlets have either been blocked or inhibited in some way. Pump Station components generally include:

- ▶ Pumps
- ▶ Pump stations (i.e. structure)
- ▶ Pump electricals
- ▶ Pump electronics (e.g. computer electronics)

Pump Stations are inspected fortnightly for operational capability and receive programmed maintenance throughout their life cycle.

Pump Stations make up only 4.3% of the Optimised Replacement Cost (ORC) for all of the rivers and drainage assets, with a total value of \$8,738,900.

Figure 14 shows the comparison of ORC across each scheme. The Kaituna and Whakatane-Waimana schemes account for the greatest ORC, with 59% and 29% respectively.

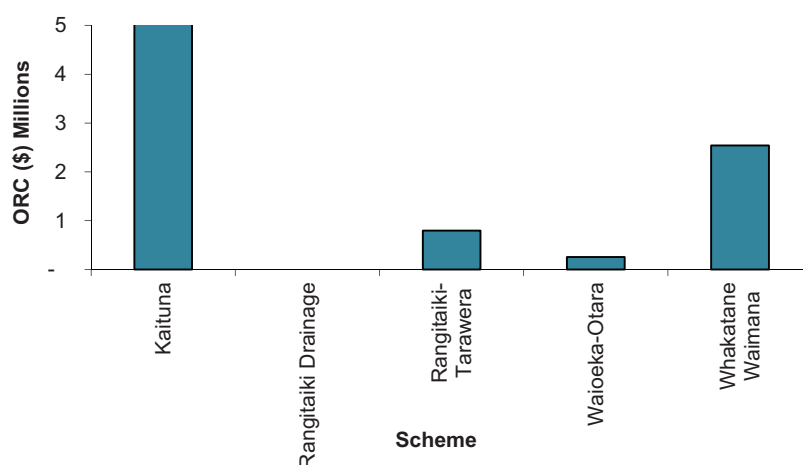


Figure 14 Pump station ORC by scheme

Figure 15 shows the number of Pump Stations per scheme. Kaituna with seven pump stations has the most of all of the rivers and drainage schemes.

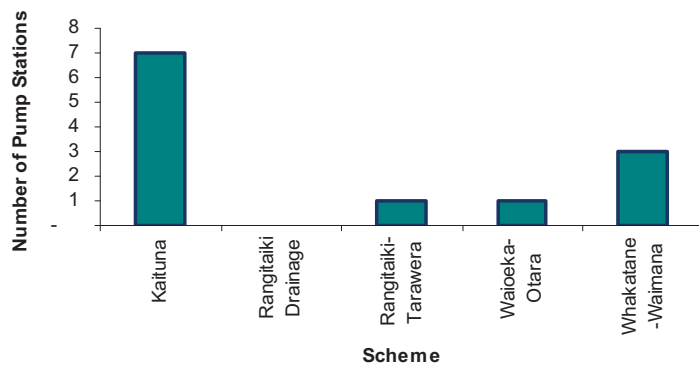


Figure 15 Number of pump stations by scheme

Figure 16 shows the average remaining life compared to the average age of the pump station components across the five schemes. The pump station components as a whole are all well below halfway through their expected lives. The pump structures all generally have 20 – 30 years expected life remaining.

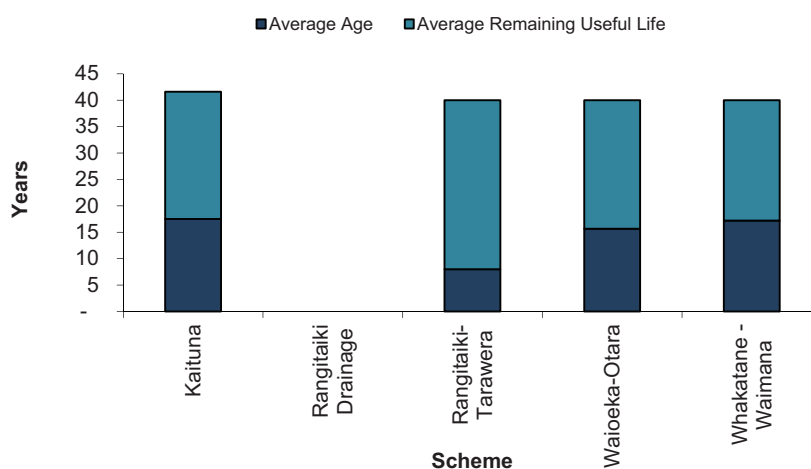


Figure 16 Pump stations age vs remaining life by scheme

Stopbanks

Stopbanks are compacted earth embankments built alongside rivers to provide protection to the bordering land from flooding. Stopbanks are the most significant asset in rivers and drainage infrastructure. The total Optimised Replacement Cost (ORC) of these assets is \$142 million (as at 30 June 2011), this represents 69% of the total network value. Stopbank asset condition is monitored by visual inspections, physical surveys and scheme reviews including detailed computer modelling.

Figure 17 shows the ORC for Stopbanks across all of the schemes. The Rangitāiki-Tarawera scheme accounts for 34% of the total ORC, with a value of \$47.8 million.

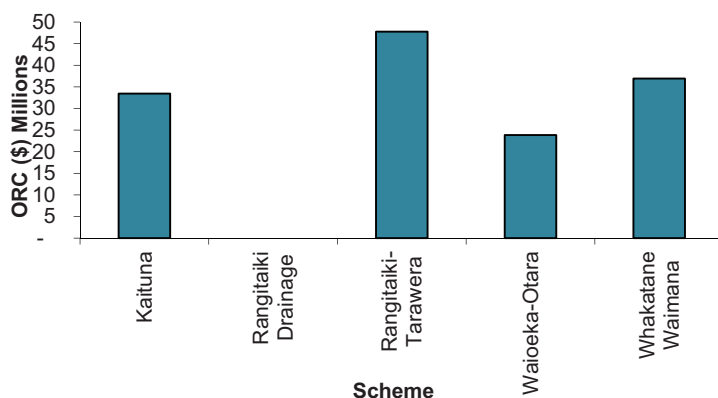


Figure 17 Stopbanks ORC

Figure 18 represents, where applicable, the length of stopbanks totalled across all of the schemes. There is a total of 348.3 km of stopbanks across the five schemes with Rangitāiki-Tarawera totalling the most at 120.7 km.

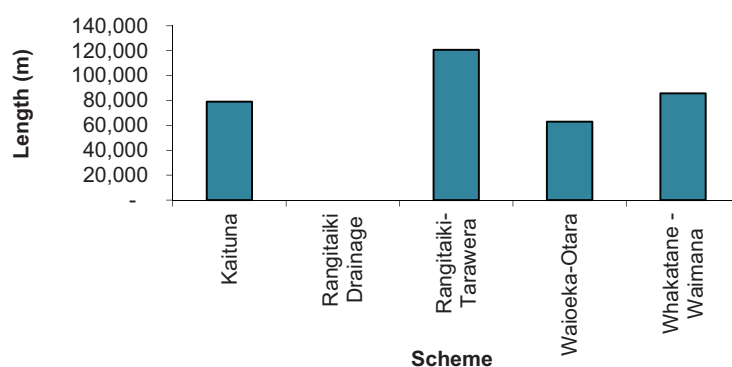


Figure 18 Length of stopbanks

Figure 19 shows the average age of the stopbank assets across all of the schemes. Note that 'remaining useful life' is not applicable as the stopbanks have an estimated life of perpetuity for depreciation purposes. Whakatane-Waimana has many of the newest stopbanks.

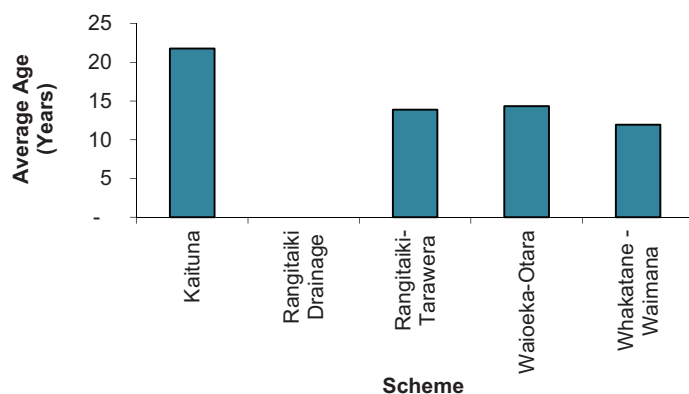


Figure 19 Stopbanks estimated average age

Structures

Environment Bay of Plenty's Rivers and Drainage Schemes have a number of structures that assist with the overall function of the activity. The structures assets that form part of the rivers and drainage infrastructure include:

- ▶ Culverts
- ▶ Concrete structures
- ▶ Concrete walls
- ▶ Drop structures
- ▶ Flood gates
- ▶ Radial gates
- ▶ Sluice gates
- ▶ Stop logs
- ▶ Timber walls

Structures assets undergo a programme of regular maintenance with asset condition monitored by regular inspection.

Structures make up 5% of the total ORC of all of the rivers and drainage assets, with a total value of \$13.1 million.

Figure 20 shows the ORC for structures across the schemes. The Kaituna scheme accounts for 48.9% of the total ORC, with a value of \$6.4 million.

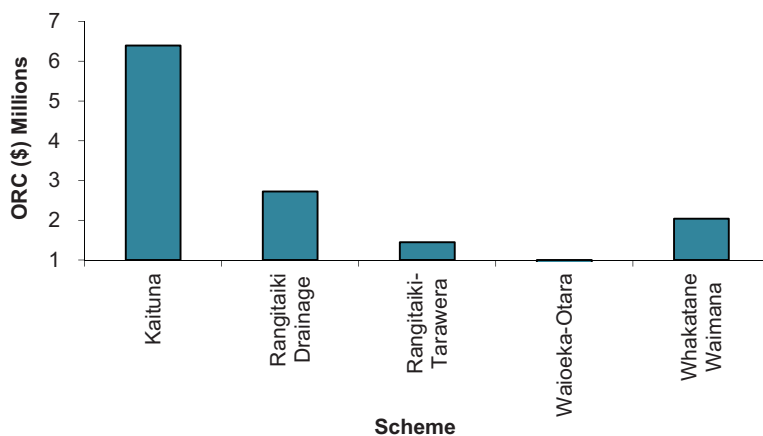


Figure 20 Structures ORC

Figure 21 shows the average remaining useful life versus estimated average age for the structures assets across all the schemes. The structures assets are less than halfway through their estimated lives with the exception of the Rangitaiki Drainage Scheme where the structures assets on average are 77% of the way through their expected lives.

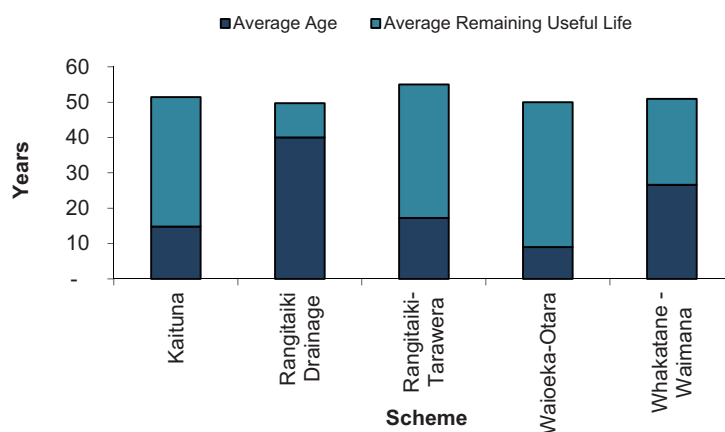


Figure 21 Structures age vs remaining life by scheme

Waterways (drains and canals)

The drains and canals assets are channels excavated to provide drainage (drains) or sufficient flow capacity for design floods (canals). The Rangitaiki-Tarawera and Whakatane-Waimana River schemes do not have waterways assets. These assets do not include natural streams.

Drains and canals contribute to 7.6% of the total ORC for all of the assets, with a total value of \$15.6 million.

The drains and canals assets have an estimated life of perpetuity and are therefore not subjected to depreciation.

Condition of the waterways is generally monitored by:

- ▶ Visual inspections
- ▶ Physical surveys
- ▶ Scheme reviews including detailed computer modelling

Figure 22 shows the ORC for drainage and canal assets across the six schemes. The Rangitāiki Drainage scheme accounts for 85% of the total ORC, with a value of \$ 13.3 million.

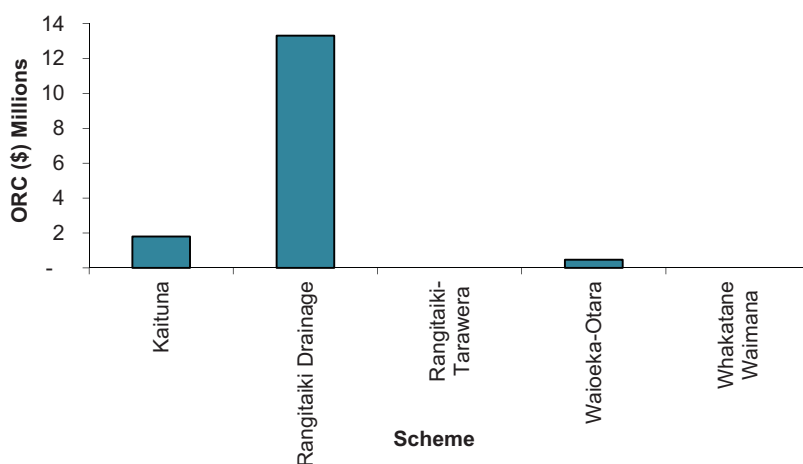


Figure 22 Drains and canals ORC

Figure 23 represents, where applicable, the length of waterways totalled across all the schemes. There is a total of 492.6 km of waterways across the five schemes with the Rangitāiki Drainage scheme totalling the most at 366.4 km.

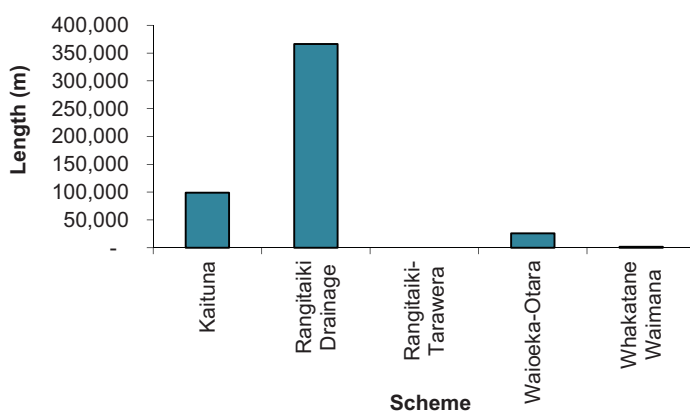


Figure 23 Length of waterways

Waterways (rivers and streams)

A number of rivers and streams are maintained by Bay of Plenty Regional Council. These assets do not have any economic value (i.e. are not considered as part of the valuation), however they do require maintenance and this requires ongoing maintenance and operational budgets to allow maintenance works to go ahead.

Scheme summaries

Overview

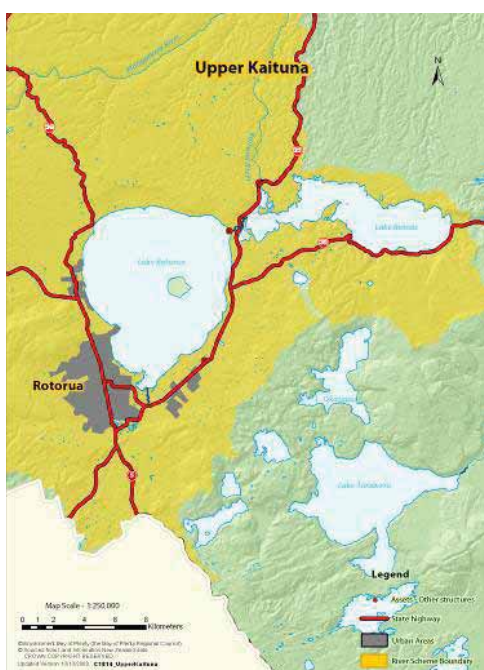
Bay of Plenty Regional Council major river schemes and drainage areas within its regional boundaries, include:

- ▶ Kaituna Catchment Control Scheme
- ▶ Rangitāiki Drainage Scheme
- ▶ Rangitāiki-Tarawera Rivers Scheme
- ▶ Waioeka-Otara Rivers Scheme
- ▶ Whakatane-Waimana Rivers

There are also a number of minor rivers and drainage schemes that complete the Rivers and Drainage network in the Bay of Plenty. The minor drainage schemes are not part of the Rivers and Drainage AMP, Bay of Plenty Regional Council do not own these assets, but do manage on behalf of these schemes. Each scheme has the discretion to use Council or others to manage their scheme.

Kaituna Catchment Control Scheme

The Kaituna Catchment Control Scheme includes the Kaituna River, Lake Rotorua and Lake Rotoiti catchments. The scheme consists of two discrete areas divided at Okere: Upper Kaituna and Lower Kaituna.



The Upper Kaituna area includes:

- ▶ 10 kilometres of stopbank through the Rotorua urban area.
- ▶ Level control structures on Lakes Rotorua and Rotoiti.
- ▶ Excavated channels and spillways.
- ▶ Diversion and grade control structures.
- ▶ Erosion protection – planting and rock riprap.



The Lower Kaituna area includes:

- ▶ 69 kilometres of stopbank
- ▶ 88 kilometres of canals and drains across the plains
- ▶ 6 operative pump stations
- ▶ Floodgate, culvert and weir structures
- ▶ Erosion protection – planting and rock riprap
- ▶ A groyne structure at the river mouth

The following asset groups are found in the Kaituna Catchment Control Scheme. Table 20 summarises the expected life, age, condition and financial information for these asset groups.

Asset Group	Quantity (m)	Average Base Life	Average Estimated Asset Age	ORC (\$)	ODRC (\$)	Total Depreciation (\$)
Erosion protection	21,884	Perpetuity	-	1,713,654	1,713,654	0
Pump stations		42	17.5	5,148,968	3,669,563	1,479,405
Stopbanks	79,026	Perpetuity (with settlement)	21.8	33,421,759	31,179,267	2,242,492
Structures	269	51	14.8	6,396,156	4,512,527	1,883,629
Drainage and canals	98,803	Perpetuity	-	1,796,243	1,796,243	0
Total	199,983			48,476,781	42,871,255	5,605,526

Figure 24 Asset information

Figure 25 shows the ORC for the Rivers and Drainage assets associated with the Kaituna Scheme, which amounts to \$48,476,781 (as at 1 July 2011). Stopbanks account for 69% of the ORC. Waterways have a zero depreciation rate due to their estimated life of perpetuity. Stopbanks also have an estimated life of perpetuity however a depreciation rate of 0.3% is included to account for settlement.

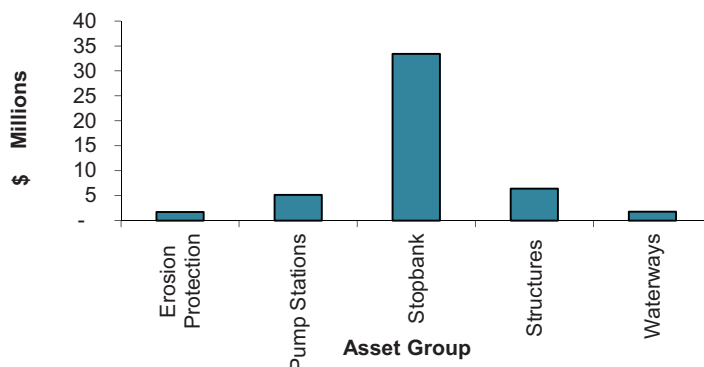


Figure 25 ORC for Kaituna scheme assets

Key issues

- ▶ Bank erosion caused from the wake created by motorised river traffic.
- ▶ Stopbank erosion from stock access and control, poor cover, inadequate berm, large trees.
- ▶ Geothermal activity in the upper Kaituna area (corrosion of flap-gate structures, hazardous working conditions).
- ▶ Private ownership of riparian land restricting access for maintenance.
- ▶ Stream channel aggradation.
- ▶ Catchment land use changes e.g. lifestyle blocks.
- ▶ Cost of upgrading the stopbanks for climate change. A number of canals are due for their renewal works. Climate change criteria has been included in design and therefore will have an effect on the cost of renewal works. This is likely to affect the Stopbank system in lower part of catchment, which is more likely to be affected by climate change.
- ▶ Land settling in the Lower Kaituna Catchment which then affects stopbanks and their potential capacity.
- ▶ Consent renewal for lake level control structures.
- ▶ River bank erosion due to storm damage, the nature of the river makes this difficult to maintain.
- ▶ Tauranga Eastern Motorway – effect on flood levels.
- ▶ Lake level operation management (competing use).
- ▶ Vandalism e.g. cutting down trees and fences for access.

The following table outlines the current stopbank design standards for the Kaituna Scheme.

Table 21 Stopbank design standards – Kaituna

Scheme	Location	Design level
Lower Kaituna	Kaituna River: Mangorewa to Te Matai, Mangorewa River for 600 m	10% AEP (10 year) no freeboard
	Kaituna River: downstream of Te Matai	1% AEP plus 500 mm freeboard
	Bells Road No 1 Drain	10% AEP (10 year) no freeboard
	Singletons Drain	10% AEP (10 year) no freeboard
	Parawhenuamea Stream	10% AEP (10 year) no freeboard
	Waiari Stream upstream of State Highway 2	10% AEP (10 year) no freeboard
	Waiari downstream of State Highway 2	1% AEP (100 year) plus 300 mm freeboard
	Ohineangaanga downstream of State Highway 2	1% AEP (100 year) plus 300 mm freeboard
	Raparapahoe downstream of State Highway 2	1% AEP (100 year) plus 300 mm freeboard
	Raparapahoe from State Highway 2 to Quarry Road	10% AEP (10 year) no freeboard
	Kopuaroa downstream of State Highway 2	1% AEP (100 year) plus 300 mm freeboard
	Drains, canals and pump stations, Lower Kaituna	20% AEP (5 year) Drainage co-efficient of 37.5mm/day
	Waingaehe – downstream State Highway 30	1% AEP (100 year)
Upper Kaituna	Puarenga – downstream State Highway 30	1% AEP (100 year)
	Utuhina – downstream State Highway 5	1% AEP (100 year)
	Waiowhero – downstream State Highway 5	1% AEP (100 year)
	Ngongotaha – downstream of Ngongotaha Road	1% AEP (100 year)
	Waiteti – downstream of Ngongotaha Road	1% AEP (100 year)
	Streams of Haupara Bay – downstream of State Highway 30	10% AEP (10 year)
	Streams of Gisborne Point – downstream of State Highway 30	10% AEP (10 year)

Table 22 Capital expenditure schedule – Kaituna

Year	Capital works	Renewal or new	How much	Funding source
Year 1 (2012/2013)	Kaituna left stopbank: Downstream of Waiari	Renewal	\$482,000	Loans & Replacement Reserve
	Maketū pump station forebay retaining wall reconstruction.	Renewal	\$100,000	Loans
	Major flood repair works	New	\$700,000	Loans
	Utuhina Stream U/S Lake Rd stopbank renewals	Renewal	\$260,000	Loans
Year 2 (2013/2014)	Kaituna right stopbank: Railway to Waiari (upstream section)	Renewal	\$879,000	Loans & Replacement Reserve
	Major flood repair works	New	\$1,100,000	Loans
Year 3 (2014/2015)	Kaituna left stopbank: Railway to Waiari (upstream section)	Renewal	\$495,000	Loans & Replacement Reserve
	Ford Road pump station replacement	Renewal	\$1,450,000	Loans & Replacement Reserve
	Okere Gates Lifting Mechanism	Renewal	\$162,000	Loans & Replacement Reserve
Year 4 (2015/2016)	Kaituna right stopbank: Railway to Waiari (downstream section)	Renewal	\$736,000	Loans & Replacement Reserve
	Upper Kaituna Stopbank renewals	Renewal	\$41,000	
Year 5 (2016/2017)	Kaituna left stopbank: Railway to Waiari (downstream section)	Renewal	\$516,000	Loans & Replacement Reserve
Year 6 (2017/2018)	Kaituna right stopbank: Waiari to 5268m to Waiari.	Renewal	\$363,000	Loans & Replacement Reserve
	Pump Station electrical renewals.	Renewal	\$34,000	Replacement Reserve
Year 7 (2018/2019)	Raparapahoe right canal stopbank.	Renewal	\$180,000	Loans & Replacement Reserve
	Pump Station electrical renewals.	Renewal	\$71,000	Replacement Reserve
Year 8 (2019/2020)	Pump replacements	Renewal	\$370,000	Loans & Replacement Reserve
	Climate change mitigation	New	\$2,150,000	Loans & Replacement Reserve
Year 9 (2020/2021)	Pump Station electrical renewals	Renewal	\$15,000	Replacement Reserve
Year 10 (2021/2022)	Pump Station electrical renewals	Renewal	\$56,000	Replacement Reserve

Annual Operational Expenditure

Each year we will: Manage the scheme in accordance with the 2011/12 Rivers and Drainage AMP maintenance schedule (e.g. vegetation and culvert clearance, fencing maintenance and replacement, rock edge protection maintenance works, floodgate and pumping station inspections etc).

Monitor and manage the levels of Lake Rotoiti and Lake Rotorua.

Rangitāiki Drainage Scheme

The Rangitāiki Drainage Scheme provides gravity drainage to the Rangitāiki Plains, an area of approximately 29,000 ha. The scheme has 88 km of major canals (arterial) and 240 km of drains, which divert excess water from the Rangitāiki Plains into the Tarawera, Rangitāiki and Whakatāne Rivers.



Table 23 below summaries the assets within the scheme, indicating the expected life, age, condition and financial information for each item.

Table 23 Asset information

	Quantity (m)	Estimated Base Life	Average Estimated Asset Age	ORC (\$)	ODRC (\$)	Total Depreciation (\$)
Erosion Protection	395	Perpetuity	-	34,000	34,000	0
Structures	2,292	50	40.0	2,725,849	870,040	1,855,809
Waterways	366,475	Perpetuity	-	13,311,888	13,311,888	0
Total	369,162			16,071,737	14,215,928	1,855,809

Figure 26 following shows the ORC for the drainage assets associated with the Rangitāiki Drainage Scheme, which amounts to \$16,071,737 (as at 30 June 2011). Waterways account for 83% of the ORC, with structures accounting for 16%. Erosion protection accounts for less than 1%.

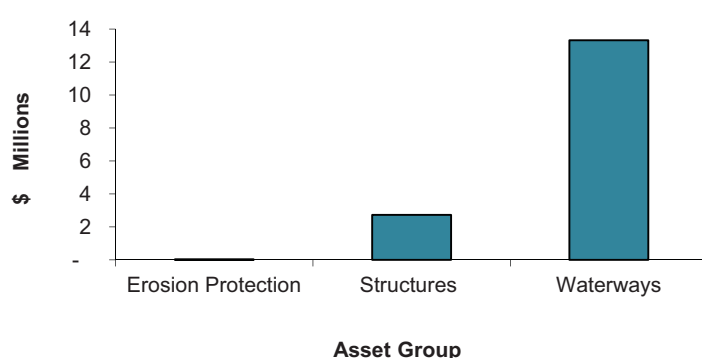


Figure 26 ORC for Rangitāiki drainage scheme assets

Key issues

- ▶ Lowering of ground levels as a result of over drainage.
- ▶ Restriction of access to stream banks by landowners and physical constraints and unauthorised crossings.
- ▶ Weed control and disposal.
- ▶ Damage to assets from major floods.
- ▶ Environmental impact of Plains drainage on wetlands.
- ▶ Contaminated sediments in the lower reaches of the Kope-Orini Canal from industry discharge.
- ▶ Aggradation from outside of the drainage area.
- ▶ Catchment land use changes e.g. lifestyle blocks.
- ▶ Seismic movement.
- ▶ Drain bank erosion due to storm damage.
- ▶ Organic land use restricting maintenance activities.
- ▶ Environmental impacts e.g. fish passage, wildfowl breeding etc.

The following table outlines the current design standards for the Rangitāiki Drainage Scheme.

Table 24 Design standards – Rangitāiki Drainage Scheme

Asset	Design Level
Drains, canals and pump stations	20% AEP (5 year) drainage co-efficient of 28 mm/day
Wilson's Creek stopbanks (NB: the left bank was lowered by 300 mm. A freeboard of 500 mm is probably more appropriate.	10% AEP (10 year) plus 300 mm freeboard

The following table outlines the annual capital expenditure for the Rangitāiki Drainage Scheme.

Table 25 Capital expenditure schedule – Rangitāiki Drainage Scheme

Year	Capital works	Renewal or new	How much	Funding source
Year 1 (2012/2013)	Multiple floodgate replacement	Renewal	\$381,311	Replacement reserve
Year 2 (2013/2014)	Multiple floodgate replacement	Renewal	\$162,941	Replacement reserve
Year 3 (2014/2015)	Multiple floodgate replacement	Renewal	\$117,522	Replacement reserve
Year 4 (2015/2016)	Multiple floodgate replacement	Renewal	\$187,646	Replacement reserve
Year 5 (2016/2017)	Multiple floodgate replacement	Renewal	\$181,937	Replacement reserve
Year 6 (2017/2018)	Multiple floodgate replacement	Renewal	\$227,932	Replacement reserve
Year 7 (2018/2019)	Multiple floodgate replacement	Renewal	\$230,962	Replacement reserve
Year 8 (2019/2020)	Culvert replacement	Renewal	\$99,926	Replacement reserve
Year 9 (2020/2021)	Culvert replacement	Renewal	\$163,072	Replacement reserve
Year 10 (2021/2022)	Culvert replacement	Renewal	\$189,558	Replacement reserve

Annual Operational Expenditure

Each year we will: Manage the scheme in accordance with the 2008/09 Rivers and Drainage AMP maintenance schedule (e.g. vegetation and culvert clearance, drain spraying, weed cutting, desilting, floodgate inspections and maintenance etc).

Rangitāiki-Tarawera Rivers Scheme

Rangitāiki-Tarawera Rivers Scheme provides flood protection and channel edge stability to land within the Rangitāiki and Tarawera catchments. It has the largest catchment area of all the schemes.

Edgecumbe/Lower Rangitāiki flood mitigation project

Flooding in 2004 has caused damage to private property and also raised concerns regarding the integrity of the stop banks surrounding the town. Bay of Plenty Regional Council manages the drainage system outside of the town boundaries. Whakatane District Council and Bay of Plenty Regional Council worked together to investigate options to protect the town from future flooding. The identified options have been consulted on with affected parties and stakeholders prior to the lodgement of a resource consent applications and physical works are currently underway.



Table 26 below summaries the assets within the scheme indicating the expected life, age, condition and financial information for each item.

Table 26 Asset information

	Quantity (m)	Average Base Life	Average Estimated Asset Age	ORC (\$)	ODRC (\$)	Total Depreciation (\$)
Erosion protection	198,249	Perpetuity	1.1	12,928,159	12,928,159	0
Pump Stations		40	8.0	796,171	659,868	136,303
Stopbanks	120,738	Perpetuity (with settlement)	13.9	47,755,802	45,067,221	2,688,581
Structures	665	55	17.3	1,447,737	980,554	467,183
Total	319,652			62,927,869	59,635,802	3,292,067

Figure 27 below shows the ORC for the Rivers and Drainage assets associated with the Rangitāiki-Tarawera Rivers Scheme, which amounts to \$62,927,869 (as at 30 June 2011). Stopbanks account for 76% of the ORC, followed by Erosion Protection with 21%.

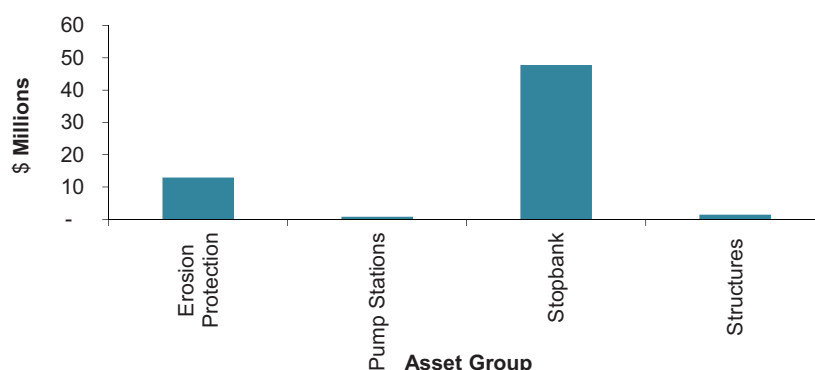


Figure 27 ORC for Rangitāiki-Tarawera Scheme Assets

Key issues

- ▶ Private ownership of riparian land restricting access.
- ▶ Water level variance as a result of hydroelectric power station activity causing bank erosion.
- ▶ High level of debt for the scheme, long-term sustainability an issue – 6-8,000 ratepayers. Previous flooding, Edgecumbe earthquake 1998 flooding, 2004/05 plus major capital projects including Edgecumbe earthquake restoration project, stopbank restoration project and the restoration works following the most recent floods.
- ▶ Flood mitigation at Waitepuru from 2005 Matata floods.
- ▶ Dams – adverse effect on edge protection vegetation works due to fluctuations in water levels. Assists with attenuation during storms.
- ▶ Sedimentation of Aniwhenua Dam headwaters.
- ▶ Gravel accumulation in upper tributaries.
- ▶ Land use changes in the upper catchment increased discharges and increased gravel and sediment.
- ▶ Land use changes in lower catchment causing access issues.
- ▶ Flood damage repair works ongoing.
- ▶ Stock damage.
- ▶ Weeds and pest control (damaging stopbanks).

The following table outlines the current stopbank design standards for the Rangitāiki-Tarawera Rivers Scheme.

Table 27 Stopbank design standards – Rangitāiki-Tarawera Rivers Scheme

Stopbanks	Design levels
Tarawera Right Bank downstream of State Highway 30	1% AEP (100 yr) plus 300 mm freeboard
Tarawera Left Bank downstream of State Highway 2	1% AEP (100 yr) plus 300 mm freeboard
Tarawera Left Bank from State Highway 30 to State Highway 2	1% AEP (100 yr) plus 150 mm freeboard
Rangitāiki River – Rural from State Highway 30 to Mouth	1% AEP (100 yr) plus 300 mm freeboard
Rangitāiki River – Urban (Te Teko, Edgecumbe, Thornton)	1% AEP (100 yr) plus 600 mm freeboard
Rangitāiki Floodway	1% AEP (100 yr) plus 250 mm freeboard
Awaiti, Omeheu, 109 canals	20% AEP (5 yr) plus 300 mm freeboard
Awakaponga	10% AEP (10 yr) plus 300 mm freeboard
Old Rangitāiki Channel	20% AEP (5 yr) plus 150 mm freeboard

The following table outlines the annual capital expenditure for the Rangitāiki-Tarawera Rivers Scheme

Table 28 Capital expenditure schedule – Rangitāiki-Tarawera Rivers Scheme

Year	Capital works	Renewal or new	How much	Funding source
Year 1 (2012/2013)	Floodway widening stage 2	New	\$3,023,000	Loans and Subsidy
	Geotech strengthening carried forward	New	\$500,000	Loans and Subsidy
	Flood Repair works	New	\$2,200,000	Loans
Year 2 (2013/2014)	Spillway Control Structure	New	\$2,164,000	Loans and Subsidy
	Flood repair works		\$2,200,000	Loans
Year 3 (2014/2015)	Te Teko School Stopbank Construction	New	\$118,000	Loans
	Flood Repair works	Renewal	\$3,000,000	Loans
	Tarawera River stopbanks – stage 1	Renewal	\$708,000	Loans
Year 4 (2015/2016)	Tarawera River stopbanks – stage 2	Renewal	\$733,000	Loans
Year 5 (2016/2017)	Rangitāiki River stopbanks – stage 1	Renewal	\$762,000	Loans
Year 6 (2017/2018)	Rangitāiki River stopbanks – stage 2	Renewal	\$550,000	Loans
Year 7 (2018/2019)	Floodway stopbank raising (outside of widened sections)	Renewal	\$1,074,000	Loans
Year 8 (2019/2020)	Stopbank renewals	Renewal	\$539,000	Loans
Year 9 (2020/2021)	Stopbank renewals	Renewal	\$539,000	Loans
Year 10 (2021/2022)	Stopbank renewals	Renewal	\$539,000	Loans
Annual Operational Expenditure				

Each year we will: Manage the scheme in accordance with the 2001/12 Rivers and Drainage Schemes AMP maintenance schedule (e.g. vegetation and culvert clearance, fencing maintenance and replacement, rock edge protection maintenance works, floodgate and pumping station inspections etc).

Waioeka-Otara Rivers Scheme

The Waioeka-Otara Rivers Scheme provides flood protection, channel edge stability and some drainage and pumping to Opotiki and the surrounding land on the floodplain.



Table 29 summarises the assets in the Waioeka-Otara Rivers Scheme indicating the expected life, age, condition and financial information for each item.

Table 29 Asset information

	Quantity (m)	Estimated Base Life	Estimated Average Asset Age	Condition	ORC (\$)	ODRC (\$)	Total Depreciation (\$)
Erosion protection	103,466	Perpetuity	1.6		3,116,701	3,116,701	0
Pump Stations		40	15.7		253,617	168,106	85,511
Stopbanks	62,925	Perpetuity (with settlement)	14.3		23,853,698	22,792,893	1,060,805
Structures	379	50	9.0		465,404	379,803	85,601
Waterways	25,854	Perpetuity	N/a		470,033	470,033	0
Total	192,624				28,159,454	26,927,537	1,231,917

Figure 28 shows the ORC for the Rivers and Drainage assets associated with the Waioeka-Otara Rivers Scheme, which amounts to \$28,159,454 (as at 30 June 2011). Stopbanks are the major asset accounting for 85% of the ORC, followed by Erosion Protection at 11%.

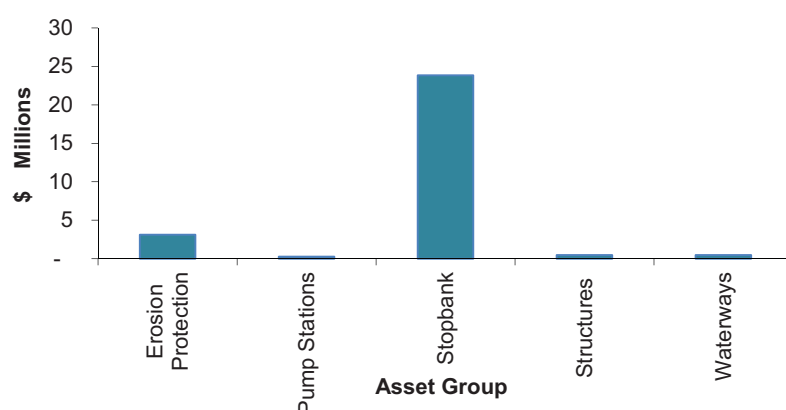


Figure 28 ORC for Waioeka-Otara Rivers Scheme assets

Key issues

- ▶ Berm and river aggradation, particularly in tidal reaches.
- ▶ Gravel extraction (sustainability).
- ▶ Opotiki Harbour works (proposed Harbour groynes may affect flood levels).
- ▶ Private ownership of riparian land restricting access.
- ▶ Gravel accumulation.
- ▶ Land use changes in the upper catchment increased discharges and increased gravel and sediment.
- ▶ Flood damage repair works from recent floods.
- ▶ Stock damage.
- ▶ Weeds and pest control (damaging stopbanks).
- ▶ Petersons ring bank, low lying area requires protection.
- ▶ State highway 2 flooding, downstream of bridge.
- ▶ Gordon Estate erosion at the Waioeka confluence.
- ▶ Flood capacity underneath the Waioeka Bridge.
- ▶ Te Rere Pa area drainage and flooding.
- ▶ Site specific flooding issues (Te Rere Pa, Gordon Estate Waioeka Bridge).

The following table outlines the current stopbank design for the Waioeka-Otara Rivers Scheme.

Table 30 Stopbank design standards – Waioeka-Otara Rivers Scheme

Stopbanks	Design levels
Waioeka Urban Right Bank	1% AEP (100 yr) plus 450 mm freeboard
Waioeka Rural Right Bank	5% AEP (20 yr) plus 300 mm freeboard
Waioeka Urban Left Bank	1% AEP (100 yr) plus 450 mm freeboard
Waioeka Rural Left Bank	5% AEP (20 yr) plus 300 mm freeboard
Waioeka Rural Coastal Left Bank	50% AEP (2 yr) plus 300 mm freeboard
Waioeka Rural Left Bank for 1 km upstream of State Highway 2 bridge	20% AEP (5 yr) plus 300 mm freeboard
Mill Stream Right Bank downstream of Clark Cross Road	1% AEP (100 yr) plus 450 mm freeboard
Mill Stream downstream of Matchett Road	5% AEP (20 yr) plus 300 mm freeboard
Peterson's Ring Bank	20% AEP (5 yr) plus 300 mm freeboard
Otara Urban Left Bank	1% AEP (100 yr) plus 450 mm freeboard
Otara Rural Right Bank downstream of Gow Road	5% AEP (20 yr) plus 300 mm freeboard
Otara Rural Coastal Right Bank	50% AEP (2 yr) plus 300 mm freeboard
Otara Rural Left Bank	10% AEP (10 yr) plus 300 mm freeboard
Otara Rural Right Bank	10% AEP (10 yr) plus 300 mm freeboard
Gault Ring Bank	2% AEP (50 yr) plus 400 mm freeboard

The following table outlines the annual capital expenditure for the Waioeka-Otara Rivers Scheme.

Table 31 Capital expenditure schedule – Waioeka-Otara Rivers Scheme

Year	Capital works	Renewal or new	How much	Funding source
Year 1 (2012/2013)	Flood Damage Repairs Waioeka-Otara stopbank top ups – Rural Banks	New Renewal	\$1,200,000 \$383,000	Loans Loans and Replacement reserve
Year 2 (2013/2014)	Flood Damage Repairs	New	\$800,000	Loans
Year 8 (2019/2020)	Duke St Pump Electronics	Renewal	\$13,000	Replacement reserve
Year 9 (2020/21)	Stopbank renewals Climate change mitigation	Renewal New	\$921,000 \$987,000	Loans and Replacement reserve Loans

Annual Operational Expenditure

Each year we will: Manage the scheme in accordance with the 2008/09 Rivers and Drainage AMP maintenance schedule (e.g. vegetation and culvert clearance, fencing maintenance and replacement, rock edge protection maintenance works, floodgate and pumping station inspections etc).

Whakatāne-Waimana Rivers Scheme

The Whakatane-Waimana Rivers Scheme provides flood protection, channel edge stability and drainage to the Whakatane River and Waimana River catchments.

Whakatane-Waimana Floodplain Management Strategy

Bay of Plenty Regional Council has prepared a Whakatane-Waimana Floodplain Management Strategy. The purpose of the Strategy being to:

- ▶ Stage 1 – Establish the context for the flood hazard
- ▶ Stage 2 – Identify mitigation options
- ▶ Stage 3 – Implement mitigation options to treat the flood hazard

Stage 1 was completed in January 2007 (updated in June 2008) and stage 2 was completed in June 2008. The stage 2 report concluded that a stage 3 report was not required since recommendations from stage 2 could be implemented simply and independently.



Table 32 summaries the assets within the scheme, indicating the expected life, age, condition and financial information for each item.

Table 32 Asset information

	Quantity (m)	Estimated Base Life	Estimated Average Asset Age	ORC (\$)	ODRC (\$)	Total Depreciation (\$)
Erosion protection	95,729	Perpetuity	1.0	7,344,713	7,344,713	0
Pump Stations		40	17.2	2,540,144	1,743,831	796,313
Stopbanks	85,676	Perpetuity (with settlement)	11.9	36,920,110	35,566,463	1,353,647
Structures	1,503	51	26.6	2,041,800	1,025,508	1,016,292
Total	182,908			48,846,767	45,680,515	3,166,253

Figure 29 below shows the ORC for the Rivers and Drainage wastewater assets associated with the Whakatane-Waimana Rivers Scheme, which amounts to \$48,846,767 (as at 30 June 2011). Stopbanks are the major asset in this scheme accounting for 76% of the ORC, followed by Erosion Protection (15%), Pump Stations (5%) and finally Structures (4%).

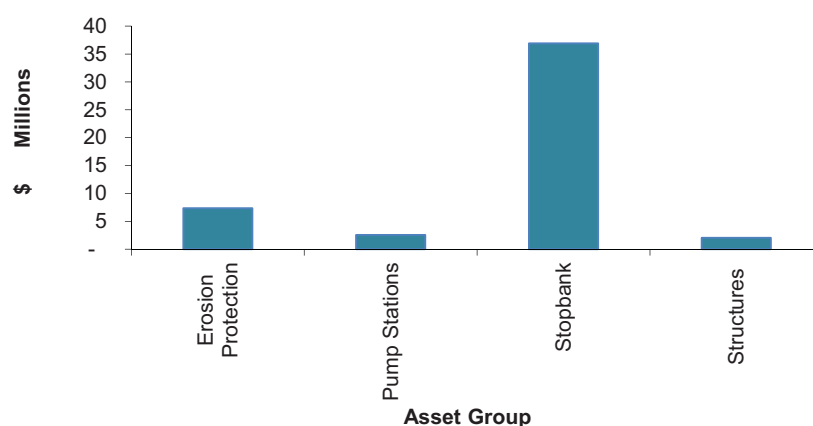


Figure 29 ORC for Whakatane-Waimana Scheme Assets

Key issues

- ▶ Berm and river aggradation, particularly in tidal reaches.
- ▶ Private ownership of riparian land restricting access, particularly in the Waimana River.
- ▶ Gravel accumulation and extraction.
- ▶ Land use changes in the upper catchment increased discharges and increased gravel and sediment.
- ▶ Flood damage repair works ongoing.
- ▶ Stock damage.
- ▶ Weeds and pest control (damaging stopbanks).
- ▶ Maintenance of flood relief fuse at river mouth.
- ▶ High level of debt.
- ▶ Add environmental list i.e. fish passage and contaminated sites.
- ▶ Contaminated sediments in the lower reaches of the Kope-Orini Canal from industry discharge.

The following table outlines the current stopbank design standards for the Whakatane/Waimana Rivers Scheme.

Table 33 Stopbank design standards – Whakatane/Waimana Rivers Scheme

Stopbanks	Design levels
Whakatane right bank downstream of Yacht Club	1% AEP (100 yr) plus 600 mm freeboard
Whakatane right bank from Landing Road Bridge to Yacht Club	1% AEP (100 yr) plus 800 mm freeboard
Whakatane left bank downstream Pekatahi Bridge (State Highway 2)	1% AEP (100 yr) plus 500 mm freeboard
Whakatane right bank from Pekatahi Bridge (State Highway 2) to Landing Road Bridge	1% AEP (100 yr) plus 500 mm freeboard
Waioho Stream	1% AEP (100 yr) plus 600 mm freeboard
Te Rahu Canal downstream State Highway 2 at Awakeri	1% AEP (100 yr) plus 600 mm freeboard
Kopepeo Canal	20% AEP (5 yr) plus 270 mm freeboard

The following table outlines the annual capital expenditure for the Whakatane/Waimana Rivers Scheme.

Table 34 Capital expenditure schedule – Whakatane/Waimana Rivers Scheme

Year	Capital works	Renewal or new	How much	Funding source
Year 1 (2012/2013)	Whakatane Geotech works - Quay Street Flood Repair works	Renewal New	\$266,000 \$900,000	Loans and Replacement reserve Loans
Year 2 (2013/2014)	Te Rahu Canal Stopbanks Flood Repair works	Renewal New	\$220,000 \$600,000	Loans and Replacement reserve Loans
Year 3 (2014/2015)	Whakatane-River stopbanks – stage 1	Renewal	\$354,000	Loans and Replacement reserve
Year 4 (2015/2016)	Whakatane-River stopbanks – stage 2	Renewal	\$366,000	Loans and Replacement reserve
Year 7 (2018/2019)	Culvert Renewals	Renewal	\$31,000	Replacement reserve
Year 8 (2019/2020)	Canal Stopbanks - 50% reconstruction Climate Change mitigation	Renewal New	\$550,000 \$665,000	Loans and Replacement reserve Loans and Replacement reserve

Annual Operational Expenditure

Each year we will: Manage the scheme in accordance with the 2008/09 Rivers and Drainage AMP maintenance schedule (e.g. vegetation and culvert clearance, fencing maintenance and replacement, rock edge protection maintenance works, floodgate and pumping station inspections etc).

Projects and financial forecasts

Overview

To undertake a sustainable, long-term approach to asset management, it is essential to prepare long-term financial forecasts. This allows a long term view of how the asset will be managed, how much this will cost and when additional funding may be required to meet expected service levels. These financial forecasts are a culmination of the previously discussed aspects of the AMP such as:

- ▶ Community consultation
- ▶ Levels of service
- ▶ Demand management
- ▶ Lifecycle management
- ▶ Asset lives
- ▶ Condition ratings
- ▶ Asset valuation

The above forms the basis of the long-term operations, maintenance and capital requirements. Funding requirements have also been included in the financial statements.

Expenditure

Expenditure on infrastructure assets can be categorised into four main areas, which are discussed below:

Operations, management and maintenance

Operations and Maintenance expenditure is that required for the day-to-day operation of the network whilst maintaining the current LoS. Examples of this type of expenditure are:

- ▶ Overheads
- ▶ Minor replacements

Maintenance costs are generally subdivided into three groups, these are described in Table 35.

Table 35 Maintenance types

Maintenance type	General meaning
Routine	Day to day maintenance which is required on an ongoing basis and is budgeted for.
Planned (Proactive)	Non day-to-day maintenance which is identified in advance and is incorporated into a maintenance budget for a certain time period.
Reactive	Maintenance that is unexpected and necessary to attend to immediately to continue operation of the service.

Replacement (renewals)

Renewal expenditure includes rehabilitation and replacement of assets to restore an asset to its original level of service, i.e. capacity or the required condition. Renewals expenditure forecasts cover the cost of asset renewal through its whole lifecycle through to disposal of the asset.

Capital works (new works)

Capital works (new works) involves the creation of new assets, or works, which upgrade or improve an existing asset beyond its current capacity or performance in response to changes in usage or customer expectations.

Disposals

Asset Disposal is the retirement or sale of assets whether surplus or superseded by new or improved systems. Assets may become surplus to requirements due to obsolescence, under utilisation, changes in policy etc.

Asset management assumptions

The following Rivers and Drainage asset management assumptions have been made in preparing the 50-year expenditure forecasts:

- ▶ Asset information is as complete as possible at 30 June 2011. This is based on the valuation data and report compiled by the Rivers and Drainage team.
- ▶ Only Rivers and Drainage assets have been valued.
- ▶ The determination of, asset replacement value, depreciated value, and renewal projections are based on the valuation data as at 30 June 2011.
- ▶ All projected expenditure is stated in dollar values as at 1 July 2012. With no allowance made for inflation.
- ▶ Operational costs are based on historical expenditure and cost to provide.
- ▶ Maintenance and operations allocations are largely based on maintaining current service levels.
- ▶ The depreciation has been calculated on a straight-line basis.
- ▶ Confidence in the data used to produce the 10-year forecasts for this AMP has been assessed at 70 - 75%.
- ▶ Council staff have developed this programme. No formal consultation has been undertaken with the public.
- ▶ It is assumed that regulations relating to rivers and drainage will remain essentially the same over the planning period (i.e. 10 years to June 2022).



Summary financial forecast – all schemes

The tables below contains the Rivers and Drainage statement of Financial Performance, which incorporates the projected income and funding sources to fund operational, renewal and capital expenditure for the next 50 years (2012/13 – 2061/62).

Table 36 Rivers and Drainage element of financial performance 2012/2013 – 2061/2062

Annual Plan 2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	Years 11-20 2023- 2032	Years 21-20 2043- 2042	Years 31-40 2053- 2052	Years 41-50 2063- 2062
(\$)	(\$)	(\$)	(\$)	(\$)	(\$)	(\$)	(\$)	(\$)	(\$)	(\$)	(\$)	(\$)	(\$)	(\$)
Operating revenue														
5,385,151	7,434,182	8,058,328	8,745,694	9,130,081	9,183,870	9,252,790	9,387,565	9,554,963	9,767,237	9,930,125	86,957,313	74,768,965	72,686,683	72,963,821
128,577	64,915	99,080	163,888	227,602	278,267	185,989	255,649	312,437	372,632	436,439	3,737,856	5,854,209	9,644,274	16,431,704
71,169	58,106	57,963	57,963	57,963	57,963	57,963	57,963	57,963	57,963	57,963	579,630	579,630	579,630	579,630
12,070	10,376	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	100,000	100,000	100,000	100,000
5,596,967	7,567,580	8,225,371	8,977,556	9,425,646	9,530,100	9,506,722	9,711,177	9,935,363	10,207,832	10,434,528	91,374,799	81,302,804	83,010,587	90,075,155
Operating expenditure by programme														
1,581,777	1,874,836	1,964,437	2,100,889	2,197,988	2,956,855	2,223,100	2,253,229	2,321,556	2,376,569	3,825,471	24,974,438	23,866,213	23,226,600	25,006,954
1,941,809	2,322,639	2,626,795	2,978,793	3,151,141	3,775,098	3,087,727	3,147,898	3,106,087	3,038,998	4,265,102	27,409,173	23,647,248	23,743,094	23,907,748
1,543,767	1,734,617	1,816,900	1,895,596	1,924,772	2,556,558	1,876,671	1,875,362	1,883,674	1,890,727	3,155,707	19,755,184	20,216,786	20,696,121	19,664,994
799,139	984,571	1,050,428	1,098,942	1,103,808	1,612,958	1,066,906	1,020,586	1,009,726	1,062,851	2,162,368	12,087,678	12,066,735	11,904,696	12,149,997
866,653	816,389	829,049	838,500	847,687	941,465	869,892	883,319	891,293	896,942	1,095,428	9,450,796	9,026,498	8,592,180	8,486,464
6,733,145	7,733,053	8,287,610	8,912,720	9,225,396	11,842,934	9,124,296	9,180,394	9,212,336	9,266,087	14,504,076	93,677,268	88,823,480	88,162,693	89,216,157
1,136,478	165,474	62,239	(64,836)	(200,250)	2,312,834	(382,426)	(530,783)	(723,027)	(941,745)	4,069,548	2,302,469	7,520,676	5,152,106	(858,999)
Funding required														
396,417	600,519	614,691	663,071	695,992	690,809	683,546	727,106	745,181	773,828	804,348	9,643,369	8,159,519	8,014,370	8,062,795
677,518	1,082,124	1,182,167	1,340,835	1,348,706	1,356,224	1,295,479	1,352,765	1,381,778	1,428,868	1,504,146	9,643,369	8,159,519	8,014,370	8,062,795
62,243	(1,517,170)	(1,734,619)	(2,068,741)	(2,244,948)	265,801	(2,361,452)	(2,610,654)	(2,849,987)	(3,144,441)	1,761,055	(16,984,269)	(8,798,362)	(10,876,635)	(16,984,588)
1,136,478	165,474	62,239	(64,836)	(200,250)	2,312,834	(382,426)	(530,783)	(723,027)	(941,745)	4,069,548	2,302,469	7,520,676	5,152,106	(858,999)
Capital expenditure by programme														
3,532,993	1,542,000	1,979,000	2,107,000	776,650	516,000	397,120	250,597	2,535,845	14,786	88,540	3,285,757	3,125,972	3,869,978	8,431,017

Annual Plan 2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	Years 11-20 2023- 2032	Years 21-20 2033- 2042	Years 31-40 2043- 2052	Years 41-50 2053- 2062
(\$)	(\$)	(\$)	(\$)	(\$)	(\$)	(\$)	(\$)	(\$)	(\$)	(\$)	(\$)	(\$)	(\$)	(\$)
4,663,000	5,723,000	4,364,000	3,826,000	733,000	762,000	550,000	1,074,000	539,000	539,000	539,000	1,885,382	3,143,365	3,113,531	3,781,258
1,547,000	1,166,000	820,000	354,000	366,000	0	0	31,068	1,215,000	0	0	3,256,733	4,892,360	2,737,124	3,141,658
1,207,033	1,583,000	800,000	0	0	0	0	0	13,061	1,908,080	0	1,907,646	1,636,285	1,561,841	2,195,586
159,390	381,311	162,941	117,522	187,646	181,937	227,932	230,962	99,926	163,072	189,558	813,535	137,930	112,161	69,430
11,109,416	10,395,311	8,125,941	6,404,522	2,063,296	1,459,937	1,175,052	1,586,627	4,402,832	2,624,939	817,098	11,149,052	12,935,912	11,394,635	17,618,950
Other capital funding applied														
840,125	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1,221,580)	(9,487,811)	(7,498,941)	(6,404,522)	(2,063,296)	(1,459,937)	(1,175,052)	(1,586,627)	(4,402,832)	(2,624,939)	(817,098)	(11,149,052)	(12,935,912)	(11,394,635)	(17,618,950)
10,727,961	907,500	627,000	0	0	0	0	0	0	0	0	0	0	0	0
Sources of capital funding														
965,580	907,500	627,000	0	0	0	0	0	0	0	0	0	0	0	0
7,662,381	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2,100,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10,727,961	907,500	627,000	0	0	0	0	0	0	0	0	0	0	0	0

Business processes

Overview

This section covers the key business processes in place to assist Bay of Plenty Regional Council in delivering asset management and services.

Specific detail is provided on the following aspects:

Lifelines - Lifelines groups are typically voluntary groups of utilities working together to improve the resilience of infrastructure to hazards, often operating under the auspices of the Regional Council.

Civil Defence Emergency Management (CDEM) - The CDEM Group works together to reduce the potential effects of hazard events and to promote community and council readiness (preparedness).

Bay of Plenty Regional Council – Flood Warning Manual – Provides an overview of the flood warning system and the procedures that need to be followed during a flooding event to protect lives and property.

Human Resources and Business Services Continuity Plan - This details Bay of Plenty Regional Council's ability to function and respond to, and during a disaster or other significant event to assist with ongoing operation of key functions.

Service Level Agreements – Provides an understanding of the service level agreements that are currently being agreed as part of the TYP process.

Plan Review & Monitoring – Provides guidance on the long-term sustainability of this document.

Compliance with LGA 2002 Schedule 10 requirements – Key elements within schedule 10 that directly relate to asset management plans have been noted and the relevant sections of the plan have been referenced. This provides Bay of Plenty Regional Council with the confidence that the requirements under the act have been addressed.

Advanced AMP & OAG Criteria – Tables are provided that indicated the requirements that need to be addressed to achieve Advanced AMP status. This can be used as a guide for future asset management improvement in combination with the improvement plan.

Lifelines

Lifelines are the essential 'utility' services, which support the life of the community. These services include water, wastewater, stormwater, power, gas, telecommunications and transportation networks. Lifelines groups are typically voluntary groups of utilities working together to improve the resilience of infrastructure to hazards, often operating under the auspices of the Regional Council. Bay of Plenty Regional Council has a lifelines group in place with a council representative from the Civil Defence Management group who also sits within the lifelines group.

Civil Defence Emergency Management

The purpose of this Plan is to provide a framework for civil defence and emergency management decisions to be made across the Bay of Plenty. The Plan also creates a commitment to the implementation of tasks and actions. It is expected that local authority long-term council community plans and the funding programmes of other agencies and groups will include financial or resource provision to enable the implementation of this Plan development and review.

The Civil Defence Emergency Management Group Plan provides the basis for civil defence and emergency management (CDEM) in the Bay of Plenty. It has been prepared by the CDEM Group. This Group is made up of the following Bay of Plenty local authorities:

- ▶ Bay of Plenty Regional Council
- ▶ Kawerau District Council
- ▶ Ōpōtiki District Council
- ▶ Rotorua District Council
- ▶ Tauranga City Council
- ▶ Western Bay of Plenty District Council

Bay of Plenty Regional Council Flood Warning Manual

Bay of Plenty Regional Council has a detailed Flood Warning Manual that outlines the key procedures that need to be undertaken during a flooding event. The main purpose of the manual is to assist the flood controller or anyone else on duty during a flood event to carry out key functions with the objective of avoiding or reducing the risk to life and property from floods.

The manual is divided into several parts, generally covering the following:

- ▶ Introduction to use the manuals
- ▶ General flood warning
- ▶ Otara River
- ▶ Waioeka River
- ▶ Waimana River
- ▶ Whakatāne River
- ▶ Rangitāiki River
- ▶ Tarawera River
- ▶ Kaituna River
- ▶ Lakes River
- ▶ Lakes operational procedures
- ▶ Coastal flooding processes

Under each of the river schemes, the following items are generally covered:

- ▶ Warnings and warnings lists
- ▶ River telemetry sites
- ▶ Catchment hydrological characteristics
- ▶ Current stopbank design standards
- ▶ Predicted warning stages and travel times
- ▶ Previous floods
- ▶ Flood warning phone lists

Human Resources and Business Services Continuity Plan

In the interests of sound business continuance planning, Bay of Plenty Regional Council has a Human Resources and Business Services Continuity Plan. This provides a tool to effectively react and respond to a crisis in a manner that ensures that its activities, provision of services and staff well-being are not unduly affected.

This Plan has been prepared to ensure the viability of Bay of Plenty Regional Council in the event of an emergency or other event that significantly affects Council's ability to deliver effective services to stakeholders. In line with the Plan, areas within the Whakatane office have been allocated which have separate power generation and telephone links to ensure that minimum ongoing operations and communication can be maintained.

The key areas covered by the Continuity Plan include:

- ▶ Information Services Section Emergency Management Response
- ▶ Databases, Internet and Emergency Management Response
- ▶ GIS and Emergency Management Response
- ▶ Human Resources Section Emergency Management Response
- ▶ Property & Procurement Section Emergency Management Response
- ▶ Customer Services and Records Section Emergency Management Response
- ▶ Governance Services Section Emergency Management Response
- ▶ IT Operations Section

Business systems

Bay of Plenty Regional Council has developed its IT infrastructure around a number of key products that provide a platform for all IT applications. The table below sets out Bay of Plenty Regional Council's cornerstone IT applications used by the Rivers and Drainage team.

Council has a daily backup-to-tape schedule in place. This backs-up all the critical data onto tapes that is stored at an off-site location.

AMP review and monitoring

This Plan is a living document, which is relevant and integral to daily activity. To ensure the plan remains useful and relevant the following on-going process of AMP monitoring and review activity will be undertaken:

- ▶ Formal adoption of the AMP by the Committee/Council.
- ▶ Complete AMP Improvement Plan annually.
- ▶ Review and formally adopt LoS to comply with community outcomes.
- ▶ Revise AMP three yearly prior to Ten Year Plan to incorporate and document changes to works programmes, outcome of service level reviews and new knowledge resulting from the AMP improvement programme.
- ▶ Quality assurance audits of asset management information to ensure the integrity and cost effectiveness of data collected.
- ▶ Peer review and external audits will be undertaken to assess the effectiveness with which this plan meets corporate objectives. Periodic internal audits will be undertaken to assess the adequacy of asset management processes, systems and data and external audits will be undertaken to measure asset management performance against 'best practice'.

Table 37 outlines the procedures and timetables adopted to achieve these objectives and community outcomes.

Table 37 AMP review and monitoring process

Activity	Action	Milestones
AMP development and review	▶ Adoption of AMP by Council.	24 June 2009
	▶ Annual update and enhancement to achieve an intermediate/advance AMP.	Annually
	▶ Set up of an Asset Management Steering Group. Asset management now seen as a priority to the Council.	2010
	▶ Complete next revision of AMP.	
	▶ Update operational plans in alignment with AMP.	2014 for TYP cycle
	▶ Annual review of Plan content by Rivers and Drainage Manager and Improvement Plan.	Annually
	▶ Check AMP content for consistency with adopted Council programmes and plans.	Annually
	▶ Compliance with agreed asset management improvement programmes.	
	▶ Effectiveness and adequacy of AMP processes, systems and data.	
	▶ External review of technical content, with results reported in LTP.	3 yearly
	▶ External review of AMP information by Audit New Zealand.	30 November triennially
Asset management data	▶ Develop data collection and data standards, specifications and quality assurance.	2009
	▶ Undertake quality audits on data integrity and report results.	
	▶ Develop capital works data capture process.	
Level of service	▶ Review current LoS (LoS options vs costs), key performance indicators (KPIs) (including public consultation process).	Ongoing
	▶ Measure LoS delivered and reporting process (in terms of social, economic, environmental and cultural well-being) in Annual Report.	
	▶ Review and implement community consultation process.	
	▶ Adopt LoS through TYP.	Every 3 years

Improvement Plan

Asset management improvement process

Overview

Council is adopting a strategic management approach to improvement planning, continually developing asset management plans, and implementing improvement processes and practices. This Improvement Plan is integral to that approach, quantifying current business practice and measuring progress toward an identified future position.

The purpose of the Improvement Plan is to Identify and develop implementation of AMP processes. This includes:

- ▶ The cycle of AMP monitoring, review, revision and audit to improve the effectiveness of AMP outputs and compliance with audit criteria, legislative requirements and best appropriate practice.
- ▶ The definition of service standards reflecting community outcomes through public consultation. The AMP is used to identify service level options and costs, and the delivery of services is a key objective of asset management planning.
- ▶ Identify and prioritise ways to cost-effectively improve the quality of the AMP, and therefore decision making and service delivery.
- ▶ Identify indicative time-scales, priorities, human and financial resources required to achieve asset management planning objectives.
- ▶ The development of this AMP is based on existing LoS, the best available current information and the knowledge of Bay of Plenty Regional Council staff. It is intended that the development of this Plan is part of an ongoing process and that the document will be reviewed and updated regularly. This review process involves using improved knowledge of customer expectations (community consultation) and information from asset management systems and databases. This will enable Bay of Plenty Regional Council to optimise decision-making, review outputs, develop strategies, improve risk management and extend the planning horizon.

What are typical key improvement areas?

A typical business is made up of a series of key organisational processes that must be managed if the organisation is to continually improve. These processes can be the key areas that are investigated to form the Improvement Plan. The key asset management process areas are listed below:

Core business process	Key element
Asset management/ information systems	<ul style="list-style-type: none"> ▶ Asset register (AMIS) ▶ Plans and records ▶ Financial system ▶ Customer inquiries ▶ Project management
Asset data and knowledge processes	<ul style="list-style-type: none"> ▶ Asset hierarchy ▶ Spatial data ▶ Physical attributes ▶ Maintenance records ▶ Condition data and assessments ▶ Performance monitoring and utilisation ▶ Life cycle cost data ▶ Risk data (critically) ▶ Asset age/lives ▶ Valuations/accounting
Operations and maintenance processes	<ul style="list-style-type: none"> ▶ Operations and maintenance (O&M) policy/strategy ▶ O&M manuals ▶ Emergency planning ▶ Contract monitoring and control ▶ Operational expenditure and analysis/review
Demand analysis and strategic planning processes	<ul style="list-style-type: none"> ▶ Demand analysis ▶ Failure prediction ▶ Risk assessment ▶ Renewal optimisation ▶ LoS reviews

Core business process	Key element
	▶ Long Term Plan (LTP)
Asset capital processes	<ul style="list-style-type: none"> ▶ Project identification/priorities ▶ Capital expenditure evaluation ▶ Contract monitoring and control ▶ Construction/design standards ▶ Asset handover ▶ Asset rationalisation
Organisational/commercial	<ul style="list-style-type: none"> ▶ Asset management review and improvement ▶ Contracting policies ▶ Internal QA processes ▶ Corporate commitment ▶ Asset management roles ▶ Corporate asset management team ▶ Training programme

These key asset management process areas are critical to achieving sustained performance of the organisation at the lowest life cycle cost. Each of the components “adds value” to the raw business processes consistent with regulations, customer demands and shareholder requirements.

All activities undertaken by Bay of Plenty Regional Council should contribute to its value in terms of delivery. Each activity will be linked and form a component part of the business. A detailed three-year Improvement Plan is provided in the Improvement Plan section.