

Contents

Introduction

- The Bay of Plenty region
- Rivers and drainage at a glance
- Overview of asset management planning
- Relationship with other plans and documents
- Scope of this plan

Strategic environment

- Strategic overview
- Rationale for Council's involvement in the rivers and drainage activity
- Key partnerships and stakeholders
- Business drivers

Business overview

- Funding and expenditure
- Rivers and drainage schemes
- Significant negative effects of this activity
- Delivery of services

Levels of Service

- LGA 2002 requirements
- Levels of Service relationship to asset management planning
- Linking Levels of Service to community outcomes
- Rivers and Drainage Levels of Service, performance measures and reporting
- Future Levels of Service improvement

Community engagement

- Overview
- Consultation Policy
- Maori consultation
- Bay of Plenty Regional Council sub-regional residents surveys
- Customer service requests and complaints
- Development of community outcomes
- Draft Ten Year Plan 2006 – 2016 consultation
- Draft Annual Plan 2008/2009 consultation
- Current and future stakeholder consultation

Growth and demand

- Rivers and drainage overview
- Introduction
- Growth strategies
- Growth vs demand
- Overview of key demand drivers
- Demographic considerations
- Environmental factors

- Community expectations and risk
- Management of hazards and safety
- Legislation
- Demand management planning
- Capital works programme and funding

Enviornmental stewardship

- Overview
- Environmental drivers
- Consents
- Strategies
- Consent monitoring and compliance
- Potential issues
- Hazards
- Future requirements

Risk management

- Overview
- Current situation
- Risk management process
- Risk register
- Risk action plan

Life cycle management

- Introduction
- Work category definitions
- Rivers and drainage overview
- Rivers and drainage asset overview
- Operations and maintenance
- Pump stations
- Stopbanks
- Structures
- Waterways
- Kaituna catchment Control Scheme
- Rangitaiki Drainage Scheme
- Rangitaiki-Tarawera Rivers Scheme
- Waioeka-Otara Rivers Scheme
- Whakatane-Waimana Rivers Scheme

Projects and financial forecasts

- Overview
- Asset management assumptions
- Summary financial forecast – all schemes
- Maintenance planning
- Capital and renewal planning
- Capital and renewal forecasts – all schemes
- Disposals

- Asset valuation
- Future asset financial projections/forecasts
- Policies
- Risk to significant forecasting assumptions

Business process

- Overview
- Civil defence emergency management
- Bay of Plenty Regional Council Flood Warning Manual
- Human Resources and Business Services Continuity Plan
- Service Level Agreements
- Business systems
- AMP review and monitoring
- Compliance with LGA 2002 Schedule 10 requirements
- Progress towards achieving advanced AMP against the OAG criteria

Improvement Plan

- Asset management improvement process
- What are typical key improvement areas
- Three-year improvements
- Asset management information systems
- Asset data and knowledge processes
- Operations and maintenance processes
- Demand analysis and strategic planning process
- Asset capital processes
- Organisational/commercial strategies

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
LTCCP	Long Term Council Community 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.

Executive Document	Summary of core components of all of the sections below, which is suitable for separate publication and distribution to elected representatives, the community and staff.
Introduction	This section overviews the area/region, highlighting the background to development of Rivers and Drainage schemes and the future key physical and future climate that relate to these schemes and the management of their assets. Brief statistics such as population, rural/urban mix, rainfall and industry sectors such as horticulture and agriculture have also been summarised. A snap shot of the Rivers and Drainage assets is also summarised to provide the reader with a quick understanding of the extent of services.
Strategic Environment	This section describes the core Rivers and Drainage activity, its key service providers and their roles and responsibilities in delivering services. The organisational structure that supports this activity externally and internally is also detailed. The significant negative effects of undertaking this activity have also been considered against quadruple bottom line requirements.
Business Overview	Outlines the vision, goals and objectives of the Rivers & Drainage Activity. Corporate strategic initiatives and community outcomes are linked to demonstrate how the activity contributes, and the rationale for involvement. Key business drivers, linkages to strategic documents, key partnerships and stakeholders are also overviewed.
Levels of Service	Levels of service (LOS) define the quality of the delivery of the particular activity or service against which service performance can be measured. Infrastructure planning enables the relationship between levels of service and the cost of the service (the price/quality relationship) to be determined. This relationship can then be evaluated in consultation with the community to determine the required level of services and minimum requirements that the customer is prepared to pay for. Service standards provide the basis for the life cycle management strategies and work programmes. The section has been developed based on the NAMS Developing Levels of Service and Performance Measures guideline.
Community Engagement	As a leader in the Community, Environment Bay of Plenty act on behalf of diverse 'communities of interest', and works with stakeholders to enable participation in the decision-making processes where appropriate. The Community Engagement section provides details of the consultation and feedback that has been undertaken/received in order to establish how the community perceives quality/timeliness the services provided.
Growth & Demand	This section sets out the growth and demand strategies that Environment Bay of Plenty will adopt in relation to its assets. The key demand drivers that influence growth and demand are assessed in detail, as well as the impacts and management thereof with a view to forward planning so that the needs of individuals, communities and the contribution to the wider region can be sustained.
Environmental Stewardship	In today's business environment there is greater emphasis on the effects on the environment. This section describes the environmental compliance responsibilities relating to consents/ permits or similar and outlines issues and mitigation strategies for potential hazards whether those are natural or manmade.
Risk Management	This section covers the strategic risk management implemented by Environment Bay of Plenty and how this applies to the Rivers and Drainage Activities. Risk Management identifies the specific business risks associated with the ownership and management of the Rivers & Drainage assets. This is used to determine the direct and indirect costs associated with these risks and to form a priority based action plan to address these.
Life Cycle Management	The Life Cycle Management (LCM) section provides the broad strategies and work programmes required to achieve the goals and standards outlined in the AMP. This section presents the LCM plan for each asset group, including a detailed description of the assets in physical and financial terms, key issues, LOS and risks. Detailed operations, maintenance, renewal and new capital strategies.
Business Processes	This section covers the key business processes in place to support Asset Management Planning. This includes an assessment of IT and business systems, an overview of business continuity planning and emergency management. The AMP is also assessed against the office of the Auditor General's Criteria for advanced asset management (NZ) plus any relevant legislation or industry standards. The key to ongoing success is to plan, review and monitor the ongoing update of the plan including key milestones and responsibilities, how the organisation intends to do this is documented within this section.
Projects & Financial Forecasts	The Projects & Financial Forecasts section outlines the short (5 year), medium term (10 year) financial requirements for the operation, maintenance, renewal and new capital needs of the Rivers and Drainage Activity based on long-term strategies, LOS and demand management outlined earlier in the plan. Funding sources and potential issues are identified and key assumptions in preparing financial forecasts are noted. A summary of asset valuation by asset groups is also outlined.
Improvement Plan	The Improvement Plan is integral to continually improve processes and practices, to ensure the ongoing development of the AMP towards an appropriate advanced level. The improvement plan quantifies current business practices, identifies indicative timescales for improvement, set priorities, and identifies human and financial resources required.

Executive Summary **2008/09 Rivers and Drainage Asset Management Plan**



*Working with our communities for a better environment
E mahi ngatahi e pai ake ai te taiao*



Contents

Contents	i
Acronyms	v
Scope of this Plan	vii
Rivers and Drainage at a glance	1
Rivers and Drainage overview	1
Activity strategic outcomes (Levels of Service)	2
Key issues and strategies	2
Asset summary	3
Foreword by the Chief Executive	5
Introduction	7
The place	7
The natural environment	7
Climate	7
Purpose of this Plan	7
Asset management objectives	7
Plan timeframe	8
Limitations of the AMP	8
Scope of this Plan	8
Strategic environment	9
Purpose	9
Mission	9
Strategic assets	9
How the Rivers and Drainage activity contributes to community outcomes	9
Rationale for Council's involvement	10

Key partnerships and stakeholders	10
Business drivers	11
Business overview	13
Extent of Rivers and Drainage schemes	13
Funding and expenditure	13
Significant negative effects of this activity	14
Levels of service	17
Linking LoS to community outcomes	17
Overview	17
LoS relationship to asset management planning	17
LoS delivery process	18
Linking LoS to community outcomes	18
LoS development process	18
Activity strategic outcomes (LoS)	20
Growth and demand	23
Introduction	23
Overview of key growth and demand drivers	23
Growth vs demand	23
Demographic overview	23
Demand management planning	24
Management strategies	24
Capital works programme and funding	24
Community engagement	27
Overview	27
Consultation methods	27
Consultation links	27
Consultation policy	27

Māori consultation	28
Bay of Plenty Regional Council sub-regional residents survey	28
Current and future stakeholder consultation	28
Consultation record	28
Proposed future consultation	29
Environmental stewardship	31
Overview	31
National	31
Role as Regional Council	31
Consents	31
Potential issues	31
Hazards	32
Flooding	32
Earthquakes	33
Volcanic eruption	33
Tsunamis	33
Future requirements	34
Risk management	35
Current situation	35
Risk management process	36
Determine likelihood and consequence for gross risk factor	36
Identify current systems and processes and their effectiveness	38
Determine residual risk	38
Prioritise residual risks and formulate action plan for risk management	38
Monitor, measure, report, review plan and actions	39
Review risks	40
Risk action plan	40

Lifecycle management	43
Work category definitions	43
Key issues and strategies	44
Asset description	44
Asset summary	45
Asset capacity and reliability	45
Scheme summaries	53
Overview	53
Kaituna Catchment Control Scheme	53
Key issues	55
Rangitaiki drainage scheme	56
Key issues	57
Rangitaiki-Tarawera Rivers Scheme	58
Key issues	59
Waioeka-Otara Rivers Scheme	60
Key issues	61
Whakatāne-Waimana Rivers Scheme	62
Key issues	63
Projects and financial forecasts	65
Overview	65
Expenditure	65
Asset management assumptions	66
Summary financial forecast – all schemes	67
Business processes	69
Overview	69
Lifelines	69
Civil Defence Emergency Management	69

Bay of Plenty Regional Council Flood Warning Manual	69
Human Resources and Business Services Continuity Plan	70
Business systems	70
AMP review and monitoring	71
Improvement Plan	73
Asset management improvement process	73

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Rivers and drainage at a glance

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

Table 1 Overview of the community facilities

	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.

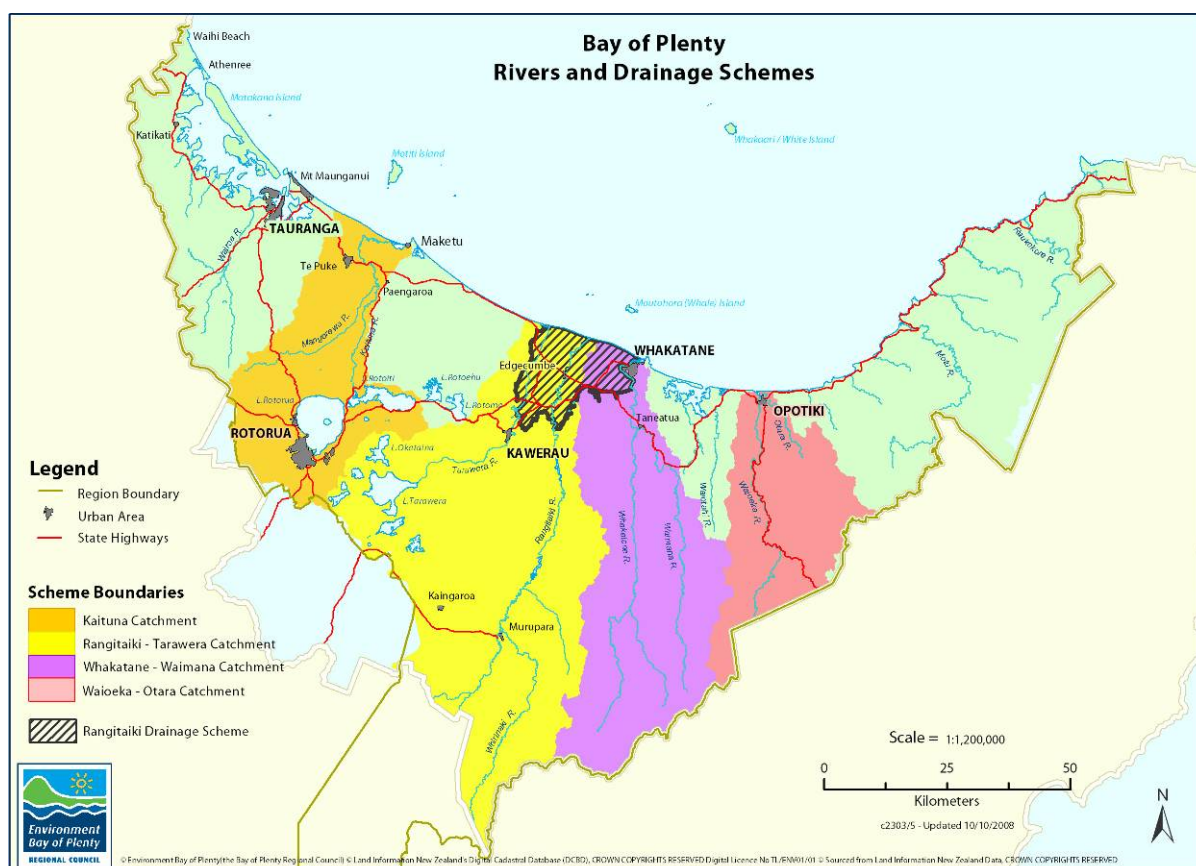


Figure 1 Map of rivers schemes and drainage areas

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.

Rangitaiki-Tarawera Rivers Scheme

Rangitaiki-Tarawera Rivers Scheme provides flood protection and channel edge stability to land within the Rangitaiki 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)

Community outcomes were developed as part of the 2006 Ten Year Plan. Further work has been undertaken to develop activity Strategic Outcomes for the rivers and drainage activity. The activity outcomes developed with the Levels of Service (LoS) represented in this AMP are described as follows and aligned with the customer values as suggested in the NAMS Developing Levels of Service and Performance Measures Manual.

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	▶ 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	▶ Decision-making processes are transparent and easily understood and enables participation .
Reliability/responsiveness	▶ 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.	▶ 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.	<ul style="list-style-type: none"> ▶ Additional edge protection works. ▶ Maintenance of existing edge protection works and buffer zones.
▶ Stopbank narrowness in some rural locations.	▶ CCTV inspection.
▶ Aggradation of river bed through the natural movement of river metal.	▶ 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 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 2008)
Erosion protection	▶ Buffer zone	\$160,694
	▶ Edge planting	\$980,938
	▶ Fencing	\$439,501
	▶ Groyne	\$265,415
	▶ Rock work	\$16,872,379
	▶ Rubble	\$355,579
	▶ Trenched willows	\$2,188,567
Pump stations	▶ Pumps	\$2,069,195
	▶ Pump station	\$4,645,290
	▶ Pump - electrical	\$43,381
	▶ Pump - electronics	\$282,511
Stopbanks	Stopbanks	\$138,632,989
Structures	▶ Culvert	\$3,605,402
	▶ Concrete structure	\$1,808,102
	▶ Concrete wall	\$1,540,496
	▶ Drop structure	\$297,022
	▶ Flood gate	\$2,100,930
	▶ Radial gate	\$209,682
	▶ Sluice gate	\$46,595
	▶ Stop log	\$75,744
	▶ Timber wall	\$20,577
Waterways	▶ Canals	\$13,418,805
	▶ Drains	
Total		\$190,059,834

Figure 2 below provides a summary of the Optimised Replacement Cost (ORC) for the main rivers and drainage asset groups as at 1 July 2008.

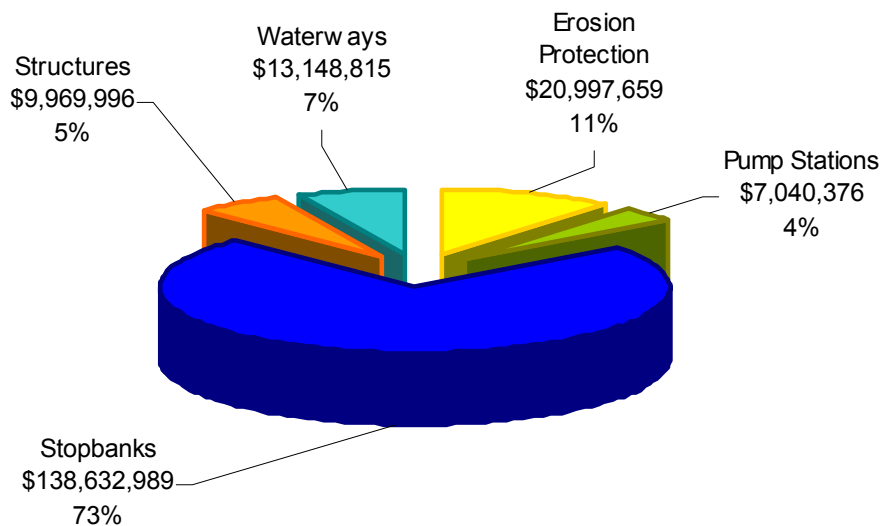


Figure 2 ORC rivers and drainage infrastructure

Foreword by the Chief Executive



This Rivers and Drainage AMP 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 year fundamental changes have been made to Bay of Plenty Regional Council's asset management plans. Until now we have had individual asset management plans for each of our major rivers and drainage schemes. These were updated on a rotational basis every five years, making it hard to match their information with our Ten Year Plan. We now have three asset management plans across the organisation, covering rivers and drainage, Property, and Parks. These have been completed before the Ten Year Plan and will now be revised in sync with future Ten Year Plan revisions.

This Rivers and Drainage AMP covers management of the assets in the Kaituna Catchment Control Scheme, Rangitaiki-Tarawera Rivers Scheme, Whakatane-Waimana Rivers Scheme, Waioeka-Otara Rivers Scheme and Rangitaiki Drainage Scheme.

Together these schemes have a combined current value of \$190 million. This AMP represents the first combined plan for all the rivers and drainage schemes and is the main driver for expenditure on flood protection and drainage in the Bay of Plenty region. Asset maintenance for the five schemes is projected to be \$50 million during the next 10 years and approximately \$51 million for each 10-year period for the following 40 years.

Capital expenditure on the schemes is projected to be \$27 million during the next 10 years, and approximately \$10 million for each 10-year period for the following 40 years.

We have also developed an integrated infrastructural asset information system so information entered into our financial system is directly linked to the assets through our Geographical Information System (GIS). For example, the value of a pump in the financial system is linked to the pump's physical location in the GIS.

For the first time this Rivers and Drainage AMP 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.

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 Rangitaiki Drainage Scheme is funded 100% by targeted ratepayers.

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

.....
 Bill Bayfield
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, Rangitaiki, 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 purpose of this Plan is to:

- ▶ Provide a document 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.
- ▶ This AMP also aims to 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 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 Community Outcomes, Vision, Goals and Objectives outlined in the Strategic Environment Section of this AMP, 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.
- ▶ 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 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.

“As caretakers of land, air and water, Bay of Plenty Regional Council monitors the effects of human activities on the environment and promotes the sustainable management of the natural and physical resources for present and future generations”

Bay of Plenty Regional Council also has a broader responsibility in combination with others for the economic, social and cultural wellbeing of the regional community.

Bay of Plenty Regional Council's other responsibilities relevant to the rivers and drainage activity include:

- ▶ Strategic thinking for the region's future.
- ▶ Supporting sustainable economic development.
- ▶ Managing the flood risks posed by our region's rivers including the region's major flood control schemes.

Mission

The Bay of Plenty Regional Council's mission is described as:

‘Working with our Communities for a better Environment’

Strategic assets

The Local Government Act 2002 (Section 97) requires that this policy shall identify all of the assets the Council considers to be strategic, as defined in Section 5 of the Local Government Act 2002.

The Bay of Plenty Regional Council has determined the Rivers & Drainage assets to be strategic in nature.

How the rivers and drainage activity contributes to community outcomes

The Ten Year Plan (TYP) outlines the community outcomes that relate to the provision of protection works for the rivers and drainage networks. The outcomes that are interlinked with flood protection and operation of the rivers and drainage schemes are outlined below combined with specific objectives for the activity.

Community outcome	Contribution to community outcomes (TYP)	Objectives	Addressed in
A clean and protected environment	<ul style="list-style-type: none"> ▶ Rate and endangered habitats and species are protected and enhanced. ▶ Areas of important natural beauty are recognised and protected. ▶ Our harbours, foreshore and waterways are clean and healthy. ▶ There are strongly connected open spaces within and between residential and business/industrial areas. ▶ The community is educated and involved in environmental care. ▶ Waste is minimised and managed to ensure efficient use of resources. ▶ Environmental legislation is enforced to ensure population increase and growth pressures are managed in a sustainable way. 	<ul style="list-style-type: none"> ▶ Identify potential hazards and formulate mitigation measures to protect property and the environment. ▶ Protecting the environment from flood damage using flood protection measures. 	<ul style="list-style-type: none"> ▶ Environmental Stewardship, Risk Management, Projects and Financial Forecasts, Levels of Service

Community outcome	Contribution to community outcomes (TYP)	Objectives	Addressed in
	<ul style="list-style-type: none"> ▶ Kaitiakitanga guardianship is practised by all – we look after our land, air, and water resources. ▶ The region is a place where people can truly experience, enjoy and appreciate nature. 		
Healthy and safe communities	<ul style="list-style-type: none"> ▶ Healthy, active people involved in their communities. ▶ Greater attention to health promotion with information on preventative health issues readily available. ▶ An environment that supports healthy living, including such things as safe drinking water, comfortable public spaces and adequate recreational opportunities. 	<ul style="list-style-type: none"> ▶ Managing the effect of development upon the existing rivers and drainage schemes and provides a sustainable solution for future requirements. 	<ul style="list-style-type: none"> ▶ Growth and Demand, Risk
Quality affordable infrastructure	<ul style="list-style-type: none"> ▶ Infrastructure improvements support sustainable economic growth and development. 	<ul style="list-style-type: none"> ▶ Provide sustainable, safe, ongoing, and cost effective rivers and drainage schemes. ▶ Provide robust maintenance, renewal and capital programmes. 	<ul style="list-style-type: none"> ▶ Levels of Service, Life Cycle Management
A prosperous and sustainable economy	<ul style="list-style-type: none"> ▶ A wide range of employment opportunities are available in urban and rural areas. ▶ Maori economic development is supported. ▶ Tourism plays an important role, building on the region's attributes and unique character. ▶ Economic growth is balanced with social and environmental responsibility. 	<ul style="list-style-type: none"> ▶ Provide protection of public health and property by providing flood protection and mitigation. ▶ Create safe conditions for new business through the management of potential rivers and drainage hazards. 	<ul style="list-style-type: none"> ▶ Risk, Levels of Service, Environmental Stewardship, Projects and Financial Forecasts

Rationale for Council's involvement

This Plan has been developed on the basis that Council intends to be responsible for the provision of the rivers and drainage activity for the Bay of Plenty, and considers the provision of the rivers and drainage activity to be an essential function of the Regional Council.

Key partnerships and stakeholders

B cannot achieve the Community Outcomes alone. There is a need to work with other councils, community groups, businesses, individual landowners, central government, iwi/hapu and non-governmental organisations.

Key partnerships

- ▶ Environmental Programmes.
- ▶ Care Groups and environmental education.
- ▶ Maori Regional Representation Committee.
- ▶ Central government.
- ▶ Non-government organisations (Environmental Enhancement Fund, heritage management and regional plans).
- ▶ Sustainable Business Network.
- ▶ Regional development partnerships.
- ▶ Local authorities in the region under the Bay of Plenty triennial agreement.

External stakeholders

- ▶ The community – citizens and ratepayers.
- ▶ Ratepayers associations.
- ▶ Iwi consultation groups.
- ▶ Emergency service providers (Police, Ambulance, Fire, Civil Defence).
- ▶ Utility companies – power (generation, transmission, distribution), communication, gas.
- ▶ Environmental groups.
- ▶ Other government agencies (Audit NZ, Ministry for the Environment), Housing NZ etc.
- ▶ Other contractors.
- ▶ Maori Committee (this has been outlined in more detail in the Community Engagement section).
- ▶ Professional service providers.

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)
 - Bylaws

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

Plans/documents	Description	Frequency
Long-Term Council Community Plan (LTCCP)	The LTCCP sets out an agreed vision and community 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.	Must be produced every three years. Consultation for community outcomes must be undertaken every six 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 LTCCPs. Every third year the Annual Plan is embedded in the LTCCP.
Annual Report	The Annual Report is the mechanism to report back to the community, showing Council's achievement against Annual Plan and LTCCP 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 LTCCP.	Should be reviewed and aligned every year prior to the LTCCP 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 LTCCP, 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.
- ▶ Rangitaiki-Tarawera Rivers Scheme.
- ▶ Whakatane-Waimana Rivers Scheme.
- ▶ Waioeka-Otara Rivers Scheme.
- ▶ Rangitaiki 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.
- ▶ 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 Rangitaiki Drainage Scheme under the Rangitaiki 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 Rangitaiki Drainage) to acknowledge the broader benefits (e.g. environmental) that the schemes provide. Rangitaiki 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 2008/2009

	2008/2009
Expenditure	
Operations	4,879,375
Interest	1,271,652
Depreciation	764,390
Total operating expenditure	6,915,417
Revenue	
User fees and charges	(88,900)
Share of Corp income	(6,724)
Other public funding	(12,848)
Targeted rates	(5,085,300)

2008/2009	
General rates	(913,679)
Investment income	(1,679,159)
Total revenue	(7,786,610)
Net cost of operations	(871,193)
Source and application of funding	
Funding from	
Operating surplus	(871,193)
Depreciation reserves	(764,390)
General reserves	(447,344)
Loans raised	(3,049,800)
Funds applied to	
Operating deficit	0
Loan repayments	1,034,200
Capital expenditure	3,869,127
Payments to reserves	229,400
Net funds applied	0

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	43,390,526
Rangitaiki-Tarawera	58,544,231
Waioeka-Otara	27,737,769
Whakatane-Waimana	46,423,778
Rangitaiki Drainage	13,963,530
Total	190,059,834

(Based on 2008 valuation)

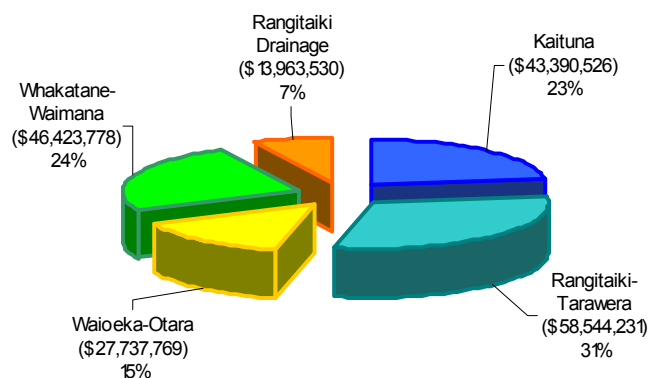


Figure 3 Gross replacement costs (GRC)

Significant negative effects of this activity

Schedule 10 of the Local Government Act covers the information required to be included in the LTCCP. Part 2 (1) (c) states that a LTCCP 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 LTCCP 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 LTCCP 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. Identify opportunities to enhance the condition and value of the remaining wetland habitat when programming upgrading or refurbishment works.	<ul style="list-style-type: none"> ▶ Environmental Stewardship ▶ Community Engagement
Disruption to wildlife.				✓	Programme works to minimise wildlife disruption avoiding fish spawning and bird nesting seasons.	<ul style="list-style-type: none"> ▶ Environmental Stewardship
Damage due to de-silting etc.		✓		✓		<ul style="list-style-type: none"> ▶ Life Cycle Management
Gravel extraction.			✓	✓	Cross-section monitoring process.	<ul style="list-style-type: none"> ▶ Life Cycle Management
Over drainage.			✓	✓	Regular monitoring of channel capacity and drainage standards. Regular review of design standards and economically optimum levels of drainage.	<ul style="list-style-type: none"> ▶ 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 community outcomes

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

Healthy and Safe Communities

E Hauora ana e Aupai ana hoki a tatau Iwi Whanui

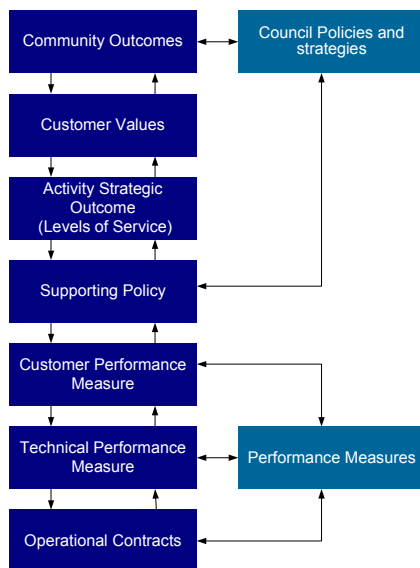
Quality Affordable Infrastructure

E Pai ana e Ea ana hoki nga Rawa katoa

A Prosperous and Sustainable Economy

E Rangatira ana e Ukauka ana hoki nga Mahi Whairawa katoa

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.

Linking LoS to community outcomes

Council's rivers and drainage activity primarily contributes to the following community outcomes:

Healthy and Safe Communities

E Hauora ana e Aupai ana hoki a tatau Iwi Whanui

Quality Affordable Infrastructure

E Pai ana e Ea ana hoki nga Rawa katoa

Prosperous & Sustainable Economy

E Rangatira ana e Ukauka ana hoki nga Mahi Whairawa katoa

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.

LoS development process

As part of the 2006 Ten Year Plan development process Bay of Plenty Regional Council carried out a review of LoS. The outcome of the review defined a set of high level LoS statements and measures that were included in the 2006 Ten Year Plan.

Bay of Plenty Regional Council is now seeking to develop the existing LoS further and to identify gaps in their knowledge of Customers perspectives about the delivery of the rivers and drainage activity. This process is described below in three parts as follows:

Part 1

To date Bay of Plenty Regional Council is working through the completion of Part 1 of the process as shown below, the results of which are included in this section. Figure 4 which follows illustrates the process undertaken.

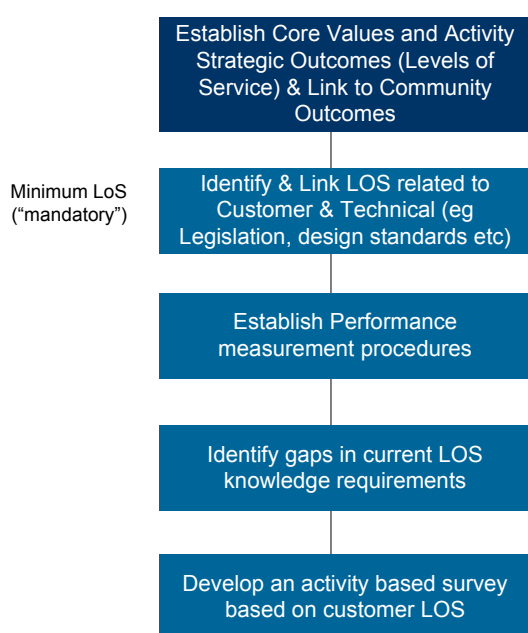


Figure 4 LoS process (Part 1)

Part 2

Bay of Plenty Regional Council has undertaken consultation 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 surveys, focus groups etc as shown in Figure 5.

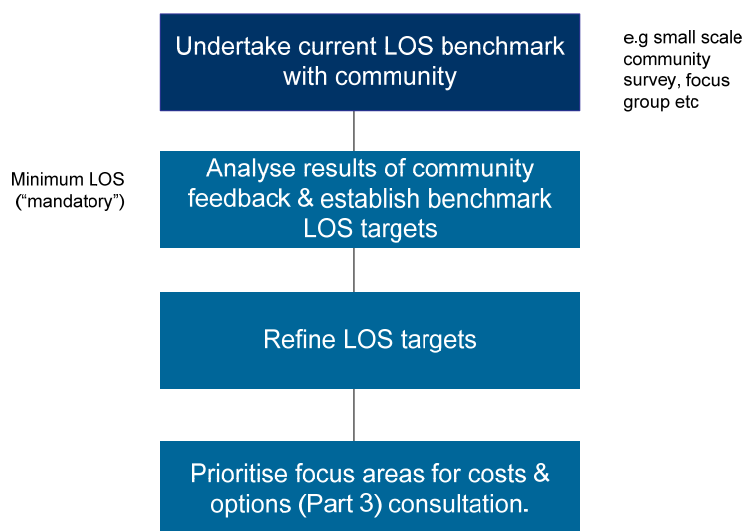


Figure 5 LoS process (Part 2)

Part 3

The third part is to establish the benchmark survey and then consult with the community on service delivery options and their associated costs (as required under Schedule 10, Section 2(a) in the 2009/10 Ten Year Plan).

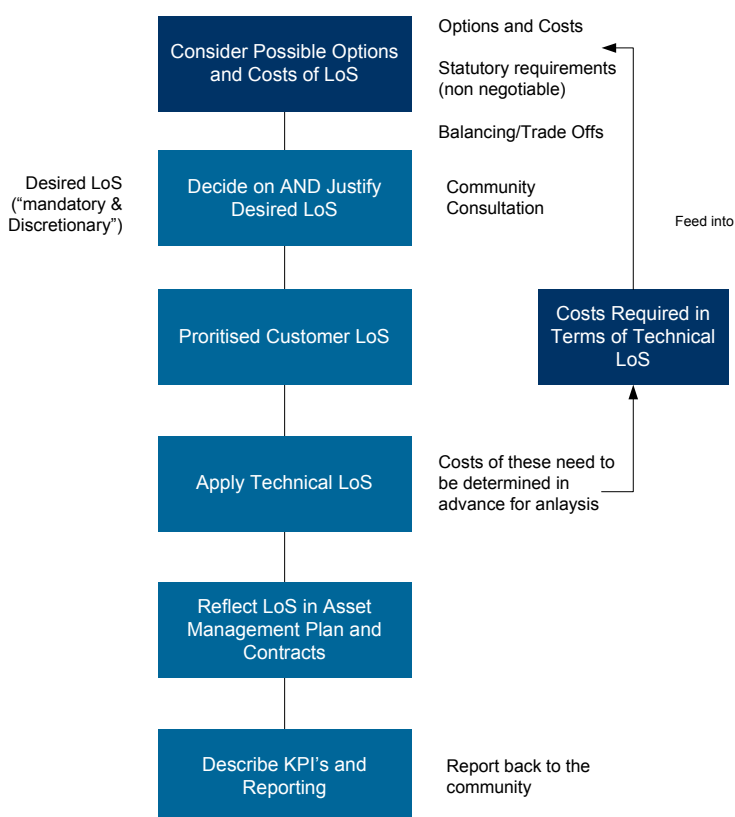


Figure 6 LoS process (Part 3)

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 (LoS)

Community Outcomes were developed as part of the 2006 Ten Year Plan. Further work has been undertaken to develop activity Strategic Outcomes for the rivers and drainage activity. The activity Outcomes developed with the LoS represented in the AMP are described as follows and aligned with the Customer Values as suggested in the National Asset Management Steering Group (NAMS) Developing Levels of Service and Performance Measures Manual.

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	▶ 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	▶ Decision-making processes are transparent and easily understood and enables participation .
Reliability/responsiveness	▶ Response to service requests, complaints and events is timely and appropriate solutions are provided.

Rivers and drainage LoS, performance measures and reporting

Table 9 Levels of Service tables

Community Outcome	Activity Strategic Outcomes (Levels of Service)	Customer Value	Customer Performance Measure			Technical Performance Measure					Performance measure procedure	Frequency
			Measure	Current target	Proposed target	Factors of influence	Measure	Current target	Current performance	Proposed target		
Quality affordable infrastructure A prosperous and sustainable economy	Provide flood protection in river and drainage scheme areas to agreed design levels	Safety Quality Reliability	No failure of flood protection system below specified design levels	Zero failures	Zero failures	<ul style="list-style-type: none"> Security from flooding Where possible incorporate sustainability principles into the designs 	<ul style="list-style-type: none"> Systems designed for annual exceedance levels for each scheme as per Table xx and Figures xx 	<ul style="list-style-type: none"> 100% compliance 	<ul style="list-style-type: none"> 100% compliance 	<ul style="list-style-type: none"> As for current 	<ul style="list-style-type: none"> Reports for events greater than specified annual exceedance levels 	<ul style="list-style-type: none"> Ongoing
						<ul style="list-style-type: none"> Maintenance 	<ul style="list-style-type: none"> Programmed maintenance for each scheme as per Table xx 	<ul style="list-style-type: none"> 100% compliance 	<ul style="list-style-type: none"> 100% compliance 	<ul style="list-style-type: none"> As for current 	<ul style="list-style-type: none"> Inspections and capacity review Monthly operational checks 	<ul style="list-style-type: none"> Annual and ten yearly Monthly
						<ul style="list-style-type: none"> Asset condition 	<ul style="list-style-type: none"> Programmed works for each scheme as per Table xx 	<ul style="list-style-type: none"> 100% compliance 	<ul style="list-style-type: none"> 100% compliance 	<ul style="list-style-type: none"> As for current 	<ul style="list-style-type: none"> Scheduled maintenance checks Maintenance records (database) 	<ul style="list-style-type: none"> Ongoing
	Flood protection is affordable and predominantly paid for by targeted ratepayers	Affordability	Ratio of targeted rate to land value	To be determined Ratio of targeted rate to land values for sample properties	Consistent or decreasing trend in ratio with time	<ul style="list-style-type: none"> Targeted rates Land values 	<ul style="list-style-type: none"> Ratio of targeted rate to land values for each scheme Targeted rate increases agreed to with schemes 	<ul style="list-style-type: none"> To be determined 	<ul style="list-style-type: none"> To be determined 	<ul style="list-style-type: none"> Consistent or decreasing trend in ratio with time 	<ul style="list-style-type: none"> Annual Plan/Ten Year Plan process Scheme rating systems Economic analysis reports 	<ul style="list-style-type: none"> Annual and ten yearly As required For major proposals
						<ul style="list-style-type: none"> Competitive and fair full-cost pricing of scheme maintenance and works 	<ul style="list-style-type: none"> Compliance with the Council Contracts Manual 	<ul style="list-style-type: none"> 100% compliance (including approved exceptions) 	<ul style="list-style-type: none"> 100% 	<ul style="list-style-type: none"> As for current 	<ul style="list-style-type: none"> Contract records and documentation Annual report to Council 	<ul style="list-style-type: none"> Ongoing Annually
Healthy and safe communities	Health and safety risks are minimised	Safety	No health and safety incidents attribute to lack of management of rivers and drainage assets	Zero	Zero	<ul style="list-style-type: none"> Activity on assets 	<ul style="list-style-type: none"> Report on all health and safety incidents 	<ul style="list-style-type: none"> New measure 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> 100% reporting and compliance 	<ul style="list-style-type: none"> Report to Council 	<ul style="list-style-type: none"> Quarterly
						<ul style="list-style-type: none"> Maintain a health and safety system to record and investigate incidents involving staff and contractors 	<ul style="list-style-type: none"> 100% of known incidents are recorded and investigated 	<ul style="list-style-type: none"> 100% compliance 	<ul style="list-style-type: none"> 100% compliance 	<ul style="list-style-type: none"> As for current 	<ul style="list-style-type: none"> Report accidents to Human Resources Health and safety audits 	<ul style="list-style-type: none"> Ongoing Annually
						<ul style="list-style-type: none"> Contractors compliance with Health and Safety Regulations 	<ul style="list-style-type: none"> Comply with Council Contract Manual and Health and Safety Policy, and legislation 	<ul style="list-style-type: none"> 100% compliance 	<ul style="list-style-type: none"> 100% compliance 	<ul style="list-style-type: none"> As for current 	<ul style="list-style-type: none"> Contract records Health and safety audits 	<ul style="list-style-type: none"> Ongoing Annually
A prosperous and sustainable economy Healthy and safe	Community is informed of potential widespread flooding allowing them to take actions to avoid the hazard	Sustainability Safety	All flood warnings at predetermined levels are given in accordance with the Flood Warning Manual	100%	100%		<ul style="list-style-type: none"> All flood warnings at predetermined levels are given in accordance with the Flood Warning Manual 	<ul style="list-style-type: none"> 100% compliance 	<ul style="list-style-type: none"> 100% compliance 	<ul style="list-style-type: none"> As for current 	<ul style="list-style-type: none"> Flood event logs and flood warning manual 	<ul style="list-style-type: none"> Ongoing/annually

Community Outcome	Activity Strategic Outcomes (Levels of Service)	Customer Value	Customer Performance Measure			Technical Performance Measure					Performance measure procedure	Frequency
			Measure	Current target	Proposed target	Factors of influence	Measure	Current target	Current performance	Proposed target		
Communities	Effects on the environment are minimised in operations, works and asset maintenance	Sustainability	All operations, works and asset maintenance undertaken according to current legislation policy	100%	100%	► Designed for the long-term, including climate change, structural integrity etc	► Compliance with adopted design guidelines(e.g. BOPRC hydrological and hydraulic guidelines, updated Ministry for Environment Climate Change releases)	► 100% compliance	► 100%	► 100% compliance	► Peer review of internal designs ► Internal review of external designs	► Ongoing
						► Minimise adverse effects ► Use of sustainable practices (e.g. bio-engineering alternatives, material re-use, fish-friendly floodgates)	► Compliance with Environmental Code of Practice and Guidelines	► 100% compliance	► 100%	► 100% compliance	► Environmental Code of Practice ► Work completion reports	► Ongoing
						► Minimise negative environmental effects on assets from surrounding land and water ► Appropriate consultation	► Obtain all necessary consents and compliance with consent conditions	► 100% compliance	► 100%	► 100% compliance	► Resource consent records ► Land entry agreements ► Contract records	► Condition of contract ► Ongoing
Healthy and safe communities	Decision making process are transparent, easily understood and enable participation	Community engagement	Scheme stakeholders and community are informed and consulted in decisions related to schemes	100%	As for current	► Significant proposed changes/ enhancements or additions to the rivers and drainage services/ infrastructure	► Carry out the special consultative procedure through the Annual Plan and Ten Year Plan (or separately as required) including options, issues and costs	► 100% compliance	► 100%	► 100% compliance	► Ten Year Plan ► Annual Plan ► Council, Operation Committee reports	► 10 yearly ► Annually ► Monthly
Quality affordable infrastructure						► The regional community is well informed about the Bay of Plenty Regional Council's activities and the environment	► Provide appropriate feedback to the community	► 100% compliance	► 100%	► 100% compliance	► Liaison meeting minutes for each scheme ► Annual scheme newsletters to all stakeholders	► Annually ► Annually
A prosperous and sustainable economy						► Information on rivers and drainage accessible via website and brochures	► Website and brochures contain information on rivers and drainage and key issues	► 100% compliance	► 100% compliance	► 100% compliance	► Website, newsletter and brochure	► Annually/ongoing
Quality Affordable infrastructure	Response to service requests and complaints is timely and appropriate solutions are provided	Reliability/ responsiveness	Response to non-urgent complaints and service requests within five working days	100%	100%	► Service request/ complaints recording and reporting system with response timeframes to be implemented (e.g. job tracker system)	► Report on response times for all complaints and requests	► 100%	► 88% compliance	► 100%	► Documented response times ► Documented investigation	► Annually
			24 hour phone line for more urgent issues	100% availability	As per current	► External service provision of hotline ► Shared service with other hotlines	► Respond to all urgent flooding and drainage requests within 24 hours	► 100% compliance	► Undetermined	► 100% compliance	► Record of request closure. Not currently available. To be implemented by 2010	► Annually

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.

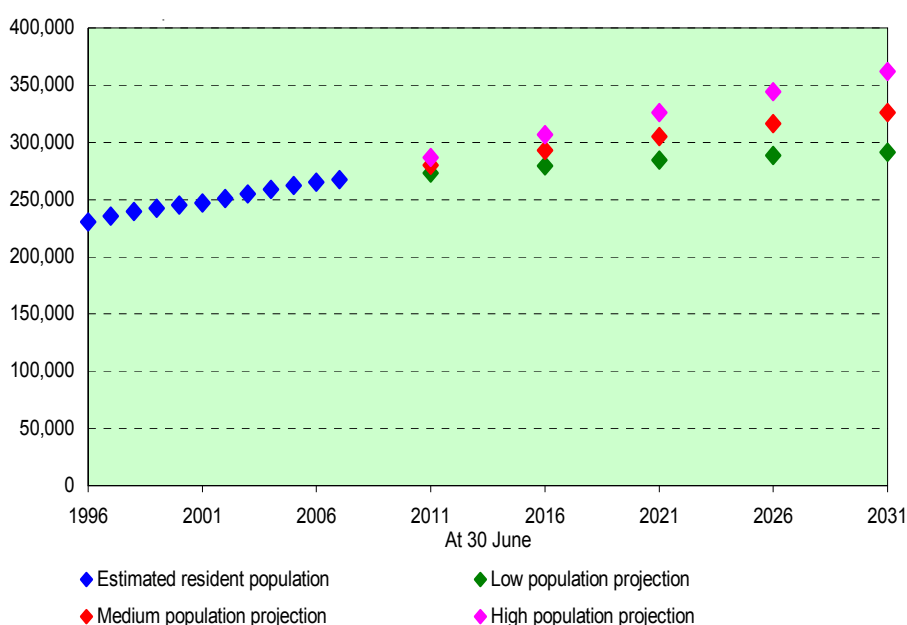


Figure 7 Bay of Plenty region population projections

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 \$22 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	Scheme	Loans	Transfer from asset replacement reserve	Other (subsidies or vested)	Completion
Bell Road pump station	\$2.10 million	Kaituna			\$2.10 million	2010
Ford Road gravity culvert	\$0.25 million	Kaituna		\$0.25 million		2010
Ford Road pump station	\$1.25 million	Kaituna	\$1.25 million			2011
Okere Gates lifting mechanism renewal	\$0.14 million	Kaituna	\$0.02 million	\$0.12 million		2015
Kaituna stopbank renewals	\$3.14 million	Kaituna	\$1.14 million	\$2.00 million		2016
Raparapahoe stopbank renewal	\$0.18 million	Kaituna		\$0.18 million		2017
Edgecumbe flood mitigation	\$9.90 million	Rangitaiki Tarawera	\$6.74 million		\$3.16 million	2014
Te Teko School stopbank	\$0.10 million	Rangitaiki Tarawera	\$0.10 million			2015

Works related to growth and demand	Project coast estimate	Scheme	Loans	Transfer from asset replacement reserve	Other (subsidies or vested)	Completion
Tarawera stopbank renewals	\$1.20 million	Rangitaiki Tarawera	\$1.20 million			2016
Rangitaiki stopbank renewals	\$1.03 million	Rangitaiki Tarawera	\$1.03 million			2018
Culvert renewals	\$0.28 million	Rangitaiki Drainage		\$0.28 million		2019
Waioho stopbank renewals	\$0.70 million	Whakatane Waimana	\$0.70 million			2011
Te Rahu Drain seepage	\$0.25 million	Whakatane Waimana	\$0.25 million			2012
Te Rahu Canal stopbank renewals	\$0.20 million	Whakatane Waimana	\$0.20 million			2013
Whakatane River stopbank renewals	\$0.60 million	Whakatane Waimana	\$0.60 million			2016
Waioeka and Otara stopbank renewals	\$0.72 million	Waioeka Otara	\$0.68 million	\$0.04 million		2012

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.

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 (1992-2007).
- ▶ Customer service requests and complaints (informally).
- ▶ Consultation carried out as part of the Ten Year Plan (2006-2016) process.
- ▶ Scheme Liaison Groups.
- ▶ Consultation carried out as part of the Annual Plan (07/08 and 08/09) process (2006-2016 TYP).
- ▶ 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.

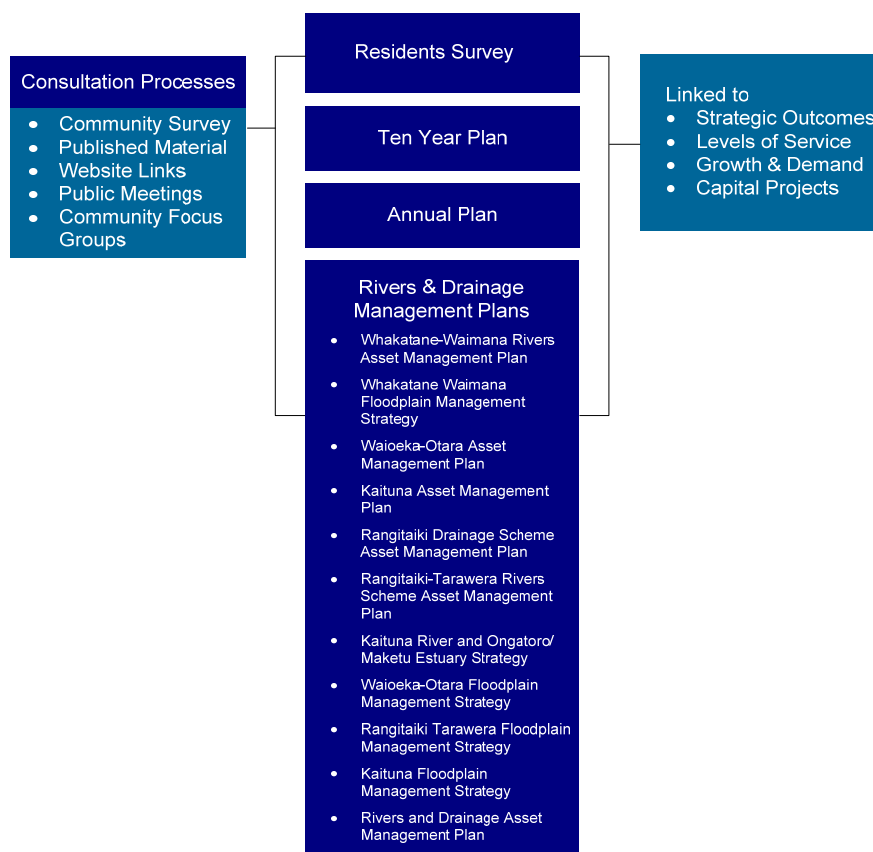


Figure 8

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.

A Maori committee was established in 2006. The objectives of this 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.

Bay of Plenty Regional Council has developed a Treaty of Waitangi Toolbox containing:

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

Bay of Plenty Regional 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 February/March 2007 and was undertaken by Key Research Consultants.

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
2008/2008	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

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
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
	2009-2019 Ten Year Plan	▶ Consultation process

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)
- ▶ Long Term Council Community Plan (Ten Year Plan)
- ▶ 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.

This includes 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

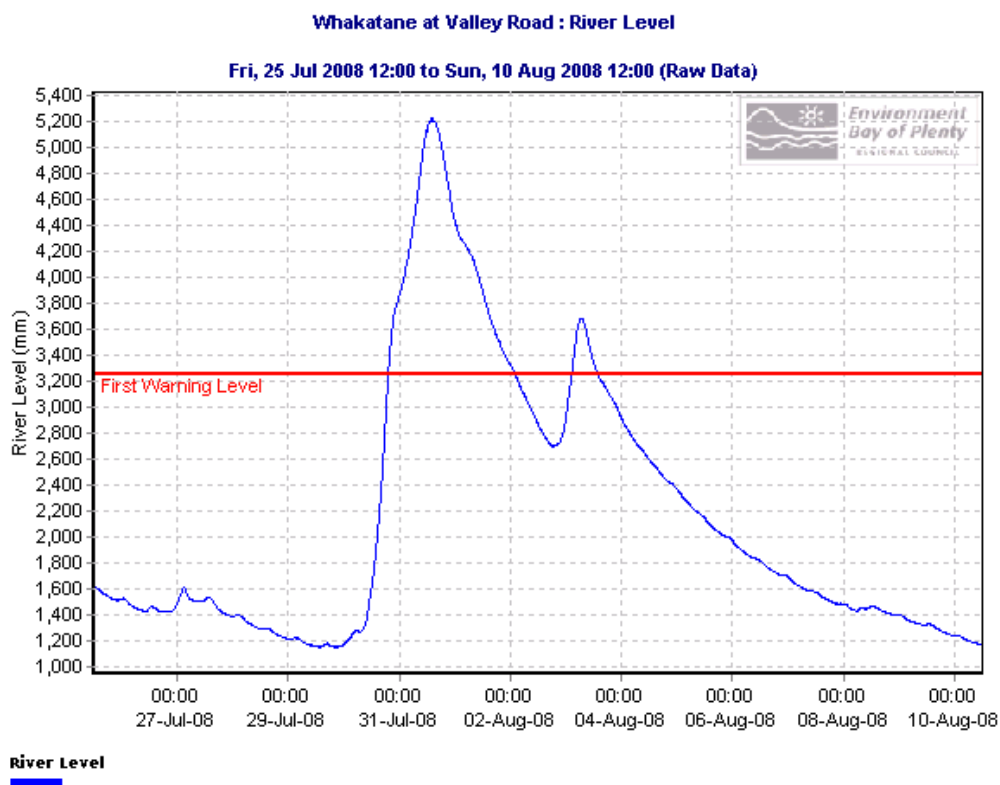
Flooding is a commonly occurring major natural hazard that results when the natural and modified drainage systems fail in a particular rainfall event. The risk of flooding is influenced by a number of factors such as:

- ▶ 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 was affected by severe flooding in 2004 and 2005. Mitigation works are currently underway for many of the affected communities including Matata and Edgumbe.

During the July 2004 event, floodwaters covered much of the Rangitaiki 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.

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.

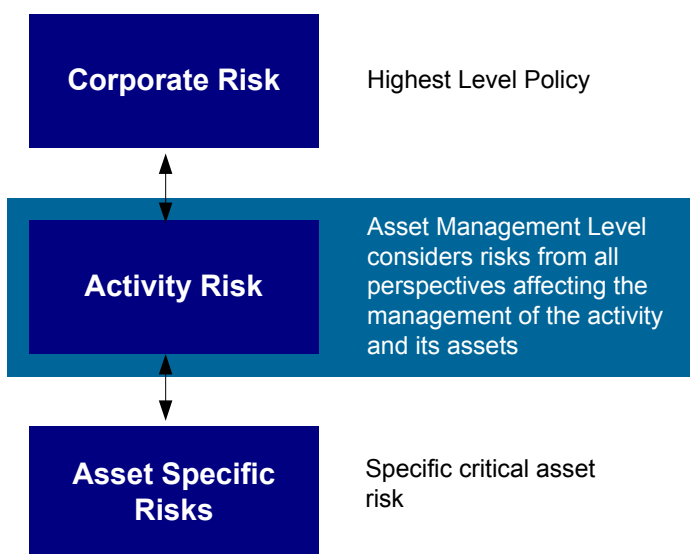
This section covers the risk management implemented by the Bay of Plenty Regional Council and how these apply to the current and future activities.

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.

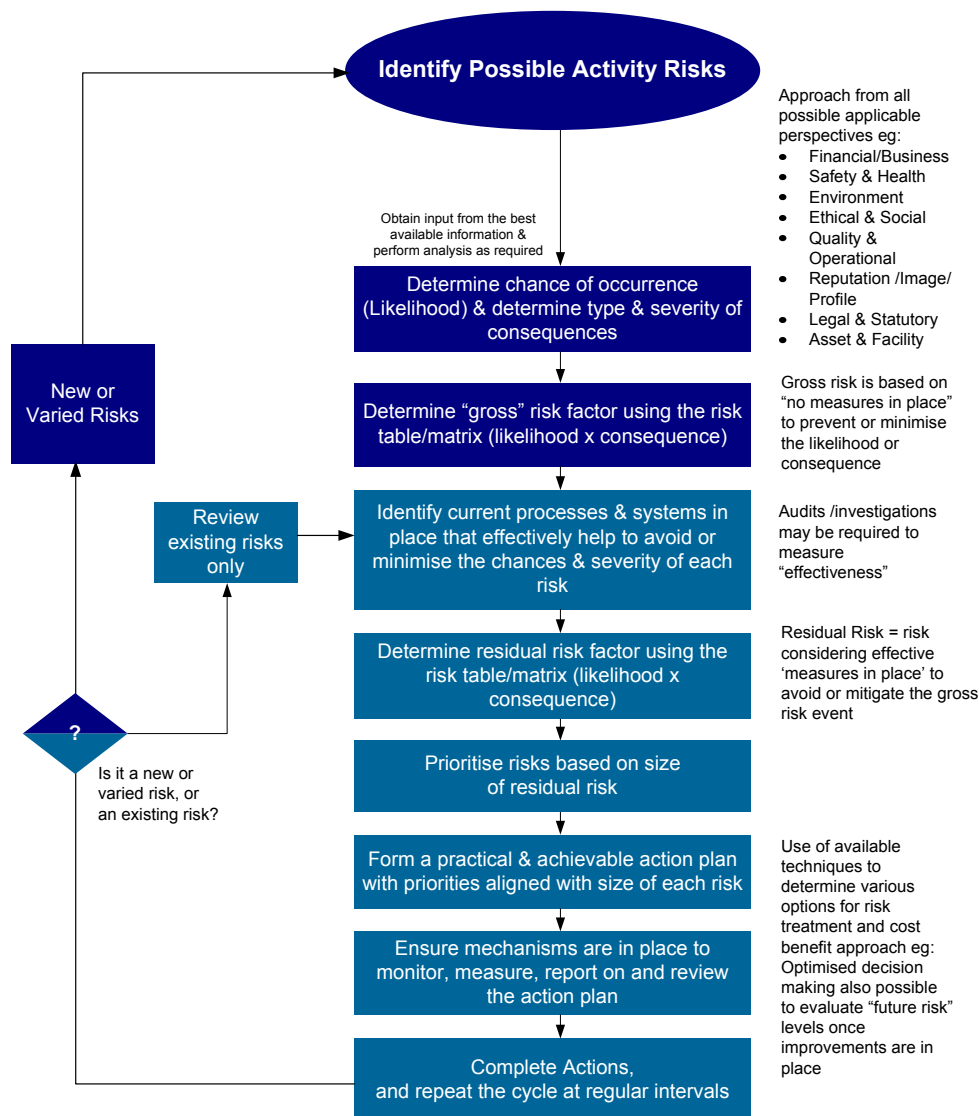


Figure 9 Risk management process

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 13 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	Fulfil requirements thoroughly, very robust and positive measurable effects.
Good	Fulfil 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 	<ul style="list-style-type: none"> ▶ 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 	<ul style="list-style-type: none"> ▶ 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 	<ul style="list-style-type: none"> ▶ 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 	<ul style="list-style-type: none"> ▶ Ongoing

Lifecycle management

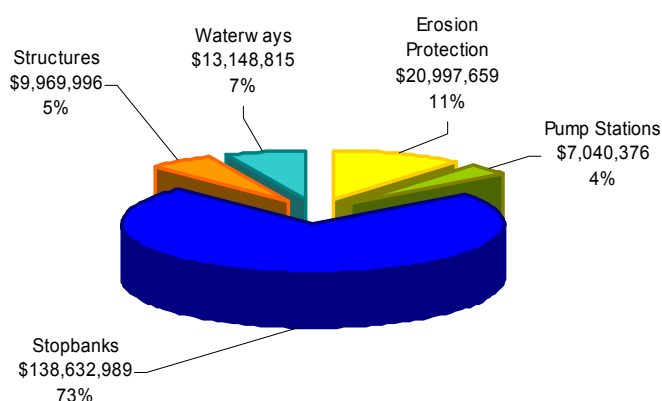
The Lifecycle Management (LCM) Section provides the broad strategies and work programmes required to achieve the goals and objectives set out earlier in this AMP.

The lifecycle management section covers the following asset groups:

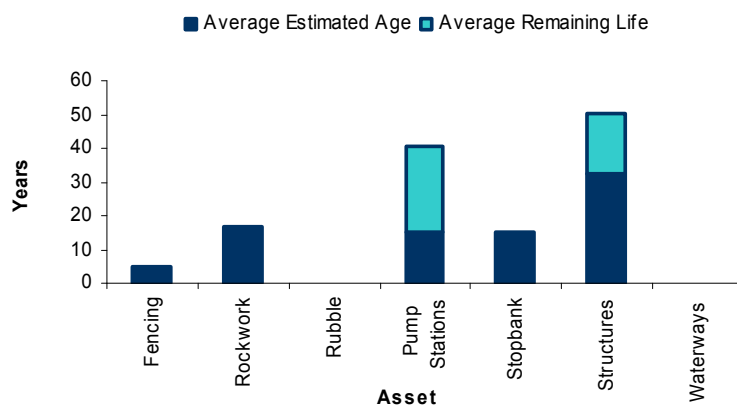
- ▶ Erosion protection
- ▶ Pump stations
- ▶ Stopbanks
- ▶ Structures
- ▶ Waterways

Optimised Replacement Cost (ORC) and Age vs Life

The total ORC for the rivers and drainage infrastructure is \$190,059,834. 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.

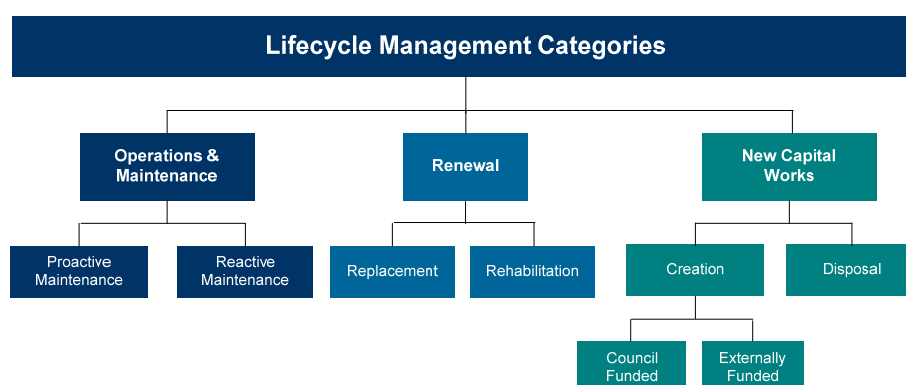


Figure 10 Recreation lifecycle management categories

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 1 July 2008.

Table 20 Asset inventory

Asset	Asset Group	Base Life (Years)	Average Age (Years)	Condition (Average)	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	22.5		1,808,102	1,243,485	23,990
Concrete Wall	Structures	50	17.8		1,540,496	1,002,651	30,810
Culvert	Structures	50	35.9		3,605,402	1,488,595	67,034
Drop Structure	Structures	40	16.7		297,022	162,913	6,896
Edge Planting	Erosion Protection	Perpetuity	–		980,938	980,938	0
Fencing	Erosion Protection	Perpetuity	–		439,501	439,501	0
Flood Gate	Structures	70	28.7		2,100,930	1,229,238	26,847
Groyne (mole)	Erosion Protection	70	51		265,415	85,819	3,521
Pump – Electrical	Pump Stations	30	20		43,381	16,397	1,343
Pump –Electronics	Pump Stations	15	2.4		282,511	243,854	17,819
Pump Station	Pump Stations	70	22.9		4,645,290	3,280,079	60,912
Pumps	Pump Stations	35	15		2,069,195	1,403,429	53,564
Radial Gate	Structures	40	18		209,682	115,182	5,250
Rockwork	Erosion Protection	Perpetuity	16.5		16,872,379	16,872,379	0
Rubble	Erosion Protection	Perpetuity	–		355,579	355,579	0
Sluice Gate	Structures	70	20		46,595	34,705	594
Stopbank	Stopbanks	Perpetuity (with settlement)	15.3		138,632,989	132,110,315	415,899
Stop Log	Structures	40	4		75,774	69,007	1,692
Timber Wall	Structures	40	10		20,577	15,800	478
Trenched Willows	Erosion Protection	Perpetuity	–		2,188,567	2,188,567	0
Waterway	Waterways	Perpetuity	–		13,418,815	13,418,815	0
Total					190,059,834	176,917,942	716,650

*Asset Condition is not available at this stage. This has been targeted for improvement.

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 11.1% of the Optimised Replacement Cost (ORC) for all the assets, with a total value of \$20,997,659.

The Figure that follows shows the comparison of Erosion Protection ORC for each scheme. The Rangitaiki-Tarawera Scheme accounts for 52% of the overall Erosion Protection ORC with a value of \$11.1 million.

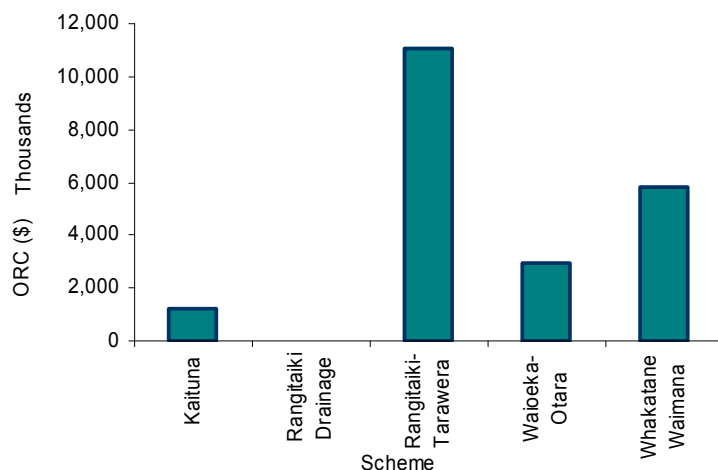


Figure 11 Erosion protection ORC by scheme

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 (79%) of the ORC at \$16.9 million. Trenched Willows are next at 10% with \$2.2 million with the remaining assets all accounting for less than \$1 million.

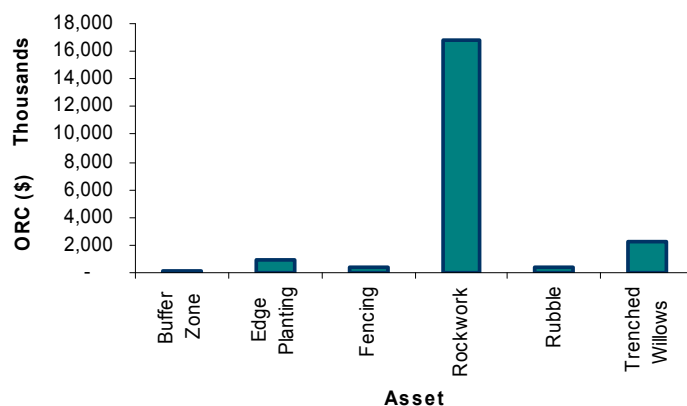


Figure 12 ORC by individual erosion protection asset

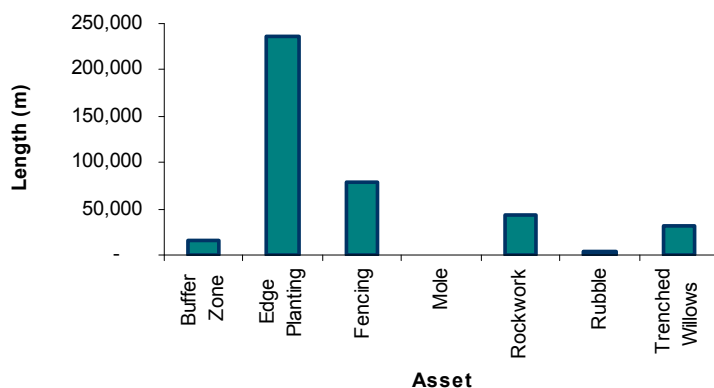


Figure 13 Lengths of erosion protection assets

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 electrics (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 3.7% of the Optimised Replacement Cost (ORC) for all of the rivers and drainage assets, with a total value of \$7,040,376.

Figure 14 shows the comparison of ORC across each scheme. The Kaituna and Whakatane-Waimana schemes account for the greatest ORC, with 53% and 33% respectively.

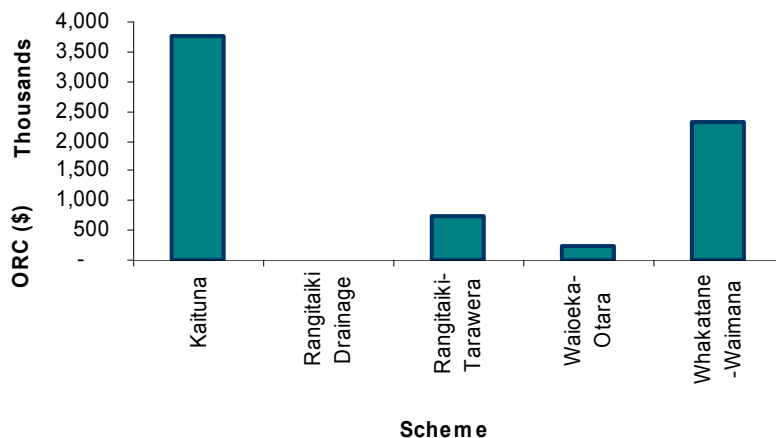


Figure 14 Pump station ORC by scheme

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.

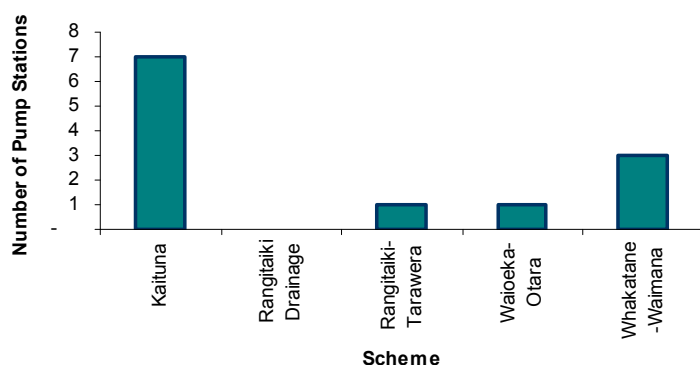


Figure 15 Number of pump stations by scheme

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 Kaituna assets are generally the oldest, being 42% through their expected lives.

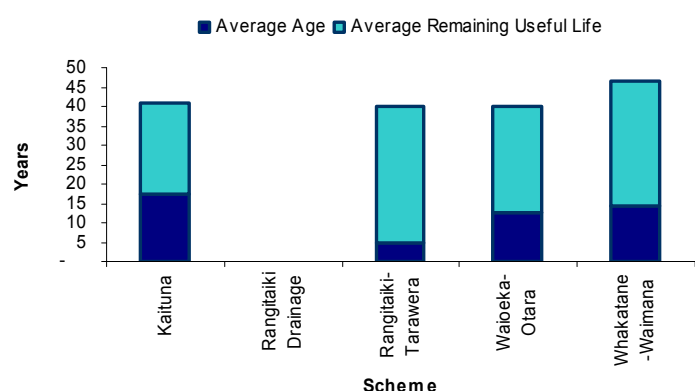


Figure 16 Pump stations age vs remaining life by scheme

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 \$138.6 million (as at 30 June 2008), this represents 72.9% 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 Rangitaiki-Tarawera scheme accounts for 33% of the total ORC, with a value of \$45.5 million.

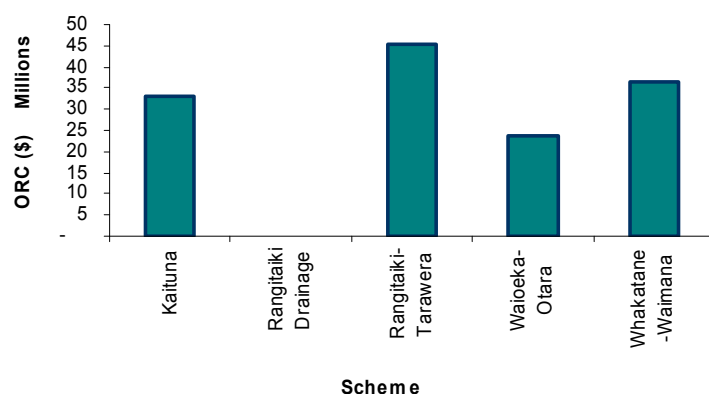


Figure 17 Stopbanks ORC

Figure 18 represents, where applicable, the length of stopbanks totalled across all of the schemes. There is a total of 346 km of stopbanks across the five schemes with Rangitaiki-Tarawera totalling the most at 118 km.

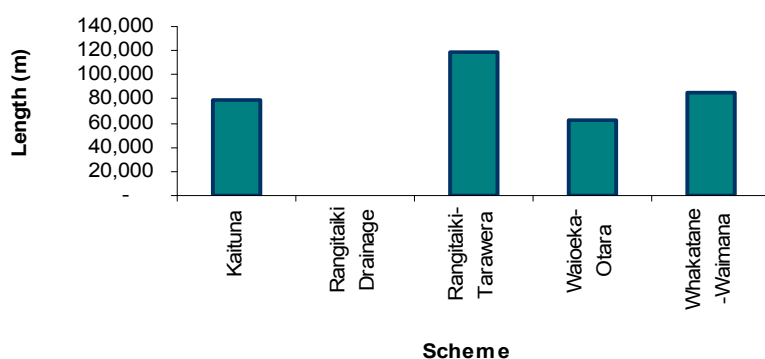


Figure 18 Length of stopbanks

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.

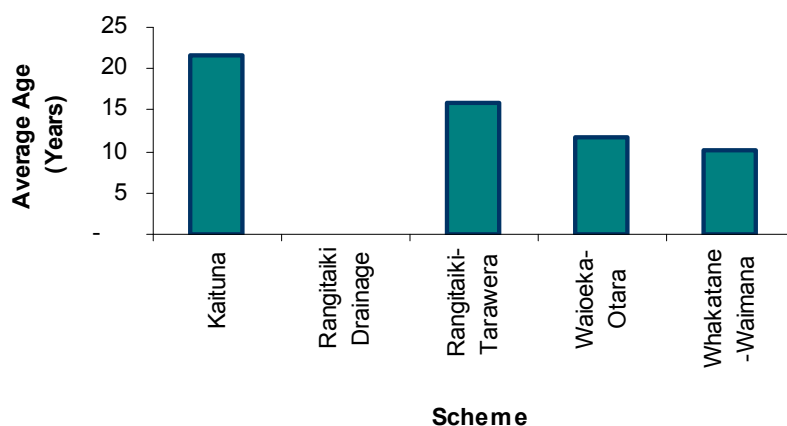


Figure 19 Stopbanks estimated average age

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 \$9,969,996.

Figure 20 shows the ORC for structures across the schemes. The Kaituna scheme accounts for 46.9% of the total ORC, with a value of \$3.87 million.

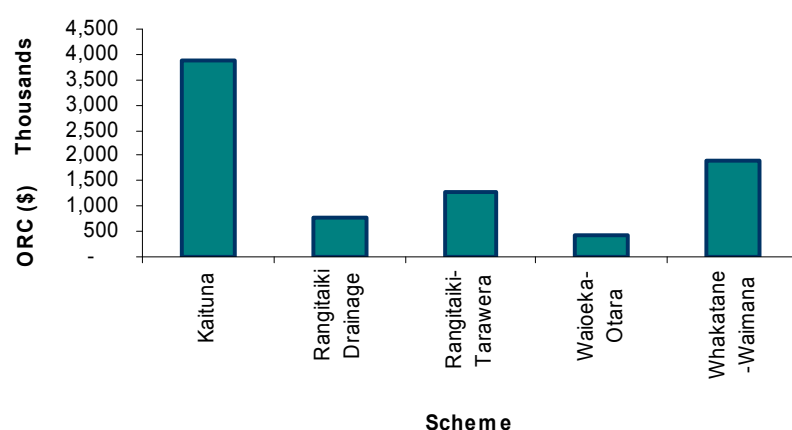


Figure 20 Structures ORC

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 75% of the way through their expected lives.

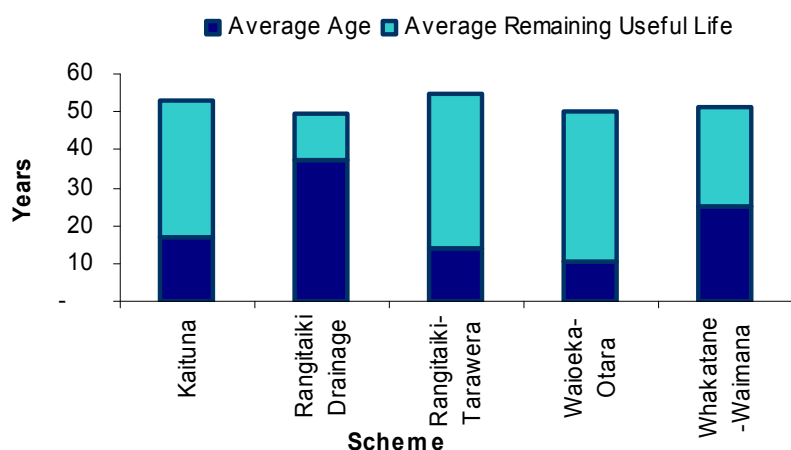


Figure 21 Structures age vs remaining life by scheme

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% of the total ORC for all of the assets, with a total value of \$13,418,814.

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 Rangitaiki Drainage scheme accounts for 85% of the total ORC, with a value of \$ 11,466,676.

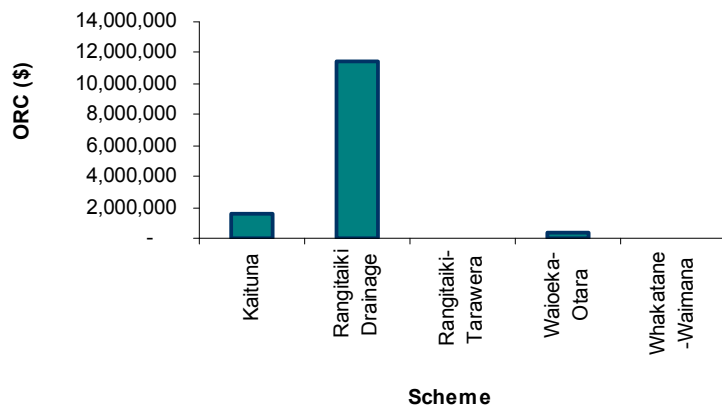


Figure 22 Drains and canals ORC

Figure 23 represents, where applicable, the length of waterways totalled across all the schemes. There is a total of 491 km of waterways across the five schemes with the Rangitaiki Drainage scheme totalling the most at 366 km.

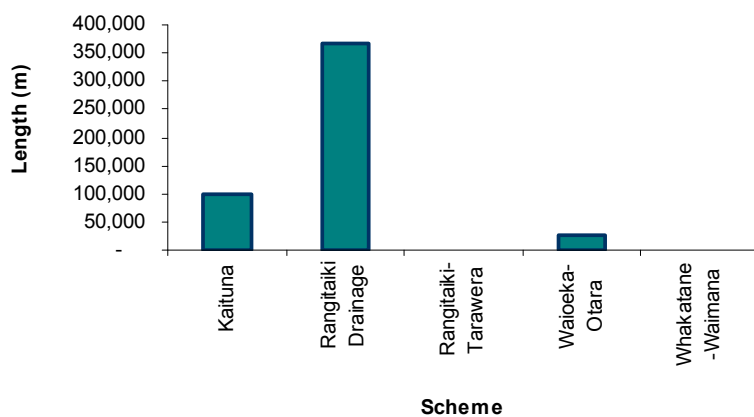


Figure 23 Length of waterways

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

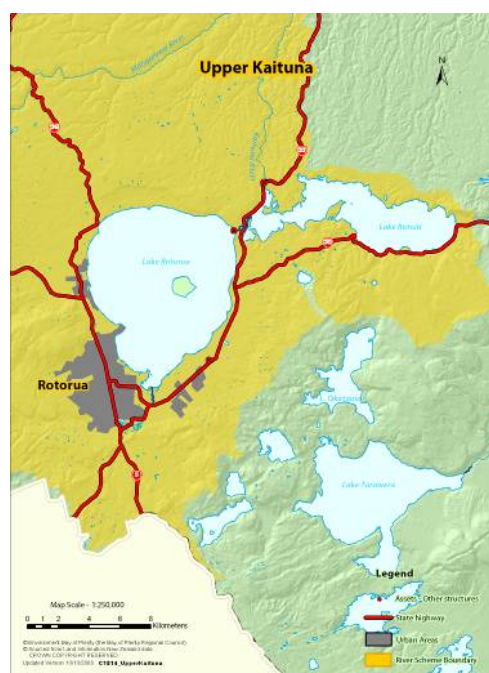
Bay of Plenty Regional Council major river schemes and drainage areas within its regional boundaries, include:

- ▶ Kaituna Catchment Control Scheme
- ▶ Rangitaiki Drainage Scheme
- ▶ Rangitaiki-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:

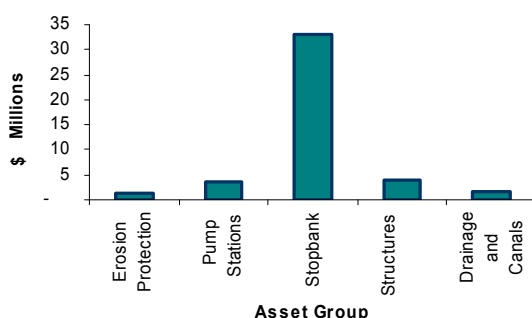
- ▶ 69 kilometres of stopbank
- ▶ 88 kilometres of canals and drains across the plains
- ▶ 6 operative pump stations
- ▶ Floodgate, culvert and weir structures
- ▶ Erosion protection – planting and rock riprap
- ▶ A groyne structure at the river mouth

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	Condition	ORC (\$)	ODRC (\$)	Total Depreciation (\$)
Erosion protection	13,206	Perpetuity	N/a		1,188,342	1,188,342	0
Pump stations		41	17.3		3,754,379	2,471,502	1,282,876
Stopbanks	79,026	Perpetuity (with settlement)	21.7		33,025,752	30,848,728	2,177,023
Structures		52	16.8		3,874,793	2,444,395	1,430,397
Drainage and canals	98,803	Perpetuity	N/a		1,547,258	1,547,258	0
Total	191,035				43,390,526	38,500,228	4,890,298

Figure 24 Asset information

Figure 25 shows the ORC for the Rivers and Drainage assets associated with the Kaituna Scheme, which amounts to \$43,390,526 (as at 1 July 2008). Stopbanks account for 76% 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 (2009/2010)	Kaituna – Ford Road gravity culvert replacement	Renewal	\$250,000	Replacement Reserve
Year 2 (2010/2011)	Kaituna Scheme Ford Road Pumping Station	Renewal	\$1,250,000	Loans & Replacement Reserve
Year 3 (2011/2012)	Kaituna River left stopbank top up (downstream of Waiari section)	Renewal	\$453,000	Loans & Replacement Reserve
Year 4 (2012/2013)	Kaituna River left stopbank top up (Railway to Waiari, up-stream)	Renewal	\$450,000	Loans & Replacement Reserve
	Kaituna River right stopbank top up (Railway to Waiari, up-stream section)	Renewal	\$800,000	Loans & Replacement Reserve
Year 5 (2013/2014)	Kaituna River right stopbank top up (Railway to Waiari, down-stream section)	Renewal	\$646,000	Loans & Replacement Reserve
	Kaituna River left stopbank top up (Railway to Waiari, down-stream section)	Renewal	\$453,000	Loans & Replacement Reserve
Year 6 (2014/2015)	Kaituna River right stopbank top up (5268 to Waiari)	Renewal	\$72,000	Replacement Reserve
	Okere Control Gates – lifting mechanism replacement	Renewal	\$137,000	Loans & Replacement Reserve
Year 7 (2015/2016)	Kaituna River right stopbank top up (downstream of wetland)	Renewal	\$228,000	Loans & Replacement Reserve
	Upper Kaituna River stopbank renewals 50%	Renewal	\$39,500	Replacement Reserve
Year 8 (2016/2017)	Kaituna (Raparapahoe Canal right stopbank top up)	Renewal	\$180,000	Loans & Replacement Reserve
Year 9 (2017/2018)	Lower Kaituna Pump electronics renewals	Renewal	\$30,300	Replacement Reserve
Year 10 (2018/2019)	Lower Kaituna Pump electronics renewals	Renewal	\$62,600	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).

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

Rangitaiki drainage scheme

The Rangitaiki Drainage Scheme provides gravity drainage to the Rangitaiki 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 Rangitaiki Plains into the Tarawera, Rangitaiki and Whakatane Rivers.

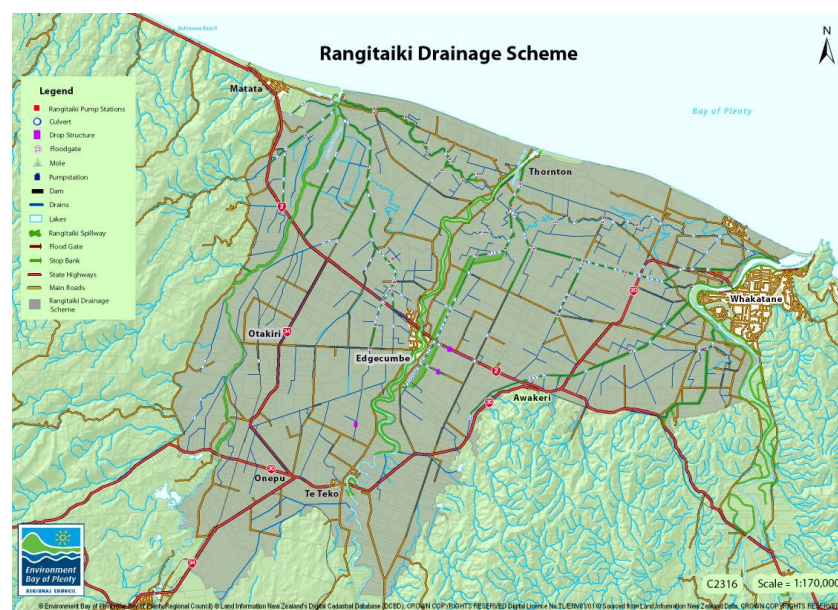


Table 23 below summaries the assets within the scheme, indicating the expected life, age, condition and financial information for each item.

Table 23 Asset information

	Quantity (m)	Estimated Base Life	Average Estimated Asset Age	Conditions	ORC (\$)	ODRC (\$)	Total Depreciation (\$)
Structures	2,296	50	37		2,496,854	773,249	1,723,604
Waterways	366,475	Perpetuity			1,146,6675	11,466,675	0
Total	368,767		37		13,963,529	12,239,925	1,723,604

Figure 26 following shows the ORC for the drainage assets associated with the Rangitaiki Drainage Scheme, which amounts to \$13,963,530 (as at 1 July 2008). Waterways account for 82% of the ORC, with structures accounting for the remaining 18%.

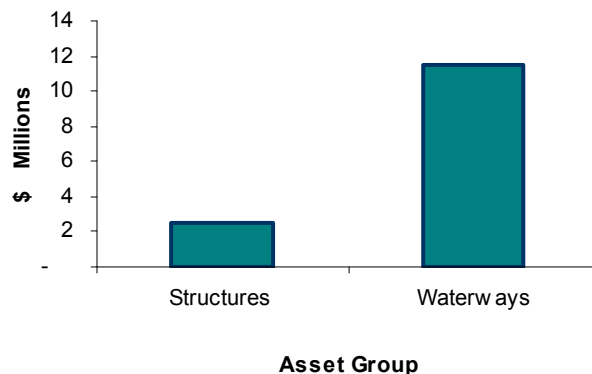


Figure 26 ORC for Rangitaiki drainage scheme assets

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 Rangitaiki Drainage Scheme.

Table 24 Design standards – Rangitaiki 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. Review needed.	10% AEP (10 year) plus 300 mm freeboard

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

Table 25 Capital expenditure schedule – Rangitaiki Drainage Scheme

Year	Capital works	Renewal or new	How much	Funding source
Year 1 (2009/2010)	Multiple floodgate replacement	Renewal	\$77,200	Replacement reserve
Year 2 (2010/2011)	Multiple floodgate replacement	Renewal	\$12,400	Replacement reserve
Year 3 (2011/2012)	Multiple floodgate replacement	Renewal	\$43,600	Replacement reserve
Year 4 (2012/2013)	Multiple floodgate replacement	Renewal	\$11,500	Replacement reserve
Year 5 (2013/2014)	Multiple floodgate replacement	Renewal	\$73,500	Replacement reserve
Year 6 (2014/2015)	Multiple floodgate replacement	Renewal	\$23,900	Replacement reserve
Year 7 (2015/2016)	Multiple floodgate replacement	Renewal	\$24,700	Replacement reserve
Year 8 (2016/2017)	Multiple floodgate replacement	Renewal	\$6,700	Replacement reserve
Year 9 (2017/2018)	Multiple floodgate replacement	Renewal	\$11,500	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).

Rangitaiki-Tarawera Rivers Scheme

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

Edgecumbe/Lower Rangitaiki 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	Condition	ORC (\$)	ODRC (\$)	Total Depreciation (\$)
Erosion protection	156,388	Perpetuity	18.0		11,073,866	11,073,867	0
Pump Stations		40	5.0		728,764	635,992	92,772
Stopbanks	117,963	Perpetuity (with settlement)	15.9		45,458,998	43,145,307	2,313,691
Structures		55	14.3		1,282,601	894,354	388,247
Total			15.3		58,544,231	55,749,520	2,794,711

Figure 27 below shows the ORC for the Rivers and Drainage assets associated with the Rangitaiki-Tarawera Rivers Scheme, which amounts to \$58,544,231 (as at 1 July 2008). Stopbanks account for 78% of the ORC, followed by Erosion Protection with 19%.



Figure 27 ORC for Rangitaiki-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 Rangitaiki-Tarawera Rivers Scheme.

Table 27 Stopbank design standards – Rangitaiki-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
Rangitaiki River – Rural from State Highway 30 to Mouth	1% AEP (100 yr) plus 300 mm freeboard
Rangitaiki River – Urban (Te Teko, Edgecumbe, Thornton)	1% AEP (100 yr) plus 600 mm freeboard
Rangitaiki Floodway	1% AEP (100 yr) plus 250 mm freeboard
Awaiti, Omeheu, 109 canals	20% AEP (5 yr) plus 300 mm freeboard
Awakaonga	10% AEP (10 yr) plus 300 mm freeboard
Old Rangitaiki Channel	20% AEP (5 yr) plus 150 mm freeboard

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

Table 28 Capital expenditure schedule – Rangitaiki-Tarawera Rivers Scheme

Year	Capital works	Renewal or new	How much	Funding source
Year 1 (2009/2010)	Rangitaiki-Tarawera stopbank strengthening (geotechnical) works	Renewal	\$1,250,000	Loans and Subsidy
Year 2 (2010/2011)	Rangitaiki-Tarawera stopbank strengthening (geotechnical) works – final stage	Renewal	\$1,250,000	Loans and Subsidy
Year 3 (2011/2012)	Rangitaiki Floodway widening – stage 1	New	\$2,750,000	Loans and Subsidy
Year 4 (2012/2013)	Rangitaiki floodway widening – stage 2	New	\$2,750,000	Loans and Subsidy
Year 5 (2013/2014)	Rangitaiki River spillway control structure	New	\$1,900,000	Loans and Subsidy
Year 6 (2014/2015)	Rangitaiki-Tarawera stopbanks (Te Teko school section)	New	\$100,000	Loans
	Tarawera River stopbanks – stage 1	Renewal	\$600,000	Loans
Year 7 (2015/2016)	Tarawera River stopbanks – stage 2	Renewal	\$600,000	Loans
Year 8 (2016/2017)	Rangitaiki River stopbanks – stage 1	Renewal	\$605,000	Loans
Year 9 (2017/2018)	Rangitaiki River stopbanks – stage 2	Renewal	\$423,000	Loans
Year 10 (2018/2019)	Floodway stopbank raising (outside of widened sections)	Renewal	\$800,000	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).

Waioeka-Otara Rivers Scheme

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

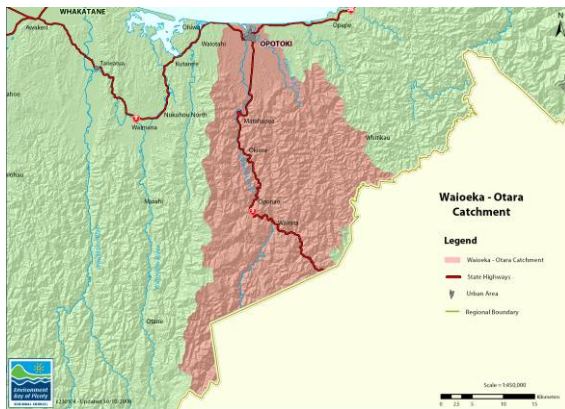


Table 29 summarises the assets in the Waioeka-Otara Rivers Scheme indicating the expected life, age, condition and financial information for each item.

Table 29 Asset information

	Quantity (m)	Estimated Base Life	Estimated Average Asset Age	Condition	ORC (\$)	ODRC (\$)	Total Depreciation (\$)
Erosion protection	532,248	Perpetuity	5		2,919,100	2,919,099	0
Pump Stations		40	13		232,145	161,953	70,192
Stopbanks	62,925	Perpetuity (with settlement)	12		23,749,616	22,880,108	869,509
Structures		50	11		432,028	374,067	57,961
Waterways	25,854	Perpetuity			404,880	404,880	0
Total			11		27,737,769	26,740,108	997,662

Figure 28 shows the ORC for the Rivers and Drainage assets associated with the Waioeka-Otara Rivers Scheme, which amounts to \$27,737,769 (as at 1 July 2008). Stopbanks are the major asset accounting for 86% of the ORC, followed by Erosion Protection at 11%.

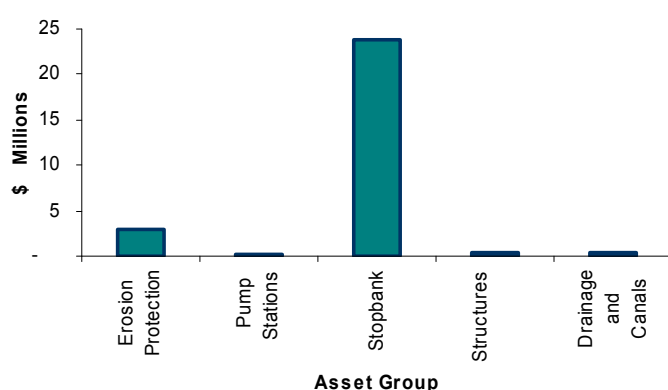


Figure 28 ORC for Waioeka-Otara Rivers Scheme assets

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 ongoing.
- ▶ Stock damage.
- ▶ Weeds and pest control (damaging stopbanks).
- ▶ Peterson's 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

Stopbanks	Design levels
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 2 (2010/2011)	Waioeka-Otara stopbank top ups – stage 1	Renewal	\$360,000	Loans and replacement reserve
Year 3 (2011/2012)	Waioeka-Otara stopbank top ups – stage 2	Renewal	\$360,000	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).

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	Condition	ORC (\$)	ODRC (\$)	Total Depreciation (\$)
Erosion protection	90,945	Perpetuity	15		5,816,350	5,816,350	0
Pump Stations		40	15		2,325,087	1,674,310	650,777
Stopbanks	85,676	Perpetuity (with settlement)	10		36,398,622	35,236,172	1,162,450
Structures		51	25		1,883,719	961,328	922,391
Total			14		46,423,778	43,688,161	2,735,618

Figure 29 below shows the ORC for the Rivers and Drainage wastewater assets associated with the Whakatane-Waimana Rivers Scheme, which amounts to \$46,423,778 (as at 1 July 2008). Stopbanks are the major asset in this scheme accounting for 78% of the ORC, followed by Erosion Protection (13%), Pump Stations (5%) and finally Structures (4%).

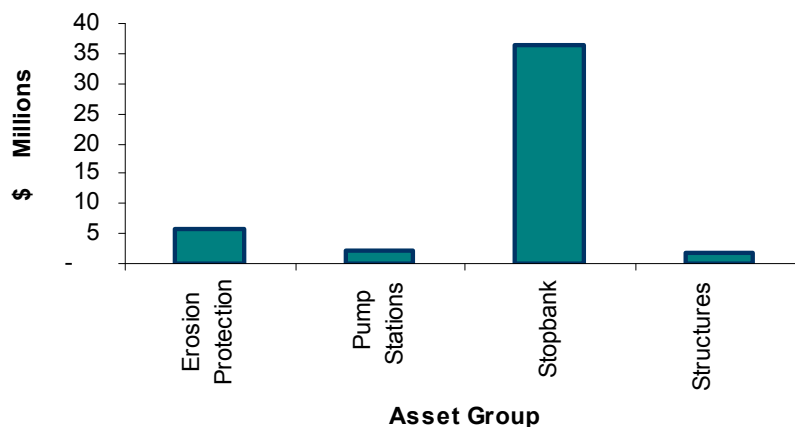


Figure 29 ORC for Whakatane-Waimana Scheme Assets

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 (2009/2010)	Waioho Canal Stopbanks top up - stage 1	Renewal	\$350,000	\$350,000
Year 2 (2010/2011)	Waioho Canal Stopbanks top up - stage 2	Renewal	\$350,000	\$350,000
Year 3 (2011/2012)	Whakatane-Waimana stop bank reconstruction (Te Rahu Drain - Barrs)	New	\$250,000	\$250,000
Year 4 (2012/2013)	Te Rahu Canal stopbank renewal	Renewal	\$200,000	\$200,000
Year 6 (2014/2015)	Whakatane-River stopbanks – stage 1	Renewal	\$300,000	\$300,000
Year 7 (2015/2016)	Whakatane-River stopbanks – stage 2	Renewal	\$300,000	\$300,000
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 manager 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 1 July 2008. 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 1 July 2008.
- ▶ All projected expenditure is stated in dollar values as at 1st July 2008. With no allowance made for inflation.
- ▶ Operational costs are largely based on historical expenditure.
- ▶ 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 2028).



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 (2008/09 – 2058/59).

Table 36 Rivers and Drainage element of financial performance 2008/2009 – 2058/2059

	Forecast for the financial year ending June										Forecast for 10 year period ending June			
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020/ 2029	2030/ 2039	2040/ 2049	2050/ 2059
Revenue														
Targeted rates	4,510,606	5,013,789	5,198,509	5,448,132	5,746,485	5,914,046	5,920,341	5,942,073	5,953,172	6,024,270	61,018,470	54,161,563	52,274,660	51,507,999
General rates	312,754	353,365	371,955	403,648	419,338	442,147	456,595	452,500	460,494	477,711	5,426,259	4,666,514	4,486,364	4,441,382
Investment income	611,579	661,976	679,130	710,846	723,237	754,555	771,045	752,030	757,816	771,626	7,765,239	6,678,006	6,420,204	6,355,832
User fees and charges	81,540	81,540	81,540	81,540	81,540	81,540	81,540	81,540	81,540	81,540	815,400	815,400	815,400	815,400
Vested asset revenue	2,100,000	0	0	0	0	0	0	0	0	0	0	0	0	0
Other public funding	676,657	1,332,500	907,500	907,500	627,000	0	0	0	0	0	0	0	0	0
Interest from reserves	51,146	100,311	115,989	56,026	71,022	83,199	99,089	115,887	96,375	122,386	1,240,385	1,420,700	1,792,005	2,098,675
Total operating revenue	8,344,283	7,543,481	7,354,623	7,607,692	7,668,623	7,275,488	7,328,610	7,344,030	7,349,396	7,477,533	76,265,753	67,742,183	65,788,633	65,219,287
Expenditure														
Operational costs by scheme														
Kaituna Catchment Control Scheme	994,653	1,045,719	1,460,499	1,079,063	1,104,575	1,113,603	1,098,354	1,296,151	1,096,120	1,145,652	11,699,800	11,699,800	11,699,800	11,699,800
Rangitāiki Drainage Scheme	688,878	718,228	752,392	745,131	768,889	771,132	760,334	773,585	751,963	732,950	7,595,000	7,595,000	7,595,000	7,595,000
Rangitāiki-Tarawera Rivers Scheme	792,357	811,372	1,131,803	842,950	854,889	865,052	853,531	1,002,942	857,423	912,666	9,073,000	9,073,000	9,073,000	9,073,000
Waioeka-Otara Rivers Scheme	486,866	499,240	663,131	524,897	533,530	538,898	530,374	604,208	531,284	522,654	5,680,000	5,680,000	5,680,000	5,680,000
Whakatāne-Waimana Rivers Scheme	795,735	812,639	1,230,809	844,781	856,617	865,263	854,656	1,053,279	856,133	845,077	9,150,000	9,150,000	9,150,000	9,150,000
Interest	688,959	1,153,040	1,216,260	1,344,658	1,492,207	1,568,323	1,559,377	1,542,489	1,496,304	1,432,332	13,651,593	10,216,360	9,484,517	8,894,629
Depreciation	760,010	816,281	829,316	837,928	878,518	887,619	890,851	894,360	896,695	898,053	9,232,492	9,505,609	9,784,718	10,038,307
Total expenditure	5,207,458	5,856,519	7,284,210	6,219,408	6,489,225	6,609,890	6,547,476	7,167,016	6,485,921	6,489,384	66,081,885	62,919,769	62,467,036	62,130,736
Operating surplus (Deficit)	3,136,825	1,686,962	70,413	1,388,284	1,179,398	665,598	781,134	177,014	863,475	988,149	10,183,868	4,822,414	3,321,597	3,088,551
Reserve transfers														
Transfers to Flood Damage Reserve	(210,529)	(259,694)	(275,275)	(214,992)	(227,891)	(241,565)	(256,059)	(271,422)	(249,308)	(264,266)	(2,795,374)	(3,014,526)	(3,205,371)	(3,561,799)
Transfers to General Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Transfers to Asset Replacement Reserves	(1,426,666)	(2,128,780)	(1,736,911)	(1,745,844)	(1,508,030)	(888,634)	(893,263)	(898,207)	(903,144)	(915,555)	(9,271,319)	(9,505,599)	(9,886,295)	(10,080,199)

	Forecast for the financial year ending June										Forecast for 10 year period ending June			
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020/ 2029	2030/ 2039	2040/ 2049	2050/ 2059
Transfers from Flood Damage Reserve	0	0	1,280,000	0	0	0	0	640,000	0	0	1,920,000	1,920,000	1,920,000	1,920,000
Cash surplus from Depreciation	760,010	816,281	829,316	837,928	878,518	887,619	890,851	894,360	896,695	898,053	9,232,492	9,505,609	9,784,718	10,038,307
Transfers from General Reserves	19,020	45,924	55,297	49,315	89,877	77,051	50,378	79,349	69,997	61,493				
Net surplus (Deficit) after reserve transfer	2,278,660	160,693	222,840	314,692	411,872	500,069	573,041	621,095	677,715	767,874	9,269,667	3,727,898	1,934,649	1,404,860
Capital statement														
Loans advance	2,442,734	1,653,057	2,675,761	3,078,764	2,157,954	1,021,407	989,813	616,839	423,000	800,000	10,203,270	10,419,938	9,106,640	12,376,476
Transfers from Asset Replacement Reserves	1,457,293	2,094,488	1,731,568	1,710,902	1,532,974	865,362	869,357	854,829	734,821	757,516	10,805,366	9,452,078	9,212,633	9,943,664
Net surplus (Deficit) after reserve transfers	2,278,660	160,693	222,840	314,692	411,872	500,069	573,041	621,095	677,715	767,874	9,269,667	3,727,898	1,934,649	1,404,860
Total capital funding	6,178,688	3,908,238	4,630,170	5,104,358	4,102,800	2,386,837	2,432,211	2,092,763	1,835,537	2,325,390	30,278,304	23,599,914	20,253,922	23,725,000
Capital expenditure – renewal	3,377,200	3,222,400	1,106,600	1,461,500	1,172,500	1,232,900	1,192,200	791,700	464,800	862,600	8,017,048	7,721,338	6,715,436	10,139,691
Capital expenditure – new	0	0	2,750,000	2,750,000	1,900,000	0	0	0	0	0	4,545,566	3,170,566	3,425,940	3,505,940
Capital expenditure – growth	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vested assets to capital	2,100,000	0	0	0	0	0	0	0	0	0	0	0	0	0
Debt repayment	701,487	685,838	773,569	892,858	1,030,300	1,153,938	1,240,011	1,301,062	1,370,737	1,462,790	17,715,689	12,708,009	10,112,546	10,079,369
Total capital expenditure	6,178,687	3,908,238	4,630,169	5,104,358	4,102,800	2,386,838	2,432,211	2,092,762	1,835,537	2,325,390	30,278,304	23,599,914	20,253,922	23,725,000
Net surplus (Deficit)	0	(0)	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.	2008
	▶ Complete next revision of AMP.	
	▶ Update operational plans in alignment with AMP.	2011 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 LTCCP.	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

Core business process	Key element
Demand analysis and strategic planning processes	<ul style="list-style-type: none"> ▶ Demand analysis ▶ Failure prediction ▶ Risk assessment ▶ Renewal optimisation ▶ LoS reviews ▶ Long Term Council Community Plan (LTCCP)
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.