Waikato Regional Council Policy Series – 2011/04

Lower Waikato zone management plan

May 2011

www.waikatoregion.govt.nz
ISSN 2230-4339 (Print)
ISSN 2230-4347 (Online)

Waikato
REGIONAL COUNCIL
Te Kaunihera ā Rohe o Waikato

Contributors

Bruce Peploe	Project Manager
Murray Mulholland	Senior Engineer
Michael Duffy	Zone Manager
Anita Ferguson	Programme Manager

Prepared by:
River & Catchment Services Group
And GHD Limited 2010

For:
Waikato Regional Council
Private Bag 3038
Waikato Mail Centre
Hamilton 3240

May 2011

Document #: 1717274 v19

Contents

Figures

Tables

Executive summary

Introduction and purpose

The Lower Waikato zone consists of the Waikato River catchment between Ngaruawahia and the Tasman Sea, and covers an area of 283,757 hectares, which is 20% of the total Waikato River catchment area.

Purpose

This plan is one of eight zone management plans that will cover the management of river and catchment activities across the Waikato region. This plan is supported by an overview document titled "River and Catchment Management in the Waikato region" (Doc# 1717271).

This plan complements the overview document by providing zone-specific detail on river and catchment management within the Lower Waikato zone.

The purpose of this plan is to:

- Provide a document to convey the long-term strategic direction for The Waikato Regional Council (WRC) River and Catchment Services (RCS) within the context of a 50 year horizon.
- Provide an overview of the zone generally with specific focus on the work programmes and other activities of RCS within the zone.
- Provide a communication tool for staff, Council committees and sub committees, Iwi, key stake holders, including the general public and audit.
- 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 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.
- Provide a management tool that is live and adaptable with regard to the changing needs of RCS assets.

The Lower Waikato zone

Regional context

The Waikato region comprises four primary catchment groups being:

- Waikato River catchment
- Waihou Piako catchments
- Coromandel
- West Coast.

For management purposes, the Waikato River catchment is divided into five separate sub catchments or management zones:

- Lake Taupo
- Upper Waikato
- Waipa
- Central Waikato
- Lower Waikato.

The Lower Waikato zone occupies a position at the lower end of the Waikato River catchment, and is the destination of all waters flowing into the Waikato River catchment. As a result of this relationship, the Lower Waikato zone is heavily influenced by activities that occur higher in the catchment within each of the other four zones – Lake Taupo, Upper Waikato, Waipa and Central Waikato.

Zone overview

The construction of the Lower Waikato Flood Protection Scheme in the 1960's was a historically significant milestone within the zone. Regular and chronic flooding had been a major difficulty for early settlers, and posed significant constraints on economic development in the area. The scheme is a comprehensive river control scheme designed to provide flood protection and drainage improvements within the flood plains of the lower Waikato and Waipa Rivers. The flood protection scheme protects approximately half of the flood plain of the Waikato River. Large parts of the remainder have not been developed and these include lakes and wetlands. The single largest remaining wetland is the Whangamarino wetland with an area of approximately 7,500 ha, and this wetland is recognised as being internationally significant with respect to its ecological values under the RAMSAR convention1.

The dominant feature of the zone is the Waikato River and its associated lakes and wetlands. At the upstream end of the zone (Ngaruawahia) the river joins with the Waipa River and becomes wider and more slowly flowing as it exits from its more incised upstream channel. Similarly the flood plain of

[1] The Convention on Wetlands of International Importance, especially as Waterfowl Habitat

the river becomes flat and wide with a large percentage of the flood plain land drained (from wetland state) for agricultural production.

The original area of low lying land in the Lower Waikato, comprising the floodplains of the Waikato River and its tributaries, (including substantial areas of wetland), was approximately 36,400 ha. Approximately 17,200 ha of this has now been directly protected by flood protection works and brought in to agricultural or horticultural production. An additional 16,500 ha receives benefit from improvements to the waterways and river channels (including the main channel of the Waikato River) and features to control natural ponding areas. In addition, within the Mangawara River Valley approximately 8,300 ha of rural land is also protected from flooding.

The total number of individual rate payers within the Lower Waikato Zone is 15,970. Agriculture (dairy and dry stock farming) is the dominant economic activity however there are also significant industrial activities including power generation, coal mining, quarrying and sand mining. A number of elements of nationally important infrastructure traverse through the zone, including State Highway 1, 1B, 2, 22 and 39, the North Island Main Trunk Railway, the national electricity grid transmission lines and the main natural gas pipeline to Auckland.

Increasingly Council has sought to address catchment based issues within an integrated catchment management framework. A significant step toward the integrated catchment management approach occurred with the adoption of the Waikato River Catchment Services Project (Project Watershed) and the Peninsula Project. These projects seek to better integrate the range of activities that need to be considered in managing river and stream catchments in a sustainable way.

River and Catchment objectives in the zone

Council's mission and vision

Council adopted its strategic direction for the council triennium on 31 March 2011. This strategy sets out what we do, why we do it and the value provided to the community. Council's vision is:

'Competing globally, caring locally'

Council's mission is:

'To provide regional leadership to balance economic and environmental outcomes to enable the social, economic, environmental and cultural wellbeing for current and future generations'.

The strategy provides the framework to develop a zone specific vision. The zone vision will be implemented through specific objectives and goals.

Zone vision

Council's vision for the Lower Waikato zone is:

'Well managed rivers and catchments, within a framework that recognises:

- *community and cultural needs and aspirations*
- *natural risks*
- *economic and environmental sustainability'.*

Zone goals and objectives

An integrated whole of catchment management approach is taken in managing the zone. Eight goals to achieve the zone vision have been established, each with a defined set of objectives. The goals and objectives for the Lower Waikato zone are:

Goal 1
To provide flood protection to rural agricultural land and to the urban areas of Huntly.

Goal 2
To maintain the Waikato River channel to accommodate flood flows to stopbank design flood levels. To ensure that the banks of the channel provide stable foundations, public access to the river is maintained and natural environmental values are enhanced.

Goal 3
To manage, maintain and enhance priority tributary catchments

Goal 4
To promote biodiversity associated with wetlands and lakes

Goal 5
To foster sound relationships with iwi and regional communities

Goal 6
To respond to requests for new works programmes including capital works according to adopted policies and protocols

Goal 7
To manage financial reserves in order for the zone to be debt free by 2015/16

Goal 8
To ensure that sound policy, practices and processes are in place to support the delivery of programmes within the zone

Priorities and targets

Some tributary streams and sub catchments within the Lower Waikato zone have been assigned priority for river and catchment purposes based on the nature of the issue, its severity and impact including downstream consequences.

Priority is normally given to catchments where there are high levels of soil erosion, land loss, river instability or high downstream effects including sedimentation and water quality deterioration.

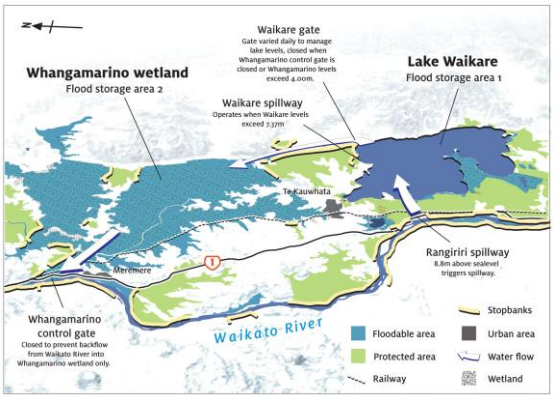
Managing the zone

How the system operates in the zone

The floodplain of the Lower Waikato River in its natural state contained many wetlands and shallow lakes. These features had a major influence on the flood hydrology of the river, with substantial interchanges of flow between the river and the wetlands and lakes occurring. The two dominant flood storage features were the Whangamarino Wetland and Lake Waikare.

The design of the Lower Waikato Flood Scheme was based on mimicking the natural processes within Whangamarino Wetland and Lake Waikare, but in a controlled fashion. The benefits of the storage areas in reducing peak flows were thus retained.

The figure below demonstrates how the system now operates.



Overview of river and catchment management activities

The aims of river and catchment management activities are to:

- Manage issues in a 'whole of catchment' basis.
- Manage hazards and effects associated with soil erosion and flooding.
- Reduce sediment entering waterways.
- Improve water quality.
- Improve river stability.
- Improve river environments by creating better habitats for a wider variety of plants and animals.
- Maintain and manage existing river and catchment assets.

In the Lower Waikato zone, river and catchment management activities include:

- Catchment oversight
- Information and advice.
- Catchment works programmes (maintenance, new works and lakes management.
- River management.
- Flood protection.
- Related Activities - Drainage works (not included within this ZMP) and Emerging practices (establishing connections and relationships, etc).

Whole of catchment management

Council made progress with the 'whole of catchment' approach following the introduction of Project Watershed in 2002 and the Peninsula Project in 2003. These projects

sought to provide a more integrated management and funding framework across the entire Waikato River Catchment and Coromandel Peninsula respectively. While this was an extension from the earlier approach, the primary focus remained the delivery of specific services (flood management, river management and soil conservation). Further progress since 2003 as a result of changes to legislation and community demand, have resulted in wider consideration of related catchment activity (including biodiversity, biosecurity, natural hazards and planning) and a broader values base (cultural, environmental, economic and social). This zone plan seeks to identify where linkages are needed and promote stronger connections being made in the future.

For the Lower Waikato zone, the whole of catchment approach means that consideration is needed of both the catchments within the zone as well as the upper reaches of the Waikato River catchment (that is, outside the zone) and the way in which these impact upon the zone.

The zone plan has identified the key zone sub catchments and the following matters will be considered within those catchments:

- Soil erosion and sedimentation.
- Riparian, river and channel management.
- Existing land protection measures.
- Water quality and quantity (including receiving waters – wetlands, lakes?).
- Plant and animal pests.
- Natural hazards and risks.
- Policy and planning (urban growth, transportation, infrastructure).
- Biodiversity.
- Treaty settlements, co-management.
- Land use and development.

In regard to the upper Waikato River catchment upstream of the zone, the impacts and considerations include:

- Land use change and future forecasts of land conversion and intensification particularly within the Lake Taupo, Upper Waikato, Waipa and Central Waikato zones.
- Impacts of future Treaty settlements within all Waikato River catchment zones.
- Climate change, which may lead to increased rainfall impacts and flood levels.
- Future governance and infrastructural arrangements.
- Flood management – particularly the operation of the Waikato River hydro system during flood events, when there is a need to balance conflicting interests.
- River and catchment work programmes in other zones particularly soil conservation works, which may have benefits to flood flows and lead to an improvement in water quality (nutrient and sediment reduction).

Key issues and strategies

A number of regionally significant issues and trends have been identified for river and catchment management activities including:

- Climate change
- Growth
- Treaty of Waitangi settlements
- Land use change
- Potential local government restructuring
- Infrastructure development and management
- Regional environmental issues.

The key issues relating to the management of the Lower Waikato zone are as follows:

Key Issue	Strategies to address key issues
Climate change (CC)	• CC forecasts included in scheme design • Monitoring • Liaison with national agencies
Growth	• Involvement in planning and policy development • Liaison, networking and relationship building
Treaty settlements	• Liaison with iwi authorities and implementation of co-management arrangements. • Alignment of strategies may be required to fit tribal rather catchment boundaries • Relationships developed
Land use change	• Sustainable land management practices promoted in upper catchments (within and outside Lower Waikato zone)
Local government re-organisation	• Monitoring of potential changes
Transportation networks	• Liaison with planning (local authorities) and transport agencies (road and rail)
Natural hazards	• Management of flood risks • Raise community awareness as to emergency procedure, response
Water quality and quantity	• Promotion of 'whole of catchment' management • Partnerships/liaison with other organisations and agencies (iwi,

Key Issue	Strategies to address key issues
	local authorities) • Future investigation/support for water harvesting strategies
Soil erosion	• Promotion of soil conservation programmes and sustainable land use practices
Peat settlement	• Investigation of issues with subsequent report and recommendations
Biodiversity/ecological effects	• Recognition of the biodiversity and ecological component of river and catchment, lake and wetland protection programmes • Appropriate mitigation measures applied
Community awareness	• Community education, promotion and engagement • Regular community targeted information / publicity
Community expectations	• Community engagement processes in place • Full evaluation and consideration of financial and management implications of increased (or changed) levels of service
River channel management	• Management programmes and strategies in place
Infrastructure change	• Liaison with other agencies
Sites of significance	• Liaise and partnerships with other agencies.
Land Improvement Agreements	• Management strategy in place and implemented by Land Management Officers
Zone governance and integration	• Prepare future management strategy with view to rationalisation of present governance arrangements
Pest management	• Increased possum control measures, ongoing control of alligator weed via spray programmes.

Legislative and policy requirements

Council has responsibilities under various acts of parliament. Those most relevant to this ZMP are:

- Local Government Act 2002 and Local Government (Rating) Act 2002.
- Soil Conservation and Rivers Control Act 1941.
- Civil Defence Emergency Management Act 2002.
- Resource Management Act 1991.
- Land Drainage Act 1906.

Council also has obligations under statutory documents; the key documents include:

- The Long Term Plan (LTP) 2009-2019
- Regional policy statement
- Regional plan
- District plans.

The most significant implication for the delivery of river and catchment services are the duties under the RMA to protect the natural resources of the region and to avoid, remedy or mitigate the effects of any activities being undertaken. RCS do this through their soil conservation activities, which protect and enhance the watercourses in the region, and through obtaining resource consents for any activities where there may be an adverse effect on the environment.

Bylaws

The majority of RCS services are governed by the above legislation; however there are regional and district council bylaws that have implications for these services including Council's Navigational Safety Bylaw 2009. The bylaws largely protect the assets of river and catchment services by restricting people from damaging structures or accidentally or deliberately blocking drainage channels.

Consents

Council currently holds 39 resource consents in relation to rivers and catchment services in the Lower Waikato zone. RCS must carry out their activities in line with the resource consent conditions specified. It is therefore important to make sure that all staff and potential contractors are aware of these obligations. The implications of non-compliance can include fines, enforcement or abatement notices or legal action. Consent conditions are becoming more stringent as more accurate data is available of the effects of particular activities. It is likely that this trend will continue into the future and this could mean that the cost of compliance will increase over time.

Standards and guidelines

In addition to the legislative requirements, there are also a number of standards and guidelines that impact how river and catchment services are delivered in the zone. These include the National Policy Statement for Flood Risk Management and Managing Flood Risk – A process Standard, NZS9401: 2008.

Key stakeholders

To achieve the Community Outcomes, Council works in partnership with other councils, community groups, businesses, individual landowners, central government, iwi/hapu and non-governmental organisations. Key stakeholders include the Lower Waikato Zone Liaison Subcommittee, the landowners holding Land Improvement Agreements, the District Councils, Department of Conservation, Fish and Game New Zealand, Mighty River Power, Genesis and the New Zealand Transport Agency.

Relationships with Iwi

As an agency acting under the authority of the Crown, all local government organisations have a responsibility to uphold the Treaty of Waitangi. This means considering and respecting the needs and values of Maori in all Council's activities. There are further statutory obligations under the Local Government Act 2002 and Resource Management Act 1991.

Strong relationships have been developed with local iwi and processes for involving Maori representatives in the decision making process. This includes memoranda of understanding with iwi, Maori representation on Council steering groups and consultation as part of the resource management process. This relationship has been strengthened through the settlement legislation that will see Council and Waikato Tainui working together to manage the health and well being of the Waikato River.

Consultation and engagement with iwi

The planning of river and catchment services, such as the development of the zone plan, must have regard to the Memorandum of Understanding (MoU) which requires working with iwi groups taking iwi management plans into account, respecting the principles of the Treaty of Waitangi and developing joint initiatives. The relationships with particular iwi groups may change over the coming years as a result of settlements between iwi and the Crown. This may result in greater involvement in iwi in the management of rivers and other features, rather than just participating in consultation. Iwi outcomes are identified in the LTP with the main interest being the protection of, and respect for, the natural features in the environment, with recognition for their role as tangata whenua and kaitiaki. Specific outcomes were developed for the three MoUs.

Treaty of Waitangi and the Waikato – Tainui River Settlement

In December 2009, the settlement legislation in relation to the Waikato River was finalised. Legislation relating to the Deed was passed in early May 2010.

The overarching purpose of the settlement is to restore and protect the health and wellbeing of the Waikato River for future generations.

The settlement legislation reflects a commitment by the Crown and Waikato-Tainui to enter a new era of co-management over the Waikato River.

Under the agreement, more than $200 million is to be put into a contestable fund over 30 years and will be available for work that directly contributes to the clean-up of the river.

The objectives of this ZMP are consistent with those set out in the legislation and the Vision and Strategy for the Waikato River. Council will need to work within the framework set out in the legislation in relation to the management of the Waikato River. The establishment of the Waikato River Authority (WRA) means that there is a new governance structure and an additional organisation to liaise with. It also means that there is additional funding from the Crown which may impact on the activities that Council undertakes and the use of rates in the zone.

The settlement legislation with Raukawa and Te Arawa, Maniapoto and potentially Tuwharetoa complement the Waikato – Tainui river settlement legislation as they have been negotiated within a similar framework.

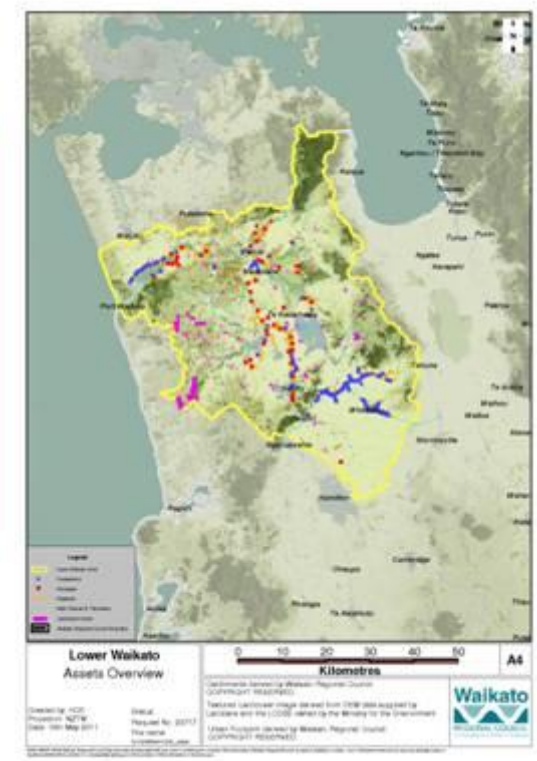
Settlements with Maniapoto and Hauraki iwi are likely to address overlapping claims with Waikato – Tainui in the zone and result in these iwi being more directly involved in the management of the zone.

Whilst the scope of the claim covering Te Puuaha / Port Waikato is not known, it is noted that this is likely to address issues within the Coastal Marine Area and therefore within the zone boundary at the harbour month.

Integrated river management plans (IRPs) will also be developed by the various iwi as a result of Treaty settlements. The relationship between zone management plans and the IRPs will need to be considered. The outcomes sought are the establishment of connections between the range of objectives and promotion of a collaborative approach.

Lower Waikato zone assets

All the assets associated with river and catchment services can be grouped under two service type categories - River management and flood protection; and catchment management these are shown in the following table.

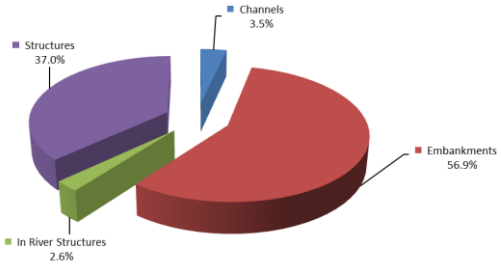


Service type	Asset category	Asset type
River management and flood protection	Embankments	Stopbanks
		Detention dams
	Structures	Bridges
		Culverts
		Drop Structures
		Floodgates
		Pumpstations
		Retaining Structures
	In river structures	River Training Works
		Weirs
		Boat ramps
		Debris Traps
	Channels	Rivers and streams
		Channels
Catchment management	Soil conservation/Clean Streams	Fencing
		Plantings

The valued assets of the zone, comprising the flood protection works, have a total replacement value of $107,679,081, a current book value of $76,676,377 and an annual depreciation of $1,168,621 as of 1 July 2011. The soil conservation assets within the zone are not valued because they are formally owned by the respective property owners. However, Council has ongoing obligations for monitoring and managing these works under the terms of the agreements with landowners. Because of these commitments, the assets have been included under this plan.

The figure below provides a summary of the Optimised Replacement Cost (ORC) of Lower Waikato zone assets.

ORC of Lower Waikato zone assets



Levels of service

The level of service provided by the zone was initially established when the LWWCS was designed in 1959 (WVA, 1959). A comprehensive post completion review of the scheme and its performance was completed in 1983 (WVA, 1983). The design service levels were confirmed through an extensive consultation process undertaken in 1997 when the first asset management plan was developed. Similar extensive consultation was undertaken during the Waikato Catchment funding review process (Project Watershed) completed in 2002.

Customers are largely satisfied with the current levels of service provided. The overall performance of the zone works in terms of the levels of protection provided against flooding and other hazards is deemed to be satisfactory.

There is however demand amongst landowners for upgrading the level of service in some areas and to provide new works in other areas. These capital works will be managed in accordance with the capital works programme and in consultation with key stakeholders and the zone catchment liaison subcommittee.

Linking levels of service to outcomes

Council outcomes

As a result of the 2010 Amendment to LGA 2002, a new definition of community outcomes is now in place. The amendment shifted the previous focus upon ‘multi agency community visioning’ to the specific aims of the respective local authority.

The community outcomes definition under the LGA 2002 Amendment Act 2010 is:

> 'the outcomes that a local authority aims to achieve in order to promote the social, economic, environmental and cultural well being of its district or region, in the present and for the future.'

The outcomes sought by Council within the definition of the LGA 2002 Amendment Act 2010 are:

- Community partnerships
- Environmental quality
- Regional economy
- Safe and resilient communities.

The existing and proposed levels of service for the zone align with the community outcomes and customer values and activity strategic outcomes. The relationship between customer values and activity outcomes is shown in the table below.

Customer value	Activity levels of service outcomes
Affordability **Quality**	• Costs for services are distributed equitably • Services are provided and perform to agreed levels and standards • Statutory requirements and legal obligations are met
Safety	• People and property are safe from hazards associated with flooding and erosion
Sustainability **(Whole community benefits)**	• The net outcome of provision of RCS services is an enhancement of the environment. • Services are managed for the social, cultural, economic and environmental well being of current and future generations
Community engagement	• Decision-making processes are transparent and easily understood • Work with stakeholders to achieve mutual objectives • We will consult with all relevant iwi and specifically in regard to implementation of Treaty settlements and co-management arrangements.
Reliability/ responsiveness	• Response requests, complaints and events is timely and appropriate solutions are provided

Each level of service statement is accompanied by one or more performance measures. The proposed levels of service and the accompanying performance measures are largely derived from a more formal definition of existing practice. This will provide enhanced ability for measuring performance and thus increase both the accountability and transparency of service delivery.

Risk management

RCS risks

As part of the development process of this ZMP, all possible risks currently affecting the RCS activities have been identified and entered into the Risk Register. The register is used to record and summarise each risk and to outline current mitigation measures and potential future management options. The impact of the risks are rated using a risk assessment matrix of likelihood and consequence. 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.

The (abridged) Action Plan table below is compiled from the risk register and highlights the most significant residual risks faced by the RCS group within the Lower Waikato Zone. 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 main risks are listed in order of severity (residual risk) as assigned in consultation with key Council staff.

Risk #	Risk descriptor	Cause	Consequence	Management options available to reduce risk level
FM4	Conflicting objectives/ aspirations (external)	• Increasing environmental standards • Treaty settlements • Environmental restoration projects	• Difficulty in renewing resource consents • Increased maintenance costs	• Better understanding of process, inter-connections, and benefits • Mutually beneficial projects (win-win) • Facilitation and agreement, mutually agreed outcomes • Negotiated solutions
GR21	Climate change	• Changes to global climate	• Sea level rise and more frequent and sever storms • Requirement to replace assets earlier and / or more frequently • Community expectation that service levels will be maintained • Higher funding requirements • Ability to pay • Adverse environmental impact • Higher risk of asset failure • Reduced land use opportunities • Disruption of community infrastructure'	• Continue current practice • Upgrade assets to off set climate change effects

Financial management

For Council to undertake a sustainable, long-term approach to the management of infrastructure assets within the catchment zones it is essential to prepare long-term financial forecasts.

Office of the Auditor General (OAG) criteria requires that Asset Management Planning (AMP) should translate the physical aspects of planned maintenance, renewal and new work into financial terms for at least the ensuing 10 years and in a manner that is fair, consistent and transparent.

The forecasts should include sufficient information to enable the decline in service potential (depreciation) of an asset to be measured. (Guidance on depreciation is included in the NZ Valuation and Depreciation Guidelines).

The funding for river and catchment works, and flood protection works in the Lower Waikato zone is set out in the LTP Section 3 'The Finances'. The zone management programme provides both asset and non asset related river and catchment services, the main services and costs are however asset management related.

A catchment wide funding system "Project Watershed" provides the mechanism for funding all river and catchment works and services within the zone.

The costs of Council services are funded through a combination of income sources including:

- Passenger transport services
- Participating landowners
- Ratepayers
- Internal borrowing
- Rental income from council owned buildings
- Investment income

The Lower Waikato Zone services are provided on an annualised maintenance cost basis. While there are activities on specific types of assets that are not carried out each year, the work is spread as evenly as possible across each year. For example, stop bank crest level surveys (sand/clay foundation) are undertaken on a 10 yearly frequency, and therefore the aim is to survey one tenth of the schemes stop banks each year on a rolling cycle.

The 2012-22 LTP proposes an increase in budgeted operating expenditure from $102.129 million in 2011/12 to $109.925 million in 2012/13. Increases in expenditure over the term of the plan range from 0.5 per cent to 7.6 per cent per annum including a provision for inflation.

The 10 year financial forecast for Lower Waikato zone is shown in the table below.

Historical maintenance costs from 2009 – 2012 indicates an increasing trend and planned maintenance cost for 2012/13 is $3.693 million.

Historical capital expenditure also indicates an increase trend. Capital expenditure, planned for Lower Waikato zone in 2012/13 is $1.822 million.

Total revenue for 2012/13 is $4.580 million and 99% of this is sourced by rates (general rates and targeted rates).

The reserve balance for Lower Waikato catchment remains negative throughout the next ten years.

Zone management assumptions

This ZMP has been prepared based on the following assumptions:

- The plan is based on currently available information and data
- The effects of climate change are considered based on the Ministry for the Environment Guidelines
- Financial forecasts are limited to 10 years
- Financial estimates have been updated as part of the 2012 LTP preparation/adoption process
- Land use within the protected compartments will remain the same
- Existing levels of service are to be maintained
- Consultation with the community has been ongoing since the adoption of the last asset management plan (which this zone plan replaces). Targeted consultation in the development of this plan has been focused on input from community representatives associated with the catchment liaison subcommittee
- There will be minimal change in applicable standards and technologies over the life of the plan
- This plan has not considered future budget constraints
- This plan has not considered changes to the Resource Management Act and the influence this will have in this activity area
- The plan has not made any specific provision for management and governance changes that may result from co-management.

	Budget figures													
	08/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22
	Actual	Actual	Actual	Actual	LTP	LTP	LTP	LTP	LTP	LTP	LTP	LTP	LTP	LTP
MAINTENANCE														
Catchment oversight	79,921	272,060	354,156	353,374	959,963	1,030,132	1,072,884	1,074,487	1,136,584	1,132,172	1,165,469	1,196,327	1,220,065	1,312,582
Information & advice	60,358	66,119	73,812	49,765	115,511	153,922	158,229	164,416	152,918	127,101	130,839	136,133	139,424	144,277
Catchment maintenance	18,186	7,534	4,515	5,928	33,471	35,412	36,789	38,024	38,959	39,935	41,123	42,538	43,565	45,044
Catchment new works	185,075	246,750	191,510	166,413	200,227	209,188	216,206	246,114	276,626	283,534	291,519	301,574	309,079	319,036
River management	233,320	253,251	182,387	133,743	279,690	279,997	293,161	302,234	310,356	319,002	328,440	338,236	347,249	358,587
Flood protection	2,056,903	1,701,595	2,082,717	2,215,209	2,104,069	2,387,301	2,464,146	2,433,174	2,510,822	2,706,885	2,792,888	2,749,779	2,838,565	2,938,377
Total Maintenance Costs	**2,633,763**	**2,547,310**	**2,889,097**	**2,924,432**	**3,692,931**	**4,095,952**	**4,241,415**	**4,258,449**	**4,426,265**	**4,608,629**	**4,750,278**	**4,764,587**	**4,897,947**	**5,117,903**
Depreciation [1]	1,049,124	1,374,238	1,202,774	1,122,706	1,066,167	1,083,530	1,205,899	1,216,412	1,233,069	1,350,666	1,350,666	1,350,666	1,481,495	1,481,495
Interest expense on reserve balance [2]	78,873	8,696	50,788	58,159	49,000	69,000	72,000	83,000	103,000	111,000	118,000	129,000	126,000	123,000
Less interest charged to zone establishment loan	(70,328)	(46,637)	(40,397)	(33,814)	(26,868)	(19,541)	(11,811)	(3,655)						
TOTAL OPERATING EXPENDITURE	**3,691,432**	**3,883,606**	**4,102,262**	**4,071,483**	**4,781,230**	**5,228,941**	**5,507,503**	**5,554,206**	**5,762,334**	**6,070,294**	**6,218,943**	**6,244,252**	**6,505,442**	**6,722,398**
FUNDED BY														
General rate	445,785	618,004	672,687	713,379	791,957	863,405	906,735	923,861	966,705	1,007,239	1,032,876	1,041,122	1,083,908	1,128,339
Targeted rate	2,700,576	3,209,664	3,259,433	3,577,045	3,785,155	4,635,740	5,184,656	4,781,352	4,886,231	5,163,538	5,291,447	5,309,623	5,536,634	5,716,238
Less Capital rates charged	(74,044)	(74,054)	(81,170)	(81,178)	(75,913)	(75,913)	(75,913)	(75,913)	(75,913)	(75,913)	(75,913)	(75,913)	(75,913)	(75,913)
Less additional capital funding					0	0	0	0	0	0	0	0	0	0
Less debt funding	(160,092)	(160,092)	(160,092)	(160,092)	(160,092)	(160,092)	(160,092)	(70,113)						
Fees and Charges	477,435	656,191	367,320	232,979	239,419	239,419	239,419	239,419	239,419	239,419	239,419	239,419	239,419	239,419
Interest income	38,645	31,406	30,344	27,916										
Interest income on reserve balance [2]	216,355	146,156	0	0										
TOTAL REVENUE	**3,644,660**	**4,427,275**	**4,088,522**	**4,310,049**	**4,580,526**	**5,502,559**	**6,094,805**	**5,798,606**	**6,016,442**	**6,334,283**	**6,487,829**	**6,514,251**	**6,784,048**	**7,008,083**
TRANSFER TO / (FROM) OPERATING RESERVE	**(46,772)**	**543,669**	**(13,740)**	**238,566**	**(200,704)**	**273,618**	**587,302**	**244,400**	**254,108**	**263,989**	**268,886**	**269,999**	**278,606**	**285,685**

CAPITAL														
New Works	229,480	120,000	216,000	0	0	0	0	0	0	0	0			
Renewals	401,310	1,273,514	1,075,267	1,888,896	1,822,423	1,901,618	1,917,127	1,737,822	2,093,747	1,434,433	2,082,760	1,507,395	1,830,051	1,593,871
Total capital	**630,790**	**1,393,514**	**1,291,267**	**1,888,896**	**1,822,423**	**1,901,618**	**1,917,127**	**1,737,822**	**2,093,747**	**1,434,433**	**2,082,760**	**1,507,395**	**1,830,051**	**1,593,871**
FUNDED BY														
General rate														
Targeted capital rates charged	74,044	74,054	81,170	81,178	75,913	75,913	75,913	75,913	75,913	75,913	75,913	75,913	75,913	75,913
Additional capital funding					0	0	0	0	0	0	0	0	0	0
TOTAL REVENUE	**74,044**	**74,054**	**81,170**	**81,178**	**75,913**	**75,913**	**75,913**	**75,913**	**75,913**	**75,913**	**75,913**	**75,913**	**75,913**	**75,913**
TRANSFER TO / (FROM) CAPITAL RESERVE	**(556,746)**	**(1,319,460)**	**(1,210,097)**	**(1,807,718)**	**(1,746,510)**	**(1,825,705)**	**(1,841,214)**	**(1,661,909)**	**(2,017,834)**	**(1,358,520)**	**(2,006,847)**	**(1,431,482)**	**(1,754,138)**	**(1,517,958)**
OPERATING RESERVE BALANCE														
Opening balance	270,250	438,291	1,240,906	1,032,804	841,886	473,203	570,509	982,632	1,049,381	1,123,685	1,205,399	1,289,112	1,375,553	1,468,727
Plus revenue	3,644,660	4,427,275	4,088,522	4,310,049	4,580,526	5,502,559	6,094,805	5,798,606	6,016,442	6,334,283	6,487,829	6,514,251	6,784,048	7,008,083
Less change to rate revenue phasing														
Less Operating expenditure	(3,691,432)	(3,883,606)	(4,102,262)	(4,071,483)	(4,781,230)	(5,228,941)	(5,507,503)	(5,554,206)	(5,762,334)	(6,070,294)	(6,218,943)	(6,244,252)	(6,505,442)	(6,722,398)
Less interest on reserve														
Transfer to disaster reserve [3]	(98,979)	(128,377)	(135,136)	(144,131)	(167,979)	(176,312)	(175,178)	(177,651)	(179,804)	(182,275)	(185,172)	(183,558)	(185,432)	(189,162)
Plus depreciation added back	1,049,124	1,374,238	1,202,774	1,122,706	1,066,167	1,083,530	1,205,899	1,216,412	1,233,069	1,350,666	1,350,666	1,350,666	1,481,495	1,481,495
Less budgeted depreciation funding tfrd to capital reserve	(735,332)	(986,915)	(1,262,000)	(1,408,059)	(1,066,167)	(1,083,530)	(1,205,899)	(1,216,412)	(1,233,069)	(1,350,666)	(1,350,666)	(1,350,666)	(1,481,495)	(1,481,495)
Closing balance / (deficit)	**438,291**	**1,240,906**	**1,032,804**	**841,886**	**473,203**	**570,509**	**982,632**	**1,049,381**	**1,123,685**	**1,205,399**	**1,289,112**	**1,375,553**	**1,468,727**	**1,565,251**
ZONE ESTABLISHMENT LOAN														
Opening balance	(937,706)	(847,942)	(734,487)	(614,792)	(488,514)	(355,290)	(214,739)	(66,458)	0	0	0	0	0	0
Plus loan repayment funded	160,092	160,092	160,092	160,092	160,092	160,092	160,092	70,113	0	0	0	0	0	0
Less interest charged	(70,328)	(46,637)	(40,397)	(33,814)	(26,868)	(19,541)	(11,811)	(3,655)						
Closing balance / (deficit)	**(847,942)**	**(734,487)**	**(614,792)**	**(488,514)**	**(355,290)**	**(214,739)**	**(66,458)**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

CAPITAL RESERVE BALANCE														
Opening balance	(2,258,025)	(2,079,439)	(2,411,984)	(2,360,081)	(2,759,740)	(3,440,083)	(4,182,258)	(4,817,573)	(5,263,070)	(6,047,835)	(6,055,690)	(6,711,871)	(6,792,687)	(7,065,331)
Plus revenue	74,044	74,054	81,170	81,178	75,913	75,913	75,913	75,913	75,913	75,913	75,913	75,913	75,913	75,913
Additional capital funding														
Less Operating expenditure														
Less Capital expenditure	(630,790)	(1,393,514)	(1,291,267)	(1,888,896)	(1,822,423)	(1,901,618)	(1,917,127)	(1,737,822)	(2,093,747)	(1,434,433)	(2,082,760)	(1,507,395)	(1,830,051)	(1,593,871)
Less interest on reserve														
Plus budgeted depreciation added back	735,332	986,915	1,262,000	1,408,059	1,066,167	1,083,530	1,205,899	1,216,412	1,233,069	1,350,666	1,350,666	1,350,666	1,481,495	1,481,495
Closing balance / (deficit)	**(2,079,439)**	**(2,411,984)**	**(2,360,081)**	**(2,759,740)**	**(3,440,083)**	**(4,182,258)**	**(4,817,573)**	**(5,263,070)**	**(6,047,835)**	**(6,055,690)**	**(6,711,871)**	**(6,792,687)**	**(7,065,331)**	**(7,101,794)**
ZONE RESERVE BALANCE (TOTAL)														
Opening balance	(2,925,481)	(2,489,090)	(1,905,565)	(1,942,069)	(2,406,368)	(3,322,170)	(3,826,488)	(3,901,399)	(4,213,689)	(4,924,150)	(4,850,291)	(5,422,758)	(5,417,134)	(5,596,603)
Plus revenue	3,878,796	4,661,421	4,329,784	4,551,319	4,816,531	5,738,564	6,330,810	5,944,632	6,092,355	6,410,196	6,563,742	6,590,164	6,859,961	7,083,996
Less Operating expenditure	(3,691,432)	(3,883,606)	(4,102,262)	(4,071,483)	(4,781,230)	(5,228,941)	(5,507,503)	(5,554,206)	(5,762,334)	(6,070,294)	(6,218,943)	(6,244,252)	(6,505,442)	(6,722,398)
Less Capital expenditure	(630,790)	(1,393,514)	(1,291,267)	(1,888,896)	(1,822,423)	(1,901,618)	(1,917,127)	(1,737,822)	(2,093,747)	(1,434,433)	(2,082,760)	(1,507,395)	(1,830,051)	(1,593,871)
Less interest on reserve														
Less interest on zone establishment costs	(70,328)	(46,637)	(40,397)	(33,814)	(26,868)	(19,541)	(11,811)	(3,655)	0	0	0	0	0	0
Transfer to disaster reserve [3]	(98,979)	(128,377)	(135,136)	(144,131)	(167,979)	(176,312)	(175,178)	(177,651)	(179,804)	(182,275)	(185,172)	(183,558)	(185,432)	(189,162)
Plus depreciation added back	1,049,124	1,374,238	1,202,774	1,122,706	1,066,167	1,083,530	1,205,899	1,216,412	1,233,069	1,350,666	1,350,666	1,350,666	1,481,495	1,481,495
Closing balance / (deficit)	**(2,489,090)**	**(1,905,565)**	**(1,942,069)**	**(2,406,368)**	**(3,322,170)**	**(3,826,488)**	**(3,901,399)**	**(4,213,689)**	**(4,924,150)**	**(4,850,291)**	**(5,422,758)**	**(5,417,134)**	**(5,596,603)**	**(5,536,543)**

Notes for inclusion
1. Depreciation costs do not include the impact of revaluations. The impact on depreciation of new works has been estimated on asset type and useful life.
2. Interest on reserve calculated on an average of reserve balance.
3. Funding is put aside each year from the zone into a regional disaster recovery fund.
4. This table reflects Lower Waikato Catchment Zone excluding main channel.
5. LTP 12-22 zone revenue and expenditure include inflation where applicable.

AP – Annual Plan
LTP – Long Term Plan

Improvement plan

Council is adopting a strategic management approach to improvement planning, continually developing ZMPs, and implementing improvement processes and practices. The Improvement Plan is integral to this approach, quantifying current business practice and measuring progress toward an identified future position. Council is in the early stages of developing the Improvement Plan for the Lower Waikato zone. The table below indicates the improvement tasks/projects to be undertaken over the next 3 years.

Process	Current practice	Target practice (3 year focus)
Community engagement		
Awareness and information	Periodic media releases Limited information dissemination Catchment liaison subcommittee engagement EnviroCare	Regular media release Promotion within community of achievements made, milestones reached Three yearly scheme open days Zone information available on website Community newsletters
Asset management		
Data management	Fundamental asset management processes in place Some gaps in quality and quantity of data. An assessment was carried out in 2012. Unit rate information currently not included in plan. Development of LIDAR information in progress but unavailable Improve data confidence and reliability Limited linkage between processes Level of historical maintenance information held is limited	Improved robust process for data collection, condition assessment and reporting (Complete Tables 13 and 14) Connections made to financial planning and forecasting Data completeness and sample quality check incorporated into 3 yearly asset valuations. Summary of unit rates for determining valuations is to be developed and included into ZMP (in accordance with Audit NZ recommendations). Completion of LIDAR survey, and usage of information in zone management Implement a programme to improve the collection and of historical maintenance data. This will provide a basis of assessing the reliability of forecast information and managing the risks of unplanned maintenance costs Defined a LoS related directly to bridges within the zone (once level status is confirmed) include within Los Tables Define and include performance grades for asset capacity and performance tables (Appendix 3b)
Information systems		
Customer inquiries	Customer enquiries not managed through a central call centre Calls/complaints/issues received by general staff member, operational staff or potentially reception KPIs to respond within particular timeframes Conquest is currently set up to handle customer inquiries but use of this functionality is limited	Review prospects for management of enquiries and requests through potential corporate system. Develop a robust process including flow diagrams to show how service requests/customer enquiries are to be tracked Document and flowchart the process for establishing an service request and the closeout loop Implement a mechanism for auditing responses in accordance with published service levels
Operation and maintenance		
River management guidelines	In development	Adopt a river management strategy for the main river channel. Introduce regional channel capacity guidelines
Flood gate capacity	Design capacity (varies by compartment)	Define flood gate capacity guideline
Monitoring of under-performing pump stations or flood gates	Fault texting for some pump stations	Develop a monitoring programme Extend remote sensing capability
Demand analysis and strategic planning		

Demand analysis	From an operation perspective service demand is analysed to include: Climate Change as required (draft climate change policy) Community Demand (resulting from land use changes and risk mitigation e.g. for businesses wanted increased protection) Options modelling	Develop and Implement demand strategy to include: Consultation Costs and options for flood protection Climate change
Optimised renewal and replacement of assets	Optimised decision making not yet implemented	Develop renewals and replacements programme and Optimised Decision making prioritisation process
Risk assessment	A risk register and framework has been developed Risk is based on NZ/AS 4360 which has been superseded by ISO 31000	Undertake actions as outlined in the risk management action plan Put critical areas onto GIS including level of risk Identify process and responsibility for updating the register. Review and maintain the risk register Implement management options/strategies to reduce risk Report regularly to the Council
Levels of service (LoS) review	Development of LoS undertaken under ZMP Technical LoS are well established for each scheme	Levels of service to consulted on next LTP Consult with zone stakeholders on service level options and costs annually and for specific projects With potential increases in the cost of maintaining services levels, continue to develop costs and options
Organisational		
Funding strategy	Funding strategies are in place for most activities	Develop and confirm zone funding strategy to address: Repayment of debt Provision for depreciation Any implications arising from peat settlement investigation
Valuations	Valuations are currently undertaken externally but there is no process in place for valuations to be reviewed	External valuation commissioned to be undertaken in 2014 Internal review to be completed
ZMP review / improvement	First ZMP developed in 2010 Benchmarked against OAG criteria Development of Improvement programme	Improvement programme implemented Annual review of ZMP Responsibilities assigned External assessment / peer review of ZMP against Schedule 10 and OAG criteria
Other agencies and community groups		
Capitalise on opportunities to work with other agencies and community groups	Consider, assess and uptake opportunities within available resources	Assess zone opportunities, prioritise and implement Progress opportunities to work with the key stakeholders: Solid Energy – additional pumping as a consequence of underground coal mining (Okawhau catchment) Transit NZ – future erosion protection on main channel associated with the Auckland Hamilton expressway, future roading developments Waikato District Council – reserve development etc. Integrated River Plans – liaise with iwi in regard to relationship with zone plans.
Costings		
Confirm forward capital costings	LTP estimates only (three-year) confirmed in detail	Full detail forward capital programme

1 Introduction and purpose

1.1 Overview

The Lower Waikato zone consists of the Waikato River catchment between Ngaruawahia and the Tasman Sea, and covers an area of 283,757 hectares. The zone represents 20% of the total Waikato River catchment area.

The Lower Waikato zone is dominated by the Waikato River channel and associated rivers, streams and lakes. A significant proportion of the total river and catchment management assets of the region are located in this zone and these assets are integral to flood management within the Waikato River catchment.

The Waikato region has more than 16,000 kilometres of rivers and streams. It is important that our waterways and catchments are managed in a way that minimises erosion and flooding and their associated damage. Sound river and catchment management assists to reduce natural risks and maintain stable rivers, streams and drainage systems and the objectives can only be achieved where there is recognition of the impacts and interdependencies across the entire catchment.

Environmental benefits of river and catchment management works include reduction in sediment entering waterways and the protection and enhancement of native vegetation and wetlands. Other issues such as recreational and cultural use of rivers and their environs, the enhancement of biodiversity and overall aesthetic improvement are all important for the community and region as a whole.

1.2 Purpose

This plan is the primary tool for the implementation of all river and catchment management activities within the Lower Waikato zone, and includes:

- A vision for the zone.
- A strategy to achieve that vision.
- Activities to implement the strategy.
- A set of service levels and performance standards for the activities.

A key component of this plan is provision of detail on the long-term management of river and catchment management assets. This plan is intended to fulfil asset management planning requirements for river and catchment management assets in the Lower Waikato zone.

In summary, the purpose of this plan is to:

- Provide a document that sets out the long-term strategic direction for river and catchment management within the zone.
- Provide an overview of the zone generally, with specific focus on the work programmes and associated activities within the zone.
- Provide a communication tool for staff, Council committees and subcommittees, iwi, and key stakeholders, including the general public.
- Improve understanding of service level standards, options and costs to smooth peak funding demands, while improving customer satisfaction.
- Manage the environmental, service delivery and financial risks of asset failure.
- Identify lifecycle 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.
- Provide a management tool that is live and adaptable, and that can address changing needs over time.

1.3 Relationship to overview of river and catchment management in the Waikato region

This plan is one of eight zone management plans that will cover the management of river and catchment activities across the Waikato region. This plan is supported by an overview document titled “River and Catchment Services – Waikato Region” (Doc# 1717271).

The document provides an overview of:

- The nature of the region and the key issues we face in the future.
- How river and catchment activities are managed across the region.
- Responsibilities for river and catchment management.
- How river and catchment management relates to other activities.
- The legislative and policy requirements for river and catchment management.

- How links with the community are developed and maintained.

This plan complements the overview document by providing zone-specific detail on river and catchment management within the Lower Waikato zone.

2 The Lower Waikato zone

2.1 Regional context

The Lower Waikato zone consists of the Waikato River catchment between Ngaruawahia and the Tasman Sea, and covers an area of 283,757 hectares. The zone represents 20% of the total Waikato River catchment area. The location of the Lower Waikato zone in relationship to the other zones within the Waikato region is shown in Figure 1.

The Waikato region comprises four primary catchment groups being:

- Waikato River catchment
- Waihou Piako catchments
- Coromandel
- West Coast.

For management purposes, the Waikato River catchment is divided into five separate sub catchments or management zones:

- Lake Taupo
- Upper Waikato
- Waipa
- Central Waikato
- Lower Waikato.

The Lower Waikato zone occupies a position at the lower end of the Waikato River catchment, and is the destination of all waters flowing into the Waikato River catchment. As a result of this relationship, the Lower Waikato zone is heavily influenced by activities that occur higher in the catchment within each of the other four zones – Lake Taupo, Upper Waikato, Waipa and Central Waikato.

The relationship between the Lower Waikato zone and the other four catchments is described within sections 2.2 (relationship of the zone to Project Watershed) and 4.2.5 (what whole of catchment management means for the zone).

2.2 Relationship to Project Watershed

Council has increasingly sought to address catchment based issues within a whole of catchment management framework. In the past, works related activities associated with land and rivers were often dealt with in isolation to related issues such as management of natural hazards and risks, water quality management and regional and district planning.

A significant step toward the whole of catchment approach occurred with the adoption of the Waikato River Catchment Services Project – also known as "Project Watershed" in 2002. Project Watershed seeks to integrate the range of activities that need to be considered in managing river and stream catchments in a sustainable way.

Formal work on Project Watershed began in 1999. It involved consideration of the whole catchment rather than the previous focus on separate historic catchment and river control schemes which differed widely in terms of levels of service, management and funding. Extensive consultation was undertaken across the entire catchment and the adoption of Project Watershed in 2002 resulted in a whole of catchment funding policy. (Refer Doc# 752002)

The land area covered by Project Watershed is geographically diverse. It comprises a range of geologies, soil types and unique features and includes geothermal areas, wetlands, hydro power generation infrastructure and peat lakes. Activities in one area of the catchment can directly impact another. For example, soil erosion in the Waipa catchment can contribute to sedimentation in the Waikato River and flooding in the Lower Waikato zone.

The catchment covered by Project Watershed includes the Waikato and Waipa rivers as well as smaller rivers in the Lower Waikato such as the Whangamarino, Maramarua and Mangawara. Project Watershed incorporates the existing Lower Waikato-Waipa Control Scheme, the Lake Taupo, Reporoa, Paeroa Range, Waitomo and Karapiro/Arapuni Catchment schemes.

The primary focus within the Lower Waikato zone is the management of the main channel of the Waikato River including the management of the existing river and flood protection scheme, the management of catchment protection works (soil conservation projects) and the management of tributary streams and associated riparian areas. However, as indicated this plan also seeks to identify those land and catchment issues based outside the zone in upper catchments that impact on this zone and which must be considered in a management strategy. All of these matters are also influenced by existing community infrastructure and future growth and development that can be expected.

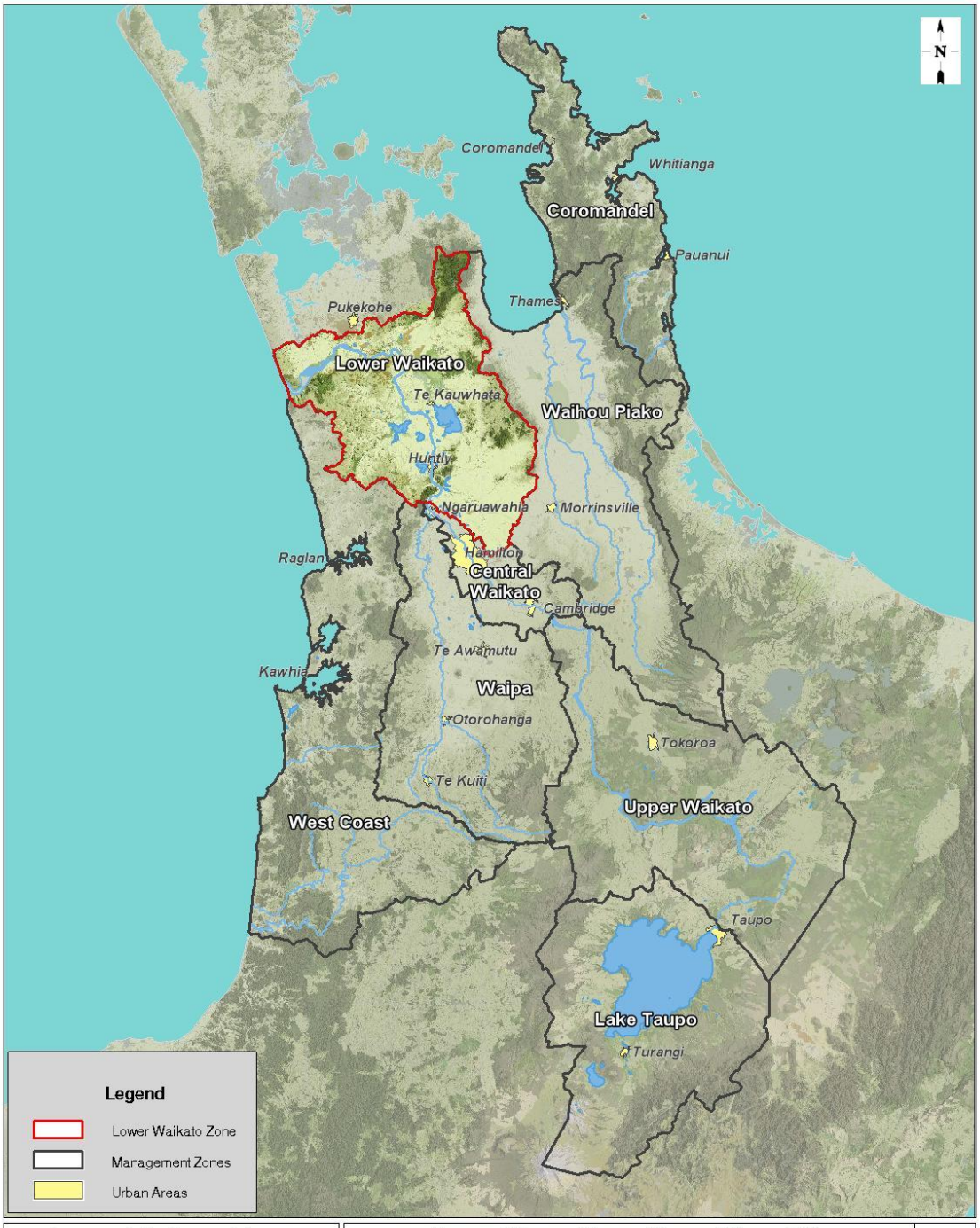
The goals of Project Watershed are:

- Prevent deterioration of established flood protection assets so as to avoid loss of land productivity and a reduced level of flood protection.
- Ensure within the limits of efficiency and fairness, that rating for flood protection within the Waikato/Waipa river catchment recognises all

beneficiaries and all those whose actions or inactions contribute to the need for expenditure on flood protection systems.

- Maximise the effectiveness and efficiency of water quality, soil conservation, flood control and land drainage activities within the Waikato and Waipa River catchments, and minimise inefficiencies caused by inappropriate actions or inaction. Project Watershed's primary objective is the management of sediment. However some activities will also contribute to improvements in water quality across the catchment.
- Provide a consistent framework for landowners and communities to be protected from flood damage in the flood plains of the major rivers, to a cost-effective standard agreed with the affected communities of the Waikato/Waipa catchment.
- Achieve and maintain stable river and stream channels and banks and ensure that inappropriate drainage or tributary management activities do not compromise scheme standards.
- Ensure effective control of accelerated erosion within the Waikato River catchment.
- Ensure that where there are significant contributors and beneficiaries elsewhere in the catchment, Project Watershed activity is not hindered by an inequitable financial burden on individual landowners.

Figure 1 Relationship of Lower Waikato zone to other management zones



2.3 Lower Waikato zone overview

2.3.1 Zone features

The dominant feature of the Lower Waikato zone is the Waikato River main channel and its associated lakes and wetlands. At the upstream end of the zone (Ngaruawahia) the river joins with the Waipa River and becomes wider and more slowly flowing as it exits from its more incised upstream channel. Similarly the flood plain of the river becomes flat and wide below Ngaruawahia.

In its pre European state, lakes and wetlands dominated the floodplain. Today, a large percentage of this land has been drained and brought into agricultural production. As the river nears its mouth, it widens and branches into many smaller channels threading their way through a myriad of small islands before entering Maioro Bay, which is a wide open tidal expanse of water. From Maioro Bay the river then exits via the single narrow channel at the Waikato Heads to the Tasman Sea.

The original area of low lying land in the Lower Waikato, comprising the floodplains of the Waikato River and its tributaries, (including substantial areas of wetland), was approximately 36,400 ha. Approximately 17,200 ha of this has now been directly protected by flood protection works and brought into agricultural or horticultural production. An additional 16,500 ha receives benefit from improvements to the waterways and river channels (including the main channel of the Waikato River) and include features to control natural ponding areas. In addition, within the Mangawara River valley approximately 8,300 ha of rural land is protected from flooding.

Geologically the zone is diverse consisting of:

- Volcanic materials including tephra (26%)
- Alluvial and unconsolidated sediments (26%)
- Greywacke or Argillite (22%)
- Peat (13%)
- Sandstone/mudstone (4%)

There are no major cities within the zone, however there are number smaller towns and communities whose primary function is servicing the agriculture industry. These towns include:

- Huntly
- Taupiri
- Te Kauwhata
- Pokeno
- Tuakau
- Port Waikato.

The total number of individual ratepayers within the Lower Waikato zone is 15,970. Agriculture (dairy and dry stock farming) is the dominant economic activity however there are also significant industrial activities including power generation, coal mining, quarrying and sand mining. A number of elements of nationally important infrastructure traverse through the zone including:

- State Highway 1, 1B, 2, 22 and 39
- North Island Main Trunk Railway
- National electricity grid transmission lines
- Main natural gas pipeline to Auckland.

Of the total zone area, 82% is in pasture, 3% is in production forestry, and 10% in native vegetation, scrub and other land uses.

The boundaries of the zone and key features are shown in Figure 2 on the following page.

2.3.2 Historical background

Historically, the floodplain of the Lower Waikato was poorly drained, low lying, floodable land, wetland and lakes. European settlement resulted in much of this land being developed for agricultural purposes. The Aka Aka Drainage Board held its inaugural meeting on 18 November 1895, and is considered to have been the first such board in New Zealand. As early as 1911, the first authority charged with controlling the river for both navigation and flood control purposes was set up. The Waikato River Board met with limited success in its activities and the effects of river training works carried out by the Board were subject to a commission of inquiry in 1917. Until the 1950's, there was no single body responsible for management or control of the lower Waikato River, although the Public Works Department carried out a number of surveys and investigations related to flood control and drainage.

During the 1950's the low level of natural protection against flooding was clearly demonstrated by floods in 1952, 1956 and 1958. The greatest of these occurred in 1958. In addition to inundating rural agricultural land for long periods, this flood caused severe damage within the boroughs of Te Kuiti, Otorohanga and Huntly.

The Waikato Valley Authority (WVA) was created in 1956 with the specific objective of controlling flooding in the Lower Waikato and Waipa catchments. A comprehensive proposal for a flood protection scheme (the Lower Waikato Waipa Catchment Control Scheme or LWWCS) was created as a result of data collected from the 1958 flood event.

After obtaining government approval the LWWCS began in 1961. The scheme was

commenced under a deed of agreement signed by the WVA, the constituent county councils and drainage boards and the Government. A major review of the Scheme, its scope and financing arrangements was undertaken in the 1976/77 at which time decisions were made on those works to be included in the scheme and those to be deleted. At this time new deeds were signed and the agreed works were substantially completed by 1982. At the time, the total replacement cost of the Scheme was approximately $125 million.

In 1989 reorganisation of local government resulted in the Waikato Catchment Board (the successor to the WVA) being amalgamated with the Hauraki Catchment Board, all drainage boards in the Waikato region, and numerous other small local bodies to form the Waikato Regional Council. Overall responsibility of the LWWCS transferred to this new body.

2.3.3 Lower Waikato Waipa Control Scheme

A comprehensive flood protection scheme referred to as the Lower Waikato Waipa Control Scheme (LWWCS) has been in place since the early 1960's.

This river control scheme was designed to provide flood protection and drainage improvements within the flood plains of the lower Waikato and Waipa rivers. The works consist of stop banks, pump stations, floodgates and main river channel improvements. Construction was commenced in 1961 and completed in 1982.

The construction of the Lower Waikato Waipa Flood Protection Scheme was a historically significant milestone for the zone. Regular and chronic flooding had been a major difficulty for early settlers and posed significant constraints on economic development in the area.

The scheme protects predominantly agricultural land and parts of the urban area of Huntly. Land development led to problems with accelerated soil erosion. As a result, soil conservation works were undertaken to address these issues. Existing protection schemes cover up to 70 individual properties across the zone. As stated, the flood protection scheme protects approximately one half of the flood plain of the Waikato River. Large parts of the remainder have not been developed and these include lakes and wetlands.

The single largest remaining wetland is the Whangamarino wetland with an area of approximately 7,500 ha. This wetland is recognised as being internationally significant with respect to its ecological values under the RAMSAR convention[2].

Scheme land

Prior to 1984 privately owned land acquired for the Scheme was generally taken for Soil Conservation and River Control (SCRC) purposes under the Public Works Act or the Crown Land Act for the Crown.

In general, this land is now vested in Land Information New Zealand (ex Department of Survey and Land Information / Department of Lands / Ministry of Works and Development / Ministry of Works / Ministry for the Environment).

From 1984, land that was taken for SCRC purposes and ownership was vested directly in the relevant catchment board and since 1989, in the Waikato Regional Council. Some areas were also vested in Waikato District Council, where it had specific interests.

Land involved with scheme works which was already in an acceptable form of public ownership was not taken for SCRC purposes and retained its previous status. Such land included legal roads and various reserves generally managed by territorial authorities (ie. local purposes, esplanade, drainage, cemetery, water treatment, slipway etc), reserves managed by the Crown (ie. wildlife management, riparian strip etc) and other land managed by the Crown (ie. Crown land reserved from sale, stream bed etc).

In many cases the full land acquisition legalisation process had not been completed resulting in a requirement for further land status enquiry and rationalisation.

Waikato-Tainui Raupatu Claims (Waikato River) Settlement Act (2010) has resulted in further land ownership changes. 18 parcels of SCRC land classified as sites of significance were vested in the Waikato Raupatu River Trust. All other SCRC Crown land that was vested in Ministry for the Environment classified as managed properties were vested in Council by way of gift from Waikato Tainui. Co-management arrangements are still being developed and it is still being determined how this may affect current management of Zone Land Licences. However, any SCRC land transferred under the settlement will retain its land status.

Mangawara

Approximately 407 hectares of land associated with the Mangawara Stream was acquired for the Scheme, is managed by Council or is occupied by waterways, etc. as part of the Lower Waikato zone. The market value as at

[2] The Convention on Wetlands of International Importance, especially as Waterfowl Habitat

30 June 2008 was estimated to be approximately $4.0 million.

Main channel

Approximately 746 hectares of non-Mangawara land was acquired for the Scheme or is managed by Council as part of the Lower Waikato zone. The market value as at 30 June 2008 was estimated to be approximately $9.6 million.

Licences

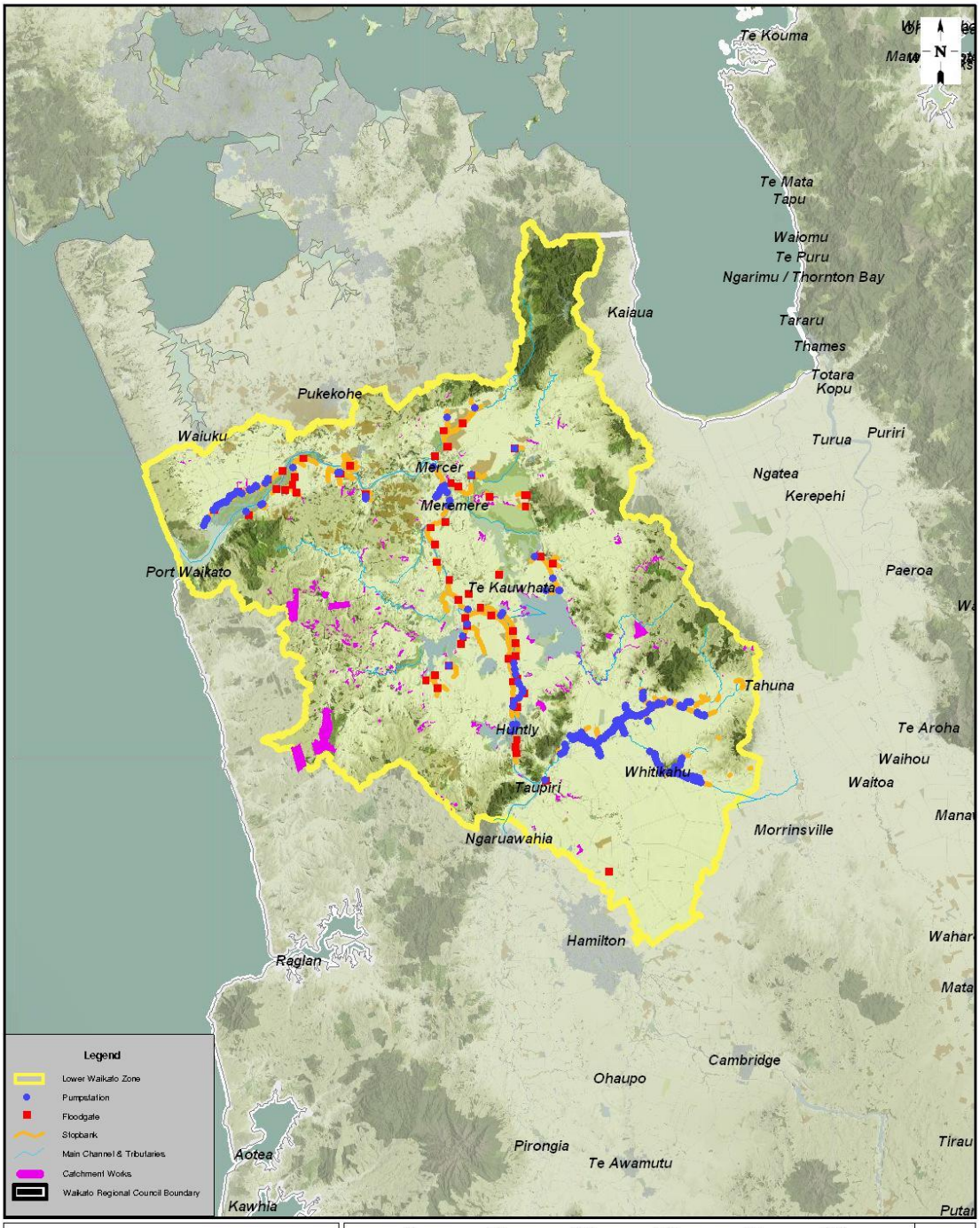
The Soil Conservation and Rivers Control Act 1941 (Act) assigns Council the responsibility of control and management of all land with SCRC status within Council territory and authorises Council to grant licences to occupy over it. The Act also authorises Council to fine or penalise persons for offences to this land up to the value of the damage or to acquire land under the Public Works Act 1981. Council may not dispose of soil conservation land, however it may consent to access for the purpose of exercising a mining permit.

The Public Works Act 1981 also authorises Council to grant a lease, tenancy or licence to occupy on land held for public work on terms and conditions as determined by Council.

Scheme management responsibilities were split between Council and Waikato District Council as successors of the WVA and the Huntly Borough Council, respectively. It was agreed that the full responsibility of scheme land management be transferred to Council by deed effective from 1 July 1996.

Approximately 960 hectares of the Lower Waikato zone land is currently licensed for grazing by Council under these Acts.

Figure 2 Lower Waikato zone overview and assets



2.3.4 Economic considerations

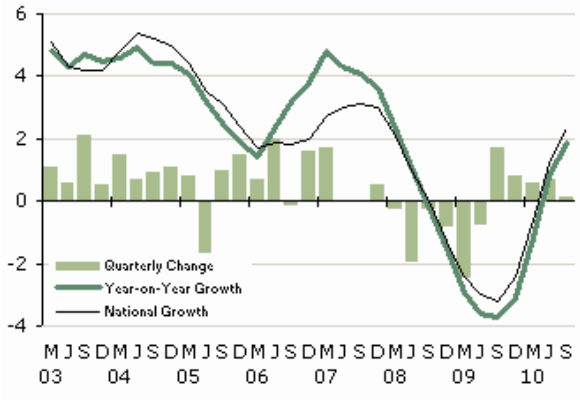
This section provides material to give some context to the value of the flood protection and pumping and drainage services provided in the Lower Waikato management zone. In particular, the value of production on rural land and the value of property improvements (mainly buildings and other infrastructure) are considered. Assumptions are made to provide an indicative estimate of the value added by river and catchment management services. It is noted that this is a relatively constrained study, and does not quantify some of the wider economic, environmental and social effects. Further work will be required to identify and develop a full picture of these effects.

It is intended that, over time, additional information will be incorporated to allow assumptions to be replaced with actual data, and to enable the inclusion of the wider benefits of river and catchment management services to be incorporated into ZMPs over time.

The Waikato economy

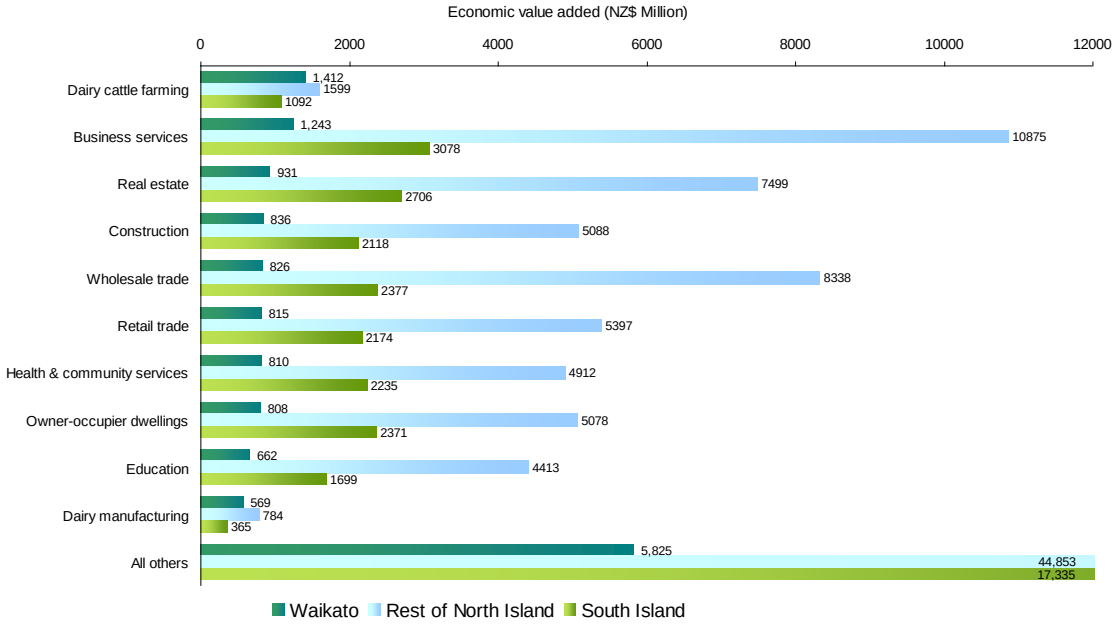
The Waikato region comprises the fourth largest regional economy in New Zealand, with the latest official estimates showing a gross regional product of $15.6 billion in 2007. In recent years, the factors driving the national economy (such as the availability of credit, and weaker international commodity markets) have also been key for the Waikato economy. The National Bank's Regional Trends report shows activity in the Waikato has followed a similar pattern to New Zealand as a whole through the recession of 2008-09 and subsequent recovery[3].

Waikato and New Zealand



The Waikato economy has traditionally been highly reliant on agriculture. Dairy farming is the largest industry in the Waikato, comprising 9 per cent of gross regional product (adding dairy manufacturing brings the wider dairy sector up to 13 per cent of gross regional product). The most recent available data indicates the business services is the next largest contributor to gross regional product (8 per cent), followed by the real estate and construction sectors (although these two sectors have been particularly hard hit by the recession, and may have declined in terms of their contribution in recent times). The next largest industries in the Waikato are the wholesale and retail trade, health and community services and education sectors.

[3] The National Bank estimates regional economic activity based on a composite index which includes business and consumer confidence, retail sales, house sales, building approvals, employment and new vehicle registrations.

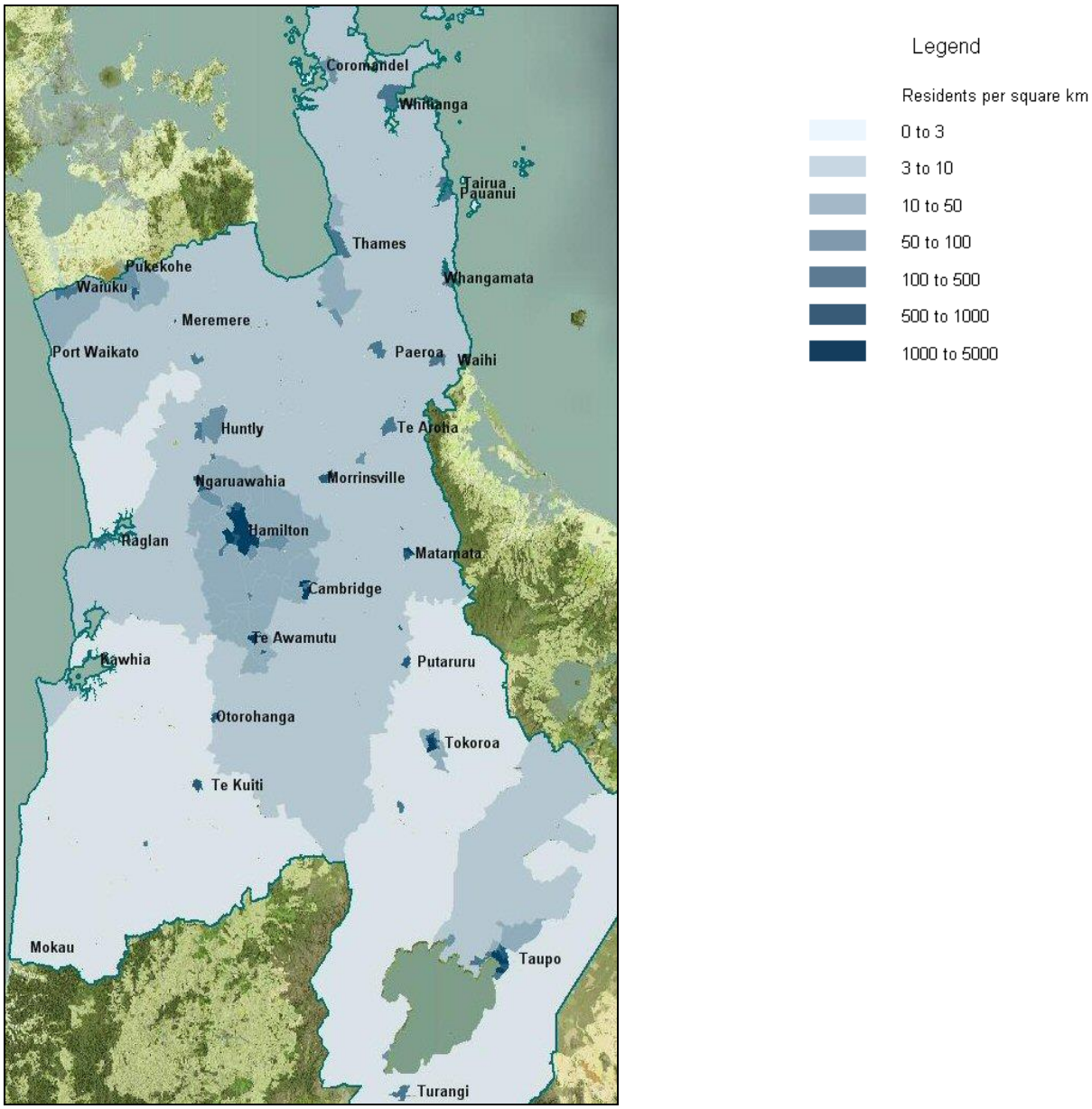


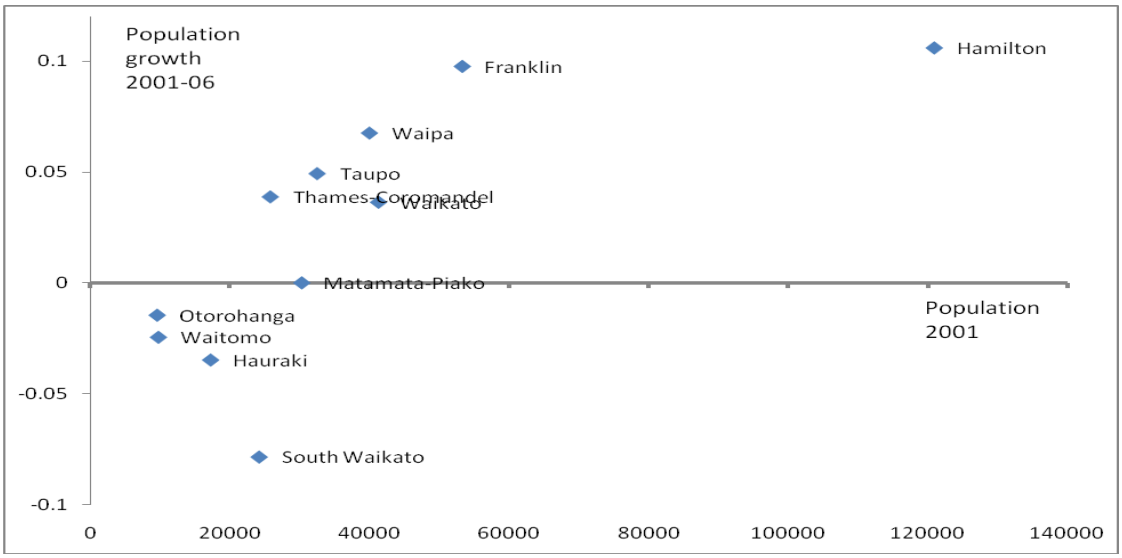
Population

The population of the Waikato region at the time of the last census (2006) stood at 395,100. Statistics New Zealand estimates the current population of the region to be 416,600, and project more than 50,000 additional people (to 468,200) by 2031. The population in the Waikato region is most densely clustered around the Hamilton urban area. The northern part of the Waikato district (formerly part of the Franklin District) is also relatively densely populated. There are small pockets of density around other town centres, but most of the region is relatively sparsely populated, with less than 10 residents per square kilometre.

Those parts of the region that are more densely populated all tend to be the fastest growing. The most rapid growth projected by Statistics New Zealand is expected to occur in Hamilton City (an annual average growth rate of 1.2 per cent between 2006 and 2031), the former Franklin District (1.4 per cent[4]), and the Waikato District (1.0 per cent). At the same time, Statistics New Zealand projects an ongoing decline in the population of the Hauraki, South Waikato, Otorohanga and Waitomo districts.

[4] Much of this growth is likely to occur in the northern part of what was Franklin, which is now part of the Auckland Council, but it is expected that there will be a spillover into that part which was incorporated into the Waikato District.





Source: Statistics New Zealand

2.4 Services provided

The services provided by Council in the lower Waikato management zone have a variety of benefits, including:

- the protection of asset values (primarily through flood protection); and
- increased productivity of protected land and assets (through flood protection and drainage).

In 1982, a review was undertaken of the Lower Waikato and Waipa flood control scheme following its completion. This review included a comprehensive economic analysis, which calculated the expected annual value of damage avoided (including lost productivity) through the scheme. Although the growth and development that has occurred in the intervening years mean this analysis is out of date, it still provides useful context. In 2001, a report from Massey University adjusted the benefits estimated by the 1982 review for changes in prices. Table 1 below replicates this, and updates the numbers to 2010 dollars.

Table 1 Costs and benefits - Lower Waikato/Waipa flood control scheme ($2010)pa

	Urban areas	Rural lower Waikato	Mangawara	Total
Increased production		20,276,000	314,000	20,590,000
Saved flood damages and losses	2,633,000	7,890,000	157,000	10,680,000
Saved cost rescues and repair	265,000	708,000	14,000	987,000
Saved damages: highways and bridges	187,000	499,000	10,000	696,000
Transportation savings	336,000	896,000	18,000	1,250,000
Total benefits	3,421,000	30,269,000	513,000	34,203,000

Source: Meister and Quazi (2001): *Direct and indirect economic benefits of the Lower Waikato Waipa Control Scheme and implications for rating.*

[a] Note that the values from the original report were updated to 2000 by Meister and Quazi using 'appropriate indices'. These have been further inflated by the consumer price index to reflect current prices.

[b] Includes Huntly, Otorohanga and Te Kuiti.

[c] Excluding Mangawara.

It is noted that these values have been adjusted for price increases. They do not necessarily reflect the growth and development that has occurred in recent years. Consequently, the value of benefits may significantly underestimate the actual value.

Previous studies have also identified a variety of unpriced benefits of flood protection and drainage in the Lower Waikato which could, in principle, be valued. These include (from Meister and Quazi, 2001):

- a more secure investment environment for land adjacent to the flood control area leading to increased intensification of that higher land
- economic impact on catchment and region of the changes in the sub-catchment
- social benefits of peace of mind, reduced risk and security of access to school and hospitals
- ecosystem/environmental/recreational benefits.

Land that has received benefits from the scheme – through drainage, flood protection or both – has risen considerably in value as a result. Analysis done for Council in 2001[5] provided examples of typical land values as follows:

- Unprotected land in willow - $1,000/ha
- Protected land in willow - $3,000-$4,000/ha
- Protected land in pasture - $10,000-$14,000/ha
- Protected land suitable for cropping - $12,000-$17,000/ha.

Value at risk

The primary benefits of the Lower Waikato Scheme accrue in the 'direct benefit area'. Although there are wider benefits[6], these are generally beyond the scope of this report[7]. The analysis that follows refers to the benefits that

[5] Lower Waikato Waipa Control Scheme – Land Classification and Direct Benefit Analysis for Differential Rating Purposes, TR 01/16.

[6] Including social and environmental effects, but also including benefits to nationally important infrastructure – notably State Highway 1 and the main trunk railway line – and the activities that rely on it. There are also likely to be effects on the value provided by ecosystem services, but for these, the effects of catchment management may in fact be negative. Understanding these effects will require further work.

[7] However, it is intended that this report will be updated in future, and that such information be included as it becomes available.

accrue through local flood protection works. Significant benefits also arise from drainage works, particularly in the form of increased agricultural productivity. Where these drainage benefits arise in areas that are not are not included in the following analysis (although it is intended that, in future, they will be), but they are reflected in Table 1, above.

According to rating valuations, the total capital value of properties in the direct benefit area is approximately $3.5 billion, including an unimproved land value of $2.4 billion and improvements of $1.1 billion[8]. The value of capital assets that receive protection from flooding within the direct benefit area can be proxied by the value of improvements. Damage to the productivity of the land itself may also be prevented – this is discussed further below.

There are estimated to be approximately 100,000 dairy cattle, 20,000 beef cattle and 8,000 sheep in the flood protected area. While the capital value of livestock may vary considerably over time, using reasonably conservative assumptions about average prices[9] yields a gross value of approximately $143 million.

Other built capital in the direct benefit area includes 400km of roads (and an additional 100km of driveways and tracks), 384 Transpower pylons, and 36km of rail track.

Combining land use data from Agribase, the Waikato Economic Model and rating data, the value of agricultural production in the direct benefit area can be estimated. The total value of agricultural output in the area is approximately $99 million per annum. The value added[10] by agriculture is estimated to be $72 million per annum. It is noted that, while this is based on a regional average level of production for dairy farming[11], the average stocking rate in the Lower Waikato management zone is much higher than average (3.9 cows per hectare, compared with an average of 2.7). The implications of this for the net value of production are unclear, however, since input costs may also be higher. Nevertheless, it is probably reasonable to consider this as a lower bound of the value added by farming in this area.

Taking into account the wider effects of this activity (for example, the transporting and processing of agricultural output) gives an indication of the value of economic activity that is protected by the Lower Waikato scheme. The total output in 2009, taking these flow-on effects into account, is estimated at $326 million per annum, while the value added is $124 million per annum.

Environmental effects

The environmental effects of flood protection and drainage in the Lower Waikato zone are ambiguous. For example, main channel plantings and stability control represent benefits of management. However, there have also been significant costs, such as the drainage of wetlands (which typically has high ecosystem service values)[12] and the subsidence of peat soils (requiring increasing costs to pump). The net benefit (or cost) of these effects is unclear, and further analysis would be required to quantify them.

[8] 'Improvements includes most of the high value assets that might otherwise be damaged by flood events, such as houses, fencing, sheds and other buildings. It does not include assets that area not fixed to the property, such as building contents, vehicles and livestock.

[9] Average prices of $1,300 per animal for dairy cattle, $600 for beef cattle, and $80 for sheep are assumed in this calculation.

[10] The gross output figure represents the total value of agricultural products from this area; this is adjusted by deducting the value of inputs to calculate the value added by agricultural activity.

[11] Around 90 per cent of the value of output is attributed to dairy cattle farming.

[12] For example, in 1999, the value of ecosystem services provided by wetlands was estimated to be approximately $40,000 per hectare (Patterson, M. and Cole, A., 1999, *Estimation of Ecosystem Services in the Waikato Region*, Environment Waikato Internal Series 1999/02).

3 River and catchment objectives in the Lower Waikato zone

3.1 Waikato Regional Council's mission and vision

Council adopted its strategic direction over the council triennium on 31 March 2011. This strategy sets out what we do, why we do it and the value provided to the community. Council's vision is:

> 'Competing globally, caring locally'

Council's mission is:

> 'To provide regional leadership to balance economic and environmental outcomes to enable the social, economic, environmental and cultural wellbeing for current and future generations.'

The organisational mission and vision provide a framework from which to develop a zone specific vision. Based on this, a zone strategy has been developed which will be implemented through specific objectives and goals.

3.2 Lower Waikato zone vision, goals and objectives

3.2.1 Zone vision

The Lower Waikato zone vision is:

> 'Well managed rivers and catchments, within a framework that recognises:
>
> - community and cultural needs and aspirations
> - natural risks
> - economic and environmental sustainability'

3.2.2 Goals and objectives

An integrated whole of catchment management approach is taken in managing the zone. Eight goals to achieve the zone vision have been established, each with a defined set of objectives. The goals and objectives for the Lower Waikato zone are:

Goal 1: ***To provide flood protection to rural agricultural land and to the urban areas of Huntly.***

To be achieved by:

- Maintaining and managing the LWWC scheme including:
  - 250 km's stop banks
  - 251 km's channels
  - 65 pump stations
  - 63 screens
  - 120 pumps
  - 255 floodgates.
- Providing 100 year protection to main river and urban areas.
- Providing 20 year protection secondary rivers/tributaries and rural areas.
- Additional protection provided to incorporate waters from Tongariro Offset works.

Goal 2: ***To maintain the Waikato River channel to accommodate flood flows to stopbank design flood levels. To ensure that the banks of the channel provide stable foundations, public access to the river is maintained and natural environmental values are enhanced.***

To be achieved by:

- Maintaining the Waikato River channel to ensure that water levels for a 350 m3/s discharge can be passed.
- Maintaining the optimum hydraulic low flow channel width of 220m between Rangiriri and Mercer.
- Maintaining design freeboards for the stop banked areas by either maintaining channel capacity or increasing stop bank levels.
- Maintain the Waikato River channel substantially free of major obstructions and impediments to normal and flood flows.
- Maintaining the riverbanks adjacent to scheme hard defenses to protect against erosion.
- Providing assistance to landowners to protect against erosion of the riverbanks.
- Encouraging commercial sand abstraction in the Lower Waikato River where such operations will support river management objectives.

Goal 3: ***To manage, maintain and enhance priority tributary catchments***

To be achieved by:

- Treatment of erosion prone land in priority catchments to reduce sediment loss and maintain the productive capacity of land.

- Support and encouragement of the planting of appropriate species for erosion control and biodiversity enhancement.
- Removal of blockages from floodway channels to reduce the effects of erosion and flooding.
- Ensure hydraulic conveyance capacities of tributaries and channels can adequately accommodate design flood flows.
- Ensure the physical stability of river systems.
- River management and drainage works are undertaken in accordance with Council's best practice guidelines.
- Working with stakeholders to enhance biodiversity in tributary catchments.

Goal 4: To promote biodiversity associated with wetlands and lakes

- Promotion of stock exclusion from all water bodies including upper catchments riparian areas, lakes and wetlands in order to reduce sediment and nutrient inputs and to protect the values of associated riparian margins.
- Working with landowners and other stakeholders around priority lakes and wetlands to protect and enhance the functions and values of these ecosystems.
- Working with stakeholders to enhance biodiversity on Council managed land.

Goal 5: To foster sound relationships with iwi and regional communities

Iwi

To be achieved by:

- Integration of settlement legislation into Council's RCS activities and programmes.
- Aligning the Lower Waikato River and catchment services objectives to support and/or enhance the Vision and Strategy objectives for the Waikato River Settlement.
- Where possible, aligning or partnering with tangata whenua in undertaking river enhancement related environmental projects.
- To formally agree on Lower Waikato management arrangements with Waikato-Tainui within the scope of the Joint Management Agreement (JMA).
- Working with iwi to develop better cultural and environmental outcomes.

Regional communities

To be achieved by:

- Effective consultation through the Long Term Plan (LTP) consultative process and Lower Waikato Catchment Liaison Subcommittee.
- Information and education programmes to maintain awareness of protection schemes in place.
- Preparation of newsletters, information readily available on Council's website.
- Working with stakeholders on key projects, seeking outcomes that will meet the range of aspirations.
- Working with territorial authorities through Annual Plan, district planning processes.
- Working with other agencies such as the Department of Conservation, Fish and Game, NZ Transport Agency, OnRail to provide better regional and local outcomes and to enhance the environment, provide better use of infrastructure; maintain water quality, flood and emergency management.

Goal 6: To respond to requests for new works programmes including capital works according to adopted policies and protocols

To be achieved by:

- Capital new works requests responded to within Council new works policy's being:
  - Proposal must be technically feasible and economically sound.
  - Works must conform to the RMA and consistent with the Waikato Regional Plan.
  - Proposals must be consistent with priorities and programmes established for the zone.

Goal 7: To manage financial reserves in order for the zone to be debt free by 2015/16

To be achieved by:

- Balance achieved between level of rates and annual expenditure requirements.
- Expenditure for flood protection works matches annualised asset management requirements.
- Manage the zone financial reserves under an agreed financial policy.

Goal 8: To ensure that sound policy, practices and processes are in place to support the delivery of programmes within the zone

To be achieved by:

- To carry out agreed investigations, assessments or surveys to support the promotion of new initiatives.
- Continuing operational and system improvements.

3.2.3 Priorities and targets

Some tributary streams and sub catchments within the Lower Waikato zone have been assigned priority for river and catchment purposes based on the nature of the issue, its severity and impact including downstream consequences.

Priority is normally given to catchments where there are high levels of soil erosion, land loss, river instability or high downstream effects including sedimentation and water quality deterioration.

Table 2 on the following page sets out the priority catchments within the Lower Waikato zone. The table assists in determining where future efforts are to be targeted and focused.

Table 2 Lower Waikato zone – catchment priorities

Priority catchment	Type of priority issue	Catchment area (ha)	Stream length (km)	Pasture cover %	Other vegetative cover %	Wetland %	% Land mapped as severe erosion (Class VI and VII)	Land area with severe erosion potential (ha)
Matahuru	Soil conservation River management	10,351	184	92%	8%	-	31%	3,254
Awaroa	Soil conservation	11,666	216	86%	10%	4%	18%	2,114
Opuatia	Soil conservation	21,573	408	84%	12%	4%	10%	2,213
Mangatangi	Soil conservation River management	5,285	157	71%	29%	-	11%	575
Mangapiko	Soil conservation	9,179	210	91%	9%	-	14%	1,300
Mangatawhiri	River management	2,049	55	34%	66%	-	2%	45
Waerenga	Soil conservation River management	4,959	101	90%	10%	-	36%	1,812
Mangawara	River management Soil conservation	4,200	64	64%	36%	-	43%	1,820
Totals/average		**69,262**	**1,395**	**77%**	**22%**	**1%**	**21%**	**13,133**

The following river and catchment management priorities and targets (Table 3) are in place for the Lower Waikato zone:

Table 3 Lower Waikato River and catchment works programme objectives and targets

Activity	Objectives / priorities	Targets
Catchment oversight	Complete zone plan in 2011	Audit NZ requirements as to asset planning are met. Implementation of zone plan Progressive improvement and development of the plan
Catchment maintenance	Ensure existing projects covered by Land Improvement Agreements are managed and maintained. Implement and annual inspection programme.	Follow up of the property inspections made in terms of maintenance works programmes. Works programmed where identified.
Catchment new works	Promote new catchment works in priority catchments being: Matahuru Awaroa Opuatia Mangatangi Mangapiko Waerenga Lake margins Undertake awareness raising and promotion of new works in these catchments	Complete works in priority catchments. Implement "Mangatangi Riparian Management Plan" (in conjunction with Watercare Services Ltd). Promote new works on 10 properties across the zone per annum. Promote margin fencing around unfenced river areas and peat lakes as agreed with property owners. Develop community awareness programmes and strategies
River management	Carry out routine river management activities in priority catchments being: Mangatangi Matahuru Mangatawhiri Waerenga Mangawara	Reduce risks of localised flooding in priority catchments through removal of willow congestion and blockages Provide long term environmental benefits through improved water quality, keeping stock out of streams and fencing and planting of streambanks to reduce stream bank erosion.
Flood protection	Maintain and manage all flood protection assets and schemes Implement main channel weed/animal pest programme	Waikato/Franklin districts Morrison Road main stopbank upgraded Provide 100 year plus freeboard protection main channel stopbank to Mercer west flood protection scheme Ensure level of service for flood protection assets maintained
Main channel	Main channel – vegetation replacement of groynes	Replacement of vegetation for training lines - Transit NZ works Te Toki Island Manage and maintain pest animals/plants main channel on Council scheme lands, private and non private land associated with flood protection and grazing license schemes. Ensure existing groynes are maintained per resource consent conditions (Transit NZ works and Council works)
Capital works	Complete capital works programme as agreed and included within Annual Plan Provide riverbank protection and increase performance of channel capacity. Provide through the stopbank upgrade 20 year level of protection	Complete stopbank upgrades for providing 20 year flood protection Meremere main pumpstation upgrade Complete new capital works Main channel – Training lines erosion protection - new training lines (tree groynes)

4 Managing the zone

4.1 How the system operates in the zone

The floodplain of the lower Waikato River in its natural state contained many wetlands and shallow lakes. These features had a major influence on the flood hydrology of the river, with substantial interchanges of flow between the river and the wetlands and lakes occurring. The two dominant flood storage features were the Whangamarino Wetland and Lake Waikare. When the lower Waikato River rose in flood, the flow in the Te Onetea Stream would reverse and overland flow would occur from the Waikato River in to Lake Waikare. When Lake Waikare rose as a result of this, the low peat ridge along its northern foreshore would overtop and water would spill in to the Whangamarino wetland. Similarly the Whangamarino River would reverse its flow when the river rose, with substantial volumes flowing from the river back in to the Whangamarino wetland. Because of the large volumes of storage available in both Lake Waikare and the Whangamarino wetland, these features had a large dampening effect on peak flows in the river. It did mean however that the river was in flood for very long periods of time as large volumes of stored water were held and released from these natural storage areas.

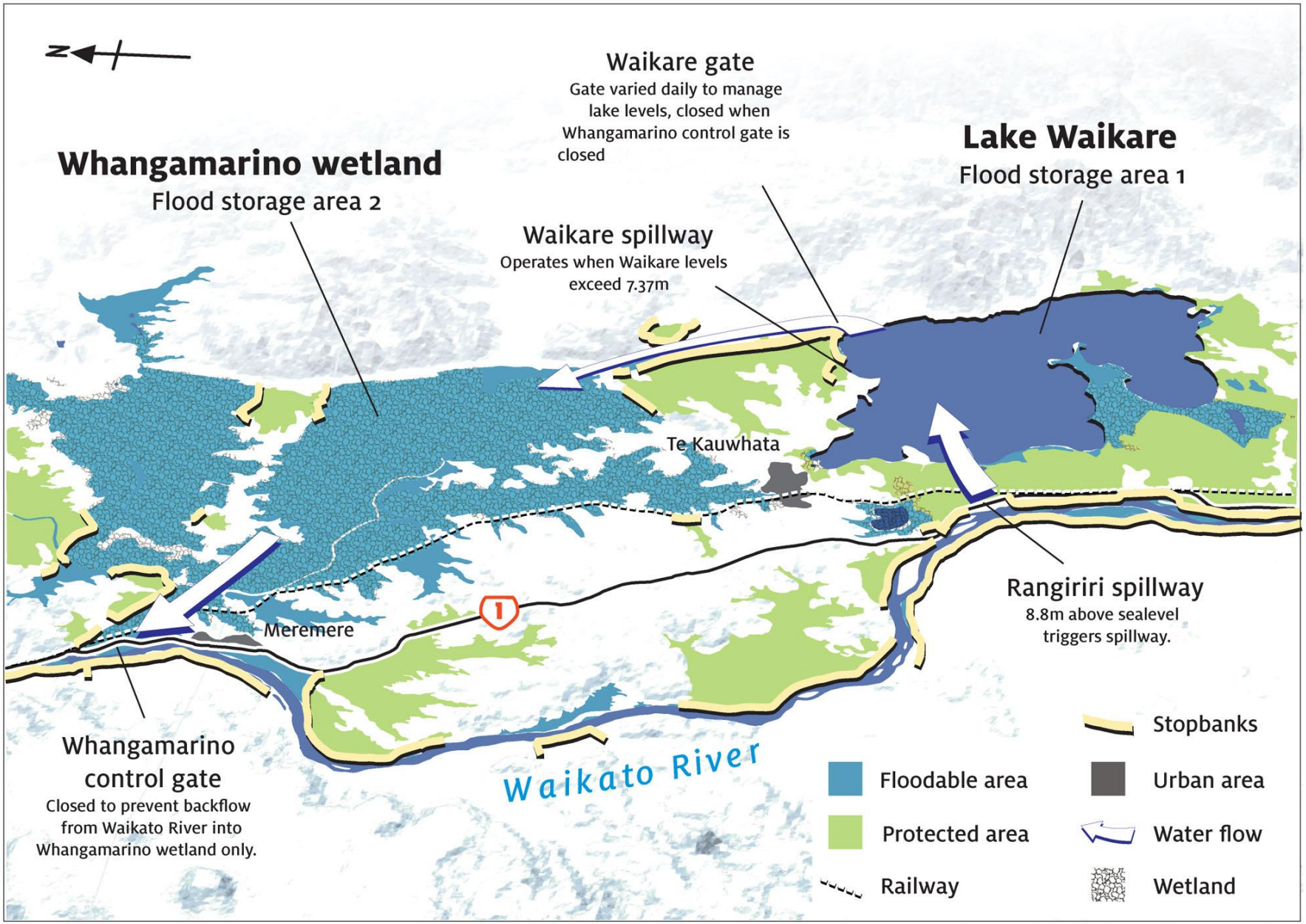
The design of the lower Waikato flood scheme was based on mimicking the natural processes within these two storage areas, but in a controlled fashion. The benefits of the storage areas in reducing peak flows were thus retained.

Firstly a new outlet was constructed from Lake Waikare to the Whangamarino wetland (the northern outlet canal) and a control gate was installed on the outlet to the lake to allow control of the lake. In addition a stopbank was constructed along the northern foreshore to prevent overflow from the lake. The canal and control gate allowed Lake Waikare to be permanently lowered, thus providing more flood storage within the lake. Also because of this lowering, the flow in the natural outlet to the lake, the Te Onetea stream was reversed under normal conditions, and a control gate was also installed on this stream. A raised spillway was constructed at Rangiriri to control the spilling of water from the Waikato River in to Lake Waikare. Lastly a control gate was installed on the outlet of the Whangamarino River to prevent backflows from the Waikato River in to the Whangamarino wetland during floods.

Figure 33 demonstrates how the system now operates; the sequence of events which normally occur during floods are as follows:

- When the Waikato River starts to backflow in to the Whangamarino wetland, the Whangamarino control gates are closed to prevent this. The Lake Waikare outlet gate is also normally closed, essentially isolating the two major storage areas. Flood runoff from the Whangamarino and Maramarua catchments is retained in the wetland storage area.
- If the Waikato River continues to rise, water will spill from the Waikato River over the Rangiriri spillway and then pass overland in to Lake Waikare. This occurs at around a 50 year flood event in the Waikato River. Because the Lake Waikare gate is closed, any water spilling from the Waikato River and any runoff from the lake's own catchment must be stored in the lake.
- When the flood starts to recede, and the Waikato River at the Whangamarino River drops to a level below the level of water impounded in the wetland, the Whangamarino gates are opened allowing water to drain from the wetland. At this time the Lake Waikare gate is opened to commence the release of water stored in Lake Waikare. This water drains to the Waikato River via the Whangamarino wetland.

Figure 3 Lower Waikato flood scheme



4.2 Overview of river and catchment management activities

Council's RCS management activities include physical works and services, and advice and information provided to landowners and the wider community. The aims of river and catchment management activities are to:

- Manage issues in a 'whole of catchment' basis.
- Manage hazards and effects associated with soil erosion and flooding.
- Reduce sediment entering waterways.
- Improve water quality.
- Improve river stability.
- Improve river environments by creating better habitats for a wider variety of plants and animals.
- Maintain and manage existing river and catchment assets.

In the Lower Waikato zone, river and catchment management activities include:

4.2.1 Catchment oversight

This involves the overall management and coordination of zone activities and programmes including implementation of the zone plan and development and implementation of the Main Channel River Management Strategy. Annual and forward programmes are considered by community representatives in the form of the zone catchment liaison subcommittee and reported to the wider community and the Council.

Catchment oversight also includes the maintenance of partnerships and relationships with key stakeholders across the zone. The objectives are to ensure the delivery of the zone programmes and activities as set out in the Annual Plan/Long Term Plan (LTP).

4.2.2 Information and advice

This activity enables response to enquiries and provision of advice and information on river and catchment management in each zone. It also includes monitoring programmes to assess the environmental changes resulting from the activities undertaken. The findings of the monitoring are reported to the community via the catchment liaison subcommittees and Council.

4.2.3 Catchment works programmes

Land throughout the Waikato region is susceptible to soil erosion. Services and programmes promoted by Council in relation to the stability and use of land include:

- Liaison with property owners as to land instability issues.
- Preparation of land protection plans.
- Management of existing protection schemes/assets.
- Promotion of retirement from grazing and conservation planting of erosion prone land.
- Protection of indigenous vegetation in upper catchment areas.
- Installation of structures to control sediment and water runoff.
- Condition and monitoring programmes.

Catchment new works may involve the design, supervision and completion of soil conservation, erosion control and other catchment management measures. Assets associated with these programmes are usually under the ownership of individual property owners. However, Council often has a role in their management due to the presence of registered agreements or covenants. All works on private land are subject to negotiation and agreement with the property owner.

Where existing catchment schemes are in place, programmes to maintain and manage these schemes are agreed with the owners. Community feedback indicates high value being placed on ensuring the existing protection measures are maintained to ensure that the benefits they provide continue into the future.

Catchment maintenance

Catchment maintenance contributes to the achievement of sustainable catchment management in the Waikato region. The purpose is to ensure that the scheme works continue to perform to the standards agreed with the community at the time of scheme adoption. The protection works in place contribute to the economic well being of the region and in many cases underpin the continued productive use of that land and the wider catchment

The works include the maintenance of conservation fencing, plantings and structures implemented under the catchment scheme. Maintenance works programmes are usually initiated by Council in partnership with individual property owners. Compliance with legal agreements between the property owner and Council (LIAs) is achieved through ground and aerial inspection on at least a 3 yearly inspection cycle.

During the period 1960-1980, soil conservation works were implemented on many properties within the area now covered by the Lower Waikato zone, under the guidance of the then WVA. These programmes were implemented using grants (of up to 75%) from central government (administered by the former National Water and Soil Authority (NWASCA) a division of the Ministry of Works and Development.

The erosion control measures promoted were largely based on maintaining the productive capability of land. Formal protection of these works was by way of Land Improvement Agreements (LIAs) a form of conservation covenant.

Central government grants for such soil conservation works ceased in 1988. Where applicable, the Project Watershed funding policy applied to the ongoing management and maintenance of these earlier works.

Over the period of the 08/09 and 09/10 financial years contractors were employed to assess the current condition of historic 'Soil and Water Conservation Plan' works in the Lower Waikato.

As a starting point, Council has prioritised inspections to those properties which have a LIAs registered on the property title; of which 30 to 40 properties fall into this category.

Catchment new works

New catchment works are promoted within the Lower Waikato zone. They are initiated to address cases of active or potential soil erosion and related land and catchment management issues. Works programmes may result from requests from property owners for assistance and subsequent agreement being reached. The works are also referred to as soil conservation works and may comprise the fencing of stock from erosion prone lands, the protection of indigenous vegetation on steep lands, the planting of conservation plant species and construction of erosion control structures.

The purpose is to promote the sustainable management of land and to address the problem of the deterioration of land through soil erosion. The activity promotes the soil conservation practices within the context of sustainable management of the land. Water quality and in-stream biodiversity benefit from sustainable land use practice. The catchment work promoted also contributes to integrated and sustainable catchment management.

New works will be undertaken in the following priority catchments in the 2010/11 financial year:

- Matahuru
- Mangatangi
- Opuatia and Awaroa.

4.2.4 Lakes management

There are 30 lakes in the Lower Waikato Zone – 14 riverine, nine peat, five dune, one artificial and one of unknown origin. The current condition of these lakes varies considerably and the majority are significantly degraded. However, many still retain important ecological, cultural, scientific and recreational values. In 2009 Council undertook an exercise scoring and ranking the lakes of the region based on their priority for biodiversity management. Table 4 represents the results of this work and lists the ranking of each lower Waikato lake both within the zone and within the region.

Table 4 The lakes of the Lower Waikato zone and priority for biodiversity management

Priority in zone	Regional priority	Lake name	District	Lake type	Lake area (ha)	Max depth (m)	Stock fully excluded?
1	16=	Lake Otamatearoa	Waikato (Franklin)	Dune	5	5.0	No
2	22	Lake Rotokawau/ Black Lake	Waikato	Peat	22	1.2	No
3	23	Lake Waahi	Waikato	Riverine	522	5.0	Yes
4	29	Lake Okowhao	Waikato	Riverine	12	2.2	Yes
5	31=	Lake Hotoananga	Waikato	Peat	19	3.5	No
6=	33=	Lake Penewaka	Waikato	Riverine	4	1.0	Yes
6=	33=	Lake Areare	Waikato	Peat	33	5.1	Yes
8	37	Lake Rotongaro	Waikato	Riverine	336	3.3	No
9	38	Lake Whangape	Waikato	Riverine	1450	3.5	No
10	39	Lake Waikare	Waikato	Riverine	3442	1.8	No
11		Parkinson's Lake	Waikato (Franklin)	Dune	1.9	6.0	Unknown
12	41=	Lake Kaituna/ Lake B	Waikato	Peat	12	1.3	Yes
13	47=	Lake Kainui/ Lake D	Waikato	Peat	24.9	6.7	Yes
14	50=	Lake Puketirini / Weavers Lake	Waikato	Artificial	54	80.0	Yes
15	57=	Lake Kopuera	Waikato	Riverine	52	1.5	No
16=	59=	Lake Pikopiko	Waikato	Peat	6.35	2.5	Yes
16=	59=	Lake Whakatangi/Lake A	Waikato	Peat	2.7		No
18=	63=	Lake Ohinewai	Waikato	Riverine	16	4.5	Yes
18=	63=	Lake Hakanoa	Waikato	Riverine	52	2.5	Yes
20	66	Lake Komakorau/ Lake C	Waikato	Peat	2.6	<1.0	Yes
21	68=	Lake Kimihia	Waikato	Riverine	58	1.0	No
22	70	LakeTunawhakaheke/ Lake E	Waikato	Peat	6.7	1.0	No
23	71	Lake Rotongaroiti	Waikato	Riverine	53	0.5	No
*dd		Lake Opuatia	Waikato	Riverine	c.7		Unknown
*dd		Lake Puketi	Waikato (Franklin)	Dune	6.42	7.0	Unknown
*dd		Lake Rotoiti/ Little Lake	Waikato (Franklin)	Dune	1.23	7.0	Unknown
*dd		Lake Rotokaraka	Waikato	Unknown			Unknown
*dd		Lake Te Kapa	Waikato	Riverine	c.1.0		Unknown
*dd		Lake Waiwhata	Waikato	Riverine	8.9		Unknown
*dd		Unnamed 3	Franklin	Dune	c.2.1		Unknown

**dd* - Lakes unable to be scored due to insufficient data

Investment to date

To date the zone based work around the lakes has focused on fencing and planting lake margins, including willow wands to reduce foreshore erosion; and the provision of information and advice. Table 5 represents the total cost expenditure on physical works around lakes in the zone for the past three years. There has been a focus on the larger riverine lakes to date with considerably less work on the peat and dune lakes.

Table 5 Expenditure on fencing and planting lake margins 2007-10

Financial year	Total cost of works	RCS contribution	Lakes
2007/08	$35,615.00	$12,465.00	Waikare, Kopuera, Whangape
2008/09	$89,790.00	$31,426.00	Waikare, Waahi, Whangape
2009/10	$30,873.00	$10,805.00	Waikare, Waahi, Whangape, Hotoananga

Within the wider council there has been ongoing work in the following areas:

- Monitoring lake water quality and health indicators.
- Construction of water level control structures on the outlet of peat lakes (Areare and Pikopiko).
- Contributions to construction of silt traps on the inlets of peat lakes (Kainui and Kaituna).
- Investment into research on aquatic weed and pest fish control, and nutrient removal from inflowing drains of peat lakes.

Council has also initiated the formation of the proposed Waikato District Freshwater Lakes and Wetlands Memorandum of Agreement (FLW MOA). This is a multi-agency group comprising representatives of Council, Waikato-Tainui, Department of Conservation, Waikato District Council and Auckland/Waikato Fish and Game Council. The stated purpose of this group is to recognise the values of the freshwater lakes and wetlands of the Waikato District, and to protect, enhance and restore these through alignment of our activities when working with communities, landowners, tangata whenua and interested parties.

Key issues affecting the lakes

There are a number of issues contributing to the condition of the lakes and impeding progress with restoration. Key areas are:

- Very poor water quality in the majority of lakes and prolonged de-vegetation of beds during which time sediments (and nutrients) are prone to re-suspension through wave action and physical disturbance.
- Drainage and hydrological modification (including reduced water levels and loss of wetlands).
- Upper catchment erosion.
- Continued stock access to lake margins, including those that are identified as Priority 1 stock exclusion water bodies in the Waikato Regional Plan.
- Presence of exotic fish species such as koi carp, catfish and rudd.
- Peat subsidence.
- Poor knowledge of the dune lakes and privately owned riverine lakes in the zone.

Future management

RCS is currently focused on several key projects. These include:

- The staged planting of the newly fenced margin of Lake Waahi.
- Working with the Department of Conservation to fence the margins of the Horsham Downs peat lakes.
- Ongoing fencing of the margins of the riverine lakes in conjunction with landowners and other stakeholders.
- Completion of the Waikato regional shallow lakes management plan.
- Working with partners in Waikato District FLW MOA to establish an action plan for lake management based on jointly agreed priorities.
- Design and construction of water level control structures on Lakes Tunawhakaheke, Whakatangi, and Hotoananga.

Upcoming priorities and issues facing the zone include the co-management of lakes and associated wetlands with Waikato-Tainui and the funding implications of policy changes that result from this; and moving from riparian enhancement of lake margins to a whole of catchment management approach.

Current funding opportunities for work relating to lakes include catchment new works, RCS shallow lakes management (approximately $70,000 per annum for the approximately 70 shallow lakes in the region), and Significant Natural Area (SNA) funding. It is anticipated that these internal funding sources will be utilised to leverage additional external funding for protection and enhancement of the Lower Waikato lakes. RCS staff will also seek to collaborate with other stakeholders in carrying out these projects.

4.2.5 River management

River management addresses issues such as instability of river and stream banks and beds, congestion of waterways and management of land adjacent to the river or stream. The purpose is to stabilize river and stream beds and banks and address the adverse effects created by peak flood flows within rivers and streams.

Typical river management works include:

- Controlling bank erosion (by planting and fencing off river banks, construction of rock or other bank revetment works or construction of groynes).
- River training works (ensuring the flow paths of rivers are stable and optimum channel widths are maintained).
- Removing blockages and obstructions
- Gravel and sand management.

River management achieves:

- Sustainable, stable and healthy rivers.
- Integrated catchment management.
- Management of flood waters.
- Enhancement of the environmental values of river systems.
- Liaison and integration with other Council activities and programmes.

4.2.6 Flood protection

Flood protection involves:

- Management of flood risks and hazards associated with rivers.
- Specific protection works as agreed with communities.

Council is responsible for the maintenance of a number of major flood schemes throughout the Waikato region.

The Lower Waikato scheme is a comprehensive flood protection and river control scheme providing significant benefits in terms of protection of low lying farm land and urban settlements against flooding, as well as providing drainage improvements. The scheme includes the main channel of the Waikato River and its tributaries, and physical assets such as stopbanks, pump stations and floodgates as well as spillways and designated flood storage lakes and wetland.

Existing flood protection works need to be maintained in order to continue to provide community protection to the agreed standards.

In the Lower Waikato zone, the main expenditure area and programme is broken down into sub-programmes, with some areas managed in conjunction with district councils.

- FP general
- Main channel
- Aka Aka
- Mangawara
- Community works
- WRC schemes
- WDC
- FDC.

The purpose is to achieve more integrated management of the Lower Waikato River system and catchments to ensure the stability of the system and consistency and cost effectiveness of service delivery across the zone.

The main channel works cover the Waikato River main channel from Ngaruawahia to Port Waikato. The efficiency of the channel is influenced by debris blockages and sedimentation of the bed. The capital and maintenance works programmes aim to maintain the capacity and stability of the main channel.

Figure 4 shows the location of the flood compartments and key assets within the zone. Figure 5 shows the Lower Waikato LIDAR information indication zone heights above seal level.

Figure 4 River and Catchment Services zone flood protection

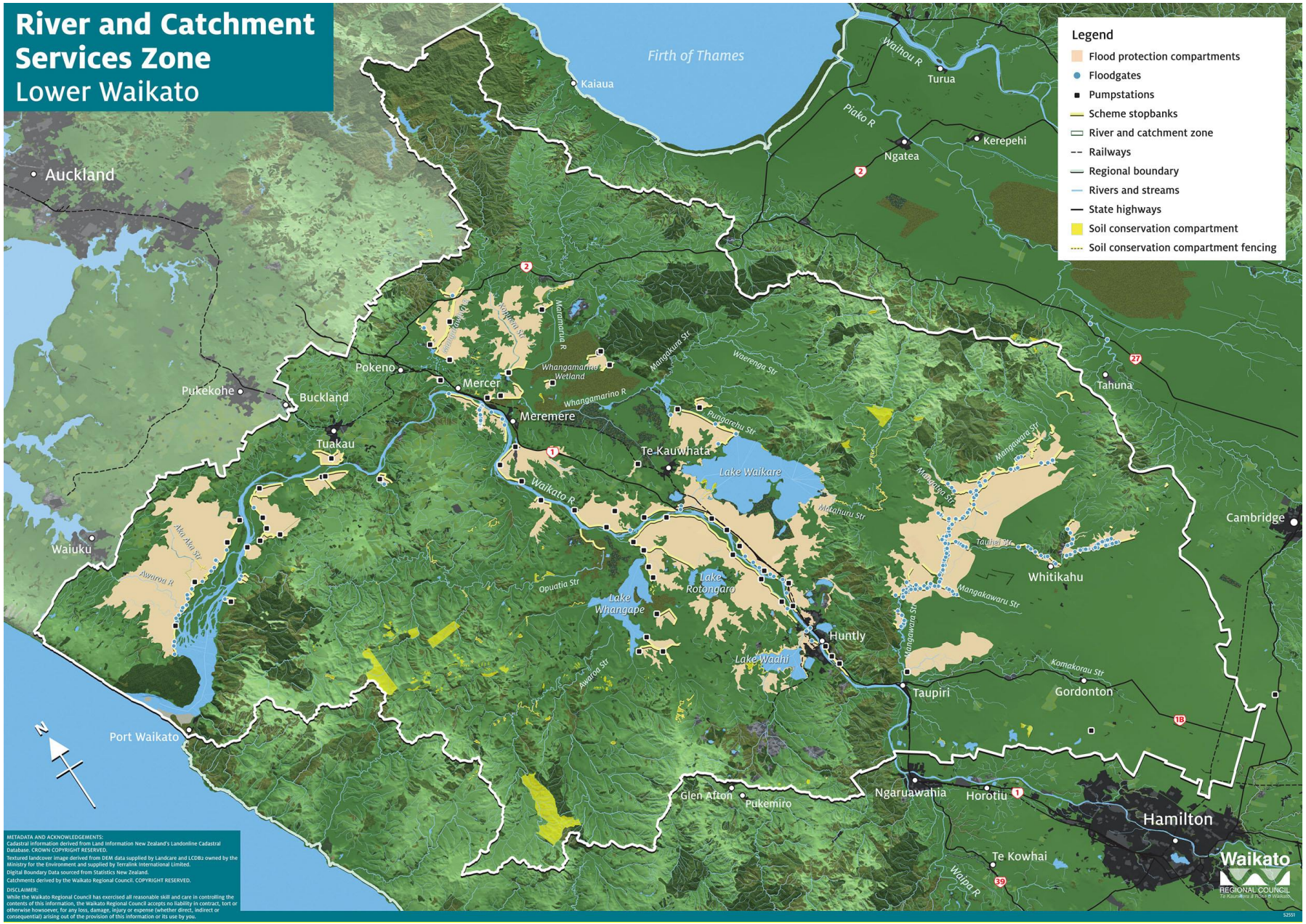
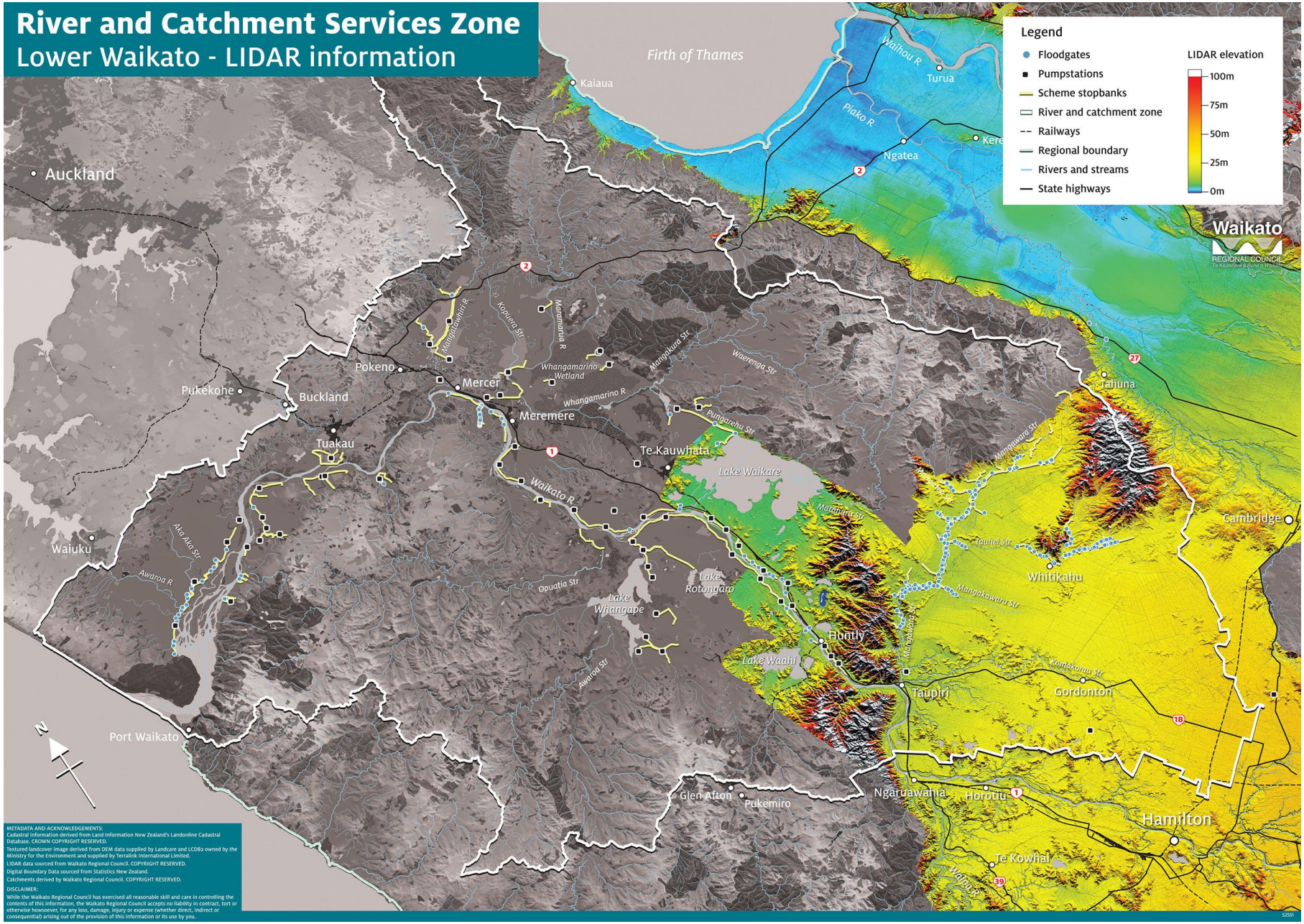


Figure 5 Lower Waikato zone LIDAR information



4.2.7 Related activities

Land drainage

Land drainage is not covered in this zone plan as the intention (as at September 2010) is to develop separate plans for this activity. However, land drainage is closely linked with river and catchment management and cannot be considered in isolation. The following is provided in order to briefly demonstrate where land drainage fits into the overall management of the zone.

Council is presently responsible for the maintenance of nine land drainage areas within the region. Territorial authorities are responsible for all other land drainage issues, which includes those other drainage areas that exist within the region. Typical activities include:

- Spraying
- Desilting
- Erosion control
- Removal of blockages

Activities are aimed at ensuring efficient and stable drainage systems, to effectively maintain optimum groundwater levels and drain surface runoff. In this way, the productivity of land is maximised.

Where land drainage discharges to the river systems through flood protection assets such as stopbanks, floodgates and pumps, a close working relationship is needed between the agencies involved. Council maintains such a relationship with each of the district councils as much of their drainage relies on the river system works to be effective and some day to day roles are shared between the agencies.

Emerging practices

In order for Council to manage the zone in an integrated manner other management practices are needed including:

- Establishing relationships with other Council functions including policy development and implementation, hazard management, resource use and resource information.
- Establishing and maintaining awareness of other influences within the zone including activities of utility providers, developers and territorial authorities or government agencies.
- Establishing a culture that ensures strategic thinking and planning of zone activities.
- Identification of linkages and impacts of other community or agency based groups within the zone.

4.3 Whole of catchment management

4.3.1 Background

Prior to the formation of the Waikato Regional Council in 1989, both catchment authorities in the Waikato region (Hauraki Catchment Board and Waikato Catchment Board/Waikato Valley Authority) actively promoted catchment based planning and work programmes. This resulted in a number of comprehensive catchment schemes based on major catchments and sub catchments including the Lower Waikato Waipa Control Scheme, Lake Taupo Catchment Scheme, Paeroa Range Scheme, Waihou Valley and Piako River schemes.

This catchment based approach was further progressed by the Council since 1989. While these earlier programmes were promoted over entire catchments they were largely limited in their focus being either river and flood protection or soil conservation based or a mix of both.

4.3.2 What is whole of catchment management?

In recent years, there has been increasing recognition of the range of issues which need to be connected in order to improve river and catchment management. The following matters have increasingly been recognised:

- Catchment processes are strongly interlinked.
- There may be effects of specific catchment activities upon other activities and values. For example, river and catchment works programmes may impact on cultural, recreational and environmental values.
- Traditional approaches to river and catchment management did not always recognise the inter-relatedness of the environment's components. In fact, problems may be created by managing resources in isolation from others.
- Catchments as a whole provide a useful and functional unit for managing natural resources in a holistic way. A catchment area is bounded by natural features from which runoff drains to a common lower point (river, wetland, sea). Areas within that catchment are 'linked' by the flow of water downstream. Linked processes include downstream transport of water, sediments, nutrients and contaminants from the upper catchment. Water quality and quantity throughout the catchment are influenced by management practices elsewhere in the catchment. Land use practices and

vegetative cover influence run off characteristics and patterns in lower catchment areas. This may have significant effects on the management of flood protection and river management measures in lower catchment reaches.

- Whole of catchment management seeks to ensure that natural resources are managed in a sustainable and equitable way. The transition from the traditional approach to the integrated, whole of catchment approach can often be challenging due to diverse and incompatible interests, activities and demands upon resources. A key is to achieve engagement and participation from across all key stakeholder groups.

Council progressed the 'whole of catchment' approach with the introduction of Project Watershed in 2002 and the Peninsula Project in 2003. These projects provide integrated management and funding across the Waikato River Catchment and Coromandel Peninsula respectively.

Further progress made since 2003 resulting from changes to legislation and community demand have prompted broader consideration of a range of catchment activities (including biodiversity, biosecurity, natural hazards and planning) and a broader values base (cultural, environmental, economic and social). This zone plan seeks to identify where stronger linkages are needed in the future.

4.3.3 Principles

The ***whole of catchment management principles*** that Council will consider in undertaking river and catchment management programmes will include[13]:

- A catchment vision is needed. There should be clearly defined goals, objectives, policies and strategies.
- There is a need to monitor the effectiveness of catchment management by measuring against identified values and goals.
- There is a need to take a holistic approach to catchment management. This is especially sought by iwi and can be expected to be increasingly applied through Treaty settlements and co-management arrangements.
- There is a need to plan and manage land and water at a catchment scale. We need to be aware of the whole not just a segment of the catchment when making decisions within catchments.
- Planning and management need to keep pace with land and water quality decline.
- Consideration is needed as to how limits and standards applied to water quality also be applied to land based activities (requiring RCS to be increasingly liaising with regulatory managers).
- Catchment management and planning need to be supported by sound up to date science. The community needs to have confidence in the science. The science needs to be easily understood and simply portrayed.
- Trends occurring within the catchment should be monitored.
- Community engagement needs to include all stakeholders. All key users/interests should be engaged in catchment planning. The team approach should be fostered.
- Better approaches are needed in balancing diverse values in catchment planning.
- Engagement of stakeholders needs continuity and planning. Long planning processes often do not lead to engagement; neither do tight timeframes encourage participation.
- Regular and continuous communication is needed with stakeholders during planning and implementation.
- There is a need to build flexibility into catchment plans and processes in order to respond to new pressures and developments and to achieve objectives.
- Catchment plans should provide an accountability tool for the performance of the catchment managers.
- There is a need to ensure that the costs of catchment management are equitably spread through robust and defendable funding and rating systems.

4.3.4 Relationship to integrated catchment management

Increasingly, Council's standard operating practice has been to identify how the range of issues associated with catchment management might be considered in a holistic way. This includes identifying the linkages between the following which is often referred to as Integrated Catchment Management (ICM):

- Treaty settlements and iwi visions and strategy.

[13] Adapted from 'Council Update Newsletter' Volume 1 July 2010 – Landcare Research.

- River and Stream management.
- Flood protection.
- Land management / Soil erosion / soil conservation.
- Land use change.
- Climate change.
- Asset management.
- Natural hazards.
- Emergency management.
- Risk management.
- Biosecurity.
- Biodiversity and ecological enhancement.
- Water quality and quantity.
- Sustainable agriculture.
- Nutrient management.
- Growth and development.
- Infrastructural development (transportation networks, electricity generation).
- Regional and district planning.

It is expected that the incorporation of the above into river and catchment planning processes including zone plans, will be progressively applied over time.

4.3.5 What this means for the Lower Waikato zone

For the Lower Waikato zone, the whole of catchment approach means that consideration is needed of both the catchments within the zone as well as the upper reaches of the Waikato River catchment (that is, outside the zone) and the way in which these impact upon the zone.

The ZMP has identified the key zone subcatchments and the following matters will be considered within those catchments:

- Soil erosion and sedimentation.
- Riparian, river and channel management.
- Existing land protection measures.
- Water quality and quantity (including receiving waters – wetlands, lakes).
- Plant and animal pests.
- Natural hazards and risks.
- Policy and planning (urban growth, transportation, infrastructure)
- Biodiversity
- Treaty settlements, co-management
- Land use and development.

In regard to the upper Waikato River catchment upstream of the zone, the impacts and considerations include:

- Land use change and future forecasts of land conversion and intensification particularly within the Lake Taupo, Upper Waikato, Waipa and Central Waikato zones. This is particularly pertinent in the Upper Waikato zone; where over the period 2004 – 2008 extensive areas of land was converted from pine plantations to pasture. This trend has since slowed and is not occurring to a significant extent since late 2008. However, large areas of land earlier identified for conversion has not been developed as at this time. Conversions have potential effects on the Lower Waikato zone by increasing water quantity (increasing flood levels) and decreasing water quality (by adding additional nutrient loads to the Waikato River).
- Impacts of future Treaty settlements within all Waikato River catchment zones.
- Climate change, which may lead to increased rainfall impacts and flood levels.
- Future governance and infrastructural arrangements.
- Flood management – particularly the operation of the Waikato River hydro system during flood events, when there is a need to balance conflicting interests between:
  - water levels in Lake Taupo (minimising lakeshore erosion)
  - ensuring the safe operation of hydro dams on the Waikato River.
- River and catchment work programmes in other zones particularly soil conservation works, which may have benefits to flood flows and lead to an improvement in water quality (nutrient and sediment reduction).

4.4 Issues and trends of significance to the zone

A number of regionally significant issues and trends have been identified for river and catchment management activities[14] including:

- Water levels in the Lower Waikato zone (minimising flood risks).
- Climate change.

[14] Refer to "*River and catchment management in the Waikato region*" document.

- Growth.
- Treaty of Waitangi settlements.
- Land use change.
- Potential local government restructuring.
- Infrastructure development and management.
- Regional environmental issues.

Table 6 provides a summary of the key issues considered relevant to the Lower Waikato zone, the implications of these issues for river and catchment management and response that may be appropriate.

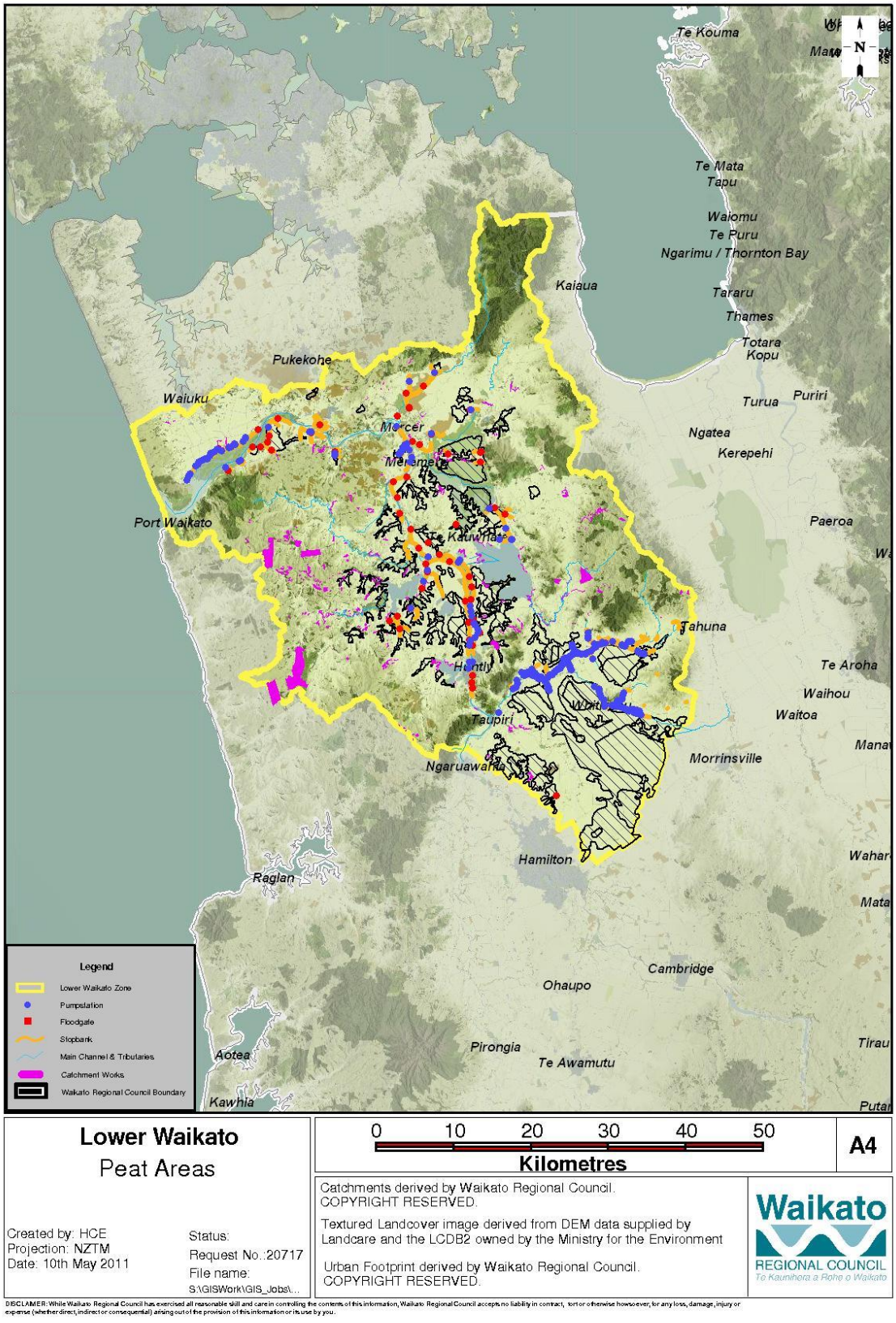
Table 6 Lower Waikato zone issues and trends

Issue	Description of issue	Implications	Strategy to address key issues
Climate change (CC)	Sea level rise Increased rainfall Drought Economic effects	Higher water tables Scheme design/Levels of service Flooding Reduced ability to pay	CC forecasts included in scheme design Monitoring Liaison with national agencies
Growth	Auckland growth influence Regional growth Urban development	Increased community expectations Pressures upon scheme assets resulting from encroachment/development Pressures on local stormwater disposal, water supply, recreational use of river margins etc.	Involvement in planning and policy development Liaison, networking and relationship building
Treaty settlements	Clarity and understanding needed as to future directions and implications arising from settlements	Need to manage expectations Technical and expert capacity Understanding roles and responsibilities Operational relationships Partnering strategies developed Settlements within the zone (and adjacent zones) may impact on Council 's role and responsibilities	Liaison with iwi authorities and implementation of co-management arrangements. Alignment of strategies may be required to fit tribal rather catchment boundaries Relationships developed Development of Joint Management Agreement Development of co-management agreement regarding flood control, scheme land Involvement in development of Integrated River Plan.
Land use change	Conversion of forest lands in upper catchment Change of land use, intensification of use	Increased run off, flooding Sedimentation and erosion Decline in water quality	Sustainable land management practices promoted in upper catchments (within and outside Lower Waikato zone)
Local government re-organisation	Future re-organisation of local government	Changes to governance, management and/or funding arrangements	Monitoring of potential changes
Transportation networks	Ongoing development	Potential impacts upon river and catchment management and asset management	Liaison with planning (local authorities) and transport agencies (road and rail)
Natural hazards	Flooding Volcanic eruption Earthquakes	Flooding risks Overtopping stopbanks, greater than 100 year event Animal welfare, safety issues Stability of flood protection structures	Management of flood risks Raise community awareness as to emergency procedure, response
Water quality and quantity	Decline in water quality	Impacts on land use opportunities, recreational use, cultural values	Promotion of 'whole of catchment' management

Issue	Description of issue	Implications	Strategy to address key issues
	Reduced water quantity, availability		Partnerships/liaison with other organisations and agencies (iwi, local authorities) Future investigation/support for water harvesting strategies
Soil erosion	Erosion in upper catchments, stream bank erosion and sedimentation	Scheme efficiency Loss of natural resource Reduced land use options	Promotion of soil conservation programmes and sustainable land use practices
Peat settlement (see map in Figure 6)	Oxidation of peat soils as a result of land development, use and drainage	Changes to ground and water levels impacting drainage efficiency and land management	Investigation of issues with subsequent report and recommendations
Biodiversity/ ecological effects	Ecological effects resulting from development and scheme operation – including those within specific catchments, riparian margins, wetlands and lakes	Loss of habitat and other ecological opportunities Loss of cultural values Loss of recreational opportunity	Recognition of the biodiversity and ecological component of river and catchment, lake and wetland protection programmes Appropriate mitigation measures applied
Community awareness	Decline over time in the level of understanding by the community of the presence, value and benefits of scheme protection	Loss of engagement with community Decline in support for river and catchment programmes Objection to the payment of rates	Community education, promotion and engagement Regular community targeted information / publicity
Community expectations	Increasing community demands as to services to be provided	Increased funding requirements Pressures upon existing assets and scheme management	Community engagement processes in place Full evaluation and consideration of financial and management implications of increased (or changed) levels of service
River channel management	Issues associated with channel management, debris management, sand mining.	Congested river channels Aggradation of river bed Loss of financial contributions for sand mining	Management programmes and strategies in place
Infrastructure change	Changes to the roles and responsibilities of external infrastructure managers	Increased requirements upon Council in form of increased costs or transfer of responsibilities	Liaison with other agencies
Sites of significance	Need to identify and protection local sites of significance.	Loss of sites through work programmes Failure to protection and enhance known sites	Liaise and partnerships with other agencies.
Land Improvement Agreements	Need to maintain profile of these agreements and ensure are resourced	Deterioration in works/assets due to inadequate maintenance and lack of landowner commitment	Management strategy in place and implemented by Land Management Officers
Zone governance and integration	Need for alignment between various management committees, including land drainage and catchment subcommittees	Misalignment, inefficiency, increased costs	Prepare future management strategy with view to rationalisation of present governance arrangements
Pest management	Threat to scheme plantings from `possums and threat to waterways from alligator weed and koi carp.	Damage to scheme plantings, erosion of river and stream banks.	Increased possum control measures, ongoing control of alligator weed via spray programmes.

Peat is an issue identified above that requires ongoing management within the zone Figure 6 shows the location of peat areas within the zone (hatched areas).

Figure 6 Lower Waikato zone peat areas



4.5 Legislative and policy requirements

Council has responsibilities for river and catchment management under various statutes the most important of which are:

- Local Government Act 2002.
- Local Government (Rating) Act 2002.
- Resource Management Act 1991 (RMA).
- Resource Management (Energy and Climate Change) Amendment Act 2004.
- Soil Conservation and Rivers Control Act 1941.
- Civil Defence Emergency Management Act 2002.

An overview of the requirements under each Act are given within the overview document "River and Catchment Services - Waikato Region".

There are three key requirements for asset management planning under the Local Government Act 2002, being:

1. Compliance with Schedule 10 requirements.
2. Compliance with the Office of the Auditor General criteria for assessing the level of asset management.
3. LGA 2002 Significance Policy.

Details of these requirements are outlined below.

4.5.1 Compliance with LGA 2002 Schedule 10 requirements

The Local Government Act 2002 (LGA 2002) has prescribed that levels of service (LoS) must in future be developed from a community perspective. This is a fundamental change in the traditional approach.

Historically, levels of service have been expressed in a technical way that describes what Council has expected from its internal or external service providers (e.g. contractors). These need to be presented to the community in a clear, informed way as 'customer levels of service', and consultation used to obtain the 'community perspective'.

Specifically the LGA 2002 requirements for planning; decision-making, consultation and accountability which is inclusive of Council 's LoS and asset management planning;

- The LGA 2002 requires local authorities to consult their communities about funding and financial policies. It also requires consultation on the types and levels of services councils propose and how they will be paid for, and requires councils to explain to their communities the relationship between costs and levels of service provision.

- When a local authority undertakes public consultation, it must do so in accordance with the principles of consultation set out in Part 6, section 82. In brief, these principles require councils to:
  - Provide easy-to-understand summaries of proposals and plans.
  - Identify who will be affected by decisions and encourage them to make their views known to the council - councils also must give reasons for their decisions.
  - Find out what all the practical options are for dealing with issues and carefully assess them.

Council's service delivery activities must meet the requirements of Schedule 10 of the Local Government Act 2002; Appendix 1a sets out a list of the Schedule 10 requirements, including significant negative effects, and includes references to the section in this document where these requirements are addressed.

4.5.2 Office of the Auditor General criteria for asset management

The office of the Auditor General (OAG) has established a set of criteria for assessing conformity to "Core" and "Advanced" levels of asset management (NAMS, 2006). The "Core" asset management planning criteria is recognised as a minimum standard for compliance with activity provisions in the Local Government Act 2002. The advanced criteria describe OAG expectations for the management of complex and high value infrastructure with high associated risks.

The assessed compliance of the provisions in this plan with the OAG "Core" and "Advanced" criteria is set out in Appendix 1b. Council currently achieves "Core" requirements plus steps towards achieving "Intermediate" criteria. Appendix 3 also sets out the steps needed to address the current gaps between existing practice and "Advanced" management planning. With adhering to the OAG criteria the ZMP takes a wider catchment view than the traditional Asset Management Plan (AMP), in doing so asset management is embedded in the newly formed ZMP document. Where gaps between the current and desired plan exist, these gaps will be identified and addressed as the ZMP moves from core to intermediate to an advanced level plan.

4.5.3 LGA 2002 Significance Policy

Section 90 of the Local Government Act 2002 requires each Council to adopt a policy on significance, which:

- Sets out that Council's general approach to determining the significance of proposals and decisions in relation to issues, assets or other matters.
- Sets out any thresholds, criteria, or procedures that are to be used by the Council in assessing the extent to which issues, proposals, decisions or other matters are significant.
- Lists the assets considered by the local authority to be strategic assets.

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

Council has determined the RCS assets to be strategic in nature.

Any decision to transfer ownership or control of a strategic asset or a decision to construct, replace or abandon a strategic asset cannot be made unless it has first been included in the LTP (and in a statement of proposal relating to the LTP).

All such actions relating to a strategic asset are automatically significant and must meet the requirements relating to significant decisions with the LGA, specifically Part 6, section 90.

4.5.4 Statutory documents

Council must fulfil its statutory requirements under the following statutory documents.

Long Term Plan (LTP)

The LTP 2012-2022 sets out a number of priorities for the region of direct relevance to river and catchment management. These priorities are:

- Financial stability.
- Sustainable agriculture.
- Climate change.
- Co-management of the Waikato River.

The LTP sets out four Groups of Activities. River and catchment services fall within the 'Safe and Resilient Communities' group which includes the sub activities of 'Catchment Management', 'Resilient Development' and 'Community Safety'. Community outcomes identified in relation to these services include:

- Land management practices that protect and sustain soil and land.
- Encourage planning and practices that protect and sustain productive resources.
- Hazards identified and managed.

Regional Policy Statement (RPS)

The RPS sets the direction for the Council in terms of promoting sustainable development and managing the regions natural resources. It provides an overview of the resource management issues in the region with policies and methods to achieve integrated management.

In terms of river and catchment services, the key polices of the operative RPS are:

- Reducing the effects of accelerated erosion and avoiding these effects where possible.
- Avoiding the discharge of contaminants onto land that may adversely affect the condition of the soil.
- Protecting productive soils through moisture management.
- Reduction in the adverse effects of river and lake bed instability on a catchment basis.
- Managing extractions, structures, water level fluctuations and surface water activities.
- Improvement of water quality through riparian management.
- Protecting significant flow regimes and modifying flow regimes where necessary.
- Protecting the mauri of water by minimising contaminants.

The Proposed RPS (notified for submissions on 3 November 2010) also needs to be recognised although until it becomes operative the PWRPS carries less weight than the WRPS under the Resource Management Act. However, it does reflect Waikato Regional Council direction and, to a large extent, that of territorial authorities and iwi on significant resource management issues for the Waikato regional for the next 10 years.

Waikato Regional Plan (WRP)

The Waikato Regional Plan contains policies and rules that enable the Council to meet its resource management objectives. The regional plan must be in accordance with the RPS and therefore contains similar policies.

The plan contains modules covering Matters of Significance to Maori, Water, River and Lake Beds, Land and Soil, Air, and Geothermal

Resources. Those of particular relevance to river and catchment management are Water, River and Lake Beds and Land and Soil. Matters of Significance to Maori are also important.

The objectives identified in the relevant chapters of the WRP that have implications for river and catchment management include those relating to preserving the natural character of lakes, rivers and their margins, controlling the damming or diverting of water, erecting and maintaining structures in water bodies, disturbing the beds of lakes and rivers and managing erosion.

The rules within the WRP can also assist in the effective delivery of river and catchment services. These works and services need to be aligned with regional policy in order to apply rules to reduce soil erosion and avoid discharges of contaminants to watercourses. The rules may also permit activities that help to provide flood protection services and manage emergencies.

District plans

Council must also comply with any relevant rules in district plans for each local authority when delivering their services. Applications may be required for resource consents for structures, earthworks or other activities.

4.5.5 Bylaws

Council has the power to make bylaws under Section 145 of the Local Government Act. Bylaws are rules or regulations made by the Council to protect the public from nuisance, protect, promote and maintain public health and safety and to minimise the potential for offensive behaviour in public places. The majority of river and catchment services are governed by legislation, as set out in the previous section. However, the Navigation Safety bylaw and relevant district bylaws have implications for these services.

Bylaws protect river and catchment management assets by restricting people from damaging structures or accidentally or deliberately blocking drainage channels, indirectly assisting Council in the efficient delivery of river and catchment services.

4.5.6 Consents

An important requirement of the Resource Management Act 1991 is the duty upon Council as a service provider to avoid, remedy and mitigate the adverse effects of its activities on the environment. This duty applies to all works and services, including river and catchment activities. In order to fulfil these obligations, Council obtains resource consents for certain works and services activities as required under regional and district plans.

A table showing the resource consents that are currently held by Council in relation to river and catchment management activities in the Lower Waikato zone is shown in Appendix 1c. Resource consents stipulate a number of conditions, particularly those relating to monitoring and often the consent holder is required to report on compliance with those conditions.

4.5.7 Standards and guidelines

In addition to the legislative requirements, there are also a number of standards and guidelines that impact on how river and catchment services are delivered in the zone. Some of these standards are already used as part of the existing service delivery, while others provide a benchmark for future service delivery in the Council. These standards and guidelines are set out in Appendix 1d.

4.6 Key stakeholders

The key external stakeholders with an interest in river and catchment management activities in the Lower Waikato zone are as follows.

4.6.1 Central Government

There is a need to ensure that delivery of zone related works is consistent with central government legislation and policy. Changes in Government policy such as climate change, should be incorporated into the decision making process to ensure future proofing of flood protection schemes and related programmes.

The Lower Waikato zone programme works closely with government departments including the Ministry of Fisheries and Ministry for the Environment.

Ministry of Fisheries

The Waikato River catchment supports important customary, recreational and commercial freshwater fisheries. The primary role of the Ministry of Fisheries (MFish) is to ensure that fisheries resources are used in a sustainable way while maintaining aquatic ecosystem health. This is achieved through education, research and enforcement. Managing fisheries resources includes managing activities related to (i) customary, recreational or commercial purposes including land-based aquaculture; (ii) special permits; and (iii) aquatic transfers.

The Fisheries Act 1996 provides the framework for managing aquatic life which includes any species of plant or animal life that inhabits water in any stage of its life history. The purpose of the Act is to provide for the utilisation of fisheries resources while ensuring sustainability. MFish does not directly

manage sports fish, whitebait or unwanted organisms.

The signing of the Waikato Tainui Treaty Settlement will bring about changes to the management of fisheries. Waikato Tainui and the Crown will work to develop fisheries regulations (`Waikato River Regulations') that will apply to the Waikato River and its catchments. The Waikato River Regulations will prevail over commercial, amateur, and customary regulations as appropriate.

Roles and responsibilities of MFish within the Waikato catchment are:

- Number of MFish commissioned research activities focused on the Waikato catchment, including:
  - the monitoring of eel fisheries.
  - activities aimed at increasing and improving fishers' knowledge of the legislation.
- Development of fisheries plans to facilitate input and participation in fisheries management by tangata whenua and stakeholders.

A general Freshwater Fisheries Plan and separate Eel Fisheries Plan will be developed over the next few years. The Freshwater Fisheries Plan will cover a range of species found in the Waikato including galaxiids, koi carp, bullies *(Gobiomorphus spp.),* lamprey *(Geotria australis),* smelt, koura or freshwater crayfish *(Paranehrops plani/rons),* kakahi/kaeo or freshwater mussel *(Echyridella menziesi),* and watercress *(Nasturtium officinale).* Managing fisheries resources includes managing activities related to (i) customary, recreational or commercial purposes including land-based aquaculture; (ii) special permits; and (iii) aquatic transfers.

Ministry for the Environment (MfE)
The Ministry is the Government's principal adviser on the environment in New Zealand and on international matters that affect the environment.

As the Ministry for the Environment is not involved in day-to-day environmental management, MfE focuses on providing:

- Environmental management systems, including laws, regulations and national environmental standards.
- National direction through national policy statements and strategies.
- Guidance and training on best practice.
- Information about the health of the environment.

The outcomes MfE are working towards are that:

- New Zealand's air, water, land and built communities are healthy.
- New Zealand is able to capitalise on its natural environmental advantages.
- New Zealand's natural resources are managed effectively and New Zealanders use resources sustainably.
- Risks to people, the economy and the environment from pollution, contamination and other environmental hazards are minimised.

MfE also own some land in the zone. Much of this land was purchased at the direction and on behalf of the earlier catchment authorities. Some of this land is currently administered by the Council as part of the LWWCCS flood control scheme. It consists of a mixture of floodway; stopbank retired areas and planted river and stream margins. Some of this land is to be transferred to Council and Waikato Tainui.

4.6.2 The community — direct or indirect beneficiaries

There are approximately 16,000 ratepayers in the Lower Waikato zone. Council must work closely with the community, providing opportunity for involvement in local decision making processes.

The information gathered from local communities assists Council in developing a range of planning and decision making tools and in ensuring the community is engaged in decision making. The catchment liaison subcommittee has an important role in this process.

4.6.3 Catchment liaison subcommittee

Council has an adopted Terms of Reference in place for all subcommittees. Appointments are made on a three yearly cycle following the council's triennial elections. Subcommittee membership includes Council constituent councillors, district councillors, and representatives from iwi, hydro power companies. Department of Conservation, forestry, community groups and property owners.

The primary purposes of the catchment liaison subcommittees are:

- To provide advice to Council on river and catchment related activities, in particular.
- To provide input and feedback in relation to Council programmes and activities.

- To assist with the exchange of information between Council and the community.

4.6.4 Tangata whenua

As set out elsewhere in this document, the relationship between Council and iwi is an important one and is expected to develop and change as part of co-management.

Council will continue to work with local Iwi to ensure the traditional role of iwi and hapu as kaitiaki is respected and reflected in the implementation of work programmes. Council will work to give effect to the vision and strategy for the Waikato River, implementing co-management through works on the ground, co-management of flood control scheme land and input to the Integrated River Plan. There is also a close association with local iwi in terms of representation on decision making forums, such as the Lower Waikato Liaison Subcommittee, relationship development and capacity building through association with river and catchment works, resource consent processes and policy integration in implementation.

4.6.5 Landowners with Land Improvement Agreements

Earlier soil conservation works were subject to agreements entered into by the property owner and the WVA. These agreements place obligations upon both parties in relation to the ongoing management and maintenance of the works in place. The agreements are in place in perpetuity (999 years) or 99 years unless altered by mutual agreement.

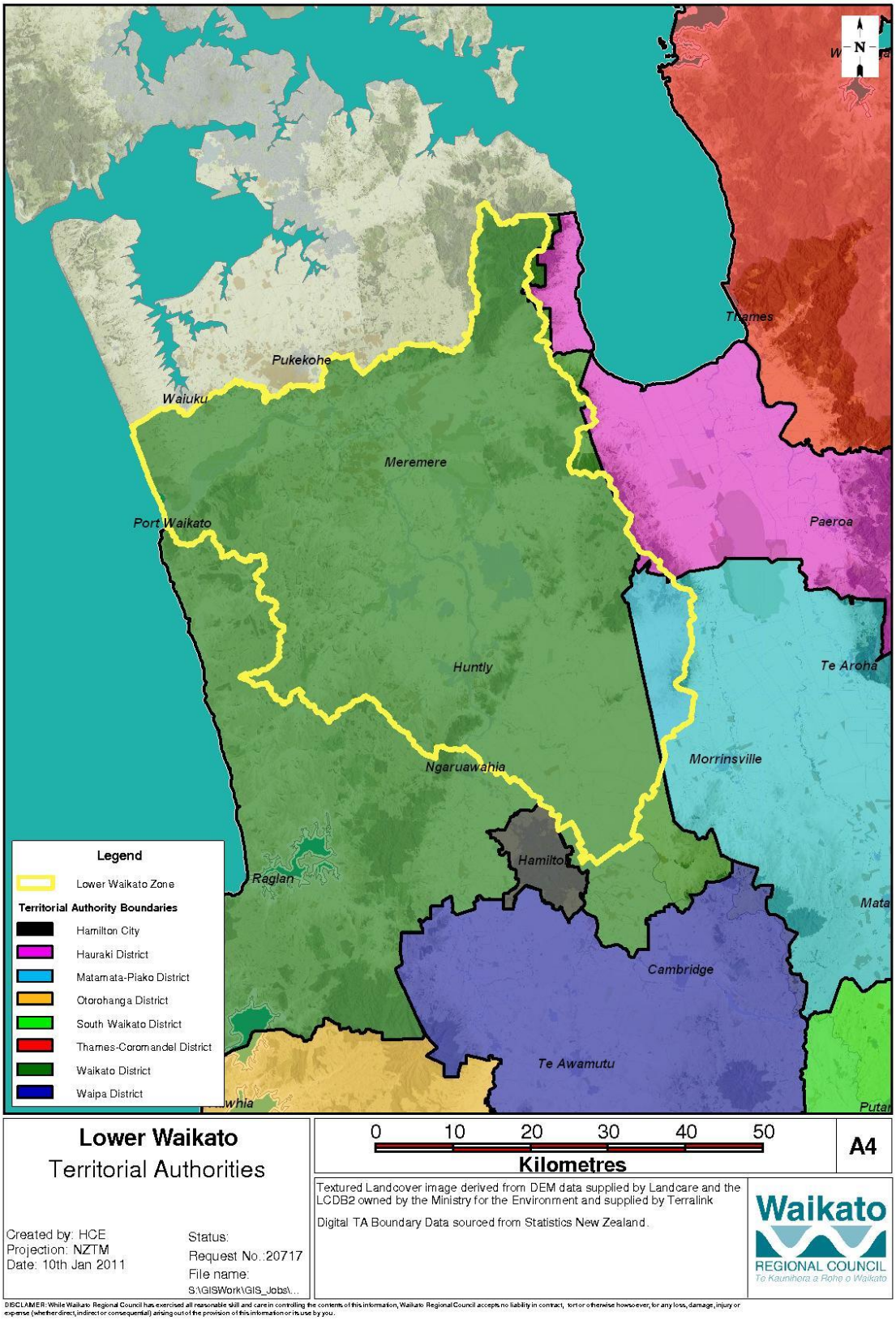
A total of up to 40 LIAs registered on the property title exist in the Lower Waikato zone. These property owners are important stakeholders in the ongoing protection of water and soil resources within the Waikato River catchment as a whole. Since 1992, no new LIAs have been entered into and have been replaced by a different form of agreement referred to as the Memorandum of Encumbrance (MoE).

4.6.6 Territorial authorities

Figure 7 shows the location of Territorial Authorities (TAs) within the region. TAs with boundaries in the Lower Waikato are the Waikato District Council (includes Franklin District Council as from boundary reorganisation changes). Staff work with the district council in relation to the following:

- Obtaining district council resource consents where required, to maintain local flood protections works.
- Through service level agreements, maintaining and managing local drainage networks associated with local flood protections schemes.
- Representation on catchment liaison subcommittee.
- Council may be an affected party in terms of resource consents.
- Input to local district planning processes.

Figure 7 Territorial authorities



4.6.7 Department of Conservation

The Department of Conservation administers conservation land such as parks, reserves and stewardship land on behalf of the Crown. The conservation land network administered by DOC in the Waikato catchment includes a number of wetlands, lakes and marginal strips along the Waikato River and its tributaries. Public conservation land is typically managed by DOC for a mix of biodiversity, historic and recreational values.

Management activities on conservation land include the control of weeds and animal pests, fencing and planting, as well as the control of water levels for some wetlands and lakes on public conservation land. As part of its responsibility to manage for the benefit and enjoyment of the public, DOC develops recreational and educational opportunities and maintains access to public conservation land. The Department also monitors the condition of some lakes and wetlands as well as some of the threatened species that they support. The Whangamarino Wetland and Serpentine lakes have been identified by DOC as high priority places for management. Threatened species recovery work is often focused on conservation land because these areas have a greater level of protection and ongoing security for these species is therefore more assured. Other activities managed by DOC include:

- Whitebait fishery.
- Threatened and alien invasive species.
- Permits, concessions and advocacy.

Aside from DOC'S management responsibilities and roles within the Lower Waikato, staff sit on the Lower Waikato Liaison Subcommittee and are part of the decision making process within the zone. This enables synergies and alignment between both Council and DOC in regard to respective responsibilities in sustaining the environment within the zone, particularly the management of the lakes and wetlands.

Staff work closely with DOC in terms of resource consent requirements, both as an affected party but also in discussion around the comprehensive consent process.

4.6.8 Fish and Game New Zealand

Regional fish and game councils manage sports fish and game birds. They have statutory responsibility *"to manage, maintain and enhance the sports fish and game bird resource in the recreational interests of anglers and hunters"* (Conservation Act 1987).

Fish and Game Councils are responsible to the Minister of Conservation, but are independent from central Government with funding solely from the sale of hunting and fishing licences. Councillors are elected every three years with voting rights restricted to adult licence holders. The Waikato River comes under the ambit of two Fish and Game regions. The Eastern Region manages the sports fish resource upstream of the Maraetai Dam, while the sports fish resources downstream of this dam are the responsibility of the Auckland/Waikato region. Much of Fish and Game's management activities are focused on advocacy, at both national and regional levels, to prevent deterioration of water quality.

Staff work closely with Fish and Game in regard to resource consent requirements, both as an affected party, but also in discussion around the comprehensive consent process.

4.6.9 Hydro power generators

Council has long standing relationships with both primary hydro generators (Mighty River Power and Genesis Power) as a result of needing to work closely on implementing the High Flow Management Plan during times of flooding.

Staff also work closely with Genesis Power to implement riparian works on their land along the Waikato River and tributaries. Staff also input to resource consent processes of both companies.

Both Genesis and Mighty River Power have representation on the Lower Waikato Catchment Liaison Subcommittee and are involved in zone decision making processes.

4.6.10 New Zealand Transport Agency

Council works closely with NZTA in a partnership role on such projects as the four laning project and future infrastructure type works, where resource consent in required and to ensure that roading works do not impede or impact on the performance of local flood protection schemes

As part of an agreement, Council manages bank stabilisation works adjacent to highways and charges NZTA for the cost to maintain those works on an annual basis.

4.6.11 Solid Energy

Solid Energy is a large landowner within this zone, being land adjacent to Waikato River and tributaries. Staff will continue to work closely with Solid Energy in terms of planning and implementing riparian works as part of meeting resource consent requirements, as part of their ongoing coal mining operations.

Significant future developments have recently been announced by Solid Energy. It will be increasingly important that the relationship between Council and Solid Energy is maintained and developed.

4.6.12 Waikato Rivercare

Lower Waikato zone staff work closely with Waikato Rivercare to facilitate the riparian enhancement of the banks of the Lower Waikato River, including biodiversity enhancement projects on Council administered land. Examples of recently completed projects have been at:

- Churchill East Road, Rangiriri.
- Riverbank opposite the old Meremere power station.
- Huntly College riverbank.
- Taupiri boat ramp.

4.7 Future demand

4.7.1 Demand forecast

The current levels of service are assessed as generally appropriate and largely meet the current needs of the beneficiaries of the zone services. There is however demand for upgrading the level of service in some areas and providing new works in other areas. These will be managed in accordance with the demand management plan for the zone, and in consultation with key stakeholders and the zone liaison subcommittee. Future new works programmed within the next three years include the upgrade of Meremere pump station and Orton pump station in response to peat shrinkage and land subsidence. The cost is to be substantially funded by the beneficiaries in these areas with the zone contributing up to 25% of the total capital cost.

The key demand drivers which could potentially place additional demands on the Lower Waikato zone are:

- Environmental factors
- Community expectations and perception of risk
- Legislation
- Increased awareness.

The changes in demand are expected to impact on asset utilisation and on the way assets are managed. This includes more frequent maintenance, refurbishment/renewal and upgrades of the scheme assets, as beneficiaries are expected to have less tolerance to damage from floods.

Environmental factors
Environmental factors which could impact on the levels of service include:

- Catchment land use change and changes in flood runoff patterns
- Climate change, increased heavy rainfall and rising sea levels
- Economic effects of climate change (carbon management etc.)
- Peat settlement within protected areas
- Wetland and stream restoration
- Biodiversity
- Natural hazard events.

Community expectations and perceptions of risk
Pressures can be expected to develop from a wide range of stakeholders with varying interests. In the longer term it is expected that the demands for services are likely to increase as use of protected land intensifies, such as:

- Changing economic returns from land driving demand for changes in land use and changes in LOS
- Increasing demand from the community and environmental stakeholders for environmental mitigation.
- Increased demand to maintain or increase access to wetlands, rivers and lakes
- Community perceptions of the risks associated with climate change and other environmental risks will be a key determinant of the degree of future proofing adopted to deal with these contingencies
- Increased community expectations driving a holistic approach to catchment management.

Legislation
Changes in legislation can have significant impacts on zone Levels of Service and the costs associated with these. In recent years the Resource Management Act, the Health and Safety in Employment Act and the Local Government Act have enhanced the Level of Service of the Scheme but have also added significant additional compliance costs.
It is not possible to envisage what additional legislative changes may occur over the life of this plan, but it is likely that the bar will continue to be raised.

Increased awareness
There is now increased awareness of the river and catchment management issues within the zone due to the initial asset management plan development, the 1998 flood, and the Project Watershed funding review. This increase in public profile for the zone services has resulted in higher expectations from the community of the level of service, and it is expected that this trend will continue.

4.7.2 Changes in technology

Future changes in technology are expected to lower the costs of service delivery and to enable improvements in monitoring and decision-making processes. These changes may include the following:

- Increased efficiency and reduced costs of earthmoving machinery resulting in reduced costs for capital, renewal, and maintenance activities. Increased fuel costs may however to some extent offset these cost reductions
- Use of computerised data loggers/ and or telemetry for collecting monitoring information
- Remote sensing of land and/or water related data. For example the use of LIDAR to obtain detailed ground level information
- Improved use of computer modelling for hydraulic assessments and flood forecasting
- Greater coverage of rainfall gauges and improved flow information as measurement technology becomes cheaper
- Improved understanding of the effects of climate change and the Southern Oscillation that affects La Niña and El Niño climate patterns
- Electronic equipment and telemetry for pump stations and floodgate monitoring allowing improved responsiveness to equipment malfunctions, and improved procedures for identifying and prioritising maintenance.

Advances in technology may therefore increase the reliability of assets, improve responsiveness to malfunctions and increase the cost effectiveness of maintenance and scheme management.

4.7.3 Demand management plan

The objective of demand management planning is to modify customer demand for services so as to maximise the use of existing assets and to avoid or defer the need for new assets or services. Community demand for catchment services is largely driven by economics, environmental considerations and changes in internal and external factors.

- As intensity of land use and the economic returns from protected land increases, the tolerance for flooding reduces, and there is therefore a demand for increased services. Increased returns from the land also provide a means for funding increased services
- Environmental considerations and the resource management act place constraints on the ability to develop new services (i.e. develop unprotected land) and to increase the level of service for existing protected land
- Internal factors - there may be internal change (for example peat subsidence) which results in demand for increased levels of service
- External factors which may drive demand include changes in weather patterns (e.g. climate change), and changes in land use throughout the catchment which may result in increased runoff and flooding.

Non-asset solutions can include insurance and change of land use. It considered that the most effective way of managing future demand for both new services and increased levels of service are via a multi-faceted approach as set out in the following table.

Table 7 Demand management instruments

Component	Tool	Description
Legislation and regulation	Resource Management Act 1991	Land use planning. Discourage/prevent development of flood and erosion prone areas. Control types of development within existing protected areas.
	Resource Management Act 1991	Discourage/prevent environmentally unsustainable development
Financial and economic	Funding policy	Costs of the works and services are borne by the beneficiaries in proportion to the degree of benefit received. Directly benefiting landowners required to fund 75% of the capital cost of new or upgrade works Require new works to be economically and technically sustainable
Education	Liaison subcommittee Customer service	Educate community in order to manage expectations for new or upgrade works. Encourage less intense land uses in some areas

4.8 Business processes

Management of the zone involves a combination of consultation, processes, data and software applied to provide the essential outputs for effective zone management. The processes that relates to the Lower Waikato zone at different organisational levels are summarised in the table below.

Table 8 Business processes and actions

Strategic processes	• **Strategic direction** • **Business continuity**
Tactical processes	• **Consultation** • **Levels of service** • **Risk management** • **Demand management** • **Financial management** • **Zone management plan** • **Health and safety**
Operational processes	• **Asset condition and performance** • **Asset attributes** • **Annual work programme (capital & maintenance)** • **Environmental monitoring** • **Audits** • **Emergency and flood management**

4.8.1 Strategic processes

Strategic Processes involves the long-term planning processes of Waikato Regional Council and the organisation's processes of defining its strategy, or direction, and making decisions to pursue this strategy.

The following strategic documents and processes that relates to the Lower Waikato Zone require regular review and monitoring. Details of the frequency, contents, requirement and responsibility are summarised in Appendix 2a and 2b.

Strategic direction

- LTP Process
- Regional Policy Statement
- Waikato Regional Plan
- Whole of catchment management principals
- District plans etc.
- Local government reform.

Business continuity

To achieve sound business continuance planning, Council is in the process of developing a Business Services Continuity Plan. This will provide 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 will be prepared to ensure the viability of Council in the event of an emergency or other event that significantly affects council's ability to deliver effective services to stakeholders.

The following business continuity related activities require regular review:

- Business services continuity plan
- Risk management funding.

4.8.2 Tactical processes

Tactical processes involves the processes for updating the zone management goals, measures and plans.

The following tactical processes require regular review, updating and reporting and relates to the Lower Waikato Zone. Details of the frequency, contents, requirements and responsibility are summarised in Appendix 2a and 2b.

Consultation

- Catchment liaison subcommittee newsletter
- Scheme liaison subcommittee reporting
- Liaison with Iwi
- Website
- Consultation register

Levels of service

The following Levels of Service related activities require regular review, monitoring and reporting:

- Level of service performance measures review
- Annual report

Risk management

The following risk related activities that relates to the activity risk (refer to section 8) requires regular review and monitoring:

- Risk action plan
- Risk register
- Risk management process including likelihood and consequence ratings.

Demand management

The following demand management related activities require regular review, monitoring and reporting:

- Growth and demand trends
- Capital works requirements associated with growth and demand
- Demand management plan.

Financial management

The following financial management documents require regular review and monitoring:

- Review valuations
- Base life assessments
- Financial forecast
- Peer review of valuations and forecasts
- Auditing depreciation
- Zone funding policy
- Zone level cost benefit analysis over a 20 year cycle

- Annual reporting of customer submission to Council.
- Contract records and documents.

Zone management plan

This plan is a living document, which is relevant and integral to daily activity. The first Lower Waikato Zone Management Plan was developed in 2010. This plan was reviewed in consideration of the Local Government Act 2002, Schedule 10 Requirements and benchmarked against Officer Auditor General (OAG) criteria.

To ensure the plan remains useful and relevant the following ongoing process of Zone management monitoring and review activity will be undertaken:

- Continuous tracking of minor updates to the zone management plan
- Continuous monitoring of improvements identified in zone management improvements plan
- Annual revision of zone management plan
- Three-yearly review of zone management plan
- Three-yearly review of improvements plan
- Peer review of zone management plan
- Adoption of zone management plan and improvement plan.

The following table provides a summary of the reviews Lower Waikato Zone Management Plan:

Table 9 Peer, ZIP and full review schedule

Information reviewed	Latest review		Next review date
	Date	Reviewer	
Zone management plan full review	2012	Internal and external	2015
Zone management plan ZIP	2012/13	Zone manager	2013/14
Valuations and financial forecasts	2010/11	Asset manager	2013/14

Health and safety

The following health and safety requirements apply to the Lower Waikato zone:

- Health and safety incident reporting
- Annual health and safety audit

4.8.3 Operational processes

Operational processes involves the processes for obtaining and analysing asset performance and condition, annual work planning and environmental monitoring and emergency and flood management within the zone. Details of the frequency, contents, requirements and responsibility are summarised in Appendix 2a and 2b.

Asset information management

Asset related data is collected and entered into the asset register. This data is under constant review with increasing accuracy being achieved though data validation by staff and contractors.

Council uses the Conquest II asset Management System as the primary asset management information tool. Conquest is a hierarchical system that holds information on all assets and their components. Data held includes asset attributes, age, condition, values, estimated remaining life and expiry dates etc. Categorisation of assets into types is also hierarchical and fully customisable, including attribute fields. The asset type hierarchy developed by Council for flood protection assets is shown in Appendix 2d Appendix 2c identifies the cornerstone applications by product and business function.

Council has developed its IT infrastructure around a number of key products that provide a platform for all IT applications.

The following table sets out the IT applications used by Council. The quality of management of a zone and improvement of asset management practices/plans is dependent on the accuracy of the underlying data used and the resulting assumptions.

Table 10 Information quality of Council applications

Data	Information source	Data quality (2010)
Asset attributes (size capacity, age etc.)	Conquest II	Fair-Good*
Asset location	Conquest II/GIS	Excellent
Condition data and history	Conquest II	Good
Performance data and history	Conquest II	Fair-Good
Asset valuation information (ORC, ODRC, depreciation etc.)	Conquest II*	Excellent

Historic maintenance activities	Manual records	Fair-Good
Historic maintenance costs	Financials	Fair

The business functions currently and potentially supported by the Conquest II system are set out in Figure 8.

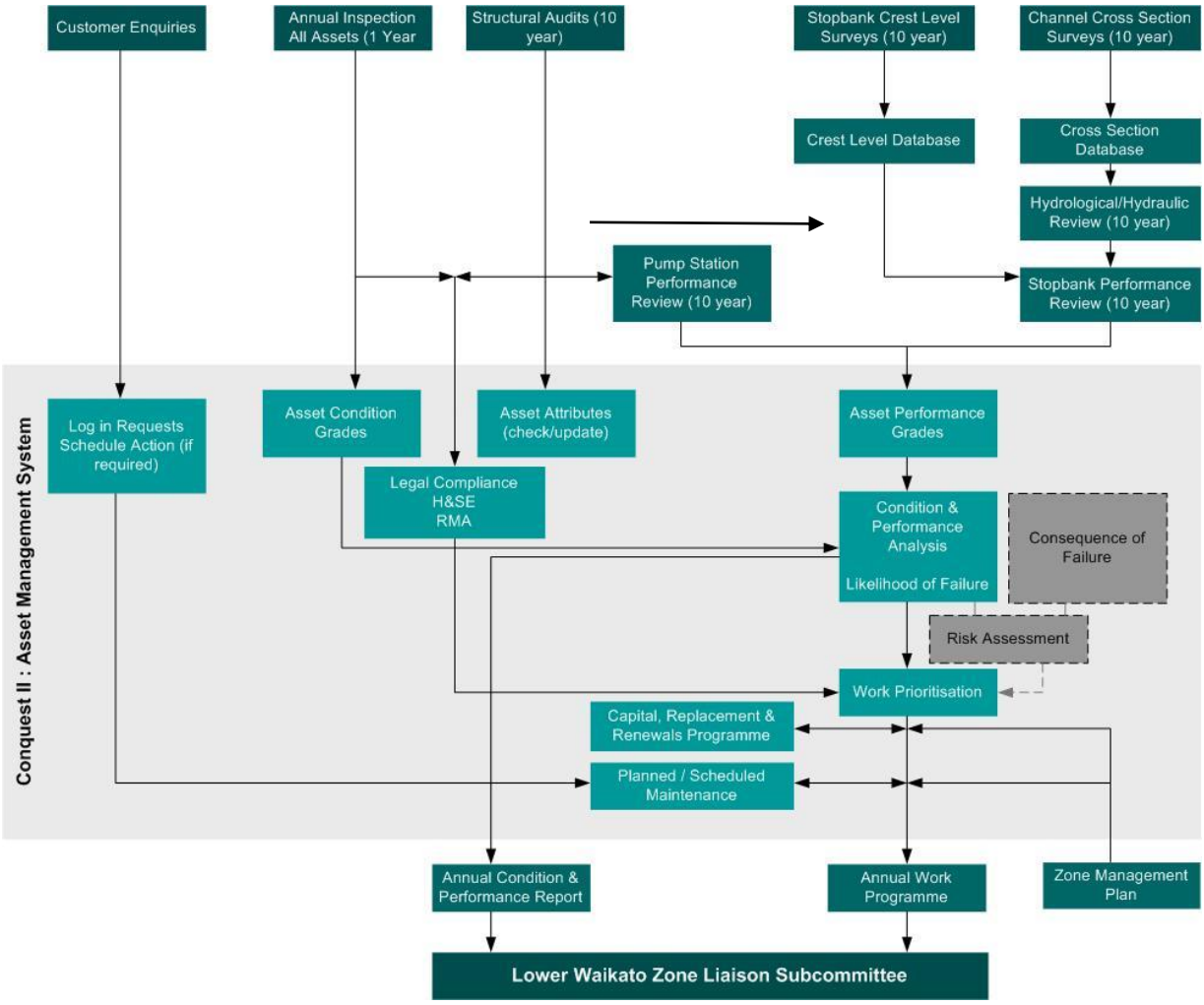
Asset condition and performance information is regularly updated with the following inspections, analysis and reporting:

- Underperforming pumps stations and flood gates
- Annual property inspection programme and property inspections
- Annual condition and performance reports
- Condition and performance analysis
- Annual inspection of all assets
- Pumpstation performance review
- Stopbank performance review
- Hydrological/hydraulic review and monitor national climate forecast.

Asset attributes information is regularly updated with the following inspections, analysis and reporting:

- Channel cross section surveys
- Stopbank crest level surveys
- Structural audits
- Capacity audits
- Dam safety inspection and audits
- Water level profile measurement
- Sand and gravel management
- Annual health and safety audit

Figure 8 Basic information flows and processes



Annual work programme

The following documents are reviewed and updated to compile the annual work programme.

- Customer enquiries record
- Monthly operational and failure reports
- Bi-annual failure logging.
- Annual work prioritisation
- Capital, replacement & renewals Programme
- Planned/schedule maintenance programme

Maintenance plans have been developed for each of the zones operated by Council. These plans outline the maintenance activities that are required to ensure the agreed levels of service for each scheme are met and to meet the requirements for typical river flows.

A breakdown of all the major maintenance activities is shown below. This table will be reviewed in line with the zone management plan review.

Table 11 Lower Waikato maintenance schedule (updated 2012)

Activity	Frequency	Description
Main channel maintenance		
Obstructions and debris removal	Annual	Removal of debris and blockages in main river
Erosion control	As required	Planting and layering of willow trees along eroded sections of river banks
Groynes and training lines maintenance	As required	Maintenance of damaged groynes and training lines
Weed and pest control	Annual	Spraying of (alligator weed, other pest plant/possum) in the river and along river banks
Environmental enhancement Main channel marginal strip	Annual	Fencing, native planting along the river and improving access at specific locations
Holmes canal de-silting	10 years or as required	Clear accumulated silt in canal
Buffer bank renewal	15 -20 year	Stopbank topping to design height
General maintenance of main channel	As required	Vegetation management, erosion control
General maintenance of embankments	As required	Stock damage, maintain grass cover, weed control
Scheme / tributary streams maintenance		
Blockage and debris removal	As required	Removal of debris and blockages in main river
Erosion control	As required	Planting and layering of willow trees along eroded sections of river banks
Weed control	Annual	Spraying of (alligator weed, other pest plant) in the river and along river banks
General Maintenance of tributary/ other channel	Annually	Erosion control, vegetation management
General maintenance of embankments	Annually	Stock damage, erosion control
Stopbanks		
General maintenance	As required	Minor repairs of stopbanks, fences, weed spray, mowing (specific banks only)
Renewal (peat, sand, clay foundation)	5 years	Reconstruction and topping of banks due to settlement and other major damages

Floodgates		
Outlet channel desilting	5 Years	Removal of silt build up
Spraying of outlets	6 Months	Weed control
General maintenance	Annually	Servicing of components
Routine operational inspections	2 months	Inspection and minor maintenance ensuring that floodgates are in a state of operational readiness
Routine maintenance	As required	Minor maintenance works including adjustments, lubrication, silt and debris removal, weed spray of floodgate structures and components
Replacement of components	20 years	Replacement of flaps, screens, lifting gear and other components
Replacement of pipes and walls	80 – 100 years	Replacement of pipes and wing walls
Pumpstations		
Routine operational inspections	Monthly	Inspection and minor maintenance ensuring that pump stations are in a state of operational readiness
Routine maintenance	As required	Minor maintenance works including adjustments, lubrication, bird proofing, weed spray and pest control of pump station structures and components
Electric check	1 year	Check electrical circuits and safety compliance
Pumpstation ultrasonic check	2 years	Check pumps for vibration
Refurbishment	8-10 years	Overhaul of pumps
Replacement of components	20 -30 years	Replacement of flaps, screens, switchboard, lifting gear, steel pipes and other components
Replacement of pumps	50 – 80 years	Replacement of pumps, motors, wing walls
Replacement of structures	80 – 100 year	Replacement of concrete and steel structures, such as walls, sumps and buildings
Control gates and community works (Te Onetea, Lake Waikare and Whangamarino Control gates and associated community works assets including Waikare spillway, Waikare fish pass, Waikare canal, stopbanks and floodgates)		
Adjust settings	Ongoing	Daily monitoring and control gates adjustments to ensure operational compliance
Operational inspections	2-3 months	Inspection of gates, mechanical and electrical gear
Routine maintenance	As required	General minor maintenance, such as lubrication, pest and weed control, etc.
Consents compliance works	Annually	Environmental monitoring, surveys, catchment works and reporting on system performance as required by consents conditions
Desilting	10 years	Waikare Canal desilting
Replacement of control structures	50-100 years	Replacement of structures and components

Other miscellaneous assets (bridges, detention dams, culverts, weirs, spillways and associated canals)		
Operational inspection	1 year	Inspection of structures and identification of maintenance needs
Routine maintenance	As required	Minor maintenance works to ensure operational readiness
Replacement	30-60 years	Replacement and reconstruction for settlement and asset deterioration
Property (scheme licences)		
Property management / Inspection	Annually	Condition and performance ensure compliance
Property licence fees	1 – 5 years	Regular review of licence fees
Property maintenance	Annually	Fence repair, stock damage etc.

Environmental monitoring

The following environmental monitoring is undertaken in the Lower Waikato zone.

- Monitoring programmes to assess the environmental changes resulting from the activities undertaken
- Monitoring lake water quality and health indicators
- Resource consent monitoring and reporting requirements.

Periodic audits

Audit to assess the adequacy of the asset management processes are performed periodically.

Table 12 Periodic audits

Information reviewed	Latest review		Next review date
	Date	Reviewer	
Periodic audits of asset management processes, systems and data	2011/12	Asset manager	2012/13

Emergency and flood management

Council has responsibilities for flood management across the region. River and catchment management has strong links with flood management in the Lower Waikato zone due to the location of the zone. Council is responsible for four interrelated flood management functions as outlined below.

The flood warning and telemetry system continuously monitors river levels and rainfall at over 50 automated recording sites throughout the region. Information from the system is used to warn landowners and communities about floods, collect data to improve the accuracy of flood prediction, co-ordinate flood response, and maintain flood protection works.

There are 18 flood warning and telemetry sites within the Lower Waikato zone – 14 river level sites and four rainfall sites. The relatively high number of flood warning and telemetry sites highlights the susceptibility of the zone to large flood events.

During flood events, Council staff undertake a series of activities in response to the event. These include monitoring of flood levels, forecasting river flows and levels and providing information to the general public and key stakeholders. To do this Council provides regular updates of river levels, flow and rainfall measurements on its website.

On the ground, staff undertake inspections of the stopbanks and structures throughout the event. Performance of the assets is recorded, and actions to reduce risks of failure are carried out, which include sand bagging seepage areas and low spots in stopbanks, and ensuring that pump stations are operating to remove local catchment runoff from protected areas.

Daily reports on the scheme performance, remedial actions and response to inquiries are documented. Key stakeholders are kept informed of all the operations and risks at all times from the early stages of the floods. The Emergency Management Officer (EMO) then acts according to a set of procedures as defined within Council's Flood Warning Procedures Manual. This includes providing warnings to district councils, land owners and key recipients' by telemetry radio links and supported by media releases to the public.

An important component of flood response is management of the Waikato hydro system. The Waikato River has a total of nine hydro power stations between Karapiro and Lake Taupo, and the reservoirs behind these power stations have some ability to retain flood waters for short periods of time.

The Waipa River has no hydro power stations, and therefore no ability to control water level peaks during flood events. Despite this, the Waipa River has a low gradient and large

ponding areas, which leads to flood peaks occurring slowly over a period of several days.

High flow management involves monitoring of flood peaks in both the Waipa and Waikato Rivers and control of the peaks in the Waikato River if possible to prevent both peaks occurring at the same time at Ngaruawahia. Control of the flood peaks within the Waikato River must be balanced with two other areas of critical importance:

- The safety of the Waikato hydro dams – once the water in the reservoirs reaches a critical level, it must be released.
- The water levels in Lake Taupo – the more water that is held back in Lake Taupo, the more risk there is of lakeshore erosion.

Guidance on the reservoir levels at which release of water must occur and guidance on the considerations for balancing the interests of communities across the Waikato River catchment are contained within the High Flow Management Rules which both Council and Mighty River Power are bound by, in managing flood events.
The Lower Waikato Control Scheme consists of a series of control structures situated between:

- The Waikato River main channel and Lake Waikare.
- Lake Waikare and the Whangamarino wetland.
- The Whangamarino wetland and the Waikato River main channel.

The control scheme operates to keep the level of Lake Waikare lower than its natural state, in order to provide capacity for flood waters when required. During non-flood times, water flows from the Waikato River into Lake Waikare via the Te Onetea Stream. The Lake Waikare gate then regulates flows into the Whangamarino wetland from Lake Waikare to keep Lake Waikare at a constant level.

During large flood events, water in the main channel flows across the Rangiriri spillway and into Lake Waikare. This has the effect of lowering the water level in the Waikato River main channel at Rangiriri, easing the burden on flood protection structures in that area. Flood waters are then stored in Lake Waikare and the Whangamarino wetlands until water levels drop lower down the Waikato River main channel at Mercer. The Whangamarino control structure ensures that water levels are kept constant at Mercer, and that no backflow into the Whangamarino wetland occurs.

WRC and TAs have responsibilities for planning and response to emergencies as members of the Waikato Civil Defence Emergency Management (CDEM) Group. Council plays a coordinating role by managing the CDEM Group Emergency Management Office and Group Emergency Coordination Centre. In the event of a large, ongoing flood event, Council has CDEM coordination responsibilities as well as flood management responsibilities

Lifelines include services such as water, power, telecommunication and transportation networks. Plans need to be put in place to ensure damaged lifelines are restored quickly following unexpected emergency or natural hazard events.

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.

Flood protection and river management measures help to avoid damage to roads and closure that may isolate certain areas. They also help to avoid damage to other essential services such as power, gas and telecommunications supply that can be affected by flooding.

5 Relationships with Iwi

5.1 Overview

Council acknowledges the special position of tangata whenua within the region and recognises the need to work with iwi/hapu in river and catchment management. Council has undertaken and continues to undertake a number of processes aimed at recognising the role of tangata whenua in river and catchment management within the region.

There are numerous Iwi authorities within the region including:

Tuwharetoa
- Te Arawa
  - Ngati Tahu - Ngati Whaoa
  - Ngati Kearoa - Ngati Tuara
  - Tuhourangi - Ngati Wahiao

Ngati Raukawa
Ngati Maniapoto
Waikato
Hauraki.

Treaty of Waitangi settlements
Across New Zealand, there are numerous Treaty Settlements in progress between the Crown and Maori claimant groups to settle historical claims against the Crown. Several of these groups within the region are currently in negotiations with the Crown.

The Waikato-Tainui Deed of Settlement was passed into law in May 2010. The agreement establishes a River Management Authority to oversee governance of the river, and the vision and strategy for the Waikato River is input in its entirety directly into the RPS. These and other Co-management arrangements will significantly influence the approach to river and catchment management, and over time, must be fully considered within zone plans.

Consultation and engagement with Iwi
In addition to the settlement processes and the co-management arrangements resulting from this, Council continues to work with iwi on a range of issues as part of everyday activities. Relationships with these groups are being formalised through Memoranda of Understanding (MoU).

At present Council has MoU with:

Hauraki Maori Trust Board
Tuwharetoa Maori Trust Board
Raukawa Trust Board.

Discussions are also progressing with the Maniapoto Maori Trust Board.

In addition to the MoU's, iwi representatives hold positions on catchment liaison subcommittees, bringing Maori values and perspectives into these groups. The council also encourages staff to work with iwi, hapu and whanau groups at an operational level. Council has formal Memoranda of Agreements (MoA) at the operational level when undertaking river and catchment management project works.

In the future, Council will continue to build on improving relationships and engagement with tangata whenua by actively pursuing joint river and catchment management initiatives with mutually beneficial outcomes.

Iwi management plans
An iwi management plan (IMP) is a term commonly applied to a resource management plan prepared by an iwi, iwi authority, rūnanga or hapū. IMP's are generally prepared as an expression of rangatiratanga to help iwi and hapū exercise their kaitiaki roles and responsibilities. IMP's are a written statement identifying important issues regarding the use of natural and physical resources in their area.

IMP's may also include information on social, economic, political and cultural issues. IMPs provide guidelines for resource management strategies and may also form an iwi planning document.

Council will have regard to any planning document recognised by an iwi authority (including IMP's) affecting a regional plan, when preparing or changing a plan. There are four current IMP's held and it is envisaged more will become available as a result of the Waikato River Settlement.

This zone plan will be updated to reflect IMP's as they become available.

5.2 The Waikato – Tainui River Settlement and Co-management

In December 2009, the Settlement legislation between the Crown and Waikato-Tainui in relation to the Waikato River was finalised. Legislation relating to the Deed was passed in early May 2010.

The overarching purpose of the settlement is to restore and protect the health and wellbeing of the Waikato River for future generations.

The settlement legislation reflects a commitment by the Crown and Waikato-Tainui to enter a new era of co-management over the Waikato River. The issue of co-management and the implications of this for RCS is discussed in the next section.

Under the settlement legislation, more than $200 million is to be put into a contestable fund over 30 years and will be available for work that directly contributes to the clean-up of the river.

The legislation sets out:

- The recognition of the significance of the Waikato River to Waikato-Tainui.
- The legislative recognition of the vision and strategy for the River.
- The co-governance arrangements, including the establishment of the WRA.
- The co-management arrangements, including the enhanced participation of Waikato Tainui, through joint management agreements, in processes under the Resource Management Act, the establishment of an integrated river management plan and the recognition of the Waikato-Tainui environmental plan.
- The recognition of the customary activities of the Waikato Tainui in relation to the river.

5.2.1 History

The Waikato Raupatu Claims Settlement Act 1995 gave effect to the 1995 Deed of Settlement in respect of the Raupatu claims of Waikato-Tainui. The 1995 Deed and 1995 Act expressly excluded certain claims from the settlement including the claims of Waikato-Tainui in relation to the Waikato River which arise as a result of the Raupatu of the 1860's and its consequences.

To Waikato-Tainui, the Waikato River is a Tupuna which has mana and in turn represents the mana and mauri of Waikato-Tainui. Waikato-Tainui constantly sought a settlement that:

- Acknowledges and respects the deeply felt obligation of Waikato-Tainui to protect te mana o te awa.
- Recognises and sustain the special relationship that Waikato-Tainui has with the Waikato River.

A Deed of Settlement in the relation to the Waikato River was originally agreed in August 2008 and provides for:

- A final resolution of the Raupatu claims of Waikato-Tainui in relation to the Waikato River.
- An overarching purpose to "restore and protect the health and wellbeing of the river for future generations".
- The establishment of a vision and strategy for the Waikato River and associated co-governance arrangements to achieve the overarching purpose of the settlement.
- Co-management arrangements to facilitate the exercise of mana whakahaere by Waikato-Tainui.
- Associated redress relating to the Waikato River.

5.2.2 Actions

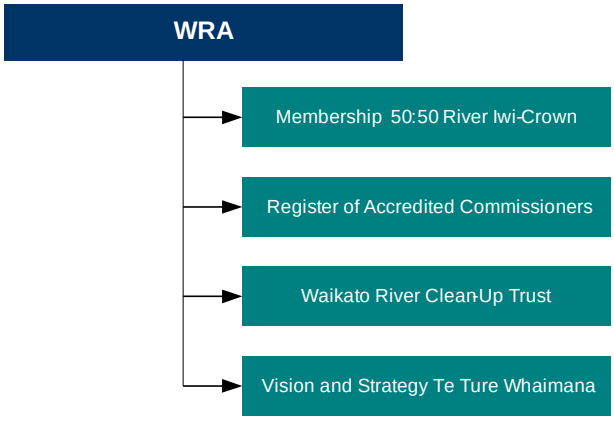
A vision and strategy for the Waikato River was developed as part of the Waikato-Tainui settlement.

The settlement legislation includes the vision and strategy and was the primary direction setting document for the river. The vision and strategy forms part of the RPS and Council must ensure that it is not inconsistent with it.

The objectives of the ZMP's are consistent with those set out in the settlement legislation and the vision and strategy for the Waikato River.

The settlement also establishes the WRA. The WRA is responsible for setting the direction in the vision and strategy and promoting an integrated, holistic and coordinated approach to management of the river and implementation of the vision and strategy. The structure and key functions of the WRA are shown below in Figure 9.

Figure 9 Waikato River Authority



The settlement legislation provides for the WRA to act as trustees for the Waikato River Clean-up Trust which is responsible for the restoration and protection of the health of the river. The Trust is given a lump sum on establishment and an annual amount to contribute to achieving this purpose ($210m over 30 years).

The Crown also commissioned an independent scoping study that will help the WRA to identify the rehabilitation priorities for the river.

5.2.3 Co-management

The Treaty of Waitangi settlement, the agreement between the Crown and Waikato-Tainui reflects a commitment by both parties to enter "a new era of co-management over the Waikato River" for the overarching purpose of restoring and protecting its health and wellbeing for future generations.

This recognises the fact that for Waikato-Tainui, the river has its own life force, spiritual authority, protective power and prestige. Waikato-Tainui has the authority to exercise control and management of the river in accordance with their values, ethics and norms. The focus of the settlement is on the health and well being of the river, which aligns with Council's responsibilities to protect and sustainably manage the region's natural resources.

Co-management requires more than consultation and the settlement legislation requires a new approach. This should include:

- The highest level of good faith engagement.
- Consensus decision making as a general rule.
- A range of management agencies, bodies and authorities working at a number of different levels.
- Processes for granting, transferring, varying and renewing consents, licences, permits and other authorisations for all activities that may impact on the health and wellbeing of the river.
- Development, amendment and implementation of strategies, policy, legislation and regulations that may impact on the health and wellbeing of the river.

The co-management arrangements set out in the settlement legislation provide a foundation for relationships between Waikato-Tainui, the Crown, local authorities and other agencies but do not prevent the parties from entering into agreements beyond this scope. Co-management agreements were entered into on 4 September 2008 between the Crown and other iwi whose rohe includes the Waikato and Waipa Rivers. These agreements are an 'Agreement in relation to a Co-Management Framework for the Waikato River' between Raukawa and Te Arawa hapu and the Crown and an 'Agreement in Principle' between Maniapoto and the Crown in respect of a co-management framework settlement for the Waipa River'. These two agreements, among other things, make provision for the Vision and Strategy for the Waikato River and the clean up fund for the catchment. There is also provision for co-management of flood control scheme land and an IRP. Settlement legislation to implement both these agreements is likely to be introduced in coming months.

Hauraki iwi and the Crown are currently in the process of negotiating towards settling historic Treaty of Waitangi claims in the Hauraki/Coromandel region. Other iwi, including Raukawa and Maniapoto are also negotiating Treaty settlements. Outstanding Treaty claims also exist, for example, in relation to harbours across the region.

All of the settlements, negotiations and claims will change the way that Council consults and engages with iwi over time.

5.2.4 Implications of settlements

The key implications of the settlement within the Lower Waikato are therefore:

- The development of a co-management agreement between Council and Waikato-Tainui within 12 months of the settlement date relating to land within the flood control scheme.
- The ongoing operation of such a co-management agreement.
- The development and ongoing operation of a joint management agreement between Council and Waikato – Tainui within 18 months of the settlement date, relating to the review of the RMA statutory documents and the process for considering resource consents.
- Opportunities to apply for funds from the Clean Up Trust to enhance work being undertaken by Council.
- The vision and strategy guiding policy direction for the Waikato River catchment.
- Iwi commissioners on consent hearings for RCS works.
- The development and operation of an integrated river management plan within three years of the settlement date with a conservation component, a fisheries component, and a regional council component, with provision for further components to be added in future.
- A need to be aware of provisions relating to customary activities, cultural harvest of flora, regulations for the management of aquatic life, habitats, and natural resources managed under conservation legislation and customary fishing regulations and fishing bylaws for the Waikato River.

Council will need to work within the framework set out in the settlement legislation in relation to the management of the Waikato River. The establishment of the WRA means that there is a new governance structure and an additional organisation to liaise with. It also means that there is additional funding from the Crown which may impact on the activities that Council undertakes and the use of rates in the zone.

Planning documents prepared under the Resource Management Act, such as the Regional Policy Statement and Regional Plan, must have regard to the Waikato-Tainui Environmental Plan. All plans, including this ZMP, must therefore reflect the goals and objectives of the Waikato-Tainui environmental plan and incorporate actions that will contribute to achieving these aims.

This plan reflects the new management structure and is consistent with the principles of the settlement.

Other considerations include:

- River enhancement education and training programmes are envisaged to roll out at marae clusters as early as mid 2011. Requests from marae clusters to RCS seeking advice and support may be expected.
- During the implementation phase of co-management, the RCS group could potentially undertake work with marae's and other agencies who wish to contribute towards the vision and strategy of the Waikato River as Kaitiaki to identify expectations and aspirations and to contribute to a planned and coordinated approach to works on the river.

6 Lower Waikato zone assets

6.1 Introduction

Many of the services included under this zone plan are based around infrastructural assets.

Managing and maintaining these assets is a key component of RCS. The zone assets section presents the lifecycle management plan for the zone and includes:

- Description of assets in physical and financial terms.
- Key issues.
- Operations, maintenance, and renewal and development strategies.
- Financial forecasts.
- Levels of Service.

The asset groups include:

- Stopbanks
- Pumpstations
- Floodgates
- Control gates
- Structures
- Channels – artificial
- Channels – rivers
- Fencing
- Planting/retirement of land
- Water supply
- Other (miscellaneous).

The status of bridges in terms of legal ownership is currently being worked through by Council's Property Services section. Once the status of each bridge is confirmed a detailed maintenance programme will need to be developed and implemented as will a defined LoS related directly to these assets.

Figure 2 Lower Waikato zone overview and assets map shows the general geographical locations of major assets within the zone.

6.2 Work category definitions

Expenditure on infrastructure assets can be categorised into key areas, which are:

Operations and maintenance

Operations and maintenance expenditure is that required for the day-to-day operation of the zone whilst maintaining the current levels of service.

Renewals

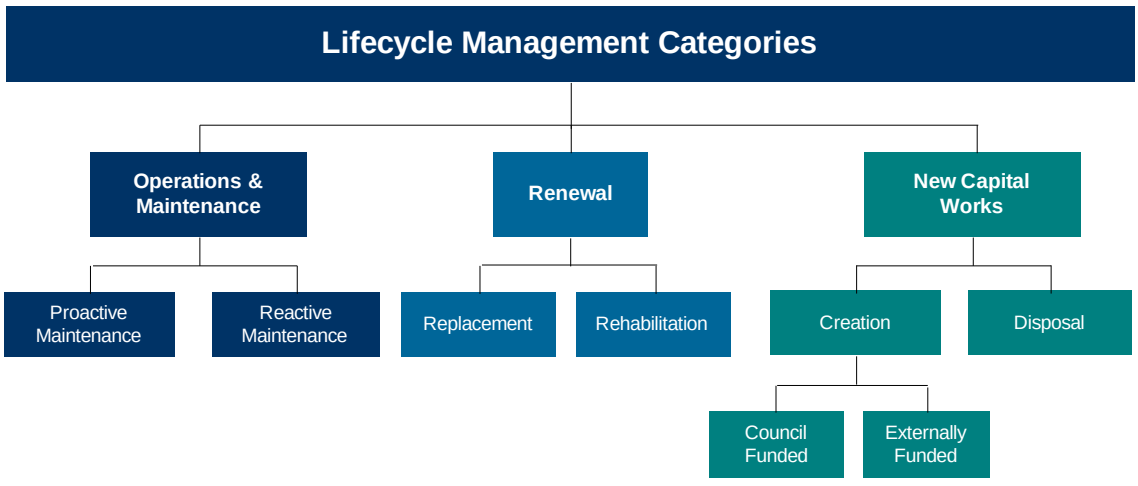
Renewal expenditure includes rehabilitation and replacement of assets. The objective is to restore an asset to its original level of service as measured by for example, capacity or another required condition. Renewals expenditure forecasts cover the cost of asset renewal through its whole lifecycle through to disposal of the asset.

New capital works

New capital 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.

The figure below illustrates the following components of lifecycle management categories.

Figure 10 Lifecycle management categories



6.3 Overview of assets

6.3.1 Asset summary

All the assets associated with river and catchment services can be grouped under two service type categories, River management and flood protection and catchment management these are shown below.

Table 13 Asset categories

Service type	Asset category	Asset type
River management and flood protection	Embankments	Stopbanks
		Spillways
		Detention dams
	Structures	Floodgates
		Pump stations
		Control gates
		Culverts
		Bridges
	In river structures	River training groynes
		Weirs
		Boat ramps
		Fish pass
	Channels	Rivers and streams
		Cannels
Catchment management	Soil conservation/Clean streams	Fencing
		Planting/retirement
		Water supply

The valued assets of the zone comprising the flood protection works have a total replacement value of $100,967,087, a current book value of $87,249,240 and an annual depreciation of $840,460 as of 1 July 2008.

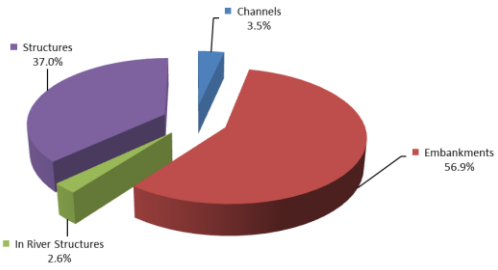
The soil conservation assets within the zone are not valued in the same manner as the above, as they are under the ownership of respective property owners. Council does however have ongoing obligations for monitoring and managing these assets under the terms of the agreements with landowners (LIAs). Because of these commitments, the assets have been included under this plan. The breakdown of assets is shown below.

Table 14 Asset inventory

Function description	Financial class	Qty	Units	ORC @ 30/06/2012	ODRC @ 30/06/2012	Annual depreciation 2011/12
Flood protection and river management	Barges	1	ea		0	
	Bridges	6	ea	1,714,608	947,627	17,181
	Channels	265,916	m	3,800,520	2,280,862	38,083
	Control gates	3	ea	3,460,881	1,294,331	49,853
	Culverts	8	ea	318,058	182,724	3,984
	Detentions	1,215	m	1,254,853	588,486	15,718
	Floodgates	247	ea	10,077,253	4,817,600	144,570
	Pumpstations	63	ea	23,959,411	10,386,124	587,971
	River training works	1,950	m	2,670,360	2,273,024	27,322
	Stopbanks	249,639	m	60,047,047	53,575,542	278,090
	Structures	5	ea	261,155	231,095	4,697
	Weirs	13	ea	114,934	98,962	1,153
				107,679,081	**76,676,377**	**1,168,621**

Figure 11 plots the optimised replacement value (ORC) of the Lower Waikato assets. The pie chart illustrates that the embankment assets followed by the structures assets hold the largest values in this zone.

Figure 11 ORC Lower Waikato zone River & Catchment Services infrastructure



Asset description and key issues

Embankments

Embankments include stopbanks, earth bunds, detention dams and spillways.

Stopbanks are compacted earth embankments built alongside rivers to provide protection to the bordering land from flooding. Earth bunds perform a similar function but are generally a lot smaller in size providing protection to an isolated area.

Detention dams are compacted earth constructed across a valley to temporarily hold excess flood water in a defined ponding area. Water is then piped back into the main river / stream channel in manageable amounts.

Spillways are structures used to provide for the controlled release of flows from a dam into a downstream area.

Key issues

Stock damage.

Stopbank alignment being too close to the river channel increasing the risk of undermining.

Stopbank width in some rural locations.

Settlement of stopbanks and dams requiring top-up.

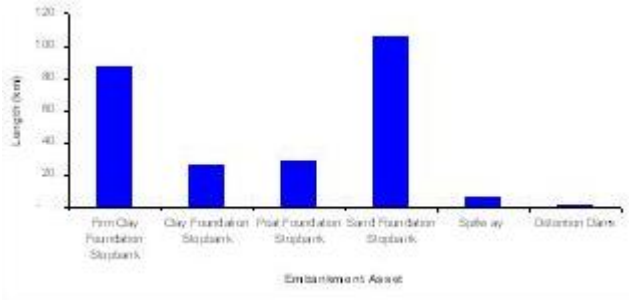
Keeping up with changes in stopbank height (ie. channel capacity) to maintain existing levels of service and taking into account silting and/or aggradation of river beds, climate change and increased rainfall intensity:

- toe erosion and old, large trees compromising structural integrity
- foundation stability due to geotechnical conditions
- earth dam displacement and earthquake damage
- land ownership and access issues.

Stopbanks, are the most significant asset in the rivers and catchment service infrastructure. The total Optimised Replacement Cost (ORC) of these assets is $60,047,047 (as at 30 June 2012); this represents 70% of the total network value. Asset condition is monitored by visual inspections, physical surveys and scheme reviews.

Figure 12 shows the lengths in the Lower Waikato zone of the various types of embankments. Sand foundation and firm clay foundation stopbanks are the predominant embankments. There is one bund in the Lower Waikato zone.

Figure 12 Lengths of embankment assets



Structures

RCS have a number of structures within the Lower Waikato zone. The structures assets that form part of the rivers and drainage infrastructure include control gates, pump stations, floodgates, culverts, bridges.

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

Key issues

Geothermal activity causing corrosion and undermining foundations.
Tidal and saline erosion of flood gates and other structures.
Blockages due to debris in flood gates etc and consequential backflow.
Vandalism.
Fish passage when new assets are built and other environmental requirements.
Scouring.
Earthquake damage to structures.
Electricity supply failures to pump stations.
Pump failures.
Insufficient capacity due to increasing required performance standards e.g. community expectations, climate change.
Weed control – causing pumps not running to capacity.
Land ownership and access issues.

Structures make up 37% of the total ORC of all of the RCS assets, with a total value of $39,791,366.

In river structures

RCS have a number of structures that exist within the river channel; these are classified as in river structures and include weirs (rock and timber), fish passes, boat ramps, river training groynes[15].

Key issues

Damage from high. river flows.
Pest infestation.

In river structures make up 3% of the total ORC of all of the RCS assets, with a total value of $2,785,294.

Channels

Channels include rivers and streams. Condition of the waterways is generally monitored by visual inspections and physical surveys.

Key issues

Excessive weed growth.
Blockages impeding flows.
Environmental issues eg timing of maintenance.
Pollution and contaminated sites.
Pest and weed control eg. invasive exotic species.
Regular maintenance is required to ensure design capacity is maintained.

Channels make up 3.5% of the total ORC of all of the RCS assets, with a total value of $3,800,520.

Soil conservation

The soil conservation assets within the Lower Waikato zone are not owned by Council and are therefore not included in the valuation; they are formally owned by the respective property owners. They have been included here, however, because Council has ongoing obligations for monitoring and managing these works under the terms of the agreements with landowners. Council contributes funding towards catchment management programmes involving the promotion and maintenance of soil conservation assets. These assets are non capital related assets. Table 15 below provides a summary of these assets for the Lower Waikato zone.

[15] River Training Groynes – structures built into the riverbanks, which protrude out into the river channel to push water away from the bank edge. Can be made of rock, concrete, or fallen trees with the butt end anchored into the bank, and can be solid or permeable. Groynes help prevent erosion and trap silt, which helps build up eroded areas

Table 15 Soil conservation asset summary

Compartment type	Number of compmts	Area (ha)	Fence length (m)	Stream-bank retired (m)	Average fence age (yrs)	Area planted (ha)	Average planting age (yrs)
Indigenous retirement	30	121.0	23,376	14,893	10.2	11.8	19.1
Riparian retirement	179	937.8	200,012	166,263	8.9	189.6	27.1
Protection production plantings	12	44.9	7,767	260	20.3	18.0	7.2
Space planting	148	312.1	980	-	13.7	1.0	28.0
Stream bank erosion control plantings	1	1.0	-	-	-	-	-
Wetland	2	3.9	4,420	-	36.0	32.5	43.5
Total/average	372	1420.7	236,555	181,416	17.8	252.9	25

Note: For ongoing maintenance purposes, only a portion of these assets are eligible for maintenance funding that being Project Watershed and earlier works covered by LIAs. Clean Streams assets are included above but are not eligible for maintenance funding.

Key issues – Catchment works (Soil conservation)

Landowner change
Property subdivision
Changing land use.

6.3.2 Data confidence and reliability

WRC's document "Asset management Processes for flood protection and drainage assets" outlines the responsibilities, processes and procedures updating asset attributes and planned maintenance requirements for each new asset or for assets that are renewed.

Both the quality and quantity of information has improved significantly since the first AMP was adopted in 1997 but it is still undergoing further improvement. The inventory of assets identifies most of the significant. The weakest area of information currently is historic maintenance costs. While gross maintenance costs are recorded, the degree of breakdown for different activities and different types of assets is insufficient to allow accurate identification of historic activity/asset unit costs at this stage.

A programme to improve on the historical asset data has been implemented since 2012. The program will improve on the asset data completeness and asset condition and performance information. The following reviews are underway or have been completed:

A review of the pumpstation and floodgate attributes
Verification of license land assets (eg fence ownership)
A review of the electrical ownership and responsibilities
A stopbank crest-level design data review

A condition inspection guidance manual is in place and an audit of the stopbank condition assessment was done in 2012.

The table below provides the confidence framework from the National Asset Management Group's International Infrastructure Management Manual (NAMS IIMM) used to determine the confidence in the asset data used in this ZMP.

Table 16 Asset data - confidence grades

Confidence grade	General meaning
Highly reliable	Data based on sound records, procedure, investigations and analysis, documented properly and recognised as the best method of assessment.
Reliable	Data based on sound records, procedures, investigations and analysis, documented properly but has minor shortcomings, for example the data is old, some documentation is missing, and reliance is placed on unconfirmed reports or some extrapolation.
Uncertain	Data based on sound records, procedures, investigations and analysis which is

	incomplete or unsupported, or extrapolated from a limited sample for which grade highly reliable or reliable data is available.
Very uncertain	Data based on unconfirmed verbal reports and/or cursory inspection and analysis.

The following table reflects the confidence in the asset data for the assets within the Lower Waikato zone. . The "material data" refers to the construction material of the asset. "Other attribute data" includes length, height, volume, width, foundation type, design freeboard, transformer rating, power rating etc.

Table 17 Summary of asset data accuracy for critical and non-critical assets (July 2012)

Asset type	Material data (where applicable)	Age	Other attribute data	Overall
Embankments	Reliable – foundation material	Reliable	Reliable	Reliable
Structures	Reliable	Reliable	Uncertain	Reliable
In river structures	Reliable	Uncertain	Very uncertain	Uncertain
Channels	Reliable	Uncertain	Uncertain	Uncertain
Soil conservation/Clean streams	Reliable	Highly reliable	Reliable	Reliable

Note: This table relates only to the information in the asset register and does not reflect the completeness of the data.

Table 18 outlines the grading system used to summarise the completeness of the data held in the asset register.

Table 18 Asset data – completeness grades

Data completeness	General meaning
0 – 20%	The asset register contains minimal information about the assets with the majority of assets not listed at all
20 – 40%	About a third of the assets are listed, and/or about a third of the attribute information is listed
40 – 60%	About half of the assets are included in the asset register and/or of the assets included, only half the asset attribute data is included
60 – 80%	Most assets are included on the asset register with most of the relevant asset attributes
80 – 100%	The asset register contains a complete set of data for every known asset

This table summarises the data completeness for the Lower Waikato zone assets.

Table 19 Overall data completeness (September 2012)

Asset type	Material data (where applicable)	Age	Other attribute data	Overall
Embankments	100%	100%	74%	74%
Structures	61%	100%	57%	57%
In river structures	100%	100%	4%	4%
Channels	100%	100%	71%	71%
Soil conservation/Clean streams	N/A	N/A	N/A	N/A

The following table gives a summary of an initial assessment of the level of completeness and data accuracy WRC wants to achieve for each asset type.

Table 20 Target level of asset data accuracy and completeness

Asset type	Accuracy	Completeness
Embankments	Highly Reliable	100%

Structures	Highly Reliable	100%
In river structures	Reliable	80%
Channels	Reliable	60-70%
Soil conservation/Clean streams	Reliable	60-70%

The data completeness and reliability for Embankments (74%, reliable) and Structures (57%, reliable) are below the target level of data completeness (100%, highly reliable). Both these asset types are included in the data improvement programme.

The data completeness for In river structures, does not meet the target level and the confidence grades are below the target "Reliable" for In river structures and channels. This indicates that further data collection is required for these assets.

6.3.3 Asset condition

Council has an asset register for all assets that contains:

- A definition of all assets including description and location
- Physical dimensions and capacity
- Age and replacement costs
- An assessment of asset condition.

The development and continued use of condition assessment data will allow preparation of verifiable predictive decay curves for particular asset types and hence permit informed prediction of remaining life.

Condition assessment & results

The condition assessment model in Table 21 should be the basis of assessing the condition of Council's assets in the Lower Waikato zone.

Table 21 Typical condition rating model

Grade	Condition	Description of condition
1	Very good	Sound physical condition. Asset likely to perform adequately without major work for 25 years or more.
2	Good	Acceptable physical condition; minimal short-term failure risk but potential for deterioration in long-term (15 years plus). Minor work required
3	Fair	Significant deterioration evident; failure likely within the next 5 years but further deterioration likely and major replacement likely within next 15 years, Minor components or isolated sections of the asset need replacement or repair now but asset still functions safely at adequate level of service.
4	Poor	Failure likely in short-term. Likely need to replace most or all of assets within 5 years. No immediate risk to health or safety but works required within 3 years ensuring asset remains safe. Substantial work required in short-term, asset barely serviceable
5	Very poor	Failed or failure imminent. Immediate need to replace most or all of asset. Health and safety hazards exist which present a possible risk to public safety or asset cannot be serviced/operated without risk to personnel. Major work or replacement required urgently

Table 22 Zone asset condition grades

Asset group	Condition grade				
	1	2	3	4	5
Stopbanks	1%	48%	44%	5%	2%
Floodgates	1%	63%	32%	2%	2%
Pumpstations		11%	61%	22%	6%
Other structures		81%	19%		

Note: The asset condition grades were based on the 2012/13 Lower Waikato Condition and Performance Assessment Report (Doc# 2401657)

6.3.4 Asset valuation (July 2011)

Table 23 Asset valuation summary ($)

	Optimised replacement cost (ORC)	Optimised depreciated replacement cost (ODRC)	Annual depreciation costs
Embankments	61,301,901	54,164,028	293,807
Channels	3,800,520	2,280,862	38,083
In river structures	2,785,294	2,371,985	28,475
Structures	39,791,366	17,859,501	808,256
Total	107,679,081	76,676,377	1,168,621

Table 24 Asset valuation details by asset type

Asset type	Optimised replacement cost (ORC)	Optimised depreciated replacement cost (ODRC)	Annual depreciation costs
Embankments			
Detentions	1,254,853	588,486	15,718
Stopbanks	60,047,047	53,575,542	278,090
Subtotal	61,301,901	54,164,028	293,807
Channels			
Channels	3,800,520	2,280,862	38,083
Subtotal	3,800,520	2,280,862	38,083
In river structures			
River training works	2,670,360	2,273,024	27,322
Weirs	114,934	98,962	1,153
Subtotal	2,785,294	2,371,985	28,475
Structures			
Bridges	1,714,608	947,627	17,181
Control gates	3,460,881	1,294,331	49,853
Culverts	318,058	182,724	3,984
Floodgates	10,077,253	4,817,600	144,570
Pumpstations	23,959,411	10,386,124	587,971
Structures	261,155	231,095	4,697
Subtotal	39,791,366	17,859,501	808,256
Total	107,679,081	76,676,377	1,168,621

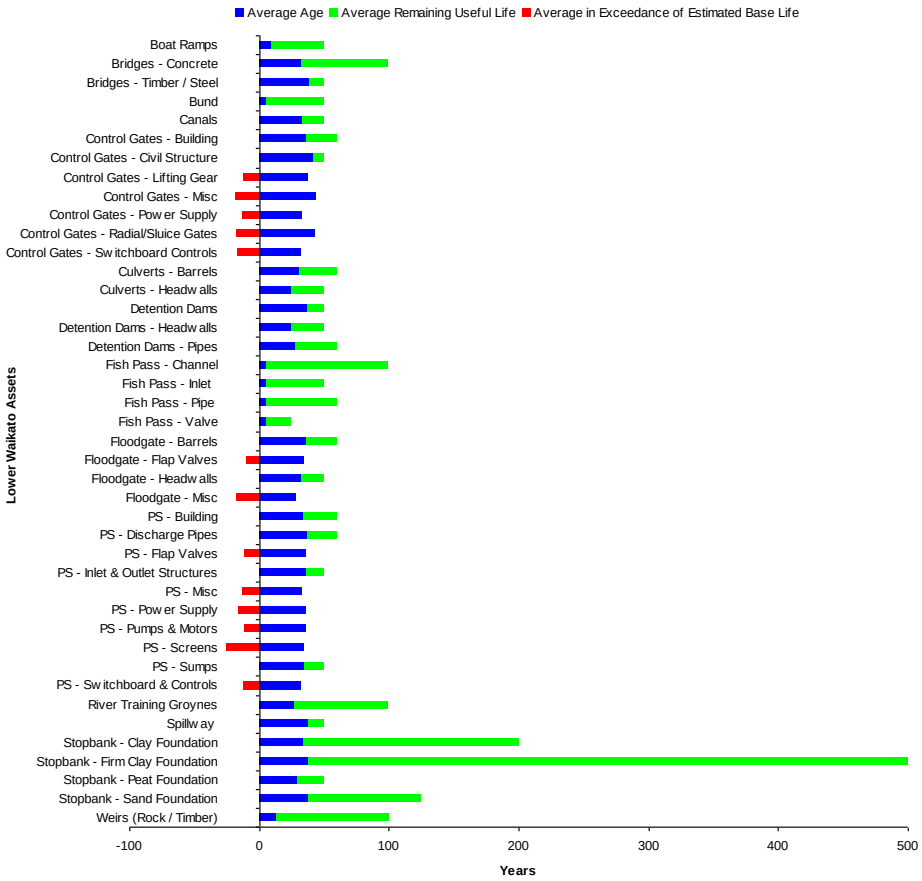
Refer to section 9.7 Asset valuation for valuation methodology.

6.3.5 Asset age

Figure 13 shows a comparison between the average age of the asset groups and the estimated average remaining useful life.

The pump station and control gate assets have, on average, exceeded their estimated useful lives. The floodgate asset group, timber/steel bridges, and spillways are approaching the estimated end of their useful lives. The concrete bridges, bund, fish pass, weir, river training groyne, boat ramp and clay and firm clay stopbank assets have the most estimated life remaining.

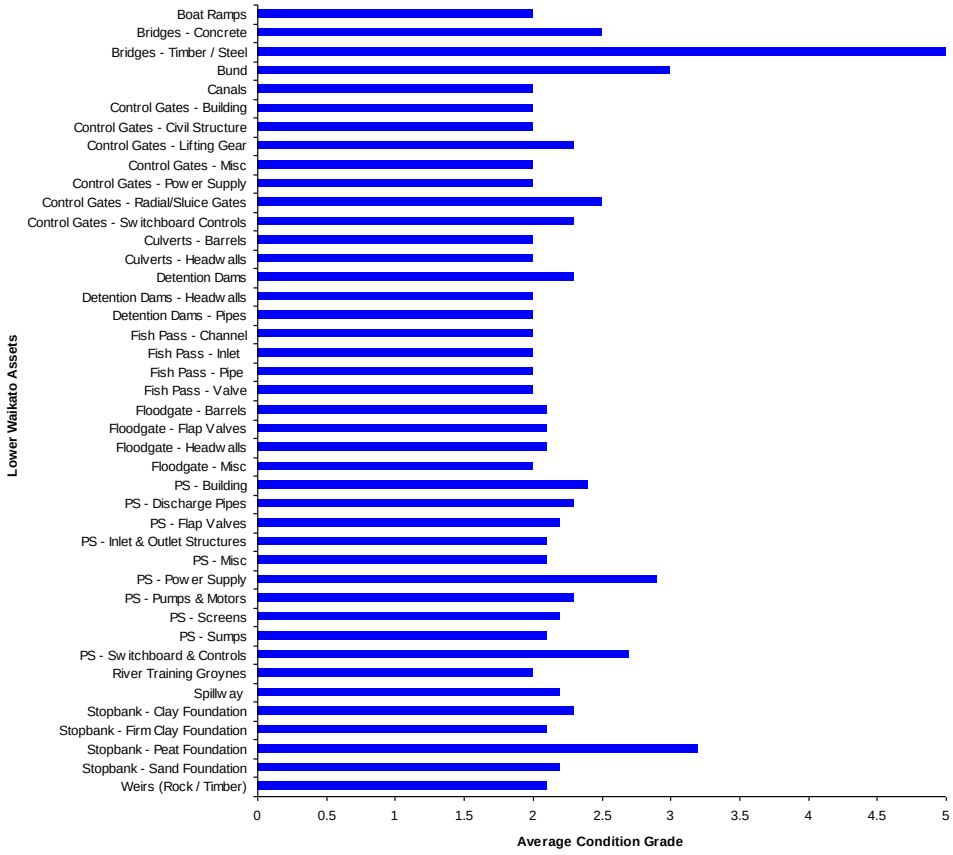
Figure 13 Asset average age versus average remaining life



6.3.6 Condition assessment and result

The figure below (Figure 14) shows the average condition grading for the asset groups.

Figure 14 Average condition grading



Although the timber/steel bridges in this zone are shown in the figure above as having a condition grading of 5 (very poor condition), it should be noted that this grade refers to only one only of these bridges in the zone. Works to improve the condition of this bridge are to be included in ongoing maintenance plans.

The peat foundation stopbanks have a condition grading of 3.2 (fair to poor). Peat foundation stopbanks are 11.6% of the total stopbank assets (approximately 29 km). A large percentage of these banks (almost 50%) are currently rated as requiring substantial remedial work (grade 4) or being unserviceable (grade 5). This is of some concern, however these banks are being progressively returned to an acceptable standard under the zone capital works programme as detailed in the plan.

Overall, 6% of stopbanks (peat, clay and sand) have a condition grading of 4 or 5 (poor or very poor). This includes 3.7km of Mangatawhiri Compartment 3 stopbank that has been upgraded and 6.2km Compartment 4 stopbanks that are programmed for upgrade in 2010/11. The 2009/10 condition and performance report recommends 620 metres of stopbanks in the Lower Waikato need urgent maintenance works. The report also recommends repairs of some stop banks, mainly due to erosion (Bell Road), stock damage (Morrison Road return banks and Mangawara Compartment 13) and vegetation overgrowth (Motukaraka Eastern).

The one bund in the zone has used only 12% of its estimated life, yet has a condition rating of 3 (fair). This bund comprises a low bank design to manage water levels within the Opuatia wetland. While its condition is low, it is not a critical item and is not at risk of failure. No remediation work is currently planned.

The pumpstation power supply and switchboard / controls assets have condition gradings of 2.9 and 2.7 respectively (good to fair). Both these asset groups are operating beyond their estimated lives (as shown in Figure 13).

A total of 64 pumpstations were inspected in the Lower Waikato zone, out of which 46 (73%) are in good condition. Nine pump stations need some maintenance work, eight require major renewal and Austin's pump station is unserviceable. The pump stations that need major renewal (condition grade 4) are:

Orton pumpstation.
Parish Polder pumpstation.
Mangatawhiri Compartment 3 pumpstation screw.
Miller Farlane pumpstation.
Tuakau pumpstation/floodgate.
Johansen's pumpstation (Franklin District Council Bonds).

Aireys pumpstation.
Hoods Landing pumpstation (Wright Gardiner).

Planned programme works on pumpstations include motors overhaul, renewal of switchboards and controls, flaps replacement, power supply, pipe work repair and screen maintenance. Planned specific works are:

Meremere Main PS – Screen, 2009/10 works programme.
Austin's PS power supply.
Mangatawhiri C3 pump building.

The condition of the Waikato River main channel has not changed since the last year's assessment. The channel from Ngaruawahia to Mercer (52.7km) has a condition grading of 2 (good) and the reach from Mercer to Port Waikato (41.7km) has a condition grading of 3 (fair).

A total of 130km of tributaries to the Waikato River were inspected. Twenty seven streams with a total length of 92km were in good condition, while only 8 (length of 38km) need some maintenance work, and mainly willow clearance. They are now part of willow maintenance programme for 2010/11. Minor erosion was also noted along some tributaries and will be part of the next year maintenance programme. In addition, Paranui drain needs channel clearance.

Majority of training lines and groynes (a total of 78) inspected are in a very good condition (grade 2), with the exception of Te Toki island groyne structure and Mercer training lines. These assets have a condition grading of 3 (fair) and are programmed for maintenance this year.

A total of 248 floodgates were inspected in 2009/10 year. The overall assessment showed that three floodgates are of major concern. Morrison Rd compartment of Mercer West scheme needs maintenance work on 2 floodgates, as culvert collapsed and are to be repaired. The third floodgate, Eastern Drain, part of the Aka Aka scheme, is programmed for an upgrade (to be redesigned). Other maintenance work includes erosion repair around inlet structure, spraying (weeds clearance) and flaps maintenance.

6.3.7 Asset capacity and reliability

Capacity
Table 25 outlines the different design capacities (where applicable) of the RCS assets within the Lower Waikato zone.

Table 25 Asset capacity

Asset group	Lower Waikato zone
Embankments	Maintained to the design crest level (flood protect + freeboard)
	Allowable settlement of 50% of the freeboard before reconstruction is required
Structures	Maintained to capacity as designed
In river structures	Maintained to ensure they are functioning as designed
Channels	Maintained in order to achieve objectives
Soil conservation	Maintained in order to achieve objectives

Reliability (performance)
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.

Performance of stopbanks
The performance of an earth structure (stopbank and detention dam) is technically assessed on the basis of the crest level compared to the design crest level and the probability of failure of the structure. Probability of failure is based on the likelihood of failure of a stopbank in an earthquake event, which might occur in 250 years. This figure combines the structural details (geometry, type of soil or construction material, location and condition) and modes of failure.

The highest grade found from the above two criteria is used as the performance measure for a particular asset.

Crest levels of the stopbanks are surveyed each five to ten years, depending on the foundation material. Five yearly cycles apply to stopbanks built on peat and marine mud, while a ten yearly cycle is for stopbanks on sand and clay foundations.

The table below shows the length of stopbanks, above design flood level by district as in the LTP document. The target percentages are shown in the section 7.10 - levels of service, performance measures and reporting and measures.

Table 26 Stop banks crest levels

Zone/district	Total stopbank length (km)	Length below design flood level (km)	Above design flood level (%)
Waikato district	172.3	0.985	98.8%
Franklin district	82.0	6.86	96.0%
Total Lower Waikato zone	254.3	7.85	96.9%

The survey of selected Lower Waikato stopbanks was undertaken in the period January – March 2010. The total length of stopbanks surveyed was 34.6 km and captured the information of 3 pump stations, 4 floodgates, Te Onetea control gate and the Waikare fishpass structures and channel rip-rap.

Out of 34.6 km of surveyed length, 26.6 km were in the Waikato District and majority (97% of the total length) is within the design standard. Less than 1 km of the stopbanks needs to be topped up (performance grades 3, 4 and 5 combined).

In the Franklin district, a total of 5.56 km of stopbanks were surveyed and 431m were found to be below design flood level. These are Mangatawhiri Compartment 1 left and right bank stopbanks. A total of 777m should be upgraded (performances grades 3, 4 and 5 combined).

7 Levels of service

7.1 Overview

Asset management (AM) planning enables the relationship between levels of service 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 levels of service they are prepared to pay for.

Defined Levels of Service (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 such 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.

7.2 Linking LoS to community outcomes

Council outcomes

As a result of the 2010 Amendment to LGA 2002, a new definition of community outcomes is now in place. The amendment shifted the previous focus upon 'multi agency community visioning' to a focus upon the specific aims of the respective local authority.

The community outcomes definition under the LGA 2002 Amendment Act 2010 is:

'the outcomes that a local authority aims to achieve in order to promote the social, economic, environmental and cultural well being of its district or region, in the present and for the future.'

However, the community outcomes developed in consultation with the regional community through the Choosing Futures Waikato (2005) process continue to be relevant in providing guidance in developing the aims of Council. The outcomes identified through Choosing Futures Waikato were:

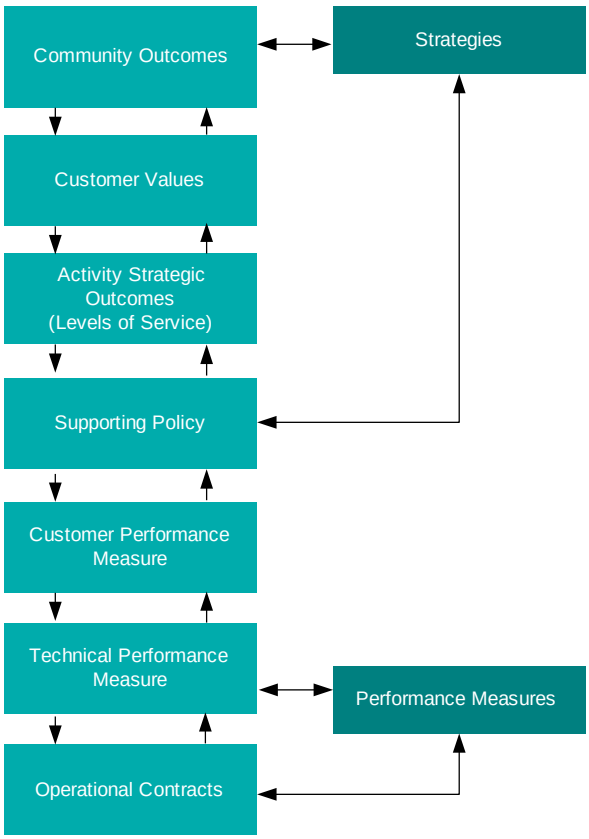
- **Sustainable environment** - the Waikato region values and protects its diverse, interconnected natural environments.
- **Quality of life** - the Waikato region is a great place to live, providing the services and opportunities we need to live well.
- **Sustainable economy** - the Waikato region balances a thriving economy with looking after its people, places and environment.
- **Culture and identity** - the Waikato region identifies with and values its land, air, rivers and waterways, mountains, flora and fauna, and its people
- **Participation and equity** - the Waikato region builds strong informed communities and has a culture that encourages people and communities to play their part.

The outcomes sought by Council within the definition of the LGA 2002 Amendment Act 2010 are:

- Community partnerships.
- Environmental quality.
- Regional economy.
- Safe and resilient communities.

RCS contributes to all of the community outcomes. The way in which the community outcomes link to levels of service is shown in Figure 15.

Figure 15 LoS linkages



7.3 LoS delivery process

Council has a number of key service providers for the delivery of river and catchment services, they are:

Internal staff.
External contractors (eg. earthworks, electrical).

Internal sections (eg. information and technology services).
Various consultants.
Government and other agencies (eg. DOC, NIWA, Fish and Game).

7.4 LoS development process

Levels of service are reviewed on a three yearly cycle as part of LTP development. As zone plans are progressively developed, the LoS contained in these plans will be reflected in the LTP. This is expected to apply as from the 2012 LTP.

7.5 Who are our customers?

7.5.1 Customer groups and their needs and wants

Zone services provide benefits to a wide range of customers at varying levels. Table 27 shows the breakdown of customer groups and their interests in zone services.

Table 27 Customer values

Category	Group	Specific needs/wants
Urban	Householders	No interior flooding of homes, basements and garages.
		Infrequent flooding of sections
		Access maintained
		No flood risks identified in LIMS
	Potential buyers	No flood risks identified in LIMS
	Users of rivers and streams	A clean and healthy environment
		Access to, use and enjoyment of natural rivers, streams and wetlands
	Road users	No road flooding which limits access to homes or businesses
Rural	Farmers	No significant loss of production or damage due to flooding
		Access maintained
		Productive capacity of farmland is maintained by reducing soil erosion
		Soil and contaminant runoff to waterways from pasture is minimised.
	Property owners most affected by flooding	Recognition of problems
		Consultation about solutions
		Economic justification for proposals
	Recognised community groups	Consultation
		Commitment to achieving agreed outcomes
Businesses	Commercial users (shops/offices)	Reasonable and equitable charges
		No flooding of premises
		Access maintained
	Industrial users	Reasonable and equitable charges
		No impact from flooding
		Maximum use of site or premises
Key stakeholders	Liaison subcommittee	Community engagement
		Responsiveness
	Special ratepayers	Community engagement
		Responsiveness
		Reasonable and equitable charges
	Other authorities	Appropriate risk management
	Central government	Minimum impact on state highway network from flooding
	LTNZ	Cooperation in mutually beneficial projects
	DOC	Water quality in streams and rivers maintained and enhanced
	Environmental groups	Minimum impact on the environment

	Tangata whenua	Water quality in streams and rivers maintained and enhanced
		Consultation about activities with environmental impact
		Recognition of status
		Consultation regarding cultural and environmental impacts

7.5.2 Consultation

Development of the original 1997 LWWCCS asset management plan involved extensive consultation with scheme beneficiaries and the community. The key issues which were identified as a result of this consultation were:

- The estimated costs for sustainable ongoing management of river and catchment issues.
- The fragmentation of responsibility for managing these issues between Council and the territorial local authorities.
- Inadequate and fragmented funding mechanisms.
- The responsibilities of central government, central government agencies and SOEs such as Transit New Zealand (now NZTA), Mighty River Power etc for contributing to addressing these issues.
- Lack of protection in some areas where there was a demand from landowners.

Most of the above issues are now substantially resolved.

Aside from these specific issues, consultation has indicated that there is a general consensus amongst scheme beneficiaries as to the appropriateness of the overall design standards and the levels of protection provided for.

Maintaining an understanding of changing customer expectations is an ongoing process and is carried out through formal and informal consultation with customers. To achieve the former, Council decided to establish permanent liaison subcommittees within each of the eight zones within the region where river and catchment management services are provided. The Lower Waikato Zone Liaison Subcommittee was formed in 1999, and included representatives from the drainage areas and TAs. This subcommittee meets three to four times a year with the objective of reviewing the maintenance and capital works programmes and over viewing the management of service delivery. The zone subcommittees report to, and make recommendations to, Council's Catchment Services Committee. Additionally, all customers have access to the annual plan and LTP process, where they can lodge submissions on the scheme works programmes or raise issues of concern.

Informal customer liaison is also undertaken by operations field staff, who work closely with landowners in regard to specific works and maintenance issues.

In future it is also proposed to establish a customer service page on the Council's website to enable customers to raise issues and to request further information on areas of interest or concern.

7.6 Establishing core customer values

Core values provide the cornerstone to the development of levels of service from both a customer and technical point of view. The "Developing Levels of Service and Performance Measures" Manual describes customer (Core) values for Council activities. It is important for the customers and the Council to consider which of these are most important as the priorities flow into the final required levels of service. (Source LTP).

- Affordability.
- Quality.
- Community engagement.
- Safety.
- Sustainability (whole of community benefits).
- Reliability/responsiveness.

7.7 Linking customer values to community outcomes

The matrix below has been developed to demonstrate how the customer values link to the community outcomes (Table 28).

Table 28 Linkage of community outcomes & customer values

Community outcome	Customer value				
	Affordability & quality	Safety	Sustain ability	Community engagement	Reliability/ responsiveness
Environmental quality	✓		✓		✓
Safe and resilient communities	✓	✓	✓		
Regional economy	✓		✓		✓
Community partnerships				✓	

7.8 Activity levels of service outcomes

As part of this ZMP, further work has been undertaken to develop Activity Levels of Service Outcomes for the RCS activity. These are described in the Table 29 below and are aligned with the customer values.

The core values considered to be important for the RCS in activities are as follows:

Table 29 RCS customer values (NAMS) and activity levels of service outcomes

Customer value	Activity levels of service outcomes
Affordability quality	Costs for services are distributed equitably. Services provided perform to agreed levels and standards. Statutory requirements and legal obligations are met.
Safety	People and property are safe from hazards associated with flooding and erosion.
Sustainability (whole community benefits)	The net outcome of provision of RCS services is an enhancement of the environment. Services are managed for the social, cultural, economic and environmental well being of current and future generations.
Community engagement	Decision-making processes are transparent and easily understood. Work with stakeholders to achieve mutual objectives. We will consult with all relevant iwi and specifically in regard to implementation of Treaty settlements and co-management arrangements.
Reliability/ responsiveness	Response to requests, complaints and events is timely and appropriate solutions are provided.

7.9 Levels of service – specific activities

The level of service provided in the zone was initially established when the LWWCS was designed in 1959 (WVA, 1959). A comprehensive post completion review of the scheme and its performance was completed in 1983 (WVA, 1983). The design service levels were confirmed through an extensive consultation process undertaken in 1997 when the first asset management plan was developed. Similar extensive consultation was undertaken during the Waikato Catchment Services funding review process (Project Watershed) completed in 2002.

Customers are largely satisfied with the current levels of service provided. The overall performance of the zone works in terms of the levels of protection provided against flooding and other hazards is deemed to be satisfactory. There is however demand among landowners for upgrading the level of service in some areas and to provide new works in other areas. These capital works will be managed in accordance with the capital works programme and in consultation with key stakeholders and the zone catchment liaison subcommittee.

The existing and proposed levels of service for the zone are outlined in the following tables. These align with the community outcomes detailed in paragraph 7.2 and the Lower Waikato zone vision, goals and objectives outlined in section 3.2. Each level of service statement is accompanied by one or more performance measures. The proposed levels of service and the accompanying performance measures are largely derived from a more formal definition of existing practice. This will provide enhanced ability for measuring performance and thus increase both the accountability and transparency of service delivery. Performance of zone assets against the agreed LoS will form part of the annual reporting annual and/or LTP reporting process

Activities provided within the Lower Waikato zone include:

Catchment management

- Stability of steep erosion prone catchments/soil conservation.
- Reduction of sediments release into streams and river systems.
- Water quality improvement and enhancement of environmental and biodiversity values.
- Lakes management.

River management

Tributary streams and channels:

- Maintain all tributary streams and floodway channels free of debris and blockages.
- Ensure hydraulic conveyance capacities of tributaries and channels

can adequately accommodate design flood flows.

- Ensure stability of the river system.

Waikato River main channel

- Managed to accommodate flood flows at the stopbanks design flood levels.
- The banks of the main river channel provide stable foundations for the stopbanks and other scheme structures.
- Public access to the river is maintained and natural environmental values associated with the river are enhanced.

The Lower Waikato Asset Management Plan 1997 defines the management objectives and performance standards for the channel of the Lower Waikato River. The hydraulic performance standard is set in terms of the water level profile of a constant standard flow "Low Winter Flow" of 350 m3/s. The standards as stated in the plan are as follows:

- Maintain the channel of the Lower Waikato River to ensure that water levels for the 350 m3/s discharge can be passed at or below those set out in Appendix 3b.
- Maintain the optimum hydraulic low flow channel width of 220m between Rangiriri and Mercer.
- Maintain design freeboards for the stopbanked areas either by maintaining channel capacity or increasing stopbank levels.
- Maintain the channel of the Waikato River substantially free of major obstructions and impediments to normal and flood flows.
- Maintain the riverbanks adjacent to the hard defences of the Scheme to protect against erosion, which may threaten these assets.
- Provide limited assistance to landowners adjacent to the Lower Waikato River to protect against erosion of the riverbanks where no Scheme hard defences are under threat.
- Council will encourage commercial sand abstraction in the Lower Waikato River where such operations will aid in performance measures outlined above, and where it is undertaken in accordance with the requirements of the Resource Management Act 1991.

Flood protection

- Protection of Huntly Township against flooding in the Waikato River up to a 100-year event with 600-mm freeboard. The design100 year flood flow within this reach is estimated to be 1840 m3/s.
- Protection of the rural farmland between Huntly and Rangiriri along the east bank and Huntly to Lake Whangape on the west bank against flooding of the Waikato River up to a 100-year with 300-mm freeboard. The design100 year flood flow within this reach is estimated to be 1840 m3/s.
- Protection of specific rural farmland compartments on both sides of the river between Rangiriri and downstream including Te Kohanga (minor) on the west bank/ and excluding Aka Aka on the right bank with the exception of Meremere East compartment, against flooding of the Waikato river up to a 20-year flood event with 600-mm freeboard. The 20-year flood flow within this reach was estimated to be 1140 m3/s.
- Diverting up to 280 m3/s over the Rangiriri spillway into Lake Waikare in a 100-year flood event. The spillway is to operate when the Waikato river flow at Rangiriri exceeds the 50-year flood, which is estimated to be1350 m3/s. The Lake level is controlled to ensure capacity for flood storage during a design event is retained at all times.
- Protection of the Meremere East compartment against flooding up to a 100-year flood event with 300-mm freeboard. The design100-year flow within this reach was estimated to be 1560 m3/s.
- Protection of the rural land on both sides of the Waikato River within specific compartments between Te Kohanga (Major) on the left bank/ Aka Aka on the right bank and downstream to Port Waikato against flooding up to 100-year event with 300-mm freeboard. The design 100-year flow within this reach was estimated to be 1590 m3/s.
- Off main channel protection
  - Compartments on the western side of Lake Whangape (Ruawaro and Deroles) are protected against flooding up to a 20-year flood event in the Waikato River (1140 m3/s) with 600-mm freeboard.
  - Compartments along the northern foreshores of Lake Waikare are protected against flooding up to 100-year flood event in the

Waikato River. The lake level is estimated to reach RL7.37-m under such an event.

- Compartments around the Whangamarino wetland are protected against flooding up to a 100-year flood event in the Waikato River with 450-mm freeboard. The wetland level is estimated to reach RL 5.85-m under such an event.
- Compartments on the Mangatawhiri River are protected against flooding of the Mangatawhiri River up to a 7-year flood event for the compartments upstream of SH2 and 20-year flood event for the compartments downstream of the SH2 with variable freeboard.
- Compartments within the Mangawara River system are protected against flooding of the Mangawara River up to a 50-year flood event with variable freeboards.

- Associated with the stopbanks and spillways are floodgates and pump stations, designed to facilitate drainage and reduce extent of ponding behind protected/stop-banked areas.

7.10 Levels of service, performance measures and reporting

7.10.1 Identifying and linking customer and technical levels of service

It is critical that from community outcomes to operational contracts, linkages need to be made clear.

The following tables are based on the NZ NAMS "*Developing Levels of Service and Performance Measures*" Manual. They have been developed to be presented for further community consultation. They group all the levels of service measures under the six main service levels, namely:

- Flood protection levels of service.
- Environmental levels of service.
- Community engagement levels of service.
- Reliability and responsiveness levels of service.
- Affordability levels of service.
- Service provision levels of service.

Each table provides the following:

- Definition of the level of service.
- Linkage to community outcomes
- The customer value the service level aims to provide.
- Customer measure (with targets if applicable).
- Technical measure (with targets if applicable).
- Description of how the service level will be achieved.
- Description of how achievement of the service level will be measured.

Table 30 Flood protection levels of service

Flood protection levels of service					
Level of service	**People and property are safe from hazards associated with flooding and erosion**				
Links to community outcomes	Community partnerships	Environmental quality	Regional economy	Safe and resilient communities	
Customer value	The core customer values this service aims to provide are: • Quality • Safety				
Customer measure	Zero failures of flood protection system below specified design levels				
Technical measure	Stopbanks maintained to the stopbank design standard and above design flood heights (LTP measure)				
Targets	Current performance	Year 1 target 2012/13	Year 2 target 2013/14	Year 3 target 2014/15	Years 4-10 target 2015-21
Percentage maintained to design standard and above design flood heights	87%	89%	90%	91%	92-98%
How we will achieve this level of service	• By maintaining stopbanks to the stopbank design heights, achieving performance grade 4 or better • By maintaining all stopbanks, pump stations, flood gates, detention dams and control structures at Condition Grade 3 or better • By maintaining operational readiness of all pump stations, control structures and flood gates (LTP measure) • By diagnosing failed pump stations or flood gates within 24 hours of being identified, and remedying within 2 days (LTP measure) • Asset operating as designed (capacity and function) • By reporting, recording and investigating all health and safety incidents to comply with Council Health and Safety Policy				
How we will measure if target is achieved	The following procedures will measure whether performance targets are achieved: • 5-10 yearly crest level survey • Annual performance and condition inspections • Monthly operational inspections and failure reports • 10 yearly capacity audits • 10 yearly dam safety inspections and audits • Design level flood review • Annual health & safety audits				

Table 31 Environmental levels of service

Environmental levels of service					
Levels of service	**Adverse environmental effects are minimised**				
Links to community outcomes	Community partnerships	Environmental quality	Regional economy	Safe and resilient communities	
Customer value	The core customer value this service aims to provide is: • Sustainability				
Customer measure	Number of customer complaints related to the river catchment environment				
Targets	Current performance	Year 1 target 2012/13	Year 2 target 2013/14	Year 3 target 2014/15	Years 4-10 target 2015-21
Adverse environmental effects reported	<10 per year	<5 per year	<5 per year	<5 per year	<5 per year
Technical measure	Best practice guidelines are followed in service provision				
How we will achieve this level of service	We will achieve these service levels by: • Conducting monitoring in priority areas • Conducting environmental surveys in targeted catchments • Compliance with the Resource Management Act 1991 (RMA) and Regional Policy Statement (RPS)				
How we will measure if target is achieved	The following procedures will measure whether performance targets are achieved: • Complaints reporting • Environmental reporting to Council • Auditing of performance				

Table 32 Community engagement levels of service

Community engagement levels of service				
Levels of service	**Decision-making processes are transparent and easily understood** **To work with stakeholders to achieve mutual objectives** **Consult with iwi** **Outcomes of Treaty settlements and co-management arrangements are considered in river and catchment decisions**			
Links to community outcomes	Community partnerships	Environmental quality	Regional economy	Safe and resilient communities
Customer value	The core customer value this service aims to provide is: • Community engagement			
Customer measure	Opportunity to provide input to Council through a process that is clear and easily understood			
Technical measure	Submissions on the Annual Plan and Long Term Plan are analysed, and written feedback is provided to submitters			
How we will achieve this level of service	We will achieve these service levels by: • Producing one newsletter per year or when needed • Publishing information on the website and keeping the website up-to-date • Maintaining a consultation register, including public meetings and submissions • Publishing decisions annually • Subcommittee reporting 3 times per year • Subcommittee and other stakeholder meetings as required • WRC meeting legal co governance obligations • Providing Iwi opportunities to be represented on the scheme liaison subcommittee			
How we will measure if target is achieved	The following procedures will measure whether performance targets are achieved: • Zone Management Plan, Long Term Plan and Annual Plan review process • Sign off on ZMP by Office of Auditor General			

Table 33 Reliability and responsiveness levels of service

Reliability and responsiveness levels of service					
Levels of service	**Information readily available (in order to respond to requests and events allowing timely and appropriate solutions to be provided)**				
Links to community outcomes	Community partnerships	Environmental quality	Regional economy	Safe and resilient communities	
Customer value	The core customer values this service aims to provide is: • Reliability / responsiveness • Safety				
Customer measure	Enquiries and complaints dealt with promptly and to customer satisfaction				
Targets	Current performance	Year 1 target 2012/13	Year 2 target 2013/14	Year 3 target 2014/15	Years 4-10 target 2015-21
Reported customer complaints	< 10 complaints per year	<5 complaints per year	<5 complaints per year	< 5 complaints per year	< 5 complaints per year
Technical measure	Enquiries and complaints are dealt with in accordance with the Council Customer Charter				
How we will achieve this level of service	We will achieve these service levels by: • By complying with the customer charter • Ensuring all flood warnings at predetermined levels are given in accordance with the flood warning manual • Making river level and rainfall information and situation reports readily available on the Council website and being able to respond effectively to flood events (LTP measure)				
How we will measure if target is achieved	The following procedures will measure whether performance targets are achieved: • By maintaining a record of enquiries, resulting actions and response times				

Table 34 Affordability levels of service

Affordability levels of service				
Levels of service	**Costs for services are distributed equitably** **Services are managed for the benefit of current and future generations**			
Links to community outcomes	Community partnerships	Environmental quality	Regional economy	Safe and resilient communities
Customer value	The core customer value this service aims to provide is: • Affordability			
Customer measure	Customers are satisfied that charges for rivers and drainage services and management are fair.			
Technical measure	All projects achieve a cost benefit ratio < 1			
How we will achieve this level of service	We will achieve these service levels by: • Undertaking a zone level cost benefit analysis over a 20 year cycle • Developing a rolling programme to review zone and local protection areas (benefit received) • Ensuring intergenerational equity by accounting for loss of service potential when it occurs (depreciation) • Allocating costs according to the funding policy • Reviewing zone funding policy in relation to benefit allocation • Maintaining competitive and fair full-cost pricing of zone maintenance and works, compliant with the Council Contracts Manual			
How we will measure if target is achieved	The following procedures will measure whether performance targets are achieved: • Contract records and documentation • Zone funding policy • Annual reporting of customer submissions to Council • Auditing of depreciation			

Table 35 Service provision levels of service

Service provision levels of service				
Levels of service	**Services are provided and perform to agreed levels and standards**			
Links to community outcomes	Community partnerships	Environmental quality	Regional economy	Safe and resilient communities
Customer value	The core customer value this service aims to provide is: • Quality			
Customer measure	Priority catchments and river systems are maintained to agreed standards and performance levels			
Technical measure	The capacity, stability and condition of the Waikato River channel and designated tributaries are maintained to the agreed performance levels			
How we will achieve this level of service	We will achieve these service levels by: • Maintaining existing catchment works to specified standards (Doc# 1648715) (LTP measure) • Following-up any non compliance with Land Improvement Agreements conditions within agreed process (Doc 1421068) (LTP measure) • Maintaining channels free of obstructions or significant blockages on a prioritised basis and where practicable • Addressing river and stream bank erosion on a prioritised basis and where practicable • Managing pest plants where they may impact upon capacity and flow and on a prioritised basis • Maintaining riparian margins (of Council owned land) by planting, stock exclusion and/or erosion protection • Achieving low winter flow performance standard of Waikato River channel • Introducing regional channel capacity guidelines (improvement plan) • Maintaining the river systems to condition grade 3 or better			
How we will measure if target is achieved	The following procedures will measure whether performance targets are achieved: • Monitoring main channels via cross section surveys on a 10 yearly basis • Audits and inspections • Annual inspection and maintenance programme • Bi-annual failure logging • 5 yearly water level profile measurement of Waikato River			

7.11 Future levels of service improvement

Council is progressively working through a robust LoS development and community agreement process as outlined and flow-charted earlier in this section. Below are the key tasks and timeline for development of levels of service.

Currently identified improvements relating to levels of service include:

- Identify, review, develop, and define river, flood and catchment performance levels.
- Introduce regional channel capacity guidelines.
- Define flood gate capacity guideline.
- Develop a monitoring programme for the monitoring of under-performing pump stations or flood gates.
- Identify best management practice document for compliance with Resource Management Act 1991, Regional Plan and Council's Environmental Guidelines.
- Continued development of process to ensure full compliance including reporting, ISO accreditation.
- Develop formal procedure to assess, prioritise and implement capitalising on significant opportunities to work with other agencies or community groups on projects that align with zone outcomes.
- Develop optimised renewals and replacements decision making prioritisation process.
- Adopt from 2012/2013.

8 Risk management

8.1 Overview

RCS risk management planning will provide the basis for future risk analysis and improvement planning.

This section covers the risk management implemented by Council and how these apply to current and future river and catchment services activities. In addition, an overview of risk management is provided along with suggested improvements to current practices.

The objective of risk management is to identify the specific business risks, together with any possible risks associated with the ownership and management of the RCS assets and provision of services. This can be used to determine the direct and indirect costs associated with these risks, and form a priority-based action plan to address them.

8.1.1 Putting the risks into perspective

Council policy and operation cannot influence all the factors contributing to these events. However, Council has a responsibility to assess the risks in order to best manage the activity with the resources available to avoid and mitigate the effects of any event.

Council has grouped risk into four activity areas these being:

- General Risks (GR)
- River Management (RM)
- Flood Management (FM)
- Catchment Management (CM)

Risk under each of these activity areas has been assessed in the Zone Risk Register via the risk management process described within this section. Risks, which after having been assessed remain with a high or extreme rating, are captured in the overall Action Plan contained in this Section of the ZMP.

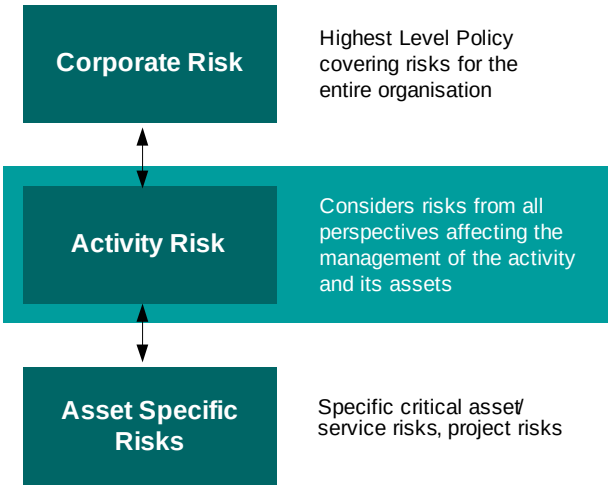
8.1.2 Level of risk

The purpose of the risk plan is to identify the risks associated with RCS activities and assets. This requires approaching the risks from many perspectives - financial, operational 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. Figure 16 shows the levels of risk.

Figure 16 Levels of risk



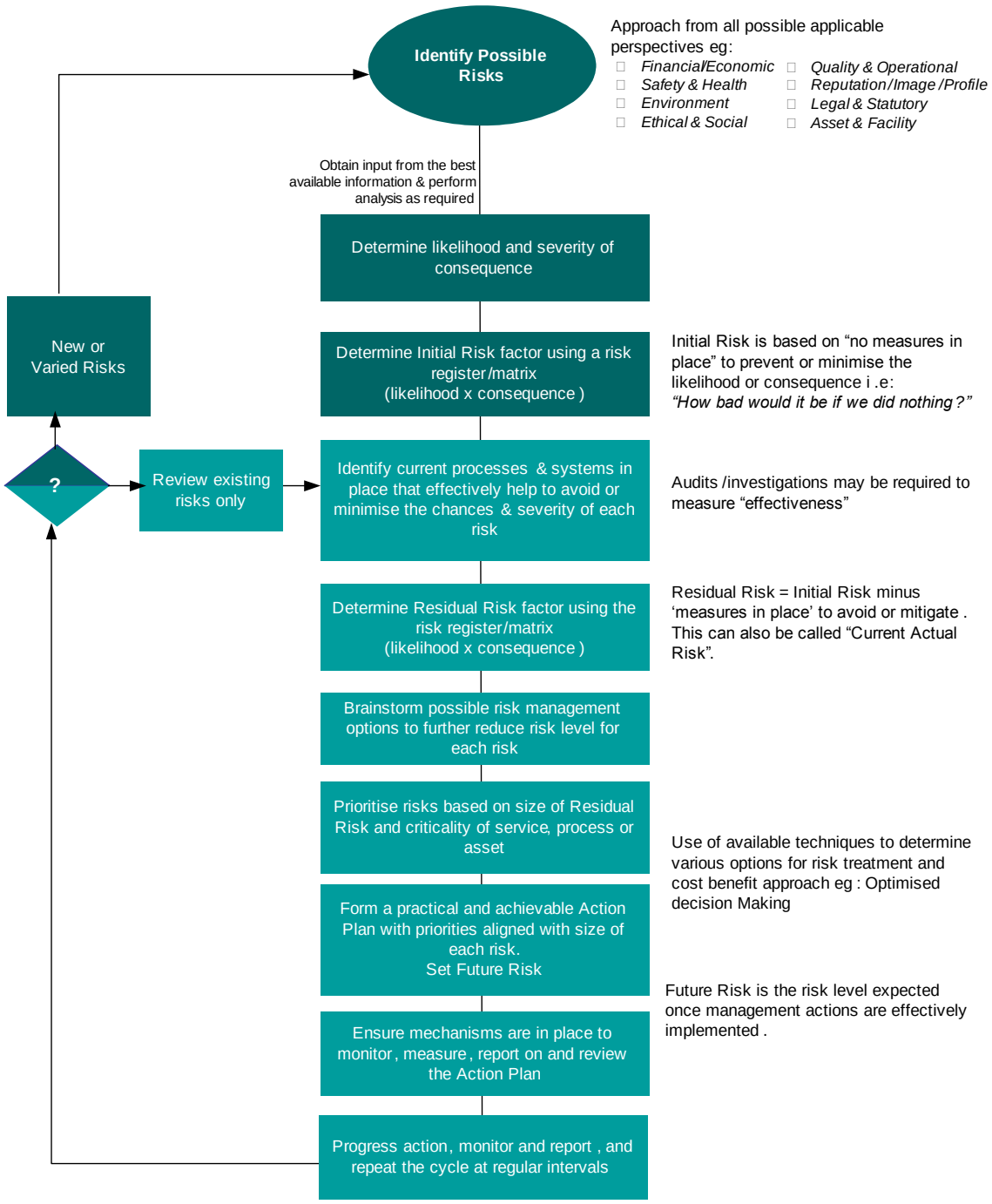
8.2 Current situation

Corporate policy
Council is currently in the process of developing a corporate risk policy and a Risk and Assurance team, which will have an overview of all risk exposures within the organisation, including corporate, financial, customer, and assets. Infrastructure Services staff will contribute regularly to the work of this group. Each risk identified in this plan will be entered into the corporate risk register.

8.3 Risk management process

The following flowchart and text details the key elements of the risk management process undertaken.

Figure 17 Risk management process



The following sections expand upon the risk management process as identified in the previous flowchart. The risk assessment process has been generally based upon the Australian New Zealand Risk Management Standard 4360:2004 to establish a Risk Matrix as shown in Table 38. While it is noted that AS/NZS 4360: 2004 has recently been superseded by ISO 31000 the process and outputs undertaken under AS/NZS 4360 align fully with ISO 31000. 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. The first step in the process is to identify all possible risks.

8.3.1 Identify possible activity risks

All possible risks affecting the RCS activity need to be identified. Risks can include financial, environmental, social, operational and health and safety considerations. Once identified, risks are entered into the risk register (see Appendix 4). The register is used to record and summarise each risk and to outline current mitigation measures and potential future management options.

Potential consequences of risk are wide-ranging in relation to activities. Those relevant to the river and catchment services activity are:

Financial	Operational
Economic	Reputation / image
Health and safety	Environment
Legal	Ethical / social

8.3.2 Determine likelihood and consequence for initial risk factor

Table 36 and Table 37 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 following table.

Table 36 Risk probability ratings

Likelihood	Descriptor	Probability
Rare	May occur only in exceptional circumstances e.g. once in 10 years	1
Unlikely	Could occur only very occasionally e.g. 2-3 out of every 10 years	2
Moderate	Might occur from time to time e.g. 5 out of every 10 years	3
Likely	Will probably occur often e.g. 7 out of every 10 years	4
Almost certain	Is expected to occur in almost all circumstances e.g. 9 out of every 10 years	5

The consequence descriptors in Table 37 indicate the level of possible consequences for a risk.

Table 37 Risk consequence ratings

Factor	Catastrophic	Major	Moderate	Minor	Insignificant
Score	**5**	**4**	**3**	**2**	**1**
Financial	Loss of $10 million or greater	Loss between $250,000 and $10 million	Loss between $100,000 and $250,000	Loss between $20,000 to $100,000	Loss less than $20,000
Public and staff	Loss of life or permanent staff turnover exceeds 30% p.a.	Injury with 3+ months time-off or permanent staff turnover 20% to 30% p.a.	Injury with 2 weeks to 3 months time-off or permanent staff turnover 15% to 20% p.a.	Injury with less than 2 weeks time-off or permanent staff turnover 10% to 15% p.a.	Nil or permanent staff turnover 0% to 10% p.a.
Legal	Litigation / significant prosecution	Minor litigation	Enforcement notice	Non compliance	Minor issues with non compliance
Political	Nation-wide one week adverse political comment	Nation-wide several days adverse political comment	Regional several days adverse political comment	Local 1 week adverse political comment	Local one day adverse political comment
Image	Negative multi-media nation-wide coverage for 2 weeks +	Negative multi-media nation-wide coverage for up to 2 weeks	Negative multi-media nation-wide coverage for several days	Negative multi-media nation-wide coverage for 2 days	Negative regional multi-media coverage for up to 2 days
Operational	Serious loss of operational capability for over 4 weeks and serious disruption to service levels	Serious loss of operational capability for over 2 weeks and major disruption to service levels	Serious loss of operational capability for over 1 week and disruption to service levels	Loss of operational capability in some areas and some disruption to service levels	No loss of operational capability or negative disruption to service levels

After the likelihood and consequence factors have been determined, the level of risk is calculated by multiplying the Likelihood of Occurrence (Table 36) and Consequence Rating (Table 33) together. Risk = the likelihood of an event occurring multiplied by 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 (see Table 38 & Table 39).

Table 38 Risk assessment matrix

	Consequence				
Likelihood	**Insignificant (1)**	**Minor (2)**	**Moderate (3)**	**Major (4)**	**Catastrophic (5)**
Rare (1)	I	I	L	L	M
Unlikely (2)	I	L	M	M	M
Moderate (3)	L	M	M	H	H
Likely (4)	L	M	H	H	E
Almost certain (5)	M	M	H	E	E

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 39 Comparative levels of risk

I	Insignificant risk	Examine where un-needed action can be reduced
L	Low risk	Managed by routine procedures
M	Medium risk	Management responsibility must be specified and risk controls reviewed through AMP
H	High risk	Senior management attention to manage risk
E	Extreme risk	Immediate action required to reduce risk

Initially, the Initial 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 Initial risk is an exercise to determine "What is the worst that could happen?" Once the Initial 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.

8.3.3 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 proves otherwise. Audits can be identified as part of the improvement process.

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

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

8.3.4 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.

8.3.5 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

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

8.3.6 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 Residual 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 LTP/ Annual Plan consultation process using benefit / cost analysis plus the following additional criteria:

- Contribution to Council's LTP community outcomes.
- Contribution to Council'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 40 provides more detail with regard to future actions/tasks required for future stages of risk management, which include the ranking outlined above.

8.3.7 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 initial risk also needs to be re-evaluated.

8.4 Risk register

The risk registers provided in the following tables for the current and future RCS activities have been developed in consultation with key staff. The risk register is outlined within Appendix 4.

8.5 Risk action plan

Table 40 is compiled from the Risk Register and highlights the most significant residual risks faced by river and catchment services within the Lower Waikato zone. The main risks are listed in order of severity (residual risk) as assigned.

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.

Monitor, measure, report, review plan and actions

Management options listed in the risk tables have been refined into actions for each risk listed. These are the actions that are required to cost-effectively reduce the Residual risk by increasing Council's ability to minimise the chances of the risk event occurring, or minimising the consequences should it occur.

Actions should consider the overall management of the asset, not just the minimisation of risk. If possible, proposed actions should align with other initiatives to:

- Reduce capital investment costs.

- Reduce operating and maintenance costs.
- Reduce business risk exposure (BRE).
- Increase effective asset life / value.
- Increase level of service.

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.

The monitoring/reporting column of the Risk Action Table specifies:

- Responsibility: Nominated person responsible for ensuring the risks are managed and those improvements are carried out in accordance with the programme.
- Timeframe: Achievable target date to be monitored and reported against.
- Method and frequency of monitoring: This entire action table will be monitored by the asset manager, but there will be certain actions that are being monitored and reported in other forums. These forums are to be specified and the frequency with which these actions will be reviewed.

The actions listed will be reported, monitored and reviewed regularly by the asset manager.

As necessary, the asset manager will need to revise timeframes, responsibility, and even the appropriateness of continuing with the proposed action, or adding new actions.

As actions are completed, the residual risk should reduce in most cases. The risk tables will need to be reviewed against these and updated to reflect these improvements.

Table 40 Zone management risk action plan – River and Catchment Services

Risk No	Risk descriptor	Type of risk	Initial risk	Residual risk	Management options available	Risk owner (name and title)	Risk appetite *Accept = Current Practice, P1 = Urgent, P2 = Routine*	Pinpoint management actions	Monitoring / reporting	Time frame	Costs / resources	Future risk
GR24	**Inadequate business continuity planning** **Caused by:** Infrastructure (communications, power, etc.) Essential Services (Transport, etc.) Fire Damage, Water Damage, etc. **Consequences:** Serious loss in public confidence Reduced public/ staff health and safety Damage to Council infrastructure Damage to Council property Loss of service Loss of information	Financial Operational Economic Reputation / Image Health and safety	E	H	Maintain/develop business continuity plans	Group manager RCS EMT	P1	Review current BCP and supporting document, identify gaps, implement actions and/or processes to close	Divisional manager CDEM manager	12/13	TBC	M
GR29	**Climate change** **Caused by:** Changes to global climate **Consequences:** sea level rise and more frequent and severe storms Requirement to replace assets earlier and / or more frequently Community expectation that service levels will be maintained Higher funding	Financial Operational Environment Health and safety	H	H	Continue current practice Upgrade assets to offset climate change effects	Divisional manager Group manager	P2	Monitor national climate forecasts (MfE) Undertake annual review of service levels and design standards incorporating any assessment of the potential effects of climate change Incorporate MfE information in service level reviews	Zone manager Assets manager CDEM manager	on-going	TBC	M

Risk No	Risk descriptor	Type of risk	Initial risk	Residual risk	Management options available	Risk owner (name and title)	Risk appetite *Accept = Current Practice,* *P1 = Urgent,* *P2 = Routine*	Pinpoint management actions	Monitoring / reporting	Time frame	Costs / resources	Future risk
	requirements Ability to pay Adverse environmental impact Higher risk of asset failure Reduced land use opportunities Disruption of community infrastructure											
GR30	**Conflicting Objectives/ Aspirations (External)** **Caused by:** Increasing environmental standards Treaty Settlements Environmental restoration projects **Consequences:** Difficulty in renewing resource consents Increased maintenance costs Services not sustainable	Financial Operational Economic Reputation / Image Environment Legal	E	H	Better understanding of process, inter-connections, and benefits Mutually beneficial projects (win-win) Facilitation and agreement, mutually agreed outcomes Negotiated solutions	Group Manager, RCS Divisional Manger Zone Manager	P2	Develop and implement targeted communications plan to improve the process for communicating long term objectives with stakeholders	Divisional manager Zone manager Liaison sub committee	On going	TBC	M

9 Financial management

9.1 Overview

9.1.1 Introduction

In order to undertake a sustainable, long-term approach to the management of infrastructure assets within the catchment zones it is essential to prepare long-term financial forecasts. This allows a long term view of how assets will be managed, the associated costs 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 zone plan such as:

- Community engagement and consultation.
- Levels of service.
- Demand management.
- Lifecycle management.
- Condition assessments.
- Asset lives.
- 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.

Office of the Auditor General (OAG) criteria requires that asset management planning should translate the physical aspects of planned maintenance, renewal and new work into financial terms for at least the ensuing 10 years and in a manner that is fair, consistent and transparent.

The forecasts should include sufficient information to enable the decline in service potential (depreciation) of an asset to be measured. (Guidance on depreciation is included in the NZ Valuation and Depreciation Guidelines).

Planning should translate the physical aspects of planned operational, maintenance, renewal and new works into financial terms;

- Generally over the timeframe in which the asset must deliver services.
- In more specific terms, over the period for which the organisation has a strategic plan.
- The assumptions underpinning financial forecasts should be disclosed in the organisations strategic plans and the asset management plans.
- The compilation of financial forecasts should be consistent, reliable and provable.

The confidence in the underlying data upon which the financial forecasts are based is discussed in section 6.3.2.

9.2 Expenditure

All costs incurred through the ownership of infrastructural assets and that directly relate to the running of those assets fall into two categories - capital/renewal expenditure or maintenance expenditure. Under the generally accepted accounting practice (GAAP) the following definitions need to be applied to the treatment of costs against infrastructure assets.

9.2.1 Operations and maintenance expenditure

Expenditure - “Costs which are repairs and maintenance should be expensed.”

Maintenance costs are generally subdivided into 3 groups; these are described inTable 41.

Table 41 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

All maintenance costs are written off in the year of expenditure.

9.2.2 Replacement/ renewal expenditure

“Costs which restore and sustain the intended service potential of the network is renewal expenditure and should be capitalised.” An example of this work is the de-siltation of artificial channels to return them to the design standard.

Renewal expenditure is treated in the same way as capital expenditure. For accounting purposes, any work performed on an asset that has previously been classified as renewal costs will be subject to these guidelines and now be classified as capital expenditure.

9.2.3 Capital (new works) expenditure

“Costs which add to the service potential of the network as a whole”. These expenses should be capitalised and depreciated.

For new capital works, the scheme contributes 25% of the total capital works costs, while the direct beneficiaries contribute the remaining 75% of the cost.

9.2.4 Zone management assumptions

The financial summary presented in the plan is based on the 2012/22 Long Term Plan adopted by council in June 2012. This included a review of the key financial management principles applied to the zone, including:

- Definition of a zone reserving policy.
- Capital funding mechanisms.
- Insurance framework for zone assets.

This zone plan has been prepared subject to the following limitations and assumptions:

- The plan is based on currently available information and data.
- Effects of climate change are considered based on the Ministry for the Environment Guidelines.
- Financial forecasts are limited to 10 years.
- Financial estimates were updated as part of the 2012 LTP preparation/adoption process.
- Land use within the protected compartments will remain the same.
- Existing levels of service are to be maintained.
- Consultation with the community has been ongoing since the adoption of the last asset management plan (which this zone plan replaces). Targeted consultation in the development of this plan has been focused on input from community representatives associated with the catchment liaison subcommittee.
- There will be minimal change in applicable standards and technologies over the life of the plan.
- This plan has not considered future budget constraints.
- This plan has not considered changes to the Resource Management Act and the influence this will have in this activity area.
- The plan has not made any specific provision for management and governance changes that may result from co-management.

9.3 Summary financial forecast

The Lower Waikato zone services are provided on an annualised maintenance cost basis. While there are activities on specific types of assets that are not carried out each year, the work is spread as evenly as possible across each year. For example, stop bank crest level surveys are undertaken on a 10 yearly frequency, and therefore the aim is to survey one tenth of the schemes stop banks each year on a rolling cycle.

Table 42 and Figure 18 below provide summary of the 10 Year financial forecast for Lower Waikato zone.

Table 42 10 year financial forecast

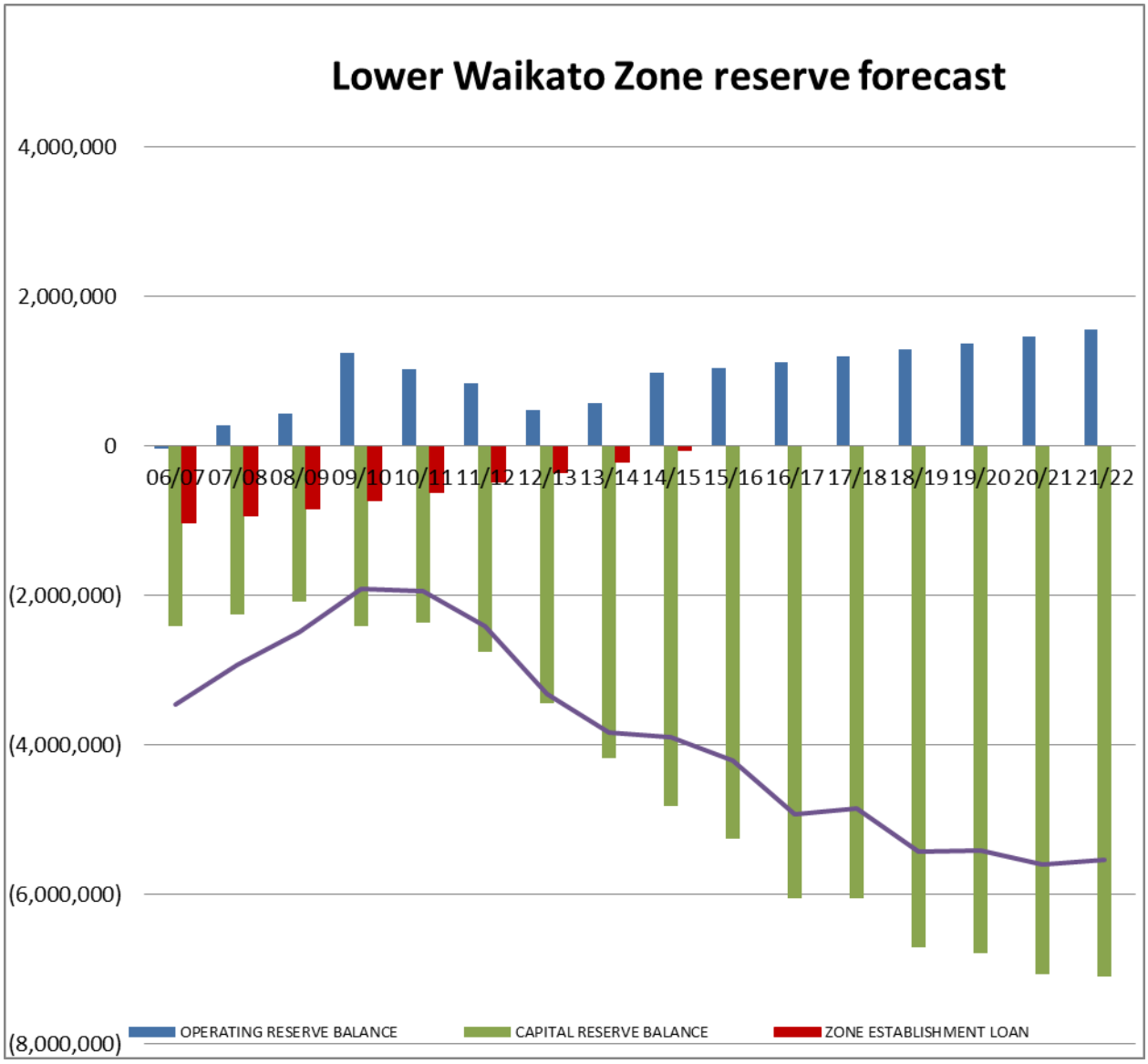
	08/09	09/10	Budget figures 10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22
	Actual	Actual	Actual	Actual	LTP	LTP	LTP	LTP	LTP	LTP	LTP	LTP	LTP	LTP
MAINTENANCE														
Catchment oversight	79,921	272,060	354,156	353,374	959,963	1,030,132	1,072,884	1,074,487	1,136,584	1,132,172	1,165,469	1,196,327	1,220,065	1,312,582
Information & advice	60,358	66,119	73,812	49,765	115,511	153,922	158,229	164,416	152,918	127,101	130,839	136,133	139,424	144,277
Catchment maintenance	18,186	7,534	4,515	5,928	33,471	35,412	36,789	38,024	38,959	39,935	41,123	42,538	43,565	45,044
Catchment new works	185,075	246,750	191,510	166,413	200,227	209,188	216,206	246,114	276,626	283,534	291,519	301,574	309,079	319,036
River management	233,320	253,251	182,387	133,743	279,690	279,997	293,161	302,234	310,356	319,002	328,440	338,236	347,249	358,587
Flood protection	2,056,903	1,701,595	2,082,717	2,215,209	2,104,069	2,387,301	2,464,146	2,433,174	2,510,822	2,706,885	2,792,888	2,749,779	2,838,565	2,938,377
Total Maintenance Costs	**2,633,763**	**2,547,310**	**2,889,097**	**2,924,432**	**3,692,931**	**4,095,952**	**4,241,415**	**4,258,449**	**4,426,265**	**4,608,629**	**4,750,278**	**4,764,587**	**4,897,947**	**5,117,903**
Depreciation [1]	1,049,124	1,374,238	1,202,774	1,122,706	1,066,167	1,083,530	1,205,899	1,216,412	1,233,069	1,350,666	1,350,666	1,350,666	1,481,495	1,481,495
Interest expense on reserve balance [2]	78,873	8,696	50,788	58,159	49,000	69,000	72,000	83,000	103,000	111,000	118,000	129,000	126,000	123,000
Less interest charged to zone establishment loan	(70,328)	(46,637)	(40,397)	(33,814)	(26,868)	(19,541)	(11,811)	(3,655)						
TOTAL OPERATING EXPENDITURE	**3,691,432**	**3,883,606**	**4,102,262**	**4,071,483**	**4,781,230**	**5,228,941**	**5,507,503**	**5,554,206**	**5,762,334**	**6,070,294**	**6,218,943**	**6,244,252**	**6,505,442**	**6,722,398**
FUNDED BY														
General rate	445,785	618,004	672,687	713,379	791,957	863,405	906,735	923,861	966,705	1,007,239	1,032,876	1,041,122	1,083,908	1,128,339
Targeted rate	2,700,576	3,209,664	3,259,433	3,577,045	3,785,155	4,635,740	5,184,656	4,781,352	4,886,231	5,163,538	5,291,447	5,309,623	5,536,634	5,716,238
Less Capital rates charged	(74,044)	(74,054)	(81,170)	(81,178)	(75,913)	(75,913)	(75,913)	(75,913)	(75,913)	(75,913)	(75,913)	(75,913)	(75,913)	(75,913)
Less additional capital funding					0	0	0	0	0	0	0	0	0	0
Less debt funding	(160,092)	(160,092)	(160,092)	(160,092)	(160,092)	(160,092)	(160,092)	(70,113)						
Fees and Charges	477,435	656,191	367,320	232,979	239,419	239,419	239,419	239,419	239,419	239,419	239,419	239,419	239,419	239,419
Interest income	38,645	31,406	30,344	27,916										
Interest income on reserve balance [2]	216,355	146,156	0	0										
TOTAL REVENUE	**3,644,660**	**4,427,275**	**4,088,522**	**4,310,049**	**4,580,526**	**5,502,559**	**6,094,805**	**5,798,606**	**6,016,442**	**6,334,283**	**6,487,829**	**6,514,251**	**6,784,048**	**7,008,083**
TRANSFER TO / (FROM) OPERATING RESERVE	**(46,772)**	**543,669**	**(13,740)**	**238,566**	**(200,704)**	**273,618**	**587,302**	**244,400**	**254,108**	**263,989**	**268,886**	**269,999**	**278,606**	**285,685**

CAPITAL														
New Works	229,480	120,000	216,000	0	0	0	0	0	0	0	0			
Renewals	401,310	1,273,514	1,075,267	1,888,896	1,822,423	1,901,618	1,917,127	1,737,822	2,093,747	1,434,433	2,082,760	1,507,395	1,830,051	1,593,871
Total capital	**630,790**	**1,393,514**	**1,291,267**	**1,888,896**	**1,822,423**	**1,901,618**	**1,917,127**	**1,737,822**	**2,093,747**	**1,434,433**	**2,082,760**	**1,507,395**	**1,830,051**	**1,593,871**
FUNDED BY														
General rate														
Targeted capital rates charged	74,044	74,054	81,170	81,178	75,913	75,913	75,913	75,913	75,913	75,913	75,913	75,913	75,913	75,913
Additional capital funding					0	0	0	0	0	0	0	0	0	0
TOTAL REVENUE	**74,044**	**74,054**	**81,170**	**81,178**	**75,913**	**75,913**	**75,913**	**75,913**	**75,913**	**75,913**	**75,913**	**75,913**	**75,913**	**75,913**
TRANSFER TO / (FROM) CAPITAL RESERVE	**(556,746)**	**(1,319,460)**	**(1,210,097)**	**(1,807,718)**	**(1,746,510)**	**(1,825,705)**	**(1,841,214)**	**(1,661,909)**	**(2,017,834)**	**(1,358,520)**	**(2,006,847)**	**(1,431,482)**	**(1,754,138)**	**(1,517,958)**
OPERATING RESERVE BALANCE														
Opening balance	270,250	438,291	1,240,906	1,032,804	841,886	473,203	570,509	982,632	1,049,381	1,123,685	1,205,399	1,289,112	1,375,553	1,468,727
Plus revenue	3,644,660	4,427,275	4,088,522	4,310,049	4,580,526	5,502,559	6,094,805	5,798,606	6,016,442	6,334,283	6,487,829	6,514,251	6,784,048	7,008,083
Less change to rate revenue phasing														
Less Operating expenditure	(3,691,432)	(3,883,606)	(4,102,262)	(4,071,483)	(4,781,230)	(5,228,941)	(5,507,503)	(5,554,206)	(5,762,334)	(6,070,294)	(6,218,943)	(6,244,252)	(6,505,442)	(6,722,398)
Less interest on reserve														
Transfer to disaster reserve [3]	(98,979)	(128,377)	(135,136)	(144,131)	(167,979)	(176,312)	(175,178)	(177,651)	(179,804)	(182,275)	(185,172)	(183,558)	(185,432)	(189,162)
Plus depreciation added back	1,049,124	1,374,238	1,202,774	1,122,706	1,066,167	1,083,530	1,205,899	1,216,412	1,233,069	1,350,666	1,350,666	1,350,666	1,481,495	1,481,495
Less budgeted depreciation funding tfrd to capital reserve	(735,332)	(986,915)	(1,262,000)	(1,408,059)	(1,066,167)	(1,083,530)	(1,205,899)	(1,216,412)	(1,233,069)	(1,350,666)	(1,350,666)	(1,350,666)	(1,481,495)	(1,481,495)
Closing balance / (deficit)	**438,291**	**1,240,906**	**1,032,804**	**841,886**	**473,203**	**570,509**	**982,632**	**1,049,381**	**1,123,685**	**1,205,399**	**1,289,112**	**1,375,553**	**1,468,727**	**1,565,251**
ZONE ESTABLISHMENT LOAN														
Opening balance	(937,706)	(847,942)	(734,487)	(614,792)	(488,514)	(355,290)	(214,739)	(66,458)	0	0	0	0	0	0
Plus loan repayment funded	160,092	160,092	160,092	160,092	160,092	160,092	160,092	70,113	0	0	0	0	0	0
Less interest charged	(70,328)	(46,637)	(40,397)	(33,814)	(26,868)	(19,541)	(11,811)	(3,655)						
Closing balance / (deficit)	**(847,942)**	**(734,487)**	**(614,792)**	**(488,514)**	**(355,290)**	**(214,739)**	**(66,458)**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

CAPITAL RESERVE BALANCE														
Opening balance	(2,258,025)	(2,079,439)	(2,411,984)	(2,360,081)	(2,759,740)	(3,440,083)	(4,182,258)	(4,817,573)	(5,263,070)	(6,047,835)	(6,055,690)	(6,711,871)	(6,792,687)	(7,065,331)
Plus revenue	74,044	74,054	81,170	81,178	75,913	75,913	75,913	75,913	75,913	75,913	75,913	75,913	75,913	75,913
Additional capital funding														
Less Operating expenditure														
Less Capital expenditure	(630,790)	(1,393,514)	(1,291,267)	(1,888,896)	(1,822,423)	(1,901,618)	(1,917,127)	(1,737,822)	(2,093,747)	(1,434,433)	(2,082,760)	(1,507,395)	(1,830,051)	(1,593,871)
Less interest on reserve														
Plus budgeted depreciation added back	735,332	986,915	1,262,000	1,408,059	1,066,167	1,083,530	1,205,899	1,216,412	1,233,069	1,350,666	1,350,666	1,350,666	1,481,495	1,481,495
Closing balance / (deficit)	**(2,079,439)**	**(2,411,984)**	**(2,360,081)**	**(2,759,740)**	**(3,440,083)**	**(4,182,258)**	**(4,817,573)**	**(5,263,070)**	**(6,047,835)**	**(6,055,690)**	**(6,711,871)**	**(6,792,687)**	**(7,065,331)**	**(7,101,794)**
ZONE RESERVE BALANCE (TOTAL)														
Opening balance	(2,925,481)	(2,489,090)	(1,905,565)	(1,942,069)	(2,406,368)	(3,322,170)	(3,826,488)	(3,901,399)	(4,213,689)	(4,924,150)	(4,850,291)	(5,422,758)	(5,417,134)	(5,596,603)
Plus revenue	3,878,796	4,661,421	4,329,784	4,551,319	4,816,531	5,738,564	6,330,810	5,944,632	6,092,355	6,410,196	6,563,742	6,590,164	6,859,961	7,083,996
Less Operating expenditure	(3,691,432)	(3,883,606)	(4,102,262)	(4,071,483)	(4,781,230)	(5,228,941)	(5,507,503)	(5,554,206)	(5,762,334)	(6,070,294)	(6,218,943)	(6,244,252)	(6,505,442)	(6,722,398)
Less Capital expenditure	(630,790)	(1,393,514)	(1,291,267)	(1,888,896)	(1,822,423)	(1,901,618)	(1,917,127)	(1,737,822)	(2,093,747)	(1,434,433)	(2,082,760)	(1,507,395)	(1,830,051)	(1,593,871)
Less interest on reserve														
Less interest on zone establishment costs	(70,328)	(46,637)	(40,397)	(33,814)	(26,868)	(19,541)	(11,811)	(3,655)	0	0	0	0	0	0
Transfer to disaster reserve [3]	(98,979)	(128,377)	(135,136)	(144,131)	(167,979)	(176,312)	(175,178)	(177,651)	(179,804)	(182,275)	(185,172)	(183,558)	(185,432)	(189,162)
Plus depreciation added back	1,049,124	1,374,238	1,202,774	1,122,706	1,066,167	1,083,530	1,205,899	1,216,412	1,233,069	1,350,666	1,350,666	1,350,666	1,481,495	1,481,495
Closing balance / (deficit)	**(2,489,090)**	**(1,905,565)**	**(1,942,069)**	**(2,406,368)**	**(3,322,170)**	**(3,826,488)**	**(3,901,399)**	**(4,213,689)**	**(4,924,150)**	**(4,850,291)**	**(5,422,758)**	**(5,417,134)**	**(5,596,603)**	**(5,536,543)**

Notes:
1. Depreciation costs do not include the impact of revaluations. The impact on depreciation of new works has been estimated on asset type and useful life.
2. Interest on reserve calculated on an average of reserve balance.
3. Funding is put aside each year from the zone into a regional disaster recovery fund.
4. This table reflects Lower Waikato Catchment Zone excluding main channel.
5. LTP 12-22 zone revenue and expenditure include inflation where applicable.

Figure 18 Financial forecast – Lower Waikato zone



9.4 Operations and maintenance planning

9.4.1 Introduction

The maintenance strategies cover the policies that will determine how the RCS activities will be operated and maintained on a day-to-day basis to consistently achieve the optimum use of the asset. The work categories are defined as follows:

9.4.2 Routine (general) maintenance

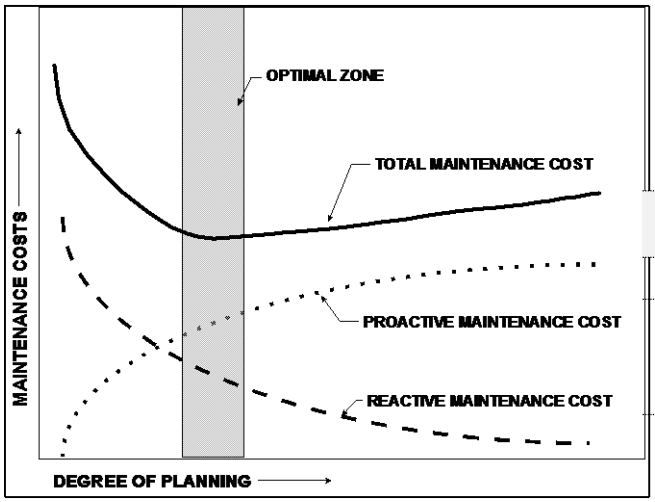
Routine maintenance is the regular ongoing day-to-day work that is necessary to keep assets operating, including instances where portions of the asset fail and need immediate repair to make the asset operational again. This work falls into two broad categories as follows:

Planned (proactive) - Proactive inspection and maintenance works planned to prevent asset failure.

Reactive - Reactive action to correct asset malfunctions and failures on an as required basis.

A key element of asset management planning is determining the most cost-effective blend of planned and unplanned maintenance as illustrated in Figure 19.

Figure 19 Balancing proactive & reactive maintenance



The short-term maintenance strategy is intended to maintain the current levels of service standards. The long-term maintenance strategy will be modified to reflect the following factors:

- **Risk of failure** -The risk associated with failure of critical assets.
- **Levels of service** - Changes in the current or agreed level of service.
- **Economic efficiency** - Asset condition assessment.
- **Extend the life of the asset component** - Asset improvements and development programme.
- **Legislative compliance** – e.g. requirements of LGA 2002.

9.4.3 Operations and maintenance programme

The annual maintenance programme includes provision for:

- The standard monitoring maintenance works necessary to ensure that the assets are operational at all times. Such works include monitoring inspections, audits and surveys, removal of blockages from outlet channels and floodgate flaps, weed spray and lubrication of mechanical components.

- Planned maintenance works are undertaken on a cyclic basis, or through the annual condition survey, crest level surveys, cross section surveys and structures audit reports. Prioritisation is based on the risks of failure.

- Unplanned maintenance is urgent maintenance work identified during routine inspections, or through customer feedback. These are investigated and assessed, and if the risks of failure warrant it, then works are added to the current annual maintenance programme. Maintenance activities and frequencies are summarised in Table 43 below.

The process of maintaining assets is described further in Section 6.

Table 43 Maintenance activity and frequency

Activity	Maintenance	Estimated frequency
River channel works and assets		
Condition assessment	Inspection and assessment of river channel conditions and reporting	Annually
Reliability inspections	Regular inspection for changes especially after floods	Biannually
Overview, inspections	Regular river inspections	Biannually and following flood events
Surveys	Cross section survey	Biannually and following flood events
Vegetative management	Clearance, spraying, removal of vegetation where causing erosion or obstruction	Annually
Rock work	Repositioning or replacement of rock work	As required
Gravel management	Survey to assess management requirements. Agreement reached with owners	As required
Stopbanks/flood walls		
Condition assessment	Survey to assess management requirements. Agreement reach with owners	Annually
Crest level survey	Survey of stopbanks /floodwall crest levels	10 Yearly
Renewal works	Topping up of stopbanks and raising floodwalls when settlement occurs	15-25 Yearly

9.5 Capital and renewal planning

9.5.1 Renewal works

Renewal expenditure is work that restores an existing asset to its original level of service, ie capacity or the required condition. These broadly fit into the following work categories as follows:

Rehabilitation - Involves the repair of an existing asset, or asset component. Rehabilitation doesn't provide for a planned increase in the operating capacity or design loading. It is intended to enable the asset to continue to be operated to meet the current levels of service.

Replacement - Doesn't provide for a planned increase to the operating capacity or design loading. Some minor increase in capacity may result from the process of replacement, but a substantial improvement is needed before asset development is considered to have occurred.

9.5.2 Renewal strategy

Renewal strategies provide for the progressive replacement or rehabilitation of individual assets that have reached the end of their useful life. This is managed at a rate that maintains the standard and value of the assets as a whole. This programme must be maintained at adequate levels to maintain current levels of service and the overall quality of infrastructure assets.

The general renewal strategy is to rehabilitate or replace assets when justified by:-

Asset performance

Assets are renewed where it fails to meet the required level of service. The monitoring of asset reliability, capacity and efficiency during planned maintenance inspections and operational activity identifies non-performing assets. Indicators of non-performing assets include:

- Structural failure
- Repeated asset failure (breaks, faults)
- Ineffective and/or uneconomic operation
- Unsafe conditions for the public.

Economics

When it is no longer economic to continue repairing the asset (ie the annual cost of repairs exceeds the annualised cost of its renewal). An economic consideration is the co-ordination of renewal works with other planned works such as road reconstruction. Council actively researches the effectiveness of new technology, which may reduce the direct and social costs of repair works.

Risk

The risk of failure and associated environmental, public health, financial or social impact justifies proactive action (e.g. probable extent of flooding damage, health and safety risk). Where such assets are identified (critical assets), proactive inspection is undertaken to determine asset condition at a frequency appropriate to the risk and rate of asset decay.

9.5.3 Life cycle

The current lifecycle expectations for the river and catchment assets and the annual depreciation rates are shown below:

Table 44 Projected asset lives

	Item	(Years)
Embankments	**Stopbanks**	
	Firm clay foundation	200-500
	Clay foundation	100-200
	Peat foundation	20-50
	Sand foundation	80-125
	Detention dams	
	Embankments and spillways	50
	Pipes	60
	Headwalls	50
	Bunds	50
Structures	**Control gates**	
	Civil structure	50
	Radial/sluice gates	25
	Lifting gear	25
	Power supply	20
	Switchboard and controls	15
	Building	60
	Pumpstations	
	Pumps and motors	25
	Switchboards and controls	20
	Screens	10
	Power supply	20
	Flap valves	25
	Building	60
	Inlet / outlet structures	50
	Sump	50
	Discharge pipes	60
	Floodgates	
	Barrels	60
	Headwalls	50
	Flap valves	25
	Culverts	
	Barrels	60
	Headwalls	50
	Bridges	
	Concrete	100
	Timber/steel	50

	Item	(Years)
In river structures	**Misc**	
	Boat ramps	50
	Weirs (rock/timber)	100
	River training groynes	100
	Fish pass	
	Inlet	50
	Channel	100
	Pipe	60
	Valve	25
	Canals	50

9.5.4 Replacement (renewal) works summary

While many of the smaller replacement (renewal) items are undertaken within maintenance, all major works are programmed as replacement items and are managed in a similar way to new capital works.

The replacement (renewal) programme and expenditure forecast for the next 10 years still needs to be improved as asset condition and data confidence improves.

WRC will consider the financial and customer risks of having sufficient funds to deal with renewal demands, consideration of detailed assessments, implementing proactive renewals and recognising the increasing maintenance and operational requirements.

9.5.5 New works

New works are the creation of new assets or works, which upgrade or improve an existing asset beyond its existing capacity or performance in response to changes in usage or customer expectations. Council recognises that asset development and asset renewal can occur simultaneously.

Asset renewal is maintaining the condition of the assets and current service levels.

Asset development is providing service improvements, measured by asset performance.

9.5.6 Development planning categories

New works fall into four separate categories as shown in Table 45 below.

9.5.7 Selection criteria

Council carries out a prioritisation process of all necessary renewal or development works. The priority list is used to assign funds when preparing the financial plans. It is important that the process be regularly reviewed and that the cost estimates reviewed at detailed design stage and/or purchase.

9.5.8 Creation/acquisition/augmentation plan, and capital works

While the zone levels of service are currently assessed as appropriate and meet the needs of the stakeholders of the works, there is demand for upgrading the level of service in some areas and providing new works in other areas. These issues are being managed in accordance with the demand management plan for the zone in consultation with key stakeholders and the zone liaison subcommittee. Future new works within the next three years include the upgrade of Meremere pump station and Orton pump station in response to peat shrinkage and land subsidence. The cost is substantially funded by the beneficiaries in these areas and under current funding policy the zone may contribute toward a share of the capital cost. Council proposes to continue to utilise internal borrowing to fund work programmes of a long term nature. An example of this is the funding of capital expenditure in relation to river management and flood protection works as well as funding land purchases as part of the natural heritage partnerships programme.

Table 45 Development planning categories

Category	Detail
Growth	Any asset development (council funded or externally funded) that is required as a result of growth
Level of service	Any asset development that is required as a result of an increase in levels of service.
Legislative	Any asset developed to meet legislative requirements
Vested	Any assets vested (gifted) with Council. As required by schedule 10 of the LGA 2002, with respect to Council funded development work, this plan also identifies and differentiates requirements of additional asset capacity in terms of increased demand (e.g. growth) or increase in service provision levels and standards.

The capital works plan shown in Table 46 sets out the programme for renewing or replacing existing assets as they wear out or become uneconomic to maintain. The programme is set and prioritised based on current condition estimated remaining life, and the risks associated with failure. It also includes the planned new capital works.

Table 46 Capital works renewal and replacement plan

Capital and Renewal Works	2012/13	2013/14	2014/15	Comments
Stopbank renewals – conditions 4 & 5	540,000			Stopbank upgrade Mangatawhiri Contour Drain, Huntly North, Huntly Freeboard, Tickles and Huntly West.
Pumps renewals	302,000			Life cycle renewal, eight year cycle
Motor renewals	54,000			Life cycle renewal, eight year cycle
Screens/platforms	480,000			Screen and platform replacements Huntly Golf Course, Pattersons, Churchill East (Holmes) and Lower Furniss
Switchboards	290,000			Construction of switchboard at Muirs, Orchard Rd, Parish Polder, Huntly Sth No 1 and Huntly Sth No 2
Gibault joints	50,000			Replace discharge pipes Blairs Pumpstation
Power Supply (renewals)	26,200			Pole replacement pumpstation sites various Lower Waikato
Control gate renewals	10,000			Investigation and design costs Lake Waikare Control gate, based on structural audit findings
Pumpstation unplanned works	70,223			Various unplanned works pumpstations due to failures throughout the year
Stopbank renewals – conditions 4 & 5		560,000		Stopbank upgrade Aka Aka, Lockes and Northern Outlet, Waikare Nth and Vrsaljkos.
Pumps renewals		316,618		Life cycle renewal, eight year cycle
Motor renewals		53,000		Life cycle renewal, eight year cycle
Screens/platforms		210,000		Screen and platform replacements Upper Furniss, Blairs, Henrys, Kimihia, Tabenels and Motukaraka
Switchboards		150,000		Construction of switchboard at Island Block Sth, Huntly Nth, Hills and Churchill East (Holmes).
Outlet pipes & outlets		100,000		Various outlet pipe replacements
Gibault joints		90,000		Replace discharge pipes Harkers Pumpstation
Pumpshed and roofs		60,000		Various pumpstation roof replacements
Power supply (renewals)		22,000		Pole replacement pumpstation sites various Lower Waikato
Pumpstation replacements		80,000		Replace Parish Polder pump station
Control gate renewals		130,000		Renewal works Waikare control gate based on structural audit findings and investigation and design renewal of Te Onetia control gate.
Pumpstation unplanned works		130,000		Various unplanned works pumpstations due to failures throughout the year
Stopbank renewals – conditions 4 & 5			560,000	Stopbank upgrade (2nd year construction) Aka Aka, and Aka Aka Buffer Bank
Pump renewals			350,000	Life cycle renewal, eight year cycle
Motor renewals			38,000	Life cycle renewal, eight year cycle
Screens/platforms			210,000	Screen and platform replacements Huntly Sth No 1, 2 and 3
Switchboards			200,000	Construction of switchboard at Pattersons, Swan Road and Huntly Sth No 3
Outlet pipes & outlets			100,000	Various outlet pipe replacements
Gibault joints			90,000	Replace discharge pipes Blairs Pumpstation
Pumpshed and roofs			60,000	Various Pumpstation roof replacements
Power supply (renewals)			22,000	Pole replacement pumpstation sites various Lower Waikato
Pumpstation replacements			80,000	Replace Parish Polder pump station
Control gate renewals			130,000	Renewal works Te Onetea control gate based on structural audit findings and investigation and design renewal of Whangamarino control gate.
Pumpstation unplanned works			110,000	Various unplanned works pumpstations due to failures throughout the year
Totals	1,822,423	1,901,618	1,917,127	

9.6 Disposals

As part of the life cycle management of assets it is vital to consider the costs of asset disposal in the long-term financial forecasts for an asset. The cost of asset disposal is expected to be incorporated within the capital cost of new works, or asset renewals.

Disposal is the retirement or sale of assets whether surplus or superseded by new or improved systems. Assets may become surplus to requirements for any of the following reasons:

- Under utilisation
- Obsolescence
- Provision exceeds required level of service
- Assets replaced before its predicted economic life
- Uneconomic to upgrade or operate
- Policy changes
- Service provided by other means (e.g. private sector involvement)
- Potential risk of ownership (financial, environmental, legal, social,).

The formal process for disposal of zone assets is as follows:

- Asset identified as obsolete due to change in technology, change in site conditions, change in community demand, or failure of the asset to provide the service.
- Disposal options considered and a cost /benefit analysis carried out. The most cost-effective option to dispose of the asset will be undertaken:
    - input sought from liaison subcommittee as appropriate
    - Council approval sought according to Delegations Manual
    - disposal is undertaken including obtaining any consent for disposal works.

Gains and losses on disposals are determined by comparing the proceeds with the carrying amount of the asset. Gains and losses on disposals are included in the statement of financial performance. When revalued assets are sold, the amounts included in asset revaluation reserves in respect of those assets are transferred to retained earnings.

Currently, there are no plans to dispose of any surplus scheme assets; however planned replacement of some components will be undertaken as per the replacement/renewal plan. Salvage values of replaced assets are unlikely to be significant, and are therefore (conservatively) not included in financial forecasts

At this time Council has no plans to dispose of any of its RCS assets.

9.7 Asset valuation

9.7.1 Introduction

Council values its assets in accordance with the procedures and methods set out in the New Zealand Infrastructure Asset Valuation and Depreciation Guidelines Edition 2 and New Zealand Equivalent to International Accounting Standard 16; Property, Plant and Equipment (NZ IAS 16) and the NZ local authority asset management practice (NZ Flood Protection Asset Valuation and Deprecation Guidelines.

An asset valuation is to be used for asset management (calculating long-term asset renewal projections), identifying loss of service potential (depreciation) and for financial reporting purposes.

Revaluations are undertaken every three years on the basis of Depreciated Replacement Cost (DRC). The initial valuation was done as at 1 July 1998 and was repeated as at 1 July 2011.

An asset valuation is undertaken on behalf of the Council every three years. Key outputs from the report are:

- Optimised Replacement Cost (ORC)
- Optimised Depreciated Replacement Cost (ODRC)
- Assessment of Remaining Economic Life (REL)

Assets are fully maintained and depreciated, and therefore no significant changes in valuation are anticipated.

9.7.2 Accounting standard

The New Zealand International Accounting Standard 16 (NZIAS16) “Accounting for Property, Plants and Equipment” is adhered to as this applies to relevant infrastructure assets considered in the scope of Council valuations for the general purpose of financial reports.

9.7.3 Industry guidelines

Infrastructure assets should be valued in accordance with the rules and methodology as prescribed in the New Zealand Infrastructure Asset Valuation & Depreciation Guidelines Manual Edition 1.0 April 2001 (NZIAV) and in reference to earlier versions of these rules.

In addition the NAMS New Zealand Infrastructure Asset and Depreciation Guidelines, Edition 2.0. 2006 (NZIAVDG) and

NZ Flood Protection Asset Valuation and Deprecation Guidelines are used regularly throughout local government and nationally as industry guidelines.

9.7.4 Valuation methodology

Council's latest revaluation of all infrastructural assets was undertaken in 2011. The valuation process was performed in accordance with generally accepted accounting standards (NZ IAS 16) and with the NZ Flood Protection Asset Valuation and Depreciation Guidelines (NAMS, 2006b).

Presently there is no process in place for valuations to be reviewed. Council will again undertake an external valuation in 2011 but will also undertake a deliberate internal review of their work. As from 2011 it is Council's intent to undertake the revaluation internally with an independent peer review of this being put in place.

Replacement values are generally calculated from a number of sources including:

- Recent contracts
- Consultant database
- Previous valuations adjusted using Capital Goods Index
- Rawlinsons
- Contractors, manufactures and suppliers

The unit rates used include the actual purchase and construction costs as well as establishment. These rates have been increased to account for professional fee's i.e. planning, investigation, design etc. A list of typical unit rates is shown in Appendix 6 is under development as part of the Improvement Plan.

The replacement value for the stopbanks was based on an equivalent component cost and included earthworks, topsoiling, fencing, royalties to landowners, design and construction supervision and administration.

The replacement value for all parcels of land owned by Council in the Lower Waikato zone has been based on independent valuations. Replacement value is derived from the average value of the land immediately adjacent to the scheme plus a component for acquisition costs.

From the asset optimised replacement value (ORC), the optimised depreciated replacement cost (ODRC) is obtained as follows.

$$ODRC = \text{Remaining Life (Years)} / \text{Economic Life (Years)} * \text{Replacement Value}$$

Refer to Appendix 6 - Summary of Methodology and Assumptions for Infrastructure Assets of the 2008 Valuation of Flood Protection Assets, Waikato Regional Council, Asset Valuation Report (Opus International Consultants Limited, 2008) for a detailed description of typical unit rates used across the different asset groups, and the associated assumptions.

9.7.5 Base life assessments

Base life for the components within the pumping stations and floodgates were originally based on the recommendations within the NZIAMM. The base life for asset components are modified during the three yearly asset valuations based on historical condition monitoring and replacement frequencies.

Historical records of top up frequencies were used for the assessment of the stopbank base life. The frequency of the need to top up the crest level of a stopbank depends on the foundation material. For marine mud, the stopbank settles at a greater rate and requires more frequent top up. Therefore the base life of this type of stopbank is a function of stopbank height and the rate of settlement.

9.7.6 Remaining life

In all instances with the exception of drains, planting and vegetation the remaining life of the asset has been calculated from the condition rating.

9.7.7 Valuation overview

The valued assets of the zone, comprising the flood protection works, have a total replacement value of $107 million, a current book value of $76 million and an annual depreciation of $1,168,621 as of 1 July 2011. The soil conservation assets within the zone are not valued because they are formally owned by the respective property owners. Council does however have ongoing obligations for monitoring and managing these works under the terms of the agreements with landowners. Because of these commitments,

the assets have been included under this plan. The breakdown of assets is shown in Table 14.

9.8 Funding strategy

The funding for river and catchment works, and flood protection works in the Lower Waikato zone is set out in the LTP Section 3 'The Finances'. The zone management programme provides both asset and non asset related river and catchment services, the main services and costs are however asset management related.

A Waikato catchment wide funding system (Project Watershed") provides the mechanism for funding all river and catchment works and services within the zone.

The costs of Council services are funded through a combination of income sources including:

- Scheme lease income.
- Participating landowners.
- Ratepayers.
- Internal borrowing.
- Rental income from council owned buildings.
- Investment income.

The council's investment fund, like others of its kind, has been affected by the financial crisis that impacted world markets over the last year.

In response to this, the council has amended its investment strategy by increasing the asset allocation of fixed interest investments compared to equities to help ensure a reliable income from the fund is available to offset rates requirements.

For the first three years of this plan, Council is only budgeting on a return from the fixed interest investments that council will hold. During this period Council expect the value of their equity holdings will start to recover some of the valuation losses of the last two years, however the timing of this is uncertain. A direct impact of this is that some programmes previously funded by income from the investment fund, such as Clean Streams, will be funded through rates. The budgeted income from the investment fund is treated as an offset to general rate and does not directly fund any work programme. This plan sees use of internal borrowing programmes in relation to river and catchment management zones. The cost of establishing the scheme works programmes was initially advanced from general council funds.

Specific debt repayment plans are in place with each affected catchment zone, funded from targeted rates, to ensure that this debt is repaid over an agreed time period (generally 10 years). Funds generated from the internal debt repayment will be added into the council's investment fund.

Council's infrastructural capital expenditure programme over the 10 years is funded by way of depreciation and capital rates. Internal borrowing is utilised to provide the initial capital financing. Capital rate revenue is then applied to the payment of interest and principle. These funding tools have been selected to ensure that the costs of these long term capital projects are spread over time to take account of intergenerational equity considerations. Operational capital expenditure is funded through depreciation.

The council is participating along with a number of other councils in a jointly developed computer software system. Council's contribution to that project will be funded from internal borrowings and be repaid over five years.

9.8.1 Financial statements and projections

Financial projections for the zone are made over a ten year horizon commencing from the 2012/2013 financial year. While this long term forecast is necessarily uncertain, more detailed projections are made for the immediate 10 year period (yearly projections until 2021/2022). The projections made here are consistent with those in Councils 2012 - 2022 LTP.

An Annual Plan is prepared every year. This is developed within the LTP framework that is reviewed every three years. Both of these planning mechanisms are conducted within the legal requirements of the Local Government Act and after consultation with the wider community.

The Annual Plan ensures financial resources are available for the projects laid out for the coming period. The expenditure estimates are designed to include as detailed an estimate as possible with regards to future expenditure requirements for maintenance and depreciation. These costs are both fully expensed in the income statement for the period concerned.

Depreciation, non-cash transaction, is transferred to a Depreciation Reserve which in turn is used to fund Fixed Asset replacements.

9.9 Policies

9.9.1 Policy introduction

Council has three policies that provide guidelines and procedures for dealing with treasury management activities; the determination of the significance of an issue,

proposal, decision or other matter; how to perform in partnerships between council and the private sector. These three policies are:

- Treasury Risk Management Policy
- Policy on Significance
- Partnership and Private Sector Policy
- Infrastructure Assets – Accounting Polices and Guidelines

9.9.2 Treasury risk management policy

The purpose of the Treasury Risk Management Policy is to outline approved policies and procedures in respect of all treasury activity to be undertaken by Council. The formalisation of such policies and procedures will enable treasury risks within Council to be prudently managed.

The objective of this Treasury Risk Management Policy is to control and manage costs and investment returns that can influence operational budgets and public equity. Specifically; all borrowing, investments and incidental financial arrangements (such as use of interest rate hedging financial instruments) will meet requirements of the Local Government Act 2002, the 2010 Amendment and incorporate the Liability Management Policy and Investment Policy.

9.9.3 Policy on significance

'Significant' is defined as:

***Significant**, in relation to any issue, proposal, decision, or other matter, means that the issue, proposal, decision, or other matter has a high degree of significance.*

Section 90 of the Local Government Act 2002 ('the Act') requires all council to have a policy on significance which sets out:

- The council's general approach to determining the significance of proposals and decisions in relation to issues, proposals, decisions or other matters.
- Any thresholds, criteria or procedures that are to be used by the council in assessing the extent to which issues, proposals, decisions or other matters are significant.
- The assets considered by the council to be strategic assets.
- The significance of a decision helps to determine how rigorously the act's decision making requirements will be followed.

9.9.4 Partnership and private sector policy

Pursuant to Section 102(4) (e) of the Local Government Act 2002 (LGA 2002), the Waikato Regional Council, ('the council'), must adopt a policy in respect of the commitment of council resources to partnerships between council and the private sector ('public private sector partnerships'). This policy must be established in accordance with Section 107 of the LGA 2002.

The purpose of this policy is to ensure that when the council enters into partnerships of a business nature with the private sector that it acts prudently to ensure the council's interests are protected and the desired outcomes are consistent with the council's strategic objectives. These partnerships can be quite diverse in nature and for this reason this policy is broadly based.

Council may consider partnership arrangements with the private sector for the provision of infrastructure and services, where such a partnership is likely to deliver better value for money based on cost, time and financial arrangements than traditional delivery methods.

The council will consider partnerships with the private sector where:

- The partnership will contribute to the achievement of community outcomes in the council's LTP.
- It will promote the social, economic, environmental or cultural wellbeing of the region in the present and in the future.
- It is a prudent, efficient and effective use of the council's resources.
- A need has been defined in measurable output terms.
- Outcomes for the community, measured on cost, quality and timeliness exceed any other provision.
- The project is structured to optimise risk allocation in order to generate the incentives for cost effective, high quality services.
- There is an identifiable market of bidders prepared to compete for the opportunity to undertake the project.
- There is scope for the private sector to demonstrate particular skills and/or innovative capacity.

- The project size justifies the transaction and ongoing management costs.
- The financial management of assets in the Lower Waikato zone must be consistent with these policies. The significance of RCS assets has been assessed in Part I and the financing of activities has been discussed earlier in this section. No RCS activities are currently carried out in partnership with the public sector though the policy demonstrates how this can be achieved.

9.9.5 Infrastructure assets – accounting policies / guidelines

The treatment of infrastructure assets is outlined in the Council document Infrastructure Assets:

- Accounting policies / guidelines. The document is reviewed every year as part of the year end financial report preparation.
- The scheme will be valued in accordance with the procedures and methods set out in the New Zealand Infrastructure Asset Management Manual. The Scheme will be revalued every three years and this will be based on the Optimised Depreciation Replacement Cost method.
- The Optimised Replacement Cost model considers technology changes, over-design, redundancy and system configuration to identify a benchmark alternative asset that efficiently replicates the current asset, while providing the same level of service. ODRC equals this replacement cost, after deducting an allowance for wear/consumption to reflect the remaining economic cost.

Currently the financial/accounting system is run within the Finance Group of Council. Manual linkages exist between the Conquest Asset Management system and the financial management system. This is currently being automated.

9.10 Risk to significant forecasting assumptions

There are risks and uncertainties associated with future cost forecasts because it is not always possible to accurately predict the level of reactive maintenance required. Reactive maintenance is subject to a range of influences including the weather and river flows etc. Major disaster (floods and earthquake) risks are however provided for through self reserving and membership of the LAPP mutual disaster damage fund (refer to Appendix 5a).

10 Improvement plan

10.1 Improvement process overview

Council is adopting a strategic management approach to improvement planning, continually developing ZMPs, 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 ZMP processes. This includes:

- The cycle of ZMP monitoring, review, revision and audit to improve the effectiveness of ZMP outputs and compliance with audit criteria, legislative requirements and best appropriate practice.
- The definition of service standards reflecting community outcomes through public consultation. The ZMP is used to identify service level options and costs, and the delivery of services is a key objective of zone management planning.
- Identify and prioritise ways to cost-effectively improve the quality of the ZMP, and therefore decision making and service delivery.
- Identify indicative time-scales, priorities, human and financial resources required to achieve zone management planning objectives.

The development of this ZMP is based on existing levels of service, the best available current information and the knowledge of 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 Council to optimise decision-making, review outputs, develop strategies, improve risk management and extend the planning horizon. This section describes:

- The specific improvements proposed over the next three years.
- The procedures proposed to be implemented within the organisation for monitoring and review.

10.2 Improvement plan

Table 47 below contains the improvement projects/tasks to be undertaken over the next 3 years including levels of resources, funding, dependencies and priorities.

Table 47 Improvement plan

Process	Current practice	Target practice (3 year focus)	Owner / responsibility	Resource time (days)		Costs	Dependencies	Year	Project	ZMP Section
				Internal	External					
Community engagement										
Awareness and information	Periodic media releases Limited information dissemination Catchment liaison subcommittee engagement EnviroCare	Regular media release Promotion within community of achievements made, milestones reached Three yearly scheme open days Zone information available on website Community newsletters	Zone Mgr	6	4	TBC	Comms	2011/12 ongoing		Managing the zone Relationships with Iwi
Asset management										
Data management	Fundamental asset management processes in place Some gaps in quality and quantity of data. An assessment was carried out in 2012. Unit rate information currently not included in plan. Development of LIDAR information in progress but unavailable Improve data confidence and reliability Limited linkage between processes Level of historical maintenance information held is limited	Improved robust process for data collection, condition assessment and reporting (Complete Tables 13 and 14) Connections made to financial planning and forecasting Data completeness and sample quality check incorporated into 3 yearly asset valuations. Summary of unit rates for determining valuations is to be developed and included into ZMP (in accordance with Audit NZ recommendations). Completion of LIDAR survey, and usage of information in zone management Implement a programme to improve the collection and of historical maintenance data. This will provide a basis of assessing the reliability of forecast information and managing the risks of unplanned maintenance costs Defined a LoS related directly to bridges within the zone (once level status is confirmed) include within Los Tables Define and include performance grades for asset capacity and performance tables (Appendix 3b)	PM AM PM AM	100+ 5	0 0	TBC TBC	Finance -	2011/12 ongoing 2010/11		Lower Waikato zone assets Financials & Appendix

Information systems										
Customer inquiries	Customer enquiries not managed through a central call centre Calls/complaints/issues received by general staff member, operational staff or potentially reception KPIs to respond within particular timeframes	Review prospects for management of enquiries and requests through potential corporate system. Develop a robust process including flow diagrams to show how service requests/customer enquiries are to be tracked Document and flowchart the process for establishing an service request and the closeout loop Implement a mechanism for auditing responses in accordance with published service levels	Division Mgr	30	5	TBC	Resources Council / Groups Funding IT	2012/13		Levels of service
Operations and maintenance										
River management guidelines	In development	Adopt a river management strategy for the main river channel. Introduce regional channel capacity guidelines	Zone Mgr	20	5	TBC	Resources Funding	2011/12		Levels of service
Flood gate capacity	Design capacity (varies by compartment)	Define flood gate capacity guideline	Division Mgr	10	0	TBC	Resources Funding	2011/12		Levels of service
Zone bridges	Doc # 1205076 lists a number of bridges within the Lower Waikato zone, the status of these, in terms of legal ownership, is currently being worked through by Council's Property Services.	Confirm legal status of each bridge. Develop detailed maintenance programme for each bridge.	Zone Mgr	20	0	TBC	Property Services	2011/12		Zone assets
Monitoring of under-performing pump stations or flood gates	Fault texting for some pump stations	Develop a monitoring programme Extend remote sensing capability	Division Mgr	10	20	TBC	Resources Funding External support	2011/12 2012/13		Levels of service
Demand analysis and strategic planning										
Demand analysis	From an operation perspective service demand is analysed to include: Climate Change as required (draft climate change policy) Community Demand (resulting from land use changes and risk mitigation e.g. for businesses wanted increased protection) Options modelling	Develop and Implement demand strategy to include: Consultation Costs and options for flood protection Climate change	Division Mgr	40	10	TBC	Resources Funding	2012/13		Managing the zone

Optimised renewal and replacement of assets	Optimised decision making not yet implemented	Develop renewals and replacements programme and Optimised Decision making prioritisation process	Division Mgr AM	TBC	TBC	TBC	Resources Funding	2011/12 ongoing		Managing the zone
Risk assessment	A risk register and framework has been developed Risk is based on NZ/AS 4360 which has been superseded by ISO 31000	Undertake actions as outlined in the risk management action plan Put critical areas onto GIS including level of risk Identify process and responsibility for updating the register. Review and maintain the risk register Implement management options/strategies to reduce risk Report regularly to the Council	Division Mgr	40+			Resources	2010/11 ongoing		Risk management
Levels of Service (LoS) review	Development of LoS undertaken under ZMP Technical LoS are well established for each scheme	Levels of service to consulted on next LTP Consult with zone stakeholders on service level options and costs annually and for specific projects With potential increases in the cost of maintaining services levels, continue to develop costs and options	Division Mgr Zone Mgr			TBC	Resources	2010/11 ongoing		Levels of service
Organisational										
Funding strategy	Funding strategies are in place for most activities	Develop and confirm zone funding strategy to address : Repayment of debt Provision for depreciation Any implications arising from peat settlement investigation	Division Mgr	20	TBC	TBC	CFO Resources	TBC		Financial management
Valuations	WRC will again undertake an external valuation in 2011 but will also undertake a deliberate internal review of their work. As from 2011 it is Council's intent to undertake the revaluation internally with an independent peer review of this being put in place.	External valuation commissioned to be undertaken in 2011.	Division Mgr	5	15	30K	Resources Funding	2010/11		Financial management
ZMP review / improvement	First ZMP developed in 2010 Benchmarked against OAG criteria Development of Improvement programme	Improvement programme implemented Annual review of ZMP Responsibilities assigned External assessment / peer review of ZMP against Schedule 10 and OAG criteria	Zone Mgr	15	 5	TBC $2K	Resources Funding	2010/11 ongoing		Improvement plan

Other agencies and community groups										
Capitalise on opportunities to work with other agencies and community groups	Consider, assess and uptake opportunities within available resources	Assess zone opportunities, prioritise and implement Progress opportunities to work with the key stakeholders: Solid Energy – additional pumping as a consequence of underground coal mining (Okawhau catchment) Transit NZ – future erosion protection on main channel associated with the Auckland Hamilton expressway, future roading developments Waikato District Council – reserve development etc.	Zone Mgr	15		TBC	Resources	2010/11 ongoing		Stake-holders
Costings										
Confirm forward capital costings	Previous LTP capital budgets for next three-years included in current ZMP	Full detail forward capital programme over 10 years needs to be developed. This should be split between growth, level of service improvement, renewal for the next ZMP and LTP Condition assessment data should be used from the asset system to determine renewal requirements. Note also the bridge renewal requirements need to be reviewed as Audit NZ feedback queried the lack of budget compared to low scores for condition ratings.	Zone Mgr	60			Finance	2010/11		Financial management

References

AS/NZS 4360: 2004. Risk Management. Standards New Zealand, 2004.

Environment Waikato, 1995. Stopbank Management Guidelines. Technical Report 1995/8.

Environment Waikato, 1997a. Floodgate Management Guidelines. Prepared by Opus International Consultants for Environment Waikato, Technical Report 1997/13. Environment Waikato, 1997.

Environment Waikato, 1997b. Pump Station Management Guidelines. Prepared by Opus International Consultants for Environment Waikato, Technical Report 1997/14. Environment Waikato, 1997.

Environment Waikato, 1997c. Lower Waikato Waipa Control Scheme Asset Management Plan. Environment Waikato, 1997.

Environment Waikato, 2000. Waikato Regional Policy Statement. Environment Waikato, 2000.

Environment Waikato, 2002. Project Watershed – Waikato River Catchment Services – Level of Service and Funding Policy. Environment Waikato, 2002.

Environment Waikato, 2003. Environmental Guidelines. Internal Policy Series 03/06, EWDOCS #848198. Environment Waikato, 2003.

Environment Waikato, 2004: Disaster Damage and Risk Management Policy for Infrastructural Assets. Report to Operations Committee June 2004. EWDOCS # 919767. Environment Waikato, 2004.

Environment Waikato, 2007a. Best Practice Guidelines for Vegetation Management and in Stream Works. Technical Report 2007/41. Environment Waikato, 2007.

Environment Waikato, 2007b. Waikato Regional Plan. Environment Waikato, 2007.

Environment Waikato, 2008a: Infrastructural Assets Accounting Policies/Guidelines. Prepared for Environment Waikato by Trish Nooroa. Created May 2000, Updated August 2008. Environment Waikato, 2008.

Environment Waikato, 2008b: Lower Waikato Service Level Review. EWDOCS #1561932, Environment Waikato, 2008)

Environment Waikato, 2009a. River and Catchment Services – Description of Services Incorporating Schedule 10/Service Level Requirements under the Local Government Act 2002. EWDOCS #1439351. Environment Waikato, 2009.

Environment Waikato, 2009b. Annual Report 2008- 2009. Environment Waikato, 2009.

Environment Waikato, 2009c. Annual Plan 2009- 2010. Environment Waikato, 2009.

Environment Waikato, 2009d. Long-Term Council Community Plan for 2009-2019. Environment Waikato, 2009.

Environment Waikato, 2009e. Condition and Performance Report 2008/09 All Zones. EWDOCS #1462203, Environment Waikato, 2009.

Environment Waikato, 2009f. Lower Waikato Flood Protection Zone Stage One: Pump Station Service Level Review. Report prepared for Environment Waikato by Sinclair Knight Merz, Final Draft, February 2009.

Local Government Amendment Act 2002.

MFE, 2008. Climate Change Effects and Impacts Assessment. A Guidance Manual for Local Government in New Zealand. 2nd Edition. Ministry for the Environment 2008.

NAMS, 2006a. International Infrastructure Management Manual – Version 3. National Asset Management Steering Group, Ingenium, 2006.

NAMS, 2006b.New Zealand Infrastructure Asset Valuation and Depreciation Guidelines. National Asset Management Steering Group, Ingenium, 2006.

NAMS, 2007. Developing Levels of Service and Performance Measures – Creating Customer Value from Community Assets, Version 2. National Asset Management Steering Group, Ingenium, 2007

Opus International Consultants Ltd, 2008: 2008 Valuation of Flood Protection Assets, Waikato Regional Council.

Opus International Consultants Ltd, 2009: 2009 Valuation Update of Flood Protection Assets, Waikato Regional Council.

Resource Management Act, 1991.

SNZ HB 4360: 2000. Risk Management for Local Government. Standards New Zealand, 2000.

WVA, 1959. Report on Major Flood Control Scheme for Flood Protection Lower Waikato and Waipa Rivers., Waikato Valley Authority, October, 1959.

WVA, 1983. Lower Waikato Waipa Control Scheme Review, Part A, Hydraulic Hydrological Evaluation, Waikato Valley Authority Technical Report No. 25, 1983.

Glossary of terms

Annual Plan (AP)	The Annual Plan provides a statement of the direction of Council and ensures consistency and coordination in both making policies and decisions concerning the use of Council resources. It is a reference document for monitoring and measuring performance for the community as well as the Council itself.
Aggradation	The accumulation of sediment in rivers and waterways due to sediment supply exceeding the waterways ability to transport sediment.
Asset Management (AM)	The combination of management, financial, economic, engineering and other practices applied to physical assets with the objective of providing the required level of service in the most cost effective manner.
Asset Management System (AMS)	A system (usually computerised) for collecting, analysing and reporting data on the utilisation, performance, lifecycle management and funding of existing assets.
Asset register	A record of asset information considered worthy of separate identification including inventory, historical, financial, condition, construction, technical and financial information about each.
Asset renewal	Major work, which restores an existing asset to its original capacity or the required condition (stopbank top-up etc)
Auditor General	The Auditor General of the New Zealand Audit Office.
Benefit cost ratio (BCR)	A ratio which compares the benefits accruing to customers and the wider community from constructing a project with at projects costs.
Capital expenditure (CAPEX)	Expenditure used to create new assets or to increase the capacity of existing assets beyond their original design capacity or service potential. CAPEX increases the value of an asset.
Climate change	A long term significant change in the average weather.
Community outcomes	Outcomes developed with the community, which outline the community's vision.
Components	Specific parts of an asset having independent physical or functional identity and having specific attributes such as different life expectancy, maintenance regimes, risk or criticality.
Condition monitoring	Continuous or periodic inspection, assessment, measurement and interpretation of resulting data, to indicate the condition of a specific component so as to determine the need for some preventative or remedial action
Condition rating survey	Survey carried out to assess the condition of assets.
Critical assets	Assets for which the financial, business or service level consequences of failure are sufficiently severe to justify proactive inspection and rehabilitation. Critical assets have a lower threshold for action than non critical assets.
Current replacement cost	The cost of replacing the service potential of an existing asset, by reference to some measure of capacity, with an appropriate modern equivalent asset.
Deferred maintenance	The shortfall in rehabilitation work required to maintain the service potential of an asset.
Depreciated replacement cost (DRC)	The replacement cost of an asset spread over the expected lifetime of the asset.
Depreciation	The wearing out, consumption or other loss of value of an asset whether arising from use, passing of time or obsolescence through technological and market changes. It is accounted for the by historical cost (or re-valued amount) of the asset less its residual value over its useful life.
Disposal	Activities necessary to dispose of decommissioned assets.
Edge protection	Rockwork or planting to help maintain the integrity of stop banks or other flood defences structures.
Emergency work	The restoration work required to restore an asset damaged by a sudden and

	unexpected event (eg storm event) to its previous condition.
Geographic Information System (GIS)	Software which provides a means of spatially viewing, searching, manipulating, and analysing an electronic database.
Life cycle management	A process of managing an asset from initial construction through to disposal.
Long Term Plan (LTP)	Council's 10-year programme setting out the community outcomes sought, key activities, levels of service, performance measures and funding.
Net Present Value (NPV)	The value of an asset to the organisation, derived from the continued use and subsequent disposal in present monetary values. It is the new amount of discounted total cash inflows arising from the continued use and subsequent disposal of the asset after deducting the value of the discounted total cast outflows.
Non-structural measures	Flood mitigation measures to separate the community from floodwaters.
Optimised renewal decision making (ODM)	An optimisation process for considering and prioritising all options to rectify performance failures of assets. The process encompasses NPV analysis and risk assessment.
Reach	A defined section of a river, used for management purposes
Remaining useful life (RUL)	Remaining Useful Life of an asset or asset component. (Generally Useful or Effective life less age).
Stakeholder	A person or organisation who has a legitimate interest in an activity e.g. community, Iwi, etc.
Stopbank	An embankment adjacent to a river or watercourse, which retains floodwaters from flowing onto a floodplain.
Structural measures	Structures or physical works constructed to keep floodwaters away from existing development e.g. stopbanks.
Sustainability	The process of meeting the needs of the present community without compromising the ability of future generations to meet their own needs.

Acronyms

AEE	Assessment of environmental effects
AM	Asset management
AMIS	Asset management information system
AMP	Asset management plan
AP	Annual Plan
ARI	Average recurrence interval
AS/NZS	Australia and New Zealand Standards
BAP	Best appropriate practice
BRE	Business risk exposure
CDEM	Civil Defence Emergency Management
CE	Chief Executive
DOC	Department of Conservation
DRC	Depreciated Replacement Cost
EW	Environment Waikato[16]
GHD	Gutteridge Haskins and Davey
GIS	Geographic Information System
GRC	Gross replacement cost
H&S	Health and safety
IIMM	International Infrastructure Management Manual
IMP	Iwi Management Plan
IRP	Integrated River Plan
IPCC	Intergovernmental Panel on Climate Change
IT	Information technology
KPI	Key performance indicator
LCM	Life cycle management
LGA 2002	Local Government Act 2002
LIA	Land Improvement Agreement
LIDAR	Light Detection and Ranging
LoS	Levels of Service
LTP	Long Term Plan
LWWCS	Lower Waikato Waipa Catchment Scheme
MFE	Ministry for the Environment
MFish	Ministry of Fisheries
NAMS	National Asset Management Steering (Group)
NIWA	National Institute of Water and Atmospheric Research
NPV	Net present value
NZIAS16	New Zealand International Accounting Standard
NZTA	New Zealand Transport Agency
OAG	Office of the Auditor General
ODM	Optimised decision making
ORC	Optimised replacement cost
ODRC	Optimised depreciated replacement cost
ORDM	Optimised renewal decision making
O&M	Operations and maintenance
QA	Quality assurance
RAMSAR	Ramsar Convention
RCS	River & Catchment Services Group
RIG	Resource Information Group
RMA	Resource Management Act 1991
RPS	Regional Policy Statement
RUG	Resource Use Group
RUL	Remaining useful life
SLA	Service Level Agreements
SNZ HB	Standards New Zealand Handbook (Risk)
WRA	Waikato River Authority
WRC	Waikato Regional Council
WRP	Waikato Regional Plan
WVA	Waikato Valley Authority
ZMP	Zone Management Plan

[16] Name changed back to Waikato Regional Council April 2011

Appendices

Appendix 1 Legislative & policy requirements

Appendix 1aLGA 2002 Schedule 10 requirements

LGA 2002 Schedule 10 requirement	LGA 2002 references	Section covered
Identify the rationale for delivery of the group of activities (including the community outcomes to which the group of activities primarily contributes)	LGA 2002 Schedule 10 – 2 (1) (b)	Overview document Sec 3.3.2.2
Outline any significant negative effects that any activity within the group of activities may have on social, economic, environmental or cultural well-being of the local community	LGA 2002 Schedule 10 – 2 (1) (c)	Zone plan Appendix 1a
Identify the assets or groups of assets required by the group of activities and identify, in relation to those assets or groups of assets,---	LGA 2002 Schedule 10 – 2 (1) (d)	Zone plan section 6
How the local authority will assess and manage the asset management implications of changes to demand for, or consumption of, relevant services;	LGA 2002 Schedule 10 – 2 (1) (d) (i) (A)	Zone plan sections 6 & 7
How the local authority will assess and manage the asset management implications of changes to service provision levels and standards	LGA 2002 Schedule 10 – 2 (1) (d) (i) (B)	Zone plan sections 7 - 9
What additional asset capacity is estimated to be required in respect of changes to each of the matters described in subparagraph (i):	LGA 2002 Schedule 10 – 2 (1) (d) (ii)	Zone plan section 9
What additional asset capacity is estimated to be required in respect of changes to each of the matters described in subparagraph (i):	LGA 2002 Schedule 10 – 2 (1) (d) (ii)	Zone plan section 9
How the provision of additional asset capacity will be undertaken:	LGA 2002 Schedule 10 – 2 (1) (d) (iii)	Zone plan section 9
The estimated costs of the provision of additional asset capacity identified under subparagraph (ii), and the division of those costs between each of the matters in respect of which additional capacity is required:	LGA 2002 Schedule 10 – 2 (1) (d) (iv)	Zone plan section 9
How the costs of the provision of additional asset capacity will be met:	LGA 2002 Schedule 10 – 2 (1) (d) (v)	Zone plan section 9
How the maintenance, renewal, and replacement of assets will be undertaken:	LGA 2002 Schedule 10 – 2 (1) (d) (vi)	Zone plan section 9
How the costs of maintenance, renewal, and replacement of assets will be met:	LGA 2002 Schedule 10 – 2 (1) (d) (vii)	Zone plan section 9
A statement of the intended levels of service provision for the group of activities, including the performance of targets and other measures by which actual levels of service provision may meaningfully be assessed: and (i) in detail in relation to each of the first three (1-3) financial years covered by the plan; and (ii) in outline in relation to each of the subsequent financial years covered by the plan (4-10).	LGA 2002 Schedule 10 – 2 (2) (a) and 2 (1) (e)	Zone plan section 7
The estimated expenses of achieving and maintaining the identified levels of service provision, including the estimated expenses associated with maintaining the service capacity and integrity of assets: and (i) in detail in relation to each of the first three (1-3) financial years covered by the plan; and (ii) in outline in relation to each of the subsequent financial years covered by the plan (4-10).	LGA 2002 Schedule 10 – 2 (2) (b) and 2 (1) (e)	Zone plan section 9
A statement of how the expenses are to be met; and (i) in detail in relation to each of the first three (1-3) financial years covered by the plan; and (ii) in outline in relation to each of the subsequent financial years covered by the plan (4-10)..	LGA 2002 Schedule 10 – 2 (2) (c) and 2 (1) (e)	Zone plan section 9
A statement of the estimated revenue levels, the other sources of funds, and the rationale for their selection in terms of section 101 (3). And (i) in detail in relation to each of the first three (1-3) financial years covered by the plan; and (ii) in outline in relation to each of the subsequent financial years covered by the plan (4-10).	LGA 2002 Schedule 10 – 2 (2) (d) and 2 (1) (e)	Zone plan section 9

Significant negative effects of this activity

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

> *(c) Outline any significant negative effects that any activity within the group of activities may have on the social, economic, environmental, or cultural well being 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. RCS activities have the potential to have negative effects on community well being. The possible negative effects are outlined in the table below.

Significant negative effect	Cultural	Social	Economic	Environmental	Mitigation of negative effects	Addressed in…
Some in-stream works may have minor negative effects on water quality and ecological values				✓	Compliance with consent conditions Compliance with Council's Engineering Code of Practice and Guidelines.	Zone plan section 4 Legislative and policy requirements and Appendices 1c and 1d
Increasing rates to fund works may create economic pressures for communities			✓		Consult with community on all costs and options for Levels of service through the LTP process	Overview document section 6 Consultation and engagement Zone Plan section 7 Levels of service
Aesthetic values may be impacted, for example losing river views because of stopbanks		✓			Consult with community on all costs and options for Levels of service through the LTP process	Overview document section 6 Consultation and engagement
Removal / relocation of properties in high hazard risk areas may effect individuals and communities		✓			Consult with community on all costs and options for Levels of service through the LTP process	Overview document section 6 Consultation and engagement
Previous identified sites containing taonga (artefacts) or koiwi (bones) may be disturbed in the process of works	✓				Consult with iwi regarding sites of significance during the works planning process	Overview document section 6 Consultation and engagement Overview document section 7 Relationships with iwi Zone plan section4 4 Managing the zone and 5 Relationships with iwi
Inadequacy of existing assets to cope with large rainfall events causing flooding, which could result in social and economic hardship.		✓	✓	✓	Compliance with consent conditions Compliance with Council's Engineering Code of Practice and Guidelines.	Overview document section 5 Legislative and policy requirements Zone plan section 4 Managing the zone Zone plan section 8 Risks Zone plan Appendices 1c and 1d
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.	Zone plan section 8 Risks
Potential impacts on customer satisfaction due to service failure /delays /responsiveness		✓	✓		Monitor and report on Levels of Service and in Service provider contracts. Seek to resolve customer complaints "close the loop"	Zone plan section 7 Levels of service Zone plan section 10 Improvement Plan

Access to waterways		✓	✓		Monitor requirements for access and liaise with the community as appropriate	Zone plan section 7 Levels of service
Disruption to wildlife				✓	Programme works to minimise wildlife disruption avoiding fish spawning and bird nesting seasons	Zone plan section 4 Managing the zone Zone plan Appendices 1c and 1d
Gravel and/or sand extraction			✓	✓	Cross-section monitoring process	Zone plan section 4 Managing the zone Zone plan Appendices 1c and 1d

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

Appendix 1b Office of the Auditor General Criteria for core and advanced asset management

The following is an internal (EW) assessment against the OAG criteria

Key AMP criteria	Key points for achieving "Core" criteria	Key points for achieving "Advanced" Criteria	Covered In ZMP section	In Development	Basic	Intermediate	Advanced	Comments
Levels of service	Asset Management (AM) Planning should define the level of service or performance required of the asset, linked to the strategic/community outcomes of the organisation. The significant services (for which service levels should be subject to consultation and agreement) should be stated.	Community outcomes linked to LoS and customer and technical performance measures	Section 7 Levels of service		✓			
		Evaluating LoS Options & Costs	Section 7 Levels of service	✓				
		For each of those significant services; Undertaking consultation with the community and other relevant stakeholders, using consultation processes which meet industry recognised standards.	Section 4 managing the zone			✓		
		Adoption by the Council or governing body of the levels of service and standards after consultation has taken place.	Section 7 Levels of service		✓			
		Public communications of the levels of service and standards in a 'Customer Charter' or equivalent public document.	Section 7 Levels of service	✓				Customer charter yet to be prepared
		Regular monitoring and public reporting of the organisations adherence to agreed levels of services and standards.	Section 4 managing the zone		✓			
		Ensuring the AM plans of each significant service reflect and are based on the agreed levels of service, including technical performance targets and measures which underpin the customer-agreed levels of service and standards.	Section 7 Levels of service		✓			
Description of assets	An adequate description of the asset, both physically and in financial terms, with the ability to aggregate and disaggregate information. State the remaining useful lives of	A reliable physical inventory of assets at both an individual asset level and at a network level. This would include: Physical attributes such as location,	Section 6 Zone assets		✓			

Key AMP criteria	Key points for achieving "Core" criteria	Key points for achieving "Advanced" Criteria	Covered In ZMP section	In Development	Basic	Intermediate	Advanced	Comments
	assets. A financial description of the assets that is linked to the physical description and meets the requirements of: Financial Reporting Standards Valuation Standards augmented by the NZ Depreciation and Valuation Guidelines A financial description of the assets that is linked to the physical description and meets the requirements of NZIAS 16. Augmented by the NZ Depreciation and Valuation Guidelines	material, age etc. Systematic monitoring and analysis of physical condition. Systematic measurement of asset performance (including utilisation / capacity).						
Financial forecasts / recognise depreciation (Loss of service potential)	AM Planning should translate the physical aspects of planned maintenance, renewal and new work into financial terms for at least the ensuing 10 years and in a manner that is fair, consistent and transparent. The forecasts should include sufficient information to enable decline in service potential (depreciation) of an asset to be measured. Guidance on depreciation is included in the NZ Valuation and Depreciation Guidelines.	AM Planning should translate the physical aspects of planned operational, maintenance, renewal and new works into financial terms. Generally over the timeframe in which the asset network must deliver services. In more specific terms, over the period for which the organisation has a strategic plan. The assumptions underpinning financial forecasts should be disclosed in the organisations strategic plans and AM plans. The compilation of financial forecasts should be consistent, reliable and provable.	Section 9 Financial management		✓			
Planning assumptions & confidence levels	AM planning should: List all assumptions and provisos under which the plan and financial forecasts are prepared. Indicate the degree of confidence of the reliability of data underpinning the AM Plan, particularly: Data on asset condition Data on asset performance Accuracy of asset inventory Demand/growth forecasts	As for 'core' plus: List all the assumptions and provisos in the AM Plans, and note key assumptions regarding AM Planning in the organisations strategic plans. Have degrees of confidence on the reliability of data as follows: Inventory data Grade 1 (critical assets) Grade 2 (non critical assets)	Section 6 Zone assets Section 6 Zone assets	✓	✓			Further work needed

Key AMP criteria	Key points for achieving "Core" criteria	Key points for achieving "Advanced" Criteria	Covered In ZMP section	In Development	Basic	Intermediate	Advanced	Comments
	On the basis of the preceding assumptions and confidence of underlying data, provide a level of precision or confidence on the expenditure forecasts for the asset network	Condition data Grade 1 or 2 (critical assets) Grade 1, 2 or 3 (non critical assets) Performance data Grade 1 or 2 (critical assets) Grade 1, 2 or 3 (non critical assets)						
Outline improvement programmes	AM Planning should state what needs to be done to improve AM processes and techniques Improvement programmes should outline: The weak areas and how these will be addressed The timeframe over which the improvements will occur and The resources (human and financial) needed	As for 'core' plus: Improvement programmes should outline key performance indicators (KPIs) for monitoring AM improvement. The improvement plan should comment generally on achievements against the previous plan, and formally report against KPIs. As for 'core' AM Plan criteria.	Section 10 Improvement plan	✓				
Planning by qualified persons	AM Planning must be undertaken by a suitably qualified person. A suitable qualification would be a Level 6 (Tactical) or Level 7 (Strategic) National Diploma in Asset Management or equivalent skill level. If plans are prepared by persons not suitably qualified, the plans should be independently assessed by a qualified person. The planning process should be peer reviewed.	As for 'core' AM Plan criteria. As for 'core' AM Plan criteria. As for 'core' AM Plan criteria.	Section 6 Zone assets Section 10 Improvement plan	✓	✓			
Commitment	The Asset AM Plan must be approved and adopted by the governing body, Board or Council. This includes approval of the improvement element of the plan. AM Plans must be seen as the key planning tool for infrastructure assets and/or significant physical assets which provide the inputs for Council's strategic plans (LTP).	As for 'core' AM Plan criteria. As for 'core' plus: The organisation must demonstrate that AM plan requirements are being implemented through operational plans and formally report discrepancies	Section 4.6.5 ZMP Review and Monitoring		✓			

Key AMP criteria	Key points for achieving "Core" criteria	Key points for achieving "Advanced" Criteria	Covered In ZMP section	In Development	Basic	Intermediate	Advanced	Comments
Updating	AM plans must be regularly updated to reflect the most current future plans for the assets (it is expected that 'core' AM planning will be significantly revised in the light of action under improvement programme. In the first few years annual revisions of AM plans are likely).	AM Planning is seen as a constantly evolving process, with underpinning AM systems constantly providing better information. It is expected that formal asset management plans and overarching asset management strategies will be formally revised every three years, with the timing of revisions linked to the organisation's strategic planning cycles.	Section 4.6.5 ZMP Review and Monitoring		✓			
Risk management	Risk management to identify critical assets and associated risks and risk management strategies.	Management of assets must include recognition and application of the principles of integrated risk management. Specifically; Risk management should be consistent with AS/NZS4360, and industry good practice such as the NZ Local Government Handbook for risk management. Risk management for assets should be integrated with other corporate risk management processes. Asset risk management should encompass: Identification and risk management strategies for critical assets The link to maintenance and replacement strategies. Engineering lifelines based risk assessments and mitigation plans including reference to the organisations disaster recovery and business continuity plans	Section 8 Risk management		✓			

Lifecycle (optimised) decision-making	Identify gaps between current service capability and the required service capability to meet future demand and target service levels and reflect these gaps in an asset development programme. Evaluation and ranking based on suitable criteria of options for significant capital investment decisions.	The ability to predict robust and defensible options for asset treatments that can assist in achieving optimal costs over the life cycle of the asset or network including: Applying appropriate economic evaluation tools (or other organisation endorsed prioritisation systems) in developing short term project lists. Using predictive modelling techniques to provide defensible long term financial forecasts.	Section 9 Financial management Section 4.6 Business processes	✓				
Managing growth	Demand forecasts for each network or facility for a 10 year period are based on latest growth forecasts. Demand management strategies and demand drivers are understood and documented	Demand forecasts include analysis of the different factors that comprise demand. The sensitivity of asset development (capital works) programmes to demand changes is understood.	Section 9 Financial management	✓				

Appendix 1c Lower Waikato zone consents

Consent No	WRC Asset	Description	Expiry
101728	Whangamarino control structure	Place and use a radial gate and associated structure on the Whangamarino River bed for water level control purposes	2/9/2037
101729	Whangamarino control structure	Dam the Whangamarino River for flood control purposes	2/9/2037
101715	Te Onetea control gate	Place and use a control gate and culvert on the bed of the Te Onetea Stream for water level control	2/9/2037
101716	Te Onetea control gate	Dam water in Lake Waikare or the Waikato River for flood control purposes	2/9/2037
101718	Te Onetea control gate	To discharge Water from the Waikato River into the Te Onetea Stream	2/9/2037
120488	Meremere main pumpstation	Construct and use culverts in the bed of the Waipapa Stream & associated bed disturbance & discharge of sediment during the construction works	1/1/2045
102265	Whangape Stream	Construct a weir to control the low level of Lake Whangape	30/4/2035
102950	Deroles floodgate	Take flood waters (1355 2.1)	15/11/2034
102951	Deroles floodgate	Consent No. 102951 - Discharge flood waters to water (1355 2.1)	15/11/2034
103826	Morrison Road main drain floodgate	Construct a floodgate on the Morrison Rd drain and a low stopbank (600mm) adjacent to the drain	23/11/2035
102959	Morrison Road main drain floodgate	Place a floodgate on the bed of a river	23/11/2035
101726	Waikare northern outlet	Take & divert water from Lake Waikare for lake level control	2/9/2037
101724	Waikare northern outlet	Place a radial sluice gate and associated structure on the beds of Lake Waikare and Waikare Canal	2/9/2037
101725	Community works	Dam water in Lake Waikare for lake level control & flood protection	2/9/2037
101727	Community works	Discharge water from Lake Waikare for lake level control	2/9/2037
102957	Mercer West Morrison Road	Discharge stormwater into the Morrison Rd Drain	23/11/2035
102955	Mercer West Morrison Road	Dam & divert water by construction of a 2.6 km stopbank on the Morrison Rd Drain	23/11/2035
101723	Waikare fishpass	Discharge water into Waikare Canal for Fish Pass operation	2/9.2037
101722	Waikare fishpass	Take water from Lake Waikare for operation of a Fish Pass	2/9.2037
101721	Waikare fishpass	Place and operate a Fish Pass on the bed of Lake Waikare & Lake Waikare outlets	2/9.2037
970068	Awaroa Stream	Divert the Awaroa Stream to allow the removal of vegetation, in the vicinity of Sanson Road	1/5/2032
102952	Southern compartment main SB	Dam & divert water by construction of a 6-8km stopbank on the west bank of Waikato River - Main SB	23/11/2035
117063	Mangawara scheme	Undertake disturbance of 1000m of the bed & banks of the Paranui Stream and removal of bed material, for the purposes of restoring channel capacity & undertaking stream maintenance	30/8/2010
116719	Mangawara scheme	Undertake disturbance in the bed & banks of the Mangawara Stream for the purposes of stabilising a 100m section of the channel bank & for stream maintenance	30/8/2042
773033	Maori Affairs detention dam	To divert the full flow of unnamed tributaries of the south Mangatea Stream for the purpose of preventing the spread of floodwaters onto arable land (Water Right 3033).	1/10/2021
773034	Maori Affairs Detention dam	To discharge the full flow of unnamed tributaries of the south Mangatea Stream for the purpose of preventing the spread of floodwaters onto arable land (Maori Affairs Dam)	1/10/2021
950080	Maori Affairs detention dam	Dam the Tauhei Stream for flood control/detention purposes (L380.027) - Maori Affairs	31/3/2030
950079	Trubshaws detention dam	Dam for flood control (L380.024) - Trubshaw	31/3/2030
940140	Jordans detention dam	Dam for flood control (L380.022) - Jordan	31/3/2030
119678	Mangawara Scheme channel works	To undertake disturbance of 1100 metres of the bed and banks of the Nobel channel. The removal and placement of bed material and the	4/5/2011

Consent No	WRC Asset	Description	Expiry
		associated discharge of sediments to water for flood control purposes	
109910	Lake Areare weir	Replace, use and maintain a drain outlet structure with a weir that will maintain the minimum levels of Lake Areare	30/4/2024
721497	Orakei detention dam	To divert Orakei Stream for flood protection purposes	1/10/2021
104190	Parry Street SB	Divert water by way of a stopbank of the Parry St catchment, Huntly West	1/12/2035
950081	Cawley detention dam	Dam for flood control (L380.026) - Cawley	31/03/2030
103411	Waahi Stream floodgate	Operate a flood control structure in a waterway (Waahi Stream)	31/01/2021
111101	Main channel training reach (Rangiriri to Mercer)	Construct up to 500m of erosion central training lines revetments and groynes, and to disturb bed and banks of the Waikato River in associated with their construction	4/2/2040
103707	Main channel training reach (Rangiriri to Mercer)	Erosion protection works on right bank of the Waikato River at 6 locations between Meremere, Mercer	30/6/2035
110145	Main channel training reach (Rangiriri to Mercer)	Construct erosion training lines, revetments and groynes, and to disturb the bed of the river in association with their construction, in the bed of the Waikato River from Mercer to Puni	28/2/2040
102953	Main channel training reach (Rangiriri to Mercer)	Take stormwater from a ponding area behind a proposed stopbank Waikato River	23/11/2035

Appendix 1d Standards and guidelines

Standard or guideline	Description/use
International Infrastructure Management Manual (NAMS, 2006a)	General asset management
Environment Waikato: Stopbank Management Guidelines. (Environment Waikato, 1995)	Generic management of stopbanks
Environment Waikato: Floodgate Management Guidelines. (Environment Waikato, 1997a)	Generic management of floodgates
Environment Waikato: Pump Station Management Guidelines. (Environment Waikato, 1997b)	Generic management of pump stations
Environment Waikato: Environmental Guidelines. (Environment Waikato, 2003)	Guidelines for undertaking asset management activities to avoid/minimise environmental effects.
Environment Waikato: Infrastructure Assets Accounting Policies / Guidelines. (Environment Waikato, 2008a)	Policies/guidelines for accounting for infrastructure assets within Council
Environment Waikato: Infrastructure Assets Disaster Damage and Risk Management Policy (Environment Waikato 2004)	Risk financing for disaster damage to schemes
NZS 3910, Conditions of Contract for Building and Civil Engineering Construction	Standard conditions of contract for construction/maintenance work
AU/NZS 4360. Australian/New Zealand Standard for Risk Management.	Risk management framework.
Vegetation Management and Instream Works (Environment Waikato, 2007)	Best practice guidelines
Waterway Crossings (Environment Waikato, 2006)	Best practice guidelines
Land Drainage (Environment Waikato, 2006)	Best practice guidelines
Oil Spill Contingency Guidelines (Environment Waikato, 2006)	Operational guidelines
Erosion and Sediment Control Guidelines for Soil Disturbing Activities (Environment Waikato, 2002)	Operational guidelines
Environment Waikato Freshwater Fish Calendar (Environment Waikato, 2007)	Operational guidelines
Consent Requirements for Vegetation Removal (Environment Waikato, 2006)	Operational guidelines
National Policy Statement for Flood Risk Management (proposed)	National standard
Managing Flood Risk – A process Standard, NZS9401: 2008	National standard
River Flood Risk Management Strategy 2009	Council regional strategy
Lower Waikato Main Channel and River Management Strategy	Council internal zone management guidance document

Appendix 2 Business process

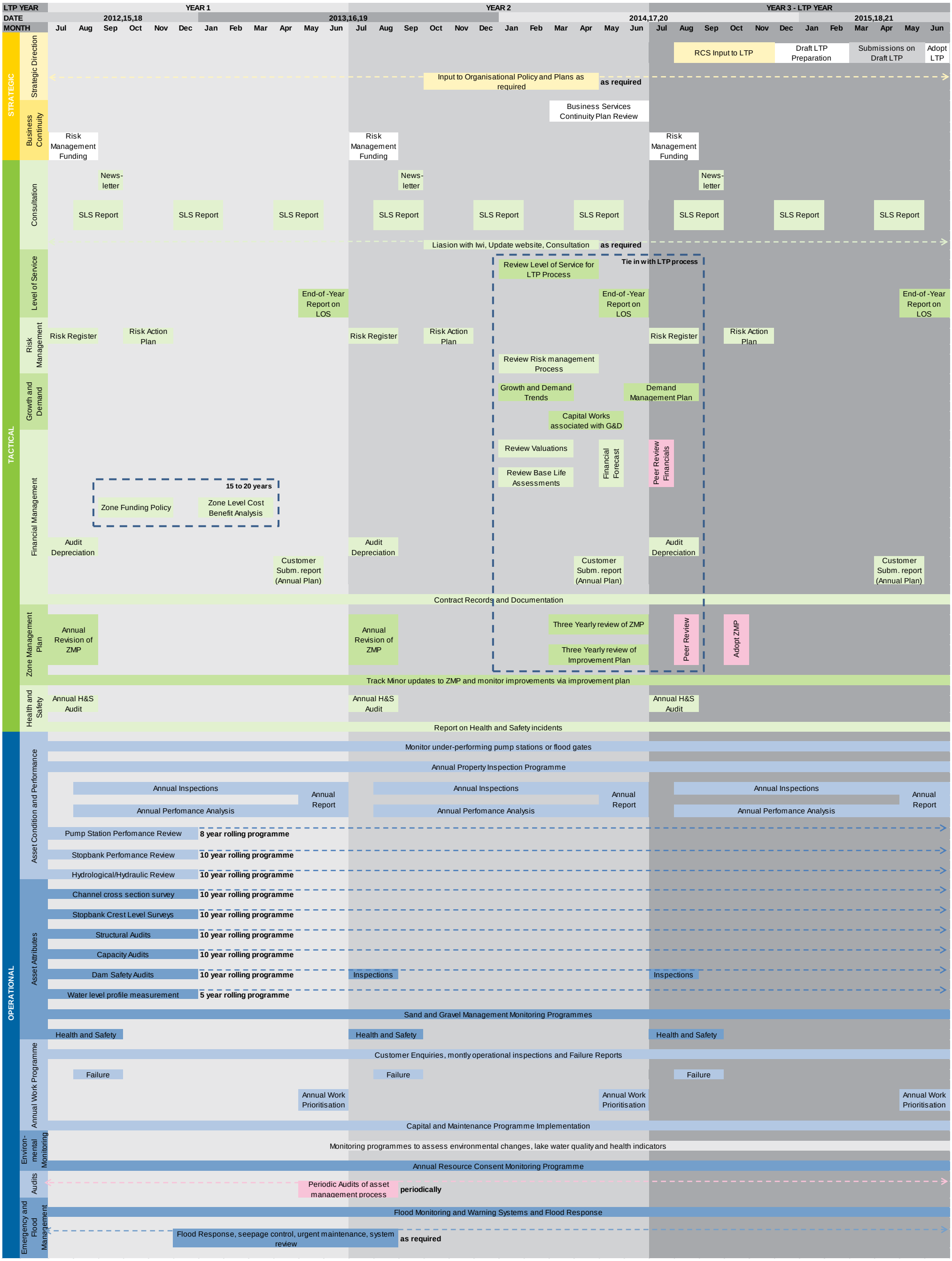
Appendix 2a Lower Waikato monitor and review programme

		Monitor/ reporting requirement	Frequency	Next report/ review due	Lower Waikato zone requirements	Why	Owner/ Responsibility
Strategic	Strategic Direction	LTP Process/ RCS Input to LTP	Three-yearly	2014/15	Financial estimates, Oracle programme Level of service performance measurements Funding requirements	Statutory Requirement LGA 2002	Zone Manager Corporate Development Unit
		Regional Policy Statement (RPS)	As required		Last updated in 2010	Statutory Requirement	Group Manager
		Waikato Regional Plan	As required		Determined at the time	Statutory Requirement	Group Manager
		Whole of catchment management principles	10 yearly		Monitor trends occurring within the wider catchment as part of the whole of catchment management principles		
		District plan reviews and any other relevant document reviews	As document updates				
		Local government reform	Ongoing	2012	To be determined	Strategy to address key issue	Policy Group Manager
	Business Continuity	Business services continuity plan review	Three yearly	In development	The key areas to be covered by the continuity plan include emergency management response for: • Information services including customer services and records • Databases and Internet • GIS • Human resources • Property & procurement • Governance services • IT operations.	Good business practice	Group Manager, Corporate Services
		Risk management funding	Annually		Council is a member of the Local authorities protection plan (LAPP) insurance. All valued assets are insured above a minimum excess, for events exceeding 100 yr (1% AEP). Council maintains a disaster fund to support system and assets maintenance in events exceeding 20-year (5% AEP).	Legislative Responsibility	Group Manager Finance
Tactical	Consultation	Catchment liaison subcommittee newsletter	Annually	2012	Produce one newsletter per year or when needed	LOS Performance Measurement (Community Engagement)	Zone Manager
		Scheme liaison subcommittee (SLS) reporting	3 times per year	2012 November	LOS Performance reporting	LTP performance measure	Zone Manager
		Liaison with iwi	Ongoing	2012	As co-management agreement	Treaty settlement requirement	Zone Manager
		Website	Ongoing	2012	Keep website up to date. Make river level and rainfall information and situation reports readily available on the Council website.	RCS Communication Plan	DM Business Services
		Consultation register	As required	2012	Maintaining a consultation register, including public meetings and submissions.	Communication Plan	Zone Manager
	Levels of Service	Levels of service performance measures review	Three-yearly	2014/15	Review levels of service to comply with community outcomes Incorporate an assessment of the potential effects of climate change by incorporating MfE information in design standards Refer to Appendix 1b for key point for achieving “Core” and “Advanced” Criteria	Local government expectations requirements Part of LTP Process	DM Catchment Management
		Annual Report	Annually (to align with Audit NZ)	July 2012/13	Reporting is done using document #2217782 as template. The following will be reported on and compared to the level of service performance targets: Enquiries and requests Work programme outcomes Achievements against targets Environmental reporting Asset performance Reported to catchment liaison subcommittee and catchment services committee	LOS Performance Measure (Environmental and Flood Protection) Reporting on trends and performance	Zone Manager
	Risk Management	Risk action plan	Annually	Annual Council performance report	Review zone risks on an annual basis	Best management practice Core requirement	Asset Manager
		Risk register	Annually	Zone performance meeting	Risk are added to the Risk Register as they become apparent.	Best management practice	Zone Manager
		Risk management process including likelihood and consequence ratings	Three-yearly		As part of ZMP Review/LTP Process	Best management practice	Group Manager Zone Plans
	Demand Management	Growth and demand trends	Three-yearly	Currently in development	Consider residential and commercial/industrial growth and developments and the impact on the zone Consider Demand drivers including environmental factors, community expectations and perception of risk, legislation, increased awareness and new technologies	Anticipate and plan for future demand	Policy Group - Policy advisor
		Capital works associated with growth and demand	Three-yearly	Three-yearly In development	Association with LTP preparation	Anticipate and plan for future demand	Zone Manager
		Demand management plan	Three-yearly	Three-yearly In development	Association with LTP preparation	Anticipate and plan for future demand	Zone Manager
	Financial Management	Review valuations	Three-yearly	2014/15	Undertake independent valuation of assets. Update valuation in Conquest II		
		Base life assessments	Three-yearly	2014/15	The base life for asset components are modified based on historical condition monitoring structural audits and replacement frequencies	To asses depreciation requirements	Asset Manager
		Financial forecast	Three-yearly	2014/15	Refer to Appendix 1b for key point for achieving “Core” and “Advanced” Criteria		Asset Manager
		Peer review of valuations and forecasts	Three-yearly	2014/15	Reviewed internally prior to adoption	BMP	Asset Manager
		Auditing depreciation	Annually	2013/14	To ensuring intergenerational equity by accounting for loss of service potential when it occurs	LOS Performance Measurement (Affordability)	Finance Manager
		Zone funding policy	15-20 years or as required	2022	Review specific funding policies applicable to the Project Watershed	LOS Performance Measurement (Affordability)	Group Manager

		Monitor/ reporting requirement	Frequency	Next report/ review due	Lower Waikato zone requirements	Why	Owner/ Responsibility
		Zone level cost benefit analysis over a 20 year cycle	20 year or as required	2030	Complete after 20 year following Zone plan adoption	LOS Performance Measurement (Affordability)	Zone Manager
		Annual reporting of customer submissions to Council	Ongoing	2013/14	As part of annual plan cycle	LOS Performance Measurement (Affordability)	Zone Manager / Compliance development
		Contract records and documentation	Ongoing	2013/14	As per Council practice	LOS Performance Measurement (Affordability)	Zone Manager
	Zone Management Plan	Track minor update requirements to zone management plan	Continuous	To be included with next annual revision	Tracking is undertaken through document 2171579	To simplify annual revision	Zone Manager
		Monitoring of improvements via improvement plan	Continuous	2013/14	Zone Improvement Plan document (doc# 2196073) include timing of actions taken.	To meet OAG criteria	Zone Manager
		Annual revision of zone management plan	Annually	2012/13	Review and update of sections where changes are known including: • Review "Core" Asset Management Planning Principles • Review river and catchment works programme objectives and targets • Check that ZP are developing in accordance with emerging practices • Check for ZP consistency with whole of catchment management principles* • Update Lower Waikato Zone Issues and Trends (Table 6)	To meet OAG criteria, to keep ZP current and useful. To reduce the length and extend of ZP review	Zone Manager
		Three yearly review of zone management plan	Three-yearly Linked to WRC strategic planning cycles leading into 10-year LTP process	2014/15	Review and update to incorporate and document changes to works programmes, outcome of service level reviews and new knowledge from the zone plan improvement programme. Updates Includes: • Revision of overarching asset management strategies • Economic considerations (replace assumptions with actual data) • Review Value at risk • Review Environmental Effects Review key zone sub catchments considering: Soil erosion and sedimentation, riparian, river and channel management, existing land protection measures, water quality and quantity, plant and animal pests, natural hazards and risks, policy and planning, biodiversity	To meet OAG criteria	Zone Manager
		Peer review of zone management plan	Three-yearly (with Review) or periodic	2014/15	External assessment / peer review of ZMP against Schedule 10 and OAG criteria Peer review and audits to assess the effectiveness with which the ZM plan meets corporate objectives. Audit to improve the effectiveness of ZMP outputs and compliance with audit criteria, legislative requirements and best appropriate practice	Audit NZ requirement	Division Manager
		Three yearly review of improvement plan	Three-yearly	2014/15	Explicit sign off on Improvement Plan targets Review of Improvement Plan	To meet OAG criteria	Division Manager
		Adoption of zone management plan including improvement plan	Three-yearly	2014/15	The Asset AM Plan must be approved and adopted by the governing body, Board or Council. This includes approval of the improvement element of the plan. Formal adoption of the plan by liaison subcommittee and Council	LOS Performance Measurement (Community Engagement)	Division Manager Lower Waikato LSC Council Office of Auditor General
	Health and Safety	Health and safety incidents	Continually		Refer to template	To meet legislative requirements	H&S Advisor
		Annual health and safety audit	Annually	2013/14	Refer to template	To meet legislative requirements	H&S Advisor
Operational	Asset Condition and Performance	Monitoring of under-performing pumpstations or floodgates	Ongoing		Review 5 pump stations annually	(from improvement section) LOS Performance Measurement (Flood Protection)	Operations Manager
		Annual property inspection programme and property inspections	Ongoing		Expectations relating to – LIA's, Land licences, scheme assets	Risk alleviation (CM2) LOS Action (Service Provision)	Land Management Officer, Asset Manager
		Annual condition & performance report	Annually	2012/13			Zone Manager
		Condition and performance analysis and likelihood of failure	Annually	2012/13		LOS Performance Measurement (Flood Protection)	Zone Manager
		Annual Condition and Performance Inspection stopbanks, floodgates, pumpstations	Annually	2012/13	Refer to Annual Inspection and Maintenance Programme under Maintenance This includes inspection of all catchment, river system and assets, and assessment of the overall condition and maintenance needs. Asset condition is monitored by visual inspections, physical surveys and scheme reviews and non-performing assets identified. Indicators of non-performing assets include: • Structural failure • Repeated asset failure (breaks, faults) • Ineffective and/or uneconomic operation • Unsafe conditions for the public. Information in Conquest II updated	LOS Performance Measurement (Service Provision)	Zone Manager
		Pumpstation performance review	8 year	Rolling programme	Assessment of service level requests, conditions and performance		Zone Manager
		Stopbank performance review	10 yearly	Rolling programme	Review overall performance	LoS Performance measures	Zone Manager
		Hydrological/hydraulic review and monitor national climate forecast	10 year	Rolling programme	Technical review of the river system and associated stopbanks ability to convey the design floods to the levels of service	LOS Performance Measurement (Flood	Technical Manager

		Monitor/ reporting requirement	Frequency	Next report/ review due	Lower Waikato zone requirements	Why	Owner/ Responsibility
					Catchment monitoring and modelling (land use changes etc.) Inundation studies	Protection) Risk Management (Activity Risk)	
	Asset Attributes	Channel cross section surveys	10 year	Rolling programme	Survey of main river and tributary channel cross sections	LOS Performance Measurement (Service Provision)	Zone Manager
		Stopbank crest level surveys	Ongoing	Rolling programme	Confirmation of design and freeboard levels, used for capital works upgrade and prioritisation. 10 – 100 year flood design. 5 year cycle (Part settlement / consolidation).	LOS Performance Measurement (Flood Protection)	
		Structural audits	10 year	Rolling programme	Third party audit of concrete/timber and steel structures (e.g. pump stations, floodgates, bridges, etc.)	Asset replacement upgrades. Renewal cycles.	Zone Manager
		Capacity audits	10 year	Rolling programme	Drains / channel / streams / pumps and floodgates	LOS Performance Measurement (Flood Protection)	Zone Manager
		Dam safety Inspection and audits (Mangawara) 6 dams and C4 (1)	10 year Sizing Annual Inspections	Rolling programme	Annual inspections of 6 Dams	LOS Performance Measurement (Flood Protection)	Zone Manager
		Water level profile measurement	5 yearly	Rolling programme	350 cumic profile	LOS Performance Measure (Service Provision)	Resource Information Group Manager
		Sand and gravel management monitoring programmes	As required		Cross-section monitoring Process Part of comprehensive consents	Comprehensive Consents	Zone Manager
		Annual health and safety audit	Ongoing		Respond to H&S Policy directives	LOS Performance Measurement (Flood Protection)	Zone Manager
	Annual Work Programme	Planned/schedule maintenance and inspection programme	Annually	2012/13	The standard monitoring maintenance works necessary to ensure that the assets are operational at all times. Such works include monitoring inspections, audits and surveys, removal of blockages from outlet channels and floodgate flaps, weed spray and lubrication of mechanical components		Zone Manager
		Customer enquiries record	Continuous (Conquest)	n/a	Log a Request Schedule Action in Conquest II if required. Maintain record of enquiries, resulting actions and response times As per new requests (AM)	LOS Performance Measure (Reliability and Responsiveness)	Zone Manager
		Monthly operational inspections and failure reports	Monthly	Ongoing		LOS Performance Measurement (Flood Protection)	Zone Manager
		Bi-annual failure logging	Bi-annually		Flood related. Power / pump failure. Stopbank failure: Rivers and streams (flooding)	LOS Performance Measure (Service Provision)	Zone Manager
		Work prioritisation and confirmation	Annually	2012/13	Based on annual land assessments and structural audits.	Meet LoS and performance measures	Zone Manager
		Capital, replacement & renewals programme	Annually	2012/13	As per LTP work programme	Meet LoS and performance LTP outcomes	Zone Manager
	Environmental Monitoring	Monitoring programmes to assess the environmental changes resulting from the activities undertaken	In development	In development		Risk	Resource Information Group Manager
		Monitoring lake water quality and health indicators	In development	In development		In development	Resource Information Group Manager
		Annual resource consent monitoring programme	Annually	Annual programme of monitoring	43+ consents	RMA requirement	Programme Manager Land & Lakes
	Audits	Auditing of asset management process	Periodically		Periodic audits to assess the adequacy of asset management processes, systems and data. External audits will be undertaken to measure asset management performance against ‘best practice’.	Best Practice	Division Manager
	Emergency and Flood Management	Flood monitoring and warning systems	Continuous	n/a	Information from the system is used to warn landowners and communities about floods, collect data to improve the accuracy of flood prediction, co-ordinate flood response, and maintain flood protection works.	Risk Management Strategy (RM1 and RM2)	PM, Regional Hazards
		Flood response	Ongoing		Undertake continuous system monitoring during all events larger than the 5 year (20% AEP) which equates to a flow of (850 m3/s) at Ngaruawahia.	Risk Management	Operations Manager
		Seepage control and system urgent maintenance	As required		Undertake works (sand bagging) to control seepage and reduce risk of failure due to piping Undertake urgent maintenance works in response to failures and underperformance of assets during significant flood events, including pumps and floodgates maintenance, mobile pumps and sand bagging low spots on stopbanks.	Risk Management	Operations Manager
		System review	As required		Following floods, compile information, review the system performance and update the maintenance works programmes	Legislative Responsibility	Programme Manager Technical Services

Appendix 2b Lower Waikato monitor and review timetable



Appendix 2c Business functionality supported by Conquest II

Product/module	Business function	Comment	WRC status
Conquest II Asset register	Records information about the nature (type, material, dimensions, quantity and age) of assets Records information about the location of assets. Records information about the design capacity of assets and the areas serviced by assets. Fully customisable type hierarchy and user defined attributes	Data not regularly updated unless errors are found. Significantly complete some asset types still to be defined and added	Partially Implemented
Conquest II valuation	Records ODRC, and ORC information. Estimated remaining lives and expected expiry date Depreciation tracking	Valuations updated every 3 years. Valuation history is retained.	Fully Implemented
Conquest II inspections and performance	Records annual inspection and condition information. Performance grade	Condition information updated annually Inspection history is retained	Fully Implemented
Conquest II requests	Customer requests recorded Actions can be loaded and programmed Provides audit trail of response times and actions.		Partially implemented
Conquest II maintenance management	Planned maintenance (standard actions/ actions) Unplanned maintenance ((standard actions/ actions) Standard procedures Works completion sign off Forward planning		Partially implemented
Conquest II risk management	Condition Performance Consequence of failure Probability of failure	Quantification of failure risk for prioritising maintenance works.	Not yet implemented

Appendix 2d Asset hierarchy

Level 1	Type code	Level 2	Type code	Level 3	Type code
Assets	04.02	Barge	04.02.20	Barge: steel	04.02.20.01
		Building	04.02.03	Building: aluminium clad	04.02.03.06
				Building: brick/timber framed	04.02.03.01
				Building: colour steel timber frame	04.02.03.05
				Building: concrete block	04.02.03.07
				Building: corrugated iron	04.02.03.03
				Building: kitset/concrete pad	04.02.03.02
		Channel	04.02.08	Channel: artificial	04.02.08.01
				Channel: natural	04.02.08.02
		Civil structure	04.02.07	Barrels	04.02.07.01
				Chambers	04.02.07.05
				Inlet/outlet structures	04.02.07.02
				Screens	04.02.07.03
				Stilling basin	04.02.07.06
				Sumps	04.02.07.04
				Bridge	04.02.18.02
				Culverts	04.02.18.03
				Ford crossing	04.02.18.01
				2008 valuation foundation asset	04.02.09.13
				Bunds	04.02.09.07
				Detention dam	04.02.09.02
				Floodwall	04.02.09.12
				Spillway	04.02.09.03
				Stopbank	04.02.09.04
				Debris dams	04.02.13.12
				Detention bunds	04.02.13.02
				Diversion banks	04.02.13.11
				Drop structures	04.02.13.03
				Flumes	04.02.13.10
				Gradient control structure	04.02.13.05
				Inlet channel protection works	04.02.13.14
				Outlet channel protection works	04.02.13.15
				Pipe drop structures	04.02.13.09
				Rip-rap	04.02.13.08
				Sediment dams	04.02.13.07
				Sinkholes	04.02.13.06
				Water supply	04.02.13.13
				Fence: conventional	04.02.05.01
				Fence: deer	04.02.05.03
				Fence: electric	04.02.05.04
				Fence: sheep netting	04.02.05.02

Level 1	Type code	Level 2	Type code	Level 3	Type code
				Floodgate: box	04.02.10.01
				Floodgate: conventional	04.02.10.02
				Floodgate: diaphragm	04.02.10.03
				Diesel generator	04.02.06.11
				Diesel storage tank and system	04.02.06.13
				Lifting gear	04.02.06.05
				Motors	04.02.06.07
				Pipework	04.02.06.03
				Power supplies	04.02.06.10
				Pumps	04.02.06.06
				Switchboard and controls	04.02.06.12
				Telemetry/scada	04.02.06.04
				Valves	04.02.06.08
				Exotic plantings	04.02.14.18
				Native plantings	04.02.14.19
				Pumpstation: Archimedes	04.02.11.04
				Pumpstation: gravity outlet	04.02.11.01
				Pumpstation: siphon flood	04.02.11.05
				Pumpstation: through bank	04.02.11.03
				Bank revetment	04.02.12.01
				Boat ramp	04.02.12.02
				Debris traps	04.02.12.06
				Fish pass	04.02.12.08
				Groynes	04.02.12.07
				Sediment ponds	04.02.12.03
				Training lines	04.02.12.05
				Weirs	04.02.12.04

Appendix 3 Levels of service

Appendix 3a Capacity and performance of scheme defences

Defence Name	Protected area (ha)	Stopbanks					Floodgates			Pumpstations										
		Length (m)	Design information		Actual information		No	Actual information		No	Name	Design information						Actual information		
			Design standard	Design freeboard	Performance grade	Average condition Grade		Cross section area (m^2)	Average condition Grade			Approx design AEP	Hill catchment (ha)	Flat catchment (ha)	Design hill runoff (mm)	Design flat runoff (mm)	Design capacity	Actual capacity (cumecs)	Approx actual ARI (years)	Average condition
Huntly - Harris St.	1.2	80	100	0.61		2.0	1		2.0	0										
Huntly North	44.8	1215	100	0.61		2.0	1	2.5	2.0	2	Huntly north pump station		0.0	15.0						2.0
											Lake Hakanoa PS/FG									
Huntly - Parry Street	31.5	315	100	0.61		2.0	0			0										
Huntly South	16.6	2893	100	0.61		2.0	0			3	Pumpstation 1		0.0	16.0						2.0
											Pumpstation 2		0.0	10.0						2.0
											Pumpstation 3		0.0	3.0				0.18		2.0
Mangawara C 01	53.5	2410	50	0.30		2.0	5	0.9	2.0	0										
Mangawara C 02	516.1	6544	50	0.30		2.3	11	7.8	2.0	0										
Mangawara C 03	248.1	4598	50	0.30		2.0	15	5.5	2.0	0										
Mangawara C 04	589.8	7372	50	0.30		2.0	14	4.9	2.0	0										
Mangawara C 05	1278.7	8295	50	0.30		2.0	23	9.3	2.0	0										
Mangawara C 06	751.8	6820	50	0.30		2.0	14	6.6	2.0	0										
Mangawara C 07	328.6	7789	50	0.30		2.0	11	4.4	2.0	0										
Mangawara C 08	193.0	5037	50	0.30		2.0	2	2.1	2.0	0										
Mangawara C 09	1732.2	8405	50	0.30		2.3	9	11.2	2.0	0										
Mangawara C 10	79.0	4568	50	0.30		2.0	4	2.0	2.0	0										
Mangawara C 11	111.0	2174	50	0.30		2.0	0			0										
Mangawara C 12	389.2	8506	50	0.30		2.0	7	3.3	2.0	0										
Mangawara C 13	83.5	4095	50	0.30		2.0	9	0.9	2.0	0										
Mangawara C 20	14.5	1317	5	0.00		2.0	4	0.5	2.0	0										

Defence Name	Protected area (ha)	Stopbanks					Floodgates			Pumpstations											
		Length (m)	Design information		Actual information		No	Actual information		No	Name	Design information							Actual information		
			Design standard	Design freeboard	Performance grade	Average condition Grade		Cross section area (m^2)	Average condition Grade			Approx design AEP	Hill catchment (ha)	Flat catchment (ha)	Design hill runoff (mm)	Design flat runoff (mm)	Design capacity	Actual capacity (m^3/s)	Approx actual ARI (yrs)	Average condition
Mangawara C 21	86.6	3678	5	0.00		2.0	14	3.1	2.0	0											
Mangawara C 22	156.1	3657	5	0.00		2.0	9	1.5	2.0	0											
Mangawara C 23	27.8	924	5	0.00		2.0	3	1.3	2.0	0											
Mangawara C 24	134.6	3004	5	0.00		2.0	8	1.1	2.0	0											
Lake Waahi	442.2	0					1	5.1	2.0	0											
Whangamaire pump area	977.4	0					1	0.4	3.0	1	Whangamaire PS		0.0	977.4				1.80	3.8	2.0
Huntly west	3661.2	26352	100	0.30		2.0	4	7.5	2.0	8	Austins pumpstation		160.0	275.0	20.0	20.0	1.01	1.00	6.2	2.0
											Blairs pumpstation		106.0	159.0	20.0	20.0	0.61	0.60	5.7	2.0
											Saxton pumpstation		0.0	100.2	25.0	25.0	0.29	0.60	141.6	2.0
											Golf Course pumpstation		544.0	536.0	20.0	20.0	2.50	2.61	7.0	2.0
											Guests pumpstation		221.0	284.0	20.0	20.0	1.17	0.75	1.6	2.0
											Hills pumpstation		110.0	173.0	20.0	20.0	0.66	0.60	4.6	2.0
											Okowhao pumpstation		217.0	168.0	20.0	20.0	0.89	0.90	5.9	2.0
											Pattersons pumpstation		230.0	1060.0	20.0	20.0	2.99	3.09	7.8	2.0
Mercer west southern	102.8	3000	10	0.61		4.0	3	1.3	2.0	0											
Mercer west Morrison Road	149.4	4795	10	0.61		3.8	17	3.6	2.0	0											
Mercer west northern	109.8	3200	10	0.30		2.0	2		2.0	0											
Waikokowai Furniss (DS)	99.9	2790	10	0.30		2.0	0			1	Furniss DS pumpstation		81.0	69.0	25.0	25.0	0.43	0.60	45.4	2.0
Waikokowai Furniss (US)	18.9	1527	10	0.30		2.0	0			1	Furniss US pumpstation		0.0	28.0	20.0	20.0	0.06	0.04	2.3	2.0

Defence Name	Protected area (ha)	Stopbanks					Floodgates			Pumpstations										
		Length (m)	Design information		Actual information		No	Actual information		No	Name	Design information						Actual information		
			Design standard	Design freeboard	Performance grade	Average condition Grade		Cross section area (m^2)	Average condition Grade			Approx design AEP	Hill catchment (ha)	Flat catchment (ha)	Design hill runoff (mm)	Design flat runoff (mm)	Design capacity	Actual capacity (m^3/s)	Approx actual ARI (yrs)	Average condition
Waikokowai Harveys (North)	95.5	1765	10	0.30		2.0	0			1	Harveys pumpstation		190.0	100.0	25.0	25.0	0.84	1.10	38.4	2.0
Deroles	104.8	2100	10	0.61		2.5	1	1.1	2.0	1	Deroles pumpstation		87.6	204.4				0.80	12.0	2.0
Orton	249.7	1627	10	0.61		3.0	0			1	Orton pumpstation		726.6	311.4						3.0
Kimihia	319.3	2613	100	0.30		2.0	3	0.6	2.0	1	Kimihia pumpstation		68.0	28.0	20.0	10.0	0.19	0.30	18.4	2.0
Motukaraka	1464.7	2081	100	0.46		3.0	1	0.1	2.0	1	Screw, duty & secondary		1544.0	2316.0	38.0	10.0	9.47	11.00		3.0
Rangiriri spillway	309.8	1812	20	0.00		2.0	0			0										
Rangiriri	110.7	2750	10	0.61		2.0	2	0.1	2.0	1	Rangiriri Nth pumpstation		77.0	86.0	20.0	10.0	0.28	0.90	135.1	2.0
Waikato River RB: Rangiriri SW-Fosters Landing	2542.6	8014	100	0.30		2.0	5	0.8	2.0	4	Higgins pumpstation		7.7	69.3	20.0	10.0	0.10			2.0
											Halls pumpstation		60.0	110.0	20.0	10.0	0.27	0.40	6.8	2.0
											Tabenels pumpstation		60.0	110.0	20.0	10.0	0.27	0.40	6.8	2.0
											Kitcheners pumpstation		0.0	159.0	20.0	10.0	0.18			2.0
Churchill east	731.5	4811	10	0.61		2.0	1	0.4	4.0	3	Main pumpstation		859.0	513.0	25.0	12.0	3.20	4.80	28.3	2.0
											Watts pumpstation		0.0	100.8	25.0	12.0	0.14	0.20	4.7	2.0
											Secondary pumpstation		0.0	17.8	25.0	12.0	0.02	2.00	> 150	2.0
Meremere east	506.9	467	100	0.30		2.0	0			1	Main pumpstation		1520.0	500.0	25.0	12.0	5.09	5.10	7.5	2.0
Meremere west	160.5	4341	10	0.61		2.0	0			2	Henrys pumpstation		60.0	30.0	20.0	10.0	0.17	0.10	1.0	2.0
											Peters pumpstation		87.0	117.0	20.0	10.0	0.34	0.60	14.9	2.0

Defence Name	Protected area (ha)	Stopbanks					Floodgates			Pumpstations										
		Length (m)	Design information		Actual information		No	Actual information		No	Name	Design information						Actual information		
			Design standard	Design freeboard	Performance grade	Average condition Grade		Cross section area (m^2)	Average condition Grade			Approx design AEP	Hill catchment (ha)	Flat catchment (ha)	Design hill runoff (mm)	Design flat runoff (mm)	Design capacity	Actual capacity (m^3/s)	Approx actual ARI (yrs)	Average condition
Swan Road	801.7	5453	100	0.61		1.8	1	0.2	2.0	1	Swan Road pumpstation		524.0	526.0	25.0	12.0	2.25	2.30	4.8	2.0
Vrsaljkos	52.1	2424	100	0.30		3.0	0			1	Vrsaljkos PS/FG		25.0	53.0	25.0	12.0	0.15	0.14	3.0	2.0
Orchard Road	25.8	424				3.0	0			1	Orchard Road PS		150.0	30.0	20.0	10.0	0.38	0.60	23.7	2.0
Island block	165.4	1824	100	0.46		2.0	0			2	Island Block south PS		0.0	44.0	25.0	12.0	0.06	0.50	> 150	2.0
											Island Block north PS		50.0	120.0	25.0	12.0	0.31	0.63	33.3	2.0
Waller Commins	26.9	493	100	0.46		3.0	0			1	Waller Commins PS/FG		52.8	79.2	38.0	10.0	0.32	0.47	29.5	2.0
Parish Polder	91.7	3140	100	0.46		3.0	0			1	Parish Polder PS		13.7	123.3				0.57	46.9	4.0
Bell Road	179.8	1136	100	0.46		3.0	1		3.0	1	Bell Road PS/FG		172.5	402.5	38.0	10.0	1.22	2.00	26.9	2.0
Locke	21.8	249	100	0.46		2.0	0			1	Locke pumpstation		15.8	142.2				0.20	1.6	5.0
Whiskey Flats eastern	16.0	1270	100	0.30		3.0	1	0.3	3.0	0										
Whiskey Flats western	14.3	1143	100	0.30		3.0	1	0.2	3.0	0										
Mangatawhiri C 1	181.6	3505	7	0.30		2.0	2	0.3	2.0	0										
Mangatawhiri C 2	189.5	2080	20	0.30		2.0	0			1	Compartment 2 PS		84.0	336.0	38.0	10.0	0.76	2.06	81.7	3.0
Mangatawhiri C3	519.4	3713	20	0.30		4.0	0			1	Screw & duty pumps		73.9	665.1	38.0	10.0	1.09	2.60	27.5	4.0
Mangatawhiri C 4	432.3	8546	20	0.30		4.3	0			1	Compartment 4 PS		163.0	652.0	38.0	10.0	1.47	2.06	9.6	2.0
Mangatawhiri C 5	28.9	545	100	0.30		3.0	0			1	Miller Farlane PS		147.0	63.0	38.0	10.0	0.72	0.52	7.0	4.0
Tuakau	147.5	7189	10	0.61		2.0	0			1	Tuakau PS/FG		0.0	94.0	38.0	10.0	0.11	0.30	20.3	2.0
Ohairoa	43.2	2470	10	0.61		3.0	1		2.0	1	Ohairoa pumpstation		70.9	0.1				0.20	11.4	4.0
Onewhero east	93.8	2635	10	0.46		3.0	1		3.0	1	Onewhero east		77.2	115.8				0.40	4.2	2.0

Defence Name	Protected area (ha)	Stopbanks					Floodgates			Pumpstations										
		Length (m)	Design information		Actual information		No	Actual information		No	Name	Design information						Actual information		
			Design standard	Design freeboard	Performance grade	Average condition Grade		Cross section area (m^2)	Average condition Grade			Approx design AEP	Hill catchment (ha)	Flat catchment (ha)	Design hill runoff (mm)	Design flat runoff (mm)	Design capacity	Actual capacity (m^3/s)	Approx actual ARI (yrs)	Average condition
											PS									
Onewhero west	161.0	3857	10	0.46		2.0	1		2.0	1	Onewhero west PS		37.8	151.2				0.40	5.1	2.0
Te Kohanga major-eastern compartment	568.1	6205	100	0.61		2.3	1		2.0	3	Masseys pumpstation		31.6	284.4				0.94	16.1	3.0
											Muirs pumpstation		40.6	17.4				0.66	> 150	3.0
											Sharpes pumpstation		34.7	312.3				0.94	12.1	3.0
Te Kohanga major-western	29.9	1672	100	0.61		2.0	0			1	Johansens pumpstation		73.6	110.4				0.20	1.0	4.0
Te Kohanga minor (Aireys)	107.3	2494	10	0.30		2.0	0			1	Aireys pumpstation		40.2	160.8				0.42	4.9	4.0
Horseshoe	99.2	767	100	0.30		2.0	0			1	Horseshoe pumpstation		54.3	126.7				0.40	5.6	3.0
Tickles	23.1	1616	100	0.30		2.0	1	0.1	3.0	1	Tickles pumpstation		19.5	19.5				0.13	23.4	2.0
Aka Aka Otaua	5244.4	14349	100	0.30		2.5	29	64.6	2.1	4	Sandy Muirs pumpstation		8.4	75.6				0.18	5.6	2.0
											Hoods Landing PS		0.0	217.0				0.15	1.0	2.0
											Eastern drain PS		469.5	1095.5				2.06	1.4	2.0
											Mangawhero pumpstation		18.0	162.0				1.80	> 150	2.0
Total or average	28290	246940				2.3	245	156.0	2.2	60			8976	13351				60		2.4

Appendix 3b Capacity and performance of lower Waikato River low flow channel

Site	Lower Waikato water Levels for 350 m3/s discharge. RL Moturiki Datum (m)			Performance standard achieved/not achieved	Trend
	Performance standard	1998 Modelled	2006/07 modelled		
Hoods Landing (XS 2B)	0.00	0.20	0.07	Not achieved (marginal)	Degrading
The Elbow (XS 20)	0.50	0.68	0.49	Achieved	Degrading
Tuakau Bridge (XS 33)	1.70	1.20	1.24	Achieved	Aggrading (Marginal)
Mercer (XS 56)	2.55	1.93	2.26	Achieved	Aggrading
Meremere (XS 60)	2.80	2.40	2.60	Achieved	Aggrading
Orton (XS 73)	4.30	4.01	4.09	Achieved	Aggrading (Marginal)
Rangiriri (XS 112)	6.10	6.20	6.41	Not achieved	Aggrading
Ohinewai (XS 114B)	6.65	6.91	6.89	Not achieved	Degrading (Marginal)
Huntly South (XS 124)	8.30	8.20	8.14	Achieved	Marginal
Mangawara confluence	9.00	8.75	8.82	Achieved	Marginal

Appendix 3c Capacity and performance of scheme control gates

Structure	Function	Performance	Capacity
Whangamarino control structure (radial gate)	Prevent backflow from the Waikato River in to the Whangamarino Wetland during floods	Gate is closed when the Waikato River rises above water levels in the Whangamarino Wetland Gate is reopened as soon as Waikato River recedes below wetland levels	Twin radial gates within twin 9.88 metre wide by 7.14 metre high rectangular reinforced concrete channel sections. (A=141 m2)
Lake Waikare northern outlet gate (Radial gate)	Control The level and Outflow from Lake Waikare	Under normal conditions the control gate is operated to maintain seasonal lake levels (within tolerances) as defined by the resource consent. During floods, the gate is closed, either: when the Rangiriri Spillway operates; or when the Whangamarino Control Gate is closed. The gate remains closed until the Whangamarino Control Gate is reopened.	Single radial gate within a 12 metre wide by 6 metre high rectangular reinforced concrete channel section. (A=72 m2)
Te Onetea culvert (Sluice gate)	Control flows between the Waikato River and lake Waikare	Under normal conditions, the gate remains fully open to allow flow from the Waikato River in to Lake Waikare. Under low flows, when the Waikato River level drops below the level of Lake Waikare the gate is closed Under flood conditions, if the Waikato River at Rangiriri exceeds 7.0 metres RL the gate is closed	1.2 x 1.2 metre box culvert. (A=1.44 m2)

Appendix 4 Risk register

The risk registers provided in the following tables for the current and future RCS activities of Council and have been developed in consultation with key staff.

Appendix 4a General risks

Risk number	Risk descriptor	Risk type	Initial risk			Current practices/strategies		Residual risk			Risk owner (name and title)	Management options available
			Consequence	Likelihood	Factor	Description	Effectiveness	Consequence	Likelihood	Factor		
GR1	**Lack of staff resources** **Caused by:** Inability to attract key staff Inability to retain skilled staff Labour market Shortage of appropriately skilled staff Staff turnover Inadequate organisation structure / mix of skill levels **Consequences:** High cost of recruitment and training of new staff Increased staff stress Decreased productivity Limited skilled staff/ mainly unskilled staff appointed Decreased operational capacity Loss of knowledge Increased staff turnover Reduction in levels of service	Operational Financial Reputation / image Health and safety	4	4	H	Dedicated HR staff, policies and guidelines Use of recruitment consultancies Monitor staff satisfaction, surveys Personal development plans Strategic planning (staff and organisation) Internal promotions/ career management Training & development processes Shared resourcing with other TLAs Secondment strategies with other organisations Study grants for staff Benchmarked salary levels / regular remuneration review Promoting positive work environment – social, team building Good office accommodation/layout Flexible working hours	Very good	2	3	M	Group manager	Continue current practice Succession planning Cadetships Development training Mentorship programmes Group business plan including resource planning Targeted recruiting

GR2	**Lack of financial resources** **Caused by:** Economic climate Political climate/cycle Operational tempo Inadequate forward planning **Consequences:** Inability to deliver aspects of a programme of work Not meeting stakeholder expectations Political Level of Service	Operational Financial Reputation / Image Health and Safety	3	4	H	Financial Planning (6 monthly review, monthly basis zone programme level) Prioritised schedule of work Financial reserves Credit facilities Monitoring and reporting of economic climate	Very Good	2	2	L	Group manager	Continue current practice Continue to train staff on financial management Improve financial forecasting
GR3	**Inefficient use of resources** **Caused by**: Inadequate project, programme and portfolio management Lack of training or qualified staff Lack of project planning or systems Projects, programmes and activities inadequately scoped, budgeted, managed and documented, and reviewed Inadequate consultation Inefficient consent process due to stakeholder objections Unrealistic expectations Lack of resources Lack of ownership Inadequate systems and processes Inadequate business planning Lack of an overall strategy or plan **Consequences:** Time & cost blowouts, Lack of quality outcomes, Loss of image, Impact on staff morale, Over/under spending of budgets, Failure to deliver on commitments e.g. LTP, Deferring of projects	Financial Operational Economic Reputation / Image	4	5	E	Project Management training for key staff Reporting / monitoring processes Use of trained external resource Have access to internal specialists Appropriate resources (e.g. software/information systems) Dedicated Project / Programme management staff/team Development and implementation of business and zone plans	Very Good	3	2	M	Divisional manager Zone manager CFO	Ensure on-going adequate (quality) training for key staff Project Closure/Reviews improved Reporting / monitoring processes Improved Project Management (process and skills) Improved Financial Capability

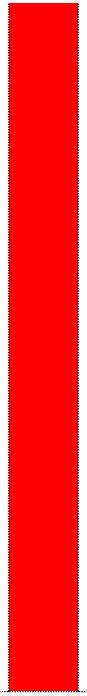
GR4	**Loss of knowledge (information)** **Caused by:** Inability to retain knowledge Insufficient systems in place to manage data/information, especially regarding asset performance and condition Loss of institutional knowledge IT failure and systems performance Inadequate transfer of knowledge (knowledge management) Lack of continuity (political process) **Consequences:** Operational loss Financial costs Loss of institutional knowledge Loss of image and credibility Reduced Levels of Service Poor planning Breakdown in stakeholder relationships Breakdown in political relationships	Financial Operational Reputation / Image Political	4	4	H	Asset changes/updates – Information currently updated in conquest IT practices (backup, virus, security etc) Develop processes to ensure that asset knowledge is transferred, stored and accessible and audited (externally), including maintenance information. Ongoing training for staff Improve asset data collection processes, data management skills and resources Constant review and improvement of systems Implement quality assurance programme for asset and zone information	Good	2	2	L	Divisional manager Group manager	Define mentors/coaches and successors
GR5	**Failure to identify opportunities and developments – Best practice and technology advances** **Caused by:** Lack of staff awareness and training Insufficient resources to implement Lack of networking Lack of personal development Lack of research Lack of process to capture/ manage opportunities **Consequences:** Missed opportunity to gain efficiencies, reduce costs and maintain service levels Lack of increased knowledge Increased costs Lost productivity	Financial Operational Reputation / Image Political	3	5	H	Local government networking eg national forums, conferences Access experienced staff and contractors Staff development and training Use of external advice/resources Liaison with groups doing research Regular updates and attendance through NAMS Environment best practice development Exchange of information between regional council through working groups Continue and develop current practices Improving capability/process to evaluate and implement recognised opportunities Internally develop best	Very Good	2	2	L	Group manager	Maintain awareness of current industry developments and research Liaison with groups doing research Monitoring international best practice and research

						practice						
GR7	**Inadequate contract management (Service/ maintenance/ capital)** **Caused by:** Inadequate documents Inadequate management of contractors Poor contractor selection/ monitoring Resourcing Competition Exit from industry Poor performance Economic environment, lack of funding Inadequate knowledge of skilled staff Lack of process e.g. contract templates Lack of corporate commitment to the formal processes Lack of skilled contractors e.g. Barge operator **Consequences:** Poor Contractor performance Unnecessary or excessive costs Insufficient output or quality Loss of key contractors Negative Council Image and adverse media coverage Increased costs Legal liability Reduced Health and Safety Temporary loss of amenity Loss of operational capability Inefficient use of resources Injury to members of the public Loss of amenity value Loss of information (where contract terminated)	Financial Operational Economic Reputation / image Health and safety Environment Legal	4	5	E	Improving contract management skills in place Contract conditions and specifications Financial and Performance reporting Corporate and zone objectives Corporate procurement procedures / manual Developing H&S monitoring/ auditing Project management and contract documentation training Internal contract performance review Audit and monitoring of contract processes Staff financial delegation process and tender assessment process Centralised filing management system for contracts Probity process	Very Good	2	2	L	Divisional manager Zone manager Asset manager	Ongoing improvements to existing contract processes and procedures Improve contract management skills Develop and implement improved H&S monitoring/ auditing Develop and implement formal contract close out process

GR8	**Inappropriate/inadequate procurement** **Caused by:** Lack of adequate policy and processes Lack of competitors in the market place **Consequences:** Cost inefficiencies Failure to meet levels of service Continuity of supplier	Financial Operational Economic Reputation / image Health and safety Environment Legal	4	4	H	Procurement policy is in place Financial delegation levels in place Contract / Tender process including tenders board in place Probity process in place Financial Policy Annual audit	Very Good	2	2	L	Divisional manager Zone manager	Continue current practice Regular review Continue to develop and refine in line with best practice
GR9	**Inadequate asset management – not up to date, or insufficient quality of process and output.** **Caused by:** Lack of AM knowledge and practice Lack of staff knowledge and training Lack of resources Poor maintenance Inadequate data collection Poor data quality/ accuracy and reporting Inadequate assessment and performance monitoring **Consequences:** Deterioration of assets Reduced level of service and loss of operational capacity Inadequate accuracy of asset and planning data for renewals/replacements and valuations Negative Council image Increased costs, Financial implications Under-utilisation of system Low confidence in accuracy of asset register Cross-functional access to data is limited Inadequate application and uptake of available tools/ information Insufficient information for informed decision making Serious injury / Loss of life Political risk Stakeholder expectations Communities/Towns expectations	Financial Operational Economic Reputation / image Health and safety Environment Legal	5	5	E	Asset Management processes and practices Asset Management System (Conquest II) GIS - Geo Media is linked to Conquest II Developing ZMPs Dedicated resources for Asset Management Condition surveys and assessments, revaluations, structural audits (internal and external) Reporting process for zone management performance measures	Good	2	2	L	Divisional Manager Asset Manager	Progressive development of ZMPs incorporating Asset management Continuing Staff Development Ongoing external audit and review (OAG) and process for post review action Consider the establish of an Asset Management steering group

GR10	**Natural hazards and resulting impact on zone assets** **Caused By:** **Extreme weather event** **Consequences:** Damage to drainage systems Damage to infrastructure Catchment changes Slips/Landslides Loss of access Loss of service (Inability to respond) Loss of electrical supply Loss of communications and telemetry Legal risk/liability Duty of care Dam / embankment (asset) failure Compounding hazards Potential injury, sickness or loss of life Damage to Council-controlled/ owned land Loss of amenity value Negative Council image (perceived as Councils problem) Increased costs e.g. clean up Adverse environmental effects Damage to private / neighbouring property Financial cost through damage to assets	Financial Operational Economic Reputation / Image Health and Safety Environment Legal	5	5	E	Reactive/Proactive approach to events Post event inspection/structural audit (as required) and renewals Engineering code of practice Communications strategy (flood warning system) Emergency/hazard procedures manual Regional hazard mapping and identification Community feedback via EMOs Connections made with Civil Defence (Lifelines) Communications plan LAPP scheme Disaster recovery policy (WRC) High-flow management plan (Waikato river system) National disaster recovery plan (government) Integrating Hazard Management into regional and district plans Redundancy for critical assets (telemetry) Flood risk management strategy	Excellent	4	2	M	Divisional Manager CDEM Manager Asset Manager	Public education / Communication plan strategy Continue current practices, improve, monitor current process Improve understanding of hazard events Develop MOU regarding roles and responsibility between WRC and CDEM Develop back up for communications where appropriate

Earthquake **Consequences:** Damage to drainage systems Damage to infrastructure Liquefaction/ Lateral Spreading Settlement/Uplift Catchment changes Slips/Landslides Loss of access Loss of service (Inability to respond) No electrical supply Loss of communications and telemetry Legal risk/liability Duty of care Dam / embankment (asset) failure Compounding hazards Potential injury or loss of life Damage to Council-controlled/ owned land Loss of amenity value Negative Council image (perceived as Councils problem) Increased costs e.g. clean up Adverse environmental effects Damage to private / neighbouring property Financial cost through damage to assets									

Tsunami **Consequences:** Inundation flooding Erosion Damage to infrastructure Loss of access Loss of service (Inability to respond) Loss of electrical supply Legal risk/liability Potential injury, sickness or loss of life Damage to Council-controlled/ owned land Loss of amenity value Negative Council image (perceived as Councils problem) Increased costs e.g. clean up Adverse environmental effects Damage to private / neighbouring property Financial cost through damage to assets									

Land instability (ie Waihi slip) **Consequences:** Sedimentation Loss of access Local dams Potential injury or loss of life Damage to Council-controlled/ owned land Loss of amenity value Negative Council image (perceived as Councils problem) Increased costs e.g. clean up Adverse environmental effects Damage to private / neighbouring property Financial cost through damage to assets **Coastal storm surge** **Consequences:** Backflow up river Localised flooding Erosion Damage to assets Salt water intrusion Damage to Council-controlled/ owned land Loss of amenity value Negative Council image (perceived as Councils problem) Increased costs e.g. clean up Damage to private / neighbouring property												

GR12	**Civil defence effectiveness** **Caused by:** Lack of clarity of roles and responsibilities and integration during events **Consequences:** Confusion regarding who is responsible for what e.g. stock management during and post event Negative Council image Delay in response	Financial Operational Reputation / Image Health and Safety Environment Legal	5	4	E	New Civil Defence Group Plan which highlights the lead agency Flood warning manual Separate but linked / coordinated response teams	Very Good	3	2	M	CDEM Manager Divisional Manager	Clarifying WRC position/expectations regarding stakeholders Roles and Responsibilities better defined
GR13	**Post event capacity** **Caused by:** Insufficient resources, funding and / or time Scale of the event? **Consequences:** In ability to reacting to post event in timely manner Negative Council image Further damage to assets Increased costs Impact on staff (H&S)	Financial Operational Economic Reputation / Image Health and Safety Environment	4	2	M	Allocation of priorities Reallocate of resources to the event until resolved Maintain strong relationship with wide range of local contractors Communications plan to keep public informed		3	2	M	Divisional Manager Zone Manager	Continue with current practice
GR14	**Compounding hazards** **Caused by:** Multiple events over a short duration **Consequences:** Further damage to drainage systems Further damage to infrastructure Additional slips/landslides Loss of access Loss of service (Inability to respond) Legal risk/liability Further damage to Council-controlled/ owned land Loss of amenity value	Financial Operational Economic Reputation / Image Health and Safety Environment Legal	4	1	L	Damage assessment Prioritise damage Flood duty team model river flows based on weather forecasting	Good	4	1	L	CDEM Manager Zone Manager	Identify and map where this could potentially happen and having an urgent response plan in place (short term) Consider viability of rapid deployment functions

	Negative Council image (Adverse environmental effects Damage to private / neighbouring property Financial cost through damage to assets											
GR15	**Insufficient insurance coverage** **Caused by:** Large scale event and/ or multiple compounding events **Consequences:** Affordability (unsure on the level that WRC need / are required to provide Financial burden Effect on future levels of service	Financial Reputation / Image	4	3	H	Self-disaster recovery fund being established LAPP Access to National Disaster recovery fund Identify disaster related costs in order to refine all insurance Disaster Recovery Policy (reviewed- 3 year cycle) Policy on financial recovery in place	Excellent	4	1	L	Divisional Manager	Regular review to ensure appropriate level in place Develop practice of gaining more detail around reporting and recording of costs related to flood damage response Appropriate staff to become more familiar with the content of the National Disaster Fund
GR16	**Non-compliance with legislation and legal requirements** **Caused by:** Inability or failure to comply with statutory and regulatory requirements, lack of awareness Legislative changes increases statutory obligations to a level where they are unable to be met with existing resources Impending changes in policy or legislation not identified Inadequate training Inadequate staff performance **Consequences:** Compromised health, safety and protection Legal implications and resulting in increased costs and claims for Council Negative Council image/reputation Financial implications Political consequences Prosecution Injury/death	Financial Reputation / Image Health and Safety Environment Legal	5	2	M	Local government networking e.g. national forums, conferences Standard processes in place with templates Asset management plan/ steering group Legal advice requested as required Asset Management reporting Training/ education programme for staff incl seminars/ conferences/ legislative education RMA updates Inter-departmental communication Conformance with industry standards and practices	Good	2	2	L	Group Manager	Ongoing training - key staff to keep updated on current legislation Regular communications to staff Continued review of Council procedures Communicating effects of legislative change to Council/ LTP process Improved communication of changes to legislation
GR17	**Clarity of roles and responsibilities**	Financial	4	2	M	Familiar with roles and	Good	2	2	L	Divisional	Continue current

	Caused by: Changing expectations of legislative duties Resources Change in ownership of assets Change in power **Consequences:** Uncertainty Delay	Operational Reputation / Image Legal				responsibilities Networking, national forums (all levels) Advocating and responding for requests to comments					Manager Zone Manager	practice
GR18	**Ineffective governance or inability of elected members to fulfil roles and responsibilities or disregard for community/staff views.** **Caused by:** Lack of communication with elected members Lack of understanding from elected members Poor planning and foresight Elections (Political cycles) Poor training of elected officials **Consequences:** Essential services under-resourced Decisions made on political grounds ahead of defensible decision making Ineffective leadership and decision making A lack of continuity of direction Operational inefficiencies	Financial Operational Economic Reputation / Image Health and Safety Environment Legal	4	4	H	Councillors roles well defined and implemented Legislative requirements/ LTP process Procedures in place to ensure items presented to Council meet legislative requirements Clear, well prepared reports are presented to Council and Community boards to enable sound decision making Councillor induction/ handbook Councillor briefings / workshops CEO giving advice to Councillors	Very Good	3	2	M	CEO	Continue to manage process through CEO / workshops
GR19	**External economic influences** **Caused by:** Cost Escalations (e.g. due to oil price increases, economic failures). Uncontrollable movements in economy e.g. exchange rates, price of oil, steel and bitumen Fluctuation in land values Monetary and fiscal policy **Consequences:** Financial impact cost of services Inability to provide services, maintain service levels or achieve community outcomes	Financial Operational Economic	2	5	M	Local government networking Responding to national directives Monitoring world events and reacting Track national and global trends. Monitor key economic developments and liaise with central government	Good	2	5	M	Divisional Manager	Track innovations in sustainable practice

GR20	**Inability to utilise funding options – Both internal and external, including failure to acquire external subsidies and people not applying for funding on time or not identifying potential areas where funding is required.** **Caused by:** Lack of staff training Lack of awareness of funding sources Organisational or process deficiencies Lack of clearly defined levels of service Change in legislation **Consequences:** Funding not realised Loss of service levels Existing ratepayers fund growth	Financial Operational Reputation / Image	2	5	E	Asset management process Prioritising projects/ LTP and Annual Plan process Experienced staff submitting external applications and reporting internally to Council. Working closely with regional groups Staff knowledge and awareness Established robust levels of service Forecast likely scenarios regarding effects of budget changes including deferments	Very Good	2	3	M	CFO Divisional Manager	Continued review of service levels Continue to utilise sustainable asset management practices Ongoing staff awareness of funding process, and changes Identify all relevant funding opportunities
GR21	**Health and safety** **Caused by:** Poorly designed, built or maintained assets Lack of staff training Lack of staff support and systems Lack of preparedness Lack of formal processes Vandalism Accidental damage **Consequences:** Injury to residents / visitors / staff Damage to property Legal claims Loss of reputation Increased costs	Financial Operational Reputation / Image Health and Safety Legal	5	3	H	Inspection, contract management, hazard identification Complaints Structure safety checks and audits Building code/standards / guidelines Specialised standards (eg agrichemical) Condition assessments Programmes in place to identify areas, issues, risks that may impact on assets Fencing Signage ACC / Indemnity insurance Health & safety representative Corporate auditing of health and safety Approved contractor health & safety plans Emergency response Training / staff induction / manuals / PPE / incident register (HR) Contractor inductions	Very Good	2	2	L	Group Manager H&S Coordinator Zone Manager	Continue current practice Improved systems and process (training, hazard id, etc)

GR22	**Natural resources ownership i.e. sand and gravel** **Caused by:** Clarity of ownership and expectations Existing issues (risk is that WRC unable to meet legislative requirements) **Consequences:** Financial conflict Cost of management		4	3	H	Engagement in Central Government processes at CEO and staff level Engagement with other potential resource owners Negotiate appropriate co-management outcomes as necessary Improving understanding of market trends and appropriateness		2	3	M	Divisional Manager	Ensure that resourcing remains focused on key relationships
GR23	**Ineffective strategic planning (internal WRC) Inability to plan for and provide for change** **Caused by:** Lack of integration between the different arms of Council pursuing objectives that are at odds with each other Policy development impacts on the ability of RCS to deliver on its current levels of service Inability and/or effectiveness to impact policy development Ability to influence that policy before it becomes policy Lack of understanding from the wider organisation of the potential impacts on existing services and benefits of those Lack of resources dedicated to planning Inability to forecast future trends and developments **Consequences:** Funding loss Loss of operational capability Decreased levels of service Negative Council image The councils strategic objectives, e.g. social, environmental & political not met Business Plan objectives not met Poor alignment of KPIs to objectives Failure to respond to change in demand in a timely manner Lack of optimised decision making	Financial Operational Economic Reputation / Image Health and Safety Environment Legal	4	3	H	Communication with Corporate Planning. Consultation within organisation on long term planning LTP process Asset Management process and updating Liaison with Community via sub committees Political Liaison Organisational wide input to district plan review Liaison with key stakeholders Strategic planning documents Increased liaison with Policy group Consideration to National forecasts, policies, standards, etc.	Very Good	2	2	L	Group Manager, RCS Divisional Manager Group Manager, Policy	Zone Plan Strategic Alignment with other corporate planning processes Improvement plan process Continue current practices Increased planning resources Upskilling staff

	Increased costs Inability to meet needs of community											
GR24	**Inadequate business continuity planning** **Caused by:** Infrastructure (communications, power, etc.) Essential Services (Transport, etc.) Fire Damage, Water Damage, etc. **Consequences:** Serious loss in public confidence Reduced public/ staff health and safety Damage to Council infrastructure Damage to Council property Loss of service Loss of information	Financial Operational Economic Reputation / Image Health and Safety	5	4	E	Manual work-around e.g. cell-phones, laptops Back -up systems Managers have staff/ contractors/other contacts contact numbers Asset Management plans Communications Plan – e.g. contact numbers for staff and key contractors Insurances (PI, PL, H&S, etc)	Very Good	4	4	H	Group Manager RCS EMT	Maintain/develop business continuity plans
GR25	**Inadequate communications and PR management - Poor communications with stakeholders (internal and external)** **Caused by:** Increasing stakeholder expectations for information provided (both quality & quantity) Poor resourcing Lack of commitment Inadequate stakeholder comms and engagement strategies **Consequences:** Inefficient use of resources Political dissatisfaction with level of service Lack of political support Negative Council image Lack of buy-in Lack of community support and poor understanding	Operational Reputation / Image Legal	3	4	H	Dedicated Communication team Improved electronic communications/ surveys/ displays Customer Service Call Centre & Charter Analysis of submissions on LTP and annual plan processes Management plans Community input/ Consultation/ Feedback from sub committees Meeting statutory requirements & guidelines Improved internal communication Iwi relations Improved customer relations Media updates Communications plans for projects Customer surveys	Very Good	2	2	L	Group Manager, RCS Manager, Comms Zone Manager	More communication/PR involvement at earlier stage of projects/ major events (i.e. adoption of plans and strategies, funding policies, etc.) Early internal liaison and with stakeholders Include communications/ customer service component in project brief and debrief process Learning from experience/ capture learning's Celebrate success / making known, demonstrating achievements Record and measure customer response/ inquiry database monitor and analysis
GR26	**Co Management** **Caused by:** The Crown Treaty settlement with	Financial Operational Reputation /	3	4	H	Seeking to be informed as to any developments on the treaty process	Very Good	2	2	L	Deputy CEO Group Manager RCS	Continue current practice Develop practice as

	Waikato-Tainui incorporates a new co-management structure for the Waikato River. **Consequences:** Potentially transfers powers for the management of the Lower Waikato River Details of settlement and its effects are still emerging Potential loss of ownership and or control of land associated with assets and a requirement to share management decision making with a second party Expectation of increased resourcing, decision making slows and is more resource hungry Conflicting expectations around management decisions and outcomes that can be achieved on river related land e.g. risk of long term cost implications, areas planted as opposed to maintained as floodway's (land use).	Image Environment Legal				Maintaining contacts with Waikato-Tainui and other iwi Actively seeking input in the development of the zone plan Have negotiated co-management agreement for Lower Waikato						the details of the settlement become known
GR27	**Local government reform** **Caused by:** Restructure of local and regional government in the Waikato Region **Consequences** Transferral of responsibilities and powers Reconfiguration of boundaries which may impact upon work programmes, costs and funding Loss of institution knowledge relating to the zone Loss of continuity, consistence Loss of momentum Change in political direct Change in community support	Financial Operational Reputation / Image Legal	3	4	H	Political liaison within and with adjacent councils Contact maintained with Central government and Local Government Regional local authority forum established	Good	2	4	M	CEO	Continue current practice
GR28	**Education/awareness- of services provided and value proposition** **Caused by:** Lack of dedicated education and awareness programme Community engagement Internal engagement		3	4	H	Annual Plan LTP Website information Sub-committee newsletters Meetings Press releases		2	2	L	Divisional Manager	RCS Communication Plan Wider resources Develop Key Messages Identify target audience

	Audience (expectations differ) **Consequences** Lack of understanding of the level of service that is provided Expectation of an increased level of service Linkage between expectation and funding they provide (potential change post Christchurch?) Diminished relationships with stakeholders (internal and external)											
GR29	**Climate change** **Caused by:** Changes to global climate **Consequences:** sea level rise and more frequent and sever storms Requirement to replace assets earlier and / or more frequently Community expectation that service levels will be maintained Higher funding requirements Ability to pay Adverse environmental impact Higher risk of asset failure Reduced land use opportunities Disruption of community infrastructure	Financial Operational Environment Health and Safety	5	3	H	Condition survey Annual structural inspections Monitor national climate forecasts (MFE) Review service levels and design standards Incorporating MFE information in service level reviews	Good	4	3	H	Divisional Manager Group Manager	Continue current practice Upgrade assets to off set climate change effects
GR30	**Conflicting objectives/ aspirations (external)** **Caused by:** Increasing environmental standards Treaty settlements Environmental restoration projects **Consequences:** Difficulty in renewing resource consents Increased maintenance costs Services not sustainable	Financial Operational Economic Reputation / Image Environment Legal	4	5	E	Environmental Management Programme Stakeholder Engagement Plans Consultation Joint projects with Stakeholders Integrated planning Political input	Good	4	3	H	Group Manager, RCS Divisional Manger Zone Manager	Better understanding of process, inter-connections, and benefits Mutually beneficial projects (win-win) Facilitation and agreement, mutually agreed outcomes Negotiated solutions

Appendix 4b River management

Risk number	Risk descriptor	Risk type	Initial risk			Current practices/strategies		Residual risk			Risk owner (name and title)	Management options available
			Consequence	Likelihood	Factor	Description	Effectiveness	Consequence	Likelihood	Factor		
RM1	**Increased adverse river behaviour** **Caused by:** Climate change Land use change Hydropower changes (i.e. increased flows) Sedimentation and erosion **Consequences:** Inability to effectively manage rivers Drainage schemes unsustainable Damage to property Damage to environment Health and safety incidents Increased costs to community Increased Flood Risks	Financial Operational Economic Health and Safety Environment	5	5	E	Flood protection measures River Management programmes Informing compliance with regulations, district plans, regional plans, etc. Flood monitoring and warning systems Education and emergency preparedness (output to Civil Defence) Sediment Management Plan Civil Defence Hydraulic modelling Inundation studies Flood manual – guideline to staff (warning levels etc.) Consideration of IPCC recommendations Monitor river conditions Consideration of options including possible retreat of at-risk dwellings and industry	Very Good	3	3	M	Divisional Manager Zone Manager Programme Manager, TS	Continue and monitor current practices Catchment monitoring and modelling (land use changes etc.) Consideration of Reduction in Standards/ Service Levels New capital works programmes Increased awareness and education of river systems

RM2	**Rise in sea level and storm surges– (see similar flood management risk)** **Caused by:** Climate change **Consequences:** Inability to effectively manage rivers Increased aggradation, degradation and morphological change Damage to property Damage to environment Health and safety incidents Increased costs to community Effects on Coastal settlements and services	Financial Operational Economic Health and Safety Environment	5	5	E	Flood protection measures River Management programmes Informing compliance with regulations, district plans, regional plans, etc. Flood monitoring and warning systems Education and emergency preparedness (output to Civil Defence) Sediment Management Plan Civil Defence Hydraulic modelling Inundation studies Flood manual – guideline to staff (warning levels etc.) Consideration of IPCC recommendations Monitor river conditions Coastal planning and regulation	Very Good	3	3	M	Divisional Manager Zone Manager Programme Manager, TS Programme Manager, NH	Input into regional and district planning processes Increased awareness and education of coastal flood hazards
RM3	**Riverbank erosion** **Caused by:** Natural events / soil types and qualities Instability Land use **Consequences:** Increased flooding Loss of land Increased risk of breach and/or course change Increased sedimentation Threat to property and infrastructure Increased risk to existing assets	Financial Operational Reputation / Image Legal Environmental	4	3	H	Edge Protection, vegetation, structural, rip rap, gabion walls. Buffer zones, fenced Financial Grants for riparian protection Renewal / upgrade programmes Maintenance regime Regular inspections Sediment Management Plan Riverbank trial protection works Trial native planting Willow protection research group contribution Environmental code of practice	Excellent	3	2	M	Divisional Manager, CM Zone Manager	As per current practice Increase monitoring Improve understanding of natural processes and exacerbating factors Improve education of general public

RM4	**Plant and animal pests** **Caused by:** Proliferation of pest plants, plants, and fish **Consequences:** Blockage of channels Poor drainage Sediment disturbance Erosion Water quality degradation Increased costs and resource requirements Adverse effects on levels of service	Financial Operational Reputation / Image Environmental	3	4	H	Plant & animal pest control programmes Monitoring programmes	Good	3	3	M	Group Manager, BS&NH Zone Manager	More Monitoring and research programmes Improved control methods (environmentally acceptable methods)
RM5	**Sand and gravel management** **Caused by:** Accumulation of sand and gravel (bed level change) Upstream land use practice Erosion / degradation/ aggradation Hydro-dams Natural processes **Consequences:** Loss of capacity Adverse impact on service levels River instability	Financial Operational Environmental	4	4	H	Management of Sand and Gravel extraction Monitoring programmes Resource Consent processes	Very Good	2	2	L	Zone Manager Programme Manager, TS	Develop a stand alone river management plan Current practices Examine relevance of financial contributions Sediment management plans (currently in development)

Appendix 4c Flood management

Risk number	Risk descriptor	Risk type	Initial risk			Current practices/strategies		Residual risk			Risk owner (name and title)	Management options available
			Consequence	Likelihood	Factor	Description	Effectiveness	Consequence	Likelihood	Factor		
FM1	**Stop bank / embankment failure** **Caused by:** Settlement Deterioration, weakness Undermined foundations Erosion Stock damage Trees, vegetation removal, Adjacent disturbance (i.e. building road, digging a drain, etc.) Poor construction **Consequences:** Ineffective flood control Flooding Property / productivity loss Legal claims	Financial Operational Reputation / Image Health and Safety	5	4	E	Regular condition reviews Visual inspections, physical surveys Scheme reviews, hydraulic capacity modelling Use of internal / external specialists e.g. geotechnical where appropriate Renewal / upgrade programmes Maintenance regime Floodway and drainage bylaws Failure Response Processes	Very Good	5	2	M	Programme Manager, TS Zone Manger	As per current practice Advocate limiting and/or control increased development behind stop banks Increased awareness and education Improved failure response procedures (i.e. warning systems, etc.) Improved understanding of legal liabilities

Risk number	Risk descriptor	Risk type	Initial risk			Current practices/strategies		Residual risk			Risk owner (name and title)	Management options available
			Consequence	Likelihood	Factor	Description	Effectiveness	Consequence	Likelihood	Factor		
FM2	**Structural failure – flood control gate, concrete walls, pump station, bridges** **Caused by:** Lack of maintenance Asset deterioration Poor design or installation Loss of power **Consequences:** Flooding Inability to function Unexpected costs and resources Negative Council image Increased costs Health and safety Legal claims	Financial Operational Reputation / Image Health and Safety	4	4	H	Regular inspections Condition monitoring Renewal / upgrade programmes Maintenance regime – internal staff (dedicated custodian) Operations manuals Emergency backup pumps, connections for generators, mobile pumps Experienced staff – ongoing training Key stations have telemetry / alarms Feedback from landowners Structural reviews/condition audits Cyclic structural audit and inspection programmes in place	Very Good	4	2	M	Zone Manager Programme Manager, TS	As per current practice Improved prediction procedures (Telemetry / monitoring / alarms) Ongoing improvements in Design, Construction, Monitoring, and Maintenance
FM3	**Peat settlement** **Caused by:** Lowering water tables Over drainage Land use **Consequences:** Inability of existing pumping facilities and floodgates to service the area	Financial Operational Economic Reputation / Image	4	5	E	Significant investigation work Monitoring	Good	3	3	M	Group Manager, RCS Zone Manager Programme Manager, TS	Continued investigation programme and subsequent physical works where appropriate Sustainable water level management strategy/ plan Community consolation and involvement Changes in land use

Risk number	Risk descriptor	Risk type	Initial risk			Current practices/strategies		Residual risk			Risk owner (name and title)	Management options available
			Consequence	Likelihood	Factor	Description	Effectiveness	Consequence	Likelihood	Factor		
FM4	**Pump station failure** **Caused by:** Mechanical failure Blockages Condition Human Interference Electrical Reliance on external infrastructure **Consequences:** Inundation of adjacent land	Financial Operational Economic Reputation / Image	4	3	H	Regular inspections Condition monitoring Renewal programmes Maintenance programmes Telemetry/alarms Experienced staff Landowner feedback Response programmes in place	Excellent	3	2	M	Zone Manager	As per current practice

Appendix 4d Catchment management

Risk Number	Risk descriptor	Risk type	Initial risk			Current practices/strategies		Residual risk			Risk owner (Name and title)	Management options available
			Consequence	Likelihood	Factor	Description	Effectiveness	Consequence	Likelihood	Factor		
CM1	**Regional intensification and development** **Caused by:** Increased need for roading and rail developments and Improvements Need for utility and infrastructure network developments Increased expectations for a higher level of service Auckland expansion and development **Consequences:** Higher risk of impacts on existing assets Conflicting objectives Need for balance of objectives	Financial Operational Economic Environment	4	4	H	Technical reviews of resource consent applications Submissions to District Plans Inter-regional planning and strategy development Liaison between TAs Liaison with Infrastructure networks owners Future Proof RPS and regional plan reviews Ongoing hazard mapping	Very Good	3	2	M	Group Manager, Policy Zone Manager	As per current practice
CM2	**Landowner failure to manage soil conservation** **Caused by:** Economic climate Lack of Interest Conflicting objectives Land use change **Consequences:** Deterioration of assets and levels of protection Soil erosion and land deterioration Non compliance with Land Improvement Agreements	Financial Operational Economic Reputation / Image Environment Legal	3	4	H	Property Inspections and Monitoring Legal Enforcement LIA's	Good	2	3	M	Divisional Manager - Catchment Management Zone Manager	More intensive inspection programme Agreement reach with land owners More regular land owner contact Greater application of enforcement Regulatory processes

Appendix 5 Risk to forecasting assumptions

Forecasting assumption	Risk	Likelihood of occurrence	Financial materiality	Reasons and financial effect of uncertainty
Projected price change factors Forecast financial information contained in this plan contains a provision for inflation. Council has used the price level change factors supplied by Business and Economic Research Ltd (BERL) in order to calculate the amount of inflation to include. Where expenditure is subject to inflation, the following cumulative rates have been applied. For 2009/10, the cost of inflation in relation to all costs except labour and passenger transport contracts has been absorbed into existing work programme budgets.	That actual price changes levels will vary significantly from the levels assumed.	Medium	Low (2009/10 – 2010/11) Medium (2011/12 – 2018/19)	Inflation is affected by external economic factors that are outside the control of council. Given the current economic climate, the actual inflation rates for both the short and long term are uncertain. While council believes it has taken a conservative approach by applying the rates supplied to the local government sector by BERL, it acknowledges that actual inflation rates may vary from these in any year of the plan.
Useful lives of significant assets The useful lives of council's significant assets are as disclosed in the notes to the accounts.	The actual life of an asset is shorter than that assumed. This may be the result of a significant weather event.	Low	Low	Council's most significant assets are its infrastructural assets comprising of flood protection works. The useful lives of these assets have been assessed by engineers and valuers.
Revaluation of non-current assets Provision has been made for a 3 yearly cycle of revaluations in relation to council's infrastructural assets. Estimates of changes in value have been based on the projected price change factors supplied by BERL.	That actual revaluation changes vary significantly from those forecast.	Low	Low	Council undertook revaluations of those property, plant and equipment assets that are subject to revaluation in June 2008. Council's accounting policies state that these assets should be re valued at least every 5 years, with an annual assessment of values carried out annually. Any change in value will impact the forecast financial statements through the funding of depreciation. No adjustment to the provision for depreciation has been made based on the value changes forecast. Because of the relatively long useful life of council's infrastructural assets which comprise the majority of its property, plant and equipment, this impact is thought to be minimal.
Depreciation rates on planned asset acquisitions New capital expenditure will be depreciated in line with the depreciation rates set out in council's accounting policies.	That further review of the nature of capital expenditure may alter the depreciation expense incurred.	Low	Low	Significant capital works are based on detailed asset management plans which specify the nature and timing of capital works. Due to the long-term nature of these capital works, any impact on depreciation will be minimal.
Emission Trading Scheme Due to the high level of uncertainty, no provision has been made for the cost of the government's Emission Trading Scheme (ETS).	That the implementation of this scheme impacts on the costs of council undertaking its business.	Medium	Low	The Council expects that there will be rising costs through the ETS but that these costs cannot yet be quantified or budgeted for. The council believes that these cost increases will not be significant and are not expected to be material.
Regional growth Increases in the number of properties will be at a lower level than experienced over the last 3 to 5 years. Council has estimated that there will be 2,000 new properties in the region each year.	That growth will not be sustained at the level anticipated.	Low	Low	This growth assumption has only been used to project likely future revenue for those rates set on a per property charge (such as Natural Heritage). Council has the ability to re-size these work programmes based on actual revenue levels achieved.

Forecasting assumption	Risk	Likelihood of occurrence	Financial materiality	Reasons and financial effect of uncertainty
Forecast return on investments Council's investment fund will achieve an average return of 5% per annum. In years 1 to 3, council has assumed a return will come from the fixed interest portion of the fund only. From 2012/13 onwards, council has assumed that its equity investments will start to make a return, with the whole fund achieving a 5% return by 2014/15.	That actual returns achieved by the fund will be lower than this average return.	Low	Low	Following a review of the investment fund and treasury policy, council is moving to a more conservative asset allocation mix aimed at achieving a consistent return on the funds invested. If returns do not achieve the budgeted level, the level of work projected to be undertaken will be reviewed.
Expected interest rates on borrowing Council will utilise the funds held in its investment fund for the purposes of internal borrowing. The interest rate applied to funds internally borrowed is 5.9%. This rate is based on the weighted average return on investments, plus a 1% borrowing margin. The interest rate applied to funds internally loaned is 4.9%. This rate is based on the weighted average return on investments.	That funds will not be available from the investment fund, resulting in council having to seek external borrowing at higher interest rates.	Low	Low	Internal borrowing from the investment fund is specifically provided for in council's treasury policy. Council's investment fund is valued at approximately $51.6 million (December 2008), which allows for significant borrowing levels to be met.
Council's share in associates Council includes a 33.3% equity share in the Lake Taupo Protection Trust in its financial statements. Because the timing and extent of activities undertaken by the trust are not determined by council, Council has not projected any change in the value of this investment over the period of this plan.	That the value of council's equity shares in the Lake Taupo Protection Trust either increases or decreases significantly from the current level of investment.	Medium	Low	The Lake Taupo Protection Trust has been established with the aim of reducing the Nitrogen levels in the soil and water of the Lake Taupo Catchment. It proposes to achieve this through the purchase of land, implementation of methods to retire the nitrogen from the land, and subsequent land sale. The funding for this is provided by the three trust partners: Waikato Regional Council, Taupo District Council and the Crown. If in undertaking these actions the value of the land decreases, this will lead to the Trust writing down the value of its assets and showing a book loss – a share of which would be reflected through Council's accounts. The financial consequence of this to council is low, as council's own financial plans are not influenced by the financial performance or position of the Trust and any book loss will not require further funding to the Trust from the partners. Trust agreements are in place that stipulates the contribution that council will make to the Trust.

Appendix 6 Valuation summary of unit rates

In development as part of Improvement Plan.