MARLBOROUGH DISTRICT COUNCIL

STORMWATER

ASSET MANAGEMENT PLAN

2014

Record No. 15470

Version	**Draft for peer review**	
Prepared by	**MNe**	
Checked by	**AECOM**	
Revised	**MNe**	
Presented to Council		

Stormwater Asset Management Plan 2014

The asset management plan was prepared by the Water Services Asset Management Engineer at Marlborough District Council in conjunction with the senior engineers, financial and planning managers. The Asset Management Engineer has a Bachelor of Science degree in Environmental Science and Diplomas in Building Services Engineering and Water Supply and Distribution; 31 years' experience in the water industry and a further 5 years as a water asset management engineer.

The draft asset management plan has been submitted to the independent consultants AECOM for peer review and comment.

Table of Contents

Chapter 1: Introduction

Stormwater drainage services are provided to the urban areas of the Marlborough Region through the Asset and Services Department of Marlborough District Council. The stormwater infrastructure is a reticulated network of pipes, channels, pump stations and associated apparatus required to drain rainwater from residencies, commercial/industrial properties and surrounding land. The service is predominantly focused on the urban areas where the density of buildings and urban infrastructure disrupt the natural flow-paths and soakage of surface water.

This activity contributes to the Community Outcomes of: Environment by providing urban drainage networks that effectively manage flood risk and potential surface contamination from entering aquatic environments. People and Economy by providing a safeguard against stormwater flooding of residential and commercial property.

Stormwater drainage is integral to and reliant upon the flow and channel conditions of the receiving water courses. The Rivers and Land Drainage Department of the council manage the main rivers and creeks that receive stormwater discharges. The Rivers Department maintains over 180 km of stop banks on the main Wairau River that protect around 20,000 ha of fertile land. It also manages a further 320 kms of rivers and stream channels along with floodway reserve land and erosion control works.

To achieve an effective and efficient drainage of surface waters closely coordinated management between the two departments is essential. The relationship has long been recognised through various administrative regimes. Recently there has been significant progress to formalise planning and operational management. The Blenheim Stormwater Strategy and the subsequent implementation arm - the Stormwater Action Group - are proving to be very effective mechanisms for coordinating the management of a complex relationship. The strategy is a detailed analysis of the stormwater issues for the town and a fundamental element to the infrastructure planning. It is heavily referred to and relied on in the development of the asset management plan.

The stormwater asset management plan has been developed in close cooperation with the Rivers and Drainage Department and their assistance is gratefully acknowledged.

Components of the Introduction:

1.1 Purpose – what the asset management plan seeks to achieve.

1.2 Strategic Goals – how stormwater asset management fits into the wider Council vision, goals and objectives.

1.3 Asset Management Plan – the asset management process, history and objectives.

1.4 Asset Management in Relation to the Planning Process – a summary of other planning processes within the Council.

1.5 Stormwater Assets Included in the Plan – a short summary of the stormwater assets managed by the Council.

1.6 Stakeholders – the main stakeholders and interested parties in the stormwater activity.

1.7 Organisational Structure – how the stormwater function is managed within the Council structure.

1.8 Negative Effects – the consequences of not providing or not delivering a satisfactory stormwater service.

1.9 Plan Framework- a short description of the main elements of the asset management plan.

1.10 AM Planning Maturity- a discussion on the developmental status of stormwater asset management planning.

1.1 Purpose

The purpose of the asset management plan (AMP) is to document the assets and management processes undertaken by the Council regarding its stormwater infrastructure and services in order to:

- Demonstrate to the stakeholders the sustainable operation and responsible management of stormwater infrastructure.
- Describe service delivery achievements against the defined community outcomes.
- Define the strategy for asset development and maintenance into the future.
- Outline the medium-term (10+ years) financial planning profile by reference to the life-cycle of the stormwater assets.
- Describe the strategies employed to manage the risks associated with the delivery of the service.
- Provide support for the Council's Long Term Plan and meet the requirements of the Local Government Act 2002.

1.2 Strategic Goals

The strategic goals of Marlborough District Council have been developed to support their over-arching Council mission:

"Enabling social and economic development in balance with environmental and community needs."

Through a number of Community and Council Outcome statements the mission is interpreted to describe the sort of community Marlborough could become as a result of actions taken now and into the future. These are reviewed and published in the Long Term Plan, the last being in 2012.

In 2009 the Government made a number of proposals to amend the Local Government Act 2002 (LGA) under the heading of Transparency, Accountability and Financial Management of Local Government (TAFM). Amongst the proposals was recommendation for local government to concentrate on core services. Water services, roading and flood management were particularly recognised as core services.

The TAFM legislation also changed the strategic focus of 'community outcomes' in the long term planning process and the method in which these were derived through community consultation.

Two advisory groups (the Local Government Efficiency Taskforce and the Local Government Infrastructure Efficiency Expert Advisory Group) were established by central government under the initiative 'Better Local Government'. The advisory groups' brief included analysis of local governments' role in the delivery of local public services to provide advice on how this could be improved and to enhance their positive contribution to economic development. The initial findings of the advisory groups were included in further reforms to the LGA that became law in 2014.

Council Outcomes are being amended and developed further in response to the recent changes in the Local Government Act. The Long Term Plan to be published in 2015 will include the expanded outcomes to explain how council services and activities will contribute to the goals of the community.

In August 2013 a Government Cabinet paper recognised the high value of capital assets owned and managed by local councils. It acknowledged the contribution of infrastructure asset to the

local communities and to longer term national strategic goals. The paper clarified many of the issues faced by councils in managing high value assets:

> *"There are a number of critical issues that each council must confront in planning and managing its infrastructure assets, including:*
>
> *What level of infrastructure investment, if any, is necessary to provide for growth in the community;*
>
> *How to manage the timing of investment for growth, to avoid constraints on growth from limited infrastructure capacity while minimising the costs to the community of under-utilised infrastructure capacity;*
>
> *What level of investment is needed to maintain, renew and replace existing assets;*
>
> *How to balance service level expectations with affordability in the context of demographic changes such as depopulation and ageing; and*
>
> *What level of investment, if any, is needed to improve the level of service provided by those assets."*

The final strategy is shaped through a number of distinct environments that influence the services and the management of the assets required to deliver the service:

Legislative and Regulatory Environment – Stormwater services must be delivered in compliance with legislation for land drainage, flood control and environmental protection. The purpose of which is to provide a safe and sanitary living conditions whilst protecting the natural environment from contaminated urban drainage. The main regulation of stormwater services is through the Building Act (2004), the Resource Management Act (1991) and the Local Government Act (2002.) Health and safety and financial control legislation is also influential

Commercial Environment – Local authorities funding and spending mechanisms are important considerations for the delivery of community services. Councils have a moral responsibility to their ratepayers for financial prudence and are scrutinised and regulated by central government. A number of funding sources are available to Council – general rates, targeted rates, development levies, volumetric charges, loans, enterprise income, grants, charges etc. The allocation of costs must have due consideration to customer affordability and also be equitable and fairly distributed between business/domestic users; inter- generations, socio-economic groupings, etc.

Economic Environment – Council must consider its strategic approach to economic development – the amount and type of businesses to be encouraged to the region along with the subsequent development of service industries and related commerce. Land must be identified and zoned for development accordingly. The prosperity of the area will contribute to population growth and urban development. The management of surface water drainage can be a significant cost or restraint to land availability. The determination of development zones and the apportionment of costs is an important Council function.

Social Environment – Social responsibility requires fair and equitable business practices across the whole community; balancing the benefits and impacts of its service provision across socio-demographic groups. Stormwater services must be delivered fairly to urban communities of dwellings, businesses, utilities and community facilities.

Natural Environment – Environmental sustainability is becoming a pressing imperative. Councils are looked upon to set high standards of environmental stewardship. Policies and strategies must be adopted to protect the environment from the negative effects of urban drainage and the service delivered to comply with those standards.

Cultural Environment – Council has to pay due consideration to the cultural sensitivity and heritage of the community. The relationship of man to the environment is significantly different

from a European perspective to Maori, Pacifica and other cultures. Stormwater discharges to natural receiving waters must be considered from a cultural as well as environmental perspective.

Within the context of these environments a number of Levels of Service have been established

- Provide an overall level of service that meets or exceeds residents' expectations.
- Minimise the environmental risks of stormwater discharges.
- Provide a reliable stormwater service.
- Provide a service that is timely and responsive to customer needs.
- Provide a stormwater service that is sustainable.

The method of developing and establishing the Levels of Service are described in Chapter 2.

1.2.1 Marlborough Infrastructure Strategy

Further amendments to the Local Government Act (2002) were passed into law in August 2014. The amendments include a requirement for local authorities to produce a 30 year infrastructure strategy for the five main assets groups in their jurisdiction – roading, water, wastewater, stormwater and flood protection.

In response to the change of legislation the Council is reviewing current strategies with a view to drafting a compliant infrastructure strategy. The strategy will discuss the assumptions and expectations of the changing operating environment over the next 30 years; it will outline the challenges and the consequences for the infrastructure required to meet the changing demands. A broad outline of the likely costs required to meet the requirements will be included.

The strategy will provide an extension of the current planning horizon. The current instruments are the Annual Plan and the Long Term Plan. These two documents provide textual and financial details of council activities for one and three years. Outline projections for a further seven years are included in the LTP. For the main infrastructural asset groups that have high individual or aggregated value and long life expectancies the 30 year strategic plan is an obvious and necessary extension. Whilst it may be difficult to define the details the main trends and areas of expenditure can be outlined for future planning.

1.2.2 The Blenheim Stormwater Strategy

During the 1990s it became increasingly apparent there were key issues developing around the management of stormwater in Blenheim. The town had experienced considerable growth in the urban area; there was a growing requirement to demonstrate responsible environmental stewardship; a legacy of existing discharge consents had evolved over time under a number of jurisdictions and there was a lack of consistency between the conditions of the consents and there was a need to clarify the level of service delivered now and in the future. As a consequence a scoping report was prepared in 2007 to outline how a coordinated stormwater strategy could be developed for Blenheim.

The strategy identified several key drivers:

- The need for Council stormwater assets to comply with regulatory requirements.
- Achieving improved water quality.
- Protection of the receiving environment.

- Coping with increased stormwater run-off from urban development.
- Provide strategic framework for all key stakeholders.

Following a series of development workshops a comprehensive strategy was developed and adopted by Council in May 2012. The strategy defines eight over-arching goals.

Integrated Management

Goal 1 – To provide an integrated approach to the management of stormwater in Blenheim.

Goal 2 – To support the implementation of the strategy with a comprehensive monitoring and enforcement programme.

Asset Management and Flooding

Goal 3 - To ensure the stormwater network provides an appropriate response during flooding events so ta people and property are protected to accepted standards.

Goal 4 – To provide guidance on effective and efficient management of MDC's stormwater assets.

Receiving Environment

Goal 5 – To maintain or enhance the environmental performance of the stormwater system and the quality of receiving environments.

Stakeholder Engagement & Education

Goal 6 – To engage with key stakeholders and educate wider community on the importance of integrated stormwater management.

Planning and Regulation

Goal 7 - To ensure the planning and regulatory framework remains responsive to integrated stormwater management.

Goal 8 – To gain a comprehensive discharge consent for Blenheim stormwater network for a 35 year term.

Whilst the strategy was developed specifically for Blenheim the process of its development and many of its outcomes will be readily transferable to the other reticulated settlements.

1.3 Asset Management Plans

The Asset Management Plan is a structured approach to the medium-term planning of stormwater service delivery. The plan explains the current standard of service; the future expectation of stakeholders and the assumptions about the changing environment in which the service operates. Subsequent asset expenditure decisions are explained within the context of the sustainable funding constraints of all Council activities.

The Council acknowledges asset management planning as a tool to deliver effective, efficient and sustained service to their community. The 2014 Stormwater Asset Management Plan updates the asset management plan of 2008 which was preceded by plans in 2005, 2003, 2000 and 1997.

The draft plan is submitted for peer review from an independent consultant. The comments received are reviewed for subsequent revisions before the final draft is presented to the Assets and Services Standing Committee.

The management of stormwater assets is subject to continual improvement. Previous asset management plans are reviewed to ensure the improvement issues are addressed and emerging issues and options are incorporated into updates.

The asset management plan contains essential information to meet the requirements of Schedule 10 of the Local Government Act 2002. The plan contains fundamental details of the stormwater activity used in support and preparation of the Long Term Plan 2015.

The draft plan is presented to the Asset and Services Committee for scrutiny and approval before it is presented to Council for ratification.

As a minimum the plan seeks to satisfy the requirements of a basic asset management plan as defined by the Auditor General:

1. Define the service level.
2. Define the timeframe (lifecycle).
3. Describe the asset (physical, financial).
4. Include financial information (10 years +).
5. Recognise decline in service potential.
6. State assumptions and confidence levels.
7. Outline an improvement programme.
8. Be prepared by qualified persons.
9. Be a firm commitment of the governing body.
10. Be reviewed regularly.

It has been developed in accordance with the guidelines published by New Zealand National Asset Management Support Group (NAMS) and in in collaboration with and contributions from many departments throughout the Council.

1.4 Asset Management in Relation to the Planning Process

Asset management is a continuous process. Operational circumstances change minute by minute. Data is collected to inform short, medium and long term operational and maintenance decisions. The data is also analysed to identify where system improvements are required. The upgrade options are evaluated and presented to council for consideration and approval. The asset management plan collates the available data and current decisions into a single document.

The role of the stormwater asset management plan in Council planning is shown in Figure 1. The asset management plan provides a link between the strategic objectives of the Council; long term planning and the day to day functioning of the operational activities.

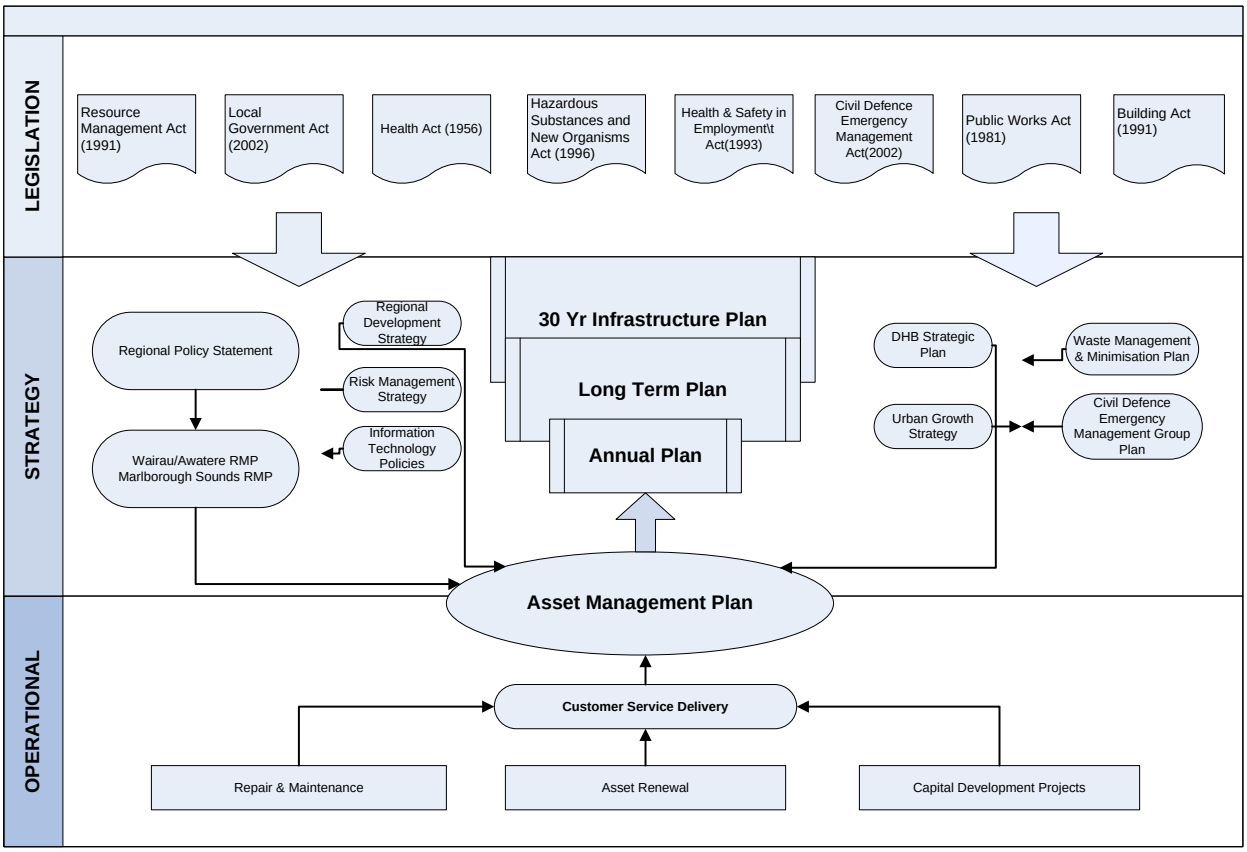


Figure 1 The Role of Asset Management Plans in the Planning Process

The main planning cycle for local government in New Zealand rotates around the triennial Long Term Plan. It is therefore sensible to prepare the asset management plans in advance of the proposals put forward in the LTP. The issues raised and discussed in the asset management plans are presented to council. Subject to approval they are collated with the other council activities and published to the community along with the proposed funding strategy in the Long Term Plan. The asset management plans are therefore generally reviewed in the year immediately before the LTP is prepared. Adjustments can be made through the Annual Plan process but the more strategic management decision making is co-ordinated with the Long Term Plan.

1.4.1 Other Planning Documents

The Long Term **Plan** – The Long Term Plan (previously the LTCCP) is a fundamental requirement of the Local Government Act 2002. The LTP is compiled and published on a three year cycle. It contains key information on all of the Council activities, assets, levels of service and costs. The plan contains detailed information for the preceding three years and outline information for a further seven years. The AMP provides the detailed information that is summarised into the LTP.

Annual Plan - In the intervening two years between the Long Term Plan its content is reviewed, updated and published to the public for discussion through the Annual Plan. Progress on infrastructure projects, performance against levels of service and financial matters are reported through Annual Report.

Both the LTP and the Annual Plans are published in draft form to the community and their feedback comments are invited prior to final determination of he plans. Following the LGA Amendment Act a new consultative document is being prepared in 2015. It is intended the new document will be more ‘user friendly’ and encourage greater participation from the community.

Resource Management Plans - The existing plans (Wairau/Awatere and the Marlborough Sounds Resource Management Plans) are currently being revised. The policies and plans incorporated into the resource management plan dictate the environmental control objectives and therefore have a major influence on stormwater management. Overarching issues such as land use, and discharges to freshwater, marine environment and atmosphere are controlled through the Resource Management Plans.

Water and Sanitary Services Assessment (WASSA) - The assessment of Marlborough water supplies was carried out in 2005 and considered the status of Council, community and neighbourhood water schemes. The WASSA is due for review.

Bylaws - Council has powers to right local enforceable bylaws. The district Water Supply Bylaw is currently being reviewed. The Awatere Water Supply Scheme has bylaws established at the initiation of the scheme.

Urban Growth Strategy - In the last four years the Council has been evolving urban growth strategies for North and South Marlborough and the Central Business District. The Assets & Services Department have been fully involved in the evolution of the strategies. Outline development plans are being prepared for the identified urban growth pockets which will inform the planning of future water service upgrades and development

The 30 Year Infrastructure Strategy will create the long term context for the short and medium term decision making.

1.5 Stormwater Assets included in the Plan

The stormwater assets covered by this plan are the reticulation systems and three terminal pump stations shown in Table 1 Stormwater Assets. There are a number of short lengths of reticulation pipework in the smaller settlements around the Marlborough Sounds (Anakiwa, Okiwi Bay, Sounds) as the result of adopted reticulation from individual subdivisions.

On the Blenheim system there are ten pump stations at the termination of the stormwater reticulation that lift the water into the land drainage system. These pump stations are operated and maintained by the Rivers and Drainage Department. The operation of these stations is integral to the functioning of the stormwater system upstream. Close coordination between the two departments is critical to the effective operation of these systems and is good example of the inter-dependency of the two systems.

Area	Length(m)	Pump Stations
ANAKIWA	849	
BLENHEIM	120,763	2
GROVETOWN	176	
HAVELOCK	1,444	
OKIWI	818	
PICTON	28,547	1
RENWICK	4,906	
RIVERLANDS	4,666	
SEDDON	249	
SOUNDS	332	
SPRING CREEK	3,385	
Grand	166,134	

Table 1 Stormwater Assets

The stormwater assets can have very different functions depending on the geomorphology of the area and the rainfall regime experienced. These factors are explained and discussed in a recent document “Procedures For Reviewing Blenheim Stormwater Capacity And Providing For New Areas (Draft)” (Williman 2014) The relationship between ground slope, rainfall and the levels of service objectives has a significant and precursory impact on the design and delivery of the infrastructure. Three slope categories were recognised for the Blenheim stormwater drainage catchment. Ranging from the foothills of the Wither Hills to the very flat lands on the valley bottom. The infrastructure has different purpose and function in each of the areas. A similar analysis of the steep catchments around Picton and Havelock will have a very different outcome and basis for developing strategic management plan.

1.6 Stakeholders

The plan is a prime planning reference document for managers and engineers within the Assets & Services Department and operators of the system. It provides a systematic plan for the ongoing operation, maintenance and upgrading of the stormwater assets in order to meet the declared objectives of the community. It will be a source of information to the Council corporate planners and finance officers, building control and resource consent staff.

Marlborough is a unitary authority and, as such, is responsible for environmental monitoring and the quality management of natural water. Urban stormwater discharges can be a major contributor to local waterways.

The District Health Board has an important role in monitoring and advising on public health issues such as bathing water quality.

Civil defence and engineering lifeline utilities have a particular interest in the functioning of the stormwater system and possible flooding issues.

The performance of stormwater drainage may have a significant impact on local business. Flooding of business premises and blocked roading may interrupt normal business or obstruct staff with damaging financial consequences. Industrial and commercial businesses may need to implement site controls to prevent spillages or other sources of pollution into the stormwater system.

Other businesses are reliant on abstraction from surface water and are stakeholders in the quantity and quality of the water available.

Aqua culture is a huge contributor to the local economy. Generally the sites of aqua-cultural production are remote from the urban areas but contaminants may be enduring with unforeseen consequences from accumulation or accretion into the wider environment.

The local iwi have deep cultural association with the aquatic environment and have a close interest in the discharges from urban areas.

Similarly there are many social and environmental groups that have vested interest in quality of the receiving water – Forest & Bird, Guardian of the Sounds, Grovetown Lagoons Restoration Project, various sporting and recreational clubs and individuals.

1.7 Organisational Structure

The stormwater service is part of the Assets and Services Department of Marlborough District Council. The capital programme is managed by the Planning and Development Engineer and the day-to-day running of the system by the Operations and Maintenance Engineer. The structure of the department is shown in Figure 1. The department has its own Finance and Information Manager to supervise the budget and liaise with the Corporate Finance Department.

Stormwater repairs and maintenance is undertaken by the councils Works Operations team in all areas except Picton where the works are let on a term contract. By agreement, routine maintenance on the kerbside stormwater sumps is undertaken by Marlborough Roads.

Rivers and Drainage are also part of the Assets and Services department which assists with co-ordination of these integrated functions.

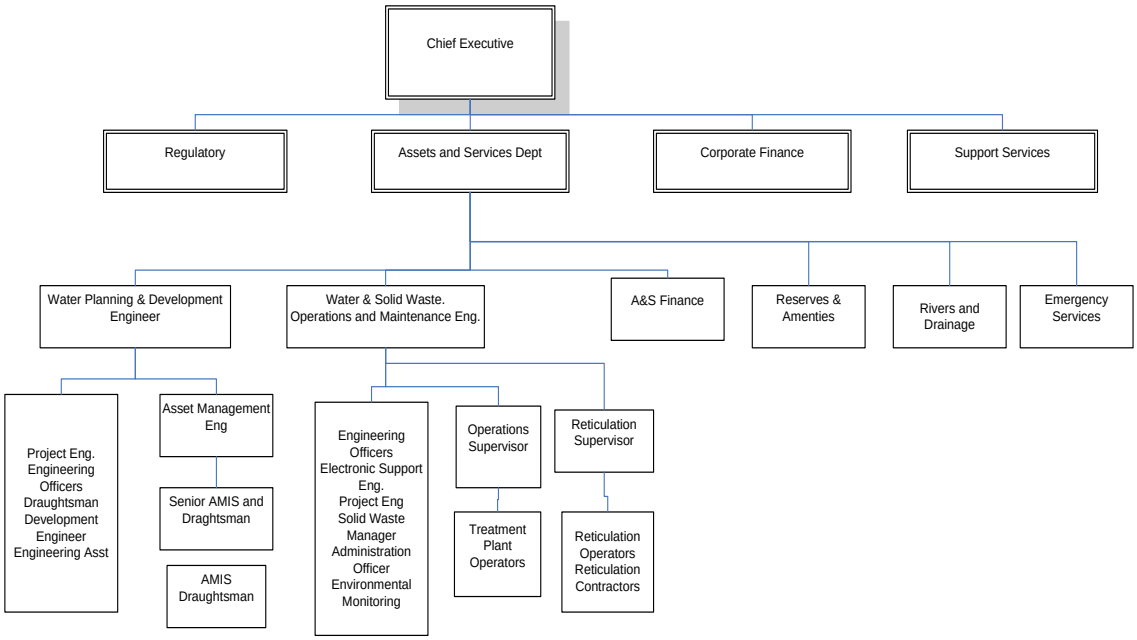


Figure 2 Organisational Structure of Stormwater Management at Marlborough District Council.

1.8 Negative Effects

The stormwater network is designed to provide a safe and sanitary living environment for urban habitation. The consequences of not providing a satisfactory stormwater service could be severe and manifold.

Area of Impact	Negative Effects
The health of communities.	Insanitary living conditions from flooded dwellings and property
The safety of communities	Personal hazard from fast flowing or deep standing water. Restricted access to community facilities from flooded roads.
Minimising adverse environmental effects.	Acute pollution events or long term degradation of natural receiving waters from urban run-off Additional flows from urban drainage exacerbating downstream flow conditions
Industrial and residential development	Damage to buildings, property, public infrastructure, vehicles etc from uncontrolled flood waters Restricted building development opportunities from inadequately drained land
Cultural Sensitivity	Causing cultural offence from polluted stormwater discharges and environmental degradation.

Table 2 Negative Effects of Stormwater Services

1.9 The Plan Framework

The 2008 Stormwater Asset Management Plan has been re-written and up-dated in accordance with the guidance of the NAMS International Infrastructure Management Manual 2011. The plan also incorporates the recommendations of 2008 peer review by AECOM, the advice and guidance of SOLGM and comments of Audit New Zealand and guidance issued by the Office of the Auditor General.

Chapter 1 Introduction – Background, Goals and Objectives of Asset Ownership, Plan Framework and Maturity of Asset Management Planning.

Chapter 2 Levels of Service – Customer Research and Expectations, Strategic and Corporate Goals, Legislative Requirement, Current Levels of Service, Desired Levels of Service.

Chapter 3 Future Demand – Demand Drivers, Demand Forecasts, Demand Impacts on Assets, Demand Management Plan, Asset Programmes to Meet Demand.

Chapter 4 Lifecycle Management Plan – Background Data on Stormwater Infrastructure, Infrastructure Risk Management Plan, Routine Operations and Maintenance Plan, Renewal/Replacement Plan, Creation/Acquisition/Augmentation Plan, Disposal Plan.

Chapter 5 Financial Summary – Financial Statements and Projections, Funding Strategy, Valuation Forecasts, Key Assumptions in Financial Forecasts, Reliability and Confidence.

Chapter 6 Plan Improvement and Monitoring – Status of AM Practices, Improvement Programme, Monitoring and Review of Procedures, Performance Measures.

References and Appendices.

1.10 Asset Management Planning Maturity

Generally the Asset and Services Department seeks to achieve a solid core standard of asset management. Intermediate and advanced asset management tools and techniques are deployed where they add real, demonstrable value to the decision making process. The maturity of asset management within Marlborough District Council is dependent upon a number factors - skills available; size, complexity and value of the infrastructure; experience and culture of staff and the risk management appropriate to the asset.

The Council recognises there is an element of diminishing returns between the effort required to collect and analyse data and the subsequent improvement in decision making. The stormwater infrastructure networks are relatively small and comprehensible systems. They are managed by an experienced engineering management team and skilled operators. Advanced asset management techniques are employed only where it will add significant value to the current decision making process or significantly improve future forecasting.

Core asset management is being developed to provide intelligence to operational managers and to ‘future-proof’ the existing knowledge base. Advanced techniques such as mathematical modelling, option identification and selection, cost-benefit and total benefit analysis, risk management techniques, asset condition grading are all regularly used within the current asset management strategy.

A team within the Assets and Services department continue to collect data on asset condition, location and performance to support the asset managers. The quality of the data is systematically and continuously reviewed and improved.

As the treatment processes and connectivity of the reticulation become more sophisticated network modelling and other techniques provide insights into the complex behaviour and

performance of the infrastructure. Dynamic mathematical models are being developed and deployed to model and predict future scenarios.

There is a current reliance on the knowledge and experience of a stable and highly skilled workforce. The depth and breadth to the skills base across the workforce mitigates many of the risks associated with reliance on individual staff members. However high quality data and empirical analysis is required to optimise effective decisions and forward planning. There is an increasing demand for logical and robust processes to support and demonstrate effective management.

The Council approach to asset management will select and deploy advance techniques where they will assist in resolving conflicting demands whilst maximising the skills and practical experience of the workforce.

Chapter 2: Levels of Service

Purpose of the Level of Service Chapter - a description of the type of wastewater service the Council endeavours to provide, the context and manner in which it is delivered, the current achievements and the future challenges are pivotal to understanding the way the assets are managed.

Components of the Levels of Service Section

2.1 Strategic Overview - The context of the stormwater within the context of Council's services.

2.2 Who Are Our Customers - A description of the stakeholders of stormwater services.

2.3 What Our Customers Want - The expectations of our customers and how they were discovered.

2.4 What Do We Have to Do - Our statutory obligation to provide a stormwater service.

2.5 What We Currently Provide - The current levels of service and the performance indicators of our achievements.

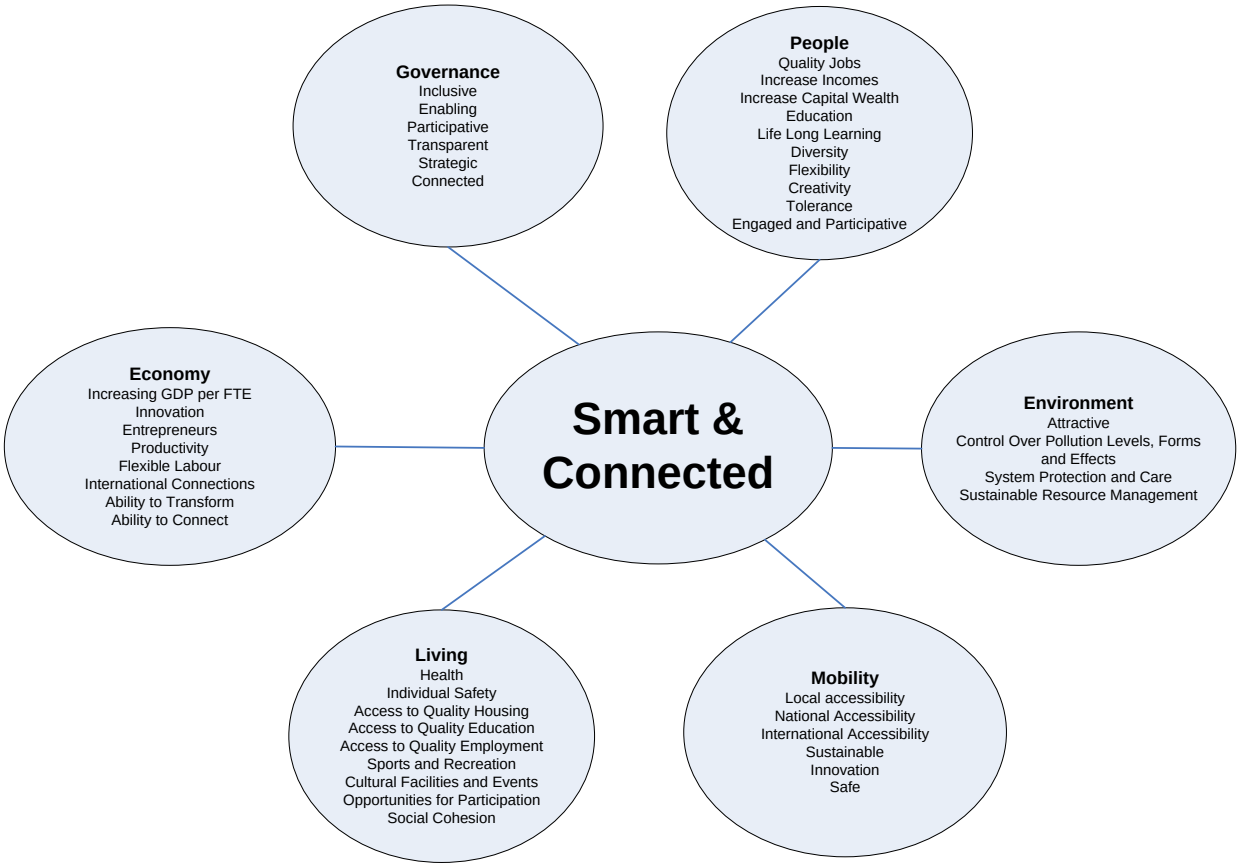
2.6 What Our Customers Would Like - Future challenges from changing expectation and growth.

2.1 Strategic Overview

The operating costs of the stormwater service accounts for around 2% of the Council's total activity expenditure. A proportion that is predicted to remain relatively unchanged in the 2015-18 planning period. Stormwater drainage has an important role in the overall service provision of the Council services. In common with Emergency Management and Rivers Flood Protection the service is seldom tested but has a high impact on urban residents. Figure 1 in Chapter 1 shows the relationship between the stormwater asset management plan and the strategic objectives of the Council.

The Council has a role to both guide and lead the community towards a vision of the future. The principle guiding strategic direction is captured in the mission statement– ***"The sort of place Marlborough could become in the future as a result of decisions and actions taken now and in the future."***

The Council has adopted a strategy under the heading of 'Smart and Connected.' The tag line quickly encapsulates an integrated approach that maximises the skills and resources of the region and how they relate to the national and international context. The strategy has been built on a framework of six Community Outcomes - Governance, Environment, People, Economy, Mobility and Learning.



2.2 Community Outcomes

Community Outcomes are a keystone to public service provision in New Zealand. The Long Term Plan 2015-25 (LTP: previously the Long Term Council Community Plan) is the vehicle by which the relationship between the community wellbeing, community outcomes and the services provided by the Council are described and published to the community. The LTP is updated every three years whilst Annual Reports and Plans are published annually in the interim periods.

This activity contributes to the Community Outcomes of **Environment** by providing urban drainage networks that effectively manage flood risk and potential surface contamination from entering aquatic environments and **People and Economy** by providing a safeguard against stormwater flooding of residential and commercial property.

The community outcomes have been established through consultation with the community and their elected representatives. The council conducts an annual customer satisfaction survey of 600 residents. Plans and strategies are published and the public invited to submit their comments. Special consultative committees and working groups are established to gain public opinion on specific projects. The council also draws intelligence from the experience and research of a number of national and local agencies such as the Nelson-Marlborough District Health Board, Ministry of Social Development, Statistics New Zealand, New Zealand Transport Agency, Marlborough Research Centre and many others.

The levels of service defined and reported in the LTP and Annual Reports is one of the primary methods of monitoring and evaluating progress towards the community outcomes through the related performance indicators.

2.3 Who Are Our Customers

The expression ‘customers’ is a concept widely understood in the free enterprise economy. It has been less readily adopted to describe the relationship between the rate payer and the council. The reluctance is partly due to the monopoly the Council has over many services, the charging mechanism through the general rates and the provision of regulatory functions that is beyond the normal concept of purchasing goods and services. The Council has a more complex role to play than a simple purveyor of services. They also have a statutory duty to provide certain services and a regulatory function to control the free market. This is particularly relevant for stormwater services and for this reason it is probably more accurate for this section to consider all of the stakeholders.

Commercial properties and domestic households connected to the stormwater reticulation are more traditional customers. All properties within the urban zone can expect to benefit from the stormwater drainage system and developers of the urban area will be required to make a stormwater development contribution towards Council owned infrastructure if a proposed subdivision causes a drainage issue.

Central government is an important stakeholder in the provision of stormwater services as much of the legal regulation in drainage matters is devolved to local government to enforce. The legislative framework is outlined in 2.4 What Customers Want.

Industries and businesses are heavily reliant on stormwater drainage to protect both their buildings and the productive areas surrounding them. The commercial sector may also represent a significant threat to stormwater quality. It is common for businesses to have an area of hard-standing as a storage area, car park or loading area that is connected to the stormwater system. There are many industrial processes that use or generate materials that are hazardous to natural receiving environment. It is part of the Council’s duty to protect the receiving environment from potential pollutants being conveyed through their stormwater infrastructure. Council may need to regulate activities within businesses’ properties in order to control the source of potential contaminants.

Environmental groups such as Forest and Bird, Guardians of the Sounds, Kaipupu Point Inland Island, Grovetown Lagoon Working Group and iwi have a strong interest in the quality of waterways. The same is true for the many recreational users – swimming, angling, boating, shell-fishing, etc

Iwi have a special cultural relationship with the environment which is an important element to consider in the abstraction and distribution of water and construction of related infrastructure.

2.4 What Customers Want

The levels of service and the subsequent performance measures are derived from the fundamental objectives of stormwater drainage -

- Safeguard of the community from urban flood hazards.
- Minimise damage to urban property from floodwater.
- Facilitate commercial and residential development.
- Protect the aquatic environment through the management of the quality of urban stormwater discharges.
- Provide the service at an efficient and equitable cost.

In practice there is a tension between the provision of the first four objectives and the perceived value and hence the willingness to pay for the service. Some of the standards included in the

stormwater levels of service are prescribed by legislation and have little room for negotiation; others recognise the limitations of delivering the desired goals within financial restraints. The levels of service that are currently used have, therefore, been derived through consultation with the customer base to best reflect the realities of the situation.

The levels of service are discussed in the Long Term Plan Public Consultation document before the LTP is finalised. The LTP is reviewed at three yearly intervals and in the intermediate years the levels of service and performance indicators are published in the Annual Reports. Major changes to the levels of service are normally dealt with through the LTP process. However the Annual Plan process can be used for modifications in the interim periods. Submissions from the public either in support or challenging the proposals are formally received and carefully considered by the Council.

The Council also collaborate with a number of national and international organisations to help determine the appropriate levels of service and performance indicators. The National Asset Management Support Group (NAMS Ltd) publishes guidance and run training courses on good practice in the development of levels of service. The New Zealand Water and Wastewater Association, Ingenium (and the Water Information Management Steering Group [WIMS]) all assist in the promotion and encouragement of best practice through research, working groups and discussion papers.

Each year an independent consultant is employed by Council to undertake a customer satisfaction survey. The telephone poll of 600 residents is selected from a statistically representative sample of the population across the region. The survey asks respondents to score each of the council's activities and the results are analysed and compared with responses from previous years. This provides a subjective assessment of Council performance relative to recent history. Verbatim comments are also recorded and these provide a good source of information on the appropriateness of the levels of service and individual concerns.

The outcome of the customer satisfaction survey can be heavily influenced by recent events. This is particularly apparent for the stormwater drainage which deals with infrequent events that have a high impact. If there has not been a major storm opinions are likely to be neutral or high. If, however, there has been major storm the customers direct experience or media coverage is likely to have a negative influence on the survey results. For instance, photographs of submerged roadways in the media are likely to suggest the system is not coping even though the roadway may have been designed as a secondary flow path for excess stormwater and is functioning as it should.

In September 2014 a Levels of Service Workshop was held to present to councillors information of the current levels of service, to discuss the options and seek their feedback. No major amendments were identified as a result of the workshop.

Marlborough District Council has embarked on a review of all its business processes from a 'systems' perspective. The foundation of the 'systems thinking' approach is to consider the performance of the business from the point of view of the customers. Once the customers experiences are thoroughly understood the business 'systems' can be analysed to ensure they are aligned to delivering the best outcome. It has been frequently demonstrated that many business processes are adept at delivering internal objectives that are not necessarily aligned with providing the best outcome to the customer.

The Water Repairs Database was developed from a 'systems thinking' approach. Analysis at the time showed there were at least 15 separate 'points of entry' into the Council for water related complaints. It was therefore difficult to gain a clear overview of the customers experience and to subsequently track the Councils response. One of the first objectives of the project, therefore, was to consolidate customer calls into a limited number of entry points and ensure there was more accurate recording. Since February 2010 all routine customer calls regarding stormwater have been logged into the database. This is proving to be an important source of data to analyse customer complaints and expectations.

The Auditor Generals standard AG-4 has focused attention on the systems and controls around Council's performance reporting. Issues identified regarding the current indicators, methods of measurement and their relevance to the customer experience are addressed as they are raised.

2.4.1 National Benchmarking

In 2013 Non-Financial Performance Measures were issued by the Secretary for Local Government in accordance with S.261B of the Local Government Act 2002. The rules came into force in 30 July 2014. Sub-part 3 of the rules prescribe eight performance measurements for stormwater drainage to be adopted by all local authorities throughout New Zealand. The new measures have the same intent as the existing performance indicators measuring the number of properties flooded during storm events; the quality of stormwater discharges, the response time to flooding events and the number of customer complaints. The new benchmark measures are attached in Appendix 3 – Non-Financial Performance Measures.

2.4.2 The Murphys Creek Case Study

The Blenheim Stormwater Strategy has sought community involvement and acceptance throughout its development and the early stages of implementation. The involvement of residents and stakeholders to the proposed developments affecting Murphys Creek in north Blenheim has provided an interesting recent example of this evolving process.

Murphys Creek is a spring fed creek that drains through a northern suburb of Blenheim and into the Taylor River just north of the town centre. The spring water is supplemented along the water course by drainage from the adjacent land through private drains and Council's stormwater pipes. The surface water flows have increased over the years as there has been housing infill and a decrease in permeable surfaces for rainwater soakage. Flow conditions in the creek are also heavily influenced by weed control in the watercourse.

Murphys Creek has a high amenity value to local residents and particularly property owners adjacent to the water course. The spring fed creek is generally considered to be high quality water and is valued for is its aesthetic and ecological value. Whilst this would appear to be self-evident there is little supportive long term data as to the chemical and biological quality of the stream.

The Blenheim Stormwater Strategy identified the Murphys Creek catchment for inclusion in Springlands Stormwater Management Area. However, recent urban development and re-zoning of land in the head waters of the catchment has promoted the priority of this area. A resource consent was given to permit the stormwater from a large retail park to be discharged into upper Murphys Creek. The pipe was installed in 2012 with additional capacity to allow for future urban development on the north-west periphery. The potential consequences of the additional flow from a large commercial site provoked considerable concern amongst the downstream stakeholders.

The Murphys Creek stakeholders have been well organised in their opposition to the upstream developments. Their concerns centre around an increased risk of flooding due to the additional flows and the potential damage to water quality and the eco-system from the stormwater collected from a commercial/urban area.

Council have responded by helping to facilitate the investigation of their concerns. Detailed hydraulic modelling of the relationship between the flows in the creek and Taylor River has been undertaken. Flood levels along the course of the creek have been projected from the mathematical models for a range of different storm scenarios. A permanent water quality monitoring station has been established at a point on the creek. The data is supplemented by routine manual sampling. An analysis of 'first flush' rainwater run-off has also been undertaken to check the effects of surface water draining to the creek after a prolonged dry spell. The data is being made available to an independent consultant to analyse and report on.

The alternative to using the Murphys Creek as a drainage channel for the new area is to extend an existing pipeline further along the Middle Renwick Road to take the stormwater directly to the Taylor River. Two alternative outlet positions have been assessed for feasibility and the options costed at between $2.3M and $3.3M.

The Council is required to act as an 'honest broker' in such matters. As a unitary authority they are responsible for regulating and monitoring the water quality of natural water courses as well as providing a stormwater service to the urban residents. Ultimately the Council is required to make a decision on how limited public funds are best spent and will need to balance the costs and benefits of the competing demands. The evidence from the scientific investigations and the independent analysis will provide an empirical basis for continuing the debate with the stakeholders.

It is likely this approach will form a model for the community consultative process for the implementation of other Stormwater Management Areas in the Blenheim strategy and subsequent strategies.

2.5 What We Have To Do - Legal Obligations and Restraints

Local Government Act 2002 S.10 The *purpose of local government is*

a) To enable local democratic decision making and on behalf of, communities; and

b) To meet current and future needs of the communities for good quality local infrastructure, local public services, and performance of regulatory functions in a way that is most cost effective for households and businesses.

'Good quality' in the legislation is defined as - efficient, effective and appropriate for present and projected future requirements.

S.11A - States local authorities are required to provide 'core services'. Network services are listed as a core service

S.125 - requires the local authority to undertake an assessment of the water and sanitary services within their area.

S.126 - States the purpose of an assessment is to assess the "adequacy of water and other sanitary services available to communities…" in terms of the quality of the service currently available; the potential health risks from the absence or deficiency of the service; the current and estimated future demand and the potential consequences of discharges of sewage and stormwater.

The Building Act 2004 – The Building Act requires new houses and habitable buildings to be designed with the floor level above the 50 year ARI event. It also requires that a 10 year ARI event not to cause nuisance to other properties. This applies only to the building of new houses, but there is an implicit indication that these are appropriate standards for older properties too.

Health Act 1956 - Requires Council to improve, promote and protect public health within its region. Stormwater drainage is integral to the public health.

Resource Management Act 1991 - The purpose of the act is to promote the sustainable management of natural and physical resources. Section 15 (a) states no person is allowed to discharge water or contaminants into water unless it is expressly allowed to do so. This is the major piece of legislation that controls the quality and quantity of stormwater that is discharged into local waterways.

Health and Safety in Employment Act 1992 - Provides the legislation for the occupational health and safety of staff employed in the stormwater operation.

Civil Defence Emergency Management Act 2002 S.60 – Requires lifeline utilities to prepare to function to the greatest possible capability during an emergency. The design and operation of the stormwater system is encompassed within the requirement of the Act.

2.6 What We Currently Provide

Currently the Council has five levels of services pertaining to stormwater drainage. Achievement against these standards is judged through eight 'performance indicators' which are reported in the LTP/Annual Report. The levels of service and the reported performance for the three years 2011-14 are shown in Table 2.

Levels of Service: Stormwater Drainage						
Performance Targets						
Key Performance Indicators	**LTP Baseline**	**2011-12 Actual**	**2012-13 Actual**	**2013-14 Target**	**2013-14 Actual**	**How did we do?**
Provide an overall level of service that meets or exceeds residents' expectations.						
Resident satisfaction with this service as measured by survey, where 10 = "service delivered extremely well".	6.7	6.8	6.5	6.7	6.6	
Minimise the environmental risks of stormwater discharge.						
Reported stormwater discharges to the aquatic environment, that cause a deterioration to the receiving water (as in the draft stormwater strategy).	≤6	5	4	≤ 6	5	
Provide a reliable stormwater service.						
Number of dwellings, commercial and industrial buildings flooded as a result of a storm event with a five year average return interval.	New measure	New measure	0	≤ 20	1	
Number of residential properties (dwellings including outbuildings and garages) flooded as the result of a storm event with a two year, or less, average return interval.	New measure	New measure	9	≤ 10	2	
Provide a service that is timely and responsive to current needs.						
% of complaints of flood water threatening a dwelling responded to in less than one hour.	New measure	New measure	98%	99%	96.3%	
% of all storm related complaints received during an event responded to within four hours.	New measure	New measure	99%	85%	100%	
Provide a stormwater service that is sustainable.						
% of annual renewal works completed.	New measure	99%	73%	75%	109%	
% of capital improvement works completed.	New measure	100%	115%	70%	118%	

Table 2 Stormwater Levels of Service and Performance 2011-2014

2.6.1 Environmental Sustainability

The avoidance of environmental damage from wastewater discharge is an essential service provided by the Council and a high a priority for environmental, social and legal reasons. The

discharges from each of the four wastewater treatment plants are required to comply with the conditions imposed by their respective resource consents.

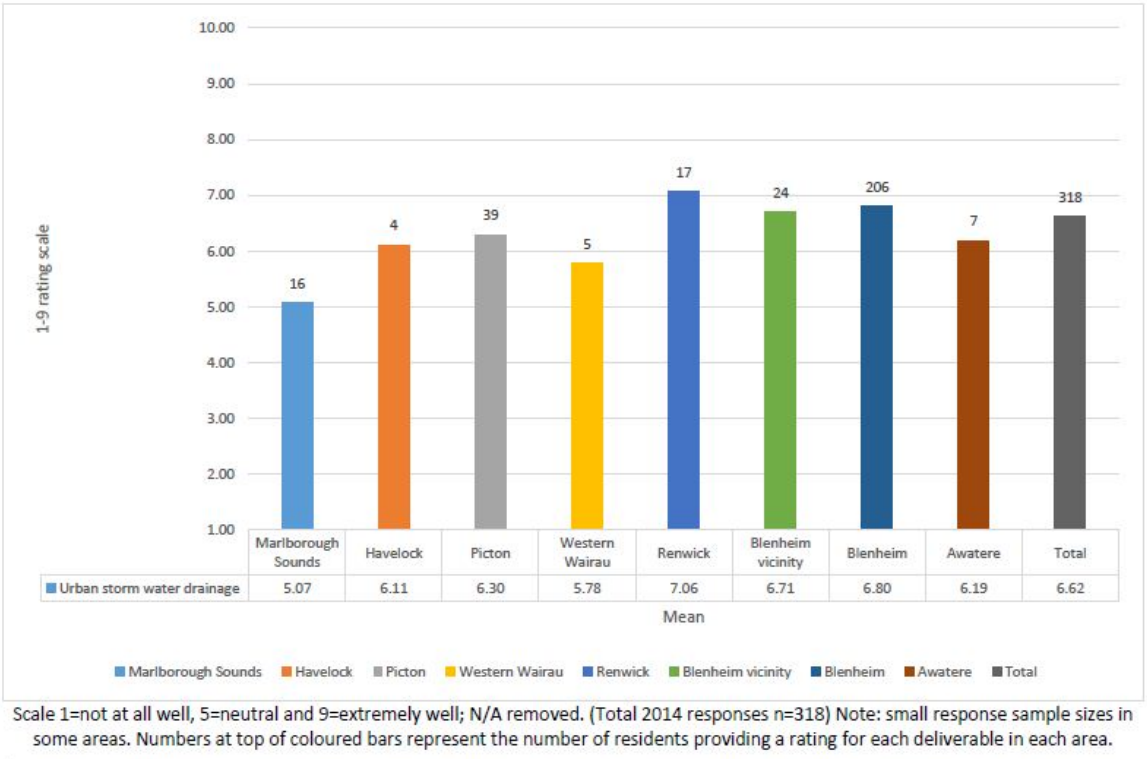
Level of Service – Provide an overall level of service that meets or exceeds residents' expectations.

Performance Indicator - Residents satisfaction survey.

The residents' satisfaction survey is conducted each year. A telephone poll of approximately 600 residents is undertaken around June/July. Participants are asked to rate the Council's performance in providing the service. The measure is subjective and can be heavily affected by recent storm activity or publicity of a particular topic. However as a general indicator of public opinion it is an important reference. The survey scores achieved between 2008 and 2011 are shown in Table 2.

The telephone survey was introduced to the customer in the following way "The Council provides a storm water drainage system to manage storm water runoff in urban catchments, predominantly in Blenheim and Picton, and smaller networks in Renwick, Havelock, Spring Creek, Riverlands and Cloudy Bay Business Park". Residents were then asked: "on a scale of 1 to 9 where 1=not at all well, 5=neutral and 9=extremely well, how well do you think the Council performs in providing this service?"

The responses are illustrated in Figure 3.



Scale 1=not at all well, 5=neutral and 9=extremely well; N/A removed. (Total 2014 responses n=318) Note: small response sample sizes in some areas. Numbers at top of coloured bars represent the number of residents providing a rating for each deliverable in each area.

Figure 3 Customer Satisfaction Survey Results 2014

The report based on the 2014 survey concluded "*Across most areas, there were some minor differences in resident satisfaction with urban stormwater drainage; however, these were NOT statistically significant indicating a degree of consistency in the provision and quality of these deliverables. Marlborough Sounds satisfied/neutral/dissatisfied variations resulted in lower mean performance ratings. Low rating comments included drains blocked/need clearing and flooding still occurring. Overall, 62.9% of residents were satisfied to some degree. In terms of trends, current and historical rating levels are somewhat inconsistent with ratings up some years and down other."*

The impromptu comments are an interesting insight into customer perception. Although subjective they can provide a valuable source of information. For this reason they are carefully scrutinised and considered in future planning.

Table 3 shows a summary of the impromptu comments from the 2014 survey. The last two negative comments appear to demonstrate some confusion between the urban stormwater system that has very little open channel infrastructure and the rivers drainage assets. There is a tiny amount of stormwater infrastructure in the Marlborough Sounds area. Sixteen residents of the Marlborough Sounds took part in the survey but their experience of stormwater drainage is likely to be quite confined relative to the urban population. Careful interpretation of the survey result is required to attain an accurate understanding of the service performance. However with caution the data can continue to give useful feedback on the service.

Positive	Comment	Count
	No Problems	52
	Very well controlled	17
	Not much flooding	15
	Other (please specify)	15
Negative		
	Flooding still occurring	33
	Other (please specify)	33
	Drains blocked/need cleaning	26
	Poor maintenance	19
	Council doesn't follow up	8
	Rubbish in rivers	5
	Irregular mulch/mowing of banks	1

Table 3 Summary of Impromptu Comments from Customer Satisfaction Survey 2014

Level of Service - Minimise the environmental risks of stormwater discharges.

Performance Indicator – Reported stormwater discharges to the aquatic environment that causes deterioration to the receiving water.

The annual target of less than six pollution incidents has regularly been achieved (see Table 2 .) The types of discharge that can cause deterioration to the aquatic environment can range from serious chemical or oil pollution, spillages, discoloration caused by soil sediment from excavation works to one reported incident that was traced to a school class washing out their paint brushes above a drain grating in the playground.

Drainage from the roads and many private properties are directly connected to the stormwater reticulation. It is extremely difficult to control contamination from these sources. However council is providing the method of conveyance to discharge into the environment and therefore has a responsibility for the quality of the discharge. There are a number of tactics that can be deployed to protect the environment. 'Source Control' of activities at the origin to prevent contaminants entering the system is generally the most cost effective. High risk sites are identified. These are typically industrial and commercial sites and are recognised either through

the planning process or through the wastewater tradewaste monitoring programme. Site owners are advised of the risks and their responsibilities. Engineering solutions are sought to mitigate the risks such as fitting canopies over high risk areas to avoid rainwater wash-off of contaminated material, fitting bunds around surface water sumps or fitting interceptors onto stormwater drains. Owners are encouraged to produce management plans to develop good practices and deal with accidental spillage.

Staff of the Assets and Services department are notified of customer complaints and are able to respond immediately on a 24/7 basis. Pollution clear-up kits are readily available to the response crew. Temporary bunds can be deployed to contain surface contaminants and absorbent pads used to soak up spillages. There is close cooperation between Assets and Service s and the Environmental Protection Officers to respond to pollutions and to search for the source.

Level of Service - Provide a reliable service.

Performance Indicator – Number of dwellings, commercial and industrial buildings flooded as a result of a storm event with a five year average return interval.

This indicator has only been measured for the last two years. There has been one recorded failure in that time and there was some evidence that the private plumbing contributed to the flooding. Although previously not specifically recorded flooding incidents of this nature are rare within the urban stormwater drainage areas.

In May 2013 a storm over Blenheim was recorded with a one hour intensity estimated as a 9 year ARI event and a 2 hour intensity of 25 year ARI. Although this was a severe storm there were no reports of flood water getting inside dwellings or commercial businesses.

Performance Indicator – Number of residential properties (dwellings including outbuildings and garages) flooded as the result of a storm event with a two year, or less, an average return interval (ARI).

Date	Storm ARI	Dwellings Flooded	Property Flooded	Total Calls
23/07/2009	<5	2	5	24
25/05/2010	3	2	6	28
2/06/2010	<5		1	12
7/06/2010	<5	2	8	37
21/12/2010	9	4	4	28
28/12/2010	20	6	10	10
18/01/2011	<1.3	0	0	na
3/03/2012	1.3	0	0	na
8/08/2012	<2.33	0	9	139
12/08/2012	<2.33	0	0	12
15/01/2013	<5	1	2	21
6/05/2013	9	0	10	48
17/04/2014	<1.5	1	4	60

Level of Service - Provide a service that is timely and responsive to current needs.

Performance Indicator - Percentage of complaints of flood water threatening a dwelling responded to in less than one hour.

Performance Indicator - Percentage of storm related complaints received during an event responded to within four hours.

This is clearly an important indicator. Stormwater infrastructure cannot be economically installed to cope with the more uncommon, intense storm events. It is therefore important that when the Council receives a request for assistance that a timely response is provided.

There can be difficulties in measuring the indictor. The interpretation of 'threat to a dwelling' can be subjective. Customers have a range of expectations and tolerances. Ensuring the property in question is within the boundary of the urban stormwater system and that the problem is not due to some configuration of private pipework also needs to be determined. Receiving good, clear feedback from the field during an emergency event can be difficult as resources are inevitably stretched and working in difficult circumstances.

During many storm events the council receives many calls regarding customers' problems with the sewerage system. Toilets and domestic plumbing are slow to drain and can back-up, sometimes alarmingly. This is due to stormwater ingress into the sewer pipes causing them to surcharge and preventing them from taking any further foul drainage. This is a problem with the sewer reticulation and must be distinguished from the performance of the stormwater system.

Level of Service - Provide a stormwater service that is sustainable.

Performance Indicator - Percentage of annual renewal works completed.

Performance Indicator - Percentage of capital improvement works completed.

These performance indicators are based on the percentage of the annual renewal and capital works budget spent each year.

The expenditure programme is carefully planned and based on three main elements – projected **growth** in demand; r**enewal** to ensure assets are replaced as they reach the end of their useful lives and **service improvement** to meet the aspirations and expectations of the community. Maintaining the infrastructure on this basis ensures the service is sustained into the future.

The budget is for infrastructure capital expenditure projects are prepared and agreed based on a forecast of the planning process. The process involves community consultation, assessment of the feasibility of the design options, seeking Resource Consent approval, land acquisition, contract preparation and tendering. From a budgetary point of view it is sensible to be optimistic towards the planning process as it would be inefficient to be delayed by lack of budgeted funds. In practice the planning process is rarely smooth. It is common therefore to under-spend on projected budgets as delays in the process slow the spending profile.

2.7 What Our Customers Would Like – Future Challenges

The levels of service in the future are likely to remain relatively unchanged.

2.7.1 Levels of Service – Water Quality

The control of stormwater discharges is currently difficult to measure against a recognised standard as there is a legacy of many different historical resource consents. The Blenheim Stormwater Strategy proposes a comprehensive review and renewal of the urban stormwater resource consents. The conditions imposed by future consents cannot readily be anticipated. It is possible that limitations will be specified on the physical, chemical and biological quality of stormwater discharges to the receiving water. Alternatively target values may be set for the water quality of receiving streams as they pass through the urban environment. The consequences for the council infrastructure and management is yet to be determined There may be additional apparatus to be installed, regular monitoring and source management required to protect the environment and ensure compliance. These will only become apparent when the consents have been finalised and monitored.

2.7.2 Levels of Service – Flooding

The standard of building flooding protection specified in the Building Act 2004 is a well-recognised standard and is likely to remain for new housing and a goal for existing property. The Act requires new houses and habitable buildings to be designed with the floor level that will not be flooded by a storm event with a 50 year ARI. It also requires that a 10 year ARI event not to cause nuisance to other properties. This applies only to the building of new houses, but there is an implicit indication that they are appropriate standards for older properties too.

The safe floor level requirement in a 50 year ARI event can be achieved by several methods:

- setting of minimum floor levels, and/or
- a pipe network to take some/all stormwater, and/or
- surface storage/ponding and/or
- providing a secondary overflow path.

Often a pipe network is constructed to deal with a 5 year ARI storm event (Q_5), but can be less or sometimes more. Surface methods of secondary overflow or acceptable ponding storage are then required to cope with storm runoff in excess of a 5 year ARI event and up to a 50 year ARI event will enable house floor levels not to be flooded. To prevent nuisance to other property in a 10 year ARI event requires such ponding storage to be limited to the road.

The challenge will be to ensure that surface drainage around houses built prior to 2004 can achieve a similar performance and that the standard can be maintained in the face of further urban growth and climate change.

There is a trend towards increasing customer expectation and lower tolerance levels. Significant work has been undertaken both locally and nationally to understand the components of stormwater management through soakage, detention and conveyance and to maximise the effectiveness of each. Once a drainage area is thoroughly understood, the infrastructure is installed and the customers' expectations managed. To this end an important report[1] has been drafted based on the Blenheim system. The report examines the attributes of a stormwater system, the factors affecting surface drainage, previous and current design criteria and a review of best practice from around the country. The report has yet to be finalised but provides an excellent platform for future stormwater design.

2.7.3 Levels of Service – Service Response Times

Customers will continue to require a speedy response to service requests. The current performance standards appear to be adequate. The existing model using directly employed service operatives supplemented at short notice by local contractors available to respond to emergency needs appears to be working satisfactorily. The system is tested under duress during storm events.

The introduction of the 'Floodwatch' programme to the MDC web-site has been very popular. The site is able to give the latest information on the quantity of rainfall recorded at the MDC weather stations and the levels of the major rivers in the district. The information is of primary benefit to the rural population but is also widely accessed by urban dwellers during storms. There are no immediate plans to develop the site further.

The Blenheim Stormwater Strategy provides an excellent framework for analysing needs and for planning and implementing future improvements.

---

1 Procedures for Reviewing Blenheim Stormwater Capacity and Providing New Areas. MDC Aug 2014

The strategy identifies 85 possible actions derived from the strategic goals. It advocates the establishment of Stormwater Management Area Plans (SMAP) based on eight natural drainage basins within the Blenheim area. The SMAPs will assist with focusing and prioritising the possible actions into a practical implementation plan. It is intended to progressively develop the plans in order to implement the strategy. It is likely the same methodology will be adopted for the other urban areas.

The Blenheim Stormwater Strategy Action Plan is attached Appendix 4 – Blenheim Stormwater Strategy – Action as it demonstrates the thorough content and detail of the Strategy.

2.7.4 Levels of Service - Affordability

Perhaps the most important challenge to be faced in the achievement of the levels of service is the question of affordability. As noted in Section 2.3 there is often a conflict between the desired, or imposed, levels of service and the ability of the community to pay for them.

The Council's Revenue and Financing Policy is reviewed every three years and the update included in the Long Term Plan. The policy seeks to establish a fair and equitable distribution of costs between the individuals that pay and the beneficiaries.

Chapter 3: Future Demand

Components of the Future Demand Section

3.1 Demand drivers – Factors influencing the demand for stormwater services.

3.2 Demand Forecasts – How future demand has been evaluated.

3.3 Demand Impact on Assets – asset additions, augmentation and utilisation to meet demand.

3.4 Demand Management Plan – Non-asset solutions to meet demand estimates.

3.5 Asset Programmes to Meet Demand – Major demand driven programmes and costs.

3.1 Demand Drivers

Future demand for stormwater services is influenced by a number of factors that work together in combination.

Population Growth – New Zoned Areas - The Marlborough Urban Growth Strategy in published in 2013 identified eight greenfield sites on the peripheries of the current urban areas that would be suitable for future development. These have been zoned Urban Residential. A further area to the south has been identified for employment land.

Population growth – Infill Housing - Included in the strategy was a realisation that housing would intensify within the existing urban areas as plots were sub-divided. The loss of permeable ground will have consequence for stormwater run-off.

Improved Levels of Service - There is a natural tendency for customers to demand higher standards of stormwater drainage and to be less tolerant of surface flooding.

Improved Environmental Standards - New Zealand is very aware of its 'clean/green' reputation and much of the economic strategy is based on exploiting this image. There is increasing concern over the damage of human activities to the quality of waterways and coastal environment. Tighter regulation and more rigorous enforcement of existing controls can be expected in the future.

Climate Change - There is still some discussion as to whether recent unusual weather events are part of a natural cycle or permanent shift due to human activities. However there has been a significant increase in extreme weather events. Researchers predict this trend will continue. As severe storms become more frequent there will be pressure to upgrade infrastructure to mitigate the impact **on the urban environment.**

Legislation – The main legislative powers influencing stormwater services are detailed in Chapter 2. Changes in legislation may require additional drainage capacity or environmental protection upgrades.

Resilience - The stormwater system provides a level of protection to the urban community from uncommon extreme events. It is important the system is robust and durable. Demand for additional security against natural hazards will require further upgrades or extension of the existing system.

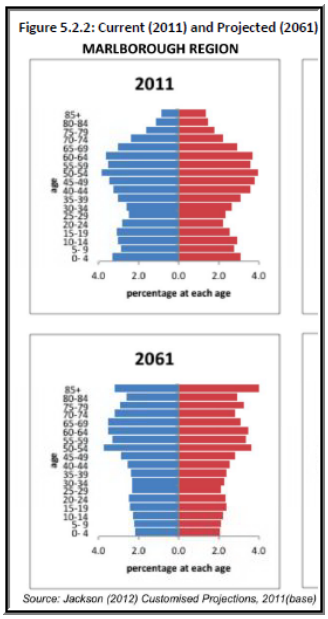
3.2 Demand Forecast

3.2.1 Population Growth

Previous analysis of the four population census counts between 1991 -2006 coincided with a period of rapid economic growth in the Marlborough region. Overall growth in the region was approaching 2% per annum although there were some significant local variations. For instance the Waikawa area saw population rise by an average of 5.5% whilst the usual resident population of Seddon decreased by 0.8%. In 2014 a reassessment of population projections was undertaken and presented to the Council Assets and Services committee. The report extracted information from research by the University of Waikato, Institute of Demographic & Economic Analysis and early data released from the 2013 census. The report recognised some international trends with major national and regional implications in contrast to previous assumptions.

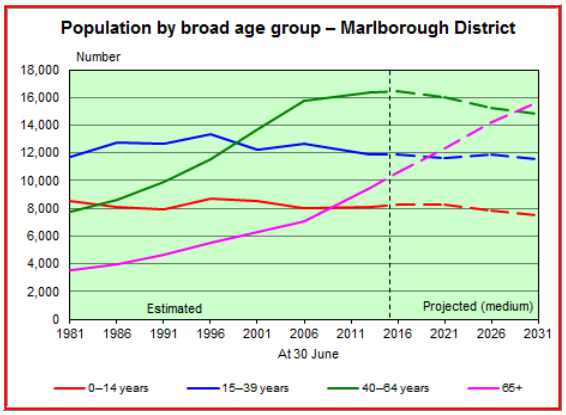
There are two major trends in the demographics of developed countries that are unprecedented

- Within a generation most developed (including New Zealand) and many developing countries in the world will be experiencing negative population growth.
- The composition of the population will be have more older (65+) people.



src: Institute of Demographic & Economic Analysis (Waikato Univ) 2012)

This can also be seen in the following figure:



src=http://www.stats.govt.nz/~/media/Statistics/browse-categories/people-and-communities/geographic-areas/local-population-trends/local-pop-trends.xls. OCT 2014

Simplistically there are two consequences for council infrastructure that need to be highlighted.

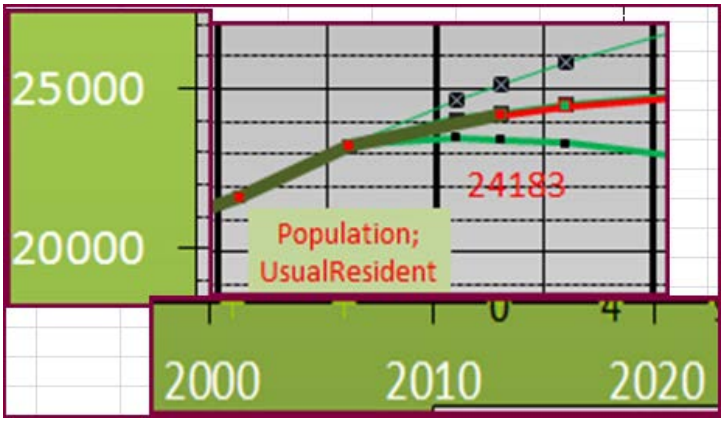
1. Councils can no longer simply design infrastructure for significant growth secure in the knowledge that at some time in the future the capacity will be required.

2. A greater portion of the population will be on fixed incomes so people will have a limited capacity to handle increased costs.

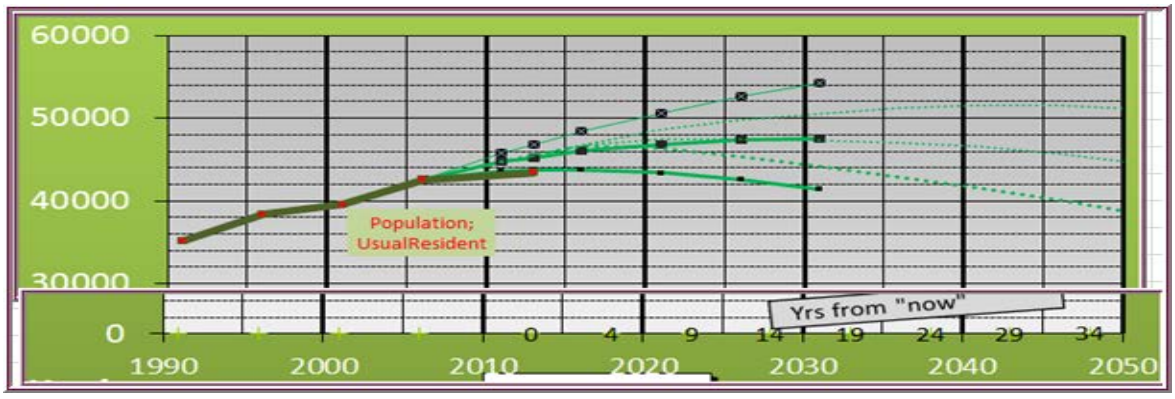
Marlborough

Council has access to the regional population projections made by Statistics NZ in 2011 based on the previous census (2006.) In addition, two reports of the Institute of Demographic & Economic Analysis (University of Waikato) 2012 provided further detailed analysis and population projections for the region and use Infometrics economic data.

Both sources make projections on high, medium and low scenarios. The trends are broadly similar although the Waikato projections are generally lower and over a narrower range within the Statistics NZ range. The Institutes work, while only for Marlborough as a whole, looked further into the future, and projected that the population will, for ALL scenarios, peak then decline. The timing of the peak ranged from as early as 2017 for the low projection to as late as 2061 for the high projection. The release of the 2013 Usual Resident show the actual population for Blenheim (graphed below) to be very similar to the medium projection scenario of Statistics NZ.



Some others were lower, and Marlborough as a whole (graphed below), tracked slight below the Low projections (from both Statistics NZ and Waikato).



The methodology used for an infrastructure planning framework therefore uses the 2011 projections but adjusted to the 2013 census population. For the purpose of planning Council services it is suggested that the Statistics NZ Medium scenario is used as a base projection. Adjustments may be required depending on the service and the area within the region.

Over the next 35 years there will be a slowing down of population increase, followed by a period of no growth and eventual negative growth.

The changes in population are not occurring uniformly through the region or uniformly through settlements. Generally the rural population is experiencing a more rapid slow-down in growth than the urban populations but there is also a shift in the “centre of gravity” of the Blenheim-Renwick and the Picton-Waikawa urban areas.

The main urban growth areas are the green-field sites on the periphery of existing urban areas. This has a significant impact on stormwater service design particularly for areas that drain through existing urban areas and existing infrastructure. This is an issue for Blenheim. The urban growth pockets have been identified to the north and west of the existing town. The natural drainage path is from west to east. Design of stormwater systems will have to take into account the impact on existing downstream residents. The growth projections are included in the Blenheim Stormwater Strategy and techniques to maximise surface water infiltration and balancing flows through detention storage areas are important tools to limit the downstream impact.

The number of inhabitants per dwelling is also falling. This means the demand for housing will decline at a slower rate than the fall in population. However it may also mean that; the wealth per household declines at a higher rate.

When planning services with a long lead time the increase in demand needs to be anticipated with a margin of error. A ‘just in time’ approach is prudent both from the point of view of cash flow and the uncertainty of the rapidly changing environment. Conversely, from a financial planning prospective it is prudent to anticipate a slower growth in the rateable property base and development contributions and a subsequent delay or reduction in revenue.

On the other hand, many infrastructure assets have a planned life in excess of 80 years and as a large proportion of the total costs are in the initial construction and it would be very expensive to under-estimate demand in the long term. Thus we should; err on the high side for such life components, use the medium scenario for shorter life components, and for all; build “Just In Time”.

Further

Population growth is probably the most obvious and ubiquitous influencing factors for the projection of future services. However population growth alone is a poor indicator of demand for infrastructural services. Other underlying factors such as climate change, environmental standards, national legislation, major hazard resilience, levels of service and other social aspects often have a far greater impact either alone or in combination. There is less empirical data to support assumptions relating to these factors. However it is important these are also placed on a common footing and a consistent approach underlies medium term strategy development.

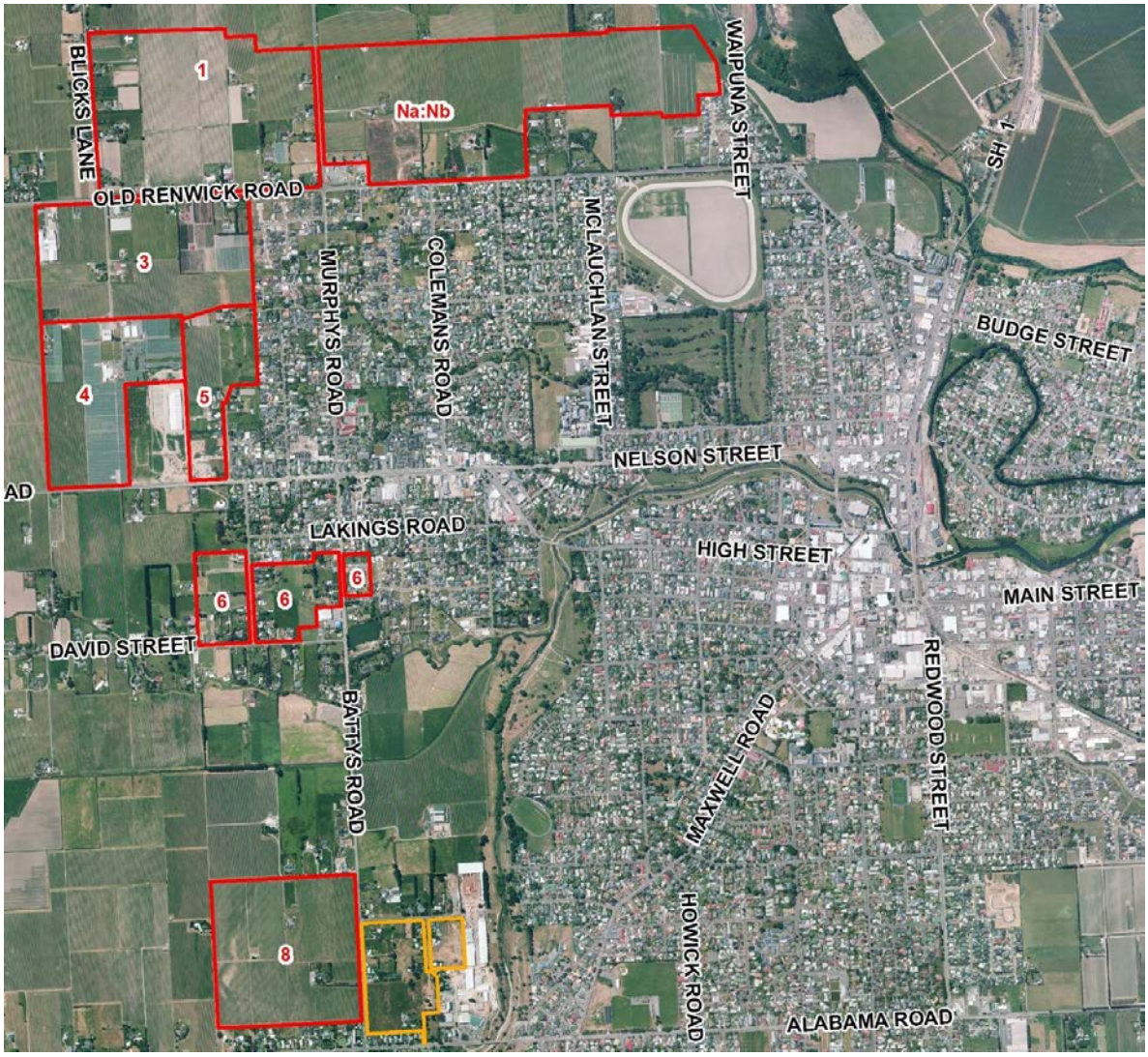
3.2.2 Demand Forecasts

Marlborough Urban Growth Strategy

In 2009 the Council embarked on a major project to develop a comprehensive urban growth strategy for Marlborough region. At that time the population projections based on previous census were estimating growth over the next 25 years of approximately 9,300 additional residents across the region. The population estimate was used to inform a major consultative process with both the public and council staff and other expert stake holders. The quantity of land required was evaluated and areas with potential to be developed into urban growth pockets identified. Underlying the project it was assumed that growth would occur around existing settlement nodes. The Canterbury earthquakes occurred during development of the strategy and early drafts had to be revised after and land around Blenheim, particularly to the east, was assessed as susceptibility to liquefaction and lateral spread.

The final strategy document was accepted by council and published in March 2013. The strategy forms a valuable platform for planning future capacity upgrades to all services.

For Blenheim seven land parcels to the west and north of the town were identified as suitable for zoning for Urban-Residential development. A total area of around 240 hectares of urban-residential and a further 53 hectares of employment land is ear-marked for development. As discussed earlier the Wairau Valley drains from west to east and the stormwater drainage from the new developments will impact to some extent on the existing settlement. Work is currently on-going to model the available capacity in the natural drainage channels.



Site investigations are being undertaken to determine groundwater levels and the soakage capability of the soils. Once these have been established an outline plan for the development zones will be prepared. The final plan will be a balance between on-site disposal and detention of stormwater verses the capability and cost of downstream conveyance.

The Urban Growth Strategy also recognised the potential for in-fill housing within the existing urban zones. The specific sections were not detailed but will be evaluated in the process of developing hydraulic models.

Important work has been undertaken by the Rivers Department to prepare good design data and gain a solid understanding of the influencing criteria. Blenheim has been categorised into 27 catchments and 224 sub-catchments Rainfall patterns are being analyses to establish the relationship between rainfall intensity, duration and location and the precedent weather and river flows. Flow monitoring at critical locations in the drainage channels during different rainfall events is being undertaken and incorporated into the hydraulic models of the drainage areas.

3.2.3 Improved Levels of Service

The implications of meeting the current levels of service are discussed in Chapter 2: Levels of Service. There are no significant changes expected to the levels of service that will influence growth in demand for stormwater services.

3.2.4 Climate Change

There continues to be debate amongst the experts on the exact nature of climate change. The Ministry for the Environment is however publishing clear advice on the possible implications. The advice on their web-site was last up-dated in July 2014 as follows:

Projections of climate change depend on future greenhouse gas emissions which are uncertain. Also, global climate models used to predict future climate vary in their sensitivity to these emissions. The combination of these factors means that projections of future climate are usually expressed as a range of likely values. This information is mostly from 'middle-of-the-range' climate change projections.

Temperature - Temperatures are likely to be around 0.9˚C warmer by 2040 and 2.0˚C warmer by 2090, compared to 1990. By the end of the century, Marlborough is projected to have about 10–40 extra days per year where maximum temperatures exceed 25˚C. The number of frosts could decrease by around 20–45 per year, with even greater reductions in frosts possible further inland.

Rainfall - Rainfall will vary locally within the region. While annual rainfall is likely to increase in the inland high country, eastern Marlborough and the Kaikoura Coast are likely to become drier. In Blenheim, there is likely to be little change in average annual rainfall by 2090. Seasonal projections show summer and autumn rainfall both increasing by 5 per cent in Blenheim, with very little change in winter and spring rainfall by 2090. Very heavy rainfall events are likely to become more frequent.

Sea-level rise - New Zealand tide records show an average rise in relative mean sea level of 1.7 mm per year over the 20th century. Sea levels are expected to continue to rise into the future. The Ministry for the Environment recommends planning for future sea-level rise of at least 0.5 m, along with consideration of the consequences of a mean sea-level rise of at least 0.8 m (relative to the 1980–1999 average) by the 2090s.

Storms - The number of storms crossing the Tasman Sea is expected to increase in summer and decrease in winter, by the end of the century. The intensity of these storms is likely to decrease in both summer and winter.

Wind - The frequency of extreme winds over this century is likely to increase by between 2 and 5 per cent in almost all regions of New Zealand in winter, and decrease by a similar amount in summer. There may be more north-easterly events over the top of the South Island and less frequent westerly winds.

Climate change - is only one of the variables to take into account in the design and operation of the infrastructure. However it is critically important and is being incorporated into all current designs.

3.2.5 Resilience

Following the Christchurch Earthquake sequence there has been substantial research and information on the resilience of utility infrastructure. The Wairau Plains has many common geographical features with the Canterbury Basin and comparisons can be usefully made.

Lateral spread adjacent to water courses was particularly damaging to stop banks, utilities and other structures. New set-back standards are being incorporated into new designs.

Manholes and wet-wells had a tendency to 'float' in liquefied ground conditions.

Ground shaking caused significant damage to linear assets – pipelines and stop banks. Research has shown that certain materials, particularly polyethylene performed much better than some of the traditional materials such earthenware, vitreous clay, un-reinforced concrete and asbestos cement. The Stronger Christchurch Infrastructure Re-build Team (SCIRT) has been generous in publishing its findings and solutions. They have created depository of technical advice and engineering standards that will assist local authorities to design and build more resilient infrastructure in the future.

3.3 Demand Impact on Assets

The storm in May 2013 revealed a number flooding incidents in the Muller Road/ Howick Road area of Blenheim. The post event analysis led to further investigation with a detailed CCTV survey. The 600 mm steel stormwater main in Muller was found to be badly corroded and partially collapsed. Subsequently 348 meters of the pipe in Muller Road was renewed with a new 675 mm concrete main.

The urban development in the head-waters of Murphys Creek is still being discussed with the stake holders. The alternative to using the creek as a conduit for the stormwater from the new Westwood development is a new pipeline along the New Renwick Road. Two alternative outfalls to the Taylor River have been estimated at $2.3M or $3.3M respectively.

The design investigation into the Redwood Street/Town Branch Drain catchment is on-going. However, as part of the integrated management through the Stormwater Action Group a relatively small upgrade to the outfall of the Symons Street Pump Station (a Rivers Department asset) provided significant improvements to the discharge and flow characteristics of the upstream stormwater pipeline.

3.4 Demand Management Plan

There is an increasing expectation from community of continually improving services. The capabilities of the stormwater service are only intermittently tested during storm events. It is difficult to explain to the public the relationship between the rainfall event and the service they can expect. This is particularly complex for towns such as Blenheim where some areas are deliberately designed to maximise surface ponding to aid detention of run-off and roads are designed as secondary flow paths. Others areas need to be drained as rapidly as possible and surface ponding is an indication the service are under pressure.

The situation is further complicated in that all storm events have unique characteristics in terms of duration, intensity, distribution and precedent conditions. It is difficult to simplify this data sufficiently to guide public expectation. Frequently the information is not available until after the event making it difficult for the public to prepare.

The management of community expectations is currently being tested with the Murphys Creek consultations as described in Chapter 2: Levels of Service.

The introduction of the 'Flood Watch' interactive maps onto the council web-site has provided benefit to the public by publishing 'live' data from the rainfall and river monitoring stations around the region. Whilst the stations are on the main rivers and the service mainly benefits the rural community it is a useful source of information for urban dwellers and helps to distribute contemporary information of storm events.

Stormwater management has been a significant issue in the design of the new urban zones to the north and west of Blenheim since the inception of the urban growth strategy. The area was known to have a high water table, there is very limited gradient across the sites and the natural flow is through the existing settlement. Investigations are currently being undertaken to quantify

the potential for percolation within the sites. Detention areas can be incorporated to balance out peak flows and reduce the need for additional infrastructure downstream. However this may restrict the amount of available land for development and a compromise will need to be reached between on-site management and infrastructure upgrade. The first development is expected in 2016. By which time an ‘accepted development plan’ will have been established for the zone. The plan will outline the location and size of the public utilities – roads, sewers, water and stormwater infrastructure.

Planning tools can be used to manage run-off co-efficients from new zones and in-fill housing. The design of floor levels in relation the surrounding land for new dwellings is a primary tool for managing future demand.

The diversion of roof water into storage vessels has been considered but is unlikely to provide adequate flow reductions for the more problematic storm events.

‘Source Control’ continues to be the most effective demand management technique to protect the stormwater system from contaminants and spillages. By managing industrial and commercial site activities that have potential to pollute the stormwater system the need for elaborate engineering solutions such as oil interceptors, silt traps, etc is reduced

3.5 Asset Plans to Meet Demand

The main capital investments related to growth have been conceptually considered and more detailed design is now underway. The main focus of attention is on the Murphys Creek and Casey’s Creek that drain the northwest urban development zones.

The Stormwater Action Group continues to investigate the Camerons Creek, Yelverton Creek and Old Fairhall Creek sub- catchments that provide drainage to the Development Zone 6 **zones.**

Chapter 4: Life Cycle Management Plan

The life cycle management plan is a coherent plan to deliver the best value for money for the assets' owners whilst providing satisfactory service to the customers. The plan seeks to anticipate future requirements, manage risks and optimise decision making throughout the assets life.

Components of the Life Cycle Management Plan

4.1 Background Data – physical parameters, asset capacity/performance, asset condition, asset valuation, historical data.

4.2 Infrastructure Risk Management.

4.3 Routine Operations & Maintenance Plan.

4.4 Renewal/Replacement Plan.

4.5 Creation/Acquisition/Augmentation Plan.

4.6 Disposal Plan.

The lifecycle of an asset follows the progression shown below.

Planning	The process of preparing for a new asset, or non-asset solution, to a service delivery issue. Service delivery issues may derive from growth, a current or anticipated failure to meet levels of service or to replace a failing or obsolete asset. The planning process involves engineering expertise, legal compliance and community engagement to size, locate, programme and operate with consideration to design options, whole life costs, risks and non-asset alternatives.
Creation	The purchase, construction or vesting of an asset to the Council. The management of the design and construction to ensure the required quality is delivered on time and at the agreed cost.
Operation & Maintenance	The day to day running of the infrastructure to ensure a continual, effective and efficient service to the customer. Maintenance is the pro-active and reactive repair and servicing of assets. It is undertaken with respect to the 'criticality' of the assets and the overall quality of the service delivered.
Rehabilitation	Proactive restoration of assets to extend the serviceability and ultimate life expectancy in a cost effective manner.
Renewal	The controlled replacement of assets that have reached the end of their useful lives.
Disposal	The removal of redundant assets by decommissioning, physical removal, sale or re-utilisation for an entirely different purpose (ie; using decommissioned sewer pipes as cable ducts.)

4.1 Physical Parameters

	BLENHEIM	PICTON	RIVERLANDS	RENWICK	SPRING CRK	HAVELOCK	ANAKIWA	OKIWI	SOUNDS	SEDDON	GROVETOWN	Grand Total
CC-RF	65,991	17,897	3,967	3,359	2,947	768	680	299		102		96,010
PVC	28,582	7,915	1,546	1,120	216	450		214		67	21	40,131
AC	14,519	590	23	19	45							15,196
EW	3,870	568	4									4,442
NOF	1,361	450				130	168					2,109
(blank)	297	641		246		38			332	88		1,641
UNKNOW	1,133	80		10				306			2	1,531
ST-SW	1,351	71										1,422
CC	1,007	42		190							153	1,392
ST	1,201	164										1,365
CC-SR	1,285	15										1,300
RC	1,204											1,204
CI	231	22										252
UPVC	229											229
NOVA		5			178							183
FTILE	171											171
ALU-F	62	58										120
AC-F	115											115
ST-GL	58	4		7		31						99
RIBST		83										83
DRUM						25						25
PE 100	22	3										24
VC	19											19
ALUFLO		17										17
MPVC		16										16
SP	4											4
Grand Total	**122,711**	**28,640**	**5,538**	**4,951**	**3,385**	**1,441**	**849**	**818**	**332**	**258**	**176**	**169,099**

Table 4 Pipe Material

As a general rule human settlements establish in areas that take advantage of natural drainage channels for removal of stormwater. It is only as the urban area develops that it becomes necessary to install a more elaborate piped infrastructure to remove the surface water. The piped stormwater network is considerably shorter and younger than both the water and sewer networks.

In Marlborough the central urban areas are commonly served by the original pipework whilst newer pipes are installed on the periphery as the towns expands. This can cause considerable capacity issues for growing settlements. The older infrastructure is often required to convey the stormwater flows from the increasing drainage area. The implications are discussed further under 4.1.1 Asset Capacity/Performance.

Table 4 shows the composition of the stormwater reticulation network. Around 90% of the entire network is constructed of three materials – concrete, PVC and asbestos cement. Generally concrete is the preferred material for larger diameter pipes (225 mm and greater.) PVC has replaced asbestos cement as its modern equivalent. These two materials are more commonly used in the smaller diameters - up to and including 300 mm.

Concrete is the oldest pipe material recorded in the current stormwater network. It has been used for at least 75 years in Marlborough. Over the years the method of manufacture has developed considerably. The early pipes were not reinforced and were cast in vertical moulds. Modern concrete pipes are now supplied as steel reinforced, centrifugally spun pipes, manufactured in accordance with NZS 3107. A variety of jointing methods, joint materials and linings have also been incorporated over the years.

Asbestos cement was a popular material in the 1940s. Records show it was still being used into the 1980s. Modern plastics and particularly PVC were being introduced into the market in the latter part of the 20th century. Their acceptance was accelerated as the health risks associated with handling asbestos cement became more apparent.

A recent CCTV survey revealed a concrete arch structure from the roundabout at the High Street/Redwood Street running north under Park Terrace. This was previously unknown. The

arch was probably cast in place and is one of the oldest structures of the Blenheim stormwater system.

The fifth most common pipe material is a corrugated polyethylene drainage pipe recorded under the brand name Novaflo (NOF.) Used extensively in agricultural and rural drainage it has a number of advantages as it is light weight, easily handled and installed. It has reasonable strength and durability but is best suited to non-trafficked areas such as the road berm and private land.

Sum of Length							
	CC-RF	PVC	AC	EW	NOF	Other	Grand Total
<125mm	624	1,348	541	471	1,266	310	4,558
150 - 180	8,549	6,554	7,070	2,280	819	2,694	27,966
200 - 275	23,306	23,144	5,366	882	25	1,930	54,654
300 -350	20,769	6,217	1,722	710		3,188	32,605
375 - 400	8,658	2,359	139			551	11,706
450-500mm	11,244	254	278	99		436	12,311
525-750mm	14,310	235	80			1,672	16,297
760-1050mm	5,643	20				327	5,990
>1050	2,908					104	3,012
Grand Total	**96,010**	**40,131**	**15,196**	**4,442**	**2,109**	**11,210**	**169,099**

Figure 4 Stormwater Pipe Age and Material

Pipe materials and standards of manufacture have evolved over the years. Modern materials are generally easier to handle, more robust and are constructed to a more consistent standard. However when a new material is introduced there is often a fall in the overall life expectancy of the pipeline as there is a lack of skill and experience in the installation limitations.

There is a relatively large variety of pipe materials in the network. This is partly due to the history of different authorities that have administered stormwater across the region over the years. At various times the responsibility for stormwater infrastructure has been in the hands of drainage boards; town, county or borough councils and in some cases privately installed schemes have been adopted the Council.

4.1.1 Asset Capacity/Performance

Perhaps the over-arching objective that has guided stormwater design was first defined nationally in the Building Act 1991 (superseded by the Building Act 2004.) It states that surface water from a storm with a 2% probability of occurring annually will not enter a building. Also surface water collected or concentrated by a building or site shall not cause nuisance from an event that has a 10% probability of occurring annually. The clauses regulate the building structure, floor levels and areas immediately surrounding the buildings. They also have clear implications for the stormwater infrastructure serving the building sites. The two must work together to achieve the target.

The quantitative management of stormwater has two major components – detention/soakage and conveyance. In this respect a recent study of stormwater systems in Blenheim separated the two elements based on the topography of the area served.

In hilly terrain the stormwater system needs to be designed to protect the lower lying property from the run-off from the hillside. In these conditions rain water will naturally flow off the impermeable surfaces. It will accumulate and concentrate as it flows downhill and may become a threat to the properties downstream. In these circumstances the stormwater system must either retard the flow in order to limit the accumulation or intercept the flow and direct it to a suitable watercourse.

The other main category is the very flat land common to alluvial plains. The absence of any appreciable gradient in this landscape means that rainfall will be very slow to drain away. A high water table is often associated with this type of land which restricts the soils capacity to absorb rainwater. The resultant ponding becomes a nuisance to property owners and road users. The stormwater system in these areas is required to collect the surface water and channel it to artificially sloped drainage networks to remove the excess. Pumps may be necessary to accelerate the natural flow.

It is therefore important to consider the stormwater catchment as a whole and for the designer to understand the primary purpose of the drainage infrastructure. Stormwater management in the two areas can have opposing aims. The main objective on the flat alluvial plain is to reduce and remove the ponded water. In hilly areas a degree of ponding serves to detain the flows downhill and may be regarded as beneficial.

Many urban areas consist of both types of topography. It has been estimated that in Blenheim around 60% of the urban stormwater catchment is on the very flat alluvial plain. Approximately 9% of the catchment is in the foothills of the Wither Hills. The remainder of the land is at an intermediate gradient, typically around 1:100. The shallow slope is created by the emergence Taylor River into the Wairau valley that formed an ancient alluvial fan.

The technical detail of this topic is explored in greater depth in “Procedures for Reviewing the Blenheim Stormwater Capacity and Providing for New Areas (Draft)” (Williman).

4.1.2 Stormwater Conveyance

Rain water that cannot penetrate the soil runs across the surface of the land and collects into a variety of channels. In urban areas the accumulated stormwater is conveyed through pipes, kerb channels on roadways and modified & naturally occurring water courses. The weather patterns in New Zealand are such that it is uneconomical to build specific infrastructure to accommodate flows from large storms that are infrequently experienced. The roadways therefore become useful alternative conveyance pathways. Many roads are specifically designed as secondary flow-paths for stormwater. On the flat plains the roads serve as detention ponds as there is often little gradient to permit a flow.

Historically there has been little consistency on the size of storm that should be accommodated by the primary stormwater infrastructure and that which spills over into the secondary flow-path. Recommendations for the design of the piped water system have varied between 2 and 10 year Annual Return Interval(ARI) The final design is likely depend on a number of contributory factors - the permeability of the catchment area, the topography and the vulnerability/sensitivity of the surrounding properties. Industrial areas tend to have less permeable surfaces and business maybe severely interrupted by surface water flooding. In these instances the piped system maybe designed for a greater capacity and be able to cope with more frequent storm events.

4.1.3 Performance

For the above reasons measurement of the performance of stormwater systems can be difficult. The base line set by the Building Act is the most definitive but strictly this still refers only to buildings constructed after 1991. The interpretation of ‘nuisance’ is reliant on case law. During storm events the Assets and Services department establish an Incident Management Centre to deal with flooding incidents and analysis of the customer complaints and issues received at the centre gives an indication of system performance.

Table 5 is a statistical summary of the customer issues received during storm events since 2009. The data has been screened to remove rural issues outside of the stormwater system. Issues primarily relating to road access and traffic management have also been removed.

Date	Storm ARI	Dwellings Flooded	Property Flooded	Total Calls
23/07/2009	<5	2	5	24
25/05/2010	3	2	6	28
2/06/2010	<5		1	12
7/06/2010	<5	2	8	37
21/12/2010	9	4	4	28
28/12/2010	20	6	10	10
18/01/2011	<1.3	0	0	na
3/03/2012	1.3	0	0	na
8/08/2012	<2.33	0	9	139
12/08/2012	<2.33	0	0	12
15/01/2013	<5	1	2	21
6/05/2013	9	0	10	48
17/04/2014	<1.5	1	4	60

Table 5 Customer Service Requests During Storm Events 2009-14

'Dwelling flooding' is interpreted as habitable floors of building whether domestic, commercial or industrial. Whilst 'property flooding' generally refers to stormwater entering garages, out-buildings, etc that is beyond the scope of expected ponding on sections.

The absolute numbers are relatively low but can disguise some significant events to small local communities affected by local storms. For example the storm on 28 December 2010 was much more intense in the northern part of Marlborough. The impact on Havelock, Rai Valley and the small communities of the Marlborough Sounds was very considerable. The storm was less significant in Picton and had negligible impact on Blenheim and the southern part of the region. The rainfall was most intense from midnight on the 27th through to mid-morning on the 28th. Rainfall intensity, duration and the precedent weather conditions will all have considerable influence on the performance of the stormwater infrastructure and the customers' experience of a storm event.

4.1.4 Asset Condition

The condition of the stormwater reticulation is generally based on the age of the pipes. In general buried pipelines have a design life of 80-100 years. There are many influencing factors on pipeline condition and life expectancy – material, depth of pipe, groundwater level, workmanship of installation, interference from other utilities, surface traffic, ground movement, jointing materials, bedding & surround, etc. These factors may act singly or combine their effects to create difficulty in predicting trends in life expectancy. Pipes can be inspected with the use of closed-circuit television camera. The pipe structural and service condition can be assessed through a nationally recognised pipeline evaluation technique. Currently CTTV is deployed to investigate suspect pipes or to assess the condition of pipes that may require upsizing. It is likely the technique will be used more widely and systematically to support the Blenheim Stormwater Strategy and other areas as strategies are developed.

For asbestos cement pipes the life expectancy has been derived from the tables published in the New Zealand Asbestos Cement Watermain Manual (2001). The manual uses data from practical experience gathered throughout New Zealand. The study was confined to water mains and the correlation to stormwater and sewer mains has not been tested. However for medium and large sized pipe the life expectancy is within the 72 year to 100 year range.

Table 6 shows the remaining life of stormwater reticulation in the serviced areas. Using the assumptions above it can be seen that less than 2% of the network will reach the end of its useful life in the next twenty years. However the projection would suggest that in the period

2035 to 2065 almost half of the entire network will require replacing. There is a need to verify the assumptions in the projection.

It is desirable to smooth the renewals programme to make the workload manageable and to avoid too much disruption to the system. Equally it is important to maximise the useful life of the underground assets but also to avoid failure to critical services and consequential flood damage. A timely programme of condition assessment through systematic CCTV survey will provide greater confidence in the condition grading and assist with future renewals programmes and is being planned for.

	BLENHEIM	PICTON	RIVERLANDS	RENWICK	SPRING CRK	HAVELOCK	ANAKIWA	OKIWI	SOUNDS	SEDDON	GROVETOWN	Grand Total
<10yrs	375	56				25						**455**
10-19yrs	1,832	710										**2,542**
20-29yrs	8,408	578			45		168					**9,199**
30-39yrs	29,701	1,092	792	138		149						**31,873**
40-49yrs	18,928	13,495	646	929	2,907	158	680	299		102	153	**38,298**
50-59yrs	11,140	1,172	203	190	214	244				76	2	**13,241**
60-69yrs	13,118	1,691	1,989	550	69	256						**17,671**
70-79yrs	14,509	3,484	340	1,977	151	193		214			21	**20,889**
80-89yrs	13,123	2,546	1,331	333		189		306	332			**18,160**
>90yrs	11,578	3,815	237	834		227				79		**16,771**
Grand Total	**122,711**	**28,640**	**5,538**	**4,951**	**3,385**	**1,441**	**849**	**818**	**332**	**258**	**176**	**169,099**

Table 6 Remaining Life of Stormwater Reticulation

4.1.5 Asset Valuation

The stormwater drainage assets are valued annually. Details of the valuation, process and methodology are included in the Asset Valuation report and summarised in Chapter 6: Plan Improvement and Monitoring.

A summary of the main asset values in 2014 is included in the table below

	Type	Replacement Cost ($)	Depreciated Replacement Cost ($)	Annual Rate of Depreciation ($)
Blenheim	Pump Stations-Electrical	$26,489	$11,655	$1,060
	Pump Stations - Civil	$118,600	$91,158	$1,186
	Pump Stations-Mechanical	$38,403	$15,813	$960
	Reticulation	$74,132,410	$47,612,012	$879,947
	TOTAL	$74,315,902	$47,730,639	$883,153
Havelock	Reticulation	$428,758	$227,163	$5,603
	TOTAL	**$428,758**	**$227,163**	**$5,603**
Picton	Pump Stations-Electrical	$99,396	$79,517	$2,485
	Pump Stations - Civil	$395,326	$221,382	$3,953
	Pump Stations-Mechanical	$90,360	$72,288	$2,259
	Reticulation	$20,287,889	$12,637,403	$242,313
	TOTAL	**$20,872,972**	**$13,010,590**	**$251,010**

	Type	Replacement Cost ($)	Depreciated Replacement Cost ($)	Annual Rate of Depreciation ($)
Renwick	Reticulation	$3,437,208	$2,735,065	$41,116
	TOTAL	**$3,437,208**	**$2,735,065**	**$41,116**
Riverlands	Reticulation	$3,800,426	$2,873,884	$45,207
	TOTAL	**$3,800,426**	**$2,873,884**	**$45,207**
Sounds	Reticulation	$220,901	$192,184	$2,209
	TOTAL	**$220,901**	**$192,184**	**$2,209**
Spring Creek	Reticulation	$2,309,830	$1,186,932	$28,352
	TOTAL	**$2,309,830**	**$1,186,932**	**$28,352**
Okiwi	Reticulation	$510,814	$353,135	$5,613
	TOTAL	**$510,814**	**$353,135**	**$5,613**
Anakiwa	Reticulation	$428,758	$227,163	$5,603
	TOTAL	**$428,758**	**$227,163**	**$5,603**
Seddon	Reticulation	$144,746	$94,043	$1,583
	TOTAL	**$144,746**	**$94,043**	**$1,583**
Grovetown	Reticulation	$117,798	$61,451	$1,445
	TOTAL	**$117,798**	**$61,451**	**$1,445**
GRAND TOTAL		**$107,029,325**	**$69,132,353**	**$1,275,912**

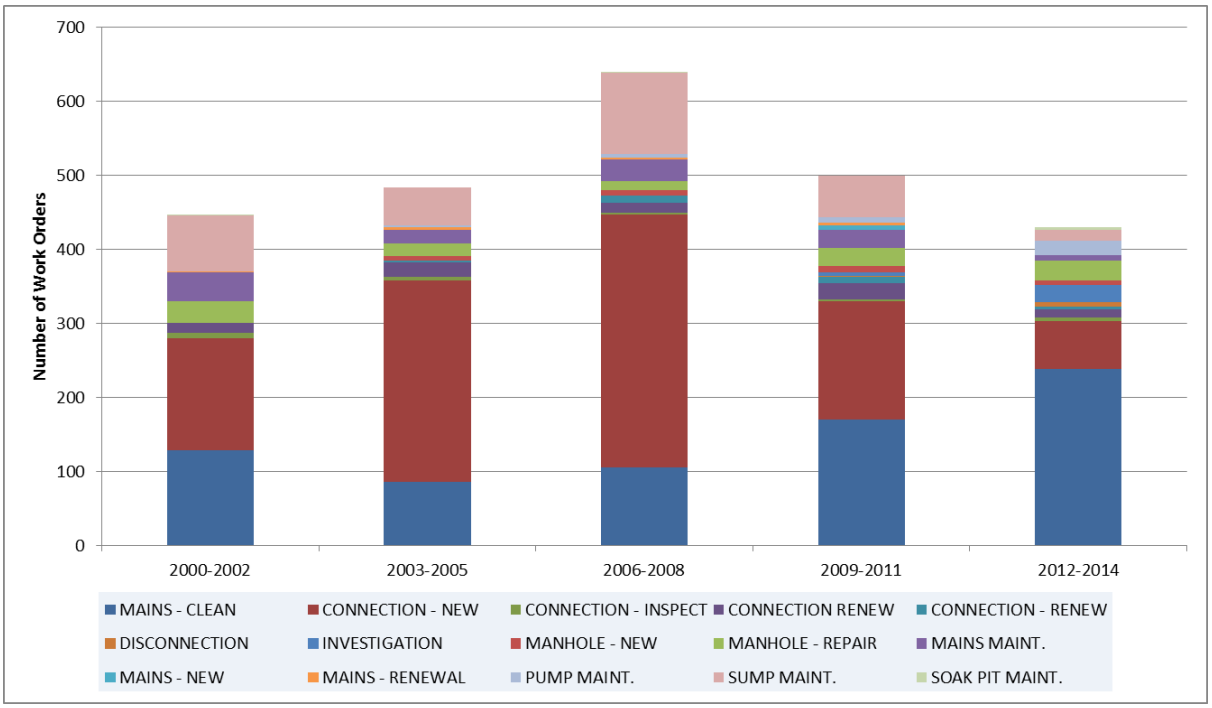


Table 7 Summary of Stormwater Reticulation Maintenance 2000-14

4.1.6 Stormwater Strategy

The Blenheim Stormwater Strategy provides detailed analysis and prioritisation of each of the Stormwater Management Areas. A brief summary of the main issues is shown Table 8 Summary of Key Issues for Blenheim Stormwater Management Areas. The Blenheim Stormwater Strategy – Action Plan is included in Appendix 4 – Blenheim Stormwater Strategy – Action with further details of the strategy proposals.

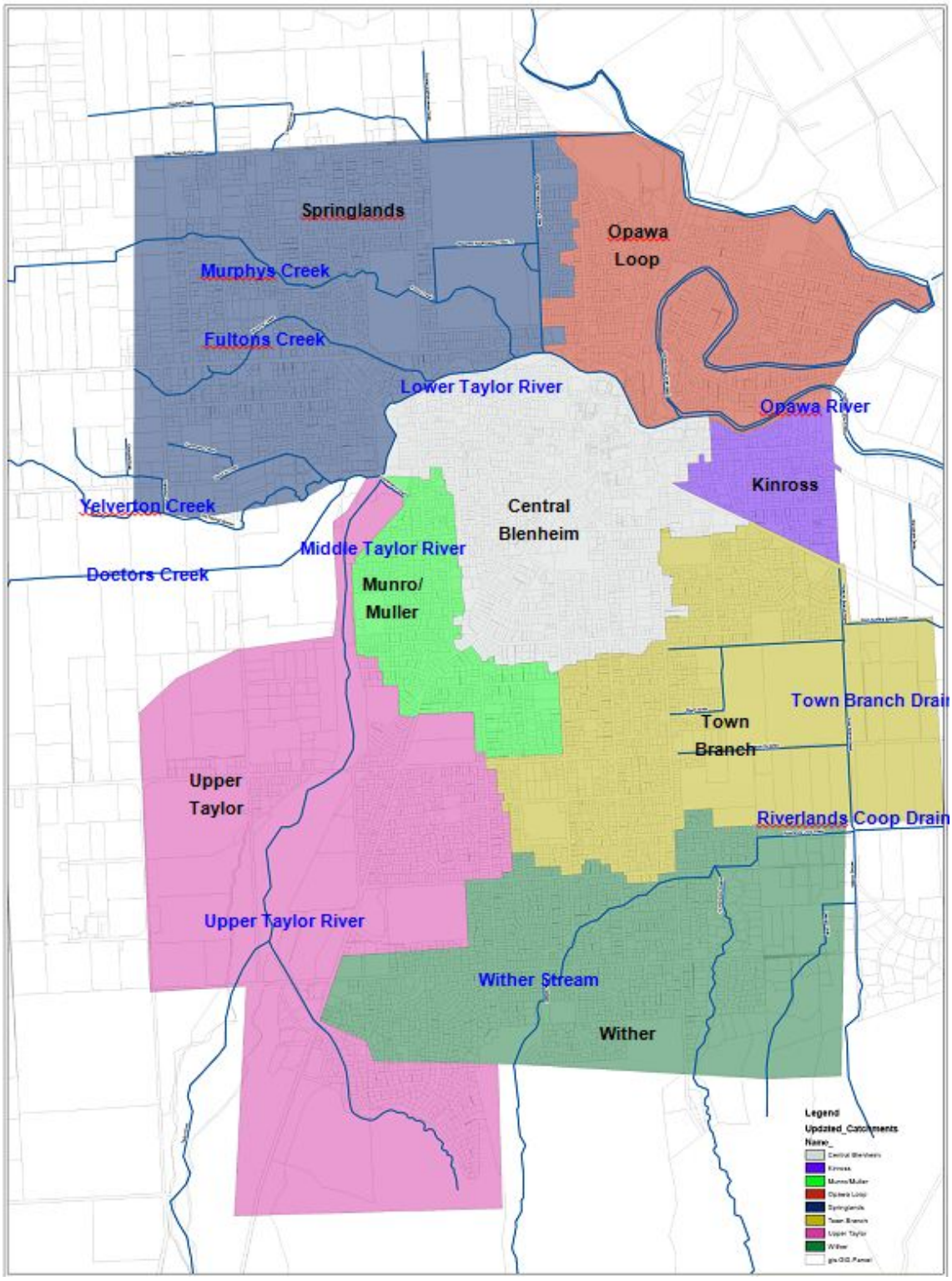


Table 8 Summary of Key Issues for Blenheim Stormwater Management Areas

Stormwater Management Area	Management Area	Description Key Issues
Springlands	This area discharges into Fultons Creek, Murphys Creek and Racecourse Creek and then into the Lower Taylor River. This SMA is primarily zoned residential; however, there is rural catchment upstream to the west of the residential area.	Pipe and drain capacity limited Urban growth/infill. Lack of soakage High natural spring-fed water clarity Sedimentation from dewatering of construction sites
Opawa Loop	This area discharges into the Opawa River at a number of locations upstream of the Taylor River confluence. This area is made up of residential and some industrial areas.	Industrial and transport corridors Inadequate pipe capacity
Central Blenheim	The Central Blenheim SMA discharges via a small number of discharge points into the Lower Taylor River. This area is made up of a mixture of residential, high density residential, commercial and some industrial zonings.	Lack of pipe and pump capacity Risk of flooding (especially Redwood Street) Infill development Commercial and transport corridors High value receiving environment
Kinross	The Kinross SMA discharges via one main discharge point to the lower Opawa River downstream of the Taylor River confluence.	Lack of pipe and pump capacity Industrial and transport corridors Soakage not available
Monro/Muller	This SMA discharges partly in the Taylor River system upstream of the Doctors Creek confluence and partly into the Central Blenheim area to the Lower Taylor River	Lack of soakage Lack of pipe capacity Flood prone Urban growth/infill
Upper Taylor	This SMA discharges into the Upper Taylor River at a number of locations including the Rifle Range Creek. Part of this area discharges directly to ground soakage	Approach for accommodating future growth on southern zoned land Good ground soakage

Stormwater Management Area	Management Area	Description Key Issues
Town Branch	This area is collected in a series of drains that flow in an easterly direction. A pump station located on the edge of town pumps this stormwater to the Lower Opawa River, and another pumps to the Riverlands Coop Drain. Therefore, this drainage system has no influence on water quality issues within the town itself except in high flows when the system capacity is exceeded and overland flow occurs.	Lack of soakage Insufficient pipe capacity Flood prone Urban growth – development pressure Outlet capacity constrained
Wither	This SMA is firstly collected in natural watercourses in the lower parts of the Wither Hills. These natural water courses then flow into a series of drains which enter the Riverlands Co-op Drain System. Some of this area discharges directly to ground soakage.	Stream erosion Not suitable for soakage Flooding risk in some areas downstream Urban growth Industrial discharges downstream Some limited capacity

4.2 Infrastructure Risk Management Plan

Risk management of the wastewater function has been prepared in accordance with the MDC Risk Management Strategy and Tools[2]. The strategy was initially developed by the Risk Management Steering Committee in 2001 in accordance with AS/NZS 4360 Risk Management and later updated to ISO 3100(2009).

The aim of the strategy is stated as:

> *To identify, assess, and manage risks in a consistent and demonstrable way.*
>
> *Our strategy is to:*
>
> *Introduce tools and internal assistance that enables sections to complete a risk analysis relevant to their operation.*
>
> *Ensure our decision making is consistent and demonstrable.*
>
> *Develop a 'risk aware' culture that encourages everyone to identify risks and associated opportunities.*
>
> *Promote and foster communication and risk monitoring throughout the organisation.*

2 Risk Management Strategy and Tools. V3.2 (Dec 2011) MDC

This framework will be managed by the Risk Manager and supported by the executive management team.

Under the guidance of the Council's Risk Manager and the O & M Engineer a joint assessment of the hazards associated with bot the stormwater and wastewater operation is undertaken on an annual basis. The hazards are risk assessed on the standard Likelihood/Consequence matrix to establish a risk profile. The controls for each risk are considered and an action plan is prepared to either augment the controls or manage the residual risk. The risk profile is reviewed and updated every year. The risk profile is included in Appendix 1 – Operations and Maintenance – Stormwater/Wastewater Risk Profile.

The risks are also be separated on a network basis. For example the risks on the steep valleys of the PIcton system have different characteristics to the urban Blenheim system.

The risk management process is included in the Standard Operating Procedures and Emergency Management Plans. They have been developed from two perspectives – all hazards that may affect individual sites ie; a chemical spillage at a site and specific events that may affect multiple sites eg; a storm event.

During 2010 the stormwater risk assessment was reviewed and rationalised to ensure there was a rational and consistent approach to each reticulated area and the asset group. The risk assessment was re-organised to follow a flow-path from 'source to sea.' The risks associated with stormwater drainage are considered in order; starting from the stormwater inlet, pipes, channels, pumps and outlets. Also included are managerial risks such as – reputation, financial, legislation, etc. At each annual review the flow path is followed and risks reviewed. New hazards are added or redundant ones removed. All risks are evaluated against any changes to ensure comprehensive assessment.

Emergency Response Planning - The risk assessment and mitigation process of existing hazards; the consideration and implementation of future controls and the management of the residual risks provides a structured framework for emergency response planning. For example power failure is a significant risk to the operation of stormwater pumps. The risk treatments may include– alternative back-up connections to the power network, installation of permanent emergency generators, deployment of mobile generators, provision of additional storage, etc. The preferred solution is selected and implemented and the outcome reviewed.

Critical Assets - The criticality of particular components of the stormwater infrastructure is recognised in the risk assessment process. Generally critical assets are those whose failure would cause widespread loss of service, serious public health risk or serious environmental damage. In each of the stormwater systems the critical assets are

- The major trunk mains
- Terminal pump stations

Individual pipes or assets may be added to the list as the Stormwater Action Areas are developed further. The criticality rating will be recoded in AMIS for future reference.

The Assets and Services Department is an active participant in the Marlborough Engineering Lifelines Group and regularly contribute to coordination meetings and civil defence exercises to prepare and test for major events. Engineering Lifelines facilitate the exchange of information and planning between the utilities such as Marlborough Lines, Marlborough Roads, telecommunications companies, major transport hubs and other stakeholders.

4.3 Routine Operations and Maintenance Plan

The operation and maintenance plan of the stormwater system sets out the procedures and tasks necessary to deliver the agreed level of service to the stakeholders whilst ensuring the

asset continues to meet its minimum life expectancy. A formal plan has not been documented but in practice includes the strategic drivers to provide for public safety, health and wellbeing.

Operational Works – Routine operational works will be undertaken by suitably trained and supervised staff or contractors at sufficient intervals to ensure the efficient functioning of the system.

Repairs – Reactive repairs will be assessed and undertaken in a timely fashion to minimise disruption to the service, meet the customer service expectations, minimise collateral damage or danger and avoid unnecessary nuisance

Preventative Maintenance – Planned maintenance schedules are implemented to minimise risk and costs of premature failure; promote the effective and efficient functioning of assets and optimise the whole life service potential of the infrastructure.

Operational management - Operational activities are undertaken by engineering officers and technicians of the Assets and Services department under the direction of the O&M Engineer to ensure the outcomes and service standards are achieved in the most efficient and cost effective manner.

System Control and Monitoring – The stormwater assets are monitored and data communicated to automatic or manual control mechanisms. Systems are controlled to operate within pre-defined ranges and procedures are implemented to respond to detected abnormalities according to need.

Incident management - Staff of the A & S department prepare and plan for managing emergency incidents; to mitigate the effects of a major storm events or system failure and return to business as usual as soon as possible.

4.3.1 Operational Management

General maintenance and repairs on the stormwater infrastructure in Blenheim, Renwick, Havelock and Seddon are undertaken by the staff of the Works Operation section of the A & S Department. Works Operations repair and maintain the reticulation and provide a 24/7 call-out service. Routine maintenance schedules have been established to inspect, clean and maintain screens, gratings, channels, culverts and pump stations on the system.

A full-time technician is employed to oversee the maintenance of electrical and telemetry components within the system. More specialist work is contracted out to specialist electrical, mechanical, telemetry or civil engineers.

Similar work in Picton is undertaken through a term contract. The term contract was re-tendered in 2014 and awarded to the incumbent contractor for a further three years with two options to renew for two years each. The contract is managed by a dedicated MDC engineering officer. The conditions of the contract specify the operational procedures, skills of the operatives and the quality of materials and fittings to be used. Renewal of the contract is reliant upon meeting minimum key performance indicators.

SCADA telemetry is installed on three pump stations at Waitohi, Picton, Dry Hills and Hardings Road. The telemetry data is returned to the engineering officers who have direct access to monitor real time data and trending of the parameters. A 24/7 standby roster is maintained to monitor the system and an automated tiered alerting system is employed to ensure system alarms are responded to.

A new asset management information system was introduced in December 2014 to replace the existing Hansen asset information management system. The software will record all schedule and reactive maintenance as well as the attributes of the assets. Maintenance schedules will be programmed to automatically generate work orders for routine servicing. The maintenance

history from the existing Hansen AMIS has been migrated to allow asset performance to be analysed

Revenue and Operating Expenditure by Significant Type

Stormwater: Blenheim	2013/14 $000's	2014/15 $000's	2015/16 $000's	2016/17 $000's
Contributions - Vested Assets	150	150	205	210
Development Contributions	30	40	51	53
Connection charges	35	40	41	42
Total External Revenues	**215**	**230**	**297**	**305**
Monitoring Expense	15	15	15	16
Other	10	10	11	11
Operating costs	**25**	**25**	**26**	**27**
Pump stations	8	8	8	9
Reticulation	68	68	70	72
Services infrastructure costs	**76**	**76**	**78**	**81**
Personnel costs	58	68	70	72
Depreciation	852	869	911	962
Overhead Allocation	52	55	57	59
Section Management	37	40	41	42
Works depot costs	15	20	20	21
Other	19	19	18	16
Other operating Expenditures	**1,033**	**1,071**	**1,117**	**1,172**
Operating expenditures	**1,134**	**1,172**	**1,221**	**1,280**

Other Stormwater systems	2013/14 $000's	2014/15 $000's	2015/16 $000's	2016/17 $000's
Connection charges	6	6	6	6
Total External Revenues	**6**	**6**	**6**	**6**
Rates payable	3	3	3	3
Operating costs	**3**	**3**	**3**	**3**
Reticulation	40	40	41	42
Services infrastructure costs	**40**	**40**	**41**	**42**
Personnel costs	9	10	11	11
Depreciation	123	133	139	145
Interest payments	26	24	23	21
Overhead Allocation	8	8	9	9
Section Management	6	6	6	6
Works depot costs	2	3	3	3
Other operating Expenditures	**174**	**184**	**191**	**195**
Operating expenditures	**218**	**230**	**235**	**243**

Stormwater: Picton	2013/14 $000's	2014/15 $000's	2015/16 $000's	2016/17 $000's
Connection charges	5	5	5	5
Total External Revenues	**5**	**5**	**5**	**5**
Monitoring Expense	3	3	3	3
Operating costs	**3**	**3**	**4**	**4**
Pump stations	5	5	5	5
Reticulation	33	33	33	34
Services infrastructure costs	**38**	**38**	**39**	**40**
Personnel costs	14	17	17	17
Depreciation	237	204	212	223
Overhead Allocation	13	13	14	14
Section Management	9	10	10	10
Works depot costs	4	5	5	5
Other operating Expenditures	**277**	**249**	**258**	**269**
Operating expenditures	**319**	**291**	**302**	**315**

4.4 Renewal Replacement Plan

The renewal strategy is designed to maintain the overall condition and performance of the asset infrastructure through a continuous, progressive cycle of replacement.

The renewal programme is formulated from:-

Age – the age of each asset is recorded in the asset management information system. A nominal useful life for every asset is allocated based on industry standards, experience or factual assessment;

Condition – the condition of assets will be assessed through systematic survey and asset condition grading and also through casual observation during reactive or routine maintenance

Performance – information is gathered on the performance of assets through post-storm analysis of surcharging and surface flooding. Consent compliance issues are recorded and contaminant ingress or inflow incidents are investigated and traced to the source;

Maintenance Costs –routine and reactive maintenance is recorded against individual assets. Both the quantum of maintenance and the costs are used to assess full life cost of asset ownership

Customer Service Delivery – requests for service and customer complaints are analysed

Economic Obsolescence – the availability of spares, skills, techniques or restricted access through re-surfacing etc. may pre-empt the physical useful life an asset

Renewal of stormwater assets is planned through the Stormwater Action Group in conjunction with the Operations and Maintenance Engineer and the Planning and Development Engineer. A schedule of potential renewal schemes is maintained and updated by the Operations Engineer.

The renewal strategy is heavily influenced by the continued rapid growth in demand. Wherever possible renewals are coordinated with capacity upgrades and the costs shared between the two drivers.

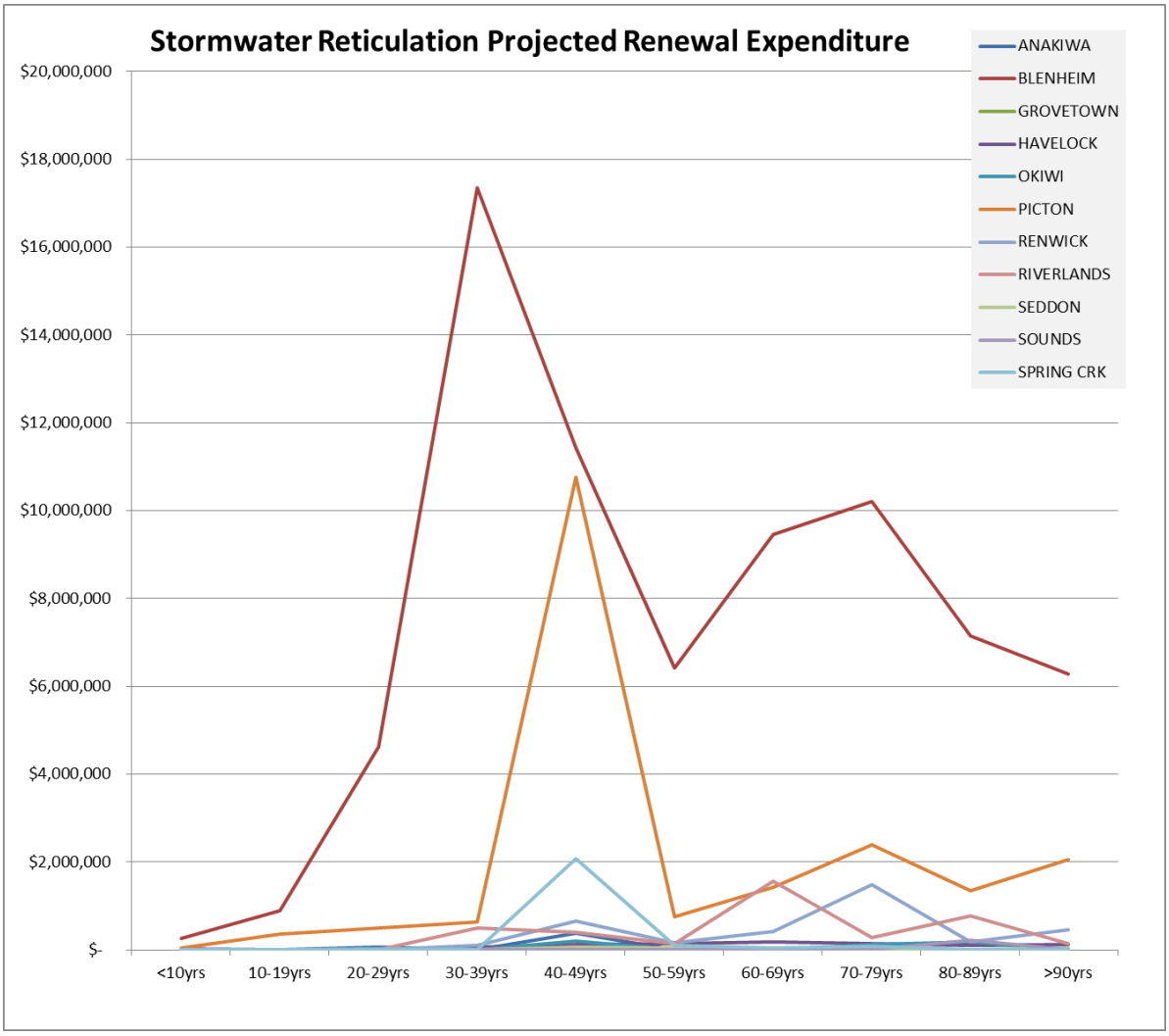


Figure 5 Projected Stormwater Renewal Expenditure

Similarly additional priority will be awarded to projects where the existing asset is under-performing causing a level of service issue. The costs of all capital projects are distributed between the main drivers – renewals, improvement to levels of service and growth.

Intervention points are established based on the criticality of the asset. Pipes and pumps that are critical to the drainage system are not allowed to fail. They are routinely monitored and maintained and renewal planned to avoid service failure.

Currently non-critical assets are allowed to fail and renewed when the cost of maintenance or service interruptions become un-tenable. This strategy ensures the useful life the asset is maximised and delays renewal as long as possible. This is considered a rational approach at this time. The condition of the whole asset base has yet to be determined through comprehensive survey and assessment. The sequence and detailed design of urban development is still to be established. There is, therefore, a motivation for delaying renewals whilst the overall strategy for the Stormwater Management Areas is more highly developed.

Figure 5 Projected Stormwater Renewal Expenditure has been determined from the re-valuation data. There is significant increase in pipeline replacement activity forecast as the current trend in pipeline performance is anticipated to continue. A more detailed renewal programme will be

developed once the pipe condition assessment and data analysis has been undertaken and used to inform the Stormwater Management Area Plans.

Asset upgrades are included in the capital programme and the costs apportioned between growth, renewal and improved level of service (see Appendix 2 – Stormwater Operational Budget Projection 2015-25.

4.5 Creation/Acquisition/Augmentation Plan

All capital upgrade projects for the stormwater infrastructure follow a process from inception though to construction and commissioning:-

Identification of Need – New infrastructure maybe required to meet forecasts of growth in demand, issues with level of service recognised through performance monitoring and customer feedback.

Project prioritisation – Projects are prioritised through a risk management process of likelihood/consequence but is also influenced by the overall objectives of Stormwater Area Management Plan, by cost and timescale and the structural integrity of the drainage areas.

Alternatives and Options – Alternative solutions including non-infrastructure solutions are considered before examining different design options

Once an outline design solution has been agreed detailed design can proceed. Further options or unforeseen problems maybe encountered at this stage and the decision making process may need to be reviewed. Additional specialist consultancy and peer review continues through the process.

Project Approval – Realistic design options are evaluated by the engineering hierarchy and presented to the Council Asset Services Standing Committee for approval. The outline budget costs and the sources of funding are also considered at this time and aligned with the objectives of the Long Term Plan. The decision of the A & S Committee is tabled at the full Council meeting for ratification.

Detailed Design – An approved project will progress to detailed design. Specialist engineering consultants are often employed as they have greater experience in the design of major works. Draft designs are submitted to the engineer and maybe passed on for peer review. Generally all engineering works are designed to national or international specifications and standards. The standards may be amended to local conditions. The design criteria set out in the draft document 'Procedures for Reviewing Blenheim Stormwater Capacity and Providing for New Areas' is likely to provide the sound basis for future infrastructure projects.

Tender - Once a final design has been proposed and agreed with council engineers most construction projects are sent for competitive tender. The council has a rigorous procurement policy which was recently subject to scrutiny from an independent lawyer following unsupported allegations of corruption. His findings were that Council's procurement systems were very robust and no corruption was found. Returned tenders are evaluated on the basis of a series of pre-determined weighted attributes. The weighted attribute methodology is designed to provide the best possible overall outcome and may consider such matters as health and safety, value for money, productivity, certainty of outcome, previous experience, innovation and risk.

It is usual for specific contracts to be prepared for every tender. Each one is up-dated to include the latest standards, materials and techniques. A specialist contract lawyer is employed to check and review contracts prior to tendering.

Construction - The construction phase is normally managed by council project engineers supported by specialist consultant project managers and supervisors. A risk register is compiled

at the beginning of each project and is monitored throughout the construction to help ensure smooth progression and successful outcome.

Significant variations in the final design may have to be returned the Asset and Services Committee for verification and approval.

The capital projects under consideration at the time are as follows:

Project	Driver	Stage	Comments
Redwood Street/Town Branch Drain	ILoS, Growth & Renewal	Alternatives and Options	Detailed hydraulic modelling being undertaken to investigate options
Murphys Creek	Growth	Alternatives and Options	Investigation into water quality issues and stakeholder consultation on creek capacity
Casey's Creek	Growth	Alternatives and Options	Investigation into channel upgrade and detention options prior to urban development
Taylor River Catchment Quality Monitoring	ILoS	Identification of Need	Water quality monitoring to set benchmark levels and identify potential problems

Vested Assets - The Council will accept ownership of assets constructed by private developers. These are normally pipes and pump stations created as part of a land development subdivision. The assets will be accepted only if they are designed and constructed to rigorous standards prescribed in the Code of Practice for Subdivision (NZS4404. 2004) and amended by MDC. The process is supervised by the Infrastructure Project Engineer and subject to his final approval of quality.

Purchased Assets - Specific assets may be purchased directly by council staff. Generally there are sufficient in-house engineering skills to select the suppliers and evaluate the purchase options. External assistance from consultants may be sought for specialist plant and equipment.

4.6 Disposal Plan

There is a need to plan for the disposal of assets that are no longer operational. The plan recognises the costs and benefits of redundant assets.

Underground assets are normally decommissioned and left in the ground. They have a residual value; they can often be re-commissioned or the pipelines used as conduits for other services. However they may also represent a continuing cost of ownership through the liability of collapse or ground subsidence, require continued maintenance, create unwanted flow paths for groundwater or present an obstacle to other services.

Chapter 5: Financial Summary

Components of the Financial Summary Section

5.1 Financial Statements and Projections.

5.2 Funding Strategy.

5.3 Valuation Forecasts.

5.4 Key Assumptions.

5.1 Financial Statements and Projections

Full details of Council's accounting policies for property, plant and equipment (including network infrastructural assets) are provided in its Statement of Accounting Policies in all the Annual Plans (including LTP) and Annual Reports.

In brief all expenditure over $500 on items expected to operate for more than 12 months (capital expenditure) is added to the fixed asset value and then depreciated over the estimated useful life of the asset.

Income levels are set at a level to cover depreciation expense as well as cash expenses, the income "funding" depreciation is accumulated in a depreciation reserve to fund capital expenditure and/or repayment of loans raised to fund capital expenditure.

Other expenditure is classified as operating expenditure and is expensed in the period incurred.

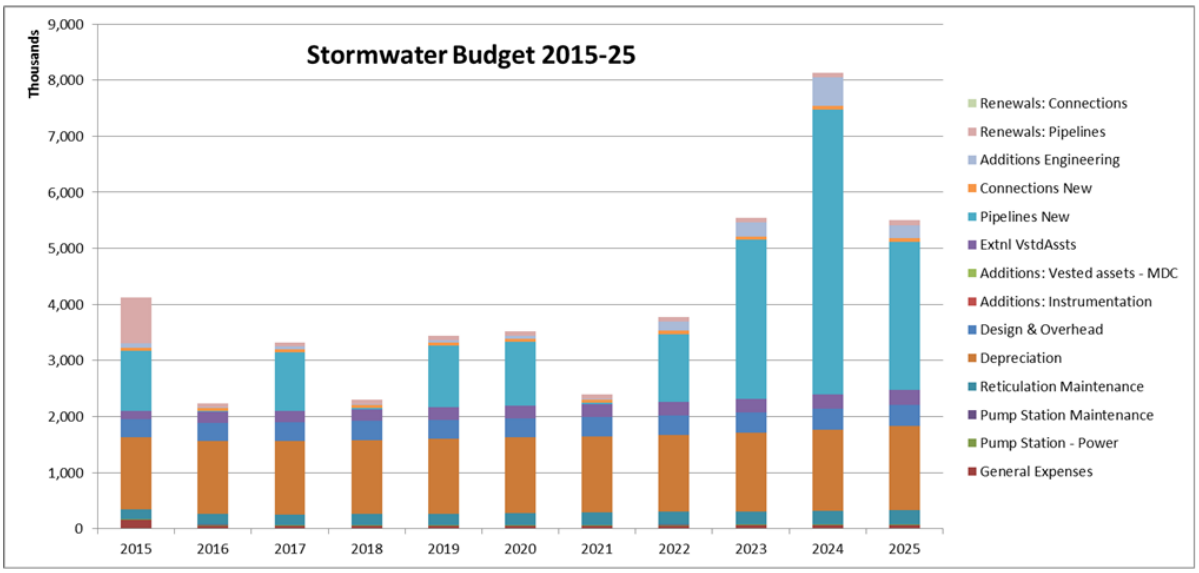
Capital expenditure is funded from designated revenues (including development contributions); depreciation reserves as above; other reserves as available/appropriate; loans (generally 20 year table mortgage).

Capital expenditure is smoothed at a whole of council level for strategic infrastructural expenditure. The current target is for total (un-inflated) expenditure to not exceed $35M p.a.

Operating expenditure is funded from rates and charges.

The funding policy is reviewed at least every three years and is included in the Long Term Plan.

The financial statements of Marlborough District Council are published in detail in the Long Term Plan and the Annual Reports. They are prepared in accordance with the Local Government Act 2002 and comply with Generally Accepted Accounting Practices in New Zealand. They comply with NZIFRS and other applicable financial reporting standards as appropriate to public benefit entities.



The budget projection for the stormwater activity is shown above.

5.1.1 Operational Maintenance Expenditure

The issues discussed previously – levels of service, growth & future demand, life-cycle management and risk management all have financial consequences. The detailed budgetary expenditure projections from 2013 to 2017 are shown in the table in Chapter 4.

The outline budget for the 10 year period from 2015 is shown in Table 9 and in further detail in Appendix 2 – Stormwater Operational Budget Projection 2015-25.

In 2015 general expenses include $80,000 of investigation costs as a one-off sum. This amount is for the water quality investigations on the Taylor River catchment and Murphys Creek. Further investigation has not be included at his time although it is likely that considerable assessment will be required for each of the Stormwater Management Areas as the strategy is developed.

Budget Item	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Income	-$ 1,789,217	$ 1,756,449	$ 1,805,914	$ 1,864,293	$ 1,922,754	$ 1,989,739	$ 2,052,831	$ 2,118,980	$ 2,195,677	$ 2,269,656	$ 2,360,047
General Expenses	$ 161,925	$ 46,925	$ 48,085	$ 49,305	$ 50,646	$ 52,077	$ 53,600	$ 55,289	$ 57,080	$ 59,029	$ 61,125
Pump Station - Power	$ 9,500	$ 9,500	$ 9,861	$ 10,240	$ 10,653	$ 11,111	$ 11,614	$ 12,151	$ 12,750	$ 13,402	$ 14,107
Pump Station Maintenance	$ 3,500	$ 18,000	$ 3,633	$ 3,741	$ 3,862	$ 3,989	$ 4,129	$ 4,282	$ 4,447	$ 4,622	$ 4,816
Reticulation Maintenance	$ 166,500	$ 185,500	$ 192,568	$ 198,287	$ 204,691	$ 211,426	$ 218,847	$ 226,944	$ 235,704	$ 244,967	$ 255,256
Depreciation	$ 1,289,553	$ 1,302,570	$ 1,311,680	$ 1,321,002	$ 1,330,634	$ 1,346,232	$ 1,356,235	$ 1,367,693	$ 1,394,665	$ 1,444,079	$ 1,490,137
Design & Overhead	$ 321,301	$ 321,020	$ 331,156	$ 340,516	$ 343,762	$ 346,388	$ 352,174	$ 359,447	$ 366,595	$ 375,732	$ 384,108

Table 9 Outline Operational Budget 2015 -25

In accordance with the Local Government (Financial Reporting) Regulations 2011 Schedule 10(3) capital expenditure budgets are apportioned between the primary drivers – renewal, improvement in levels of service and growth. The council's strategy to apportioning these costs is to assess the expired/remaining life of an asset and to attribute the value of the life-to-date to 'renewal'. This value is obtained from the annual asset re-valuation. Of the remaining cost estimate an assessment is made of any current or anticipated levels of service issues. If there are none the full estimated cost (less the renewal element) is apportioned to 'growth.'

Implementation of the Blenheim Stormwater Strategy is still in its infancy. Consultants have been commissioned to produce detailed hydro-dynamic models of the Redwood Street Drain catchment. Detailed investigations are being undertaken in the Murphys Creek Catchment and the areas subject to development in the North and west of the town. The implications in terms of

the engineering capital works will not be known until the studies have been complete. An additional $10 million has been sought and granted by the Council to fund the likely capital development for new pipeline works. The exact nature of the works is yet to be determined and the spend profile is indicative only.

Budget Item	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Design & Overhead	321,301	321,020	331,156	340,516	343,762	346,388	352,174	359,447	366,595	375,732	384,108
Additions: Instrumentation											
Additions: Vested assets - MDC											
Extnl VstdAssts	150,000	200,000	205,000	210,207	215,988	222,143	228,697	236,015	243,709	252,190	261,244
Pipelines New	1,069,000	20,000	1,044,582	21,021	1,102,501	1,133,922	22,927	1,206,601	2,836,090	5,084,293	2,648,044
Connections New	51,000	51,000	52,229	53,603	55,125	56,696	58,465	60,330	62,345	64,502	66,857
Additions Engineering	83,095	7,053	47,258	19,039	46,789	59,789	13,362	168,575	252,924	506,864	224,498
Renewals: Pipelines	811,814	69,000	70,663	72,521	74,581	76,707	79,100	81,623	84,349	87,268	90,453

Capital expenditure is categorised to growth, improvement to the level of service or renewal. The expenditure for new pipelines in Blenheim has been apportioned 50% to improved level of service and 50% to renewal.

5.2 Funding Strategy

Local authorities are obliged to take certain matters in to consideration when determining how the water activity is funded:

- Contribution to the achievement of Community Outcomes.
- Beneficiaries of the activity.
- The period over which the benefit will be achieved.
- The extent to which individuals contribute to the need for expenditure.
- The costs/benefits of funding water activities relative to other Council activities.
- The impact of the cost on the activity on the wellbeing of the community.

The stormwater activity contributes to the Community Outcomes of **Living** by providing a safe and sanitary environment through the removal of urban stormwater and urban flood management. The control & monitoring of the quality of urban stormwater discharges to the natural **environment** also helps to manage the quality of aquatic ecosystems. Limiting the interruptions to commercial activity and industrial production through the effective management of floodwaters contributes to the **economy** of the region.

The beneficiaries of the urban stormwater systems are identified in the Revenue and Financing Policy in the following way.

"Owners of developed properties require that there are systems for the collection and disposal of stormwater. Developers who are adding to the demands placed on schemes which require the Council to undertake new capital works related to growth will contribute to these costs."

The overall costs of providing the stormwater service must be traditionally distributed between the day-to-day operational expenses and the capital costs of developing, improving and renewing the infrastructure.

5.2.1 Operational Expenses

There are many potential sources of funding for the activity - general rates, targeted rates, lump sum contributions, fees and charges, interest and dividends from investments, borrowing,

proceeds from asset sales, development contributions, grants and subsidies and other sources as permitted by statute.

Prior to determining the “Residual amount to be funded by General-type Rates”, Council identify all other funding sources appropriate to the type of cost incurred for the stormwater service. After the exclusion of fees, charges, subsidies, grants and general revenue:

Fees and Charges - These have been set at a level to recover private benefits where it is practical and economic to do so, unless there have been determinations arising from previous funding reviews to fund all or part of such benefits from rates.

Grants and Subsidies - These are sought and applied for whenever they are available.

General Revenues - These are allocated to geographic rating areas in proportion to the gross general-type rates and charges.

The Council has determined the fair and equitable charge for the operational costs of the stormwater service to be 100% to General-type Targeted Rate in all areas except Picton where the costs are funded 100% by a separate targeted charge.

Funding of Capital Requirements

In general, the sources of funds for capital expenditure will be utilised in the following order:

- Development and financial contributions.
- Capital grants and subsidies (where available).
- User charges.
- General revenue sources [see below].
- Council financial reserves, including Depreciation Reserves.
- Loan raising [which will impact on rates in the form of loan servicing charges].
- Targeted rates [directly charged].

5.2.2 Development Contribution Policy

Marlborough District has experienced significant growth over the last decade. Although this is often hailed as positive for the community, growth also presents a number of challenges. Not least is Council’s task of expanding infrastructure networks to support the increased use of essential services.

The cost of expanding these networks is often high, and the issue of funding inevitably arises. Funding the expansion of these core networks entirely from general rates (or other indirect means) is inequitable, because existing ratepayers may neither cause these works to occur, nor materially benefit from them. As a result, alternative means for funding these capital works must be considered. Development Contributions is one such source.

Previously Council has levied financial contributions in accordance with the Resource Management Act 1991 to recover the cost of growth.

Subsequently Council adopted a Development Contributions Policy effective from 1 July 2009. The Development Contributions Policy replaced the Financial Contributions Policy with the exception of the North West zone, parking contributions and where the new Policy is silent on issues in the Resource Management Plans.

Council considers the use of the Development Contributions mechanism under the Local Government Act 2002 to provide a fair more robust means of recovering the cost of growth as compared to charging ratepayers.

The purpose of the development contributions is to recover an appropriate proportion of the costs of growth-related capital expenditures from participants in the property development process, rather than from general rates or any other indirect funding source. The full policy is included in the LTP.

Charges are calculated for each catchment and each activity on the basis of:

- The expected scale and timing of capital works required to service growth.
- Expected rate and timing of developments for which the works are required.

The drivers for capital works projects are categorised into growth, improvement/maintenance of the level of service and renewal of existing capability. The costs and source of funding the work is proportioned accordingly.

The Marlborough development contributions policy is currently under review following the changes introduced in the Local Government 2002 Amendment Act 2014 that was enacted in August 2014. The review will also take into consideration the latest growth projections for the district.

5.3 Valuation Forecasts

5.3.1 Asset Valuation

The asset valuation has been undertaken annually since 2008. The asset register of stormwater reticulation consists of nearly 7,000 pipes with individual age, length, diameter and life expectancy characteristics. A data set has been collected of the outturn costs of sewer and stormwater pipeline renewal contracts. From this data set a cost curve has been established and unit rates for pipelaying estimated. The rates are reviewed and updated each year and used in the re-valuation. A summary of recent valuations is shown in Table 10.

5.3.2 Depreciation Methodology

The Gross Replacement Cost is the sum of the replacement costs of each of the components if it is replicated with *modern equivalent asset* and recognises the use of modern materials, standards and installation techniques to replicate the existing system.

The Depreciated Replacement Cost distributes the value of the asset across its useful life.

“The way in which depreciation is allocated over the life of the asset must reflect the pattern in which the assets’ future economic benefits are expected to be consumed by the entity.” (NZIAS16).

In recognition of the above straight line depreciation is considered appropriate for the assets included in this valuation. The Depreciated Replacement Cost has therefore been calculated by:

- Depreciated Replacement Cost = Replacement Cost x (Remaining Life/Life Expectancy).
- The Annual Depreciation (Decline in Service Potential) spreads the current value of the asset across the remaining life of the asset.

Depreciated Replacement Cost /Remaining Life.

Depreciation is fully funded. The Annual Decline in Service Potential is used for determination of councils general and targeted rates for the funding of future infrastructure renewal.

The valuation provides fundamental information for the Long Term Plan as required by Schedule 10 of the Local Government Act 2002. It has been prepared in accordance with “New Zealand International Accounting Standard 16 - Property Plant and Equipment” and follows the guidance provided by the National Asset Management Steering Group (NAMS) in the New Zealand Infrastructure Asset Valuation and Depreciation Guidelines, Version 2 (2006).

An annual report is compiled by the asset management engineer in collaboration with the engineering managers. It is peer reviewed by an independent external valuer and scrutinised by auditors from Audit NZ.

No opportunities for optimisation were identified at the current time. None of the systems are over-designed or have significant redundant capacity. The Blenheim Stormwater Strategy has been adopted. As tactical details are finalised there maybe opportunities to optimise the infrastructure for future valuations.

Re-Valuation Year	Replacement Cost	Optimised Depreciated Replacement Cost	Annual Decline in Service Potential
2001	$25,876,448	$19,623,418	$267,708
2005	$31,411,844	$22,372,989	$383,787
2008	$79,300,805	$59,659,898	$879,616
2009	$79,300,805	$59,659,898	$879,616
2010	$83,802,882	$55,767,953	$970,015
2011	$90,340,962	$60,134,069	$1,060,855
2012	$95,292,666	$63,017,286	$1,119,349
2013	$101,236,592	$65,929,486	$1,201,717
2014	$107,029,325	$69,132,353	$1,275,912

Table 10 Summary of Stormwater Re-valuations 2001-14

A sharp increase in the valuation occurred in 2008 when the unit rates were re-assessed. Prices had increased as a result of high global demand and an economic boom in many international markets. Since then prices have stabilised substantially although there is evidence that the current rates are again under pressure. The rates have not been increased in response to the latest data as it is not clear if the prices are a transient spike or long term trend.

In recent years the re-valuation rates have been increased by the application of an index derived from the Capital Goods Price Index as published by Statistics New Zealand.

The original cost curve was established by graphing the contract out-turn costs of pipe renewals undertaken within the district. This data source is maintained and updated with all new contract costs. In 2013 and 2014 an additional 4% was added to the indexed reticulation and plant rates to cover design and supervision costs. A further 4% will be added to the plant rates in 2015 in recognition of the additional design and supervision required on complex plant installations. The introduction of the design and supervision costs was phased in over 2/3 year period to avoid a sudden price shock to the funding stream.

Recent tender prices have shown a sharp increase in pipe laying costs. Whilst these have been added to the data the cost curve has not been reviewed as there is some doubt as to whether this a permanent increase in prices a transient peak.

In the foreseeable future depreciation will continue to be calculated on a straight-line basis.

There are significant and unpredictable risks to the valuation process – prices of raw materials, local plant and labour costs, fluctuations in international exchange rates, etc. Perhaps the major risk to future valuations is a significant shift in life expectancy of a large group of assets if either a material type is deteriorating faster than expected or a widespread external influence is causing accelerated deterioration.

5.3.3 Optimisation

No opportunities for optimisation were identified in the 2015 re-valuation. None of the systems are over-designed or have significant redundant capacity. The Blenheim Stormwater Strategy has been adopted. As tactical details are finalised there maybe opportunities to optimise the infrastructure for future valuations.

5.4 Key Assumptions

Pipe life expectancy is based on the NAMS Guidelines with the exception of asbestos cement which is based on the tables in the New Zealand Asbestos Cement Watermain Manual 2001. The life expectancy varies with the diameter of the pipe and the subsequent wall thickness. Life expectancy of the diameters has been capped at 100 years.

Replacement of reticulation pipework will be with modern materials - PVC, polyethylene, ductile iron, steel or concrete. All plant and equipment will be replaced with modern equivalents.

Pipe laying rates are inclusive of valves, fittings apparatus and branch connections. The rates are an average across all ground conditions and depths and include for trench support and de-watering.

The life expectancies that have been adopted suggest there is a significant amount of pipework that is beyond its theoretical life. This is particularly apparent for asbestos cement pipe in the Awatere. However there has not been an equivalent increase in mains bursts or repair activity. The Assets and Services department is actively considering a programme of pipe condition assessment in order to re-evaluate the life expectancy of these pipes under local conditions.

Plant and equipment life expectancy assumes the continuation of the good standard of planned pre-emptive maintenance currently undertaken. The NAMS guidance on life expectancy has generally been followed unless there is clear local evidence to the contrary.

Material Type	Pipe Diameter	Useful Life		Material Type	Pipe Diameter	Useful Life
AC	25	38		EW		77
AC	32	38		FT		100
AC	40	38		HEL		100
AC	50	38		MPVC		100
AC	75	43		NOF		60
AC	100	53		NOVA		100
AC	125	63		PE 100		100
AC	150	72		PE 80		100
AC	200	90		PVC		100
AC	250	98		RC		100
AC	300	100		SP		100
AC	375	100		ST		100
AC	225	100		ST-CC		100
ALUFLO		100		ST-D		100

Material Type	Pipe Diameter	Useful Life		Material Type	Pipe Diameter	Useful Life
B-ARCH		80		ST-GL		60
C-ARCH		80		ST-SW		100
CC		80		UNKNOWN		100
CI		100		UPVC		100
CU		40		VC		80
DI	0	100				
DRUM		50				

Plant	Useful Life
Mechanical Plant	40
Electrical Plant	25
Civil Structures	100

The data quality is regarded as fair. Of the pipes recorded in the asset management database one or more of the attributes (age, diameter or material type) was missing for around 24% of records. Estimates were made for the missing data based on adjacent pipes or the known history of land drainage in the area.

Other assumptions included in the financial planning are shown in Table 11.

Assumption	Confidence in Assumption	Risks of Incorrect Assumption	Mitigation Measures
Growth continues within the medium to high growth projection	Medium	Either decrease rate base affects income Or increased demand on assets and accelerated investment	Regularly review forecasts and particularly following 2012 census, BERL and local intelligence
Deterioration of underground assets continues in line with guideline useful lives	High	Accelerated renewal programme	Continued condition monitoring and asset management
Interest rate stability	High	Shortfall in income projections	Loans through LGFA costs spread through Council activities
Construction cost rises	Low	The resource drain as a result of the Canterbury reconstruction may have significant impact on received prices	Continue to monitor contract prices, pre-order where possible
Insurance costs predictions	Low	Increased costs, reduced cover, increased risk management costs	Improved construction standards high risk awareness and management.

Table 11 Assumptions Included in the Financial Forecasts

Replacement of reticulation pipework will be with modern materials – PVC, polyethylene, ductile iron, steel or reinforced concrete. All plant and equipment will be replaced by their modern equivalent.

The pipe laying rates are inclusive of manholes, valves, fittings apparatus and branch connections. The rates are an average across all ground conditions and depths and include for trench support and de-watering.

Reticulation pipework below a nominal diameter of 75 mm is assumed to be predominantly installed in non-carriageway locations and with a proportion of low-dig installation techniques. Assumptions on pipe life expectancy have been described above.

Manholes, valves, grids, gratings and other fittings are included in the pipeline rate and assumed to have the same life expectancy as the pipe.

Chapter 6: Plan Improvement and Monitoring

This section describes the current and future asset management practices and systems used. It includes a summary of the progress made on previously identified short-comings and identifies improvements to be made in the future. Also included are the monitoring and review procedures adopted in the compilation of the asset management plan.

Components of the Improvement and Monitoring section

6.1 The Status of Asset Management Practices - current and desired state of AM processes, data and systems.

6.2 Improvement Programme – review of progress on the 2009/19 improvement programme and improvements identified for the future.

6.3 Monitoring and Review Procedures.

6.4 Performance Measures.

6.1 Status of Asset Management Practices

6.1.1 Asset Management Information System

The Assets and Service Department has used the Hansen AMIS for around 18 years. The quality and completeness of the data stored has improved significantly during this time. Data is extracted from a variety of historical and contemporary records – service record plans, property files, new connection records, as-built records (internal and contractor), maintenance works orders, etc. The quality of the data can be variable. The current assessment of the quality and completeness of records transferred into the AMIS is as follows:

- Stormwater asset completeness ≈ 60-70%.
- Data accuracy ≈ 70%.

The asset register is stored in the AMIS and the maintenance history is also recorded.

In 2010 detailed discussions with staff in the department resulted in the development of a protocol that defines and records a common understanding of the accuracy of asset data and the confidence in the source data. In conjunction with this there has been a continued effort to ensure contract specifications and in-house record checks are consistent with the required information.

There is a continuous effort to document processes and definitions and to disseminate the standards to staff to ensure consistent and accurate data recording.

A project was commenced in 2011 to upgrade the current AMIS. The project is being headed by the Information Systems Department and a small team of subject experts. External consultants were employed to examine the asset management information needs throughout the Council including Reserves, River Control, Regulatory, Fleet, Libraries, Property, the Harbour Master and others.

The outcome of the needs assessment was used to develop a Request for Proposal (RFP) from a select list of AMIS vendors. The RFP was issued in December 2011 and response returned in January 2012. Four potential vendors were invited to demonstrate their product.

One of the main draw-backs of the existing IMS was that a limited number of licenses had been purchased it was not available to all operational staff for day-to-day management. One of the primary objectives of the new system is to provide universal access to the system and promote the practical management tools to the operators and supervisors of the system.

In February 2013 the Works and Assets module of the TechnologyOne Pty software was purchased. Between that date and December 2014 extensive effort has been expended to build and configure the software to meet the needs of water, wastewater and stormwater asset management. The project evolved to include the revision and integrate the financial accounting system.

6.1.2 Geographical Information System

The ESRI ARCMap GIS system has become a cornerstone for information management within the Council. The existing AMIS has well developed automated interface with the GIS. It has been recognised that the GIS has many tools and features that can be leveraged by the AMIS and this is a prime consideration in the selection of the AMIS upgrade. The GIS is also widely used by other departments and is a primary source for accessing and coordinating information. Service information can be viewed by all staff through the GIS viewer Dekho.

6.1.3 Computer Modelling

The Council has very high quality in-house network modelling capability augmented by specialist consultants. Models are used extensively to predict behaviour of the reticulation network and as a planning tool for future designs.

Models are verified by on-site observations and measurement and have a high level of reliability.

6.1.4 Financial Forecasting

Asset re-valuation is currently undertaken manually based on information from the asset register. Unit rates and prices are updated from contemporary contract prices and where possible are verified with rates from other councils. Where insufficient direct information is available historical construction/purchase costs are inflated through nationally published construction cost indices.

Current financial forecasts are considered to be moderate to good. Improvements in asset condition grading and life expectancy determination, further refinement of unit rates and asset component analysis may be expected in the future.

Capital cost forecasting is considered to be good/ very good although cost pressures from the Canterbury earthquake resource drain are not yet apparent and are certain to have an impact on future works.

6.1.5 Customer Service Data

The introduction of the Water Services Database in 2010 and the accurate logging of customer service requests have added great value to asset management. There is now an accurate mechanism for registering customers' calls and recording response times. There is a facility to sort and filter service requests in order to monitor performance of assets.

The current database however was only introduced as a temporary solution. The permanent solution will be incorporated into one of the existing business systems (AMIS, Property & Rating, Finance) or have high quality interface with them. It is likely the customer service module in either the Property & Rating database or the new AMIS will replace the temporary database. The ability to associate the customer service request with a subsequent maintenance work order is fundamental to improved asset management.

6.1.6 Asset Data Confidence

Asset data is constantly being updated and checked The Council Assets and Services department are converting their hard copy asset records to Geographical Information System (GIS) and an electronic asset management Information System. The two systems are intrinsically linked. The spatial information on the location of assets, zones and catchments area are kept in the GIS whilst the individual attributes of the assets are stored in the AMIS.

Information sources include as-built drawing from when the asset was first built. These are obviously created when the asset was installed and can consequently be quite old. Quality can be variable and many drawings are in imperial measurements. Recent as-built drawings can be either hard- copy or electronic CAD drawings. These are carefully scrutinised by the Asset Development Officer and the asset will not be accepted for adoption by council until it meets the specified standard.

Various surveys have been undertaken over time. Often plans and long-section drawings are produced and data such as depth and invert levels of underground pipes recorded. CCTV surveys of stormwater pipelines are generally undertaken to investigate specific problems or confirm particular requirements. The surveys are reviewed by engineering staff and pipe condition grades are assessed and recorded. The location of laterals can also be ascertained and recorded.

Applications for connections from the main to properties are kept as separate records. Property records often record the location, size and material of underground services within the property boundary.

The repairs and maintenance operatives return records of the assets they have worked on. The quality of the records has been variable with little consistency. The primary aim of the recently introduced asset management information system is to increase the quality and consistency of this data. The improvement will only be achieved through careful training and mentoring of field staff.

A- **Highly reliable**. Data based on sound records, procedures, investigations, and analysis, documented properly and recognised as the best method of assessment. Data set is complete and estimated accuracy is +/-2%.

B- **Reliable**. Data based on sound records, procedures, investigations, and analysis documented properly but has minor shortcomings, for example some data is old, some documentation is missing and/or reliance is placed on unconfirmed reports or extrapolation. Dataset is complete and estimated to be accurate to +/-10%.

C- **Uncertain**. Data based on sound records, procedures, investigations, and analysis which is incomplete or unsupported or extrapolated from a limited sample for which grade A or B data are available. Dataset is substantially complete but 50% is extrapolated data and accuracy is estimated +/_25%.

D- **Very Uncertain**. Data based on unconfirmed verbal reports and or cursory inspection and analysis. Dataset is substantially complete and most data is estimated or extrapolated. Accuracy +/-40%.

E- **Unknown**. None or very little data held.

	Pipes	Manholes	Sumps	Outlets	Pumps	Pump Stations
Age	C	C	B	A	A	A
Material	C	B	B	A	A	N/A
Diameter	B	B	A	A	A	N/A
Location	B	B	A	A	A	A
Criticality	C	B	B	A	A	A
Performance	B	B	A	A	A	A
Condition	C	B	B	A	A	A

6.2 Improvement Programme

Throughout the asset management plan improvements have been identified that will assist the management of the asset and delivery of the service in the future. Improvement is continually required as technology progresses, business processes evolve, the operating environment changes and/or the aspirations of stakeholders change. The provision of local services is also subject to changes in the legal framework and the political climate.

The 2008-18 AM Improvement Plan has been progressed and is detailed in the table below:

2008-18 Improvement Plan	
Customer Service	**Progress Update 2014**
Improved data capture • Revised data capture form • Training • Inputting	The Water Services Database was introduced in February 2010 and extended to wastewater and stormwater in March 2011. Customer Service staff have been given comprehensive training including site visits to gain a better appreciation of customer requirements and accurately record service requests.
Customer Contact Recording	
Written Complaint Response Recording	Written complaints are infrequent and responses are now recorded in the TRIM electronic document management system. Recording and retrieval are improved
Integrated IT	See Asset Management Information System - above
Business process review	Extensive business process review workshops were undertaken whilst specifying and designing the replacement AMIS
Review all LoS for Community Outcome Review	A Councillor workshop was held in September 2014 to review the current levels of service and performance indicators
Asset Register	
Updating Asset Register	Two full time data entry staff have been given permanent contracts. Asset data is being systematically updated to agreed accuracy protocols. An outline programme has been adopted
Asset Condition & Performance	

2008-18 Improvement Plan	
Field data capture process	Engineering officers undertake field condition assessment of pipes and underground assets. Pipe samples are returned to the depot for assessment where possible. Further work is required to standardise the process and ensure consistent data is stored in the AMIS.
Asset condition assessment training	Further work is required to determine the accuracy and consistency of on-site assessment of pipes & underground assets by field operatives and provide training where necessary.
AMIS Facilitation	The replacement AMIS has been specifically configured to ensure condition grading can be adequately recorded.
System Performance	
Asset Management Information System	
Review of existing Hansen V7 to V8 upgrade with integration to other data systems	A Council wide review of AMIS requirements was undertaken in 2010/11. A thorough procurement process was undertaken. The Technology One AMIS module was selected with excellent integration functionality to the GIS, customer request management and the financial system. The system went 'live' in December 2014
Planned Maintenance	
Assess pump station preventative maintenance trial	The trial was satisfactory and will be incorporated into new AMIS
Maintenance Scheduling	The replacement AMIS has improved maintenance scheduling functionality. Current paper based schedules are being loaded and programmed through the AMIS
Asset Management Plan	
Revise to include peer review recommendations.	Consider and include recommendations of AECOM peer review for future drafts
Develop an asset management policy for A & S	Following recommendations of Audit NZ an asset management policy is to be developed for future guidance
Risk Management	
Undertake a Risk Management Profile and Action Plan	Risk management process overhauled to follow 'source to sea' flow. Annual update undertaken by Operations Engineer and staff overseen by Corporate Risk Manager

6.2.1 2012- 20 Improvement Programme

Issue identified and to be progressed in the future include:

Modelling

Consultants have been appointed to model the Redwood Street/Town Branch Drain system. The model will use the latest data on run-off co-efficients, detention, open channel and piped flows, receiving water conditions and rainfall pattern. The sophisticated model will use the latest predictive techniques available and provide greater confidence in solutions for current and future issues.

Issue	Responsibility	Target Date
Development of dynamic hydraulic model for the Redwood Street/Town Branch Drain to assist with planning upgrades for the SMA	Rivers and Drainage Department overseen by the Stormwater Action Group (SAG)	2015
Consider the value of further modelling for other catchments in accordance with the Blenheim Stormwater Strategy and other catchments.	Stormwater Action Group	Ongoing

Asset Management Information System (AMIS)

A new asset management Information was purchased in February 2013. Extensive efforts have been made to understand the existing business processes and design and configure the system to meet the needs. The new system was installed in December 2014.

The primary requirements of the upgrade are for the system to be universally available to all engineers and operatives for monitoring and reporting. Currently due to the licencing arrangements there is limited access to the Hansen AMIS.

The implementation of the new AMIS will involve major training and familiarisation for current non-users. The development of a suite of relevant reports will be required. There is likely to be a customisable dashboard to facilitate further interaction from field operatives. Greater pro-active maintenance planning is a high priority.

Business processes will need to be modified or introduced to improve field data capture. Mobile field data capture is an objective but will probably be phased in after the system has been bedded-in.

Issue	Responsibility	Target Date
Complete implementation plan for the AMIS	AMIS Project Manager	2015
Continue and develop training	Asset Management Engineer	Ongoing
Develop reporting functionality and apply appropriate advanced AM reports.	Asset Management Engineer	2016 onwards

Asset Register

Significant advances have been made in transfer of hard copy records into the GIS and AMIS system. Existing records include original public works utility plans, multiple and over-lapping as-

built plans of new subdivision and mains extensions, field books, new connections records, maintenance records, property files, PIMS/LIMS. These sources of information are rarely consistent and considerable effort is required to determine the accurate and reliable data.

An exercise has been undertaken with technical administrative staff preparing LIMs/PIMs reports to determine the quality of information needed for their purpose. A protocol was established to record the degree of accuracy; the source of information transcribed into the AMIS/GIS system and to confidence grade the source. Underground services that can be recorded to within 300 mm, with a high degree of certainty are given a confidence grade of 1. Confidence grade 2 is within one metre accuracy and confidence grade 3 is less certain. Similar grades are given to the material type and age of an asset.

Two temporary contract employees were given permanent contracts in 2011. They have been systematically transferring data from the various hard copy sources to the electronic information systems. The systematic 'sweeping' of areas has been mapped to record and communicate progress to other staff. There is a margin of variance between the different networks but around 65% and 75% have been 'swept' to a consistent and high standard.

There are instances within the asset register of data that has been estimated or taken from less accurate sources. For example the installation date of some pipes in Picton was recorded as the date the record drawing was created and not the correct installation date. Some errors and estimates have been tolerated as adequate in the circumstances but need to be corrected through further research.

Issue	Responsibility	Target Date
Use the sorting and auditing functions of the new AMIS to search and 'scrub' data for accuracy and inconsistencies	Asset Management Engineer	2015 ongoing
Continue with asset transfer from hard-copy to electronic format using accepted quality protocols.	Asset Management Engineer	2015 ongoing

Urban Growth

The commitment to developing urban growth strategies for North and South Marlborough has been a valuable contribution to the Council planning functions. Growth pockets have been identified and zoned for urban residential development to the north and west of Blenheim.

Site investigations are being undertaken to assist with the detailed design of stormwater services to the zoned areas to the north and west and Blenheim.

Outline service plans will be developed and used to ensure co-ordinated design of complete zones particularly the land parcels that are in multiple ownership.

Issue	Responsibility	Target Date
Urban growth strategy. Continue site investigations to determine detailed design of new urban zones development and planning	Infrastructure Projects Engineer/SAG	2015 ongoing

Financial Forecasts

Continue to monitor contract prices for pipeline and plant installations. The spike in contract prices recently received needs to be closely monitored and intelligence gathered from other councils or consultants to determine whether the price increases are likely to endure.

Issue	Responsibility	Target Date
Review and update unit rate cost curves	Asset Management Engineer	Annually
Revise the Development Contributions Policy in line with current growth predictions and infrastructure costs.	Chief Finance Officer	2015

Condition Monitoring

There is good knowledge of the performance of pipes by a long-established and experienced work force. Some visual condition assessment and photographic recording is undertaken on major repairs. A limited amount of pipe sample analysis has been undertaken on cast iron and asbestos cement pipe in the last 15 years. The general condition of the reticulation is estimated based on the above experience and the age and material of pipes.

The current life expectancy of pipes is based on a theoretical maximum of 80-100 years or guidance from the AC Pipe Manual. This methodology is predicting a significant proportion of the network is reaching the end of its useful life in 30 to 40 years' time. There is a need for a more systematic condition analysis of the reticulation. The development of condition grade strategy through a more comprehensive CCTV survey programme is becoming increasingly necessary.

The asset management information system must be developed to accept, report and display the condition grades for management decision making.

Progress is being made with the on-site reporting of asset condition during routine maintenance. Electronic data capture through hand-held devices has been introduced. Continued training and mentoring is required to ensure accuracy and consistency of data capture.

Issue	Responsibility	Target Date
Develop a condition survey and monitoring strategy for stormwater reticulation assets	O & M Engineer/ Asset Management Engineer	2017
Develop condition grade recording and reporting systems within the asset management information system	Asset Management Engineer	2015 onwards
Continue to improve site feedback mechanisms from routine repair and maintenance activities.	O & M Engineer/Asset Management Engineer	2015 onwards

Performance Monitoring

A project has been initiated to establish a set of 'live' performance measures available to operators and technicians. The current formal performance measures reported in the Annual Report are compiled and published for that purpose only and are not integrated into the operational process.

A key output of the asset management information system upgrade is the introduction of a suite of performance reports readily available to engineering staff. Contemporary reports on service request response times, types of failures, performance of materials and fittings, operational costs etc will be beneficial.

Issue	Responsibility	Target Date
Improved performance monitoring and reporting to be developed through the AMIS	Asset Management Engineer/SAG	2016

Proactive Maintenance Scheduling

There is limited programmed maintenance through the former AMIS. It is generally a manual process with no automatic alert and is confined to a limited number of Hansen licenced users. Maintenance programmes are scheduled for some pump station maintenance, pump oil inspection and replacement.

A priority objective of the new AMIS is for all operatives and engineering officers to create and view maintenance schedules and to monitor, implement and update programmed work. There will be a considerable change in business practice and training required in order to utilise the functionality of the new system. Implementation will be undertaken in a phased manner.

Issue	Responsibility	Target Date
Proactive maintenance schedule of asset groups	Asset Management Engineer/O & M Engineer	2015 onwards

Risk Management

The Council Risk Management system is a thorough and reliable system for analysing hazards and risk assessment. The annual review of each activity is overseen by the Risk Manager.

In the light of the Canterbury earthquake sequence the evaluation and management of public utility risk has come under scrutiny. Valuable information is becoming available through Stronger Christchurch Infrastructure Re-build Team (SCIRT) on the vulnerability of utility assets and the building of increased resilience.

Local authorities have had significant problems securing commercial insurance. The co-operative insurance organisation, Local Authority Protection Programme (LAPP) subscribed to by the Council has been deeply affected and its reserves and access to re-insurance has been eroded. The protection they are now able to offer is significantly less whilst the premiums have risen. It is likely that in the future much more detailed risk mitigation evidence will need to be supplied to insurance companies before premiums can be insurance.

The identified urban growth areas have been investigated for liquefaction potential and issues relating to later spread around watercourses. Early findings suggest that welded polyethylene pipelines have performed better in areas of both ground movement and liquefaction. The specification for future pipeline contracts and the Code of Practice for new subdivisions maybe adapted to reflect the new knowledge.

The major concrete reservoirs at Weld St, Blenheim and Cloudy Bay Business Park have been examined and additional seismic strengthening works have been programmed.

Issue	Responsibility	Target Date
Continue to review construction specification, standards and Codes of Practice in the light of information from the SCIRT	Development & Planning Engineer/Risk Manager/ Infrastructure Development Engineer	Ongoing

6.3 Monitoring and Review Procedures

The Asset Management Plan is formally reviewed and updated every three years. The review is timed to coincide with the development of the Long Term Plan. A summary of the major components of the plan are included in the activity statements, performance measures and financial summary included in the Long Term Plan. Following the Local Government Act the new and revised public consultation process will be used in 2015. Public submissions to the consultation will be presented to councillors and any alterations to policy may need to revise the Asset Management Plan.

The draft asset management plan is submitted to an external consultant for peer review. Their comments are considered and incorporate into a revised draft prior to submission to the Assets and Services Standing Committee. The peer review may include longer term recommendations to be included in future plan re-writes.

The asset management plans are made available to the auditors of the Office of Auditor General during the audit of the Long Term Plan and the intervening Annual Plans.

The asset management plan includes a compilation of day to day planning and management by the engineering managers and other senior Asset & Services staff. Subsequently the asset management is 'live' and under constant review.

Asset valuation is undertaken annually and the valuations and all supporting calculations submitted to an external valuer for independent verification. The valuation process is also audited by Audit New Zealand.

Following major storms there is an incident de-brief and there may be an accompanying paper submitted to the A & S Standing Committee. De-brief includes the circumstances and facts of the storm, the customer service issues and the asset performance. All relevant departments of the council contribute to the content. The debrief is lodged with the Stormwater Action Group to inform their decision making.

Levels of Service performance indicators are monitored at six monthly intervals and reported to the Council's Executive Management Team. The Performance Indicators are published in the Annual Report for public comment. It is the intention to elevate the status of performance measures and supplement them with other internal benchmark measures. These will be under constant review and published on the internal intra-net. Progress has already been made towards this goal.

6.4 Performance Measures

Rules introduced through the Local Government (Amendment) Act also introduced national non-financial performance measures for water, wastewater, stormwater, roading and flood protection. The introduced measures are broadly similar to the existing level of service measures on environmental pollution, flooding, response to customer issues and the number of customer complaints.

Performance measures have been thoroughly scrutinised following the adoption of AG4 (revised) The Audit of Service Performance Reports by the Office of Auditor General which added emphasised the importance of the quality of local authorities' services as well as financial performance.

Some stormwater performance measures used by Council were found to be difficult to measure and there was no defined interpretation of the method of measurement. A detailed methodology is now documented for each measure to ensure consistency and accuracy. Recommendations by the OAG to improve the control environment including the data collection and storage mechanisms have been actioned.

The introduction of the Water Repairs Database has provided greater rigour to the collection of service request data. Internal controls of data quality have been implemented. Performance measures are collected and reported internally at half-yearly intervals. The Water Repairs Database was superseded by the customer request management module of the new AMIS in December 2014.

Appendix 1 – Operations and Maintenance – Stormwater/Wastewater Risk Profile

Record No. 14144207				WITHOUT CONTROLS				WITH EXISTING CONTROLS					TREATMENT
The risk: describe what can happen and how it can happen **Op Maintenance - Wastewater** **Security/Storage Risk??**				**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**What are the existing controls**	**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**Are the existing controls adequate**	**Comments**	**Action Plan**
Operation	**Category**	**Risk**	**Area**										
Laterals	Sewage	Infiltration Inflow (including Flood) - accumulative through network	All	3	A	E	Engineering codes of practice (design features). Maintenance and renewal programme. Infiltration monitoring and repair. Backflow preventers. Network Model.	3	B	H	N		Pipe upgrades for Picton/Blenheim - 3 - 5 years (2016).
Laterals	Man Made Hazard	Surcharge/ Overflow	All	3	A	E	Service level requirements. Design capacity. Infiltration programme. Network Model.	2	B	H	N		Pipe upgrades for Picton - 3 - 5 years (2016). Managed sewage overflows SRo June 2015.

Record No. 14144207				WITHOUT CONTROLS				WITH EXISTING CONTROLS					TREATMENT
The risk: describe what can happen and how it can happen **Op Maintenance - Wastewater** **Security/Storage Risk??**				**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**What are the existing controls**	**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**Are the existing controls adequate**	**Comments**	**Action Plan**
Operation	**Category**	**Risk**	**Area**										
Laterals	Sewage	Sewer Overflows - accumulative through network	All	2	C	M	Design features. Monitoring. Maintenance. Increased cleaning for problem areas. Service level requirements, eg; response times. Control discharge points. Network Model.	2	C	M	N		Pipe upgrades for Picton - 3 - 5 years (2016). Managed sewage overflows SRo June 2015.
Laterals	Sewage	Corrosive Effluent	Tradewaste	1	A	H	Tradewaste Bylaw . Monitoring - Ph . Tradewaste Officer. CCTV survey (as part of other work).	1	B	M	Y		Accept current level of control
Laterals	Sewage	Poisonous/ Hazardous/ Flammable	All	3	B	H	Tradewaste Bylaw Monitoring - Ph . Tradewaste Officer. Routine pump station monitoring.	3	C	H	Y	Education	Accept current level of control

Record No. 14144207				WITHOUT CONTROLS				WITH EXISTING CONTROLS					TREATMENT
The risk: describe what can happen and how it can happen **Op Maintenance - Wastewater** **Security/Storage Risk??**				**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**What are the existing controls**	**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**Are the existing controls adequate**	**Comments**	**Action Plan**
Operation	**Category**	**Risk**	**Area**										
Laterals	Sewage	Sharps	All	3	B	H	Tradewaste Bylaw Tradewaste Officer. Routine pump station monitoring.	3	C	H	Y		Accept current level of control
Laterals	Sewage	Exfiltration - accumulative through network	All	3	A	E	Engineering codes of practice (design features). Maintenance and renewal programme. Infiltration monitoring and repair.	3	B	H	Y		Accept current level of control
Laterals	Man Made Hazard	Blockage - Individual Lateral	All	1	A	H	Service level requirements. Design features.	1	A	H	Y		Accept current level of control
Laterals	Man Made Hazard	Trees	All	2	A	H	Subdivision requirements. Use of root guards. Removal.	2	B	H	Y		Accept current level of control

Record No. 14144207				WITHOUT CONTROLS				WITH EXISTING CONTROLS					TREATMENT
The risk: describe what can happen and how it can happen **Op Maintenance - Wastewater** **Security/Storage Risk??**				**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**What are the existing controls**	**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**Are the existing controls adequate**	**Comments**	**Action Plan**
Operation	**Category**	**Risk**	**Area**										
Laterals	Sewage	Solids (+ 15 mm and acquiescent settling velocity of <50 mm pm) Tradewaste Bylaw	All	1	A	H	Tradewaste Bylaw Tradewaste Officer. Routine pump station monitoring. Property discharge monitoring.	1	B	M	Y		Accept current level of control
Laterals	Sewage	Fats and Oils	All	1	A	H	Tradewaste Bylaw Tradewaste Officer. Routine pump station monitoring. Grease traps in commercial premises. Tradewaste Bylaw . Tradewaste Officer.	1	B	M	Y		Accept current level of control
Laterals	Natural Hazard	Earthquake/ Ground Movement	All	5	D	H	Design features. Emergency management planning. Disaster recovery planning.	4	E	M	Y		Accept current level of control
Laterals	Natural Hazard	Slip/Flood Scour	Picton, Havelock, Seddon	2	C	M	Design features. Spares inventory.	2	C	M	Y		Accept current level of control

Record No. 14144207				WITHOUT CONTROLS				WITH EXISTING CONTROLS					TREATMENT
The risk: describe what can happen and how it can happen **Op Maintenance - Wastewater** **Security/Storage Risk??**				**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**What are the existing controls**	**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**Are the existing controls adequate**	**Comments**	**Action Plan**
Operation	**Category**	**Risk**	**Area**										
Laterals	Man Made Hazard	Mechanical Breakdown	Spring Creek, Grovetown, Blenheim (Springlands)	2	C	M	Spares inventory. Resident monitoring. Design features. Built in 72 hour storage. Maintenance schedules.	2	C	M	Y		Accept current level of control
Laterals	Man Made Hazard	Power Failure (grinder pumps)	Spring Creek, Grovetown, Blenheim (Springlands)	3	B	H	Built in 72 hour storage	1	B	M	Y		Accept current level of control
Laterals	Man Made Hazard	Failure/ Collapse	All	2	C	M	Service level requirements. Design features. Asset management planning.	2	D	M	Y		Accept current level of control
Laterals	Man Made Hazard	Third Party Damage	All	1	B	M	System records. Transport corridor access requirements.	1	B	M	Y		Accept current level of control

Record No. 14144207				WITHOUT CONTROLS				WITH EXISTING CONTROLS					TREATMENT
The risk: describe what can happen and how it can happen **Op Maintenance - Wastewater** **Security/Storage Risk??**				**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**What are the existing controls**	**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**Are the existing controls adequate**	**Comments**	**Action Plan**
Operation	**Category**	**Risk**	**Area**										
Sewers	Sewage	Infiltration/ Inflow (including Flood)	All	4	A	E	Monitoring, detection and rehabilitation programme. Likely source identification modelling. Engineering codes of practice. Network Model.	3	B	H	N		Sro-Pipe upgrades for Picton/Blenheim - 3 - 5 years (2016).
Sewers	Sewage	Poisonous/ Hazardous/ Flammable	All	3	B	H	Tradewaste Bylaw. Monitoring - Ph. Tradewaste Officer. Routine pump station monitoring.	3	C	H	Y		Accept current level of control
Sewers	Sewage	Fats & Oils	All	2	A	H	Tradewaste Bylaw. Monitoring - Ph. Tradewaste Officer. Routine pump station monitoring. Scheduled mains cleaning.	2	B	H	Y		Accept current level of control

Record No. 14144207				WITHOUT CONTROLS				WITH EXISTING CONTROLS					TREATMENT
The risk: describe what can happen and how it can happen **Op Maintenance - Wastewater** **Security/Storage Risk??**				**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**What are the existing controls**	**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**Are the existing controls adequate**	**Comments**	**Action Plan**
Operation	**Category**	**Risk**	**Area**										
Sewers	Sewage	Surcharge/ Overflow	All	3	B	H	Monitoring. Electric alarms. Increased cleaning of problem areas. Control discharge points. Design features. Inbuilt over capacity. Network Model.	3	C	H	Y		Pipe upgrades for Picton/Blenheim - 3 - 5 years (2016). Managed sewage overflows - SRo June 2015.
Sewers	Sewage	Exfiltration	All	4	B	E	Engineering codes of practice (design features). Monitoring, detection and rehabilitation programme.	3	B	H	Y		Accept current level of control
Sewers	Sewage	Hydrogen Sulphide	All	3	A	E	Design features. Monitoring, detection and rehabilitation programme.	3	C	H	Y		Accept current level of control
Sewers	Natural Hazard	Slip/Flood Scour	Picton, Havelock, Seddon	3	C	H	Insurance/LAPP. Monitoring. Spares inventory.	3	C	H	Y		Accept current level of control

Record No. 14144207				WITHOUT CONTROLS				WITH EXISTING CONTROLS					TREATMENT
The risk: describe what can happen and how it can happen **Op Maintenance - Wastewater** **Security/Storage Risk??**				**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**What are the existing controls**	**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**Are the existing controls adequate**	**Comments**	**Action Plan**
Operation	**Category**	**Risk**	**Area**										
Sewers	Sewage	Corrosive Effluent	Tradewaste	2	A	H	Tradewaste Bylaw Monitoring - Ph. Tradewaste Officer. Use of fit for purpose materials. Monitoring, detection and rehabilitation programme. CCTV surveys.	2	C	M	Y		Accept current level of control
Sewers	Sewage	Solids (+ 15 mm and acquiescent settling velocity of <50 mm pm) Tradewaste Bylaw	All	2	A	H	Tradewaste Bylaw. Monitoring - Ph. Tradewaste Officer. Routine pump station monitoring. Scheduled mains cleaning.	2	C	M	Y		Accept current level of control
Sewers	Natural Hazard	Earthquake/ Ground Movement/ liquefaction		5	D	H	Insurance/LAPP. Design features. Spares inventory. Alternative network solutions.	4	E	M	Y		Accept current level of control

Record No. 14144207				WITHOUT CONTROLS				WITH EXISTING CONTROLS					TREATMENT
The risk: describe what can happen and how it can happen **Op Maintenance - Wastewater** **Security/Storage Risk??**				**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**What are the existing controls**	**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**Are the existing controls adequate**	**Comments**	**Action Plan**
Operation	**Category**	**Risk**	**Area**										
Sewers	Natural Hazard	Tsunami	Blenheim, Industrial Estates	5	E	H	Insurance/LAPP. Specialist advice/analysis.	4	E	M	Y		Accept current level of control
Sewers	Man Made Hazard	Failure/ Collapse	All	3	C	H	Design features. Asset management process, including monitoring, inspections and rehabilitation programme.	3	D	M	Y		Accept current level of control
Sewers	Man Made Hazard	Third Party Damage	All	2	C	M	Records and identification. Insurance. Transport corridor access requirements.	2	D	M	Y		Accept current level of control
Sewers	Man Made Hazard	Trees	All	2	B	H	Location control (Reserves). Subdivision (plans approval) process. Easements. Root guards / control method.	2	C	M	Y		Accept current level of control

Record No. 14144207				WITHOUT CONTROLS				WITH EXISTING CONTROLS					TREATMENT
The risk: describe what can happen and how it can happen **Op Maintenance - Wastewater** **Security/Storage Risk??**				**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**What are the existing controls**	**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**Are the existing controls adequate**	**Comments**	**Action Plan**
Operation	**Category**	**Risk**	**Area**										
Sewers	Man Made Hazard	Sharps	All	3	B	H	PPE. Training and education. H&S Operational Plan.	3	D	M	Y		Accept current level of control
Manholes	Man Made Hazard	Overflow	All	3	C	H	Datran warnings. AMP performance measures. Plant on standby for blockages. Pumping. Disinfection process.	3	C	H	Y		Accept current level of control
Manholes	Man Made Hazard	Working in the Road	All	3	A	E	STMS SOPs Staff training. CARs.	3	C	H	Y		Accept current level of control
Manholes	Man Made Hazard	Collapse	All	3	C	H	NZS4404 - design features.	3	D	M	Y		Accept current level of control
Manholes	Man Made Hazard	Displaced Cover/Rattling Covers/Noise	All	1	A	H	Cover design. Wedges for old covers. Lock bars. Lid weight (larger	1	B	M	Y	H&S for wet well. Chamber access.	Chain mesh fall arrestors for deep wet wells and manholes at risk of lifting -

Record No. 14144207				WITHOUT CONTROLS				WITH EXISTING CONTROLS					TREATMENT
The risk: describe what can happen and how it can happen **Op Maintenance - Wastewater** **Security/Storage Risk??**				**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**What are the existing controls**	**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**Are the existing controls adequate**	**Comments**	**Action Plan**
Operation	**Category**	**Risk**	**Area**										
							covers).						KWa/JGr/MDa - June 2015.
Manholes	Man Made Hazard	Ladders and Access	All	3	B	H	SOPs Inspections. Removal/ replacement if warranted. Fall arrest nets.	3	D	M	Y		Chain mesh fall arrestors for deep wet wells and manholes at risk of lifting - KWa/JGr/MDa - June 2015.
Manholes	Man Made Hazard	Hydrogen Sulphide	All	2	A	H	Gas detection. Confirmed space SOP. Design features (materials). Venting.	2	D	M	Y		Complete network assessment project, including condition rate -KWa/MNa June 2015.
Manholes	Man Made Hazard	Sharps	All	3	B	H	PPE. Training and education. H&S Operational Plan.	3	D	M	Y		Accept current level of control

Record No. 14144207				WITHOUT CONTROLS				WITH EXISTING CONTROLS					TREATMENT
The risk: describe what can happen and how it can happen **Op Maintenance - Wastewater** **Security/Storage Risk??**				**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**What are the existing controls**	**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**Are the existing controls adequate**	**Comments**	**Action Plan**
Operation	**Category**	**Risk**	**Area**										
Pump Stations	Effluent	Surcharge/ Overflow	All	3	B	H	Scada. Overpumping. Suction trucks. Standby pumps and staff. Increased storage. Network Model.	3	C	H	N		Pipe upgrades for Picton/Blenheim - 3 - 5 years (2016). Managed sewage overflows - SRo June 2015.
Pump Stations	Effluent	Solids (+ 15 mm and acquiescent settling velocity of <50 mm pm) Tradewaste Bylaw	All	2	A	H	Tradewaste Bylaw. Monitoring. Tradewaste Officer. Routine inspections. Scheduled cleaning.	2	B	H	Y		Accept current level of control
Pump Stations	Effluent	Sharps	All	3	B	H	PPE. Training and education. H&S Operational Plan.	3	C	H	Y		Accept current level of control
Pump Stations	Natural Hazard	Tsunami	Blenheim. Riverlands	5	E	H	Insurance. Design decisions. Research - risk evaluation. Specialist advice and analysis.	5	E	H	Y	Larger sites insured.	Accept current level of control

Record No. 14144207				WITHOUT CONTROLS				WITH EXISTING CONTROLS					TREATMENT
The risk: describe what can happen and how it can happen **Op Maintenance - Wastewater** **Security/Storage Risk??**				**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**What are the existing controls**	**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**Are the existing controls adequate**	**Comments**	**Action Plan**
Operation	**Category**	**Risk**	**Area**										
Pump Stations	Natural Hazard	Lightning Strike	All	3	B	H	Insurance Arrestors Site design	3	C	H	Y		Project to ensure lightning arrestors adequate at 'at risk' sites - SRo June 2015
Pump Stations	Man Made Hazard	Mechanical Breakdown - pumps and valves	All	3	A	E	MB cover in MD Policy. Regular maintenance. Spares inventory. Contractor arrangements.	2	B	H	Y	MB insurance policy cancelled from 2009/2010	Accept current level of control
Pump Stations	Man Made Hazard	Telemetry System	All	3	B	H	Specialist staff/supplier support. Training. Maintenance. Warning system.	3	C	H	Y	Telemetry monitors sewer pump stations - does not control them. Insurance for telemetry background removed from 12/13 year.	Accept current level of control

Record No. 14144207				WITHOUT CONTROLS				WITH EXISTING CONTROLS					TREATMENT
The risk: describe what can happen and how it can happen **Op Maintenance - Wastewater** **Security/Storage Risk??**				**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**What are the existing controls**	**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**Are the existing controls adequate**	**Comments**	**Action Plan**
Operation	**Category**	**Risk**	**Area**										
Pump Stations	Man Made Hazard	Power Failure - multiple pump stations	All	4	B	E	Standby generators. Storage in pump station and in network. Scada. Power supply arrangements. Generator capacity reviews (annual)	3	C	H	Y		Accept current level of control
Pump Stations	Man Made Hazard	Electrical Breakdown	All	3	A	E	Spares inventory. Electricians on call. Preventative maintenance. Up to date electrical drawings.	3	C	H	Y		Accept current level of control
Pump Stations	Man Made Hazard	Fire	All	4	D	H	Emergency services. Design and maintenance. Fire extinguishers at bigger sites.	4	D	H	Y		Accept current level of control

Record No. 14144207				WITHOUT CONTROLS				WITH EXISTING CONTROLS					TREATMENT
The risk: describe what can happen and how it can happen **Op Maintenance - Wastewater** **Security/Storage Risk??**				**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**What are the existing controls**	**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**Are the existing controls adequate**	**Comments**	**Action Plan**
Operation	**Category**	**Risk**	**Area**										
Pump Stations	Effluent	Corrosive Effluent	Tradewaste	2	A	H	Tradewaste Bylaws. Education. Monitoring. Confined space SOP. Design - materials.	2	C	M	Y		Accept current level of control
Pump Stations	Effluent	Poisonous/ Hazardous/ Flammable	All	3	B	H	Tradewaste Bylaws. Education. Monitoring. Confined space SOP. Design - materials. Electrical design features.	3	D	M	Y		Accept current level of control
Pump Stations	Effluent	Fats and Oils	All	2	A	H	Tradewaste Bylaw. Monitoring. Tradewaste Officer. Routine inspections. Grease traps in commercial premises. Scheduled cleaning.	2	C	M	Y		Accept current level of control

Record No. 14144207				WITHOUT CONTROLS				WITH EXISTING CONTROLS					TREATMENT
The risk: describe what can happen and how it can happen **Op Maintenance - Wastewater** **Security/Storage Risk??**				**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**What are the existing controls**	**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**Are the existing controls adequate**	**Comments**	**Action Plan**
Operation	**Category**	**Risk**	**Area**										
Pump Stations	Effluent	Direct Infiltration Inflow (including Flood)	All except Seddon	4	B	E	Design features. Infiltration programme. Inspections.	3	D	M	Y		Accept current level of control
Pump Stations	Natural Hazard	Earthquake/ Ground Movement/ Liquefaction	All	5	D	H	Insurance/LAPP. Design features. Inspections.	4	E	M	Y		Accept current level of control
Pump Stations	Natural Hazard	Slip/Flood Scour	All	3	D	M	Design features. Inspections and maintenance.	3	D	M	Y		Accept current level of control
Pump Stations	Man Made Hazard	Power Failure - single pump stations	All	3	A	E	Generators. Storage at pump station and in network. Use of standby pumps from twin pump stations. Overflow design. Power supply arrangements.	2	D	M	Y		Accept current level of control
Pump Stations	Man Made Hazard	Failure/Collapse - Wetwell Wall	All	3	D	M	Design features.	3	E	M	Y		Accept current level of control

Record No. 14144207				WITHOUT CONTROLS				WITH EXISTING CONTROLS					TREATMENT
The risk: describe what can happen and how it can happen **Op Maintenance - Wastewater** **Security/Storage Risk??**				**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**What are the existing controls**	**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**Are the existing controls adequate**	**Comments**	**Action Plan**
Operation	**Category**	**Risk**	**Area**										
Pump Stations	Man Made Hazard	Third Party Damage	All	3	D	M	Insurance. Security - various levels. Design features.	3	E	M	Y	Terrorism allied to third party damage as more serious.	Accept current level of control
Pump Stations	Man Made Hazard	Wet Well Access and Station Entry (confined space)	All	3	B	H	Specialist training and equipment. SOPs.	3	D	M	Y		Accept current level of control
Pump Stations	Man Made Hazard	Vandalism/ Terrorism	All	1	A	H	Insurance. Graffiti clean-up policy. Security - various levels.	1	C	M	Y		Accept current level of control
Pumped Sewers	Man Made Hazard	Third Party Damage	All	3	C	H	Drawings. CoP for operating in transport corridors. Transport corridor access requirements.	3	C	H	Y		Accept current level of control
Pumped Sewers	Effluent	Exfiltration under Pressure	All	3	C	H	Design features. Maintenance programme. Scada. Spares inventory.	3	D	M	Y		Review spares held for large diameter pipe - SRo/KWa March 2015

Record No. 14144207				WITHOUT CONTROLS				WITH EXISTING CONTROLS					TREATMENT
The risk: describe what can happen and how it can happen **Op Maintenance - Wastewater** **Security/Storage Risk??**				**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**What are the existing controls**	**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**Are the existing controls adequate**	**Comments**	**Action Plan**
Operation	**Category**	**Risk**	**Area**										
Pumped Sewers	Man Made Hazard	Air Valve Leakage	All	2	B	H	Maintenance programme. Float alarm monitored by Scada at some higher risk sites. Annual inspection/ maintenance.	2	C	M	Y		Accept current level of control
Treatment Works	Effluent	Corrosive Effluent	Tradewaste	3	A	E	Tradewaste Bylaw. Monitoring - pH. Tradewaste Officer on site.	3	C	H	Y		Accept current level of control
Treatment Works	Effluent	Poisonous/ Hazardous/ Flammable	All	4	B	E	Tradewaste Bylaw. Monitoring - pH. Tradewaste Officer on site. Picton - monitoring of gases from adjacent landfill.	4	C	H	Y		Accept current level of control
Treatment Works	Effluent	Tradewaste (Exceeding Strength Limits)	All	4	A	E	Tradewaste Bylaw. Tradewaste charges. Tradewaste	4	C	H	Y		Accept current level of control

Record No. 14144207				WITHOUT CONTROLS				WITH EXISTING CONTROLS					TREATMENT
The risk: describe what can happen and how it can happen **Op Maintenance - Wastewater** **Security/Storage Risk??**				**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**What are the existing controls**	**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**Are the existing controls adequate**	**Comments**	**Action Plan**
Operation	**Category**	**Risk**	**Area**										
							monitoring.						
Treatment Works	Natural Hazard	Flood	All	4	C	H	Insurance/LAPP. Cut-off drains maintenance (Picton).	4	D	H	Y		Accept current level of control
Treatment Works	Man Made Hazard	Power Failure	Blenheim, Picton, Spring Creek	4	B	E	Generators. Supplier agreements. Bypass to domestic network.	3	C	H	Y		Generator servicing contracts - MDa June 2015.
Treatment Works	Man Made Hazard	Third Party Damage	All	4	D	H	On site supervision. Drawings/plans. Security features. Insurance.	4	D	H	Y		Accept current level of control
Treatment Works	Man Made Hazard	Treatment Pond Failure	All	4	A	E	Scada alarms. Sampling. Design features. On site operator. Operating Plan. Resource Consent.	4	C	H	Y		Accept current level of control

Record No. 14144207				WITHOUT CONTROLS				WITH EXISTING CONTROLS					TREATMENT
The risk: describe what can happen and how it can happen **Op Maintenance - Wastewater** **Security/Storage Risk??**				**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**What are the existing controls**	**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**Are the existing controls adequate**	**Comments**	**Action Plan**
Operation	**Category**	**Risk**	**Area**										
Treatment Works	Effluent	Solids (+ 15 mm and acquiescent settling velocity of <50 mm pm) Tradewaste Bylaw	All	2	A	H	Tradewaste Bylaw. Tradewaste Officer on site. Tradewaste Bylaw. Screens.	2	D	M	Y		Accept current level of control
Treatment Works	Effluent	Surcharge/ Overflow	All	4	D	H	Design features. Monitoring. Scada.	4	E	M	Y		Accept current level of control
Treatment Works	Effluent	Sharps	All	3	C	H	Tradewaste Bylaw. Tradewaste Officer. Routine monitoring. H&S Operational Plan.	3	D	M	Y		Accept current level of control
Treatment Works	Natural Hazard	Earthquake/ Ground Movement (liquefaction)	All	5	D	H	Insurance/LAPP. Design features. Multiple ponds.	3	E	M	Y		Accept current level of control
Treatment Works	Natural Hazard	Tsunami	Blenheim	5	E	H	Insurance/LAPP. Topographical features. Emergency planning. Multiple ponds.	3	E	M	Y		Accept current level of control

Record No. 14144207				WITHOUT CONTROLS				WITH EXISTING CONTROLS					TREATMENT
The risk: describe what can happen and how it can happen **Op Maintenance - Wastewater** **Security/Storage Risk??**				**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**What are the existing controls**	**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**Are the existing controls adequate**	**Comments**	**Action Plan**
Operation	**Category**	**Risk**	**Area**										
Treatment Works	Man Made Hazard	Mechanical Breakdown	Blenheim, Picton	3	A	E	MB cover in MD Policy. Maintenance programme. On site supervision. Alarms.	2	C	M	Y	MB insurance policy cancelled from 2009/2010	Accept current level of control
Treatment Works	Man Made Hazard	Failure/Collapse Pump Station	Blenheim, Picton	4	D	H	Design features. Bypass.	4	E	M	Y		Accept current level of control
Treatment Works	Man Made Hazard	Vandalism/terrorism	All	2	C	M	Insurance. On site supervision. Security features. Graffiti clean-up policy.	2	D	M	Y		Accept current level of control
Treatment Works	Man Made Hazard	Trespass/ Public Access (public safety)	All	3	C	H	Security measures, including intruder alarms and signage. Location (some).	3	D	M	Y		Accept current level of control
Outfall		Flood Gate Failure	Havelock, Blenheim	4	C	H	Design features, including pond retention capacity. Inspection and maintenance.	4	D	H	Y		Accept current level of control

Record No. 14144207				WITHOUT CONTROLS				WITH EXISTING CONTROLS					TREATMENT
The risk: describe what can happen and how it can happen **Op Maintenance - Wastewater** **Security/Storage Risk??**				**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**What are the existing controls**	**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**Are the existing controls adequate**	**Comments**	**Action Plan**
Operation	**Category**	**Risk**	**Area**										
Outfall		Third Party Damage	Picton	3	D	M	LAPP Installation location Inspection	3	D	M	Y		Accept current level of control
Outfall		Failure/ Collapse	Picton	3	D	M	Design features. Inspection. Spares inventory.	3	D	M	Y		Accept current level of control
Outfall		Blockage	All	4	E	M	Design features, including screening. Process design and monitoring - regulating outfall material. Tidal flow monitor (Blenheim). Scada	4	E	M	Y		Accept current level of control
Outfall		Tsunami	Blenheim, Picton	4	E	M	LAPP. Risk evaluation research. Design features.	3	E	M	Y		Accept current level of control

Record No. 14144207				WITHOUT CONTROLS				WITH EXISTING CONTROLS					TREATMENT
The risk: describe what can happen and how it can happen **Op Maintenance - Wastewater** **Security/Storage Risk??**				**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**What are the existing controls**	**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**Are the existing controls adequate**	**Comments**	**Action Plan**
Operation	**Category**	**Risk**	**Area**										
Outfall		Flooding/ Scouring/Sea Surge	All	4	D	H	LAPP. Design features. Public monitoring. Treatment plant operator.	3	E	M	Y		Accept current level of control
Management	Asset Management	Inadequate Capacity	All	4	A	E	Design. Planning process, including LTP. Infiltration inflow. Network Model.	4	D	H	Y		Accept current level of control
Management	Reputation	Environmental Stewardship	All	4	A	E	Resource consent compliance. Tradewaste Bylaw. Tradewaste Officer. Sampling/monitoring.	3	C	H	Y		Accept current level of control
Management	Admin	Land Easement Issues	All	4	B	E	LGA and Public Works Act. Access agreements. Easement process. Subdivision process.	3	C	H	Y		Accept current level of control

Record No. 14144207				WITHOUT CONTROLS				WITH EXISTING CONTROLS					TREATMENT
The risk: describe what can happen and how it can happen **Op Maintenance - Wastewater** **Security/Storage Risk??**				**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**What are the existing controls**	**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**Are the existing controls adequate**	**Comments**	**Action Plan**
Operation	**Category**	**Risk**	**Area**										
Management	Asset Management	Asset deterioration	All	4	A	E	Forward planning, including LTP. Op and maintenance procedures. AMPs - renewals programme. CCTV. Design features, including installation methods and material selection. Materials acceptance standards (NZ/Aus Standards)	3	D	M	Y		Accept current level of control
Management	Asset Management	Age (longevity)	All	4	A	E	Forward planning, including LTP. Op and maintenance procedures. AMPs - renewals programme. CCTV. Design features, including installation methods and material selection. Materials acceptance	3	D	M	Y		Accept current level of control

Record No. 14144207				WITHOUT CONTROLS				WITH EXISTING CONTROLS					TREATMENT
The risk: describe what can happen and how it can happen **Op Maintenance - Wastewater** **Security/Storage Risk??**				**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**What are the existing controls**	**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**Are the existing controls adequate**	**Comments**	**Action Plan**
Operation	**Category**	**Risk**	**Area**										
							standards (NZ/Aus Standards)						
Management	Asset Management	Records	All	3	A	E	AMPs, including regular data updates. As-built plans, including electronic records. Subdivision and maintenance data processes.	2	D	M	Y		Accept current level of control
Management	Resources	Pipe and Fittings Availability	All	3	A	E	Stock Policy - spares carried. Supply agreements (including lifeline arrangements). Meeting appropriate	2	D	M	Y		Accept current level of control

Record No. 14144207				WITHOUT CONTROLS				WITH EXISTING CONTROLS					TREATMENT
The risk: describe what can happen and how it can happen **Op Maintenance - Wastewater** **Security/Storage Risk??**				**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**What are the existing controls**	**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**Are the existing controls adequate**	**Comments**	**Action Plan**
Operation	**Category**	**Risk**	**Area**										
							industry standards.						
Management	Resources	Pumps/ Treatment Equipment Availability	All	3	A	E	Stock Policy - spares carried. Supply and service agreements (including lifeline arrangements). Interchangeability - common products used throughout networks.	2	D	M	Y		Accept current level of control
Management	Resources	Chemical and Reagent Availability	All	3	A	E	Stock policy. Supply agreements. Storage capacity.	2	D	M	Y		Accept current level of control
Management	Resources	Contractor/Staff Skills - Treatment/Retic - Retention/ Succession Planning	All	4	A	E	Recruitment and retention policies. Skills training. Tender and contracting process.	2	D	M	Y		Accept current level of control

Record No. 14144207				WITHOUT CONTROLS				WITH EXISTING CONTROLS					TREATMENT
The risk: describe what can happen and how it can happen **Op Maintenance - Wastewater** **Security/Storage Risk??**				**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**What are the existing controls**	**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**Are the existing controls adequate**	**Comments**	**Action Plan**
Operation	**Category**	**Risk**	**Area**										
							Multi-skilled workforce.						
Management	Resources	Staff and Contractor Availability	All	4	A	E	Contract agreements. MDC place in market. Recruitment and retention policies.	2	D	M	Y		Accept current level of control
Management	Resources	DRP and Continuity planning	All	4	A	E	LAPP. Emergency plans. DRP.	2	D	M	Y		Review emergency and DR plans - SRo June 2015
Management	Resources	Power Costs and Availability	All	3	B	H	Supply agreements.	3	D	M	Y		Accept current level of control
Management	Admin	Consents Renewals/ Consent Compliance	All	4	A	E	Consents monitoring programme.	3	D	M	Y	Developing further compliance monitoring systems.	Accept current level of control
Management	Admin	Telemetry (Backbone)	All	3	A	E	Maintenance and upgrade programme. Contract relationships. Electronic and manual monitoring.	2	D	M	Y		Accept current level of control

Record No. 14144207				WITHOUT CONTROLS				WITH EXISTING CONTROLS					TREATMENT
The risk: describe what can happen and how it can happen **Op Maintenance - Wastewater** **Security/Storage Risk??**				**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**What are the existing controls**	**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**Are the existing controls adequate**	**Comments**	**Action Plan**
Operation	**Category**	**Risk**	**Area**										
							Insurance programme.						
Management	Admin	Tradewaste	Blenheim, Picton, Renwick	4	A	E	Tradewaste Officer. Tradewaste Bylaw. Sampling/monitoring.	3	D	M	Y	Havelock and Spring Creek/Grovetown to be added.	Accept current level of control
Management	Reputation	Loss of Service	All	4	A	E	Levels of service standards. Asset management plans.	4	E	M	Y		Accept current level of control
Management	Reputation	Competence	All	3	A	E	Recruitment process. Upskilling and refreshers to industry standards. Performance management system.	3	E	M	Y		Accept current level of control

Record No. 14144207				WITHOUT CONTROLS				WITH EXISTING CONTROLS					TREATMENT
The risk: describe what can happen and how it can happen **Op Maintenance - Wastewater** **Security/Storage Risk??**				**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**What are the existing controls**	**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**Are the existing controls adequate**	**Comments**	**Action Plan**
Operation	**Category**	**Risk**	**Area**										
Management	Political	Decisions / Delays/Cost	All	4	A	E	LTP. Annual Plan. Reports to Council.	3	E	M	Y		Accept current level of control
Management	Liability	Damage/Injury	All	4	A	E	Levels of service standards. SOPs. Industry best practice. Design features. Proactive maintenance. Security measures. Liability insurance.	3	E	M	Y		Accept current level of control
Management	Financial	Budgets/ Unplanned Costs/ Escalations/ Fiscal Management	All	4	A	E	LTP. Annual Plan. Reports to Council. Asset management plans/renewals programme. Procurement policies. Budget reports/monitoring. Project management.	2	D	M	Y		Accept current level of control

Record No. 14144207				WITHOUT CONTROLS				WITH EXISTING CONTROLS					TREATMENT
The risk: describe what can happen and how it can happen **Op Maintenance - Wastewater** **Security/Storage Risk??**				**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**What are the existing controls**	**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**Are the existing controls adequate**	**Comments**	**Action Plan**
Operation	**Category**	**Risk**	**Area**										
Management	Admin	Health & Safety Aspects	All	4	A	E	Corporate H&S Plan. H&S Operational Plan. Hazard identification and control process - job/site specific. Industry standards. SOPs. H&S Manager. Internal and external audits. Annual reviews of SOPs and H&S Plans.	3	D	M	Y		Accept current level of control
	Admin	Legislative Change	All	4	C	H	MoH, LGA, MfE, SOLGM notifications. Membership of national bodies. LTP process. Submission process.	2	E	L	Y		Accept current level of control

Record No. 14144207				WITHOUT CONTROLS				WITH EXISTING CONTROLS					TREATMENT
The risk: describe what can happen and how it can happen **Op Maintenance - Wastewater** **Security/Storage Risk??**				**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**What are the existing controls**	**Consequences 1 – 5**	**Likelihood A - E**	**Level of Risk**	**Are the existing controls adequate**	**Comments**	**Action Plan**
Operation	**Category**	**Risk**	**Area**										
Key Notes/Changes - 2014 Review ⇧ Updates reflect completion of network modelling. ⇧ Some action plans now completed. ⇧ Dates for other plans extended.													

Appendix 2 – Stormwater Operational Budget Projection 2015-25

Budget Item	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Consultancy											
Contributions											
General Expense	$ 500	$ 500	$ 513	$ 526	$ 540	$ 555	$ 572	$ 590	$ 609	$ 630	$ 653
Insurance											
Legal											
Loss On Sale of Fixed Assets											
Investigations	$ 80,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Monitoring	$ 68,000	$ 33,000	$ 33,825	$ 34,684	$ 35,638	$ 36,654	$ 37,735	$ 38,942	$ 40,212	$ 41,611	$ 43,105
Rates	$ 4,115	$ 4,115	$ 4,214	$ 4,320	$ 4,435	$ 4,557	$ 4,688	$ 4,830	$ 4,984	$ 5,146	$ 5,323
Rent	$ 9,310	$ 9,310	$ 9,533	$ 9,775	$ 10,034	$ 10,311	$ 10,605	$ 10,927	$ 11,275	$ 11,642	$ 12,043
General Expenses	**$ 161,925**	**$ 46,925**	**$ 48,085**	**$ 49,305**	**$ 50,646**	**$ 52,077**	**$ 53,600**	**$ 55,289**	**$ 57,080**	**$ 59,029**	**$ 61,125**
PStn: Power	$ 9,500	$ 9,500	$ 9,861	$ 10,240	$ 10,653	$ 11,111	$ 11,614	$ 12,151	$ 12,750	$ 13,402	$ 14,107
Pump Station - Power	**$ 9,500**	**$ 9,500**	**$ 9,861**	**$ 10,240**	**$ 10,653**	**$ 11,111**	**$ 11,614**	**$ 12,151**	**$ 12,750**	**$ 13,402**	**$ 14,107**
PStn: Other	$ 2,000	$ 2,000	$ 2,076	$ 2,138	$ 2,207	$ 2,280	$ 2,360	$ 2,447	$ 2,541	$ 2,641	$ 2,752
Pump stations - buildings/civil											
Pump stations - electrical											
PStn: Mech	$ 1,500	$ 16,000	$ 1,557	$ 1,603	$ 1,655	$ 1,710	$ 1,770	$ 1,835	$ 1,906	$ 1,981	$ 2,064
Pump stations - telemetry											
Pump Station Maintenance	**$ 22,500**	**$ 37,000**	**$ 23,355**	**$ 24,221**	**$ 25,169**	**$ 26,212**	**$ 27,357**	**$ 28,585**	**$ 29,948**	**$ 31,426**	**$ 33,030**
Berm Sump Mtce	$ 15,000	$ 15,000	$ 15,572	$ 16,034	$ 16,552	$ 17,096	$ 17,697	$ 18,351	$ 19,060	$ 19,809	$ 20,641
Conn Mtce	$ 20,500	$ 20,500	$ 21,281	$ 21,913	$ 22,621	$ 23,365	$ 24,185	$ 25,080	$ 26,048	$ 27,072	$ 28,209
Reticulation - infiltration/leaks											
Mains Mtce	$ 67,000	$ 102,000	$ 105,886	$ 109,031	$ 112,553	$ 116,256	$ 120,336	$ 124,789	$ 129,606	$ 134,699	$ 140,356
Manhole Mtce	$ 10,000	$ 10,000	$ 10,381	$ 10,689	$ 11,035	$ 11,398	$ 11,798	$ 12,234	$ 12,706	$ 13,206	$ 13,760
Open Drains Mtc	$ 54,000	$ 38,000	$ 39,448	$ 40,619	$ 41,931	$ 43,311	$ 44,831	$ 46,490	$ 48,284	$ 50,182	$ 52,290
Treatment - monitoring/testing											
Reticulation Maintenance	**$ 166,500**	**$ 185,500**	**$ 192,568**	**$ 198,287**	**$ 204,691**	**$ 211,426**	**$ 218,847**	**$ 226,944**	**$ 235,704**	**$ 244,967**	**$ 255,256**
Depreciation	$ 1,278,313	$ 1,278,313	$ 1,278,313	$ 1,278,313	$ 1,278,313	$ 1,278,313	$ 1,278,313	$ 1,278,313	$ 1,277,805	$ 1,277,804	$ 1,275,653
Deprec-Calc	$ 11,240	$ 24,257	$ 33,367	$ 42,690	$ 52,321	$ 67,920	$ 77,923	$ 89,381	$ 116,861	$ 166,274	$ 214,485
Depreciation	**$ 1,289,553**	**$ 1,302,570**	**$ 1,311,680**	**$ 1,321,002**	**$ 1,330,634**	**$ 1,346,232**	**$ 1,356,235**	**$ 1,367,693**	**$ 1,394,665**	**$ 1,444,079**	**$ 1,490,137**
Int Exp - Intl	$ 24,247	$ 22,802	$ 21,255	$ 19,598	$ 17,822	$ 15,920	$ 13,883	$ 11,700	$ 9,362	$ 6,858	$ 4,175
Corporate Overh	$ 84,446	$ 83,082	$ 86,176	$ 88,806	$ 90,623	$ 90,323	$ 92,048	$ 94,393	$ 96,861	$ 100,077	$ 102,818
Departmental Ma	$ 11,695	$ 11,593	$ 11,855	$ 12,119	$ 12,365	$ 12,549	$ 12,817	$ 13,125	$ 13,451	$ 13,822	$ 14,186
Section Managem	$ 151,411	$ 153,575	$ 158,205	$ 161,964	$ 165,411	$ 167,832	$ 171,574	$ 175,879	$ 180,471	$ 185,710	$ 190,819
Works Depot cos	$ 25,235	$ 25,515	$ 28,473	$ 32,245	$ 31,213	$ 33,064	$ 34,567	$ 36,388	$ 37,765	$ 39,757	$ 41,799
Planning and De	$ 24,269	$ 24,453	$ 25,192	$ 25,786	$ 26,327	$ 26,699	$ 27,286	$ 27,962	$ 28,683	$ 29,508	$ 30,311
Design & Overhead	**$ 321,301**	**$ 321,020**	**$ 331,156**	**$ 340,516**	**$ 343,762**	**$ 346,388**	**$ 352,174**	**$ 359,447**	**$ 366,595**	**$ 375,732**	**$ 384,108**

Appendix 3 – Non-Financial Performance Measures

The following measure have been introduced following the enactment of the Local Government (Amendment) Act in August 2014

Sub-part 3 – Stormwater drainage

(1) **Performance measure 1 (system adequacy)**

(a) The number of flooding events that occur in a territorial authority district.

(b) For each flooding event, the number of habitable floors affected. (Expressed per 1000 properties connected to the territorial authority's stormwater system.)

(2) **Performance measure 2 (discharge compliance)**

Compliance with the territorial authority's resource consents for discharge from its stormwater system, measured by the number of:

(a) abatement notices

(b) infringement notices

(c) enforcement orders, and

(d) convictions,

received by the territorial authority in relation those resource consents.

(3) **Performance measure 3 (response times)**

The median response time to attend a flooding event, measured from the time that the territorial authority receives notification to the time that service personnel reach the site.

(4) **Performance measure 4 (customer satisfaction)**

The number of complaints received by a territorial authority about the performance of its stormwater system, expressed per 1000 properties connected to the territorial authority's stormwater system.

Appendix 4 – Blenheim Stormwater Strategy – Action Plan

Report

Blenheim Stormwater Strategy - Action Plan

Prepared for Marlborough District Council (Client)

By Beca Carter Hollings & Ferner Ltd (Beca)

Error! Unknown document property name.

Revision History

Revision Nº	Prepared By	Description	Date
A	Greg Lee	Draft	21 May 2009

Document Acceptance

Action	**Name**	**Signed**	**Date**
Prepared by	Greg Lee		
Reviewed by	Graham Levy		
Approved by	Greg Pollock		
on behalf of	Beca Carter Hollings & Ferner Ltd		

Table of Contents

Glossary

AEP	Annual Exceedance Probability. A statistical term defining the probability of an event of a given size being equalled or exceeded in any year, expressed as a percentage. For example, a 5% AEP event has a 5% chance of being equalled or exceeded in any one year.
BMP	Best Management Practice. Methods (programmes, systems or structures) used to control or prevent contamination of receiving environments.
CMA	Coastal Marine Area
CSC	Comprehensive Stormwater Consent. The purpose of a CSC is to consent multiple activities associated with stormwater management and discharge within urban catchments3.
Contaminants	Includes any substance or heat that when discharged into water or onto land, changes or is likely to change the physical, chemical or biological condition of that land or water onto or into which it is discharged.
MDC	Marlborough District Council
Modified Watercourse	A watercourse or river that has always existed in some form in the general area. However, the watercourse has been modified by engineering works to alter is original form or alignment such as, for example concrete or gabion lining, or channel straightening works.
River	Is a continually or intermittently flowing body of freshwater and includes a stream and modified watercourse, but does not include any artificial watercourse (including an irrigation canal, water supply race, canal for the supply of water for electricity power generation and farm drainage canal).
RMA	Resource Management Act 1991
Sediment	Eroded material that can include adsorbed contaminants.
SMAP	Stormwater Management Area Plan
Stormwater	Water that falls to the ground, runs off the surface into streams, lakes, marine areas or underground aquifers and includes the contaminants washed off surfaces by water.
Stormwater Management Area Plan	A unit which represents the areas catchment (area within which runoff is carried under gravity drainage system to a common outlet) plus, selected adjacent areas where the aspiration is for those areas to be managed by the same network or process

3 In the context of these guidelines, an 'urban catchment' is considered to be a defined urban area for which a CSC is sought. The defined urban catchment may be the entire urban area from which rainfall is collected and consist of many hydrological sub-catchments. It is likely to have multiple stormwater discharge points to receiving water that are located both within and beyond its boundaries.

Stormwater Network	A system of pipes and ancillary works to collect and convey stormwater to the place of discharge.
Suspended Solids	Sediment or other solids either suspended or floating in runoff.
WARMP	Wairau Awatere Resource Management Plan
Watercourse	See River

Introduction

Stormwater management in Blenheim is a critical challenge for the town, both currently and when future potential growth is concerned. Many challenges are created by the flat topography and unique and sensitive receiving environments.

The Blenheim Stormwater Strategy has been developed in order to provide a clear, long term direction for stormwater management in Blenheim. It provides a a guide to making decisions on the future management of the stormwater system and in this context provides a number of goals and policies. This Strategy also provides a basis for applying for a comprehensive discharge consent of stormwater in Blenheim.

This document provides a suite of actions which deliver improvements wanted by the strategy. This Action Plan, therefore, needs to be read in conjunction with the Stormwater Strategy.

1.1 Responsive Process

This document is a living document. The priority of and specifics of actions will be modified following analysis of monitoring information and in response to any issues identified. Modification is anticipated to be needed following the first year of operation which will in particualr entail examination of the priority of actions listed in schedule 1.

It is proposed that Council should establish a working group, with a small focussed team to guide the development of the strategy and ensure that it is integrated with the action plan. This working group should:

- Work to a program;
- Seek to gain the appropriate budgets; and,
- Review the outcomes of the process over the agreed duration of the project.

1.2 Stormwater Strategy

This Strategy has a number of goals, policies and actions. The Strategy firstly identifies a range of issues, both at a generic and a catchment level. A total of eight stormwater management areas are identified to assist in managing stormwater and developing priorities. A number of receiving environments are also affected by the Strategy. These are shown in the Figure 1.

The strategy is aimed primarily at Council to assist the assets and operations team in managing stormwater. There are a number of other stakeholders too, including other parts of MDC (acting as regulators, for example), the development community, and Blenheim residents and ratepayers.

The goals and policies of the Strategy have been developed to provide an integrated approach and to guide the management of stormwater for Blenheim. The Strategy has the following, over-arching goals:

Integrated Management	
Goal 1	To provide an integrated approach to the management of stormwater in Blenheim.
Goal 2	To support the implementation of the strategy with a comprehensive monitoring and enforcement program.

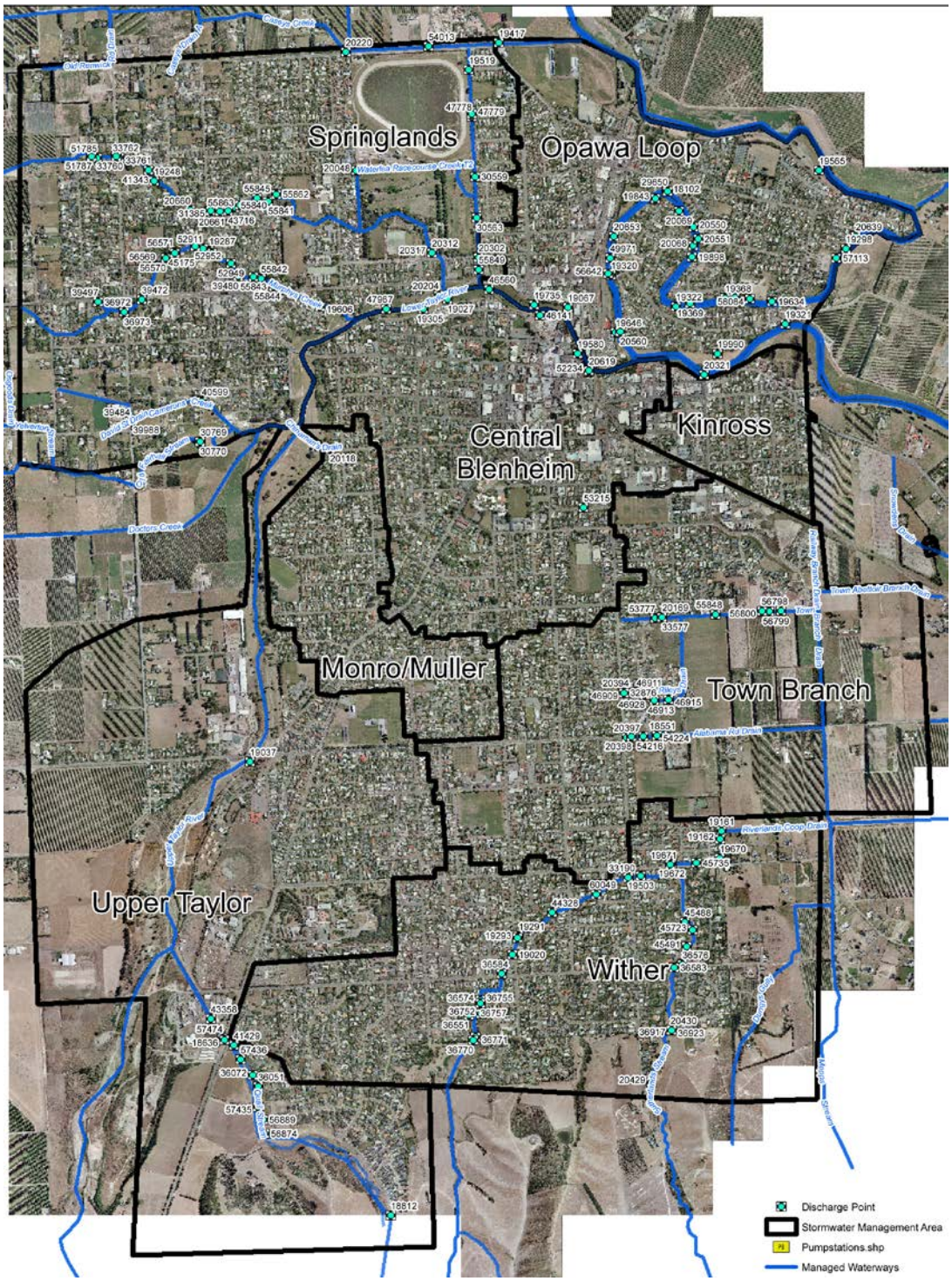
Asset Management and Flooding	
Goal 3	To ensure the stormwater network provides an appropriate response during flooding events so that people and property are protected to accepted standards.
Goal 4	To provide guidance on effective and efficient management of MDCs stormwater assets.

Receiving Environment	
Goal 5	To maintain or enhance the environmental performance of the stormwater system, and quality of receiving environments.

Stakeholder engagement and education	
Goal 6	To engage with key stakeholders, and educate wider community on the importance of integrated stormwater management.

Planning and Regulation	
Goal 7	To ensure the planning and regulatory framework remains responsive to integrated stormwater management.
Goal 8	To gain a comprehensive discharge consent for Blenheim's stormwater network for a 35 year term.

Figure 6: Stormwater Management Areas and Receiving Environments



(no. ID – see Appendix A)

1 Actions

The actions are arranged in schedules which correspond with the 6 management approaches listed in the Strategy document and are provided as schedules 2 to 7 of this report. Schedule 1 of this report provides a selection of actions from schedules 2 to 7 which are proposed to be brought forward first.

A full list of actions (by identifier number only) cross referenced to the schedules 1 - 7 of the Action Plan is provided overleaf (table 2-1). The colour indicates priority and also those projects which are 'ongoing' are identified. Once these are implemented and if needed (subject to annual review) they can continue to be delivered for a number of years.

Timeframes

The implementation of this stormwater strategy relies on three key timeframe periods, as follows:

- **Short Term** – this is the 0-5 year period, which specifically is the initial period to be governed by the comprehensive discharge consent, and allows a range of further investigations, monitoring and other activity.
- **Medium term** – this is the 5-10 year period; during which is it anticipated most of the catchment management plans will be prepared and finalised.
- **Ongoing** and/or long term – these may be tasks that occur in the short or medium term, or may be long term tasks that take 35 years (or the life of the stormwater strategy combined with the comprehensive discharge consent).

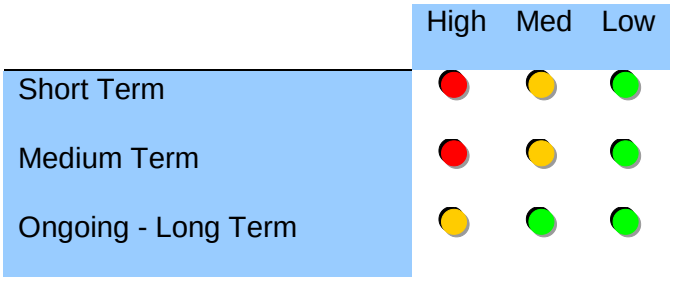
Priorities

Each action is assigned a priority, as follows:

- **High** – must be undertaken either to address a known or imminent issue which is or will shortly cause significant adverse effects, or which is to be required as part of the comprehensive discharge consent.
- **Medium** - must be undertaken either to address a known or imminent issue which is causing adverse effects or which may be causing effects but which are of lower risk, or which is to be required as part of the comprehensive discharge consent.
- **Low** - to be undertaken as part of the wider implementation program, but not critical to addressing immediate effects or issues, but part of the strategic direction of the strategy.

In order to identify important tasks more readily, the following 'traffic light' rating system is used to identify those projects which need to be initiated as soon as practicable ('red light') versus those that are medium term ('orange light') or long term/ ongoing but of lower priority ('green light').

Table 0-2: Prioritisation of Actions



All Actions	Ongoing?	Actions to be Implemented first	Integrated Management	Asset management and flooding	Receiving Environment	Stakeholder and Education	Planning and Regulation
1a	✓	1a	1a				
1b		1b					1b
1c		1c	1c				
1d						1d	
1e			1e				
1f		1f	1f				
2a	✓		2a				
2b		2b			2b		
2c					2c		
2d			2d				
2e						2e	
2f		2f	2f				
2f							
2g			2g				
3a		3a	3a				
3b		3b	3b				
3c			3c				
3d	✓		3d				
3e							3e
3f			3f				
3g		3g	3g				
4a		4a		4a			
4b		4b		4b			
4c	✓			4c			
4d				4d			
4e							4e
4f				4f			
4g			4g				
4h	✓			4h			
4i				4i			
5a				5a			
5b				5b			
5c		5c		5c			
5d							5d
5e							5e
5f				5f			
5g				5g			
5h				5h			
5i							5i
5j		5j		5j			
6a					6a		
6b	✓				6b		
6c	✓				6c		
6d	✓				6d		
6e	✓		6e				
6f	✓				6f		
7a		7a			7a		
7b	✓				7b		
7c	✓				7c		
7d					7d		
7e	✓						7e
7f		7f					7f
7g		7g					7g
7h					7h		
7i	✓		7i				
8a		8a	8a				
8b			8b				
8c			8c				
8d			8d				
9a	✓						9a
9b	✓						9b
9c	✓		9c				
9d	✓						9d
9e		9e	9e				
9f	✓						9f
9g		9g					9g
10a				10a			
10b	✓		10b				
10c							10c
10d		10d		10d			
10e				10e			
10f				10f			
10g				10g			
10h				10h			
11a	✓						11a
11b	✓						11b
11c	✓				11c		
11d	✓						11d
12a		12a				12a	
12b						12b	
12c						12c	
12d						12d	
13a						13a	
13b							13b
13c		13c					13c

Table 0-1: Overview of Actions by Schedule (colour coding indicates priority)

2 Schedule 1: Implementation – Stage 1

This Schedule provides a summary of the key activities to be undertaken in the first stage of implementation. This is considered to be the first five years, or should the comprehensive discharge consent identify an alternative timeframe, the point at which the first key monitoring report is completed, and the strategy reviewed.

This schedule should be reviewed and updated annually, and aligned with budgets and inputs to the annual plan process.

Prior to any of the actions below being carried out, an assessment of costs and benefits of carrying out each of the actions should be done. Costing should also include the costs involved in installing any stormwater treatment devices.

Specific actions also identify timeframes and priorities for implementation. These are explained below.

Resource Consent Application

The first task once this Strategy is adopted is to lodge a resource consent for the comprehensive discharge consent (or CSC). This will involve the preparation of an Assessment of Environmental Effects in accordance with the Fourth Schedule of the RMA, and associated documentation.

Priority Implementation Measures

The following table identifies those priority implementation measures which are considered critical to the first implementation period, and which are likely to be required by any consent conditions for the comprehensive discharge consent.

Indicative budgets are provided where possible, for the purpose of external costs

#	Action	Priority	Timeframe	Indicator
1a	Review specific stormwater management information including flooding and stormwater contaminant levels on an annual basis.	High	Short	
1c	Develop and implement a specific environmental monitoring program aimed at identifying the relative contributions and issues associated with urban versus rural water quality.	High	Short	
1f	Establish clear overall accountability for stormwater management across both network and urban streams/waterways for quantity and quality.	High	Short	

#	Action	Priority	Timeframe	Indicator
2f	Prepare comprehensive stormwater catchment management plans for all catchments within the Blenheim area, priority based on risk. A risk based programme priority is provided in table below	High	Medium	
3a	Develop a comprehensive monitoring programme to support the resource consents and enable a staged and prioritised approach to addressing stormwater management issues across the City.	High	Short	
3b	Undertake monitoring to allow refinements in the application of the strategy principles and action plan requirements, within the boundary of any subsequent resource consent granted for stormwater discharge.	High	Short	
3g	Review Implementation Programme annually (need some questions answered, including who does the review, should initially be driven by assets, submitted to regulatory to satisfy consent conditions occurs annually and must be tangible.	High	Short	
8a	Review results of water quality monitoring and distinguish rural and urban contaminants and effects for receiving environments upstream of urban Blenheim to determine level of change occurring as a result of non-point source rural discharges.	High	Short	
9e	Provide for integration between Stormwater Strategy and Urban Growth Strategy in LTCCP to ensure funding for future services is earmarked ahead of time (and give priority to identified catchments/works).	High	Short	
4a	Determine the level in the roading hierarchy where it is acceptable to have flooding by secondary flows	High	Short	
4b	Develop specific outcomes sought in relation to each type of land use, in particular set standards for the level of protection that should be offered to open space, commercial, industrial and residential development.	High	Short	
5c	Identify and map areas where discharge to ground or ground soakage is possible and appropriate, and ensure this is linked into the WARMP and building consent processes.	High	Short	

#	Action	Priority	Timeframe	Indicator
5j	In assessing discharge applications any additional discharge shall not compromise the performance of the downstream drainage system. This shall take into account potential discharge from other zoned but undeveloped land draining to the drainage system.	High	Short	
10d	Identify where stormwater systems and treatment devices are not performing.	High	Short	
2b	Develop a risk-based framework to managing land use and stormwater contaminants.	High	Short	
7a	Develop specific guidelines on dewatering techniques for construction projects.	High	Short	
12a	Improve the understanding of the effects of stormwater derived sediments and contaminants on the ecological and amenity values of the receiving environments.	High	Short	
1b	Review the stormwater strategy within five years to determine the appropriateness of this Stormwater Strategy and associated stormwater discharge consents.	High	Short	
7f	Develop a bylaw on tradewaste connections which provides Council sufficient powers to remedy/prosecute any non-compliance with the standards and rules.	High	Short	
7g	Review WARMP rules to ensure they provide sufficient ability to regulate land use, including specifically industrial and commercial landowners.	High	Short	
9g	Review approach to collecting development contributions to ensure it remains responsive (preference to move to LGA rather than RMA).	High	Short	
10c	Develop bylaws for new connections of industrial and commercial premises to the Council stormwater network, including for treatment of stormwater quality.	High	Short	
13c	Apply for comprehensive discharge consent.	High	Short	

Program of Stormwater Management Area Plans

Based on the above priorities (and as described in section 6 of the Stormwater Strategy Technical Report), the programme for preparation of SMAPs could be, as follows (note that the following prioritisation does not allow for emerging potential future development locations):

Stormwater Management Area	Year 1	Year 2	Year 3	Year 4	Year 5	Years 5-10
Monitoring data						
SMAP Guidelines prepared.						
Blenheim Central						
Opawa Loop						
Springlands						
Kinross						
Monro/Muller						
Upper Taylors						
Town Branch						
Wither						

The prioritisation shown above is provisional and the first year of implementation involves the collection of further monitoring data. Once this data has been collected and analysed, and taking into consideration parallel work streams of the Council (e.g. on urban growth) the prioritisation of preparation of Stormwater Management Plans may be modified. It is thus understood for example that Town Branch and Springlands may be brought forward earlier (in the first tranche of work) in response to emerging future development locations and pressures.

3 Schedule 2 – Integrated Management Actions

#	Action	Priority	Timeframe	Indicator
1a	Review specific stormwater management information including flooding and stormwater contaminant levels on an annual basis.	High	Ongoing	
1c	Develop and implement a specific environmental monitoring program aimed at identifying the relative contributions and issues associated with urban versus rural water quality.	High	Short	
1e	Identify and utilise appropriate databases including GIS to integrate rivers and stormwater network; to ensure validity of information and update as necessary. Allow access to database to facilitate good data availability.	Medium	Short	
1f	Establish clear overall accountability for stormwater management across both network and urban streams/waterways for quantity and quality.	High	Short	
2a	Maintain a total environmental perspective in managing the stormwater network and receiving environment.	High	Ongoing	
2d	Prepare or revise design codes and guidelines to support the use of appropriate stormwater management practices.	Medium	Medium	
2f	Prepare comprehensive stormwater catchment management plans for all catchments within the Blenheim area priority based on risk.	High	Medium	
2g	Develop a comprehensive network plan for Blenheim which identifies at a city-wide level the basic model for moving stormwater from land to receiving environment, including any significant needs to re-divert catchments to alternative receiving environments.	High	Medium	
3a	Develop a comprehensive monitoring programme to support the resource consents and enable a staged and prioritised approach to addressing stormwater management issues across the City.	High	Short	
3b	Undertake monitoring to allow refinements in the application of the strategy principles and action plan requirements, within the boundary of any subsequent resource consent granted for stormwater discharge.	High	Short	

#	Action	Priority	Timeframe	Indicator
3c	Undertake monitoring to demonstrate the result of investment in stormwater management infrastructure and management techniques.	Medium	Short	
3d	Continue research to better understand the monitoring of the environment.	High	Ongoing	
3f	Undertake monitoring to assess the effectiveness of management methods.	High	Medium	
3g	Review Implementation Programme annually (need some questions answered, including who does the review, should initially be driven by assets, submitted to regulatory to satisfy consent conditions occurs annually and must be tangible.	High	Short	
4g	Integrate capacity upgrades with urban growth strategy for Blenheim.	High	Medium	
6e	Any development relating to existing and future waterways (including channels/drains) shall incorporate as appropriate multiple functions (recreation, access for maintenance, habitat, visual amenity, connectivity).	High	Ongoing	
7i	Wherever a stormwater quantity storage device is being constructed, consider opportunities to achieve quality improvement (and any other objectives).	High	Ongoing	
8a	Review results of water quality monitoring and distinguish rural and urban contaminants and effects for receiving environments upstream of urban Blenheim to determine level of change occurring as a result of non-point source rural discharges.	High	Short	
8b	If rural contributions to water quality are considered significant, develop a specific action plan for addressing these water quality challenges, including (a) Create and protecting riparian buffers between stormwater sources and watercourses; (b) Re-evaluate whether stormwater treatment options being pursued in urban Blenheim are not providing best value for money; (c) Retrofit stormwater treatment devices in existing drainage systems should problems be identified. This should include options for employing the use of wetlands (including constructed wetlands) and other	High	Medium	

#	Action	Priority	Timeframe	Indicator
	retention systems along stormwater drains.			
8c	If urban contributions to water quality are considered significant, develop a specific action plan for addressing these water quality challenges, including (a) Create and protecting riparian buffers between stormwater sources and watercourses. (b) Re-evaluating whether stormwater treatment options being pursued in urban Blenheim are not providing best value for money (c) Retrofit stormwater treatment devices in existing drainage systems should problems be identified. This should include options for employing the use of wetlands (including constructed wetlands) and other retention systems along stormwater drains.	High	Medium	
8d	Map stream classifications.	Medium	Short	
9c	Where significant pressure for brownfield development occurs in any one SMA, review priorities for preparing SMAP.	Medium	Ongoing	
9e	Provide for integration between Stormwater Strategy and Urban Growth Strategy in LTCCP to ensure funding for future services is earmarked ahead of time (and give priority to identified catchments/works).	High	Short	
10b	Monitor the effectiveness of existing stormwater treatment practices, particularly those provided for industrial and commercial sites.	High	Ongoing	

4 Schedule 3 – Asset Management and Flooding Actions

#	Action	Priority	Timeframe	Indicator
4a	Determine the level in the roading hierarchy where it is acceptable to have flooding by secondary flows	High	Short	
4b	Develop specific outcomes sought in relation to each type of land use, in particular set standards for the level of protection that should be offered to open space, commercial, industrial and residential development.	High	Short	
4c	Prepare comprehensive flood maps for each SMA to identify areas where insufficient capacity in network exists. This should occur as part of the SMAP for each specific catchment.	Medium	Ongoing	
4d	Develop a transparent framework for making decisions in relation to how network flow problems will be solved in each catchment.	Medium	Medium	
4f	Undertake further evaluation of Flow levels to assist in providing clear guidance for asset managers and future developments.	Medium	Medium	
4h	Infill subdivision development will not be approved until the network can accept flow without compromising standards.	High	Ongoing	
4i	Existing serviced development can only occur where capacity exists: define acceptable standards and future growth areas.	Medium	Medium	
5a	Reduce hydrological effects of development on more frequent storm peaks to manage potential effects on stream morphology and erosion.	Medium	Medium	
5b	Minimise the impact of new greenfields development on existing, runoff patterns, including requiring new development to limit peak runoff rates to existing levels and minimise runoff volumes.	High	Medium	
5c	Identify and map areas where discharge to ground or ground soakage is possible and appropriate, and ensure this is linked into the WARMP and building consent processes.	High	Short	
5f	Develop agreed maximum limits of site impervious coverage that are appropriate for each catchment, and ensure rules and/or education measures are in place to minimise the amount of impervious cover of keep it	High	Medium	

#	Action	Priority	Timeframe	Indicator
	within the acceptable limits.			
5g	Identify options for reducing existing impervious cover, in particular through best practice on Council owned or developed property.	Medium	Medium	
5h	Explore whether the reuse of stormwater is a viable option in parts of Blenheim, including the use of rainwater storage tanks on private properties.	Medium	Medium	
5j	In assessing discharge applications any additional discharge shall not compromise the performance of the downstream drainage system. This shall take into account potential discharge from other zoned but undeveloped land draining to the drainage system.	High	Short	
10a	Develop and implement stormwater management action plans for each catchment, based on priorities identified in this strategy.	High	Medium	
10d	Identify where stormwater systems and treatment devices are not performing.	High	Short	
10e	Identify and map infrastructure in poor condition in each catchment – make sure this information is available and is utilised when making capacity upgrade decisions.	Medium	Short	
10f	Identify retrofit opportunities to upgrade existing stormwater systems that have been identified as discharging to priority catchments. This should occur in conjunction with land intensification decisions to identify areas where infill is most appropriate.	Medium	Medium	
10g	Undertake mapping and auditing of soakpits, including development of a database of information.	Medium	Short	
10h	Develop improved understanding of current runoff characteristics including informal storage and runoff coefficients. Incorporate results into design techniques and guidelines.	Medium	Short	

5 Schedule 4 – Receiving Environment Actions

#	Action	Priority	Timeframe	Indicator
2b	Develop a risk-based framework to managing land use and stormwater contaminants.	High	Short	
2c	Identify high risk sites based on criteria developed in 2B and develop an auditing and action program for high risk land users to improve quality of discharges from these sites.	High	Medium	
6a	Map riparian margins along existing streams, and identify areas where future riparian margins should be protected or enhanced, including for flood storage, ecological, access and water quality objectives.	Medium	Medium	
6b	Avoid piping or channelling stream channels, including first order streams.	High	Ongoing	
6c	Maintain sufficient water flows in streams to support aquatic life, with a particular emphasis on maintaining baseflows.	Medium	Ongoing	
6d	Avoid constructing stormwater quality improvement devices ‘on line’ within perennial watercourses, and where there is on-line flood attenuation, ensure fish passage is provided.	High	Ongoing	
6f	Any instream works/structures to provide for fish passage.	High	Ongoing	
7a	Develop specific guidelines on dewatering techniques for construction projects.	High	Short	
7b	Maximise the use of appropriate stormwater quality control measures at source for new industrial and commercial development.	High	Ongoing	
7c	Encourage/require good housekeeping systems on existing commercial and industrial sites.	High	Ongoing	
7d	Apply industry specific Codes of Practice, which include environmental management procedures and for major transport corridors.	Medium	Medium	
7h	Until such time as monitoring shows otherwise, Council will not require point source/stormwater treatment from existing residential.	Low	Short	
11c	Promote the use of stormwater methods that minimise, retain and treat direct stormwater runoff.	High	Ongoing	

5 Schedule 5 – Stakeholder Engagement and Education Actions

#	Action	Priority	Timeframe	Indicator
1d	Develop a broader MDC wide awareness campaign on environmental issues, including stormwater. This should include targeted education packages, including for homeowners to ensure they understand what can and cannot be discharged into Council's stormwater system.	Medium	Short	
2e	Identify examples of best practice that Council will accept.	Low	Short	
12a	Improve the understanding of the general public of the effects of stormwater derived sediments and contaminants on the ecological and amenity values of the receiving environments.	High	Short	
12b	Carry out industry specific education programmes, outlining the impact of the specific contaminants on the environment.	High	Medium	
12c	Improve the understanding of costs associated with managing flooding and contamination issues.	Medium	Medium	
12d	Develop partnerships with local schools specifically on stormwater management and stream protection. provide resource materials.	Medium	Medium	
13a	Develop guidelines/training – regular and ongoing programme for regulatory staff processing/compliance consents (SW, subdivision, building).	Medium	Short	

6 Schedule 6 – Planning and Regulation Actions

#	Action	Priority	Timeframe	Indicator
1b	Review the stormwater strategy within five years to determine the appropriateness of this Stormwater Strategy and associated stormwater discharge consents.	High	Short	
3e	Set standards and/or guidelines where practicable to enable useful and comparative environmental assessments to be undertaken.	Medium	Medium	
4e	Review WARMP to review activity status for infill development and recommend changes. The review should also determine the most appropriate status for greenfield and brownfield residential development, including reviewing densities and activity status (so that consents can be declined if there is inappropriate provision for stormwater disposal).	High	Medium	
5d	In development areas, retain good surface infiltration characteristics wherever practicable.	Medium	Medium	
5e	Identify groundwater recharge areas and minimise the effects of development on water quality in these areas, in particular in the Springlands catchments.	Medium	Medium	
5i	Review building consent processes for alignment with stormwater strategy.	Medium	Medium	
7e	Have a progressive enforcement programme to discourage potential polluters, specifically for industrial and commercial sites.	Medium	Ongoing	
7f	Develop a bylaw on tradewaste connections which provides Council sufficient powers to remedy/prosecute any non-compliance with the standards and rules.	High	Short	
7g	Review WARMP rules to ensure they provide sufficient ability to regulate land use, including specifically industrial and commercial landowners.	High	Short	
9a	Subdivision and development of greenfield sites should be designed and managed so as to emphasise the protection and enhancement of streams, lakes, watercourses, wetlands and the coast and the enhancement or restoration of riparian vegetation.	Medium	Ongoing	

#	Action	Priority	Timeframe	Indicator
9b	Structure planning processes should be undertaken and include full consideration of matters relating to stormwater issues.	Medium	Ongoing	
9d	Develop designs and stormwater management techniques (e.g. LID) that minimise the need for stormwater infrastructure, especially reticulated systems with direct discharges to streams.	Medium	Ongoing	
9f	Any significant new development at residential density on parent lots >10ha or rezoning shall be subject to structure planning to identify key infrastructure connections to Councils existing networks (amongst other things).	Medium	Ongoing	
9g	Review approach to collecting development contributions to ensure it remains responsive (preference to move to LGA rather than RMA).	High	Short	
10c	Develop bylaws for new connections of industrial and commercial premises to the Council stormwater network, including for treatment of stormwater quality.	High	Short	
11a	Ensure stormwater strategy is a key driver in developing future land use and growth options for Blenheim, particularly in those catchments or parts of the network where there are already significant capacity constraints.	High	Ongoing	
11b	Encourage development styles and stormwater management methods that mimic natural runoff patterns.	High	Ongoing	
11d	Ensure that appropriate techniques are supported by design codes to provide for best practice application – revise codes if necessary.	High	Ongoing	
13b	RPS or WARMP Review – any review of RMA policy/regulation should incorporate the provisions in, and preferably give-effect to the Stormwater strategy (via comprehensive review or variation).	High	Medium	
13c	Apply for comprehensive discharge consent.	High	Short	

Appendix 5: Stormwater Asset Valuation

	Type	Replacement Cost ($)	Depreciated Replacement Cost ($)	Annual Rate of Depreciation ($)
Blenheim	Pump Stations- Electrical	$26,489	$11,655	$1,060
	Pump Stations - Civil	$118,600	$91,158	$1,186
	Pump Stations- Mechanical	$38,403	$15,813	$960
	Reticulation	$74,132,410	$47,612,012	$879,947
	TOTAL	**$74,315,902**	**$47,730,639**	**$883,153**
Havelock	Reticulation	$428,758	$227,163	$5,603
	TOTAL	**$428,758**	**$227,163**	**$5,603**
Picton	Pump Stations- Electrical	$99,396	$79,517	$2,485
	Pump Stations - Civil	$395,326	$221,382	$3,953
	Pump Stations- Mechanical	$90,360	$72,288	$2,259
	Reticulation	$20,287,889	$12,637,403	$242,313
	TOTAL	**$20,872,972**	**$13,010,590**	**$251,010**
Renwick	Reticulation	$3,437,208	$2,735,065	$41,116
	TOTAL	**$3,437,208**	**$2,735,065**	**$41,116**
Riverlands	Reticulation	$3,800,426	$2,873,884	$45,207
	TOTAL	**$3,800,426**	**$2,873,884**	**$45,207**
Sounds	Reticulation	$220,901	$192,184	$2,209
	TOTAL	**$220,901**	**$192,184**	**$2,209**
Spring Creek	Reticulation	$2,309,830	$1,186,932	$28,352
	TOTAL	**$2,309,830**	**$1,186,932**	**$28,352**
Okiwi	Reticulation	$510,814	$353,135	$5,613
	TOTAL	**$510,814**	**$353,135**	**$5,613**
Anakiwa	Reticulation	$428,758	$227,163	$5,603
	TOTAL	**$428,758**	**$227,163**	**$5,603**
Seddon	Reticulation	$144,746	$94,043	$1,583
	TOTAL	**$144,746**	**$94,043**	**$1,583**
Grovetown	Reticulation	$117,798	$61,451	$1,445
	TOTAL	**$117,798**	**$61,451**	**$1,445**
GRAND TOTAL		**$107,029,325**	**$69,132,353**	**$1,275,912**

Appendix 6: Capital Budget 2015-18

DESCRIPTION	2015/16 Growth	2015/16 LoS	2015/16 Replace	2015/16 BUDGET	2016/17 Growth	2016/17 LoS	2016/17 Replace	2016/17 BUDGET	2017/18 Growth	2017/18 LoS	2017/18 Replace	2017/18 BUDGET
Blen Sewage Treatment Domestic	25,200	100,800		126,000	4,000	16,000		20,000	7,000	28,000		35,000
Blen Sewage Treatment Industrial	10,800	43,200		54,000	1,800,000			1,800,000	3,000	12,000		15,000
Modelled Upgrades	2,174,038	2,028,921	1,032,733	5,235,691	210,193	356,927	372,264	939,384	411,520		28,384	439,904
Springlands Green & Battys Rd	150,000			150,000								
Modelled Upgrades	1,209,700	1,224,300	1,280,000	3,714,000					717,700	432,300		1,150,000
Design and consents												
Vernon St PS	54,000	18,000	18,000	90,000								
HVL Sewage Treatment	4,500	40,500		45,000	68,200	613,800		682,000				
Picton Sewage Pumps	2,818,800	2,114,100	2,114,100	7,047,000	25,000	112,500	112,500	250,000	3,154	2,366	2,366	7,885
Picton Sewer Pipe	2,316,149	1,737,112	1,737,112	5,790,373	40,000	180,000	180,000	400,000	41,302	185,860	185,860	413,022
Picton Sewage Treatment	945,000	708,750	708,750	2,362,500					405,000	202,500	67,500	675,000
Spring Cr Sewage Treatment	17,000	153,000		170,000								