Tasman District Council

Stormwater
Activity Management Plan

2009 - 2019

August 2009

Quality Assurance Statement		
Tasman District Council 189 Queen Street Private Bag 4 Richmond 7050 Telephone: (03) 543 8400 Fax: (03) 543 9524	**Version:**	5 (August 2009)
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For full Quality Assurance Statement, Refer Appendix Z

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1. INTRODUCTION

1.1 The Stormwater Activity Management Plan: What is it and why is it Produced?

The Stormwater Activity is one of the eight engineering activities addressed in the Tasman District Council Long Term Council Community Plan (LTCCP). This Stormwater Activity Management Plan (AMP) is, therefore, strongly linked to the overall strategic direction for the district. The LTCCP is the document and process that alerts the community to the key issues and strategies contained in this document.

The purpose of this plan is to outline and to summarise in one place, the Council's strategic and management long-term approach for the provision and maintenance of stormwater drainage systems. Under Council's significance policy, stormwater is deemed to be a significant activity.

The AMP demonstrates responsible management of the District's assets on behalf of customers and stakeholders and assists with the achievement of strategic goals and statutory compliance. The AMP combines management, financial, engineering and technical practices to ensure that the level of service required by the customers is provided at the lowest long term cost to the community and is delivered in a sustainable manner.

This AMP is based on existing levels of service, currently available information and the existing knowledge and judgement of Council staff.

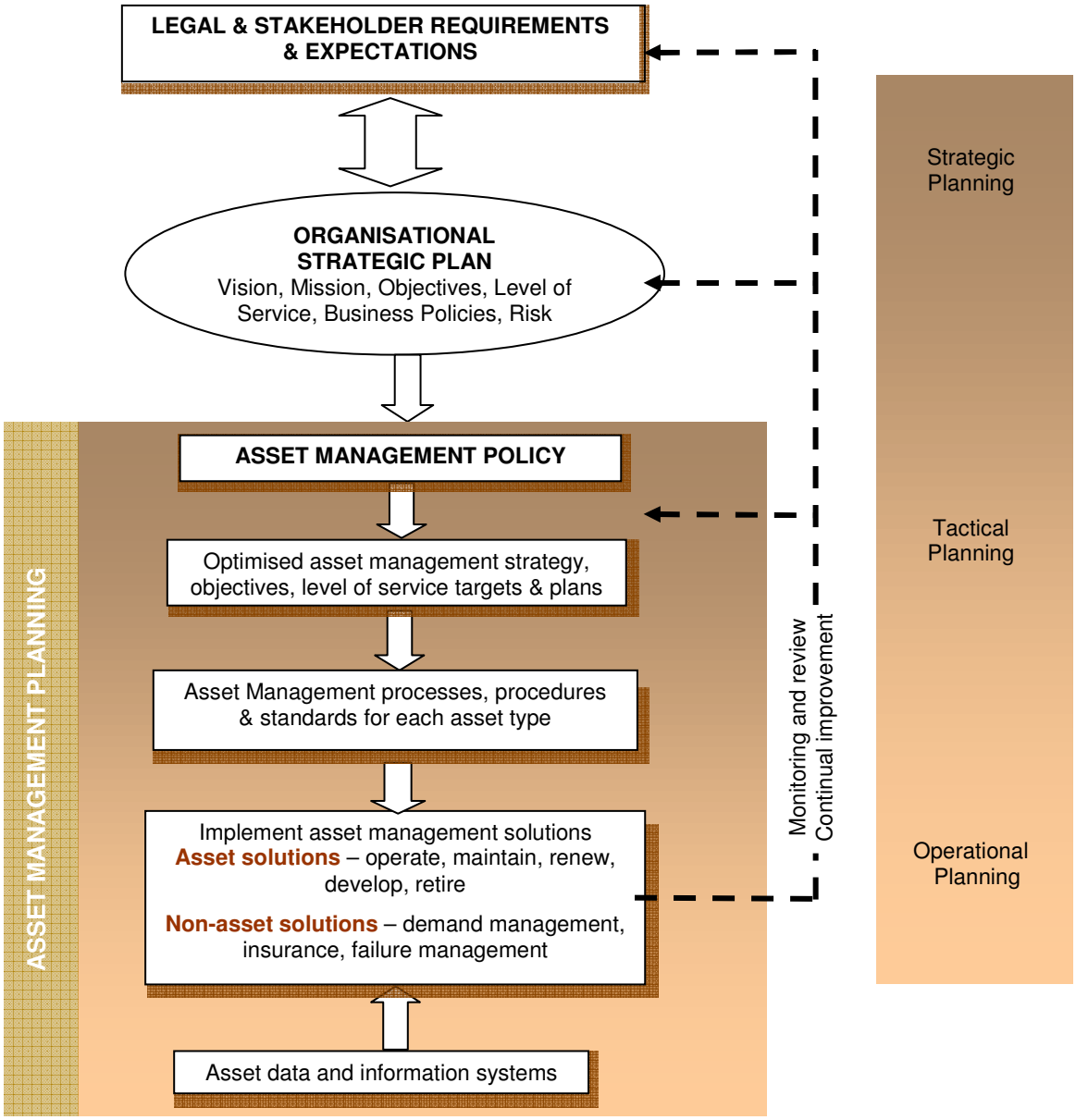
A programme of AM improvement (see Appendix V) is planned to improve the quality of decision making (e.g. predictive modelling, risk management, optimised renewal decision making) and improve the knowledge of Council's assets and customer expectations. These future enhancements will enable Council to optimise life cycle AM activities and provide a greater degree of confidence in financial forecasts.

Figure 1 - 1 depicts the activity management planning process for infrastructure assets, with fundamental links to customer expectations, legislative requirements and corporate visions and strategies.

This plan has been prepared in line with the requirements of the Local Government Act 2002 and the International Infrastructure Management Manual (IIMM), Australia / New Zealand Edition, Version 3.0, 2006.

The key drivers, linkages with other plans and legislative requirements that all feed into the development of the plans are discussed in Appendix A.

Figure 1-1: The Total Asset Management Process (Source IIMM)



1.2 Rationale for Council's Involvement in the Stormwater Activity

The ownership of stormwater assets is an important issue because of:

- The high value of the assets
- The high costs of operating, maintaining, renewing and developing the assets
- The risks and liabilities that go along with owning stormwater assets

The Council has no statutory obligation to provide for private stormwater runoff, just as it has no obligation to provide protection against wind or other natural events. This is clear in the Local Government Act (LGA) 2002 where it states that Council does not have to take responsibility for stormwater systems which service only private properties.

However, Council does have a duty of care to ensure that any runoff from its own properties is remedied or mitigated. Because most of its property is mainly in the form of impermeable roads in developed areas, this generally means that some level of reticulation system is constructed. The presence of this system then becomes the logical network for private stormwater disposal.

The provision of stormwater drainage to urban areas is something that the Council has always done historically. The service provides many public benefits and it is considered necessary and beneficial to the community that the Council undertakes the planning, implementation and maintenance of the stormwater services within the urban areas.

1.3 Justification of Asset Ownership

This AMP assumes continued Council ownership of the stormwater schemes. Arguments to justify public ownership of stormwater assets include:

1) Core Business - the provision of stormwater services is considered to be a core function of local government;
2) Public Benefit - the service is assessed as providing mainly public benefits;
3) Funding - local government has access to more favourable financing options;
4) Exclusivity - it is not practical to exclude customers from utilising the service;
5) Community Opinion - the public generally do not favour private ownership of key infrastructural assets;
6) Community Impact - the adverse effects of stormwater failure or mismanagement would mostly be felt off-site.

For these and other reasons, most Councils throughout New Zealand have to a greater or lesser degree, taken ownership of stormwater assets which service and/or run through private properties.

When and how the Tasman District Council has done this has been answered differently by the controlling local authority of the time. Consequently, the stormwater systems in the Tasman District are a mixture of private and public drains and the responsibility to maintain and repair stormwater systems is sometimes unclear.

The legal authority for Council to be involved in the management and ownership of assets is embodied in the LGA 2002 and empowers Council:

- to undertake the planning, implementation and maintenance of any work that, in the opinion of the territorial authority, is necessary or beneficial to the district, whether within or outside the district,
- to purchase, take in the manner provided for in the Public Works Act 1981, or otherwise acquire and hold, any land or interest in land which may be necessary or convenient for the purposes of or in connection with any public work that the local authority is empowered to undertake, construct or provide.

1.4 Current Ownership Policy

Council has ownership and is responsible for stormwater pipes within a road reserve or other Council property and within downstream pipe systems after collecting runoff from Council property.

Ownership of pipes servicing only private properties is less clear and sometimes these become public drains when a subdivision is completed. In general, Council may decide to adopt drainage assets where it is fair and reasonable for them to take over.

Open channels differ from pipes in that channels have sometimes been considered private responsibility despite receiving runoff from roads or other Council property. Council has decided in some instances (often due to landowner pressure) to purchase land around the drain. At other times no easement has been created and the responsibility for maintenance is unclear.

Landowners occasionally decide to pipe sections of natural waterway through their properties to enable better use of the land. Historically these pipes may have been constructed under capacity and developed in an ad hoc way. In legal terms, the landowners remain responsible for these waterways and sections of pipe and any flooding of neighbouring areas associated with private modifications or lack of maintenance.

In order to provide some clarity on the ownership of open drains, designated watercourses and pipe systems, Council has produced a policy which is included in Section 3, 'Legal Responsibility associated with Council Assets', TDC Engineering Standards 2008. TDC drawing 700 (TDC Engineering Standards 2008), illustrates Councils ownership policy as well as requirements for maintenance access.

1.4.1. Current Practice in Determining Ownership/Control during Land Development

Where new stormwater systems are constructed, Councils ownership and easement / land access requirements are required as per the TDC Engineering Standards for its range of assets, comprising pipes, channels, intake structures, detention structures, swales, and other low impact design methods.

This typically requires that for assets on private land:

- A minimum easement of 3m plus the pipe diameter (1.5m either side of the pipe) is vested to Council for maintenance for pipes up to 1.5m depth. For pipes greater than 1.5m depth, easements greater than 3m depth may be required to enable excavation (as advised by the Engineering Manager). This is a requirement of Councils policy in Section 3 of the Engineering Standards 2008.
- Maintenance access shall be provided for the full length of an open channel by either a 6.0m wide berm on one side or a 4.0m wide berm on both sides (as required by design standards on Open Channel Design, Section 7 'Stormwater and Drainage', Engineering Standards 2008).

Council has published conditions on when a stormwater asset is considered private or public. Refer to drawing 700, TDC Engineering Standards 2008.

1.5 Overview of the Stormwater Activity

This activity encompasses the provision of stormwater collection, reticulation, and discharge systems for the region of Tasman District. The assets used to provide this service include drainage channels, piped reticulation networks, tide gates, detention or ponding areas, inlet structures, and discharge structures.

The stormwater sumps and road culvert assets are generally owned and managed by the Roading Asset Group or by the NZ Transport Agency, depending upon whether or not they are State Highways.

The Council manages its stormwater activities under 15 Urban Drainage Areas and one General District Area. The General District Area covers the entire district remaining outside the Urban Drainage Areas. Typically these systems include small communities with stormwater systems that primarily collect and convey road run-off to suitable discharge points. It does not include land drains or river/stream systems. These are either the responsibility of Council under the Rivers Asset Management area or the responsibility of the landowners under the Tasman Resource Management Plan (TRMP).

The Council's stormwater assets are managed either within the 15 UDAs or the General District Area as outlined in Table 1 - 1:

Table 1-1: Categories for Stormwater Schemes

UDA	General District Area		
	Those Communities with Stormwater Reticulation	Those Communities Without Stormwater Reticulation	
Richmond	Marahau	Awaroa	Puponga
Brightwater	Upper Takaka	Best Island	Rangihaeata
Wakefield		Brooklyn	Rotoroa
Murchison		Lower Moutere	Seaford
St Arnaud		Milnethorpe	Torrent Bay
Tapawera		Motupipi	
Motueka		Pakawau	
Mapua/ Ruby Bay		Parapara	
Tasman			
Kaiteriteri			
Takaka			
Pohara			
Ligar Bay/ Tata Beach			
Collingwood			
Patons Rock			

Council operates, maintains and improves the infrastructure assets relating to stormwater on behalf of the ratepayers and undertakes to meet the level of service they require to enhance community development and improve the environmental and recreational assets relating to Tasman District.

Council has access to staff and consultants who have had a long association with the assets being managed. Most of the history of the assets is known, however, as a source of information such knowledge and experience has its limitations and a number of information systems are currently in place to monitor performance and assist in a more formal asset management process.

Day-to-day operation, inspection and maintenance of the stormwater systems are carried out by Downer EDI. This maintenance contract is administered by MWH (Professional Services Consultant).

As part of the annual budgeting exercise the Asset Managers combine their knowledge with that provided by MWH and Downer EDI to identify assets that require renewal or significant upgrades. Renewal decisions are based on issues such as high operating costs or failure rates.

Council's decision to authorise significant renewal projects typically follows a formal investigation process. Renewals are prioritised through Councils Asset Management System (Confirm Enterprise Software) which looks at whole life costs and asset life. Another system which forms part of the decision making process for renewals and capital upgrades is Councils risk management system, which is being developed.

Extensions to the existing network of assets occur through the vesting of assets associated with a new development or through direct creation to meet demand.

1.6 Key Issues and Strategic Approach

Over the last few years, there has been a shift in design philosophy on stormwater system design. Evidence of climate change on stormwater flows increases has begun to emerge and coupled together with an increasing awareness of the importance of environmental issues, Council has begun to change the way they manage their Stormwater Assets.

Stormwater is defined as overland flow originating from rainfall over land. Council has a responsibility to ensure that stormwater flows within urban drainage areas do not adversely impact on the use or operation of Council services or assets, including roads, treated water supplies, wastewater, solid waste, etc... Council also has a responsibility to stormwater flows within the general district, defined as outside of urban drainage areas.

Land use and soil type/ ground type determines the quantity of overland flows generated by any particular rainfall event (also referred to as a storm event). Urban areas typically have a high percentage of impermeable areas which prevent stormwater from soaking through into the ground as groundwater.

With urbanisation continuing to expand, the extent of impermeable drainage areas has increased, which has caused an increase in storm flows from rainfall events. Urbanisation has also impacted on natural open drainage systems, many which now are partly constrained by development either side. In some places, open drainage systems have been replaced with buried piped systems to allow for development.

Council's major responsibility is to maintain natural drainage systems and provide piped storm flow systems so that accumulated storm flows from rainfall events are intercepted and transferred through urban developed areas without causing undue disruption to the wider community or damage to council or private property. Council is committed to providing adequately sized stormwater systems up to a defined level of service (refer to Section 2) both to cope with the impacts from existing development and from the impact of future development.

A significant programme of upgrade work is required to accommodate both future development and meet an increased level of service for stormwater system performance in the Richmond UDA, requiring upgrade work to both open channel and piped systems.

The Council has increased the levels of service for the capacity of all new piped stormwater systems from a 1 in 5 year storm, to provide for a 1 in 20 year storm capacity. Over time, Council intends to upgrade parts of the existing stormwater system towards meeting the new levels of service.

Council will implement more sustainable design practices, particularly for open channel design in order to nurture existing ecosystems and maximise environmental values. Council recognises that natural systems generally need more land than engineered solutions, however, this allows for multi use / shared approach to be taken in the design of swale / environmental channel type designs, in partnership with Councils Parks and Reserves and / or developers.

Council is committed to improve the quality of stormwater discharges and will achieve this by bylaw regulation where necessary and ongoing monitoring to identify problem areas. Council has allowed for capital investments to construct stormwater treatment units and will work in partnership with Council's Roading Asset and Land Transport NZ to mitigate potential stormwater pollution runoff.

Council is committed to providing new levels of service for its stormwater assets by completing staff and public education, making capital investments to provide new or upgraded stormwater assets, and continuing with operational and maintenance programmes.

2. LEVELS OF SERVICE, PERFORMANCE MEASURES, AND RELATIONSHIP TO COMMUNITY OUTCOMES

2.1 Introduction

A key objective of this AMP is to match the level of service provided by the stormwater activity with agreed expectations of customers and their willingness to pay for that level of service. The Levels of Service provide the basis for the life cycle management strategies and works programmes identified in the AMP.

The Levels of Service for Stormwater have been developed to contribute to the achievement of the stated Community Outcomes that were developed in consultation with the community, but taking into account:

- The Council's statutory and legal obligations
- The Council's policies and objectives
- The Council's understanding of what the community is able to fund.

2.2 How Do Our Stormwater Activities Contribute to the Community Outcomes?

A full summary of the Community Outcomes is included in Appendix R.

Table 2-1 describes how the stormwater activities contribute to the Community Outcomes.

Table 2-1: How Stormwater Activities Contribute to Community Outcomes

Community Outcomes	How Our Stormwater Activity Contributes to the Community Outcome
Our unique and special natural environment is bountiful, healthy, clean and protected	Stormwater arising within urban development areas is controlled, collected, conveyed and discharged safely to the receiving environment. This activity can be managed so the impact of the discharges does not adversely affect the health and cleanliness of the receiving environment.
Our built urban and rural environments are functional, pleasant, safe and sustainably managed.	Our stormwater activity ensures our built urban and rural environments are functional, pleasant and safe by ensuring stormwater is conveyed without putting the public at risk or damaging property, businesses or essential infrastructure.
Our transport and essential services are sufficient, efficient and sustainably managed.	The stormwater activity is considered an essential service that should be provided to all properties within urban drainage areas in sufficient size and capacity. This service should also be efficient and sustainably managed.

2.3 What Level Of Service Do We Seek to Achieve?

Table 2-2 sets out the levels of service the Council has adopted. It also shows:

- the Community Outcome from which each level of service has been developed
- how we will know if we are successful in delivering the level of service.

Table 2-2: Levels of Service – Stormwater

Community Outcomes	Levels Of Service (what Council will provide)	We will know we are achieving this when…..
Our unique and special natural environment is bountiful, healthy, clean and protected	1. Our stormwater systems do not adversely pollute or degrade but sustain and nurture the receiving environment	We have stormwater quality catchment management plans (SQMPs) for each urban drainage area, which identify environmental values and set sustainable improvement targets to improve environmental values and amenity value to the community
		We have discharge consents in place for each major urban stormwater discharge (controlling stormwater quality)
		We control the discharge of pollutants from our stormwater systems to sustainable levels so there is a minimal adverse impact on the quality of our natural freshwater and marine habitats
		We apply a sustainable design approach to all stormwater system upgrades. The primary aim in the design of open channels will be to nurture and provide environmental values in keeping with the surrounding environment and in providing and enhancing amenity value to the community
Our built urban and rural environments are functional, pleasant, safe and sustainably managed.	2. Our stormwater systems collect and convey stormwater safely through urban environments, reducing the adverse effects of flooding on people and property	Stormwater drainage facilities are provided to service all Urban Drainage Areas
		Inlets, outlets, floodgates, detention dams, and watercourses are kept open at all times through a proactive maintenance programme
		Work that is considered a priority to clear obstructions reported within the stormwater system is attended within one working day of receiving notice, 90% of the time
		New primary stormwater systems (comprising a combination of open channels and/ or pipes) are capable of containing a 1 in 20 year storm event
		New secondary stormwater systems are provided to accommodate stormwater flows from a 1 in 50 year storm event so that there is no damage to or nuisance effects on people or property
		New open channels for major streams are capable of accommodating stormwater flows from a 1 in 100 year storm event that there is no damage to or nuisance effects on people or property
		Existing stormwater systems are capable of containing a 1 in 5 year storm event

Community Outcomes	Levels Of Service (what Council will provide)	We will know we are achieving this when…..
Our transport and \ essential services are sufficient, efficient and sustainably managed.	3. Our stormwater activities are managed at a level which satisfies the community	Our surveys show that at least 80% of customers are satisfied with the stormwater service they receive
		We receive less than 10 complaints per year regarding health nuisance (noise, smells, mosquitoes, etc...)
	4. We have measures in place to prevent flood damage to property and risk to the community.	We have a customer service facility for receiving and handling emergency calls 24 hours per day, 7 days per week
		Council's contractor guarantees emergency response times to attend a site in the event of an immediate flooding risk to property, including the deployment of sandbags where required
		A response to repair/ reinstate open watercourses from flood damage is completed within 24 hours 90% of the time.

The Levels Of Service that the Council has adopted for this AMP have been developed from the Levels of Service prepared in the July 2006 AMP, however the after taking into account feedback from various parties including Audit New Zealand, the Council has decided to reduce the number of levels of service so there is more focus and clarity, and to make sure that the link between the Levels Of Service adopted and the Community Outcomes is clear.

2.4 What Performance Are We Achieving and What Do We Plan to Achieve?

Details of the Levels of Service that Council is currently achieving are included in Appendix R, Table R-2. This table includes an implementation plan for each level of service, with information on Councils intentions to achieve within the next 3 years, and by the end of the next 10 year period.

2.5 What Plans Have Council Made to Meet The Levels Of Service?

In preparing the future financial forecasts, Council has included the following specific initiatives to meet the current or intended future Levels Of Service:

- Council is making a capital works investment of approx. $45 million over the next 20 year period to upgrade existing stormwater assets and improve levels of service in the stormwater system, starting with areas requiring urgent improvements to remove high risks of flooding.
- Of the above sum, the Council plans to invest $3.7 million over the next 20 years to renew stormwater assets.
- The Council has allocated a budget of $14.7 million for the Operation and Maintenance of its Stormwater Assets, including professional services for investigative work/ studies and costs to improve stormwater discharge quality. This includes a budget provision to invest in general, $100,000 per year over the next 20 year period to construct facilities to mitigate the environmental impact of stormwater discharges on the receiving environment.

3. THE EXISTING SITUATION DESCRIBED

3.1 Urban Stormwater Systems

The urban stormwater systems that are presently owned and managed by the Tasman District Council are shown in Table 3-1 below. A comprehensive description of each scheme is provided in Appendix B.

The general district covers the remaining area of the district not included in the 15 UDAs. The Council recognises that there are issues with the funding of any major upgrade in the general district area. The Council has included 5 additional UDAs. These are for the following communities: Patons Rock, Tasman, Ligar Bay/ Tata Beach, Pohara, and Tapawera.

The data displayed in the Table below has been sourced from the Councils GIS system and excludes any private reticulation systems.

Table 3-1: An Overview of the Stormwater Systems Managed by TDC

Urban Drainage Area	Channels (km)	Pipes (km)	Manholes	Other Features
Richmond (incl. Hope)	48	74	800	Detention Basins as follows: Washbourne Gardens Bill Wilkes Reserve Lodestone Road Cemetery Dam
Brightwater	8	9	120	
Wakefield	9	7	60	Eden Detention Basin
Murchison	1	1	2	
St Arnaud	-	0.1	1	
Tapawera	6	3	30	
Motueka	36	31	380	Seven tidal gate outlets
Mapua/ Ruby Bay	10	8	100	Causeway and other outfalls
Tasman	-	0.2	5	
Kaiteriteri	-	3	40	
Takaka	11	5	20	
Pohara	-	2	20	
Ligar Bay/ Tata Beach	-	3	20	
Collingwood	0.1	3	20	
Patons Rock	-	0.2	10	

Council only maintains a limited number of channels and are shown on plans included in Appendix E. The remainder of the channels are the responsibility of the landowners.

3.2 Private Stormwater Systems

There are no privately owned systems which form part of this AMP. Private supply assessments were carried out in 2004/2005. The Water and Sanitary Services Assessment (WSSA) documents, Volumes 1 and 2 underwent the public submission process and were approved by Council in June 2005. The outcomes of the WSSA have been incorporated into this AMP under Appendix C.

3.3 Asset Condition

The Asset Register was reviewed in June 2007 with assets formally valued as at July 2007 for all stormwater assets. Generally accepted theoretical design life (baselife) of the asset components were assessed in relation to a point when asset performance or condition becomes unsustainable. The base lives used in the AMP are also consistent with the lives adopted in the Asset Register. Further information on the asset records and systems utilised can be found in Appendix D.

3.4 Asset Management Practices

Council has access to staff and consultants who have had a long association with the assets being managed. The entire history of virtually all the assets is typically known. However, as a source of information such knowledge and experience has its limitations. The Councils Confirm AMS in conjunction with the Councils GIS system has been populated with Stormwater asset data with a view to using this database for future asset revaluations. Customer complaints and works carried out by the maintenance contractor are being logged against these individual assets, where they can be identified, in Confirm, This process will enable future system assessments to be made against fault histories and assist in improving data confidence.

Day to day operational, inspection and maintenance of the stormwater supply systems is carried out by Downer EDI Works (Formerly Works Infrastructure Ltd). The 688 contract which outlines work to be performed under the utilities maintenance contract commenced on 1 July 2007. This maintenance contract is administered by MWH.

As part of the annual budgeting exercise the Asset Managers combine their knowledge with that provided by MWH and Downer EDI Works to identify assets that require renewal or significant upgrades.

Renewal decisions are based on issues such as high operating costs, system inadequacies or failure rates. While there is no formal project ranking system, the Council decision to proceed with significant renewal projects typically follows a formal investigation process. A risk management system is to be developed as part of the asset management system to aid this decision making process.

Extension of the existing network of assets occurs through the vesting of assets associated with a new development.

Southbank Systems Ltd, Confirm Enterprise Software is used Councils corporate Asset Management System. The implementation and expansion of this system is ongoing.

Refer to Appendix S for more details.

4. OPERATIONS AND MAINTENANCE

4.1 Council 'Ownership; of Operations and Maintenance

The operation and maintenance of the stormwater systems has been incorporated into a single contract along with the operation and maintenance of the water supply and wastewater systems in the District. Whilst Council has recruited assistance through delegation, it is ultimately the Council's responsibility to ensure that the stormwater assets are adequately operated and maintained.

The Council has implemented a performance based contract from 1 July 2007. This contract states what the contractor must achieve within a strict set of guidelines and standards. It is then up to the contractor to determine what must be done to achieve these outcomes. This empowers the contractor to be innovative in scheduling the maintenance works, as better efficiency and effectiveness will lead to commercial gain. The theory is that the savings achieved by the contractor in the long term will lead to reduced maintenance costs to the Council and an ability to divert expenditure from maintenance to improvement.

4.2 Control and Management of Operations and Maintenance

A full explanation of how the Council manages the whole stormwater activity (its organisation arrangements, information systems, various processes and implementation tactics) is in Appendix E.

The Council has rationalised the stormwater accounts into one urban account covering the 15 UDA's and one account that covers the remainder of the District.

Downer EDi Works Ltd carries out the day to day operation, inspection and maintenance of the stormwater systems. The maintenance contract is administered by MWH who is Council's professional services provider.

Contract 688 the current Utilities Maintenance Contract includes provision for both proactive and reactive stormwater activities. The proactive element covers the bulk of maintenance works carried out with the reactive element covering one off repairs and improvements. There is additional facility for the Council to instruct and remunerate the contractor to carry out pre storm event checks on the key system assets. These are usually approved and instructed by the Engineer.

4.3 Maintenance Standards

Details of the maintenance standards and costs are in Appendix E.

4.4 Maintenance and Operating Issues

Generally the stormwater systems are kept well maintained and operate smoothly. However there are maintenance and operation issues that Council recognises and will continue to work to resolve.

The following table indicates the key operations and maintenance issues, and what Council intends to do to address these issues are summarised in Table 4-1 below.

Table 4-1: Operations and Maintenance Issues and Actions

Issue	Action Council is Taking
Lack of access for maintenance	Council is requiring a 6m access track along one side or 4m along both sides of new drains as part of the new easement requirements. Council requires easements along stormwater pipes for maintenance access and typically requires a minimum easement of 3m plus the pipe diameter (1.5m either side of the pipe) to be vested to Council. Easement to be negotiated along the existing drains to enable maintenance. Council's requirements for easements are discussed in more detail in Section 1.4 'Current Ownership Policy'.
General perception by the public that Council should maintain more drains than they do.	Use definitive list to show the public where Council owned and maintained drains are located.
Budgets have restricted what maintenance work can be done in any one year.	Council has increased budgets and developed group account to better enable flexibility to manage budgets between UDAs.
New assets such as detention dams are adding to the asset base requiring maintenance.	Council will list, log and include these new assets in the maintenance contract with clear definitions of responsibility.
Environmental Constraints	Council to prepare a register of channels with environmental constraints.
Asset Location; access to accurate plans of assets can be difficult to obtain.	Continued development of Confirm Enterprise database and GIS system.
Recognising Renewal Investment - presently there is significant renewal works being undertaken under O&M budgets, and this tends to undervalue investment in renewals.	Clarify General Ledger codes to enable identification and distinction of renewal works.

4.5 Business Continuity / Emergency Management

The Council has developed various plans that outlines the procedures that are to be followed to enable the stormwater network to continue to function to the fullest possible extent, even though this may be at a high capacity level during a civil emergency or major storm event.

These plans include:

- Nelson Tasman Engineering Lifelines Report 2008.
- Nelson Tasman Emergency Management Plan.
- TDC Emergency Procedures Manual – June 2005.
- MWH/TDC Emergency Procedures Manual – June 2005.
- Y2K report.

5. FUTURE DEMAND

5.1 Factors Affecting Demand

Council recognises that future demands for infrastructure services will be influenced by:

- Population growth and demographics
- Changes in community expectations
- Industrial demand
- Technological change
- Changes in legislation

The impact of these influencing factors on stormwater demand and the effect on the current asset infrastructure is discussed below.

5.2 Population Growth

5.2.1. District Wide Projections

The scale of population growth anticipated in the District will have a significant impact on the stormwater assets. More people generally equates to higher water demand.

The Tasman District has undergone a period of rapid growth, as shown by census population shown **Table** 5-1 below.

Table 5-1: Summary of Population Growth

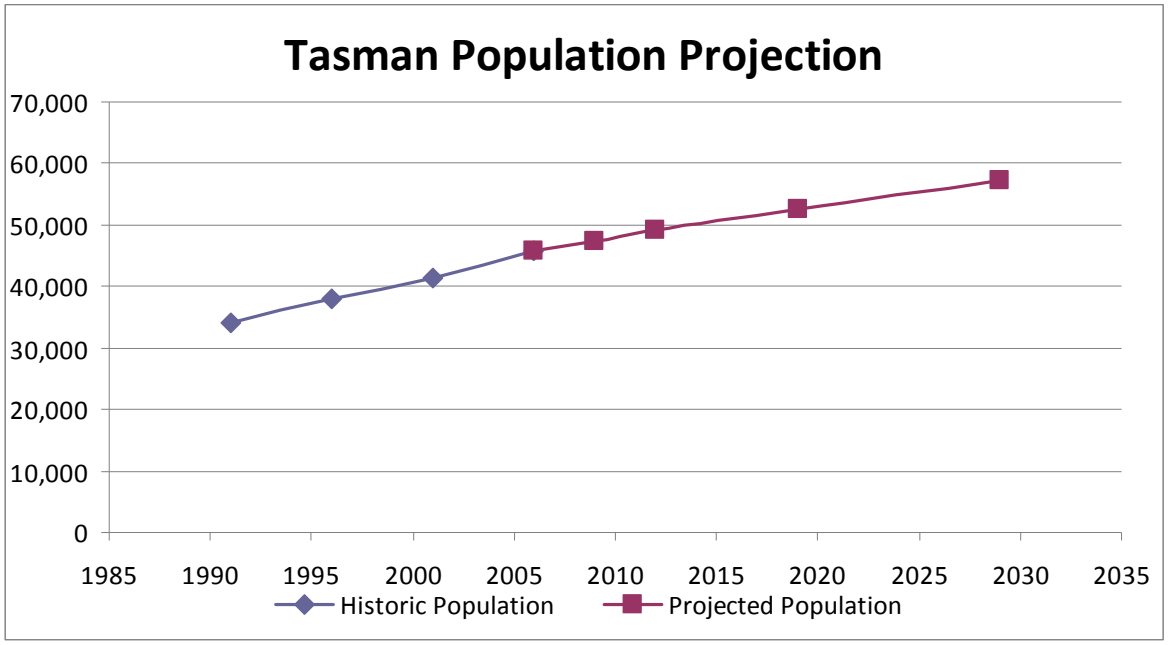
Year	Census Population For Tasman District	% Increase since last census	Average Compound Growth Rate per Annum	New Zealand Average Growth Rate per Annum
1991	34,026			
1996	37,971	11.6%	2.22%	1.41%
2001	41,352	8.9%	1.72%	0.65%
2006	45,800	10.8%	2.06%	1.51%

This shows that Tasman District has been growing at a faster rate that the national average.

For the purpose of projecting population growth and related property / dwelling growth in the district for the next 20 years and beyond, a comprehensive growth modelling analysis has been undertaken. This is summarised in Appendix F, and reported in more detail in a separate document (Refer to Appendix F for details). The resulting population projection that Council has adopted for the purposes of its infrastructure planning and financial planning is shown in Figure 5-1.

Council have adopted population projections that are consistent with Statistics New Zealand growth projections. Council has assumed medium growth for all areas except Motueka and Richmond where a high growth rate has been adopted.

Figure 5-1: Council's Desired Population Growth



5.2.2. Effects of Population Growth on Stormwater flows

The link between population growth and stormwater flows is not as direct as it is for say water supply or wastewater, however generally population growth leads to intensification of development (infill housing) and/or sub-divisional development of new areas. Both of these activities will lead to quicker and higher runoff from rainfall. The potential effects of this on the stormwater systems are:

- Increased flooding: faster and higher runoff flows will exceed capacities of existing systems more often unless upgrades are made in a timely manner.
- Deteriorating stormwater quality: increasing urbanisation is strongly linked to reductions in stormwater quality with potential adverse effects on the receiving environment.

5.2.3. New or Expanded Schemes

Projections for future increases in stormwater flows must taking into account additional flows not only from new developments but also from existing developed areas.

Anticipated new developments and changes within existing developed areas include the following significant schemes:

- Richmond South Stormwater - proposed drain/ stream widening of the Reed/ Andrews and Eastern Hills Drains and associated tributaries to accommodate the proposed Richmond South development.
- Borck Creek - major planned stream channel widening planned to accommodate a considerable area of proposed development, the Richmond West and Richmond South development areas.

5.3 Trends in Community Expectations

- Environmental awareness is leading to demand for more sustainable stormwater systems that support aquatic ecosystems, provide aesthetic and amenity value, and that consider water conservation and re-use opportunities.
- Increasing demand for higher levels of flood protection to be provided, and decreasing tolerance of flooding.
- Increasing expectation that Council should maintain more drains and waterways over a wider area.

5.4 Technological Change

Technological change has the ability to impact on the demand for a service. These changes can reduce or increase the demand for stormwater infrastructure. It has been assumed that the predicted technological changes will not have a significant effect on the assets in the medium term. However, relevant examples are:

- New or more sustainable urban drainage design in subdivision development
- New or different treatment processes that provide a higher quality and more reliable discharge quality
- Better technology to measure flood flows and analyse system performance
- Better technology to rehabilitate pipelines (trenchless technology etc)

5.5 Legislative & Strategic Change

Legislative change can significantly affect the Councils ability to meet minimum levels of service, and can require improvements to infrastructure assets. Recent and possible future legislative changes that will impact on Council's ability to meet required standards, and may require improvements to infrastructure assets are outlined below.

Recent trends suggest that there will be more pressure on the Council to improve their management of waste (including stormwater). Current initiatives that are being advanced in the central government/industry include:

- Local Government Act 2002: also introduced a new philosophical approach that encompasses government's approach to sustainable development, i.e. the concept of sustainable communities and the requirement to consider social, cultural, environmental and economic thinking in the Council's decision making, financial management and reporting. This Act encourages, from Council, a higher level of environmental management responsibility and accountability.
- Ageing Pipes and Murky Waters (PCE June 2000): Report by Parliamentary Commissioner for the Environment to identify the key sustainability issues and significant risks affecting the sustainable management of urban wastewater systems. A major conclusion in this report is that New Zealand needs to manage its urban water systems (water supply, wastewater and stormwater) in an integrated and sustainable manner.
- The Local Government Act 2002 which required Council to carry out a Water and Sanitary Services Assessment by June 2005.

The implications of these include the need for Council to:

- Know the quality of stormwater and the effect it has on the environment
- Increase its level of consultation
- Increase the integration of planning for stormwater systems (between water supply, wastewater and stormwater)

A financial allowance has been made to address some of these eventualities in this AMP. However the Council will be taking an active monitoring role to follow progress on these issues.

6. NEW CAPITAL EXPENDITURE

6.1 Future Capital Works Programme

New works are those works that create a new asset that did not previously exist, or works that upgrade or improve an existing asset beyond its existing capacity. They may result from growth, social or environmental needs. Assets may be created at no direct cost to the Council (i.e. subdivisional developments for local authorities).

The creation of entirely new systems and the significant expansion of existing systems are driven by the Asset Manager, based on public demand, political drivers or technical requirements.

Council have developed 20 year capital works programmes. Only the first 10 years of the capital works programme are reported in Council's LTCCP, however Council have decided that there is benefit in planning over a 20 year horizon to ensure the level of expenditure over the long term is financially sustainable, and that a long term view is taken on the infrastructure planning.

The Council's 20 year capital programme is included in Appendix F.

6.2 Development Standards

All new stormwater assets constructed by the Council or acquired from subdivision developments will be constructed in accordance with the latest edition of the Council Engineering Standards and Policies.

The standards are updated regularly to incorporate relevant experiences and changes in best practice.

The standardisation in designs and specifications will be considered in the interests of facilitating replacement and operational simplicity.

6.3 Deferred Capital Projects

In developing their financial forecasts, Council has prepared a full schedule of capital projects and has programmed them in order to meet the levels of service, or the meet the needs of population growth. Initially Council adopted an optimistic growth forecast which drove significant capital expenditure. When new information became available from Statistics New Zealand on the 2006 census and their population projections, Council reviewed their growth forecast and adopted a more moderate growth in alignment with Statistics New Zealand projections. This has meant that some growth driven projects have been moved back, however these have moved because Council considers the need for them will arise later, rather than because of affordability issues. Thus it is expected that with these movements in the programme, the levels of service can still be met.

The Council has considered the financial affordability of the stormwater supply capital forecasts together with forecasts from all other Council activities, and has concluded that the stormwater supply capital forecast as provided is affordable, and has thus approved the capital programme without amendment.

6.4 Funding of Future Capital Works

6.4.1. Overview

Future capital works are typically grouped into two categories:

- New Networks/Schemes
- Significant upgrades outside existing UDA boundaries.
- Works to address additional requirements within the UDA boundary.

6.4.2. Significant Upgrades Outside Existing UDA Boundaries

Significant upgrades outside the UDA boundaries are either works required to provide protection to the UDA, or works required to allow development to occur outside the UDA. With the latter case, works can be funded by:

- Extending the UDA or a new UDA to include this area into the Group Stormwater Account.
- Developers meeting the cost of extending and upgrading the system to cater for the increased flows or higher levels of service requirements.
- Financial Contribution which is a mechanism for developers to contribute towards designing for future growth capacity.

If the upgrade outside the UDA and is to provide protection to the UDA, it is funded as per Section 6.4.3 below.

6.4.3. Funding New Requirements for an Existing Scheme

This type of capital work is funded by:

- Development Contribution – for any growth related proportion of the work payable by new allotments created by subdivision.
- UDA Stormwater Account

6.5 Other Capital Works Issues

Apart from community consultation and affordability of new schemes, issues that must be addressed for many capital projects include:

- Obtaining land to build on, either by purchase or lease.
- Obtaining resource consents - this often includes consultation with affected parties (including iwi, landowners and neighbours) and other interested parties.

7. RENEWALS CAPITAL EXPENDITURE AND DEPRECIATION

7.1 Future Renewals Needs

Details outlining the Council's renewal policy are listed in Appendix I.

An asset management software system is being implemented to assist in the process of identifying under-performing assets and determining the cost of maintaining those assets. It will also support decisions of whether or not renewing the asset is the most cost effective solution. The aim is to achieve a solution with the lowest long-term costs and with an affordable cash flow programme.

The projected expenditure on renewals for the next 20 years is in Appendix I.

The following stormwater assets are planned for renewal:

- Motueka Tidal Gates - existing automated tidal gates require replacement
- Richmond Beach Road Drain - existing timber retaining walls require replacement
- Richmond Bill Wilkes Reserve - replace inlet structure on detention dam
- Richmond Gladstone Road - replace brick stormwater culvert
- Richmond Loadstone Park - replace inlet structure on detention dam
- Richmond Reservoir Creek - replace spillway and repair dam

7.2 Funding of Renewal Work

Renewal work is funded from the stormwater account in which the renewal is required. Council will decide on an ongoing basis whether or not any part of the works should be loan funded depending on the scale of work and state of the account balance.

7.3 Deferred Renewals

Renewal works identified may be deferred if the cost is beyond the community's ability to fund it. This can occur when higher priority works are required on other infrastructure assets, or there are short term peaks in expenditure or if an inadequate rating base exists.

When renewal work is deferred the impact of the deferral on economic inefficiencies and the system's ability to achieve the required service standards will be assessed. Although the deferral of some renewal works may not impact significantly on the operation of assets, repeated deferral will create a liability in the longer term.

There are no renewal projects that have been deferred in the 20 year period of this plan.

7.4 Depreciation and Decline of Service Potential

As assets age they deteriorate and the efficiency and effectiveness of the service they provide can erode. This "decline of service potential" can be very minor and take a long time, or it can be quick depending on the type of asset. Depreciation is the mechanism by which this is accounted for, and renewals are the means by assets are restored to providing an acceptable level of service. Key assumptions on the Depreciation and Decline in Service Potential are included in Appendix J. The actual value of depreciation accounted for is included in the future overall financial requirements in Appendix L.

7.5 Asset Disposals

When an asset reaches the end of its useful life and renewal or replacement is decided against, Council may elect to decommission and dispose of an asset. The Council does not have a formal strategy relating to asset disposals. Council's approach to asset disposals is summarised in Appendix W.

There are no plans to decommission and dispose of any assets in the stormwater activity in the period of this AM Plan.

8. SUMMARY OF THE OVERALL FINANCIAL POSITION INCLUDING EXPENDITURE, INCOME AND EXISTING ASSET VALUE

8.1 Overview

Council has a policy of "user pays", or those that get the benefit should pay for stormwater services. Previously each urban drainage area, and the General District, was operated as a 'closed account', and therefore each has a credit or a debit balance and reported annually.

The Council decided in 2003/04 to combine all urban drainage areas under one 'group' account. This enables the Council to manage works between each UDA more easily. The General District remains as a separate closed account.

8.2 A Statement of Financial Performance for the Next Ten Years

The future overall financial requirements for the stormwater activity over the next 10 years are provided in Appendix L.

8.3 An Explanation of the Council's Funding Policy for Stormwater

Stormwater expenditure is funded by:

- Targeted stormwater rates
- Loans
- Development contributions (DC's)
- Sundry income (dividends etc)

The main funding source is the Targeted Stormwater Rate. Those who receive the benefit, therefore, pay for the activity. It is not funded by any general rate appropriation.

Major capital projects will be generally loan funded. When loans are needed, they are taken for a fixed period, usually 20-30 years, with a fixed annual principal repayment as a capital expense on the account, and interest payments as an operating expense.

8.4 Schedule of Fees and Charges

The schedule of fees and changes for stormwater are detailed in Appendix M.

9. RESOURCE CONSENTS AND PROPERTY DESIGNATIONS

9.1 An Explanation of All Resource Consent Issues Relating to this Activity

A very important aspect of the stormwater activity is to ensure that the district's natural waterways and water resources are managed responsibly.

Stormwater drainage systems have a significant role in the environment. Open channel stormwater systems can provide a buffer between the urban and rural environments, and high value receiving waters such as rivers, estuaries, wetlands, lakes and coastal waters. In themselves they are potentially an important environmental asset providing habitats for native plants, birds and aquatic life. Conversely all stormwater discharges, whether open channels or reticulated systems, introduce a significant risk of quickly conveying contaminants into highly valued environments. Cumulative adverse effects of the build up of contaminants from urban stormwater (e.g. heavy metals) are important environmental considerations.

Stormwater quality is an issue that is attracting national interest, and it is expected that in the future, there will be more pressure to improve stormwater quality. It is not expected that this will lead to national stormwater quality standards, however it is expected that regional authorities will be more vigilant of adverse effects associated with the quality of stormwater discharges.

Presently, the driver for action is the need to demonstrate compliance with the Resource Management Act (RMA) 1991 and Tasman Resource Management Plan (TRMP), and in particular Part VI of that Plan: Discharges, Chapter 36. In terms of those Plan provisions, most discharges from Council managed stormwater systems in Tasman are considered to be "Permitted Activities" and therefore there are few discharge permits required for the stormwater activity. However to be a "Permitted Activity", a stormwater discharge has to comply with various conditions, one being that "…. the discharge does not cause or contribute to the destruction of any habitat, plant or animal in any water body or coastal water".

In order to formulate an approach to the District's Stormwater Quality, the Council intends to investigate:

- Current national practices and standards in stormwater quality management
- Current knowledge of Richmond stormwater quality and its impacts on the environment
- Possible approaches and strategies Council could employ to better manage stormwater quality.

Resource consents may also be required for stormwater inlet and outlet structures (including tide gates) on rivers and streams and on the coast; for detention and ponding areas, and flood diversion bunds within stormwater systems; and also for modifying natural streams (such as widening stream channels to increase flood flow capacity).

New developments may involve new stormwater discharges or extensions to the existing network of stormwater assets which require resource consents that Council will become responsible for when those assets are transferred from the developer to Council.

Designations are a way provided by the RMA of identifying and protection of land for future public works. Council has notified a proposed designation for stormwater drainage purposes in Richmond West (Poutama Drain), to ensure that improvements can be made to stormwater systems in the Richmond urban area.

9.2 A Schedule of all Resource Consents

A schedule of resource consents for Council managed stormwater systems is being prepared. Identifying the full suite of on-going resource consent requirements for the stormwater activity will be influenced by provisions of the pending Part IV of the TRMP: Rivers and Lakes, which will determine what consents are required for structures in river and stream beds. Refer to Appendix H for more details.

10. DEMAND MANAGEMENT

10.1 An Explanation of Council's Demand Management Policies for the Activity

The objective of demand management is to actively seek to modify customer practices and developer practices in order to:

- Optimise utilisation and performance of existing assets
- Reduce or defer the need for new assets
- Meet the organisation's strategic objectives (including social, environmental and political)
- Deliver a more sustainable urban drainage service
- Respond to customer needs

The Asset Managers have few opportunities to influence the demand for stormwater assets. Current tools used to influence and cause changes to stormwater demand are:

- Provision of information to the resource consent processes that control development of properties
- Development of Engineering Standards which require new developments to construct more sustainable urban drainage systems.

10.2 Methods of Demand Management for Stormwater

Demand Management control methods are focused on providing environmental and sustainable improvements, in line with meeting Councils Levels of Service and include introducing the requirement for developments to provide:

- Stormwater detention/retention
- Catchment management
- Sustainable sub-division development
- Stormwater re-use practices.
- Stormwater soakage and other low impact designs (sustainable urban development)
- Use of open waterways, wetlands and planting instead of pipes and canals (required in new Engineering Standards for all new assets by Council and by Developers)

10.3 Sustainable Urban Development

The use of sustainable urban development solutions or low impact designs instead of conventional piped or open channel stormwater collection system is encouraged, but there are a number of issues which once resolved can result in a preferable solution which saves costs and adds environmental and sustainable value.

- Some low impact designs require regular maintenance and designs need to allow for appropriate access to be maintained
- Many of these solutions are likely to be "non-engineered" and have an interface with other council services such as Parks and Reserves and Roading.
- Larger land areas are required but although this is true, the areas can become multifunctional and allow for amenity use
- Lack of knowledge and understanding of urban drainage solutions is often the reason why consideration is not given at the outset to a development design.

10.4 Private Stormwater Systems

Many residents within the district have their stormwater drained by means other than a Council scheme.

As discussed in Appendix C, the Local Government Act 2002 requires Council to assess all stormwater services within the District. The Council reviewed the private stormwater systems as part of the WSSA in 2005.

11. SIGNIFICANT NEGATIVE EFFECTS

Significant negative effects of the stormwater activity include:

- As a purely functional system it does not encourage or hold incentives for demand type management / sustainable practices to reduce stormwater flows at source or to have low impact design alternatives
- It is prone to illegal cross connections and overflows from sewerage systems
- Development of open swale/ environmental/ natural channels can require significant land, especially significant within urban areas
- Significant advance planning is required for the development of stormwater systems to ensure that the correct hydraulic capacity has been provided. Upsizing parts of the stormwater system is usually required as a result of upstream development increasing stormwater flows, as opposed to changes to the level of service provided
- Stormwater systems concentrate flows and pollutants at points of discharge
- Stormwater systems can accelerate flow velocity and be more prone to flooding than more natural systems, in the event of a blockage
- Stormwater systems can lead the public to believe that flooding will not occur and thus increase unwise development in areas that could flood. The presence of a stormwater system is no guarantee that that land will not flood
- An increase of funding (e.g. rates) will be required to fund further schemes

12. SIGNIFICANT ASSUMPTIONS, UNCERTAINTIES, AND RISK MANAGEMENT

12.1 Assumptions and Uncertainties

The most significant assumptions and uncertainties that underlie the project planning approach are described in Appendix Q and summarised as follows;

(a) ***Asset data knowledge:*** Assumptions have been made on the locations, condition and performance of the assets because the asset data register is not complete.

(b) ***Growth Forecasts:*** Assumptions have been made on future population growth. These assumptions greatly influence the financial forecasts.

(c) ***Network Capacity***: Assumptions are made to estimate the hydraulic capacity of open channels, culverts and closed pipe systems, but a greater level of understanding is coming from hydraulic modelling which has recently been completed for the Richmond and Mapua stormwater systems.

(d) ***Timing of Capital Projects:*** Many factors influence when projects can be implemented, some of these beyond the Council's control which have the potential to defer expenditure and require carry over of annual allocated budgets.

(e) ***Funding of Capital Projects:*** Assumptions need to be made on how to fund stormwater projects especially in terms of Council subsidies, major user contributions, development contributions, and community contributions. The timing of a project is usually critical in this respect as is the assumptions made on sources of income.

(f) ***Accuracy of Capital Project Cost Estimates:*** All projects in the capital forecasts have been estimated. A 15% provision has been included to get a "Base Project Estimate" to reflect the uncertainties in the unit rates used. A further provision has been added to reflect the uncertainties in the scope of the project. The amount added depends on the amount of work already done on the project. It is not feasible to have all projects in the next 20 years advanced to a high level of accuracy. However, it is preferable to have projects in the next 3 years advanced to a level that provides reasonable confidence about the accuracy of the estimate.

12.2 Risk Management

Council is adopting an Integrated Risk Management (IRM) framework and processes to manage risk with the organisation. Appendix Q contains a brief description of the IRM framework. The IRM process and framework is intended to:

- Demonstrate responsible stewardship by Council on behalf of its customers and stakeholders.
- Act as a vehicle for communication with all parties with an interest in Council's organisational and asset management practices.
- Provide a focus within TDC for ongoing development of good management practices.
- Demonstrate good governance.
- Meet public expectations and compliance obligations.
- Manage risk from an organisational perspective.
- Facilitate the effective and transparent allocation of resources to where they will have most effect on the success of the organisation in delivering its services.

The risk assessment is considered at 3 levels:

Level 1 – Organisational Risk

Level 2 – Asset Group Risk

Level 3 – Critical Asset Risk

At this point, Council has undertaken the Risk Assessments for Level 1 and 2, but have yet to complete the determining the appropriate risk treatment strategies for either. This has been included in the Improvement Plan. The level 3 assessment has not been started but has been planned for in the Improvement Plan.

Typical Level 1 risks include:

- Resource consents for projects may not be granted.
- Future demand is based on projected growth, which may prove to be incorrect.
- Proposed schemes may not receive public or Council support
- Land acquisition may be required and relies on a successful outcome from land negotiations.

13. STORMWATER BYLAWS

There are currently no specific stormwater by-laws but some stormwater issues are addressed in various other by-laws such as Trade Waste By-laws.

The Council intends to review the need for a stormwater bylaw.

14. PLAN REVIEW AND PUBLIC CONSULTATION

14.1 Review Process for this Activity Management Plan

This section details the programme of ongoing monitoring of AMP effectiveness and review. The AMP is a living document that is relevant and integral to daily AM activity. To ensure the plan remains useful and relevant the following ongoing process of AMP monitoring and review activity will be undertaken:

- A comprehensive review at intervals of not less than three years via the Special Consultative Procedure. Each review will be completed to coincide with the next review of the LTCCP.
- Between three yearly reviews, various asset management improvement initiatives will be undertaken as listed in the improvement plan (Appendix V). The AMP will be amended to incorporate the outcomes of these at each review.
- Quality assurance audits (Appendix Z) of AM information to ensure the integrity and cost effectiveness of data collected.

14.2 Public Consultation

The Council consults the public through various mediums as outlined in more detail in Appendix U. Through this consultation, Council concludes that:

- Where a Council Stormwater Service is provided, people are generally satisfied with the service received (over 80% satisfied from CommunitrakTM survey 2008) and are comfortable with the cost relative to the level of service provided. Only 2% want to spend less, while 63% want to spend about the same. 21% want to spend more knowing that this will increase rates and charges.
- There is a lower level of satisfaction with the stormwater service when residents not on a Council scheme are included in the survey. The data is not sufficient to make any major conclusion from this but it may indicate unmet demand for a Council service.

14.3 Intentions for Future Consultation

The Introduction of the Draft Long Term Council Community Plan outlines the Council's intent for future consultation around the LTCCP and this AMP.

Council plans to review the community outcomes in the latter half of 2010 (refer LTCCP) followed by a review of the Levels of Service for all Council activities in 2011 (refer Improvement Plan and LTCCP). The outcome of these will feed into the next revision of the AMP and LTCCP.

15. SUSTAINABLE DEVELOPMENT

Council's Vision, Mission and Objectives (refer Appendix A) demonstrate the Council's commitment to sustainable development at an organisational level. This is in line with the community wishes and the legislative requirements of the Local Government Act 2002 to promote the social, economic, environmental and cultural well beings of communities in the present and for the future.

At an organisational level, Council has:

- incorporated the 4 well beings into the community outcomes, which flow into the levels of service and performance measures
- incorporated the 4 well beings in the integrated risk management approach
- incorporated environmental, social and cultural considerations in the growth planning and modelling

In the Stormwater activity specifically, a sustainable development approach is demonstrated in the following aspects:

- Councils new Engineering Standard requires a sustainable design approach in a number of areas, namely:
    - The importance of controlling stormwater discharge quality and the impact on the health and diversity of the aquatic environment is a high priority and a legislative requirement. The Council has begun to measure current environmental values to provide a benchmark record against which to make improvements and to highlight areas requiring protection.
    - The Council require stormwater infrastructure to be cost effective and efficient in delivering the required level of service over the entire life-cycle of the stormwater system.
    - Stormwater infrastructure is designed and constructed in a way that maintains or enhances current amenity values in the immediate environment. An environmental channel design is favoured over purely functional hydraulic channels as a design option. However, the provision of a hydraulic channel must be justified based on physical land constraints or similar.
    - Demand management should be considered for all new development work as an alternative to upsizing existing stormwater systems, particularly as new development typically takes place upstream from developed areas.

- The Council plans for all Stormwater to be managed in compliance with the RMA for the discharge of water onto land or into water. The Council aims to achieve this by completing stormwater quality catchment management plans by Year 5 of the next AMP Period, to establish goals/ targets to make stormwater quality improvements. The Council plans a stormwater quality improvement programme and has budgeted for continued improvements to be made by introducing stormwater quality treatment units and completing demand management practices over the next 20 year AMP.

- Council requires new sub divisions to mitigate the impact on downstream stormwater systems from additional stormwater flows, either through demand management or through upgrading downstream culverts/ pipes or providing mitigation storage for development outside UDA's.

- The Council encourages the use of soakbeds and soakage trench design to minimise flow runoff from developed areas and the provision of open channel design (designed to closely resemble a natural stream channel shape and incorporating other features to encourage aquatic ecosystems) over the provision of piped stormwater pipe systems.

- When considering new upgrade solutions, the Council considers lifecycle cost issues. Council does not have a formal process for this, but where lifecycle cost is considered to have an impact on decision making, it is used as an evaluation criteria.

16. IMPROVEMENT PLAN

The development of this plan is based on existing levels of service, the best available current information and the knowledge and judgement of Council staff. The AMP will be the subject of on-going monitoring, review and updating to improve the quality of AM planning and accuracy of the financial projections. This process will use improved knowledge of customer expectations and enhanced AM systems and data to optimise decision-making, review outputs, develop strategies, and extend the planning horizon.

The AM improvement process involves:

- The cycle of AM plan monitoring, review, revision and audit to improve the effectiveness of AM plan outputs and compliance with audit criteria, legal requirements and good practice.
- The definition of service standards reflecting community desires through public consultation (service level review). The AM plan is used to identify service standard options and costs, and the delivery of the service standards adopted is a key objective of AM planning.
- The corporate AM co-ordination role by the AM team, which guides and audits the development of AM plans within the framework of Council's strategic direction.

Details of the specific planned improvements to Stormwater Asset Management are detailed in Appendix V.

17. SCHEDULE OF KEY PROPOSED NEW CAPITAL AND RENEWALS CAPITAL WORKS

17.1 Schedule of Works for Next 10 Years

Table 17-1 below details the capital and renewal work of significant cost programmed for years 2009 to 2019. A full list of all capital projects for the 20 year period is included in Appendix F.

Table 17-1: Funded Projects for the Next 10 Years

Activity	2009/10 to 2011/12 Years 1 to 3	2012/13 to 2018/19 Years 4 to 10	Project Driver*
Jeffries Creek, Brightwater	$227,400		GI
Mt Heslington Stream, Brightwater		$1,339,175	GI
Elizabeth Street, Collingwood		$215,600	GI
Little Kaiteriteri	$263,900		GI
Martins Farm/Motorcamp, Kaiteriteri		$36,100	GI
Able Tasman Drive, Ligar Bay		$86,200	GI
School Road, Mapua		$97,000	GI
Stormwater System Improvements, Ruby Bay	$394,600		GI
Seaton Valley Stream, Mapua	$696,100		GI
Tidal Gates General Refurbishment, Motueka		$110,000	GI
Stormwater System Improvements, Motueka	$180,000		GI
New development, Motueka		$1,076,400	G
Parker Street, Motueka		$61,600	GI
Pool St/ High St, Motueka	$1,030,285		GI
Wharf Road Tidal Gates, Motueka		$183,400	GI
Old Wharf Rd, Motueka	$212,100		GI
Stormwater System Improvements, Murchison		$54,300	GIR
Main Road, Paton's Rock	$494,500		GI
Pohara Main, Pohara	$224,000	$224,000	GI
Pohara Valley, Pohara		$259,700	GI
Bill Wilkes Reserve, Richmond	$93,000		GIR
Borck Creek – Widening – Stage 1		$3,029,220	GI
Hill Street Stormwater System Upgrade, Richmond		$1,225,210	GI
Loadstone Park, Richmond		$137,800	GR
Middlebank Drive, Richmond		$3,193,000	GI

Activity	2009/10 to 2011/12 Years 1 to 3	2012/13 to 2018/19 Years 4 to 10	Project Driver*
Poutama Drain, Richmond	$174,570	$1,571,130	GI
Queen Street, Richmond		$2,969,000	GI
Reservoir Creek, Richmond	$860,500		GIR
Hart Drain Dam, Richmond		$193,800	G
Land Purchase for Richmond South and Richmond West, Richmond		$2,475,000	GI
Waitapu Road, Takaka		$146,600	GI
Meihana Street, Takaka		$60,540	GI
Commercial Street, Takaka		$240,000	GI
Land Drainage Improvements/ Culvert Upgrade, Tasman	$253,600		GI
Eden Stream, Wakefield		$39,410	GI
Stormwater System Upgrade, Whitby Road, Wakefield		$567,400	GI
Strategic Improvement Review, St Arnaud	$13,200		GI

* Project Drivers: G = Growth, I = Increased Level of Service, R = Renewal
[Does not include Inflation]

APPENDIX A. LEGISLATIVE AND OTHER REQUIREMENTS AND RELATIONSHIPS WITH OTHER PLANNING DOCUMENTS AND ORGANISATIONS

A.1 Introduction

In preparing this AMP the project team has taken account of:

- National Drivers – for example the drivers for improving Asset Management through the Local Government Act 2002, and drivers for improving stormwater quality through the Resource Management Act (RMA) 1991.
- Local Drivers – for example the Community Outcomes determined through consultation with the public through the Long Term Council Community Plan (LTCCP)
- Linkages – the need to ensure this AMP is consistent with all other relevant plans and policies such as the Trade Waste Bylaw 2005
- Constraints – the legal constraints and obligations Council has to comply with in undertaking this activity.

A.2 Key Legislation and Industry Standards, and Statutory Planning Documents

A.2.1. Key Legislation

- The Local Government Act 2002

  [Especially Part 7, Schedule 10]
- The Resource Management Act 1991
- The Climate Change Response Act
- The Civil Emergency Management Act 2002 (Lifelines)
- The Government's Sustainable Development Action Plan
- The Local Government (Rating) Act 2002
- The Health and Safety in Employment Act 1992
- The Building Act 2004
- The Land Transfer Act 1952
- Land Drainage Act (1908)
- Rivers Board Act (1908)
- Soil Conservation and Rivers Control Act (1941)
- Council's District Plan
- Tasman Resource Management Plan (TRMP)

Some of the legislative requirements that the Council must act within are discussed in more detail as follows:

a) Local Government Act 2002 as it applies to Stormwater Assessments

Under Part 7 of the Local Government Act 2002 (and Section 285), required every local authority to complete an approved Water and Sanitary Services Assessments (WSSA) of all stormwater drainage in its District before 30 June 2005.

The WSSA documents were made available to the public for consultation purposes and a special meeting was held in June 2005 to review public submissions.

Council approved the WSSA documents in June 2005 and therefore met the requirements of the Local Government Act 2002 that the first assessment be adopted before 30 June 2005.

b) Local Government Act, Land Drainage Act, Rivers Boards Act, Soil Conservation and Rivers Control Act

The Local Government Act empowers District Councils to provide public drains. It also empowers Council to cleanse, repair and maintain their drainage infrastructure as necessary for effective drainage. Council also has powers under the Land Drainage Act (1908), Rivers Boards Act (1908), and Soil Conservation and Rivers Control Act (1941). The Asset Management Department takes on the service provider roles enabled through these Acts.

Note these statutes empower, but do not require, Council to provide drainage works. However, once Council does provide or take over control of systems, which enable and protect developments, there is an ongoing duty to continue this protection.

c) Resource Management Act

In relation to stormwater, the Resource Management Act 1991 deals with:-

- the control of the use of land for the purpose of the maintenance and enhancement of the quality of water in water bodies and coastal water;
- discharges of contaminants into water and discharges of water into water;
- the control of the taking, use, damming and diversion of water, including:
  - the setting of any maximum or minimum levels or flows of water;
  - the control of the range, or rate of change, of levels or flows of water; and

The RMA requires Council to sustain the potential of natural and physical resources to meet the reasonable foreseeable needs of future generations.

The Environment and Planning Department are responsible for the regulatory functions of Regional Council to control the use, development and protection of land, discharges etc, and do this through provisions and rules in the Regional Plan.

The Asset Management Department is responsible for complying with those rules in the management of public stormwater systems.

The Resource Management Act also requires Council to take into account the principles of the Treaty of Waitangi.

d) Building Act

This Act requires that buildings and site works are constructed to protect people and other property from the adverse effects of surface water. The Environment and Planning Department of Council are responsible for the enforcement of the Building Code which is enabled through the Building Act.

The ***Building Code*** requires that:

- Urban runoff from a Q10 rain event is disposed of in such a way as to avoid likelihood of damage or nuisance to other property.
- Surface water from a Q50 event does not enter buildings.
- Secondary flow paths are taken into account

A.2.2. Statutory Planning Documents

Council has several statutory planning documents to implement its responsibilities under the Resource Management Act 1991. These guide the processing of resource consent applications for stormwater discharges to land or to water bodies, and for land disturbance or waterway interferences that may be associated with stormwater reticulation.

The following plans influence the location, design and construction of stormwater reticulation networks:

a) Tasman Regional Policy Statement - Operative 2001

An overview of significant resource management issues with general policies and methods to address these.

b) Proposed Tasman Resource Management Plan - Notified 1996

A combined regional and district plan with statements of issues, objectives, policies, methods and rules addressing the use of land, water, coastal marine area and discharges into the environment. This plan largely supersedes the Tasman District Transitional District Plan (comprising the Waimea, Golden Bay, Motueka and Richmond planning schemes).

c) Variations to the Proposed Tasman Resource Management Plan - Notified 1996

Variations 49 & 50
Richmond South Development Area and Sustainable Urban Development Provisions
[Covers planning map amendments, Richmond South Development Area Design Guide, Schedule of amendments to the TRMP]

Variation 56
Stormwater (Notified July 2007)
[Proposals to amend provisions in Proposed Tasman Resource Management Plan, which encourages stormwater management within land use and subdivision activities and introduces the concept of low impact stormwater design (LID) for the effective management of stormwater.]

Variation 61 & 62
Richmond West Development Area
[Planning map amendments]

Variation 63
Richmond West Development Area
[Sustainable urban development provisions]

d) Richmond West proposal regarding design of Borck Creek

Agreement between Council and Landowners regarding the design of the Borck Creek Channel
Regional Plan (Land) - Operative 1998
The Regional Plan (Land) is superseded by Chapter 12 and Section 18.6 of the TRMP

A.2.3. Industry Guidelines/ Standards

The following guidelines/standards determine stormwater system design:

a) NZS 4404 (Code of Practice for Urban Subdivision)

b) Sustainable urban drainage systems, Best practice manual – CIRIA Report 523

c) Tasman District Council Engineering Standards

The TDC Engineering Standards require that:

- new primary stormwater systems are designed for a 1 in 20 year storm event, comprising a combination of open channels and / or pipes
- new secondary stormwater systems are provided capable of accommodating stormwater flows from a 1 in 50 year storm event in a way that does not cause damage to or nuisance effects on people or property
- existing stormwater systems have a capacity to contain at least a 1 in 5 year storm event.

A.3 Key Stakeholders

Stakeholders are those individuals and organisations that have an interest in the management and/or operation of the assets. Stakeholders include, but are not limited to:

National Industry Organisations:

- New Zealand Hydrological Society
- INGENIUM (Association of Local Government Engineering New Zealand)
- NZWWA (New Zealand Water and Wastes Association)
- MfE (Ministry for the Environment)
- DOC (Department of Conservation)
- IPENZ Engineers New Zealand
- NIWA (National Institute of Water & Atmospheric Research Limited)
- Stormwater Industry Association (Australia)
- ERMA (Environmental Risk Management Association)
- Local Government New Zealand
- PCE (Parliamentary Commissioner for the Environment)

Local Stakeholders

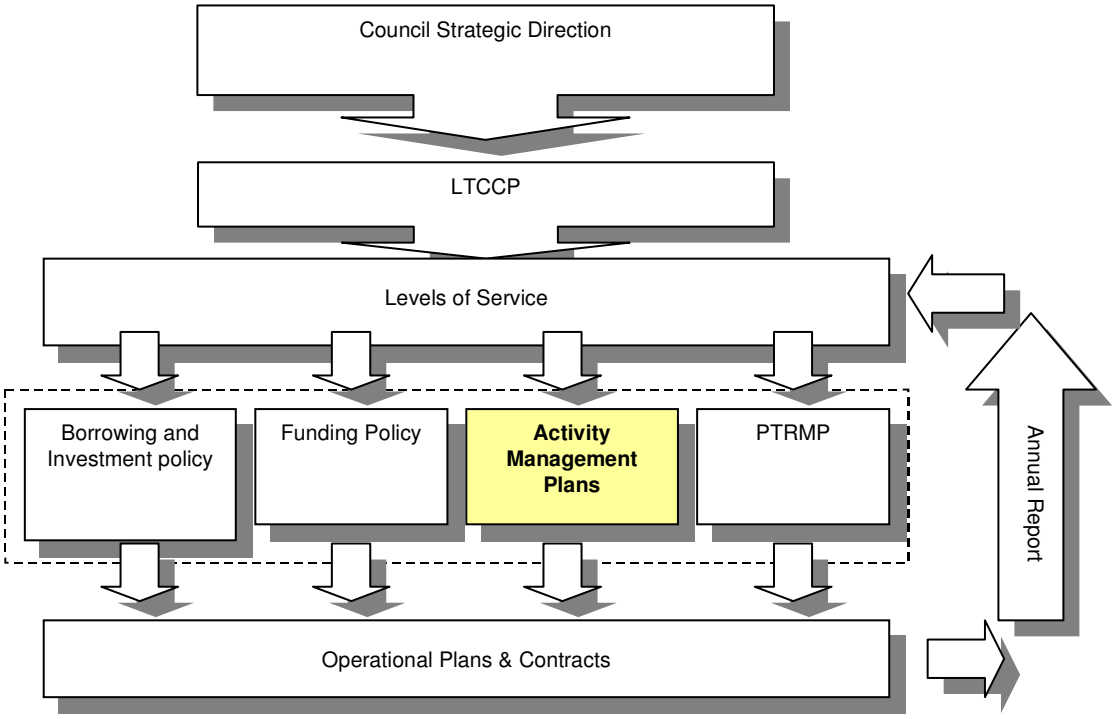
- The elected representatives (Councillors and Community Boards)
- Tasman community of owners, residents and ratepayers
- Tangata Whenua
- Regulatory and monitoring bodies including Tasman District Council (E&P), Ministry of Health, Ministry for the Environment, Department of Conservation, Audit NZ
- Environmental and Recreational Interest Groups including Fish and Game New Zealand, Royal Forest and Bird Protection Society and Friends of Nelson Haven and Tasman Bay
- Tasman District Council employees
- Consultants and contractors

A.4 Links with Other Documents

This Activity Management Plan is a key component in the Council's strategic planning function. Among other things, this Plan supports and justifies the financial forecasts and the objectives laid out in the Long Term Council Community Plan (LTCCP). It also provides a guide for the preparation of each Annual Plan and other forward work programmes.

Figure A-1 depicts the links between Council's asset management plans to other corporate plans.

Figure A-1: Hierarchy of TDC Policy, Strategy and Planning



Council Strategic Direction is outlined in the Vision, Mission and Objectives of the Council:

Vision: An interactive community living safely in the garden that is Tasman District.

Mission: To enhance community wellbeing and quality of life.

Objectives:

Objective 1:
To implement policies and financial management strategies that advance the Tasman District

Objective 2:
To ensure sustainable management of natural and physical resources, and security of environmental standards

Objective 3:
To sustainability manage infrastructural assets relating to Tasman District

Objective 4:
To enhance community development and the social, natural, cultural and recreational assets relating to Tasman District

Objective 5:
To promote sustainable economic development in the Tasman District

Table A-1: Strategic Documents Utilised During the Planning Process

LTCCP	The Long-term Council Community Plan. The primary instrument for the Council to report on its intentions on delivering its services to the community. The LTCCP supersedes the Long Term Financial Strategy (LTFS) and traditional Annual Plan.
Strategic Plan	This is the broad strategic direction of Council set in the context of current and future customer requirements. The AMP is the tactical plan with a view to achieving the strategic targets.
Annual Plan	The service level options and associated costs developed in the AMP will be fed into the Annual Plan consultation process. The content of the Annual Plan will feed directly from the short term forecasts in the LTCCP.
Financial and Business Plans	The financial and business plans requirement by the Local Government Amendment Act (3). The expenditure projections will be taken directly from the financial forecasts in the AMP.
Contracts	The service levels, strategies and information requirements contained in the AMP are the basis for performance standards in the current Maintenance and Professional Service Contracts.
Operational Plans	Operating and maintenance guidelines to ensure that the schemes operate reliably and equipment and plant is maintained in a condition that will maximise their useful service life.
Corporate Information	Quality AM is dependent on suitable information and data and the availability of sophisticated AM systems which are fully integrated with the wider corporate information systems (e.g. financial, property, GIS, customer service, etc.). Council's goal is to work towards such a fully integrated system.

A.5 Legislative and Planning Requirements – Summary

There is a move within many New Zealand Councils to improve the quality of stormwater discharges and developing/ upgrading the stormwater system with sustainability issues in mind. This has picked up momentum in recent years and is driven by the requirements embedded in the Resource Management Act 1991. Regulatory authorities have made it clear that stormwater quality improvements should be made by local Councils and that the impact on discharging to the surrounding environment should be taking into consideration to determine the level of treatment required.

Many Council's have started a programme of stormwater quality improvement works and it is hoped that all parties will recognise that immediate changes cannot be made, but properly planned and targeted, significant improvements can be made within the first five years of this AMP.

Council's policy for Stormwater Asset Management and Operation is driven by legislative, planning requirements and from local community requirements, which give rise to a number of key activity drivers as follows:

- Completion of Stormwater Quality Management Plans for each Urban Drainage Area
- Improve stormwater quality discharges
- Apply a sustainable design approach to stormwater system upgrades
- Develop new open channels in line with environmental channel design standard
- Increase levels of service
  - New primary stormwater systems designed for a 1 in 20 year storm event
  - New secondary stormwater systems designed for a 1 in 50 year storm event
  - New open channel for major streams designed for a 1 in 100 year storm event
- Proactive maintenance of critical aspects of the stormwater system
- Effective reactive maintenance response
- Risk Management Process and Risk Mitigation Plan.

APPENDIX B. OVERVIEW OF COUNCIL OWNED STORMWATER NETWORKS IN THE DISTRICT

Plans illustrating the extent of Council's stormwater system in each UDA are enclosed in Appendix Y, Stormwater UDA Boundaries.

There are fifteen stormwater UDA's within the Tasman District, an increase of five UDA's since the last AMP.

B1 Richmond UDA

B2 Brightwater UDA

B3 Wakefield UDA

B4 Murchison UDA

B5 St Arnaud UDA

B6 Tapawera UDA

B7 Motueka UDA

B8 Mapua/ Ruby Bay UDA

B9 Tasman UDA

B10 Kaiteriteri UDA

B11 Takaka UDA

B12 Pohara UDA

B13 Ligar Bay/ Tata Beach UDA

B14 Collingwood UDA

B15 Patons Rock UDA

B.1 Richmond UDA

B.1.1. System Overview

The Richmond UDA is the most developed and densely populated UDA in the Tasman District. Much of the stormwater flows originate from the Richmond foothills, which slope away from the developed areas towards an elevation of approx. 600m. Much of the foothills area is forested but is subject to periodic harvesting. There are a number of gullies which route through stormwater flows into a number of places within the urban area.

The UDA has three distinct drainage catchments:

1. South Richmond and Borck Creek
2. Jimmy Lee Creek (CBD)
3. Reservoir Creek

The stormwater systems outside the built up developed areas are predominantly open channels with culvert crossings under roads and other services. In some places, detention dams have been located to "control" stormwater flows in strategic places to reduce peak flows and the severity/ likely hood of flooding risk further downstream. In Richmond, there are seven such structures:

- Olympus Way Detention Pond
- Cemetery Dam Detention Pond
- Blair Terrace Detention Pond
- Washbourne Gardens Detention Pond
- Bill Wilkes Reserve Detention Pond
- Loadstone Road Detention Pond
- Reservoir Creek Detention Pond

Since these control peak flows reaching the lower parts of the catchments, the maintenance of the inlets and outlets of these structures is a high priority.

Much of the stormwater system within the developed area is piped. The major piped stormwater systems convey stormwater along Oxford Street Queen Street, Salisbury Road and Gladstone Road. These link up and intercept and convey stormwater from major open drain systems originating from Reservoir Creek, Jimmy Lee Creek and the Hart Drain.

Much of the stormwater flows in a northerly direction from its source of origin into the CBD area. In many places the existing piped stormwater system is under capacity, a problem, which has been compounded as a result of the continuous development of Richmond originating from the CBD outwards towards the foothills.

The Richmond Urban Drainage Area comprises six sub catchments:

1. Eastern Hills and Reed/ Andrews Drain
2. Borck Creek
3. Jimmy Lee Creek
4. Central Richmond Catchment (Gladstone Rd/ Beach Rd)
5. Lower Richmond Catchment
6. Reservoir Creek Catchment

Within these six sub catchments, there are three distinct stormwater discharges into Tasman Bay:

1. Borck Creek (draining flows from the Eastern Hills, Reed Andrews and Borck Creek)
2. Jimmy Lee Creek (draining into Beach Road Drain)
3. Reservoir Creek

The characteristic of each sub catchment is described in more detail as follows:

B.1.2. Eastern Hills and Reed/ Andrews Drain Catchment

This area has two distinct catchments of the Eastern Hills Drain and of the Reed/ Andrews Drain catchments, which are situated adjacent to each other, and drain an area of Southwest Richmond UDA. They both have similar catchment characteristics and intercept stormwater overland flows from the Richmond Hills, from an area of land steeply sloped and comprising rural or forested land types.

Much of the catchment areas are rural and undeveloped but some urban areas are situated particularly within the Eastern Hills Drain catchment, off Hart Road and indeed much of the area between Gladstone road and Paton Road/ Bateup Road is developed.

The Reed/ Andrews Drain has two tributaries that intercept stormwater overland flows south of Paton Road, which are the Whites Drain and the Whites Drain East. Much of the land draining to the Reed/ Andrews Drain is rural, however a significant area of this land is zoned for future residential development.

Further towards central Richmond is the Eastern Hills Drain catchment, which is roughly twice the size of the Reed/ Andrews Drain. Two tributaries of the Bateup Drain and the Hart Drain intercept Stormwater flows south of Paton Road. Flows from these two drains combine at the junction of Bateup Road and Wensley Road, which forms the Eastern Hills Drain. From this point, flows pass through a residentially developed area before being culverted under State Highway 6 and through a short open ditch section to join Borck Creek.

There are proposals to redistribute flows away from the Eastern Hills Drain with the diversion of the Bateup Drain into the Reed/ Andrews Drain system, in order to relieve flooding problems in the Eastern Hills Drain and in anticipation from increased runoff flows from additional development. These proposals are in line with plans for substantial residential development in this area and are required to alleviate flooding risk ahead of this planned development.

B.1.3. Borck Creek Catchment

Borck Creek was excavated through swamp lands in east Richmond in the 1970's by the Nelson Catchment Board. The drains purpose is to divert floodwater away from entering into the main town area and into the Beach Road drain system.

This is the major catchment area for stormwater drainage flows from the Richmond UDA and adjacent land areas. This drains a large area to the south and west of Richmond UDA and intercepts flows to convey them away from the Richmond UDA (North West of State Highway 6). Borck Creek is a large open water trapezoidal channel which cuts across rural land from the junction of Ranzau Road and State Highway 6, through towards McShane Rd and Lower Queen Street, where it passes adjacent to Headingly Lane to discharge into Tasman Bay.

This has a number of major culvert and bridge crossings over State Highway 6, State Highway 60 (Appleby Highway) and Lower Queen Street. Other open drains which join Borck Creek are the Reed/ Andrews Drain and the Eastern Hills Drain. There are plans to construct a third major open drain to convey stormwater flows from an area of the central Richmond Urban area, to relieve pressure and reduce flooding risk with the construction of the Poutama Drain.

B.1.4. Jimmy Lee Creek Catchment

The Jimmy Lee Creek Catchment drains from the steep valleys of the Richmond foothills into residential zoned land upstream of Hill Street, where it joins the CBD piped stormwater system, entering into a major piped stormwater system in Oxford Street by Washbourne Gardens.

The Jimmy Lee Creek comprises of two main open channel tributaries, which pass through residential zoned land and combine at the Bill Wilkes Reserve flood park. From here the channel passes through Washbourne Gardens (which acts as a second flood pond area) and into the Oxford Street piped stormwater system (Upper Richmond Catchment).

B.1.5. Central Richmond Catchment (Gladstone Rd / Beach Rd)

This catchment is densely populated and is primarily residential with a significant portion of commercial development. Beach Road drain is the main arterial stormwater channel draining this area and a significantly modified natural stream, discharging to the Waimea Inlet. Stormwater flows join into the Beach Road drain from the Jimmy Lee Creek and the reticulated stormwater system draining the central business area of Queen Street and Oxford Street and Gladstone Road.

Two 1500 dia. pipes carry stormwater flows along Gladstone Road to discharge into Beach Road drain. These intercept flows joining from the 900 dia. pipe along Queen Street, a major twin 1200 dia. pipe system along Oxford Street (flows from Jimmy Lee Creek via Washbourne Gardens) and other parts of the reticulated piped stormwater system further along Gladstone Road.

The coverage of the reticulated stormwater system in this catchment picks up flows from the upper residential areas beginning at Hill Street.

The other major stormwater discharge into Beach Road is from a twin 1350 dia. pipe system serving parts of the CBD (McGlashen Avenue through to Croucher and Talbot Streets).

These major piped systems discharge into the head of the Beach Road open drain, a steep sided (mostly vertical and supported/ formed with a wooden retaining wall), a purely hydraulic functional channel.

B.1.6. Lower Richmond Catchment

This is an area between Queen St, Salisbury Rd and the State Highway and is predominantly residential although this also includes an area of commercial development on the Queen Street side and some light industrial/ commercial development in the Northeast corner.

The majority of the catchment runoff is intercepted and drains through a number of piped systems under the Richmond Deviation (State Highway 6) to discharge into Tasman Bay. A part of the Northwest catchment drains into the Beach Road open drain through a piped system.

B.1.7. Reservoir Creek Catchment

Reservoir Creek drains the Richmond foothills on the Nelson side of Queen Street. The upper reaches are in the Barnicoat range and are steep and partly forested.

Immediately above Hill Street and between Hill Street and Salisbury Rd the area is zoned residential. Below Salisbury Rd the stream collects runoff from a small area of rural land before discharging under the Richmond bypass into Tasman Bay.

A significant portion of the residential area along the North Eastern side of the catchment has been developed recently, however a large area within the Reservoir Creek catchment remains to be developed, referred to as the Richmond East development area. In places, such as the recently developed area in the lower part of the catchment, Reservoir Creek has been upgraded to pass a Q_{50} return period flow and some detention storage has been provided.

B.1.8. Strategy

The key issues for the Richmond UDA are:

- Significant development is planned around the central dense residential developed area, with potential to further increase stormwater flows through the piped and open channel stormwater systems. Many piped systems in the central area were originally designed to accommodate flows from the immediate central areas but with recent significant development in many areas, many parts of the system do not provide a satisfactory level of service.

- The natural pathway for Stormwater Flows is in a northerly direction, against many of the main infrastructure routes and road layout on a North West to South East grid. As development takes place this is leading to an increase in peak stormwater flows which naturally pass into the more densely populated areas.

- Significant development (residential, commercial and light industrial) took place around a number of key open drains such as the Reed/ Andrews and the Eastern Hills Drains and now provides a constraint against drain widening.
- There are a number of significant areas of land allocated for future residential development to the north west of State Highway 6, within the Reed/ Andrews and Eastern Hills catchments and east of central Richmond, all which will increase future stormwater flow peak levels and volumes.
- The Reed/ Andrews Drain and Borck Creek have crossings under State Highway 6 and 60 (Appleby Highway) through box culverts, and proposals to increase the size of any culvert crossing will require the approval of Transit NZ.
- The levels of service has been increased to provide a level of protection for new stormwater systems to a 1 in 20 year storm return period from a 1 in 5 year storm return period. This will increase expectations to upgrade a number of stormwater systems in Richmond.

The strategic approach to managing the Richmond UDA is to:

- Redistribute flows within the Richmond catchment to areas of the stormwater system which currently have a greater level of capacity.
- Secure areas of land for future ditch widening (in advance of future work, where possible) to accommodate additional stormwater flows from future development.
- Upgrade the piped stormwater system in a number of areas to provide an acceptable level of service.
- To prevent additional flows from future development throughout the Richmond catchment to increase stormwater flows on the central piped stormwater systems, which are already overloaded and regularly surcharge; In particular the Gladstone Road and Oxford Street piped stormwater systems.
- Complete a stormwater catchment management plan, to form a number of goals/ targets for stormwater quality improvements
- Implement a programme for stormwater quality improvements applying a mixture of source control measures, strategic system midpoint controls and system discharge controls

Particular proposals include:

- Complete an integral drainage catchment management plan to better assess flooding issues while planning for stormwater system upgrades to incorporate planned development.
- Complete an environmental assessment of stormwater quality and a stormwater quality catchment management plan
- Implement stormwater quality improvements
- Implement a strategic upgrade plan to widen Borck Creek from Headingly Lane through to the Reed/ Andrews Drain, providing significant environmental improvements and developing in a sustainable way to provide for future planned development and a new 1 in 100 year level of service. Work has begun to widen Borck Creek with an environmental channel type design from its discharge point at Headingly Lane and is due to continue upstream towards State Highway 60 and tie in with widening work planned for the Reed/ Andrews Drain
- Widen the Reed/ Andrews Drain and improve the hydraulic capacity of the Eastern Hills Drain including widening associated tributaries of Hart Drain, Bateup Drain, Whites Drain East and Whites Drain, all within the area of proposed development of Richmond South. A project is included within this upgrade strategy to divert the Bateup Drain away from the Eastern Hills Drain and into the Reed/ Andrews Drain system instead
- Improvement work to Reservoir Creek Dam to remove a leakage problem and lower top water storage levels coupled together with providing a new spillway to improve its serviceability and extend its asset life
- Complete replacement of the timber retaining walls on Beach Road Drain and other work to improve the hydraulic capacity and level of service which will provide opportunities to improve aesthetic and amenity values and public accessibility in this area
- Provide a new strategic piped stormwater system to route through stormwater flows from the Middlebank Drive area and Olympus Way through to the Gladstone Road, and connecting to the new Poutama Drain. This will also incorporate an improvement plan to remove the Cemetery Dam which will be bypassed with a new stormwater pipe cross connection into the new Middlebank Drive stormwater system and also in removing Olympus Way detention dam.

- Provision of a new open drain (the Poutama Drain), to relieve stormwater flow loading on the Beach Road drain system, effectively diverting a part of the central Beach Road catchment to flow into Borck Creek
- Upgrade the stormwater pipe system in Queen Street to provide additional hydraulic capacity and replace a structurally deficient stormwater pipe, also to relieve stormwater flooding issues at the Salisbury Rd roundabout on the junction with Queen Street
- Upgrade the piped stormwater system in Oxford Street between the twin 1200 pipes in the lower section of road and Washbourne Gardens
- Provide a new stormwater piped system on Hill Street between Kingsley Place to Angelis Avenue, to discharge into the Reservoir Creek open channel
- Improvement work to Bill Wilkes Reserve and Loadstone Park inlet structures to improve their performance
- Modification work to improve the hydraulic efficiency at the Easby Park intake structure

B.1.9. Level of Service

A stormwater hydraulic model was completed on the recommendation from the last AMP review and has provided an overview of the hydraulic capacity within the Richmond piped and open channel stormwater system.

Other useful inputs to assess the level of service provided are from observations and knowledge of the staff involved in managing and maintaining the assets and on records of historical flooding.

B.1.10. Eastern Hills and Reed/ Andrews Drain Catchment

A study[1] was completed by Council in December 2005 to make recommendations to upgrade stormwater drains in the South Richmond Area, covering the catchments of the Eastern Hills and the Reed/ Andrews Drains. Although severe flooding of properties is not an issue currently, a substantial amount of residential development is planned. As a strategic measure, a review was carried out to secure land ahead of future development to enable ditch widening in the future. The study identified a number of local flow restrictions with levels of service restricted to Q_1 and Q_2 storm return period.

Overall the capacity of the Eastern Hills Drain was assessed to be less than satisfactory in places although still a relatively high level of service of a Q_{15} storm return period. However, there has been recent development close to the lower reaches of this ditch in the Bateup Road area although there may be no reported historical flooding there is the potential for flooding in the future.

The mostly rural catchment of the Reed Andrews Drain was determined to have a satisfactory level of service of Q_{50} storm return period, although with a local restriction past the Sutton and Holler properties immediately u/s of State Highway 6.

It is estimated that the existing system provides levels of service in the region of:

Drain	Level of Service	Notes
Eastern Hills Drain	Approx. Q_5 lower reach Approx. Q_{20} upper reach	1 in 5 year return period between Borck Creek and Bateup Road in places 1 in 20 year return period between Bateup Road to Wensley Road
Reed Andrews Drain	Approx. Q_{50}	1 in 50 year return period except past Sutton and Holler properties where capacity is restricted to the order of Q_5, (1 in 5 year return period flows) immediately upstream of State Highway 6

[1] South Richmond Development Area Study - Stormwater concept design, MWH, December 2005

The study made recommendations to transfer flows across to the Reed/ Andrews drain with the diversion of the Bateup Drain and to provide a level of service for a Q_{100} storm return period (with 200 mm freeboard) for the whole area. The impact of the proposed drain diversion should be to reduce storm flows into the Eastern Hills drain so that no ditch widening would be required even with accommodating the proposed residential development. However, substantial ditch widening would be required to the Reed/ Andrews Drain, although this passes through mostly rural land (which has been zoned for residential development).

Proposals to widen the Reed Andrews drain including the transfer of storm flows from Eastern Hills Drain catchment (Bateup Drain) have been publicly notified and incorporated into the Tasman Resource Management Plan (TRMP) with the issue of Variations 49 and 50.

B.1.11. Borck Creek Catchment

A study was completed by Council to make recommendations to upgrade Borck Creek, from its point of discharge into Tasman Bay, upstream to Ranzau Road. Given the substantial level of development in recent years and expectations for future residential, commercial and industrial growth over the next few years, the report has identified the need for substantial ditch widening to accommodate future storm flows.

It is estimated that the existing system provides levels of service in the region of:

	Level of Service	**Notes**
Lower Borck Creek	Approx. $Q_{5\text{-}10}$	1 in 5 to 10 year return period from the end of Headingly Lane upstream to the State Highway 6 culvert
Queen Street Culvert	Approx. Q_5	1 in 5 year return period
State Highway 60 Culvert	Approx. Q_{15}	1 in 15 year return period

The study made recommendations to widen Borck Creek to provide a level of service for a Q_{100} storm return period in the Year 2030 (with 200 mm freeboard) from the discharge point in Tasman Bay to Ranzau Road. Proposals to incorporate environmental features in the channel upgrade for public amenity values and to encourage local flora and fauna species were reviewed and were recommended for the ditch upgrade between Queen Street and State Highway 6. The three culvert crossings at Queen Street, State Highway 60 and State Highway 6 would need upsizing.

Proposals to widen Borck Creek including the construction of a new drain to divert flows from the central district through the Poutama Drain have been publicly notified and incorporated into the Tasman Resource Management Plan (TRMP) with the issue of Variations 61, 62 and 63.

B.1.12. Jimmy Lee Creek Catchment

The current level of protection in the Bill Wilkes Reserve is unclear, although improvement work to the Bill Wilkes Reserve is planned. The lower detention area (Washbourne Gardens) overtopped in 1985 sending flood waters into the township. As a result, the outlet from the upper detention dam was throttled to try to address this problem. It overtopped the spillway again in 2003.

The stormwater model shows that the level of service of the stormwater system where flows join the Oxford Street stormwater pipe from Washbourne Gardens has capacity between a 1 in 5 and 10 year storm event, a problem of being under-capacity exacerbated by the convoluted pipe route at the top end of Oxford Street.

Further downstream, the existing system comprises two large diameter 1200-mm pipes which have sufficient capacity for a 1 in 100 year storm. However, this capacity is restricted due to capacity issues in the adjoining Gladstone Road stormwater system further downstream (although the twin projects to reconstruct Beach Road drain and construct the Poutama Drain will remove this incapacity issue).

In recent times, a large amount of development has been completed above Bill Wilkes Detention Dam which has increased the flooding risk in the top end of Oxford Street.

B.1.13. Central Richmond Catchment (Gladstone Rd / Beach Rd)

Lack of capacity in the Gladstone Rd system (which has less than Q_5 capacity at present) is preventing additional discharges from further development into this drainage system, as this will cause an increase in peak flows leading to an increase in flooding.

There are proposals to upgrade the Oxford Street and Queen Street stormwater systems and loading on the Gladstone Road stormwater system should be reduced with the construction of the Poutama Drain further reducing the flooding risk upstream and increasing the hydraulic capacity of the Oxford Street and Queen Street systems.

The Queen Street stormwater system is not adequately sized and is in poor structural condition and needs replacing to tie in with proposals to reconstruct the road/ pedestrian areas through a streetscaping project. Flooding is prone to occur up at the Salisbury Road roundabout with flows unable to enter into the stormwater system so an extension to the Queen Street stormwater system is planned into Upper Queen Street to catch / intercept flows. This stormwater system upgrade is one of the major stormwater upgrades planned for the Richmond UDA, and will provide a 1 in 20 year level of service. Currently, the Queen Street system is estimated to provide a level of service to cope with a 1 in 2 year storm only.

B.1.14. Lower Richmond Catchment

There are known problems in the lower lying areas around Bird Street, Croucher Street and Doran Street, with less than a 1 in 2 year capacity in some piped sections. Tidal influences at the outfall have the potential to further reduce capacity. A major stormwater improvement project is underway to provide a larger diameter stormwater system to remove many of these problems.

B.1.15. Reservoir Creek Catchment

Historically there has been little reported flooding in this catchment but this may well be because flooding in undeveloped areas is not often notified. The capacity of the Salisbury Rd box culvert which was unable to cope with a Q_{50} flood has recently been upgraded to cope with a Q_{100} return period storm. Parts of the piped stormwater system from Loadstone Road and of the open water channel behind houses between Wilkes Street and Hill Street have an estimated hydraulic capacity of 1 in 2 years. A project to replace the open channel with a new stormwater pipe along Hill Street will remove this incapacity and increase the level of service towards 1 in 50 years.

The open channel of Reservoir Creek has an estimated capacity of 1 in 100 years, although work is required to improve the hydraulic efficiency of the inlet structure in Easby Park.

B.1.16. Operations and Maintenance

The primary operating and maintenance activity for Richmond is to ensure the open drainage channels are kept to a reasonable standard of repair. There have been some problems with the state of the drains in recent years so the Council in association with the operations and maintenance contractor developed an appropriate regime of works.

The inlet and outlet structures of all the detention dams are maintained so that these remain fully functional.

Details of the operation and maintenance regime are included in Appendix E.

B.1.17. Asset Condition

Generally the assets in the Richmond UDA are relatively young in their asset life expectancy and there are no major condition problems that signal the need for renewal expenditure.
Asset renewals planned for the period of this AMP.

1. Beach Road Drain upgrade, where the timber pole banks are deteriorating and require an on-going programme of improvement.
2. Inlet structures to Bill Wilkes and Lodestone Park detention dams

3. Replacement of the spillway on Reservoir Creek Dam to remove a leakage problem and improve functionality
4. Replacement of the brick culvert on Gladstone Road

The piped stormwater system in Richmond consists of approximately 74km of pipes. The key stormwater assets in Richmond UDA are:

Stormwater Detention Structures:

- Lodestone Road
- Bill Wilkes Reserve
- Washborne Gardens
- Olympus Way
- Cemetery Dam
- Easby Park

Stormwater Channels:

- Reservoir Creek
- Jimmy Lee Creek
- Eastern Hills Drain
- Whites Drain (aka Reed Andrews Drain)
- Borck Creek
- Beach Road Drain

B.1.18. Capital Works

The full upgrade and development programme is included in Appendix F.

B.2 Brightwater UDA

B.2.1. System Overview

The Brightwater settlement is positioned between the Wai-iti and Wairoa Rivers, three kilometres upstream from their confluence. It is situated on a very flat floodplain with a number of old, shallow river and stream channels crossing it.

There are four catchments immediately above Brightwater; from East to West these are the Mt Heslington catchment (395 ha), Rutherford catchment (13 ha), Jeffries catchment (141 ha), and the Pitfure catchment (2500 ha). Brightwater's urban stormwater network (UDA) is positioned in the centre of these surrounding rivers and catchments, and covers an area of about 70 ha. These are detailed on the enclosed catchment plan.

The streams originating from the Pitfure, Jeffries, and Rutherford catchments generally pass around the western side of Brightwater then up towards the Wai-iti River. The Mt Heslington Stream passes through the Brightwater School then turns eastward to join the Wairoa River via the Railway Diversion. The Wai-iti and Wairoa Rivers that flank Brightwater have their own associated flooding problems. The assessment of the flood hazard resulting from these rivers falls outside the scope of this investigation, which is primarily concerned with localised stormwater flooding.

The Mount Heslington and Jeffries Creek arise from steep hillside catchments to the south. They both cross through parts of the Brightwater UDA. Mt Heslington Stream crosses through the Southeast through the stockyards, under the deviation (SH6) across the primary school, under Ellis Street and into a Diversion Channel that takes stream away from its "natural channel" direct to the Wairoa.

Jeffries Creek cuts across the far Southwest end of the UDA around Lord Rutherford Road before draining into the Pitfure. The Pitfure is a long flat meandering stream that drains the floodplain between Wakefield and Brightwater. It passes to the west of Brightwater UDA.

The main urban areas of Brightwater discharge in piped systems either into one of the three streams or into the old river channels that lead into the Wairoa or Wai-iti Rivers.

Through observing the floods of 29 June 2003 (Tomkinson and Burridge, 2003), the stormwater flooding problems at Brightwater are believed to have been a caused by runoff flows from a combination of the four catchments immediately above the township.

B.2.2. Strategy

The key issues for Brightwater UDA are:

- It is flat with very little hydraulic gradient to get good drainage.
- It has three streams fed by reasonably large rural catchments (outside the UDA) that run through or around the outskirts of the UDA.
- Flooding issues in Southwest Brightwater are inter-related. The main issue is the relatively flat topography of the valley floor which is primarily a flood plain for the Wai-iti River and is naturally graded towards the urban areas of south west Brightwater, which combined with the lack of existing drainage capacity leads to widespread overland flow and flooding.
- Flooding to properties in Lord Rutherford Road South is related to issues outside the immediate area and requires an integrated approach to solve flooding to benefit the whole area. Whilst this will take longer to implement, it will provide a more robust solution for a wider community benefit. It is aimed at getting the support of the local community behind the Council's strategy, rather than driving a solution through against the community and fighting disaffected parties through the RMA process.

The strategic approach to managing Brightwater UDA is to:

- Keep the three streams that arise from outside the UDA from flooding properties inside the UDA
- Provide appropriate drainage infrastructure inside the UDA to deal with the runoff that arises from inside the UDA

Recent improvements include:

- Widening the Pitfure Stream upstream of State Highway 6 and constructing an earth bank adjacent to the Pitfure Stream State Highway crossing to reduce the severity and frequency of flooding into Brightwater UDA
- Increasing the capacity of the Jeffries Creek culvert crossing, under Lord Rutherford Road South

Proposals to further improve the level of service include:

- Increase the capacity of Jeffries Creak upstream of Lord Rutherford Road South.
- Drainage channel diversion to reduce risk of flooding to properties in Rintoul Place
- Improve the capacity of the Mt Heslington Stream channel diversion and to provide an alternative route to the existing section of open drain through the school off Ellis Street, together with improvement works to reduce the risk of floodwaters passing through the school underpass to flood the school and parts of Brightwater.

Future Growth

- The residential, commercial and industrial development within this catchment is predicted to increase by 21% up to the Year 2029, from the latest 2008 Population Review.

B.2.3. Level of Service

The level of service of the stormwater drainage assets has been assessed based on the Rational Method, which has been used to determine stormwater flows for storms of various return periods of occurrence.

The assessment of an appropriate level of service has also been backed up from observations and knowledge of the staff involved in managing and maintaining the assets. The recent event of 29 June 2003 provided recent knowledge.

Generally all of the streams are flood prone and experience frequent “out-of-channel” flows. This causes problems where they come into or up against the UDA, specifically:

- Jeffries Creek – frequent flooding of the houses along Lord Rutherford Road where it crosses the road
- Mt Heslington Stream – flooding experienced where stream passes through private property south of Ellis Street
- Pitfure Stream – the Pitfure floods frequently and threatens the on-going subdivision development to the Northwest. Subdivisions have been protected by construction of low flood banks and property raising.

It is estimated that the existing system provides levels of service in the region of:

- Jeffries Creek - Q_2 - 1 in 2 year return period
- Pitfure Stream - Q_1 - 1 in 10 year return period
- Mt Heslington Stream - Q_2 - 1 in 2 year return period

Generally the remainder of the stormwater system appears adequate, or has adequate secondary flow paths so as not to cause undue flooding when the system capacity is exceeded. The exceptions to this are:

- Rintoul Place which suffered extensive surface flooding when the primary drainage system capacity was exceeded in the 29 June 2003 event
- Fairfield Street where a stormwater soak pit does not provide sufficient drainage in severe events.

B.2.4. Operations and Maintenance

The primary operating and maintenance activity for Brightwater is to ensure the open drainage channels are kept to a reasonable standard of repair.

Details of the operations and maintenance schedule are enclosed in Appendix E.

B.2.5. Asset Condition

Generally the assets in the Brightwater UDA are relatively young in their asset life expectancy and there are no major condition problems that signal the need for renewal expenditure. Therefore there are no asset renewals planned for the period of this AMP.

B.2.6. Capital Works

The full upgrade and development programme is included in Appendix F.

B.3 Wakefield UDA

B.3.1. System Overview

The Wakefield UDA is a mixture of rural and urban development. To the west of the State Highway the land is flat, and to the east it is undulating. Recent subdivision development has incorporated stormwater systems but these ultimately discharge to open drains which in the east discharge to the Pitfure Stream which flows from Wakefield to Brightwater before it joins the Wai-iti River. The southern area discharges to 88 Valley Stream and several areas lead directly to the Wai-iti River.

Wakefield lies between 2 waterways; the Wai-iti River and the Pitfure Stream. All the drainage systems in Wakefield eventually drain to one of these rivers. Most of the stormwater system was built during the late 1980's.

B.3.2. Strategy

The key issues for Wakefield UDA are:

- The settlement is located on a flood plain, close to the Wai-iti River to one side and to the Pitfure Stream on the other side (a tributary of the Wai-iti River).
- A formal review of the condition of the stormwater system and assessment of the current system performance and review to accommodate future population growth has not been completed but is recommended.

The strategic approach to managing Wakefield UDA is to:

- Complete a more detailed review of the stormwater system and prioritise improvements required to the system to address flooding problems and accommodate additional flows from future development.

Most of the drainage system within the area is thought to accommodate storms between a 1 in 2 and 5 year storm period with the exception of Windleshim Place, which has a lower capacity. The pipe system draining Lord Auckland Road and surrounding area cannot accommodate a 1 in 5 year storm however overflows can pond on adjacent paddocks with little effect.

Future developments within the urban area can be accommodated with additional discharge points to the Wai-iti River and Pitfure Streams. Future developments will need to take into account the significant flooding that occurs from the Wai-iti River affecting land surrounding the Wakefield urban area.

Future Growth

- The residential, commercial and industrial development within this catchment is predicted to increase by 18% up to the Year 2029, from the latest 2008 Population Review.

B.3.3. Level of Service

The level of service of the stormwater drainage assets has been assessed based on the Rational Method, which has been used to determine stormwater flows for storms of various return periods of occurrence.

There is little data available concerning the performance of either pipe systems and/or the open drains in this area, however it should be noted that there was serious flooding to the surrounding area from the Wai-iti River during the July 1983 floods in that area.

The Wakefield area can be divided into nine catchments. A high level assessment has been completed to identify the level of performance of the Wakefield stormwater system within each of these catchments with levels of service assessed to typically provide a 1 in 5 year return period.

In order to improve the level of service to provide a capacity for 1 in 20 year storm events, parts of the system need upgrading, including:

- Section of open channel, Eden Stream along Clifford Road to crossing under State Highway 6
- Construct earth bank to protect houses on Edward Street from flooding in the adjacent paddock, particularly in light of the recent sub division to the south of Edward Street.
- New stormwater pipe from Whitby Road to Arrow Street, to upgrade the capacity of the local piped stormwater system
- Refurbish a number of soakpits installed in Whiting Drive to reinstate drainage capacity, following recent subdivision development work.

B.3.4. Operations and Maintenance

The open drains are to be maintained to a level of service determined by the Asset Manager Stormwater, namely that the passage of stormwater through the open channels is achieved without causing either blockages or scouring of banks.

Details of the operation and maintenance regime are included in Appendix E.

B.3.5. Asset Condition

Although a formal assessment of the Wakefield stormwater system has not been completed, there are no immediate specific concerns with the Wakefield stormwater assets.

Generally the assets in the Wakefield UDA are relatively young in their asset life expectancy and there are no major condition problems that signal the need for renewal expenditure. Therefore there are no asset renewals planned for the period of this AMP.

B.3.6. Capital Works

The full upgrade and development programme is included in Appendix F.

B.4 Murchison UDA

B.4.1. System Overview

The primary drainage system in Murchison is the network of open creeks that drain to the Matakitaki River just south of Murchison. These creeks drain over 600ha of predominantly rural catchment through Murchison, picking up the urban runoff as they pass through the town. The creek network is quite extensive throughout the town and the area of piped stormwater systems is restricted to drainage from Waller Street, the central part of town.

There are numerous culvert crossings under a number of streets as a result of the six open channels passing into the Murchison UDA.

Within the UDA, the majority of stormwater from residential dwellings is to ground soakage. From highways stormwater runoff is to open channels (Ned's Creek) or to soakaways.

The reticulated stormwater system comprises of a number of small piped systems that collect highway drainage, most discharging into Ned's Creek. Grey Street runoff drains into a series of soakaways.

The remainder of the Murchison area drains into a series of open ditches and waterways. The ditches are highly modified from their natural state (to improve drainage capacity) and the riparian areas are a variety of grassed, landscaped and bush verges depending on the land use and landowner preference.

B.4.2. Strategy

The key issues for Murchison UDA are:

- The network of stormwater ditches pass through the UDA in close proximity to a number of dwellings and access is very restricted in places where ditches pass through various subdivisions.
- Many lengths of ditch suffer from excessive weed growth and accumulated silts washed down from further upstream in the catchment.
- The Murchison Environmental Care Group (MECG) has been maintaining and provided environmental enhancements to a section of open drain within the Murchison UDA, through agreement with TDC. The aim of the MECG is to return stormwater ditches to their natural state, supportive of native flora and fauna species. Overall this has been successful, however, the capacity has been reduced and because a number of properties may be prone to flooding, a Council has been asked to clear a section.
- A number of culvert crossings in upstream locations of the UDA severely restrict continuation stormwater flows, with estimated levels of service providing a capacity possibly less than a Q_1 storm event.
- Murchison stormwater catchment is a dendritic non-linear catchment where there are four main sub catchments, which drain into one central point located in the centre of Murchison. At this point, storm flows are likely to converge at a particular time of concentration.

The strategic approach to managing Murchison UDA is to:

- Implement a regular programme of ditch maintenance, working together with the support of MECG where appropriate, in order to protect the creek network, the key stormwater drainage asset in Murchison. If the creeks can be properly maintained, the risk of flooding of the UDA should be reduced.
- Complete an assessment to determine short-term improvements to increase the level of service for the stormwater ditch system. This is likely to be a combination of ditch widening in specific locations to alleviate the risk of flooding properties. Note that no historical flooding of properties is currently known and the risk of this occurring would need to be investigated.
- Longer term the ditch network and culvert crossings should be enhanced to provide greater than Q_5 level of service.

Future Growth

- The residential, commercial and industrial development within this catchment is predicted to increase by 2% up to the Year 2029, from the latest 2008 Population Review.

B.4.3. Level of Service

The level of service of the stormwater drainage assets has been assessed based on the Rational Method, which has been used to determine stormwater flows for storms of various return periods of occurrence.

A brief study of the Murchison stormwater network has determined that the level of service provided by the existing UDA ditch network and culverts is between a Q_1 and Q_2 return period.

Whilst there are no known recurrent surface flooding problems in the area affecting residential properties, historical flooding is thought to have occurred in fields upstream of Fairfax Street.

A particular deficient level of service is upstream of Fairfax Street to the intersection with the ditch network from Hotham Street and further upstream to the next intersection towards Hotham Street.

The majority of property owners maintain the streams on their property, however Council involvement is required where streams pass through reserves and other Council owned property and where property owners fail to carry out maintenance.

It is intended to prepare a Stormwater Catchment Management Plan to improve understanding of system limitations and flood risk areas.

B.4.4. Operations and Maintenance

The primary operating and maintenance activity for Murchison is to ensure the open drainage channels are kept to a reasonable standard of repair.

A number of sections of ditch have had environmental improvement work, completed by the Murchison Environmental Care Group, which has included the planting of native plants and grasses, removing accumulated silts and debris to ditch base level, and removing weeds and plant growth. There is an agreement between TDC and the MECG for these enhancements to be made. The MECG have recently been highly commended by TDC in the community group category for the Environmental Awards 2005.

The ditch network requires work in a number of areas to maintain the ditch banks, remove accumulation of weed growth, reinstate ditch beds and cut down vegetative growth restricting the flow path.

B.4.5. Performance History

There is little data available but there have been recent problems with single sumps and pipes in Fairfax Street becoming blocked, new double sumps and larger pipes have been installed and this should resolve these problems. A new stormwater system in Milton Street discharges to Ned's Creek and maintenance work in that creek is done on an "as and when" required basis. The performance of the deep sump manholes, which discharge into river gravels in Grey and Fairfax Streets, has been satisfactory.

B.4.6. Operational Requirements

The open drains are maintained to a level of service determined by the Asset Manager Stormwater, namely that the passage of stormwater through open channels is achieved without causing either blockages or scouring of banks. The operation and maintenance regime is included in Appendix E.

B.4.7. Asset Condition

While the stormwater systems in Murchison are older than many in the District, there are no major condition problems that signal the need for renewal expenditure.

B.4.8. Capital Works

The full upgrade and development programme is included in Appendix F.

B.5 St Arnaud

B.5.1. Stormwater Overview

The St Arnaud settlement is surrounded by the Nelson Lakes National Park and located on the shores of Lake Rotoiti. The steep, glacial terrain surrounding St Arnaud has high run off flows. Recently a wastewater reticulation treatment and disposal system was installed for the area. Problems of sewage contamination into roadside and stormwater drains that discharge into Lake Rotoiti via Black Valley Stream have been solved.

St Arnaud has very few piped systems in the more established developments with predominant systems being runoff to open drains. While the majority of drainage within the built up area consists of small streams and roadside type open channels, the more recent sub divisions have been developed with piped stormwater systems.

A number of culvert crossings of the open drains over Main Road St Arnaud are the strategic parts of the stormwater system and are the responsibility of Transit NZ to maintain.

B.5.2. Strategy

MWH completed a review of the stormwater system and issued a report in September 2005[2], making recommendations to address maintenance issues and to accommodate future development, in order to provide a satisfactory level of service.

The key issues for St Arnaud UDA are:

- This is located within a National Park and therefore any development work or modification work to the existing stormwater system is subject to National Park regulations.
- Future residential development is likely to be very limited and restricted by national park regulations.
- The Black Valley Stream drains a large area of land and passes in close proximity to a number of residential properties and the Alpine Lodge and St Arnaud Hall. The stream is prone to debris accumulation and fallen trees, which cause flow restrictions.
- The Black Valley Stream culverts crossing Bridge Street and State Highway 63 suffer from regular blockages from debris accumulation.
- Local flooding in Brookvale Drive from accessway construction

The strategic approach to managing St Arnaud UDA is to:

- Liaison with DOC regarding stream bed clearance
- Maintain the stormwater culverts by liaison with Transit NZ

Future Growth

- The residential, commercial and industrial development within this catchment is predicted to increase by 5% up to the Year 2029, from the latest 2008 Population Review.

B.5.3. Level of Service

No formal catchment analyses and system capacity assessments have been made for these communities, apart from assessments made on a case-by-case basis. What is known is as follows:

There are problems of erosion in the open channel behind the footpath that goes down to the lake foreshore.

Flooding has been reported to St Arnaud Hall and the Alpine Lodge, arising from the Black Valley Stream.

[2] MWH Report, St Arnaud Stormwater Catchment Study, September 2005

B.5.4. Operations and Maintenance

Regular maintenance of the culverts is required.

Details of the operations and maintenance schedule are enclosed in Appendix E.

B.5.5. Asset Condition

Much of the residential developed area has piped stormwater systems. The condition of the existing stormwater infrastructure is not known.

B.5.6. Capital Works

The full upgrade and development programme is included in Appendix F.

B.6 Tapawera UDA

B.6.1. Stormwater Overview

Tapawera was constructed by NZ Forest Service as a forestry headquarters village.

There are a limited number of piped stormwater systems within the urban drainage area that discharge into a series of open channels which flow into the Motueka River.

A gravel fan outflows from steep hillside country that defines the Motueka River Valley, situated behind the east side of the township. During the village construction, groundwater issues in the residential area became significant and a substantial drainage cut off system was constructed to the east of the village at the foot of the gravel fan. Failure of this system presents a risk to the township area of surface flooding and very wet ground conditions. This is unlikely to cause rapid inundation of buildings but more likely to cause surface flooding in the area.

A stream intercepts flows from a large area to the south of Tapawera which drains an area of flood plain between the gravel fans and Motueka River. This stream passes through the UDA, crossing main road Tapawera and Tadmor Valley Road, before leaving the UDA and discharging into the Motueka River. This is the keystone of the Tapawera stormwater system into which collects stormwater flows from open drain and piped stormwater systems in Tapawera.

B.6.2. Strategy

MWH completed a review of the stormwater system and issued a report in May 2008[3], making recommendations to address maintenance issues and to accommodate future development, in order to provide a satisfactory level of service.

The key issues for the Tapawera UDA are:

- The settlement is small and self contained but vulnerable to surface flows from outside the UDA
- A key interception drainage ditch was constructed by the forestry board but is now maintained by Council
- A number of properties on Matai Crescent are vulnerable to flooding from surface flows arising from the stream/ open channel to the south of Tapawera, particularly in the event of a blockage of the twin 750 dia. culvert crossing on the Motueka Valley Highway
- There are concerns over the level of service offered by the main stream crossing main road Tapawera to the south which may put properties on Matai Crescent at risk of flooding
- Both the road drainage and property runoff is collected by a piped stormwater system within the Tapawera UDA and much of this system discharges into a swale type open water channel in the centre of the UDA

The strategic approach to managing Tapawera UDA is to:

- Continue to maintain the old forestry interception drain
- Actively maintain the interception drain behind Matai Crescent
- Assess whether an upgrade of the culvert crossing main road Tapawera (south) is required
- Actively ensure the key outlets and culvert crossings remain debris free and unblocked

[3] MWH Report, Tapawera Stormwater Catchment Study, May 2008

Future Growth

- The residential, commercial and industrial development within this catchment is predicted to increase by 10% up to the Year 2029, from the latest 2008 Population Review.

B.6.3. Level of Service

- The culvert crossings for the network of streams and drains are estimated to provide a level of service to cope with between a 1 in 10 and 20 storm return period
- There are concerns over the level of service offered by the main stream crossing main road Tapawera to the south which may only offer a level of service for a 1 in 5 year storm event

B.6.4. Operations and Maintenance

Regular maintenance of the culverts is required. Details of the operations and maintenance schedule are enclosed in Appendix E.

B.6.5. Asset Condition

Much of the residential developed area has piped stormwater systems. The condition of the existing stormwater infrastructure is not known.

B.6.6. Capital Works

The full upgrade and development programme is included in Appendix F.

B.7 Motueka UDA

B.7.1. System Overview

Motueka has a long history of flooding problems because of its low lying nature, flat terrain, and alluvial gravels with high water table, proximity to the Motueka River and Tasman Bay.

The Motueka Urban Drainage Area (UDA) is mostly developed less densely than Richmond due to the size of the properties, mostly quarter-acre sections. A considerable amount of stormwater drainage is by soakage to the underlying soils and gravels.

The UDA is drains from three main areas:

- Into the Motueka River in the North West via Staples Drain
- Into a small enclosed tidal lagoon through the Lammas Drains in the North East*
- Into a small enclosed tidal lagoon in the South, through the Thorp and Woodlands Drain*

  * Both tidal lagoons are protected by tidal gates, to control against high tidal surge / flooding into lower areas of the Motueka Township, the former discharges into Tasman Bay, the latter into the Moutere Inlet.

The dominant piped drainage direction is from west to east. To the north of Motueka the drainage infrastructure is largely informal with a large reliance on discharge to groundwater and/or shallow swales. The ultimate outlet is via two small surface drains, Staples Drain and Lamas Drain.

The bulk of the central area drains to either Thorp or Woodlands Drains which run north to south between High Street and Thorp Street. Originally all drainage flowed east until it met the coastal ridge that Thorpe Street runs along. This turned the flow south into the Moutere Inlet, a large tidal estuary, via Thorp Drain. Frequent flooding of the upper end of Thorp Drain caused the construction of Woodlands Drain and Wilkinson Drain, a parallel drain slightly further west. The aim of this was to cut off the main flows from the west and discharge them earlier to the estuary. A further extension of this philosophy saw the construction of a new system in High Street to prevent flooding in the commercial and retail centre of Motueka.

The remainder of Motueka is drained via small piped stormwater systems discharging directly to sea or adjacent open channels.

Very few parts of the stormwater reticulation were designed in accordance with former performance standards, providing a 1 in 5 year level of service. The former Motueka Borough Council standard was for pipes to pass 1 in 2 year storm flow events.

Recent developments between Thorp Street and Motueka Quay have included the construction of detention ponds to enable piped coastal outlets to operate against high tidal levels. In addition, other recent developments have seen the use of soak pits as the primary stormwater discharge system, returning storm flows to ground.

Three substantial stormwater outlet structures exist in the system:

- Wharf Road culvert tidal gates (draining the southern tidal lagoon, controlling Woodlands and Thorp drain discharges)
- Old Wharf Road tidal gates (secondary tidal gates, controlling flows from the Woodlands drain)
- Staple Street tidal gates (draining the northern tidal lagoon, controlling Lammas drain discharges)

The operation of control gates on Wharf Road and Old Wharf Road are controlled via Council's telemetry system.

Four open stormwater channels discharge collected stormwater from the township:

- Lamas Drain
- Staples Drain
- Woodlands Drain
- Thorp Drain

Future Growth

- The residential, commercial and industrial development within this catchment is predicted to increase by 13% up to the Year 2029, from the latest 2008 Population Review.

B.7.2. Strategy

MWH NZ Limited investigated the performance of the stormwater system using hydraulic modelling and issued a report[4] making recommendations to upgrade the stormwater system. However, there has been no formal condition assessment of the Motueka stormwater assets. From inspections carried out under the maintenance contract and local knowledge, it is thought likely that the condition of a number of the older assets is poor.

The key issues for Motueka UDA are:

- It is flat with very little hydraulic gradient to get good drainage
- Drainage from ditches is subject to tidal influences
- The stormwater system in the town centre lacks a number of stormwater collection sumps along the High Street and the system in this area is already overloaded
- The system has been assessed as being unable to cope with Q5 return period storm flows in a number of areas.
- Many secondary flow paths are wide given the flat gradients and often follow streets and roads
- There are several locations where roads or natural topographical features block the overland flow paths, therefore increasing the risk of flooding.
- The road network and the housing development make it very difficult to restore an overland flow path that directs overland flows away from houses.

The strategic approach to managing Motueka UDA is to:

- Keep additional stormwater flows arising from development away from the town centre
- Improve the drainage systems to the north and north west of Motueka town centre
- Maintain the tidal gates

Particular proposals include:

- Complete an integral drainage catchment management plan to better assess flooding issues while planning for stormwater system upgrades to incorporate planned development.
- Assess options and identify a solution to improve the level of service in the Boyce/ Clay Street reticulated stormwater system
- Complete an environmental assessment of stormwater quality and a stormwater quality catchment management plan
- Complete a review of the current tidal gate system and renew/ refurbish where required
- Implement stormwater quality improvements
- Complete a series of reticulation improvements to the piped stormwater system in the CBD
- Complete a significant stormwater system upgrade to install a larger diameter stormwater pipe along Pool Street and High Street to improve the current level of service to a 1in 20 year storm return period
- Complete a key upgrade to provide stormwater drainage for a large area of future development, located between Whakarewa Street and King Edward Street.

[4] MWH NZ Ltd report "Motueka Stormwater Strategy, April 2000

B.7.3. Level of Service

In 1999/2000 a Motueka Stormwater Strategy was developed which used hydraulic modelling to assess system performance. The outcomes of this investigation are reported in depth in Motueka Stormwater Strategy, April 2000. The stormwater system was assessed as being capable of coping with flows from a 1 in 5 year return period storm. This has also been backed up from observations and knowledge of the staff involved in managing and maintaining the assets.

Much of the reticulated piped stormwater system has a level of service with a capacity of 1 in 5 year storm flow and a small number of locations with a 1 in 2 year storm flow capacity. Given the completion of recent work to upgrade the system from days of the former Motueka Borough Council, significant improvements have been made to the former level of service, in particular, to the High Street/ Tudor Street areas, and to Parker and Fearon Street areas. The level of service in these areas should be greater than a 1 in 5 year storm flow capacity.

B.7.4. Operations and Maintenance

The primary operating and maintenance activity for Motueka is to ensure the open drainage channels are kept to a reasonable standard of repair.

Details of the operations and maintenance schedule are enclosed in Appendix E.

B.7.5. Asset Condition

While the stormwater systems in Motueka are older than many in the District, there is not a great deal of knowledge about the system's condition. The renewal work estimates are therefore based on some CCTV investigations to identify works that need repair and to scope the severity and extent of the problems.

There are approximately 38km of stormwater pipes in Motueka.

Key Stormwater assets are:

Stormwater Structures:

- Wharf Road Tide Gate
- Old Wharf Road Tide Gates
- Various System Outlet Structures

Stormwater Channels:

- Lamas Drain
- Staples Drain
- Woodlands Drain
- Thorpe Drain

Asset renewals planned for the period of this AMP.

- Renew/ refurbish the tidal gates

B.7.6. Capital Works

The full upgrade and development programme is included in Appendix F.

B.8 Mapua and Ruby Bay UDA

B.8.1. System Overview

The Mapua/Ruby Bay UDA is an urban/coastal development. The Ruby Bay area is a coastal strip with recently developed land being controlled by stormwater detention systems. Mapua is a mixture of urban and semi-urban development with the majority of stormwater from earlier developments going to soakage. Only recent development has included piped stormwater systems, which most discharge into open drains and then into the Mapua estuary. The major piped stormwater system on Aranui Road picks up much of the new piped systems and discharges into the estuary by the Mapua wharf.

The Mapua Toru Street Causeway acts as a tidal barrier to high tidal flows entering into the inner estuary and protects a large part of Mapua from flooding. A tidal gate on the end of the Aranui Road stormwater pipe protects the reticulated piped system from high tidal level intrusion.

A significant land area forms the upper part of the Mapua UDA, currently undeveloped and located inland from the coastal highway and Stafford Drive. Parts of this area are low lying and are unlikely to be developed, particularly the area immediately adjacent to the Coastal Highway and Seaton Valley Drain which is an old swamp, now drained and protected with a tidal flood bank by the current landowner.

The catchment upstream of the coastal highway and Stafford Drive drains out through an open waterway, the Seaton Valley Stream. This passes through a culvert under Stafford Drive and discharges into the Toru Street inner estuary further downstream.

The causeway has a major influence on the level of service provided by the Seaton Valley Stream. The area draining into the Seaton Valley Stream accounts for 65% of the Mapua/Ruby Bay drainage area.

There are two other distinct stormwater systems draining the Mapua UDA, the Broadsea and Pinehill Heights areas. Both drain directly to the Tasman Sea through a number of stormwater culverts.

In 2003/04, a desk-based study[5] of the stormwater system was done for the purposes of assessing financial contributions from developers. This was a high level study of the catchment and it concluded that:

- The existing reticulation does not comply with required levels of service
- That further development in the area will increase the problem

Following on from this report, a hydraulic model was constructed of the Mapua Township and drainage area of the Seaton Valley Stream and upgrade options to improve the level of service of the open drains in the area were assessed. The modelling study was completed by MWH and issued to Council in June 2006 and later updated in August 2007[6].

The report recommended modifying the Causeway tidal outlets, widening the Seaton Valley Stream including upgrading a number of road crossings and some upgrade work to other open channels, namely the School road drain and drainage improvement work around Aranui Road. The report took into account planned development and current predicted sea level rises. The outcomes of the modelling report have helped to form Councils policy on future sub division development within the UDA.

The report has led to Council to submit a resource consent application to widen the Seaton Valley Stream and upgrade the Toru Street Causeway, currently under consideration, with planned upgrade works in mind.

B.8.2. Strategy

The Mapua DIL Study and the recent Modelling work highlighted a significant lack of capacity in the existing stormwater systems.

[5] Refer Mapua Stormwater DILs, MWH report, March 2004

[6] Refer Mapua Causeway and Seaton Valley Drain Floodplain Hydraulics Analysis, August 2007

The key issues for Mapua/ Ruby Bay UDA are:

- Lack of gradient in the main channels and pipe systems
- Low lying flat areas which are susceptible to ponding and flooding
- Major tidal influences on all the outlets with significant effects at the causeway
- Lack of capacity in major sections of the reticulated system
- Maintenance problems with the outfalls blocking with shingle and debris from high tides/ storms

The strategic approach to managing Mapua/ Ruby Bay UDA is to:

- Increase the storage capacity within the inner estuary and reduce flood levels inside the inner estuary during high tidal events
- Plan development in line with confirming the impact on other parts of the catchment using the strategic stormwater catchment model
- Implement stormwater quality improvements to protect ecosystems of high environmental value
- Complete the Seaton Valley Stream widening in a sustainable manner, providing public amenity and environmental values

Particular proposals include:

- Complete an environmental assessment of stormwater quality and a stormwater quality catchment management plan
- Modify the Toru Street Causeway Structure to increase the hydraulic capacity for discharging storm flows
- Upgrade the Seaton Valley drain to provide a satisfactory level of service
- Upgrade the Broadsea reticulation system and outfalls
- Complete upgrade work to the piped stormwater systems in Langford Drive

Future Growth

- The residential, commercial and industrial development within this catchment is predicted to increase by 9% up to the Year 2029, from the latest 2008 Population Review.

B.8.3. Level of Service

The causeway structure protects a large part of the Mapua UDA from flooding. If the tide could flow into the inner estuary unrestricted, the theoretical ‘astronomical high tide’ with a level of 3.5m could potentially reach upstream almost 2km from the causeway and would cause significant flooding along the way.

The model was calibrated with the last major storm event in June 2003, when large parts of Mapua were under water. This showed that many areas adjacent to the Seaton Valley Stream would flood with a storm event in the order of 1 in 50 year return period. In addition, further significant increases in storm flow runoff should be expected from the large amount of development planned in Mapua UDA over the next 20 years, estimated to increase by 80% from current residential population levels. Climate change and sea level rises have also been factored into the modelling which recommends urgent upgrade work to be completed for further development to take place.

The future level of service for the open drain system for future upgrades will be a 1 in 100 year storm event. For the reticulated piped stormwater system, capacity will be provided for a 1 in 20 year storm.

Significant upgrade work has recently been competed in Mapua on the piped stormwater system in Aranui Road and Higgs Road to improve the existing level of service.

B.8.4. Operations and Maintenance

The primary operating and maintenance activity for Mapua is to ensure the open drainage channels are kept to a reasonable standard of repair.

Details of the operations and maintenance schedule are enclosed in Appendix E.

B.8.5. Asset Condition

Generally the assets in the Mapua and Ruby Bay UDA are relatively young in their asset life expectancy and there are no major condition problems that signal the need for renewal expenditure. Therefore, there are no asset renewals planned for the period of this AMP.

B.8.6. Capital Works

The full upgrade and development programme is included in Appendix F.

B.9 Tasman UDA

B.9.1. System Overview

Tasman is a small settlement with approx.150 people, situated close to the edge of the Motueka Inlet and on State Highway 60. The settlement is within an area between Dicker Road and Baldwin Road on land rising away from the State Highway which is rural and mostly pasture land.

Some areas of recent rural sub divisions and lifestyle block type developments have been completed around the Tasman settlement in recent years. However, much of this development is spread out and does not contribute to stormwater flows entering into the settlement.

The stormwater system in the settlement is limited to some small piped systems although is predominantly open drained.

The catchment area for surface water flows draining towards the Tasman settlement is 1150 Ha. Surface flows drain from south to north, discharging through the Marriages Stream, into the Motueka Inlet. The stream drains much of the catchment area and picks up open drains from rural land use, including the road drainage off State Highway 60.

A serious flooding problem occurred as a result of a storm in May 2006. This resulted in flooding a number of buildings by the corner of Baldwin Road and the Coastal Highway as well as flooding parts of the State Highway.

State Highway 60 – effectively forms a barrier for the natural drainage of the Tasman urban area to flow into the Moutere Inlet. The Marriages stream passes along the other side of the Coastal Highway from the Tasman settlement, while along the other runs a smaller open drain, intercepting drainage from various smaller drainage areas to the south, draining areas along Baldwin Road, William Road, Orion Road, etc. However, the Coastal Highway has formed a barrier to natural drainage flows passing straight into the Marriages Stream and as a result flows are only able to pass under the highway in a small number of strategic locations.

In the event of the under capacity of the highway culverts or open channel on the same side as Tasman settlement, flows continue towards Tasman where they eventually pass into the centre of the settlement and cause flooding of properties and roads. This is what happened in May 2006 during the last major flood event.

B.9.2. Strategy

A Stormwater Catchment Study was completed in July 2006 and assessed the impact/ causes of the recent flood event, including investigating solutions to improve the level of service of the local stormwater system.

The report indicated that while the small piped stormwater system was severely restricted in capacity in a culverted section over which the shop and art gallery had been built over, the capacity of the culverts passing under the State Highway further upstream was also a major contributing factor to the flooding event.

The key issues for Tasman UDA are:

- The close location to the State Highway
- The susceptibility to flooding from flows arising outside the UDA
- The culvert crossings under State Highway 60 are critical assets to maintain
- There is little scope / opportunity to improve the hydraulic capacity of the culverted section of open drain passing under buildings on Baldwin Road

The strategic approach to managing Tasman UDA is to:

- Take an integrated approach with Transit NZ in arriving at an solution to improve the current levels of service

Particular proposals include:

- Resolve flooding at junction of Baldwin Road/ State Highway, by arriving at a solution through discussions with Transit NZ. This will include local modifications to the local reticulated stormwater pipe system and solutions to pass increased stormwater flows across the State Highway to join the Marriages Stream, south of the settlement.

Future Growth

- The residential, commercial and industrial development within this catchment is predicted to increase by 1% up to the Year 2029, from the latest 2008 Population Review.

B.9.3. Level of Service

The open drainage system in and around Tasman is estimated to have a level of service suitable to cope with a 1 in 5 year storm event. Parts of the culverted stormwater system at the end of Baldwin Road are believed to offer a level of service less than a 1 in 5 year storm event.

B.9.4. Operations and Maintenance

The primary operating and maintenance activity for Tasman is to ensure the open drainage channels are kept to a reasonable standard of repair.

Details of the operations and maintenance schedule are enclosed in Appendix E.

B.9.5. Asset Condition

Generally the assets in Tasman UDA are relatively young in their asset life expectancy and there are no major condition problems that signal the need for renewal expenditure. Therefore, there are no asset renewals planned for the period of this AMP.

B.9.6. Capital Works

The full upgrade and development programme is included in Appendix F.

B.10 Kaiteriteri

B.10.1. Stormwater Overview

The Kaiteriteri stormwater area contains mostly residential/ holiday type home development with two significant motor camps. The steep hilly nature of the Kaiteriteri area provides high run off to the stormwater system. Discharges either from pipe systems or small drains are direct to the sea or the Kaiteriteri Inlet.

A small wetland area is situated at the lower point of Rowling Road in Little Kaiteriteri. Open drains within the area present significant problems with the decomposed granite sandy material being easily scoured by relatively small flows.

Much of the catchment is forested and could be at risk of increased runoff flows from logging activities. Much of the catchment runoff is intercepted by drains, which discharge to sea in the Kaiteriteri Inlet. These drains converge on Martins Farm Road.

There are two residential developed areas within the catchment of Little Kaiteriteri and Kaiteriteri. The forecast growth in population over the next 20 years is 20%.

B.10.2. Strategy

MWH completed a review of the stormwater system and issued a report in September 2005[7], making recommendations to address maintenance issues and to accommodate future development, in order to provide a satisfactory level of service.

The key issues for Kaiteriteri UDA are:

- This is a high profile tourist area in an area of outstanding natural beauty
- Stormwater outfalls discharge across the beach and due to the location are subject to sand infiltration

The strategic approach to managing Kaiteriteri UDA is to:

- Maintain the stormwater outfalls and open drains
- Review strategic upgrade requirements for key main line stormwater pipes through existing developed areas, in order to accommodate future development
- Require new sub divisions to minimise or mitigate any stormwater runoff flows leaving the area

Particular proposals include:

- Upgrade manholes and extend pipe work to prevent surcharge and flooding through existing manhole lids in Kotare Place, Torlesse Drive and Rowling Road
- Investigate flooding problems relating to poor drainage within the wetland area
- Investigate and improve the secondary flow path to reduce surface flooding around the Motorcamp, close to the camp beach stormwater outlet pipe.

Future Growth

- The residential, commercial and industrial development within this catchment is predicted to increase by 1% up to the Year 2029, from the latest 2008 Population Review.

B.10.3. Level of Service

There have been a number of stormwater problems along the beach frontage as private property has either developed or has been redeveloped. However, this was mostly resolved with improvement work to the main beach frontage area.

[7] MWH Report, Kaiteriteri Stormwater Catchment Study, September 2005

Kaiteriteri UDA has a number of stormwater outfalls, around Stephens Bay, Tapu Bay, Little Kaiteri and Kaiteriteri Bay, most which are prone to blockage with sand.

In general the stormwater system has a level of service with a capacity for a 1 in 5 year storm event. Recent development has compounded capacity issues with the reticulated pipe systems particularly around the area of Little Kaiteri.

This area suffers from system overloads in three locations, which are due to be addressed during this next AMP. The problem arises from additional stormwater flows arriving from development behind existing densely developed areas. The ground rises steeply away from the coastline and there is still a significant area to be developed between Talisman Heights and Kotare Place on steeply rising ground.

B.10.4. Operations and Maintenance

Regular maintenance of the outfalls to remove sand infiltration is required. Details of the operations and maintenance regime are included in Appendix E.

B.10.5. Asset Condition

Much of the residential developed area has piped stormwater systems. The condition of the existing stormwater infrastructure is not known.

B.10.6. Capital Works

The full upgrade and development programme is included in Appendix F.

B.11 Takaka UDA

B.11.1. System Overview

The Takaka UDA consists mostly of developed flat land and is situated in the flood plain of the Takaka River. In July 1983 the township was largely flooded with water from the Takaka River; however, events of a similar magnitude have not occurred since that date.

The stormwater systems in Takaka have been developed in conjunction with kerb and channel projects. The Takaka Stormwater Plan shows the general arrangement of the stormwater system. Stormwater runoff from the township on the Takaka River side of Commercial Street is piped to the Te Kakau Stream. The areas around Motupipi Street and Abel Tasman Drive drain into the upper Motupipi River.

The UDA closely covers the built up area around Meihana Street, Motupipi Street and Commercial Street. The town's stormwater systems drain into the Motupipi River to the south, the Te Kaka Stream to the west (a local drainage spur in the floodplain, adjacent to the Takaka River), and into a series of natural drainage swales to the north. Much of the town overlies silty gravels with high water tables and artesian groundwater flows. Lake Killarney is located within the centre of Takaka and the water level is controlled by surrounding groundwater levels. A number of stormwater pipes drain small areas into Lake Killarney.

A formal assessment of system capacity was carried out in 1997. This investigation looked into areas of reported historical flooding and assessed the system upgrades required for pipes in those problem areas to pass a 1 in 5 year storm event.

B.11.2. Strategy

A large number of residential properties rely on soakage through to river gravels for their stormwater disposal and fluctuating groundwater levels control their effectiveness.

Generally the existing township area is low lying in relationship to the adjacent Takaka River. This presents potential flooding throughout the urban area as there are no stop bank controls on the river flooding patterns.

There was a proposal to construct a large residential area to the south of the existing town in the Park Avenue vicinity and this would have significantly less drainage difficulties as a result of its higher elevation above the Takaka River plain and risk from flood damage.

Any developments proposed within the existing urban area will have difficulty achieving a level of service greater than a capacity for a 1 in 5 year flood event due to high groundwater levels and lack of gradient within the existing ground contour of the township.

However, there is little room for more development within Takaka and the population is expected to grow by only 10% over the next 20 years within the town.

There are a number of small reticulated stormwater systems draining Commercial Street. Many of these need upsizing, particularly as they need to accommodate additional road drainage. Much of Commercial Street road drainage does not drain adequately and a number of road sumps are planned to be constructed.

The key issues for Takaka UDA are:

- It is flat with very little hydraulic gradient to get good drainage and has high groundwater levels
- It is at high risk from significant flood damage from the Takaka River

The strategic approach to managing Takaka UDA is to:

- Maintain the existing ditches
- Assess the condition of the stormwater system assets
- Improve drainage from Commercial Street - construct new road sumps and enlarge stormwater pipes leaving Commercial Street. Construct two or three strategically places stormwater systems to drain Commercial Street.

- Improvements to the existing stormwater piped system to drain Methana and Edinburgh Street
- Improvement to the existing stormwater piped system in Waitapu Road

Future Growth

- The residential, commercial and industrial development within this catchment is predicted to increase by 5% up to the Year 2029, from the latest 2008 Population Review.

B.11.3. Level of Service

The existing stormwater system offers a level of service of up to a 1 in 5 year storm return period. However, some areas have a level of service less than this, particularly in the central area on Commercial Street, which has a problem with inadequate road drainage.

B.11.4. Operations and Maintenance

The majority of the stormwater drainage is by soakage to river gravels and the performance is affected by high ground water levels. In addition, there are some pipes along the main commercial area that discharge into open drains to the west and east of the town. High groundwater levels also impact on the capacity of the ditches.

Details of the operation and maintenance regime are included in Appendix E.

B.11.5. Asset Condition

Generally the assets in the Takaka UDA are relatively young in their asset life expectancy and there are no major condition problems that signal the need for renewal expenditure.

Therefore there are no asset renewals planned for the period of this AMP.

B.11.6. Capital Works

The full upgrade and development programme is included in Appendix F.

B.12 Pohara UDA

B.12.1. System Overview

Pohara UDA consists of two parts, the main Pohara settlement area and the Pohara Valley area. Both areas have been subject to much significant recent development. Much of the main Pohara settlement is made up of traditional beach frontage property but the core of recent development has focused away from the coast, inland, off Richmond Road. Pohara Valley is a settlement predominantly set back from the coast, within a gently rising valley with development off Pohara Valley Road and Haile Lane.

Development in both areas has begun close to the sea and continued into the hilly areas behind. As development has been made, a series of piped stormwater systems have been installed and with each new wave of development further additions to extend the existing stormwater systems have been made. Many of the stormwater piped systems offer a very poor level of service as a result. This is particularly the case with development that has taken place in Pohara Valley.

Road drainage is mostly open drain in both parts of the UDA and combined with piped stormwater systems.

In addition, there have been flooding problems caused by the proximity of developments over or close to existing stream channels draining the large areas of hills behind Pohara. In Pohara main settlement there are three major stream channels converging on the settlement from outside the UDA. One of these channels passes close-by to properties and through an area of residential development parallel to Richmond Road. In the Pohara Valley settlement two open channels both pass through areas of residential development. Each of these open channels also cross under Abel Tasman Drive before discharging into Tasman Bay.

Problems of flooding from blockages and incapacity are exacerbated through many privately owned bridge crossings and foot access crossings providing artificial restrictions to the hydraulic capacity of the streams.

MWH completed a Stormwater catchment study in May 2008 which identified current flooding issues and solutions to upgrade the system.

B.12.2. Strategy

The major strategy required is to review the remaining potential for development in both parts of the UDA and to integrate this into an overall stormwater system design to provide a satisfactory level of service. Any significant upgrade of the system is likely to require the agreement from a number of private landowners and any future development needs to be completed without further loading some areas of the reticulated stormwater system.

An urgent upgrade is required to a number of culverts which are owned by Council, but also, a number of privately owned bridge or culvert crossings will need upgrading if the level of service of a number of the open channels streams can be improved.

The main settlement (Richmond Road) has major issues relating to the piped reticulated stormwater system in place. The underlying ground conditions may form part of the final solution for improved groundwater soakage. Parts of the drainage area overlay limestone in which there are a number of sinkholes/ tomos. This offers opportunities to make use of these as soak pits but this would require stormwater quality controls before discharging to ground. Water draining through this limestone bedrock will eventually drain out to sea from a number of resurgences.

In the Pohara Valley area, the issue is the low level of service offered by both open water channels and the numerous restrictions to flow capacity from bridge crossings and culverts, many privately owned.

Future Growth

- The residential, commercial and industrial development within this catchment is predicted to increase by 9% up to the Year 2029, from the latest 2008 Population Review.

B.12.3. Level of Service

The level of service of the open water channels in Pohara Valley is typically less than a 1 in 5 year storm event before flooding occurs. There have been a number of flooding incidents reported in this settlement area in recent years. This was put down to possible blockages and the general lack of capacity of a number of restrictions on the channels, some which are 900-mm diameter and thought to offer a level of service of around a 1 in 1 year storm event.

In the main Pohara settlement, the level of service of council owned culvert crossings is greater than a 1 in 20 year storm event, however two privately owned culvert crossings around Bay Vista Drive are more restrictive to flows and thought to only be able to offer a level of service less than a 1 in 5 year storm event.

B.12.4. Operations and Maintenance

The open water channels in both the main Pohara settlement and Pohara Valley discharge into Tasman Bay onto beach frontage through culvert crossings to pass under Abel Tasman Drive. There is no problem with the discharge point at Pohara Valley, but the culvert crossing Abel Tasman Drive in the main Pohara settlement is partly blocked with sand, significantly reducing its hydraulic capacity. There is little that can be done to clear this pipe since its invert level is below the beach level. This would need to be addressed in an overall solution to upgrade the stormwater system.

Many of the culvert crossings over the open channels require regular checking to ensure they are free from blockages.

Details of the operation and maintenance regime are included in Appendix E.

B.12.5. Asset Condition

Generally the assets in the Pohara UDA are relatively young in their asset life expectancy and there are no major condition problems that signal the need for renewal expenditure.

Therefore there are no asset renewals planned for the period of this AMP.

B.12.6. Capital Works

The full upgrade and development programme is included in Appendix F

B.13 Ligar Bay/ Tata Beach UDA

B.13.1. System Overview

Ligar Bay and Tata Beach are similar settlements, separated by a short distance of coastline. Both are popular holiday retreats and have grown considerably in recent years. The catchments are both covered by forestry and native bush and are steep with numerous gullies, rising to approx. 300m on the ridgeline.

The original Bach style properties were built close to beach frontage and development has progressed further inland and onto steeper ground. The surrounding land is predominantly native bush and these settlements lie on the edge of the Abel Tasman National Park.

There are a number of small self contained stormwater systems (many piped) and serving various developments which have taken place of the last number of years.

There are no major issues reported for either settlement.

Local flooding issues relating to poor road drainage have been observed in Tata Beach. A stormwater pipe renewal and improvement has recently been completed in Tata Beach behind Cornwall Place.

In Ligar Bay, the properties are self draining into open road drains with a small number of piped systems in place. The main stormwater flows come from the catchment behind the UDA with an open watercourse crossing Abel Tasman Drive on the UDA boundary.

B.13.2. Strategy

MWH completed a review of the stormwater system and issued a report in May 2008[8], making recommendations to address maintenance issues and to accommodate future development, in order to provide a satisfactory level of service.

The key issues for Ligar Bay and Tata Beach UDA are:

- This is popular holiday location and an area of outstanding beauty
- The extent of flooding and flooding mechanisms is relatively unknown from historical flooding records

The strategic approach to managing Ligar Bay and Tata Beach UDA is to:

- Maintain the open channel culvert crossings outside the UDA where these could cause flooding inside the UDA
- Improve road drainage in Tata Beach for Cornwall Place and Peterson Road which is due to be completed under the Roading AMP
- Improve the level of service to the stream culvert crossing Abel Tasman Drive, next to Ligar Bay UDA

Future Growth

- There is predicted to be little or no growth in residential, commercial and industrial development within this catchment up to the Year 2029, from the latest 2008 Population Review.

B.13.3. Level of Service

No formal catchment analyses and system capacity assessments have been made for these communities, apart from assessments made on a case-by-case basis.

The stream crossing next to Ligar Bay UDA is estimated to provide a 1 in 2 year level of service.

[8] MWH Report, Ligar Bay and Tata Beach Stormwater Catchment Studies, May 2008

B.13.4. Operations and Maintenance

Complete regular maintenance to clear culvert crossings over open channels, particularly to the storm channel passing through Tata Beach.

Details of the operation and maintenance regime are included in Appendix E.

B.13.5. Asset Condition

Generally the assets in the UDA are relatively young in their asset life expectancy and there are no major condition problems that signal the need for renewal expenditure.

Therefore there are no asset renewals planned for the period of this AMP.

B.13.6. Capital Works

The full upgrade and development programme is included in Appendix F.

B.14 Collingwood

B.14.1. Stormwater Overview

Collingwood UDA consists of a north facing high ridge bounded on the west by the Aorere River and the tidal inlet and on the east by the Tasman Bay. This steep sided ridge discharges stormwater to both the east and west sides. Most of the discharge off the high ground is through small road drains and minor open ditches.

A small peninsula at the northern end of the high ground accommodates the commercial area of Collingwood and the public motor camp on the northern tip. This area is low lying and several small pipe systems discharge to the east and west sides of the peninsula. On the Tasman Bay side a large sandy section of land has effectively blocked several of the outlet systems. These have been extended in open drains and constructed pits to allow some drainage.

Recent works have redirected some flows from the easterly direction and piped these under Tasman Street to the west or the inlet at the Aorere River mouth.

The catchment is mostly residential and stormwater flows are intercepted by a combination of open drains and piped stormwater systems. The main open drain passes down Gibbs Road before discharging to sea. A number of piped systems discharge into this ditch. The remainder of the catchment is mostly served by piped stormwater systems. Along Beach Road a number of open drains, which collect stormwater from the steep sub catchment, pass through a number of culverts to discharge to sea.

B.14.2. Strategy

MWH completed a review of the stormwater system and issued a report in September 2005[9], making recommendations to address maintenance issues and to accommodate future development, in order to provide a satisfactory level of service.

The key issues for Collingwood UDA are:

- This is high profile tourist area in an area of outstanding beauty
- Stormwater pipes in the area of Gibbs Road and culverts on Beach Road are not shown on the TDC GIS system - A survey is required in order to update the Council's GIS system
- Issues with blockages of Beach Road culverts from sand intrusion and accumulation of vegetative growth

The strategic approach to managing Collingwood UDA is to:

- Maintain the stormwater outfalls
- Maintain the stormwater ditches
- Upgrade lower Gibbs Road and Elizabeth Street piped stormwater system

The population of Collingwood is expected to increase by 1% over the next 20 years.

B.14.3. Level of Service

No formal catchment analyses and system capacity assessments have been made for these communities, apart from assessments made on a case-by-case basis.

Recent improvements for stormwater disposal in Gibbs Street at the eastern end of Tasman Street and at the western end in Williams Street have eliminated longstanding problems at these locations.

There are problems maintaining stormwater outfalls along the western end of Beach Road, where the gravity outfalls through the fore dune are constantly affected by tidal movement of sand.

[9] MWH Report, Collingwood Stormwater Catchment Study, September 2005

B.14.4. Operations and Maintenance

Regular maintenance of the Beach Road outfalls to remove sand infiltration and vegetation is required.

Details of the operation and maintenance regime are included in Appendix E.

B.14.5. Asset Condition

Much of the residential developed area has piped stormwater systems. The condition of the existing stormwater infrastructure is not known. Large areas of the piped stormwater system are not mapped onto the TDC GIS system.

B.14.6. Capital Works

The full upgrade and development programme is included in Appendix F.

B.15 Patons Rock UDA

B.15.1. System Overview

Problems experienced in the past are normally related to the low coastal strip between the main road and the sea coast. This is low lying land and drainage systems are affected by coastal tidal conditions.

The main settlement area has a stormwater system that is more or less self-contained and independent from storm flows draining the larger catchment area.

Open channel flows from the larger catchment areas discharge to sea either side of the settlement area.

The stormwater system in the settlement is largely self draining but has four culverts draining runoff flows from the road. Each of the culverts discharge onto the head of the sandy beach, and are each protected with a flap valve.

B.15.2. Strategy

MWH completed a review of the stormwater system and issued a report in May 2008[10], making recommendations to address maintenance issues and to accommodate future development, in order to provide a satisfactory level of service.

The key issues for Patons Rock UDA are:

- This is popular holiday location and an area of outstanding beauty
- Issues with blockages of the four culverts from sand intrusion at the discharge points
- The extent of flooding and flooding mechanisms is relatively unknown from historical flooding records

The strategic approach to managing Patons Rock UDA is to:

- Maintain the stormwater outfalls by clearing sand blockages
- Complete a strategic overview to upgrade the stormwater system

The population of Patons Rock is expected to increase by 1% over the next 20 years.

B.15.3. Level of Service

No formal catchment analyses and system capacity assessments have been made for these communities, apart from assessments made on a case-by-case basis.

The culverts are estimated to provide around a 1 in 5 year level of service.

B.15.4. Operations and Maintenance

Regular maintenance of the outfalls is required, to remove sand accumulation in front of the discharge points.

Details of the operation and maintenance regime are included in Appendix E.

B.15.5. Asset Condition

Generally the assets in the Pohara UDA are relatively young in their asset life expectancy and there are no major condition problems that signal the need for renewal expenditure.
Therefore there are no asset renewals planned for the period of this AMP.

[10] MWH Report, Patons Rock Stormwater Catchment Study, May 2008

B.15.6. Capital Works

The full upgrade and development programme is included in Appendix F.

Brightwater
Stormwater Drains Maintenance

WAIMEA WEST ROAD
BRYANT ROAD
HOLLYBUSH DRIVE
ELLIS STREET
STAVEALL STREET
BGW006
Ellis St Drain
BGW005
BGW003
BGW004
LIGHTBAND ROAD
MAIN ROAD SPRING GROVE
BRIGHTWATER DEVIATION
Jeffries Creek
BGW001
BGW002
LORD RUTHERFORD ROAD SOUTH
ROUGHTON LANE
RIVER TERRACE ROAD

MWH TDC

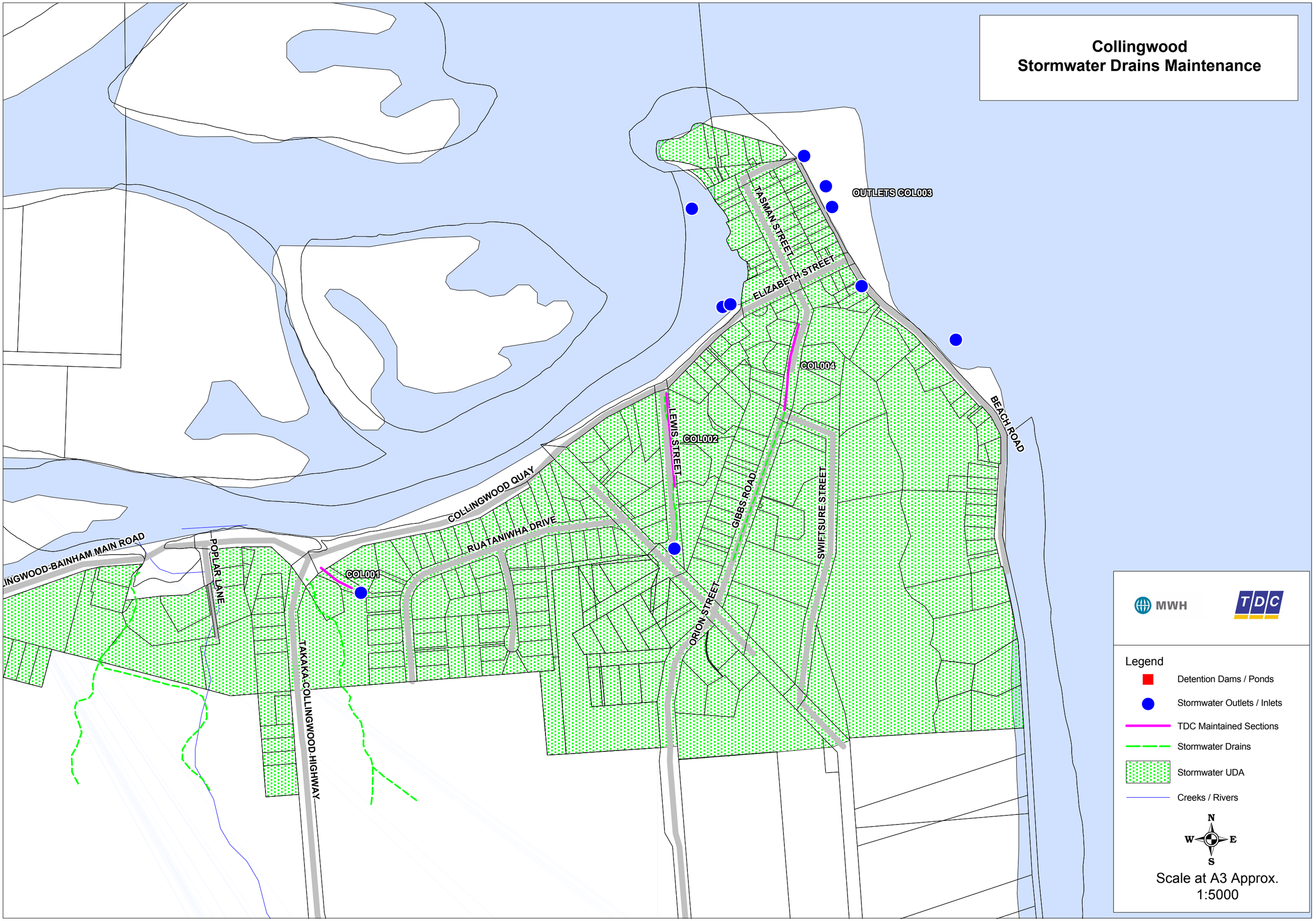
Legend

- Detention Dams / Ponds
- Stormwater Outlets / Inlets
- TDC Maintained Sections
- Stormwater Drains
- Stormwater UDA
- Creeks / Rivers

N
W E
S

Scale at A3 Approx.
1:10000

Collingwood
Stormwater Drains Maintenance



Kaiteriteri
Stormwater Drains Maintenance

KAITERITERI-SANDY BAY ROAD

INLET ROAD

MARTIN FARM ROAD

RIWAKA-KAITERITERI ROAD

KOTARE PLACE

TALISMAN HEIGHTS

STEPHENS BAY ROAD

Camp Beach Outlet
KAI003

KAI001

Little Kaiteri Outlet
KAI002

MWH

TDC

Legend

- Detention Dams / Ponds
- Stormwater Outlets / Inlets
- TDC Maintained Sections
- Stormwater Drains
- Stormwater UDA
- Creeks / Rivers

N
W E
S

Scale at A3 Approx.
1:10000

Mapua
Stormwater Drains Maintenance

SEE DETAIL

TAIT ST OUTLET

RUB002

RUB003

BROADSEA AVENUE

POMONA ROAD

CRUSADER DRIVE

MAP002

BROADSEA AVE CHAMBER

RUB004

STAFFORD DRIVE

SEATON VALLEY ROAD

Seaton Valley Drain

ARANUI ROAD

Morley Drain

MAP001

THE COASTAL HIGHWAY

HIGGS ROAD

TORU STREET

IWA STREET

ITAHI STREET

MAPUA ARANUI RD OUTLET

DETAIL

BRABANT DRIVE

PINE HILL ROAD

THE COASTAL HIGHWAY

RUB001

MWH

TDC

Legend

- Detention Dams / Ponds
- Stormwater Outlets / Inlets
- TDC Maintained Sections
- Stormwater Drains
- Stormwater UDA
- Creeks / Rivers

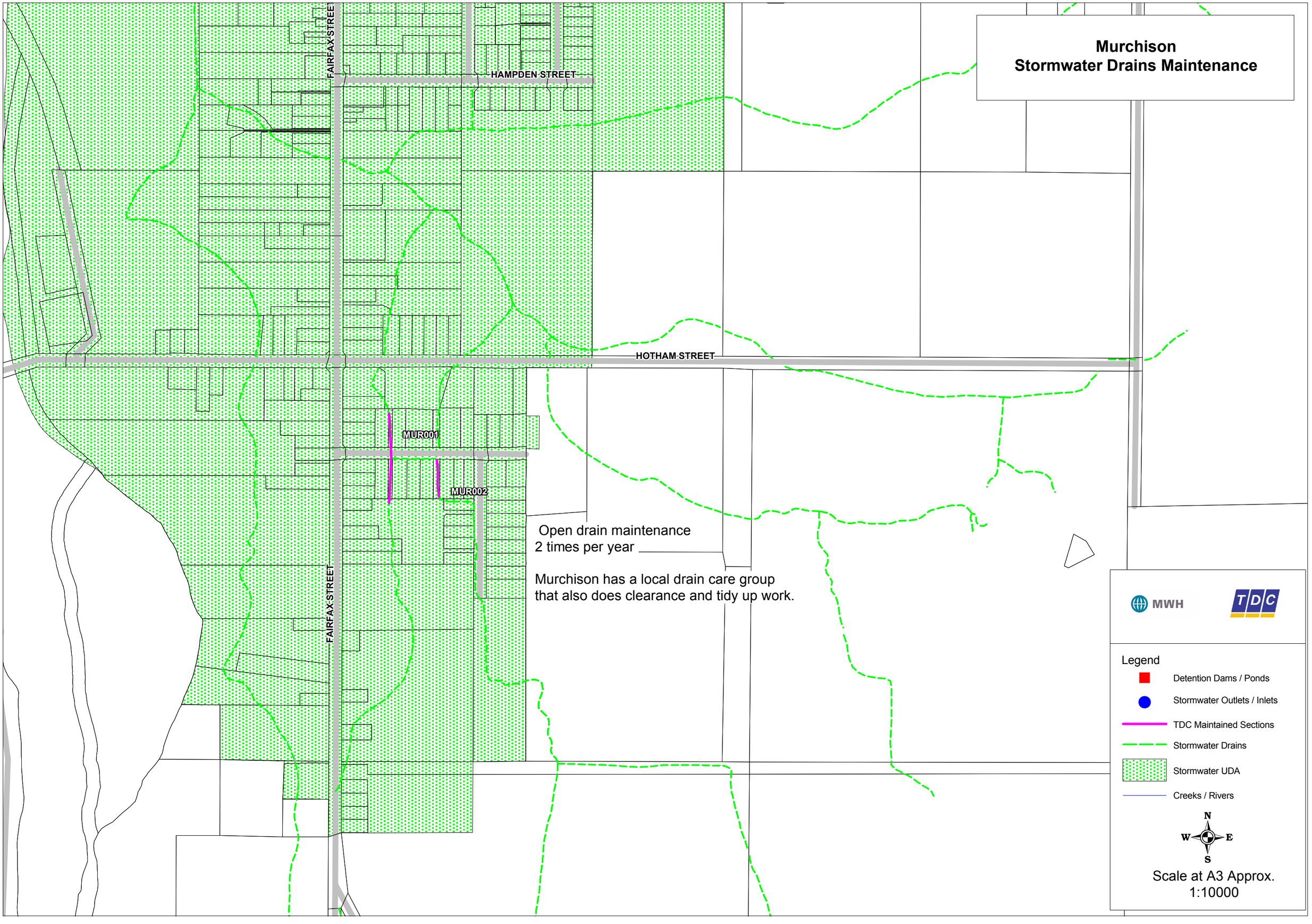
N

W E

S

Scale at A3 Approx.
1:10000

Murchison
Stormwater Drains Maintenance



Open drain maintenance
2 times per year

Murchison has a local drain care group
that also does clearance and tidy up work.

MWH TDC

Legend

- Detention Dams / Ponds
- Stormwater Outlets / Inlets
- TDC Maintained Sections
- Stormwater Drains
- Stormwater UDA
- Creeks / Rivers

N
W E
S

Scale at A3 Approx.
1:10000

Patons Rock
Stormwater Drains Maintenance

Patons Rock Beach Outlet

Patons Rock Beach Outlet

OUTLETS PAT001

PATONS ROCK ROAD

Patons Rock Beach Outlet

Patons Rock Beach Outlet

BAY VIEW TERRACE

MWH

TDC

Legend

- Detention Dams / Ponds
- Stormwater Outlets / Inlets
- TDC Maintained Sections
- Stormwater Drains
- Stormwater UDA
- Creeks / Rivers

N
W E
S

Scale at A3 Approx.
1:2500

Richmond
Stormwater Drains Maintenance

HEADINGLY LANE
RD001
Borcks Creek
MCSHANE ROAD
QUEEN STREET
RD002
BEACH ROAD
RD013 Beach Road Drain
RICHMOND DEVIATION
MAIN ROAD STOKE
RD012
Reservoir Creek
RD018
CHAMPION ROAD
Railway Yard
RD026
SALISBURY ROAD
RD014
APPLEBY HIGHWAY
RD003
GLADSTONE ROAD
QUEEN STREET
TALBOT STREET
RD015
LOWRY STREET
Humes Drain
RD007
CRESCENT STREET INLET
Washbourne Gardens
Borcks Creek
RD008
RD004
Blair Tce Detention Dam
RD020
RD021
WASHBOURNE GRILL
RD023
HILL STREET
RD009
Cemetery Dam
RD019
RD016
RD011
Reg Andrews Drain
BILL WILKES SCREEN
RD023
RD005
MAIN ROAD HOPE
EASBY PARK GRILL
RD024
Bill Wilkes Reserve
RD017
RD010
Olympus Way Detention Dam
RD025
Jimmy Lee Creek
LODESTONE RD GRILL
WHITE ROAD
RD006
PATON ROAD
HART ROAD
Lodestone Road Detention Dam
RD022
RANZAU ROAD EAST
HILL STREET

MWH
TDC

Legend

- Detention Dams / Ponds
- Stormwater Outlets / Inlets
- TDC Maintained Sections
- Stormwater Drains
- Stormwater UDA
- Creeks / Rivers

N
W E
S

Scale at A3 Approx.
1:20000

Riwaka
Stormwater Drains Maintenance

RIW001

School Rd Floodgates
Check & Clear Monthly

RIW002

Lodder Lane Outfall
Check & Clear two monthly

MWH

TDC

Legend

- Detention Dams / Ponds
- Stormwater Outlets / Inlets
- TDC Maintained Sections
- Stormwater Drains
- Stormwater UDA
- Creeks / Rivers

N
W E
S

Scale at A3 Approx.
1:10000

Takaka
Stormwater Drains Maintenance

WAITAPU ROAD
ROTOTAI ROAD
MEIHANA STREET
HIAWATHA LANE
ROSE ROAD
TMP Drain
Reilly Drain
TAK001
REILLY STREET
MOTUPIPI STREET
Orange & others Drain
TAK002
WILLOW STREET

MWH
TDC

Legend

- Detention Dams / Ponds
- Stormwater Outlets / Inlets
- TDC Maintained Sections
- Stormwater Drains
- Stormwater UDA
- Creeks / Rivers

N
W E
S

Scale at A3 Approx.
1:10000

Pohara
Stormwater Drains Maintenance

SELWYN STREET

ABEL TASMAN DRIVE

POH001

POHARA VALLEY ROAD

Paradise Way Outlet & Detention Dam

RICHMOND ROAD

ABEL TASMAN DRIVE

MWH

TDC

Legend

- Detention Dams / Ponds
- Stormwater Outlets / Inlets
- TDC Maintained Sections
- Stormwater Drains
- Stormwater UDA
- Creeks / Rivers

N

W E

S

Scale at A3 Approx.
1:10000

Motueka
Stormwater Drains Maintenance

STAPLES STREET
STAPLE ST OUTLET
MOT006
Lammas Drain No.2
PARKER STREET
FEARON STREET
Lammas Drain No.1
POOLE STREET
OUTLETS MOT007
PAH STREET
GREENWOOD STREET
THORP STREET
HIGH STREET
Queen Victoria Drain
MOT005
WHAKAREWA STREET
MOTUEKA QUAY OUTLET 4
MOT002
MOT001
Thorpe Drain
MOTUEKA QUAY
Woodland Drain
MOT003
GLENHAVEN DR DETENTION DAM
GLENAVEN DRIVE
MOT010
QUEEN VICTORIA STREET
KING EDWARD STREET
OLD WHARF RD GATE
MOT009
MOT004
MOTUEKA QUAY OUTLET 1
HIGH STREET
TREWAVAS STREET
WHARF ROAD
WHARF RD GATES
MOT008

MWH
TDC

Legend

- Detention Dams / Ponds
- Stormwater Outlets / Inlets
- TDC Maintained Sections
- Stormwater Drains
- Stormwater UDA
- Creeks / Rivers

N
W E
S

Scale at A3 Approx.
1:20000

Tapawera
Stormwater Drains Maintenance

TAP001

Diversion drain requires regular inspection and clearance 2 times a year.

TOTARA STREET

TADMOR VALLEY ROAD

Grass swale

RATA AVENUE

KOWHAI STREET

Inlet screens under roads require clearance 4 times a year.

TAP002

MATAI CRESCENT

TAP003

3 Culvert inlets along this boundary that require regular 3 times a year clean.

MAIN ROAD TAPAWERA

MWH

TDC

Legend

- Detention Dams / Ponds
- Stormwater Outlets / Inlets
- TDC Maintained Sections
- Stormwater Drains
- Stormwater UDA
- Creeks / Rivers

N
W E
S

Scale at A3 Approx.
1:5000

Ligar Bay / Tata Beach
Stormwater Drains Maintenance

CORNWALL PLACE
TAT002
TATA HEIGHTS
TAT001
PENINSULA ROAD
ABEL TASMAN DRIVE
NYHANE DRIVE

MWH

TDC

Legend

- Detention Dams / Ponds
- Stormwater Outlets / Inlets
- TDC Maintained Sections
- Stormwater Drains
- Stormwater UDA
- Creeks / Rivers

N
W E
S

Scale at A3 Approx.
1:10000

Wakefield
Stormwater Drains Maintenance

PIGEON VALLEY ROAD
LORD AUCKLAND ROAD
WHITBY ROAD
WHITBY ROAD
CLIFFORD ROAD
EDWARD STREET
PITFURE ROAD
EDWARD STREET
TREETON PLACE
WK002
Faulkners Bush Drain
WK001
Eighty Eight Vly Drain
EIGHTY EIGHT VALLEY ROAD
Eden Detention Dam
WK003

MWH
TDC

Legend

- Detention Dams / Ponds
- Stormwater Outlets / Inlets
- TDC Maintained Sections
- Stormwater Drains
- Stormwater UDA
- Creeks / Rivers

N
W
E
S

Scale at A3 Approx.
1:10000

APPENDIX C. ASSESSMENT OF STORMWATER SYSTEMS IN THE DISTRICT

Under Part 7 of the Local Government Act 2002 (and Section 285), every local authority was required to carry out an approved Water and Sanitary Services Assessments (WSSA) of all stormwater drainage in its District before 30 June 2005.

The WSSA documents were made available to the public for consultation purposes and a special meeting was held in June 2005 to review public submissions.

Council approved the WSSA documents in June 2005 and therefore met the requirements of the Local Government Act 2002 that the first assessment be adopted before 30 June 2005. This included an assessment of privately owned stormwater systems within the district.

The WSSA documents consisted of two volumes:

Volume 1 Contained an overview of the water and sanitary services in Tasman District with recommendations and priority rankings for future improvements,

Volume 2: Contained the detailed assessments.

Following the approval of the WSSA, privately owned stormwater systems in Tapawera, Tasman Township, and Patons Rock were formally adopted by Council with the creation of new Urban Drainage Areas. The WSSA will be updated in 2009/10.

APPENDIX D. ASSET VALUATIONS- STORMWATER

D.1 Background

The Local Government Act 1974 and subsequent amendments contain a general requirement for local authorities to comply with Generally Accepted Accounting Practice ("GAAP").

The Financial reporting Act 1993 sets out a process by which GAAP is established for all reporting entities and groups, the Crown and all departments, Offices of Parliament and Crown entities and all local authorities. Compliance with the New Zealand Equivalent to International Accounting Standard 16; Property, Plant and Equipment (NZ IAS 16) and IAS 36 (Impairment of Assets is the one of the current requirements of meeting GAAP.

The purpose of the valuations is for reporting asset values in the financial statements of TDC.

TDC requires its infrastructure asset register and valuation to be updated in accordance with Financial Reporting Standards and the AMP improvement plan (i.e. three yearly updates)

The valuations summarised below have been completed in accordance with the following standards and are suitable for inclusion in the financial statements for the year ended June 2007.

- NAMS Group Infrastructure Asset Valuation Guidelines – Edition 2.0
- New Zealand Equivalent to International Accounting Standard 16; Property, Plant and Equipment (NZ IAS 16) and IAS 36 (Impairment of Assets

D.1.1. Depreciation

Depreciation of assets must be charged over their useful life.

- *Depreciated Replacement Cost* is the current replacement cost less allowance for physical deterioration and optimisation for obsolescence and relevant surplus capacity. The *Depreciated Replacement Cost* has been calculated as:

$$\frac{\text{Remaining useful life}}{\text{Total useful life}} \times \text{replacement cost}$$

- *Depreciation* is a measure of the consumption of the economic benefits embodied in an asset. It distributes the cost or value of an asset over its estimated useful life. Straight-line depreciation is used in this valuation.
- *Total Depreciation to Date* is the total amount of the asset's economic benefits consumed since the asset was constructed or installed.
- The *Annual Depreciation* is the amount the asset depreciates in a year. It is defined as the replacement cost minus the residual value divided by the estimated total useful life for the asset.
- The *Minimum Remaining Useful Life* is applied to assets which are older than their useful life. It recognises that although an asset is older than its useful life it may still be in service and therefore have some value. Where an asset is older than its standard useful life, the minimum remaining useful life is added to the standard useful life and used in the calculation of the depreciated replacement value.

D.1.2. Revaluation

The revaluations are based on accurate and substantially complete asset registers and appropriate replacement costs and effective lives. The basis of the data inputs used is described in detail in the attached report.

(a) The lives are generally based upon NZ Infrastructure Asset Valuation and Depreciation Guidelines – Edition 2. In specific cases these have been modified where in our, and Council's opinion a different life is appropriate. The changes are justified in the valuation report.

(b) The component level of the data used for the valuation is sufficient to calculate depreciation separately for those assets that have different useful lives.

D.2 Overview of Asset Valuations

Assets are valued every three years, and historic asset valuations reports are held with Council.

The stormwater assets were last re-valued in June 2007 and the data are reported under separate cover[11]. The total replacement value of the stormwater assets as of 30 June 2007 is given in the Table below.

Key assumptions in assessing the asset valuations are described in detail in the valuation report.

Stormwater assets consist of:

- Culverts
- Channels (not depreciated)
- Detention Dams (not depreciated)
- Floodgates (including hydraulics and electrical components)
- Manholes
- Outlets
- Pipes
- Rock Protection
- Soakpits, and Sumps

D.3 2007 Valuation- Stormwater

Table D-1: Stormwater Asset Valuation Summary

	Optimised Replacement Value ($)	Optimised Depreciated Replacement Value ($)	Total Depreciation to Date ($)	Annual Depreciation ($/yr)
Stormwater 2007	65,589,739	53,664,244	11,925,495	582,890

[11] Infrastructural Asset Revaluation, June 2007 – MWH report for Tasman District Council

Table D-2: Stormwater Asset Valuation Breakdown

Component	Quantity	Optimised Replacement Value ($)	Annual Depreciation ($/yr)	Optimised Depreciated Replacement Value ($)
Richmond Pipes	73,980 m	28,140,000	245,800	22,525,000
Richmond Manholes	800 No	3,800,000	47,500	2,725,000
Richmond Channel	48,000 m	975,000	0	975,000
Richmond Detention Dams	5	446,000	0	446,000
Richmond Outlets	1	9,816	82	9,571
Brightwater Pipes	8,743	3,000,000	27,500	2,550,000
Brightwater Manholes	123	431,600	5,400	350,600
Brightwater Channel	7,430	151,500	0	171,500
Hope Pipes	1,570	548,000	5,158	480,000
Hope Manholes	20	95,000	1,186	85,300
Wakefield Pipes	7,125	2,455,000	21,012	2,137,000
Wakefield Manholes	59	276,600	3,460	225,700
Wakefield Channel	9,293	189,500	0	189,500
Motueka Pipes	31,342	12,760,000	108,437	10,711,000
Motueka Manholes	382	1,812,000	22,970	1,395,000
Motueka Channel	36,045	735,000	0	735,000
Motueka Floodgates	3	175,000	5,400	84,000
Collingwood Piping	2,617	691,500	6,600	538,000
Collingwood Manholes	19	90,120	1,127	85,263
Collingwood Channel	131	2,700	0	2,700
Mapua/Ruby Bay Piping	7,419	2,184,000	19,160	1,700,000
Mapua/Ruby Bay Manholes	93	441,000	5,514	314,000
Mapua/Ruby Bay Channel	10,425	213,000	0	213,000
Marahau Piping	150	38,000	315	26,000
Marahau Manholes	3	14,200	178	7,650
Murchison Piping	1,433	360,000	3,032	236,100
Murchison Manholes	2	9,500	119	3,900
Murchison Channel	1,390	28,300	0	28,300
Tapawera Piping	2,724	764,000	6,400	505,000
Tapawera Manholes	29	137,600	1,719	72,700
Tapawera Channel	5,550	113,200	0	113,200
Takaka Piping	5,058	1,435,300	12,767	1,237,000
Takaka Manholes	17	80,640	1,008	65,600
Takaka Channel	11,325	230,900	0	230,900
U/Takaka Pipes	528	120,500	1,004	83,400
U/Takaka Manholes	7	33,200	415	17,850
Tata Beach Piping	749	238,500	2,154	216,988
Tata Beach Manholes	16	75,900	949	70,700
Pohara Pipes	1428	333,000	4,016	319,700
Pohara Manholes	20	94,900	1,186	91,370
St Arnaud Piping	75	13,500	136	12,600
Kaiteriteri Pipes	2,385	511,010	4,666	446,000
Kaiteriteri Manholes	41	194,500	2,431	149,700
Riwaka Pipes	100	85,830	718	81,100
Riwaka Floodgates	1	700	6	663

Component	Quantity	Optimised Replacement Value ($)	Annual Depreciation ($/yr)	Optimised Depreciated Replacement Value ($)
Riwaka Outlets	4	43,500	360	41,000
Riwaka Rock Protection	80	6,350	53	5,980
Others, Misc (sumps, etc...)		1,004,373	12,952	952,709
Total	-	65,589,739	582,890	53,664,244

APPENDIX E. OPERATIONS AND MAINTENANCE

E.1 Maintenance Contract

The operation and maintenance of the stormwater systems has been incorporated into a single performance based contract. The initial contract duration is 6 years provided the contractor meets the performance requirements of the contract. Some of the key aspects of this contract are:

- Spirit of Partnering
- Emphasis on Innovation
- Performance Criteria
- Measurement of Performance
- Proactive Maintenance

The implementation of the proactive maintenance work is managed in the following way:

The Contractor prepares an Annual Operation and Maintenance Programme (AOMP) that consists of monthly programmes of all proactive maintenance that is prioritised and priced.

The Engineer to the Contract (Council's consultant) in conjunction with the Council reviews the programme against the budgets and then negotiates with the Contractor to agree any deferrals or amendments.

The Contractor then implements the works according to monthly schedules.

A proactive maintenance schedule summarising the scheduled work (dated August 2007) is enclosed.

Plans illustrating which sections of drains/ open water courses in each UDA, which is the Council's responsibility to maintain are enclosed with this Appendix. All drains highlighted as being Council's responsibility are included in the proactive maintenance schedule, issued to the Council's maintenance Contractor.

There are two areas of maintenance: "Proactive Maintenance" and "General Maintenance". Budgets for these have been set based on historical spending sums.

"Proactive Maintenance" is based on a need to carry out inspections, clear debris or blockages and ensure the correct functioning of critical parts of the stormwater system, being Detention Dam Inlet Structures, Culvert openings, Floodgates, and Beach Outlets. These are checked by the Maintenance Contractor on issue of instruction from the Engineer to the Contract, usually on issue of a heavy rain warning, to ensure the system operates at its optimum capacity when required.

"General Maintenance" covers the need for attendance to site to manage reactive maintenance requirements, ranging from urgent needs to attend site through to managing less urgent corrective work, in order to maintain the general operation of all parts of the stormwater system.

E.2 Engineering Studies

A number of studies requiring engineering consultancy professional services have been allocated to the Operations and Maintenance Budget. These are summarised in the Table below. A detailed forecast is shown in Table E-1.

1	Motueka Boyce/ Clay Street	Flooding alleviation study - Investigate route for new stormwater pipe
2	Richmond/ Waimea Plains Study	Catchment Management Plan
3	Motueka Study	Catchment Management Plan
4	Wakefield Study	Catchment Management Plan

5	Detention Dam Consents	Requires completion of risk management assessment/ condition assessments
6	Asset Management Improvements	System improvements/ development - ongoing
7	Sanitary Service Assessments	Completed every 3 years
8	Stormwater Quality Assessments	Investigations/ Studies, initially in Richmond and Motueka and eventually covering all urban areas
9	O&M Contract Re-tender	Completed every 7 years
10	Foreshore Study	Environmental Assessments and recommendations for improvement in environmental quality.
11	CCTV	Programme of work to identify poor structural and operational condition of Stormwater pipes.

E.3 Renewal/ Maintenance Work

A number of renewal/ maintenance projects have been allocated to the Operations and Maintenance Budget. These are summarised in the Table below:

1	Stormwater Quality Improvements	Planned ongoing work to improve stormwater quality discharges from Yr 5 onwards
2	Collingwood, Clean out Gravel Traps	Planned maintenance Yr 3
3	Tapawera Interception Drains	Planned maintenance Yr 1 and Yr 5
4	Collingwood, Beach Road outlets	Planned renewal/ maintenance Yr 10

E.4 Stormwater Quality Improvements

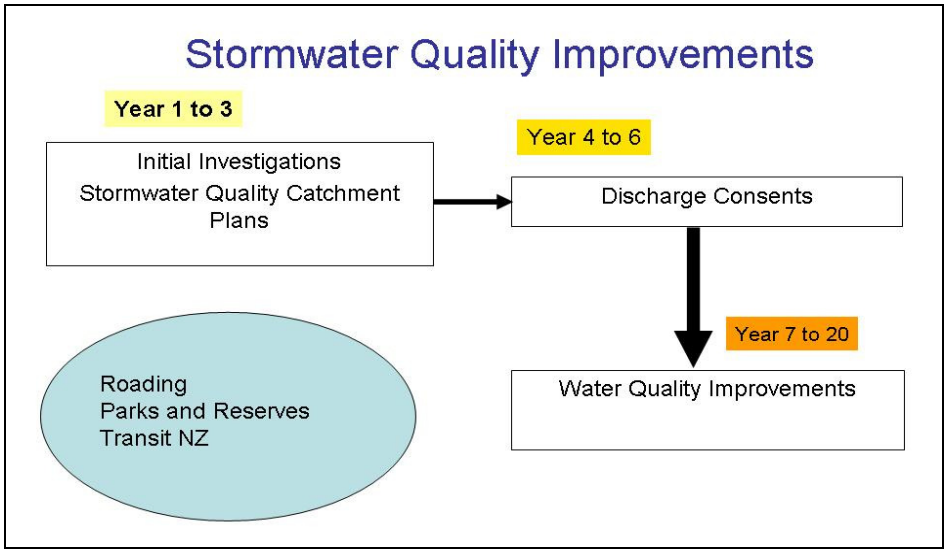
Included in the O&M budget are allowances for Stormwater Quality Improvements. These are due to be completed in line with the national trend towards Stormwater Quality improvements.

Stormwater quality issues arise from pollutants in our stormwater which enter the environment and impact on the ecosystems wellbeing and the general amenity and enjoyment value within our community. This is one of the key levels of service that Council is committed to. Stormwater can receive pollutants from a number of sources, but the main areas of contamination are:

- Oils and Grease
- Heavy Metals (road runoff)
- Sediments
- Excess nutrients /bacteria

A budget of approx. $100K per year has been allocated to make these improvements. These improvements will be made in conjunction with other asset areas, Roading and Parks and Reserves. We also envisage working closely with the New Zealand Transport Agency (formally Transit NZ) to minimise impacts of runoff contaminants from State Highways.

Figure E-1: Illustrating the Stormwater Quality Improvement Plan



There are a number of options to make stormwater quality improvements, ranging from at source control which relies on working with the most at risk polluters to prevent the discharge of contaminants in the first place, to installing head of system control measures through to mid system collection systems and end of system treatment systems. End of system treatment systems are typically expensive as they have to catch all catchment flows, and therefore would usually be installed once all other options for making water quality improvements had been assessed. Where land is available, a relatively cheap solution to 'treat' stormwater flows at the end of a system is to provide a wetland to pass flows through.

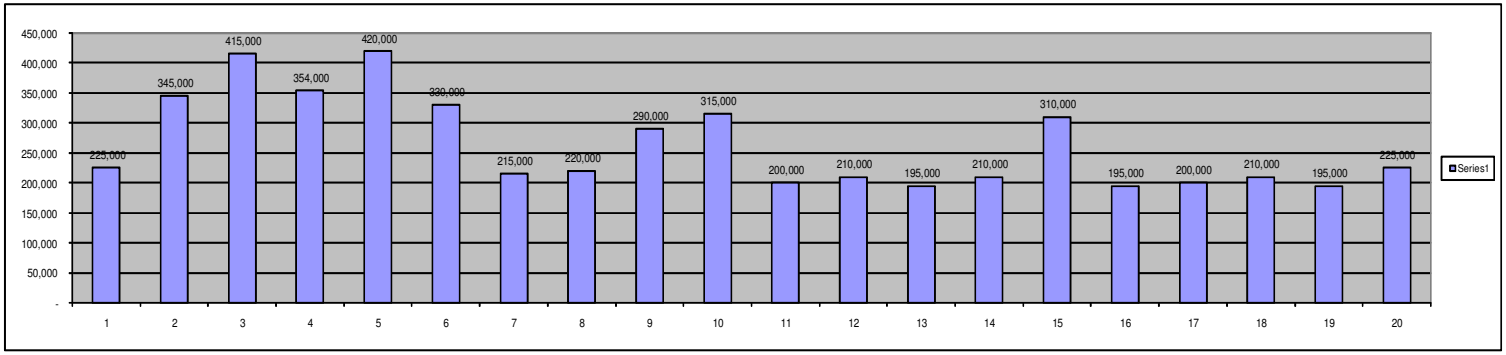
The O&M costs shown in this appendix include for additional maintenance costs for maintaining various stormwater quality treatment units, which it is believed will be installed over the AMP period.

The priority will be to implement stormwater quality improvements to the Richmond UDA first, following by other major UDAs until the whole region complies with community expectations for stormwater discharges.

E.5 Projected Operations and Maintenance Costs

Table E-1: Engineering Strategic Studies

Item	Study Name	Description	TOTAL	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29
				Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
1	Stormwater Quality Review	Yr 1 to 3 - initial investigations, Yr 4 - 6 apply for discharge consents (Spilt 60/40 Rich & Mot)	550,000	50,000	100,000	100,000	100,000	100,000	100,000														
2	Sanitary Services Assessments		175,000	25,000			25,000			25,000			25,000			25,000			25,000			25,000	
3	AMP Review and Update	3 yrly reviews (20yr forecast)	330,000		15,000	40,000		15,000	40,000		15000	40,000		15000	40,000		15000	40,000		15000	40,000		
4	AMP Improvement Plan Activities	Annual allowance	1,000,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000
5	O&M Contract Tender	Retender allowance	180,000			60,000						60,000						60,000					
6	Valuations	3 yrly reviews	105,000		15,000			15,000			15000			15000			15000			15000			15000
7	Collingwood Elizabeth Street	Clean out gravel pits	20,000			20,000																	
8	Collingwood Beach Rd Outlets		60,000										60000										
9	Motueka Boyce/ Clay Street	Flooding alleviation study	50,000				50,000																
10	Tapawera Forestry Board Int Drain	clear out remove gravel, repair	200,000	40,000				40,000					40000					40000					40000
11	Tapawera Maitai Crescent Drain	clear out remove gravel, repair	20,000					20,000															
12	Stormwater Quality Improvements	Yr 5 onwards (allow for 100K per year)	1,600,000					100,000	100,000	100,000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
13	Richmond/ Waimea Plains Study	Catchment Management Plan	85,000		85,000																		
14	Motueka Study	Catchment Management Plan	65,000			65,000																	
15	Detention Dam Consents		200,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000										
16	Wakefield Study	Catchment Management Plan	39,000				39,000																
17	Prof Services Contract Retender		20,000				10,000										10000						
18	Foreshore Study		180,000	20,000	40,000	40,000	40,000	40,000															
19	CCTV		400,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20000	20000	20000	20000	20000	20000	20000	20000	20000	20000	20000	20000	20000
20	Model update with LIDAR		-	-	-	-	-	-															
Total				225,000	345,000	415,000	354,000	420,000	330,000	215,000	220,000	290,000	315,000	200,000	210,000	195,000	210,000	310,000	195,000	200,000	210,000	195,000	225,000



N.B. Does not include inflation.

Table E-2: Projected O&M Costs

General Ledger Code	STORMWATER GENERAL OPERATING & MAINTENANCE	2009/10 Year 1	2010/11 Year 2	2011/12 Year 3	2012/13 Year 4	2013/14 Year 5	2014/15 Year 6	2015/16 Year 7	2016/17 Year 8	2017/18 Year 9	2018/19 Year 10	2019/20 Year 11	2020/21 Year 12	2021/22 Year 13	2022/23 Year 14	2023/24 Year 15	2024/25 Year 16	2025/26 Year 17	2026/27 Year 18	2027/28 Year 19	2028/29 Year 20
Stormwater																					
0601 2401	STO RICHMOND GEN MTCE	61,291	64,968	70,618	71,324	77,037	78,193	78,975	84,765	85,612	91,468	92,840	93,769	94,707	100,654	101,660	108,185	109,267	110,360	111,463	112,578
0601 2401 01	STO RR SCHEDULED MAINT																				
0601 2401 02	STO RR PROACTIVE MAINTENANCE																				
0602 2401	STO MOTUEKA GEN MTCE	45,004	47,704	48,181	53,663	54,199	55,012	55,562	56,118	61,679	62,296	63,230	63,863	64,501	65,146	65,798	66,785	67,453	68,127	68,808	69,497
0602 2401 01	STO MOT SCHEDULED MAINTENANCE																				
0602 2401 02	STO MOT PROACTIVE MAINT																				
0603 2401	STO MAPUA/RUBY BAY GEN MTCE	25,769	27,315	27,588	27,864	28,143	28,565	28,851	29,139	29,431	29,725	30,171	35,473	35,827	36,186	36,547	37,096	37,467	37,841	38,220	38,602
0603 2401 01	STO MAPUA SCHEDULED MAINT																				
0603 2401 02	STO MAPUA PROACTIVE MAINT																				
0604 2401	STO BRIGHTWATER GEN MTCE	9,429	9,995	10,095	10,196	10,298	10,452	10,557	10,663	10,769	10,877	11,040	11,150	11,262	11,375	11,488	11,661	11,777	11,895	12,014	12,134
0604 2401 01	STO BRIGHTWATER SCH MAINTENANC																				
0604 2401 02	STO BGW PROACTIVE MAINTENANCE																				
0605 2401	STO WAKEFIELD GEN MTCE	9,505	10,075	10,176	10,278	10,381	10,536	10,642	10,748	10,856	10,964	11,129	11,240	11,352	11,466	11,581	11,754	11,872	11,991	12,110	12,232
0605 2401 01	STO WAKEFIELD SCH MAINTENANCE																				
0605 2401 02	STO WAKEFIELD PROACTIVE MAINT																				
0606 2401	STO TAKAKA GEN MTCE	10,587	11,222	11,334	11,448	11,562	11,735	11,853	11,971	12,091	12,212	12,395	12,519	12,644	12,771	12,898	13,092	13,223	13,355	13,489	13,624
0606 2401 01	STO TAKAKA SCH MAINTENENCE																				
0606 2401 02	SCH TAKAKA PROACTIVE MAINTENAN																				
0607 2401	STO MURCHISON GEN MTCE	9,387	9,950	10,050	10,150	10,252	10,405	10,509	10,615	10,721	10,828	10,990	11,100	11,211	11,323	11,437	11,608	11,724	11,841	11,960	12,079
0607 2401 01	STO MURCH SCH MAINTENANCE																				
0607 2401 02	STO MURCH PROACTIVE MAINT																				
0610 2401	STO GENERAL DISTRICT MTCE	60,647	64,286	64,929	65,578	66,234	67,228	67,900	68,579	69,265	69,957	71,007	71,717	72,434	73,158	73,890	74,998	75,748	76,506	77,271	78,044
0610 2401 02	STO GENERAL PROACTIVE MAINT																				
0621 2401	STO COLLINGWOOD GEN MTCE	3,429	3,635	23,671	3,908	3,947	4,006	4,046	4,087	4,127	64,169	5,131	5,183	5,234	5,287	5,340	5,420	5,474	5,529	5,584	5,640
0622 2401	STO KAITERI GEN MTCE	5,679	6,020	6,080	6,141	6,202	6,295	6,358	6,422	6,486	6,551	6,649	6,716	6,783	6,851	6,919	7,023	7,093	7,164	7,236	7,308
0623 2401	STO ST ARN GEN MTCE	5,572	5,907	5,966	6,025	6,085	6,177	6,239	6,301	6,364	6,428	6,524	6,589	6,655	6,722	6,789	6,891	6,960	7,029	7,099	7,170
06242401	LIGAR BAY UDA	7,070	7,494	7,569	7,645	7,721	7,837	7,915	7,995	8,075	8,155	8,278	8,360	8,444	8,528	8,614	8,743	8,830	8,919	9,008	9,098
06262401	TATA BEACH UDA	10,100	10,706	10,813	10,921	11,030	11,196	11,308	11,421	11,535	11,650	11,825	11,943	12,063	12,184	12,305	12,490	12,615	12,741	12,868	12,997
06272401	PATONS ROCK UDA	10,100	10,706	10,813	10,921	11,030	11,196	11,308	11,421	11,535	11,650	11,825	11,943	12,063	12,184	12,305	12,490	12,615	12,741	12,868	12,997
06282401	TAPAWERA UDA	45,050	5,353	5,407	5,461	65,515	5,598	5,654	5,710	5,768	45,825	5,913	5,972	6,031	6,092	46,153	6,245	6,307	6,370	6,434	46,499
06292401	TASMAN UDA	5,050	5,353	5,407	5,461	5,515	5,598	5,654	5,710	5,768	5,825	5,913	5,972	6,031	6,092	6,153	6,245	6,307	6,370	6,434	6,499
06312401	POHARA UDA	6,060	6,424	6,488	6,553	6,618	6,718	6,785	6,853	6,921	6,990	7,095	7,166	7,238	7,310	7,383	7,494	7,569	7,645	7,721	7,798
		329,730	307,113	335,185	323,536	391,772	336,748	340,116	348,517	357,002	465,572	371,956	380,675	384,482	393,327	437,260	408,219	412,301	416,424	420,588	464,794
ELECTRICITY																					
06022505	MOTUEKA ELECTRICITY	2,135	2,263	2,286	2,309	2,332	2,367	2,390	2,414	2,439	2,463	2,500	2,525	2,550	2,576	2,601	2,640	2,667	2,693	2,720	2,748
	BRIGHTWATER UNDERPASS	500	530	535	541	546	554	560	565	571	577	585	591	597	603	609	618	624	631	637	643
PROFFESSIONAL SERVICES																					
06012203	STO RICH P/S CONSULTANTS	19,212	20,365	20,569	20,774	20,982	21,297	21,510	21,725	21,942	22,161	22,494	22,719	22,946	23,176	23,407	23,758	23,996	24,236	24,478	24,723
06022203	STO MOT P/S CONSULTANTS	14,719	15,602	15,758	15,915	16,075	16,316	16,479	16,644	16,810	16,978	17,233	17,405	17,579	17,755	17,933	18,202	18,384	18,567	18,753	18,941
06032203	STO MAPUA P/S CONSULTANTS	6,799	7,207	7,279	7,352	7,426	7,537	7,612	7,689	7,765	7,843	7,961	8,040	8,121	8,202	8,284	8,408	8,492	8,577	8,663	8,750
06042203	STO BGW P/S CONSULTANTS	5,102	5,408	5,462	5,516	5,571	5,655	5,712	5,769	5,826	5,885	5,973	6,033	6,093	6,154	6,215	6,309	6,372	6,435	6,500	6,565
06052203	STO WAKEFIELD P/S CONSULTANTS	5,102	5,408	5,462	5,516	5,571	5,655	5,712	5,769	5,826	5,885	5,973	6,033	6,093	6,154	6,215	6,309	6,372	6,435	6,500	6,565
06062203	STO TAKAKA P/S CONSULTANTS	5,102	5,408	5,462	5,516	5,571	5,655	5,712	5,769	5,826	5,885	5,973	6,033	6,093	6,154	6,215	6,309	6,372	6,435	6,500	6,565
06102203	STO GEN P/S CONSULTANTS	28,306	30,005	30,305	30,608	30,914	31,378	31,691	32,008	32,328	32,652	33,141	33,473	33,807	34,146	34,487	35,004	35,354	35,708	36,065	36,426
06212203	STO COLLINGWOOD P/S CONSULTANT	1,815	1,924	1,943	1,963	1,982	2,012	2,032	2,052	2,073	2,094	2,125	2,146	2,168	2,189	2,211	2,244	2,267	2,290	2,312	2,336
06222203	STO KAITERI P/S CONSULTANT	1,815	1,924	1,943	1,963	1,982	2,012	2,032	2,052	2,073	2,094	2,125	2,146	2,168	2,189	2,211	2,244	2,267	2,290	2,312	2,336
06232203	STO ST ARN P/S CONSULTANT	1,815	1,924	1,943	1,963	1,982	2,012	2,032	2,052	2,073	2,094	2,125	2,146	2,168	2,189	2,211	2,244	2,267	2,290	2,312	2,336
0601220310	AMP/LTCCP (3 YEARLY REVIEW/UPDATE)	-	15,000	40,000	-	15,000	40,000	-	15,000	40,000	-	15,000	40,000	-	15,000	40,000	-	15,000	40,000	-	-
06002203001	AMP IMPROVEMENT PLAN ACTIVITIES	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000
06002203002	SANITORY SERVICE ASSESSMENTS	25,000	-	-	25,000	-	-	25,000	-	-	25,000	-	-	25,000	-	-	25,000	-	-	25,000	-
06012203001	Stormwater Quality Review Richmond	30,000	60,000	60,000	60,000	60,000	60,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
06002203003	Stormwater Quality Review Motueka	20,000	40,000	40,000	40,000	40,000	40,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
06022203001	Motueka Boyce/ Clay Street Flooding alleviation study	-	-	-	50,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
06002203004	Stormwater Quality Improvements Yr 5 onwards (allow for 100K per year)	-	-	-	-	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000
06012203002	Richmond/ Waimea Plains Study Catchment management plan	-	85,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
06022203002	Motueka Study Catchment management plan	-	-	65,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
06002203005	Detention Dam Consents	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	-	-	-	-	-	-	-	-	-	-
06002203006	O&M CONTRACT RETENDER	-	-	60,000	-	-	-	-	-	60,000	-	-	-	-	-	60,000	-	-	-	-	-
06002205	REVALUATIONS (3 YEARLY)	-	15,000	-	-	15,000	-	-	15,000	-	-	15,000	-	-	15,000	-	-	15,000	-	-	15,000
06002203008	PROF SERVICES RETENDER	-	-	-	10,000	-	-	-	-	-	-	-	-	-	10,000	-	-	-	-	-	-
06002203007	Wakefield Study	-	-	-	39,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
06002203009	Foreshore Study	20,000	40,000	40,000	40,000	40,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
06002203010	CCTV	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000
06002203011	Model update with LIDAR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		274,786	440,173	491,125	451,086	458,057	429,528	315,523	321,528	392,544	318,569	305,123	316,174	302,236	318,308	379,391	306,032	312,142	323,264	309,396	300,540
	Total	607,151	750,080	829,131	777,472	852,707	769,197	658,589	673,025	752,555	787,181	680,164	699,965	689,865	714,813	819,862	717,510	727,735	743,012	733,342	768,726

N.B. Does not include inflation.

Table E-3: TDC Stormwater Asset Maintenance List

MAINT.ID	Waterway name	Reach	Ownership	Start Co-ord	End Co-ord	Length	Required Routine Maintenance	Maintenance Frequency
	Richmond							
RD001	Borck Creek	Headingly Lane to Queen St	Engineering	0	880	880	Tractor boom mowing	4 times yearly
RD002	Borck Creek	Queen St to Humes Drain	Engineering	880	2540	1660	Currently not maintained	
RD003	Borck Creek	Humes to SH 60	Engineering	2540	2840	300	Tractor boom mowing	4 times yearly
RD004	Borck Creek	SH to Andrews Drain	Engineering	2840	3520	680	Not maintained	
RD005	Borck Creek	Andrews to SH 6	Engineering	3520	4480	960	Mechanical hand clearing	4 times yearly
RD006	Borck Creek	SH 6 to Ranzau Road	Engineering	4480	5300	820	Mechanical hand clearing	4 times yearly
RD007	Humes Drain	Borck Cr to end of Railway Reserve	Engineering	2540	2980	440	Tractor boom mowing	4 times yearly
RD008	Humes Drain	Railway Reserve to SH 6 Bridge	Engineering	2980	3180	200	Mechanical hand clearing	4 times yearly
RD009	Humes Drain	SH 6 Bridge to eastern Hills Drain	Engineering	3180	3710	530	Tractor boom mowing	4 times yearly
RD010	Eastern Hills Drain	Alongside Bateup Road	Engineering	3710	4095	385	Tractor boom mowing	4 times yearly
RD011	Andrews Drain	Borck to SH6	Engineering	3520	3750	230	Mechanical hand clearing	4 times yearly
RD012	Reservoir Creek	Waimea inlet to Salisbury Road	P & R	0	460	460	Not maintained	
RD013	Reservoir Creek	Salisbury Road to Kareti Dr	P & R	460	830	370	Not maintained	
RD014	Reservoir Creek	Kareti Dr to Templemore Road Culvert.	Engineering	830	1050	220	Chemical Spray	2 times yearly
RD015	Reservoir Creek	Templemore Culvert to hill St	Engineering	1050	1650	600	Mechanical hand clearing	4 times yearly
RD016	Jimmy Lee Creek	Washbourn Drive to Bill Wilkes Reserve	Engineering	0	370	370	Desilt and Mechanical hand clearing	2 times yearly
RD017	Jimmy Lee Creek	Bill Wilkes Reserve to Hunter Ave	Engineering	370	578	208	Desilt and Mechanical hand clearing	2 times yearly
RD018	Beach Rd Drain	Waimea inlet to Lammas Street	Engineering	0	890	890	Desilt and Chemical Spray	2 times yearly
RD026	Railway Yard Drain	Railway Reserve to Queen St behind Railway Hotel	Engineering	0	436	436	Desilt and Mechanical hand clearing	2 times yearly
RD019	Cemetery Dam	Otia Drive	Engineering				Maintain and clear grates. Mow	12 times yearly
RD020	Blair Terrace Detention area	Blair Terrace	Engineering				Maintain and clear grates.	12 times yearly

MAINT.ID	Waterway name	Reach	Ownership	Start Co-ord	End Co-ord	Length	Required Routine Maintenance	Maintenance Frequency
RD021	Blair Terrace Inlet Structure	21B Blair Terrace	Engineering				Maintain and clear grates.	12 times yearly
RD022	Lodestone Road Detention Dam	14 Lodestone Road	Engineering				Maintain and clear grates.	12 times yearly
RD023	Bill Wilkes Reserve Inlet Structures	20 Wasbourn Drive	Engineering				Maintain and clear grates.	12 times yearly
RD024	Marlborough Crescent Inlet Structure	TDC Reserve Easby Park	Engineering				Maintain and clear grates.	12 times yearly
RD025	Olympus Way Detention Dam	43 Olympus Way	Engineering				Maintain and clear grates.	12 times yearly
					TOTAL	10639		
	Motueka							
MOT001	Thorp Drain	Tudor St to 136 Thorp St	Engineering	0	140	140	Mechanical hand clearing	2 times yearly
MOT002	Woodlands Drain	Supermarket to end of Thorps Bush	Engineering	0	410	410	Mechanical hand clearing	2 times yearly
MOT003	Woodlands Drain	Thorp Bush to Old Wharf Road	Engineering	410	1360	950	Tractor boom mowing	2 times yearly
MOT004	Woodlands Drain	Old Wharf Road to detention estuary	Engineering	1360	1620	260	Mechanical hand clearing	2 times yearly
MOT005	Queen Victoria Drain	Between Whakarewa St and Pah St.	Engineering	0	290	290	Tractor boom mowing	4 times yearly
MOT006	Lammas drain 2		Engineering	0	390	390	Mechanical hand clearing	2 times yearly
MOT007	14 Outfalls		Engineering				Inspect inlet and keep clear	12 times yearly
MOT008	Wharf Road Flood Gate	Wharf Road	Engineering				Inspect and carry out regular maintenance	4 times yearly
MOT009	Old Wharf Road Flood Gate	Old Wharf Road	Engineering				Inspect and carry out regular maintenance	4 times yearly
MOT010	Glenaven Ave Motueka	Glenaven Ave Motueka	Engineering				Maintain and clear grates.	12 times yearly
					TOTAL	2440		
	Brightwater							
BGW001	Jeffries Creek	Eder Property Lord Rutherford Rd South	Private	0	130	130	Mechanical hand clearing if required	2 times yearly
BGW002	Jeffries Creek	Hill Property Lord Rutherford Rd South	Private	130	280	150	Mechanical hand clearing if required	2 times yearly

MAINT.ID	Waterway name	Reach	Ownership	Start Co-ord	End Co-ord	Length	Required Routine Maintenance	Maintenance Frequency
BGW003	Jeffries Creek	Bashford property to Lord Rutherford Rd South	Private	300	440	140	Mechanical hand clearing if required	2 times yearly
BGW004	Ellis Street Drain	96 Ellis St to School		0	50	50	Hand Clear or Excavator clean	2 times yearly
BGW005	Ellis Street Drain	Ellis Street to Brightwater Engineers	Engineering	50	265	215	Hand Clear or Excavator clean	2 times yearly
BGW006	Railway Reserve Drain	Brightwater Engineers to Wairoa River	Engineering	265	765	500	Mow	2 times yearly
					TOTAL	1185		
	Wakefield							
WK001	Eighty Eight valley drain	72A Eighty Eight valley Rd to 88 Valley stream	Engineering	0	240	240	Mechanical hand clearing	2 times yearly
WK002	Domain Drain (Faulkner's Bush to 39 Eighty Eight Valley Road		Engineering	390	1020	630	Hand Clear or Excavator clean	2 times yearly
WK003	88 Valley Dam	Eden property 88 Valley Road	Engineering				Maintain and clear grates.	12 times yearly
					TOTAL	870		
	Mapua							
MAP001	Morley Drain	to Mapua inlet	Engineering	0	410	410	Hand Clear or Excavator clean	2 times yearly
MAP002	Crusader Drive Dam	21 Crusader Drive Dam	Engineering				Maintain and clear grates.	12 times yearly
					TOTAL	410		
	Ruby Bay							
RUB001	Brabant Drive/Pine hill Rd	Culvert outlet to beach	Engineering				Inspect outlet and keep clear	6 times yearly
RUB002	4 Crusader Drive	Culvert inlet & outlet drain to detention area	Engineering				Inspect inlet and keep clear	4 times yearly
RUB003	Tait St outlet	Culvert outlet to beach	Engineering				Inspect inlet and keep clear	12 times yearly
RUB004	Broadsea Ave outlet	Culvert outlet to beach	Engineering				Inspect inlet and keep clear	12 times yearly

MAINT.ID	Waterway name	Reach	Ownership	Start Co-ord	End Co-ord	Length	Required Routine Maintenance	Maintenance Frequency
	Kaiteriteri							
KAI001	Little Kaiteriteri Reserve Drain	Rowling Road opposite Kotare Place	Engineering	0	200	200	Hand Clear or Excavator clean	4 times yearly
KAI002	Little Kaiteriteri outlet	Rowling Road	Engineering				Maintain and clear grates.	4 times yearly
KAI003	Camp Beach outlet pipe	Kaiteriteri Sandy Bay Road alongside boat ramp	Engineering				Inspect and clear culvert	12 times yearly
					TOTAL	200		
	Takaka							
TAK001	Reilly	Reilly Rd to Te kaka Stream	Engineering	0	170	170	Hand Clear or Excavator clean	2 times yearly
TAK002	Orange and others	Motupipi St to Motupipi River	Engineering	0	330	330	Hand Clear or Excavator clean	2 times yearly
					TOTAL	500		
	Pohara							
POH001	Watino Place	Picks up new subdivision and runs to Richmond Rd behind properties.	Engineering	0	178	178	Hand Clear or Excavator clean	2 times yearly
					TOTAL	178		
	Tata Beach							
TAT001	Abel Tasman Drive	Tata Heights to Peterson Road	Engineering	0	325	325	Hand Clear or Excavator clean	2 times yearly
TAT002	Cornwell Place	Inlet/culvert and open drain	Engineering	0	160	160	Inspect, clear vegetation	2 times yearly
					TOTAL	485		
	Collingwood							
COL001	Ruataniwha Drive	Open drain between 34 & 38	Engineering	0	85	85	Spray, hand clear and maintain rock	2 times yearly
COL002	Lewis St Drain		Engineering	0	115	115	Mechanical hand clearing	1 times yearly
COL003	Beach Road	5 stormwater outlets to beach	Engineering					6 times yearly
COL004	Gibbs Road	Open Drain Gibbs Road North	Engineering	0	195	195	Spray or desilt drain	2 times yearly
					TOTAL	395		

MAINT.ID	Waterway name	Reach	Ownership	Start Co-ord	End Co-ord	Length	Required Routine Maintenance	Maintenance Frequency
	Murchison							
MUR001	Neds Creek	70m North and South of Cromwell St	Engineering	1070	1210	140	Mechanical hand clearing	2 times yearly
MUR002	Neds Creek	Cromwell St 70m South toward George St	Engineering	1140	1210	70	Mechanical hand clearing	2 times yearly
					TOTAL	210		
	Riwaka							
RIW001	School Road tide gates	School Road and Lodder Lane intersection	Engineering				Inspect inlet/outlets and keep clear	12 times yearly
RIW002	Lodder Lane Outfall	Terry Fry's property	Engineering				Inspect inlet/outlets and keep clear	6 times yearly
	Tapawera							
TAP001	Cut off drain	Diversion drain above Tapawera to Western side of the township	Engineering	0	1860	1860	Inspect, hand clear and excavator clean/rock repairs.	2 times yearly
TAP002	Grass swale	Motueka Highway to Kowhai St	P & R	0	380	380	Clear road crossing screens	4 times yearly
TAP003	Matai Crescent inlets	4 culvert inlets at the rear of Matai Crescent	Engineering				Inspect, clear vegetation	6 times yearly
					TOTAL	2240		
	Patons Rock							
PAT001	Patons Rock Road	4 culvert outlets to beach	Engineering				Inspect, clear vegetation and sand	12 times yearly
	General District							
					TOTAL	19752		

Figure E-2: Flood Inspection Locations

Metservice Weather warning inspection schedule.
Sites to be checked when a warning is issued that covers the catchments concerned.

Flood Inspection Locations

Metservice Warning Checks	Waterway name	Location	Asset Type	Ownership	Inspection activity
	Richmond				
Y	Blair Toe	21B Blair Terrace	Detention Dam and Inlet Structure	Engineering	Inspect & Clear debris
Y	Marlborough Crescent	Easby Park TDC Reserve	Inlet Structure	Engineering	Inspect & Clear debris
Y	Cemetery Dam	Otia Drive	Detention Dam and Inlet Structure	Engineering	Inspect & Clear debris
Y	Lodestone Road	14 Lodestone Road	Detention Dam and Inlet Structure	Engineering	Inspect & Clear debris
Y	Bill Wilkes Reserve	20 Wasbourn Drive	Detention Dam and Inlet Structure	Engineering	Inspect & Clear debris
Y	Jimmy Lee Creek under Washbourne Drive	20 Wasbourn Drive	Culvert Inlet Structure	Engineering	Inspect & Clear debris
Y	Washbourn Dam	15 Wasbourn Drive in Washbourn Gardens	Detention Dam, Spillway and Inlet Structure	P & R	Inspect & Clear debris
Y	Olympus Way	43 Olympus Way	Detention Dam and Inlet Structure	Engineering	Inspect & Clear debris
	Wakefield				
Y	88 Valley Dam	Eden property 88 Valley Road	Detention Dam and Inlet Structure	Engineering	Inspect & Clear debris
	Motueka				
Y	Glenaven Ave Motueka	Glenaven Ave Motueka	Detention Dam and Inlet Structure	Engineering	Inspect & Clear debris
Y	Wharf Road Flood Gate	Wharf Road	Floodgate	Engineering	Inspect & Clear debris
Y	Old Wharf Road Flood Gate	Old Wharf Road	Floodgate	Engineering	Inspect & Clear debris
	Ruby Bay				
Y	Aranui Rd	Oulet by Chemical Site	Outlet Flapgate	Engineering	Inspect & Clear debris
Y	Crusader Drive Dam	21 Crusader Drive Dam	Detention Dam and Inlet Structure	Engineering	Inspect & Clear debris
Y	Broadsea Ave outlet	Culvert outlet to beach	Outlet Flapgate in Manhole	Engineering	Inspect & Clear debris
	Pohara				
Y	Paradise Way	Pohara	Detention area and Culvert inlet	P & R	Inspect & Clear debris
	Patons Rock				
Y	Patons Rock Road	4 culvert outlets to beach	Beach Outlets	Engineering	Inspect and clear sand build up.
	Collingwood				
Y	Elizabeth St Gibbs Rd	System and grates from the bottom section of Gibbs Rd through to the outlet on Elizabeth St	Inlet, Sumps and Beach Outlet	Engineering	Inspect and clear debris.
18 Sites					

APPENDIX F. DEMAND AND NEW FUTURE CAPITAL REQUIREMENTS

F.1 Growth Supply – Demand Model

A comprehensive population growth supply/demand model has been developed in 2008. This replaces the previous "AMPlan/LTCCP Growth Maps – November 2005", and is now in two volumes namely:

Volume 1 TDC Growth Supply - Demand Model 2009/10 to 2018/19 to 2029.
Volume 2 Infrastructure Activity Outputs

The model projects development within the time periods:

- Year 1 to 3 - term until the next LTCCP review
- Year 4 to 10 - 10 year timeframe of LTCCP
- Year 11 to 20 - for future infrastructure planning
- Year 20 plus - for future infrastructure planning.

The status of the assessments of the many Development Areas for the model process remains subservient to the TRMP.

The model projects are described in detail in both volumes and are summarised as follows:

F.1.1. Volume 1

F.1.1.1 Supply

- Settlement Areas – 17 GIS Maps represent the 'urban' areas in the district which are further divided into some 258 Development Areas aligned to existing and potential new zonings. All known existing Residential dwellings and existing Business buildings are shown. The current supply of lots, dwellings and buildings are established.
- An assessment of every Development Area is then completed considering:
    - Land Use Effects – settlement form, productive land value, hazard risk exposure and environmental/social impacts.
    - Network Services Effects – stormwater, water supply, wastewater, transportation, green space.
    - Each Development Area has a net positive or negative development score assigned to it identifying where growth should be promoted or halted.
    - Using the data from the Settlement/Development Area maps and Assessments plus the Council staff knowledge the model generates the theoretical total future supply of lots.

F.1.1.2 Demand

- Residential: A district population growth projection percentage has been established for the five wards and the Settlement Areas within each ward. The population growth is based on Statistics New Zealand demographic population projections assuming medium growth for all areas except Richmond and Motueka where a high growth projection has been adopted. Initially Council adopted a higher growth projection across the district, however in the light of new information that was released by Statistics New Zealand on the 2006 census, and when the full impact of the higher growth projection was understood, Council reviewed this decision and adopted a projection in line with Statistics New Zealand projections. The population growth is converted into required dwellings assuming 2.4 persons per average household.

- Business: Council Land Management Consultants have produced a 'business land required' sub model. Three types of business are considered namely Industrial, Commercial and Retail, however the model simplifies the demand to future building sites required over three time periods.

- Supply and Demand: The model requires experienced Council staff to then decide on how the demand for future Residential and Business quantities will be satisfied. The demand is met by using either:
    - Existing available unbuilt on lots.
    - New lots created through subdivision.

  The results of this whole process are shown in the first worksheet table in Volume 1 called 'Summary of Volume 1 Outputs'.

F.1.2. Volume 2

The Volume 1 summary outputs table is reproduced in Volume 2.

Volume 2 creates worksheets for the entire Engineering infrastructure activities which require a rate to be struck over the 10 year period of the LTCCP.

Volume 2 does not contain any financial figures but rather provides the numerical units required to be determined.

The starting, base data for Volume 2 is derived from Council's rating database.

F.1.2.1 Projections Beyond 20 Years

This model satisfies the requirement to project growth over a 3, 10 and 20 year time period for the LTCCP financial model.

Asset Managers however are also tasked to consider design requirements for assets with life cycles exceeding 20 years.

There is sufficient data available in both volumes to extrapolate figures to a future time requirement acknowledging the limitations of the models accuracy.

F.1.2.2 Funding

Stormwater contributions are payable for each new allotment created within each of the stormwater UDAs. There are 15 (2008) separate stormwater urban drainage areas (UDAs) that form the Group Stormwater Account. These UDAs pay a targeted rate based on the Capital Value (CV) of each rating unit. The number of lots in the UDA that pay the rate area also tracked.

The balance of the district not included within one of these UDAs also pay a lesser district targeted rate based on the CV of each lot.

The revenue projection is therefore affected by the addition of new lots to the various UDAs.

F.2 Projection of Stormwater Demands

Table F-1: Estimated Number of Lots due to Projected Population Growth

	08/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19
		Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
UDA											
Richmond (incl. Hope)	5391	5475	5560	5645	5724	5806	5887	5968	6049	6130	6211
Brightwater	622	632	643	655	659	669	680	691	701	711	721
Wakefield	656	662	672	682	686	694	701	709	716	724	732
Murchison	250	250	250	250	250	250	250	251	252	253	253
St Arnaud	261	261	262	262	262	263	265	266	267	267	267
Tapawera	138	138	139	139	139	140	141	142	143	144	145
Motueka	3058	3084	3112	3140	3161	3183	3205	3227	3249	3271	3293
Mapua/ Ruby Bay	889	893	900	907	909	914	919	924	929	934	939
Tasman	57	57	57	57	57	57	57	57	57	57	57
Kaiteriteri	467	467	467	467	467	467	468	469	469	469	469
Takaka	454	454	454	455	457	460	462	465	467	468	468
Pohara	300	300	303	306	306	308	311	313	315	317	318
Ligar Bay/ Tata Beach	239	239	239	239	239	239	239	239	239	239	239
Collingwood	201	201	202	202	202	202	203	203	203	203	203
Patons Rock	64	65	65	66	66	67	67	68	68	69	69
Total	**8947**	**8996**	**9050**	**9105**	**9160**	**9217**	**9274**	**9331**	**9390**	**9449**	**9510**

F.3 Future New Capital Requirements

New works are those works that create a new asset that did not previously exist, or works that upgrade or improve an existing asset beyond its existing capacity. The need for the new work could be from one of the following drivers:

- Growth – to provide infrastructure to accommodate the demand
- Increased Level of Service – to improve assets to provide a better level of service
- Backlog – to upgrade or improve an asset that should have been upgraded previously but for some reason has been deferred or not identified.

This is necessary for two reasons as follows:

a) Schedule 13(1) (a) of the Local Government Act requires the local authority to identify the total costs it expects to have to meet relating to increased demand resulting from growth when intending to introduce a Development Contributions Policy.

b) Schedule 10(2)(1)(d)(I)-(iv) of the Local Government Act requires the local authority to identify the estimated costs of the provision of additional capacity and the division of these costs between changes to demand for, or consumption of, the service, and changes to service provision levels and standards.

Development within or adjacent to an existing developed area is typically driven by a developer subdividing land. These developments are guided and controlled by zoning and building consent processes, administered by the Environment and Planning Section. As part of the building consent process the design of all assets, which will be vested to the Council, are checked against TDC Engineering Standards.

The creation of entirely new systems and the significant expansion of existing systems are driven by the Asset Manager, based on public demand, political drivers or technical requirements. All new works or capital expenditure is completed in accordance with the latest edition of the Councils Engineering Standards. The standards will be updated regularly to incorporate relevant experiences and changes in best practice. The standardisation in designs and specifications will be considered in the interests of facilitating replacement and operational simplicity.

Where new works are deemed necessary, each upgrade/ investment project is tested against the number of project drivers discussed above, to determine which ones apply. Some projects may be driven by a combination of these factors and an assessment has been made of the proportion attributed to each driver. Some projects may also be driven fully or partly by needs for renewal. Details of the renewal projects assigned within this AMP period are covered in Appendix I.

The projected new capital requirements for the next 20 years (including renewals) is summarised as follows:

Figure F-1: Stormwater Capital Forecast – by Scheme

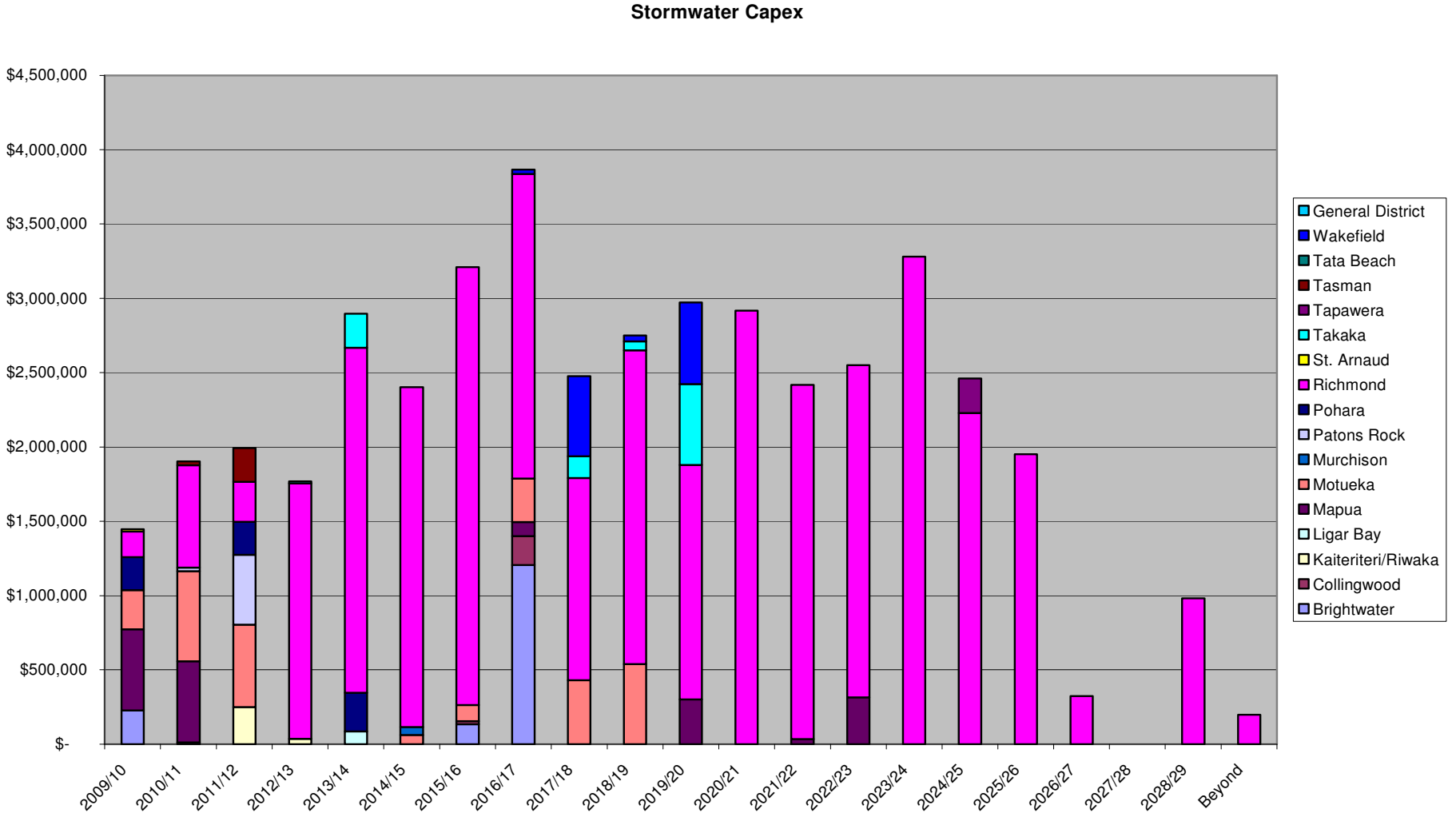
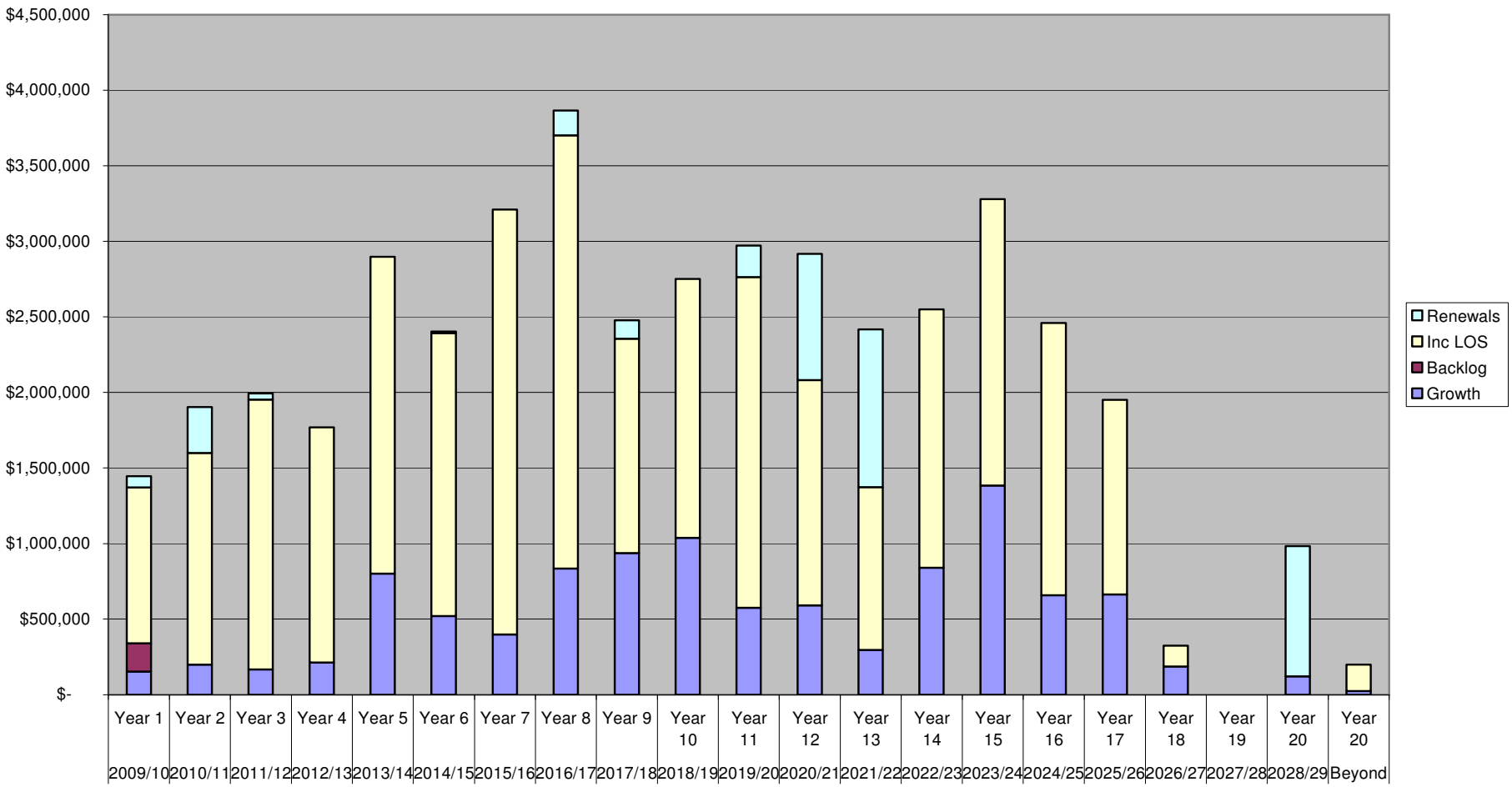


Figure F-2: Stormwater Capital Forecast – by Project Driver

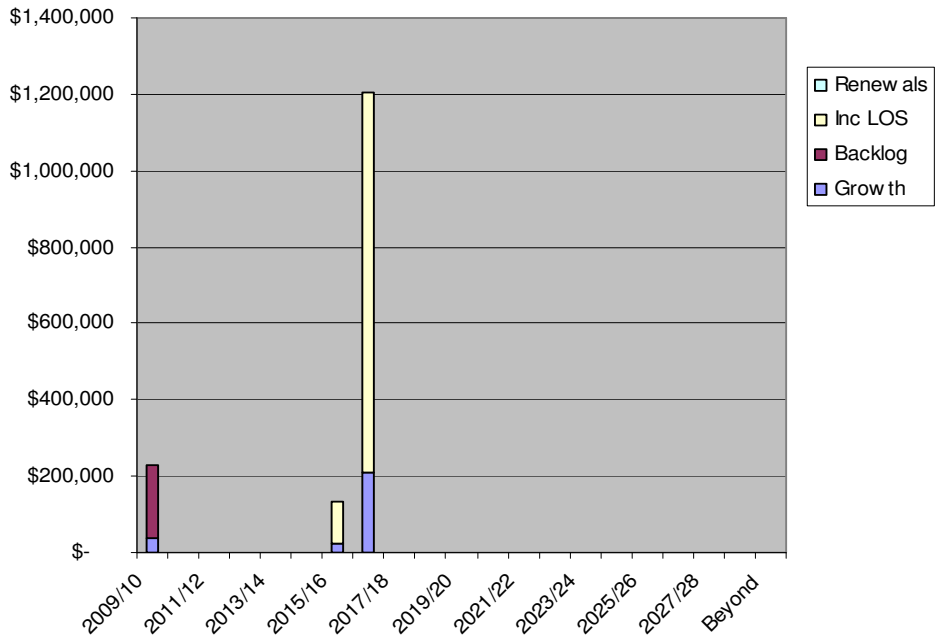


These charts have been developed from a database of projects that provide a full list of the individual projects along with project cost estimate, allocations against project drivers, project programming and other project specific information. This project database is included at the end of this Appendix.

F.4 Future New Capital Requirements by Scheme

The following section contains a number of charts showing capital expenditure by scheme along with details of the main expenditure items contributing to new capital requirements:

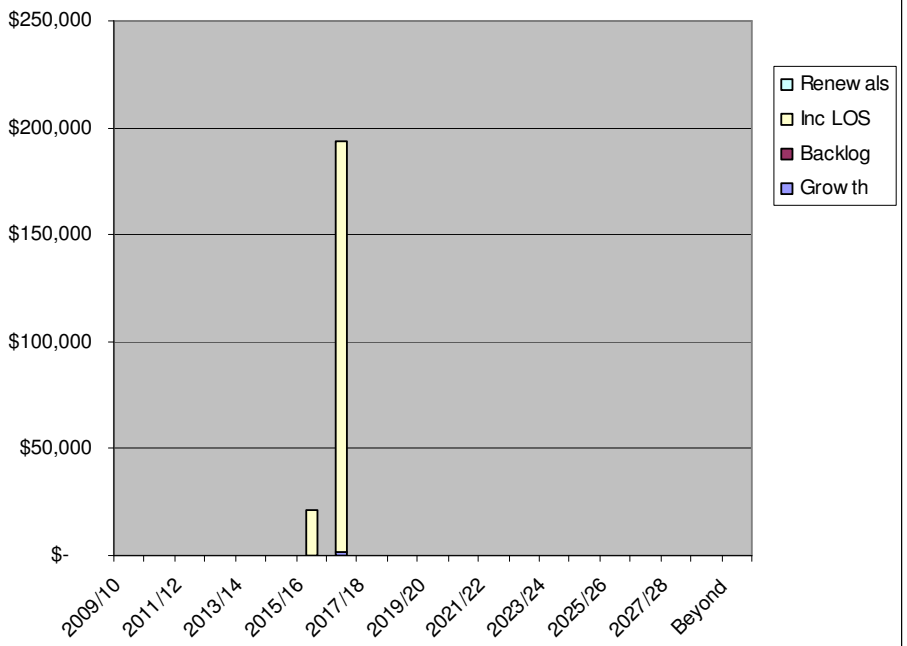
Capex Brightwater



Projects

Year 1	Jeffries Creek
Year 7/8	Mt Heslington Stream Diversion

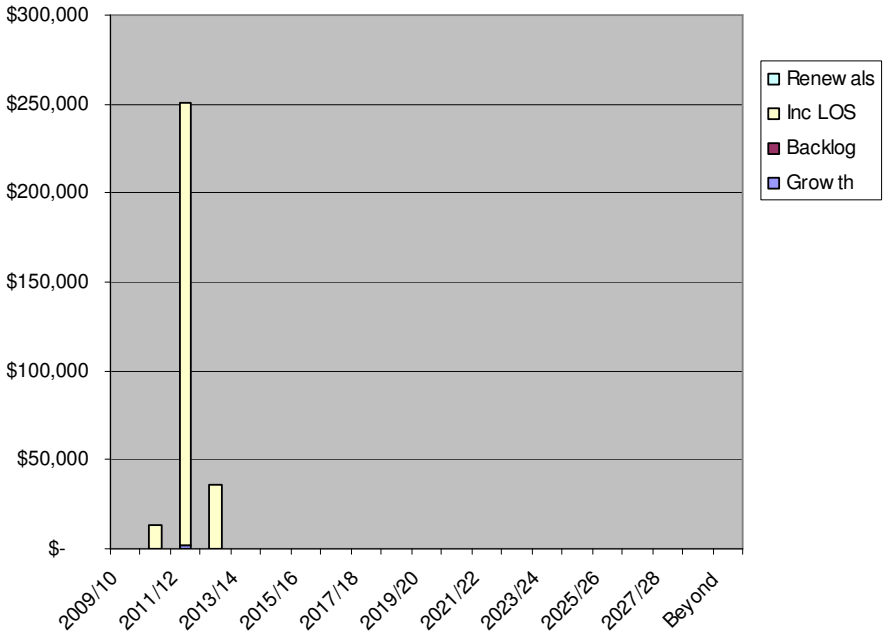
Capex Collingwood



Projects

Year 7/8	Elizabeth Street

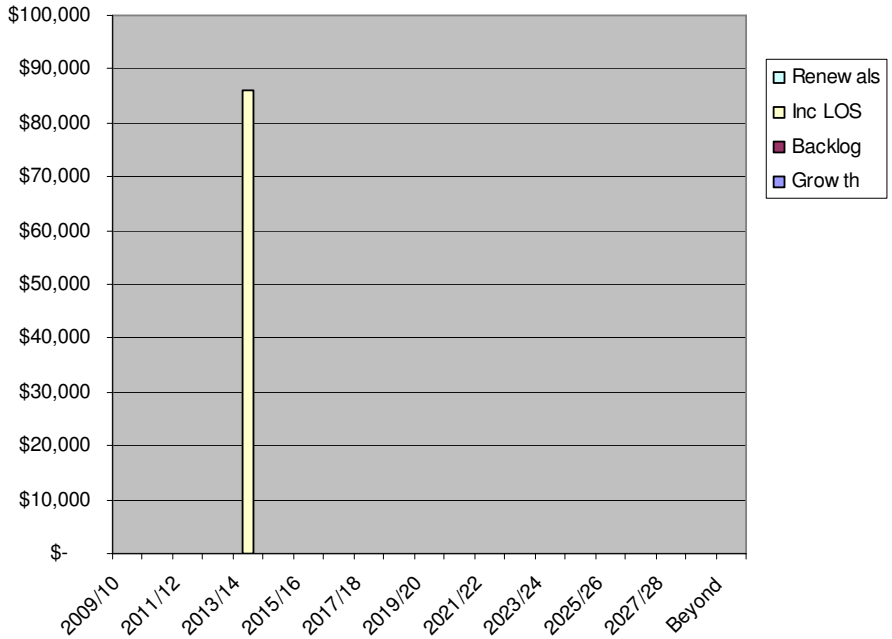
Capex Kaiteriteri/Riwaka



Projects

Year 2/3	Little Kaiteriteri, Rowling Road
Year 4	Martin Farm/ Motorcamp

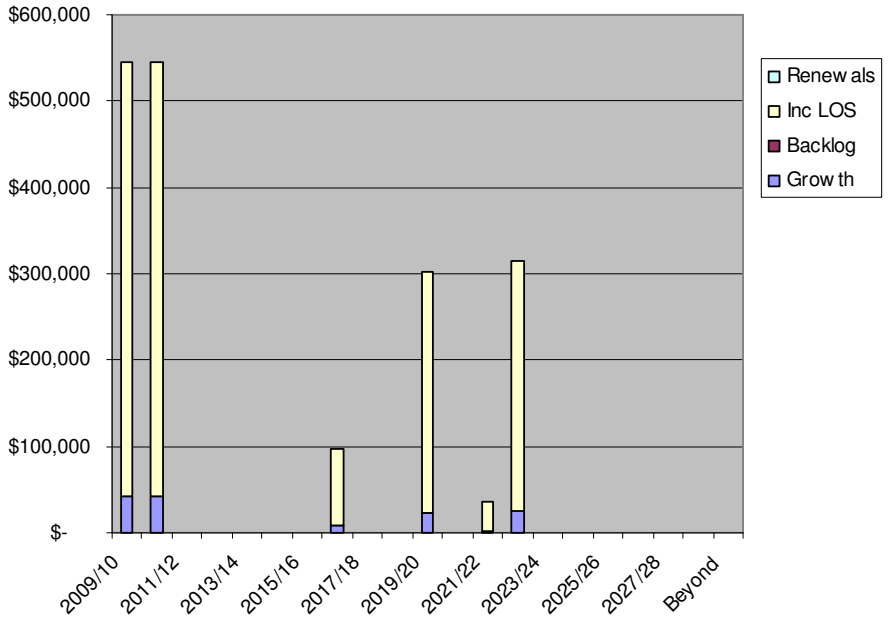
Capex Ligar Bay



Projects

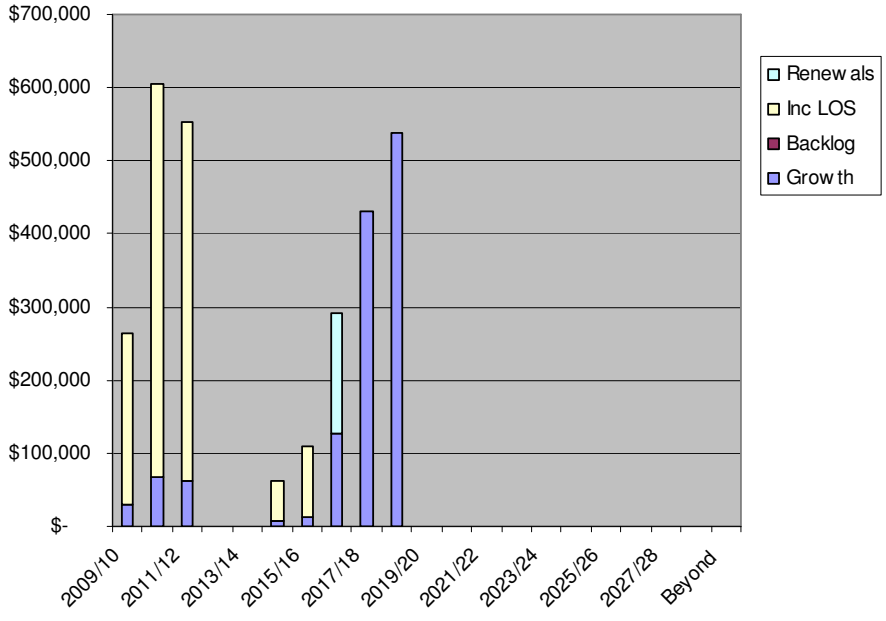
Year 5	Abel Tasman Drive Culvert

Capex Mapua

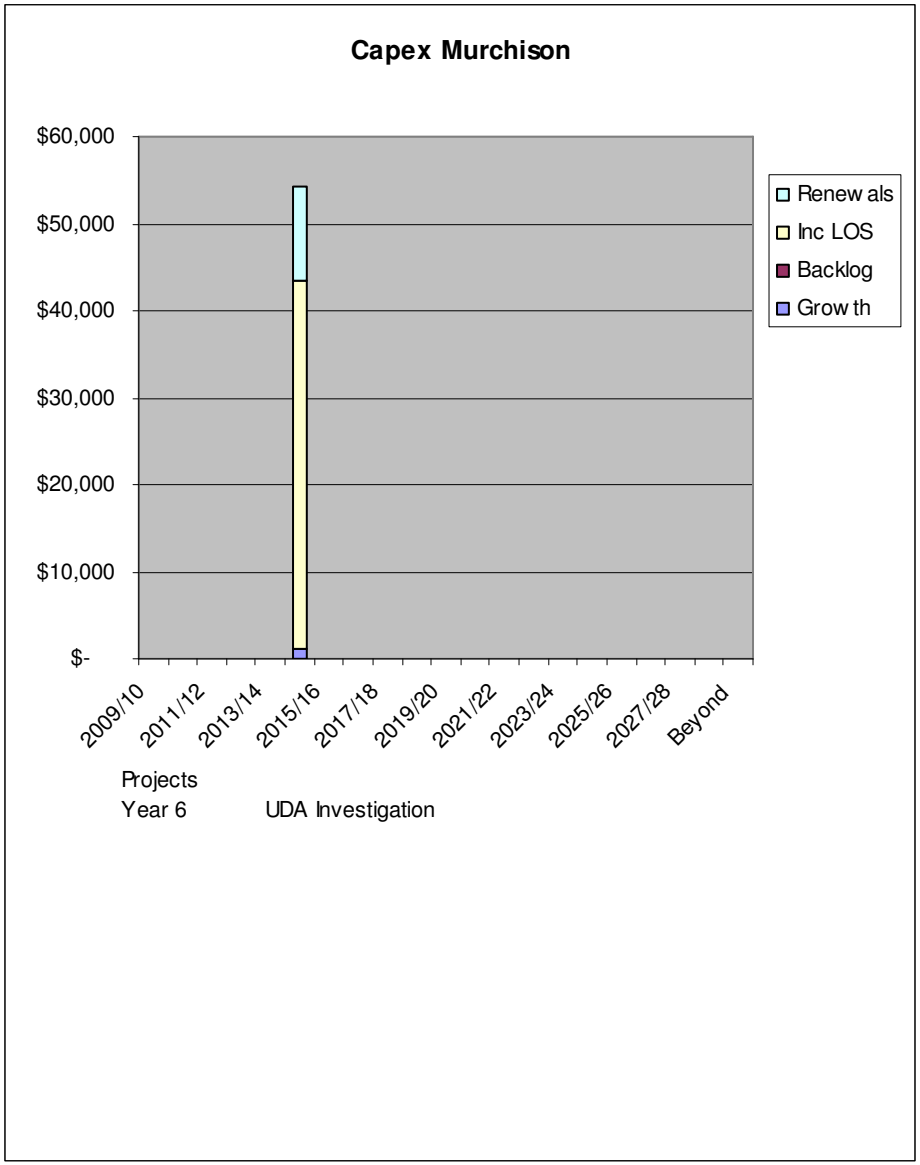


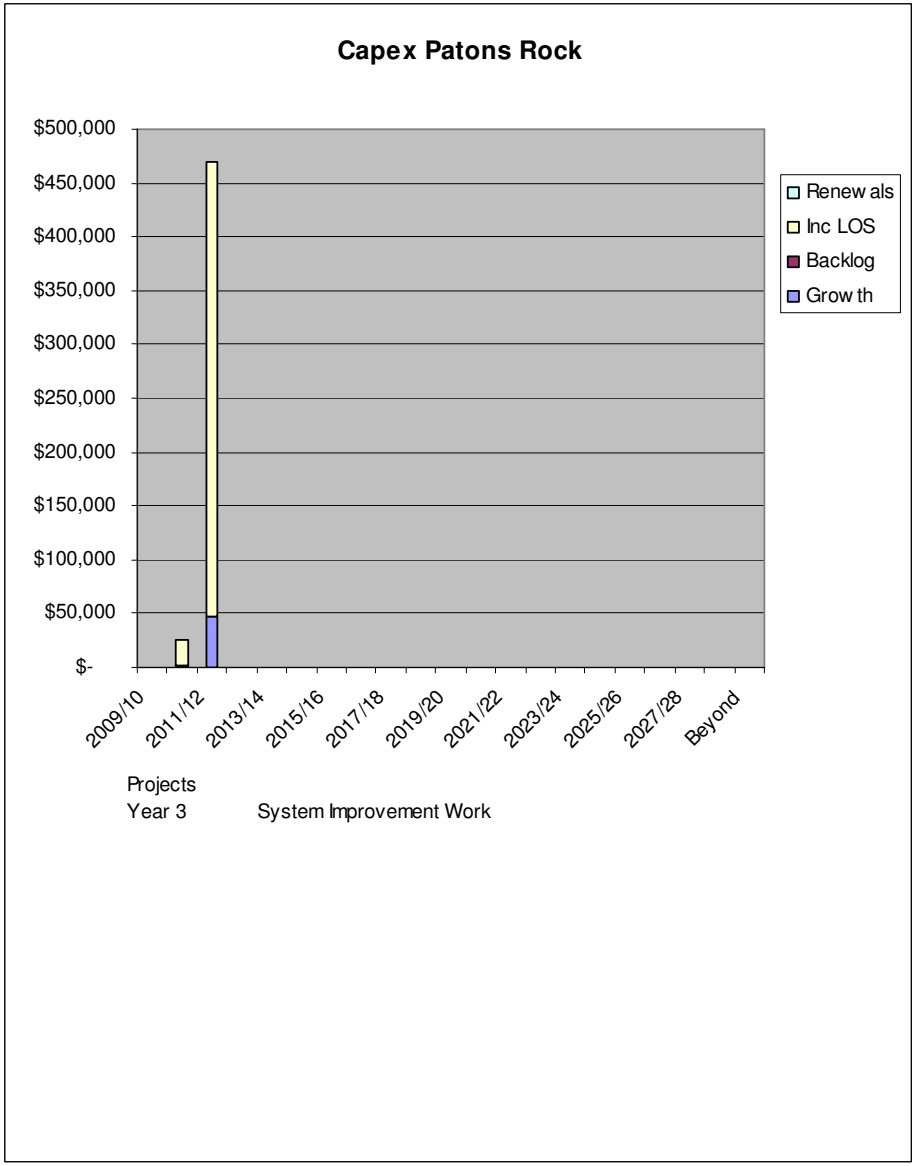
Projects	
Year 1/2	Mapua, Seaton Valley Stream Widening
Year 1/2	Ruby Bay, Pinehill Heights
Year 8	Mapua, School Road Drain
Year 11	Mapua, Langford, Other small areas
Year 13/14	Mapua, Pinehill Heights

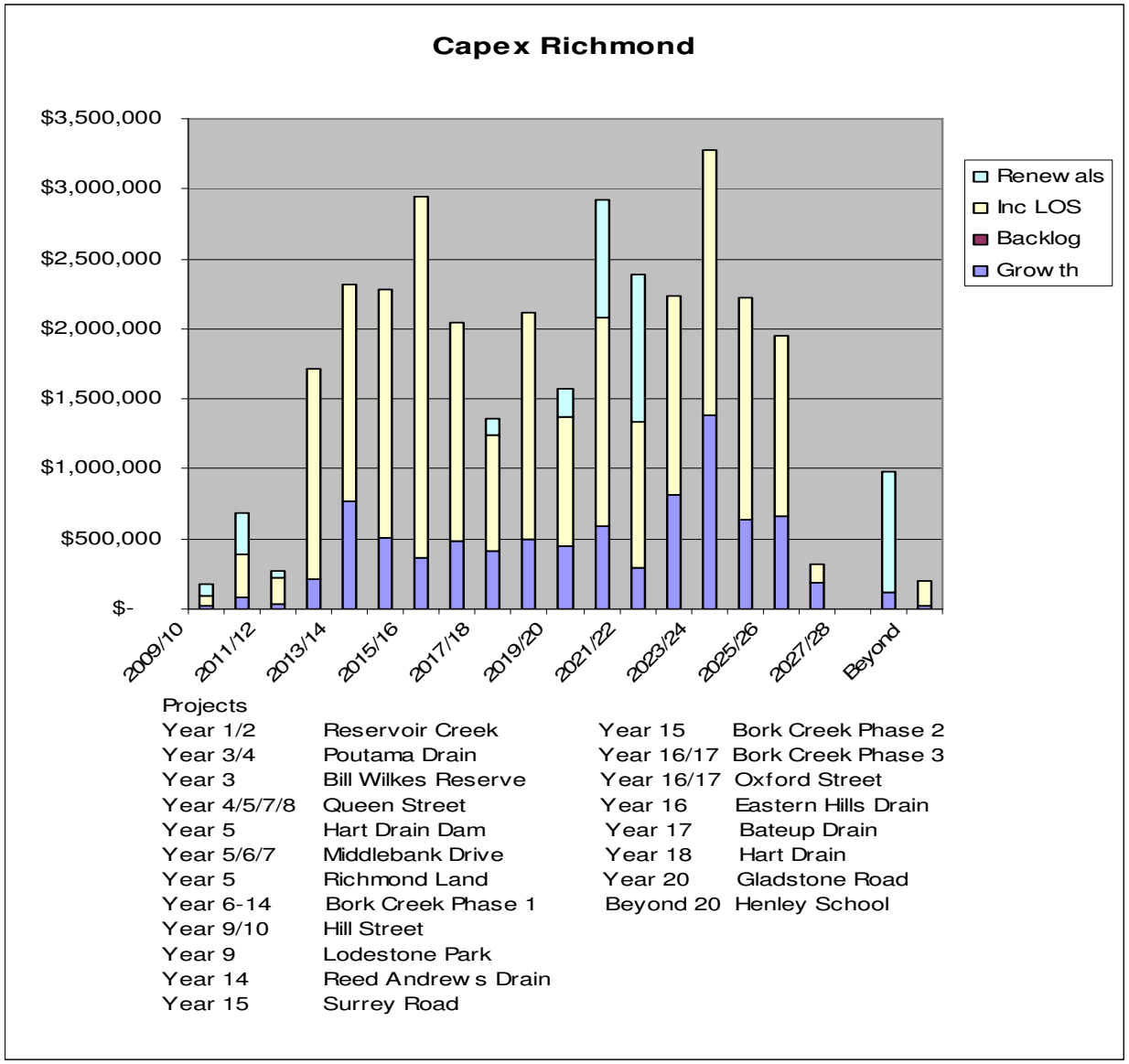
Capex Motueka

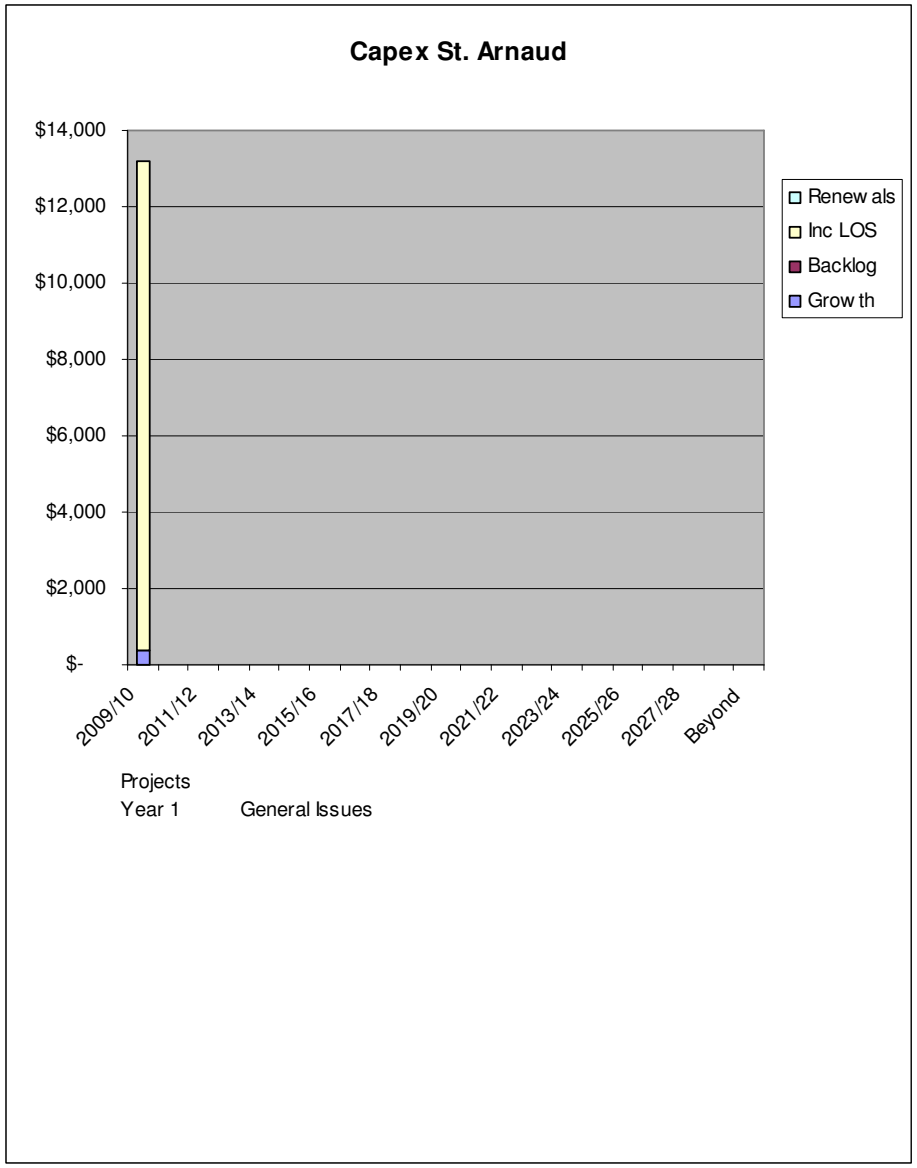


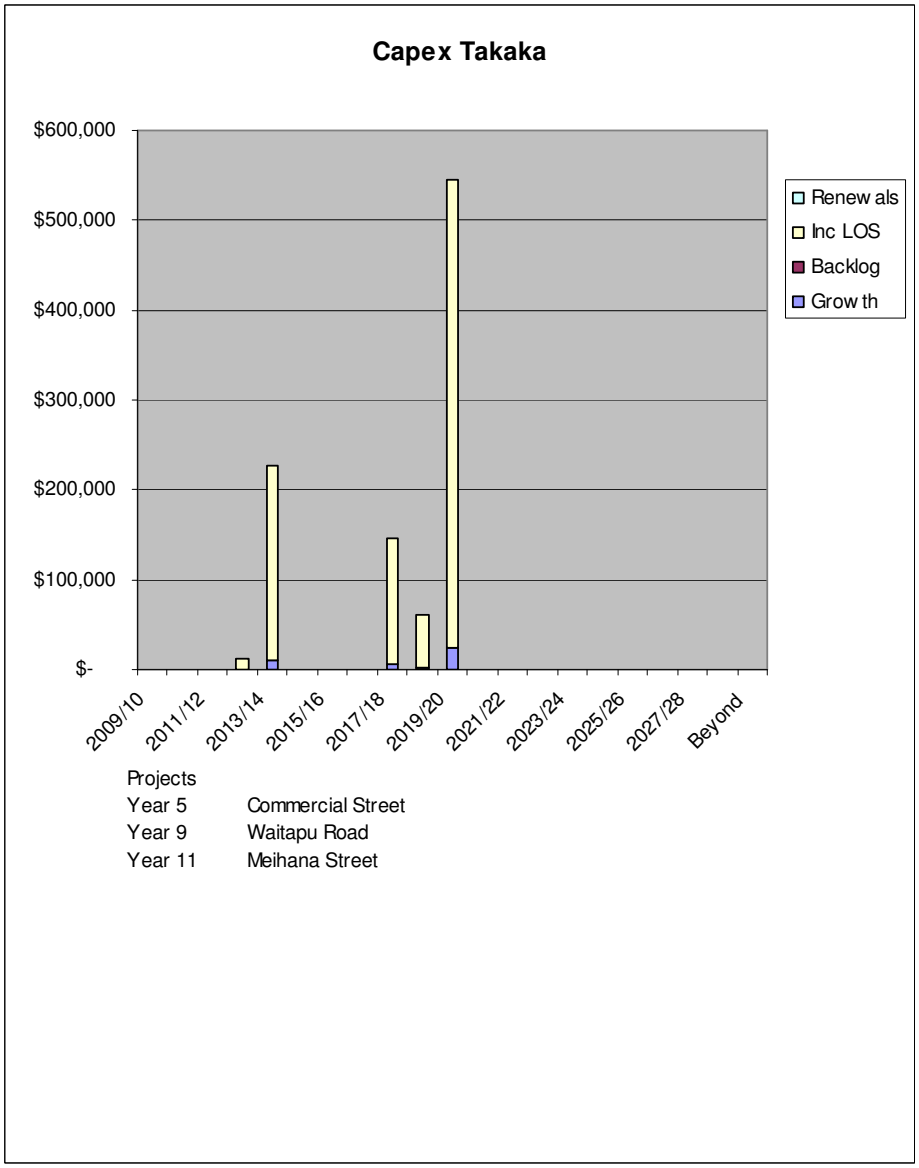
Projects	
Year 1	Old Wharf Road
Year 1/2/3	Pool Street/ High Street
Year 2/3	Reticulation Improvements
Year 6	Paker Street
Year 7	Tidal Gates
Year 8	Wharf Road Gates
Year 8/9/10	New Development Areas

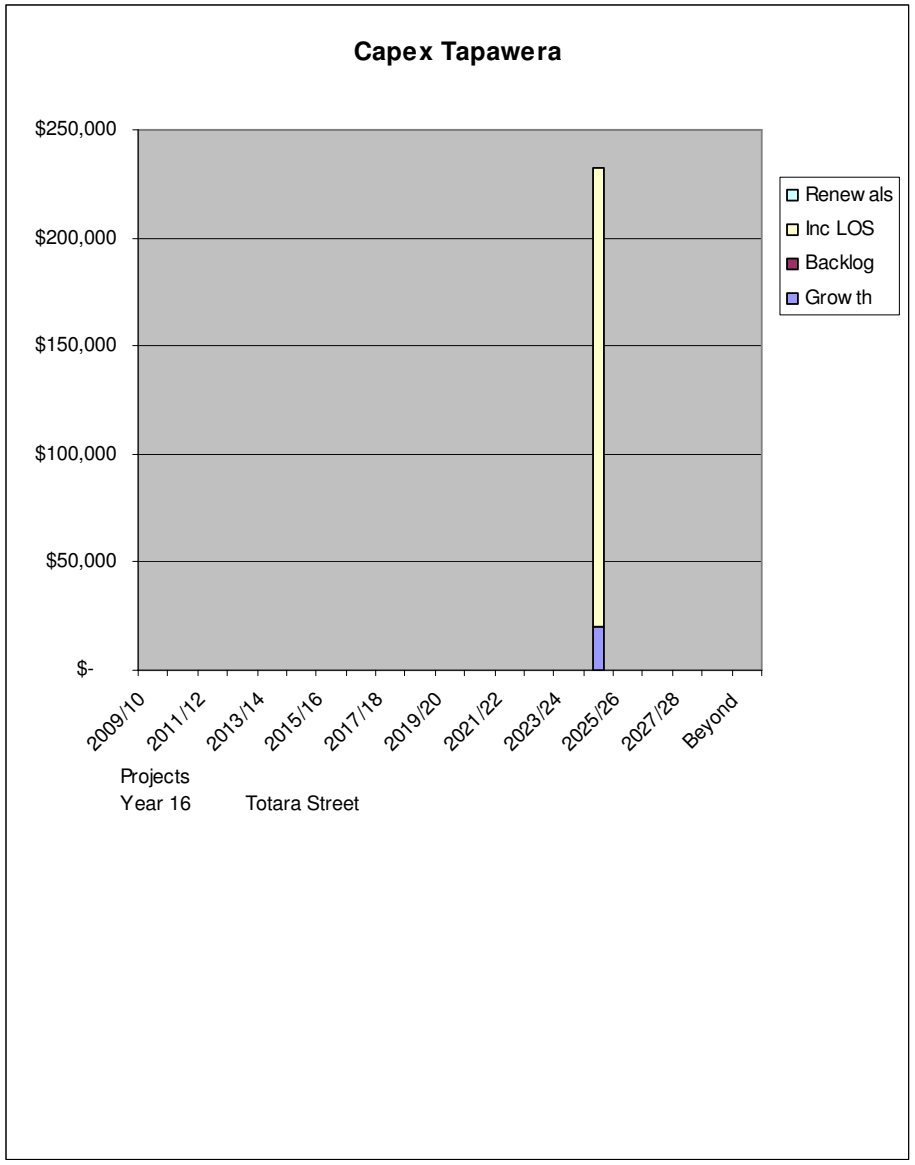

Capex Murchison
$60,000
$50,000
$40,000
$30,000
$20,000
$10,000
$-
2009/10
2011/12
2013/14
2015/16
2017/18
2019/20
2021/22
2023/24
2025/26
2027/28
Beyond
Renew als
Inc LOS
Backlog
Grow th
Projects
Year 6
UDA Investigation

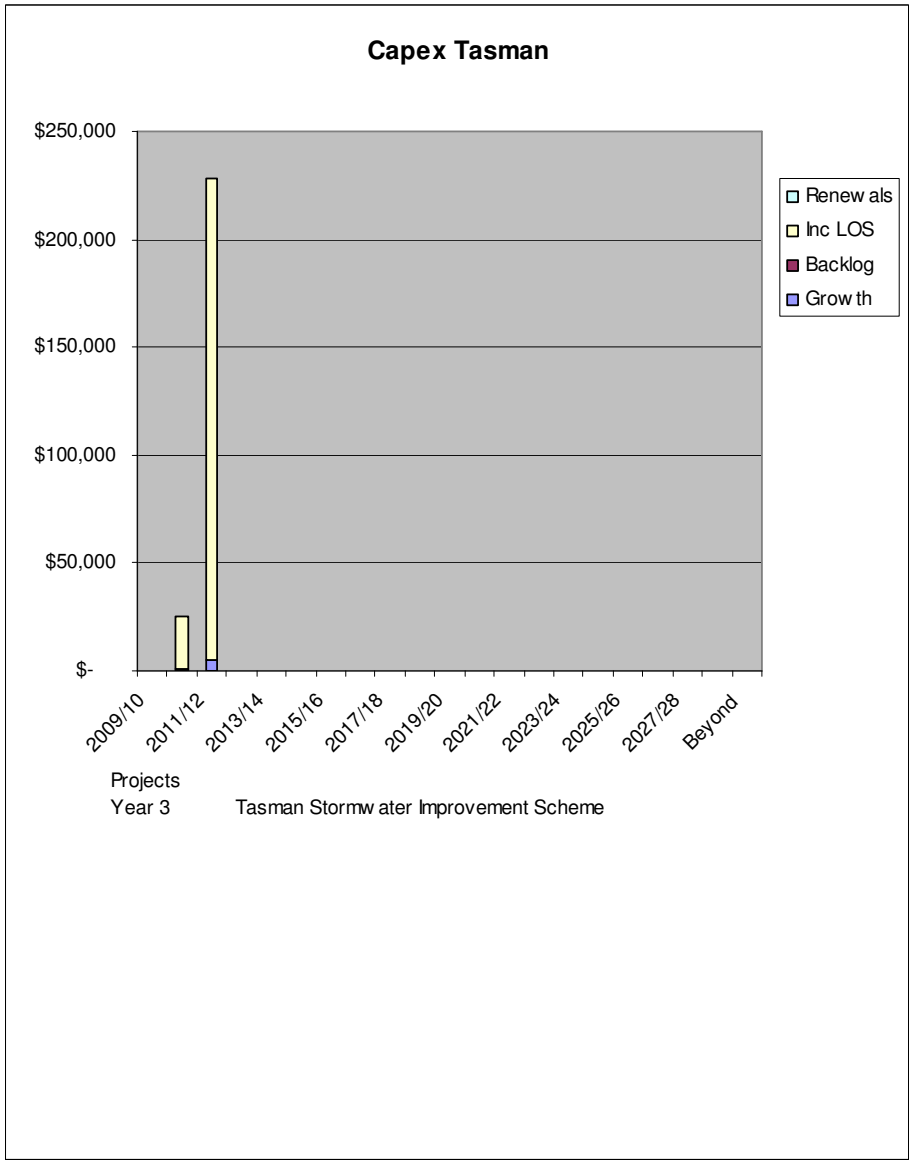

Capex Patons Rock
$500,000
$450,000
$400,000
$350,000
$300,000
$250,000
$200,000
$150,000
$100,000
$50,000
$-
2009/10
2011/12
2013/14
2015/16
2017/18
2019/20
2021/22
2023/24
2025/26
2027/28
Beyond
Renew als
Inc LOS
Backlog
Grow th
Projects
Year 3
System Improvement Work

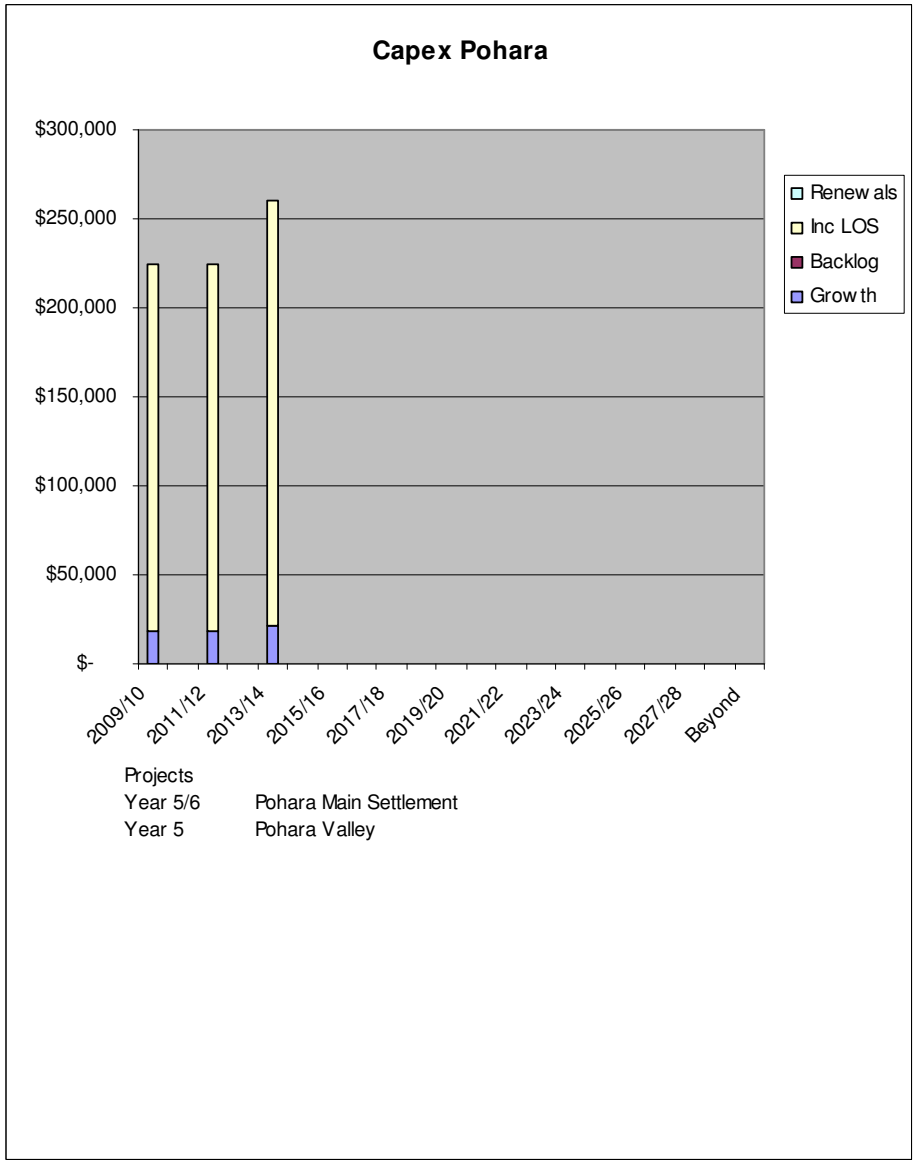

Capex Richmond
$3,500,000
$3,000,000
$2,500,000
$2,000,000
$1,500,000
$1,000,000
$500,000
$-
2009/10
2011/12
2013/14
2015/16
2017/18
2019/20
2021/22
2023/24
2025/26
2027/28
Beyond
Renew als
Inc LOS
Backlog
Grow th
Projects
Year 1/2 Reservoir Creek
Year 3/4 Poutama Drain
Year 3 Bill Wilkes Reserve
Year 4/5/7/8 Queen Street
Year 5 Hart Drain Dam
Year 5/6/7 Middlebank Drive
Year 5 Richmond Land
Year 6-14 Bork Creek Phase 1
Year 9/10 Hill Street
Year 9 Lodestone Park
Year 14 Reed Andrew s Drain
Year 15 Surrey Road
Year 15 Bork Creek Phase 2
Year 16/17 Bork Creek Phase 3
Year 16/17 Oxford Street
Year 16 Eastern Hills Drain
Year 17 Bateup Drain
Year 18 Hart Drain
Year 20 Gladstone Road
Beyond 20 Henley School

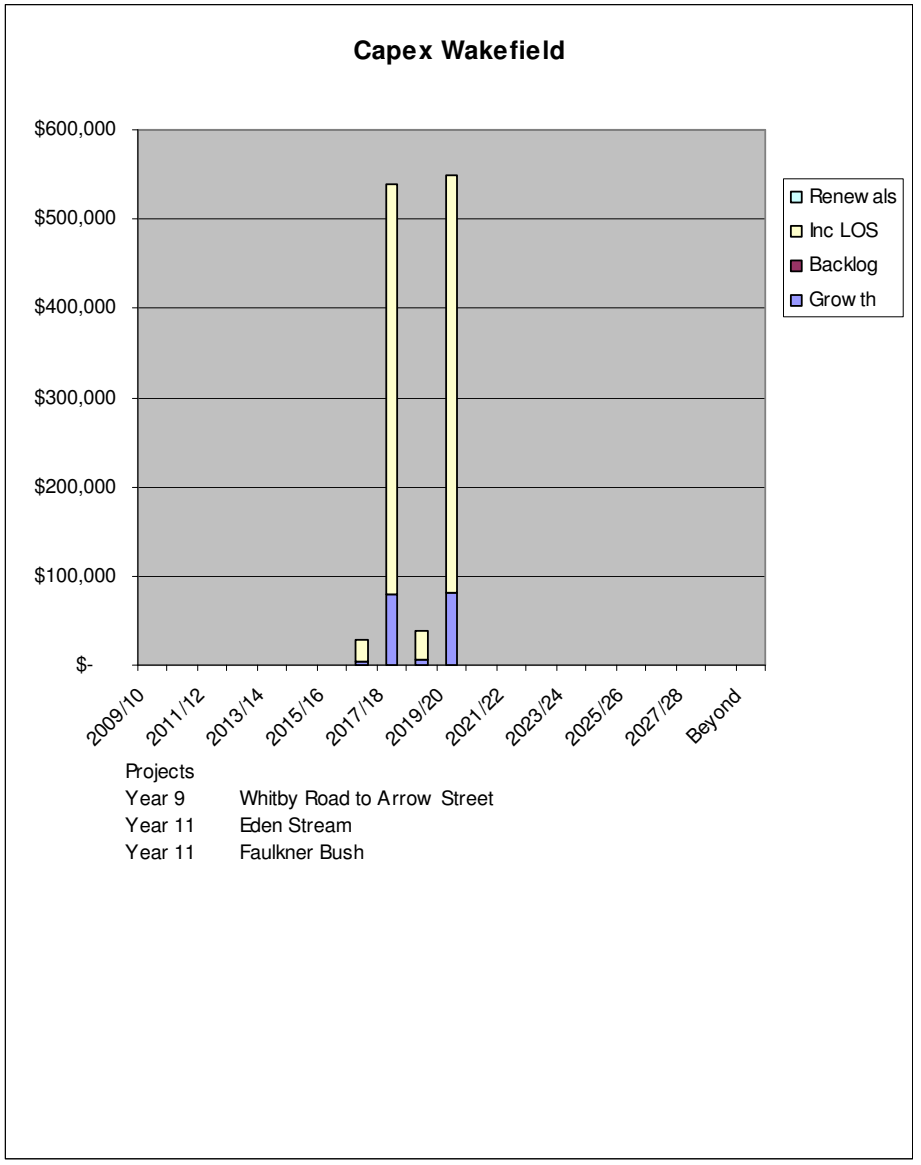

Capex St. Arnaud
$14,000
$12,000
$10,000
$8,000
$6,000
$4,000
$2,000
$-
2009/10
2011/12
2013/14
2015/16
2017/18
2019/20
2021/22
2023/24
2025/26
2027/28
Beyond
Renew als
Inc LOS
Backlog
Grow th
Projects
Year 1 General Issues


Capex Takaka
$600,000
$500,000
$400,000
$300,000
$200,000
$100,000
$-
2009/10
2011/12
2013/14
2015/16
2017/18
2019/20
2021/22
2023/24
2025/26
2027/28
Beyond
Renew als
Inc LOS
Backlog
Grow th
Projects
Year 5 Commercial Street
Year 9 Waitapu Road
Year 11 Meihana Street


Capex Tapawera
$250,000
$200,000
$150,000
$100,000
$50,000
$-
2009/10
2011/12
2013/14
2015/16
2017/18
2019/20
2021/22
2023/24
2025/26
2027/28
Beyond
Renew als
Inc LOS
Backlog
Grow th
Projects
Year 16
Totara Street


Capex Tasman
$250,000
$200,000
$150,000
$100,000
$50,000
$-
2009/10
2011/12
2013/14
2015/16
2017/18
2019/20
2021/22
2023/24
2025/26
2027/28
Beyond
Renew als
Inc LOS
Backlog
Grow th
Projects
Year 3
Tasman Stormw ater Improvement Scheme


Capex Pohara
$300,000
$250,000
$200,000
$150,000
$100,000
$50,000
$-
2009/10
2011/12
2013/14
2015/16
2017/18
2019/20
2021/22
2023/24
2025/26
2027/28
Beyond
Renew als
Inc LOS
Backlog
Grow th
Projects
Year 5/6 Pohara Main Settlement
Year 5 Pohara Valley


Capex Wakefield
$600,000
$500,000
$400,000
$300,000
$200,000
$100,000
$-
2009/10
2011/12
2013/14
2015/16
2017/18
2019/20
2021/22
2023/24
2025/26
2027/28
Beyond
Renew als
Inc LOS
Backlog
Grow th
Projects
Year 9 Whitby Road to Arrow Street
Year 11 Eden Stream
Year 11 Faulkner Bush

F.5 Development of New Capital Requirement Forecasts

During April to September 2008, a number of workshops with the project team were held to identify new works requirements. New works were identified by:

- Reviewing levels of service and performance deficiencies
- Reviewing risk assessments
- Reviewing previously completed investigation and design reports
- Using the collective knowledge and system understanding of the project team.

Each project identified was developed with a scope and a project cost estimate. Common project estimating templates were developed to ensure consistent estimating practices and rates were used. This is further described in Appendix Q. The project estimate template includes:

- Physical works estimates
- Professional services estimates
- Consenting and land purchase estimates
- Contingencies for unknowns

All estimates are documented and filed in an estimates file held by Council.

The information from the estimates was entered into Capital Forecast spreadsheet/database and the outputs from that summarise the Capital Costs per project, per scheme, per project driver and per year. This has been used as the source data for input into council's financial system for financial modelling.

The full spreadsheet of capital projects is included on the following page.

Total Capital Forecast

Item	Scheme	Project Name	Project Estimate	2009/10 Year 1	2010/11 Year 2	2011/12 Year 3	2012/13 Year 4	2013/14 Year 5	2014/15 Year 6	2015/16 Year 7	2016/17 Year 8	2017/18 Year 9	2018/19 Year 10	2019/20 Year 11	2020/21 Year 12	2021/22 Year 13	2022/23 Year 14	2023/24 Year 15	2024/25 Year 16	2025/26 Year 17	2026/27 Year 18	2027/28 Year 19	2028/29 Year 20	Beyond Year 20
1	Brightwater	Jeffries Creek	$ 227,400	$ 227,400	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
2	Brightwater	Mt Heslington Drain Diversion	$ 1,339,175	$ -	$ -	$ -	$ -	$ -	$ -	$ 133,918	$ 1,205,258	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
3	Collingwood	Elizabeth Street	$ 215,600	$ -	$ -	$ -	$ -	$ -	$ -	$ 21,560	$ 194,040	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
4	Kaiteriteri/Riw	Little Kaiteriteri Rowling Rd	$ 263,900	$ -	$ 13,195	$ 250,705	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
5	Kaiteriteri/Riw	Martin farm/ Motorcamp	$ 36,100	$ -	$ -	$ -	$ 36,100	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
6	Ligar Bay	Abel tasman drive culvert	$ 86,200	$ -	$ -	$ -	$ -	$ 86,200	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
7	Mapua	School Road Drain	$ 97,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 97,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
8	Mapua	Langford, other small areas	$ 301,300	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 301,300	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
9	Mapua	Pinehill Heights	$ 350,900	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 35,090	$ 315,810	$ -	$ -	$ -	$ -	$ -	$ -	$ -
10	Mapua	Ruby Bay	$ 394,600	$ 197,300	$ 197,300	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
11	Mapua	Seaton Valley Drain	$ 696,100	$ 348,050	$ 348,050	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
12	Motueka	Tidal Gates	$ 110,000	$ -	$ -	$ -	$ -	$ -	$ -	$ 110,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
13	Motueka	Reticulation Improvments	$ 180,000	$ -	$ 90,000	$ 90,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
14	Motueka	New Development Areas	$ 1,076,400	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 107,640	$ 430,560	$ 538,200	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
15	Motueka	Parker Street	$ 61,600	$ -	$ -	$ -	$ -	$ -	$ 61,600	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
16	Motueka	Pool St High St	$ 1,030,285	$ 51,514	$ 515,143	$ 463,628	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
17	Motueka	Wharf Rd gates	$ 183,400	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 183,400	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
18	Motueka	Old Wharf Road	$ 212,100	$ 212,100	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
19	Murchison	UDA Investigation	$ 54,200	$ -	$ -	$ -	$ -	$ -	$ 54,200	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
20	Patons Rock	Pattons Rock	$ 494,500	$ -	$ 24,725	$ 469,775	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
21	Pohara	Pohara Main Settlement	$ 448,000	$ 224,000	$ -	$ 224,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
22	Pohara	Pohara Valley	$ 259,700	$ -	$ -	$ -	$ -	$ 259,700	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
23	Richmond	Beach Road	$ 4,765,600	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 476,560	$ 1,906,240	$ 2,382,800	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
24	Richmond	Bill Wilkes Reserve	$ 93,000	$ -	$ -	$ 93,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
25	Richmond	Borcks C - Queen Street to SH60	$ 5,048,700	$ -	$ -	$ -	$ -	$ -	$ 1,009,740	$ -	$ 1,009,740	$ -	$ 1,009,740	$ -	$ 1,009,740	$ -	$ 1,009,740	$ -	$ -	$ -	$ -	$ -	$ -	$ -
26	Richmond	Borcks C - SH60 to SH6	$ 2,086,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 2,086,000	$ -	$ -	$ -	$ -	$ -	$ -
27	Richmond	Gladstone Road	$ 982,400	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 982,400	$ -
28	Richmond	Borcks C - Headingly lane	$ 943,100	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 471,550	$ 471,550	$ -	$ -	$ -	$ -
29	Richmond	Henley School	$ 200,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 200,000
30	Richmond	Hill Street	$ 1,225,210	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 122,521	$ 1,102,689	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
31	Richmond	Lodstone Park	$ 137,800	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 137,800	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
32	Richmond	Middlebank Drive	$ 3,193,000	$ -	$ -	$ -	$ -	$ 159,650	$ 1,277,200	$ 1,756,150	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
33	Richmond	Oxford Street CBD	$ 1,567,680	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 783,840	$ 783,840	$ -	$ -	$ -	$ -
35	Richmond	Poutama Drain	$ 1,745,700	$ -	$ -	$ 174,570	$ 1,571,130	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
36	Richmond	Queen Street	$ 2,969,000	$ -	$ -	$ -	$ 148,450	$ 593,800	$ -	$ 1,187,600	$ 1,039,150	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
37	Richmond	Reservoir Creek	$ 860,500	$ 172,100	$ 688,400	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
38	Richmond	Richmond South - Reed Andrews	$ 1,238,100	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 123,810	$ 1,114,290	$ -	$ -	$ -	$ -	$ -	$ -
39	Richmond	Richmond South - Bateup Drain	$ 695,800	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 695,800	$ -	$ -	$ -	$ -
40	Richmond	Richmond South - Eastern Hills	$ 147,200	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 147,200	$ -	$ -	$ -	$ -	$ -
41	Richmond	Richmond South - Hart Drain	$ 324,300	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 324,300	$ -	$ -	$ -
43	Richmond	Surrey Road	$ 79,600	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 79,600	$ -	$ -	$ -	$ -	$ -	$ -
44	Richmond	Richmond South - Hart Drain Dam	$ 193,800	$ -	$ -	$ -	$ -	$ 193,800	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
45	Richmond	Richmond Land Purchase	$ 5,500,000	$ -	$ -	$ -	$ -	$ 1,375,000	$ -	$ -	$ -	$ 1,100,000	$ -	$ 1,100,000	$ -	$ -	$ 1,100,000	$ -	$ 825,000	$ -	$ -	$ -	$ -	$ -
46	Takaka	Waitapu Road	$ 146,600	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 146,600	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
47	Takaka	Meihana Street Upgrade	$ 605,400	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 60,540	$ 544,860	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
48	Takaka	Commercial Street Upgrade	$ 240,000	$ -	$ -	$ -	$ 12,000	$ 228,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
49	Tapawera	Totara St	$ 232,200	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 232,200	$ -	$ -	$ -	$ -	$ -
50	Tasman	Tasman	$ 253,600	$ -	$ 25,360	$ 228,240	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
51	Wakefield	Eden Stream	$ 394,100	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 39,410	$ 354,690	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
52	Wakefield	Faulkner Bush	$ 195,100	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 195,100	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
53	Wakefield	Whitby Rd to Arrow Street	$ 567,400	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 28,370	$ 539,030	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
54	St. Arnaud	General issues	$ 13,200	$ 13,200	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

APPENDIX G. DEVELOPMENT CONTRIBUTIONS / FINANCIAL CONTRIBUTIONS

Information on Development Contributions and Financial Contributions can be found in the Council's Long Term Council Community Plan (LTCCP) document.

There is one Transportation Development Contribution in place and the policy on where and how it is applied is detailed in the LTCCP.

The following Table summarises the current Development Contributions:

Activity	Development Contribution per HUD $ (incl GST)*
Water	6,922
Wastewater	5,518
Transportation	5,034
Stormwater	2,919
Total	**20,393**

* The value of the Development Contribution shall be adjusted on 1 July each calendar year.

APPENDIX H. RESOURCE CONSENTS

H.1 Introduction

A very important aspect of the stormwater activity is to ensure that the district's natural waterways and water resources are managed responsibly.

Stormwater drainage systems have a significant role in the environment. Open channel stormwater systems can provide a buffer between the urban and rural environments, and high value receiving waters such as rivers, estuaries, wetlands, lakes and coastal waters. In themselves they are potentially an important environmental asset providing habitats for native plants, birds and aquatic life. Conversely all stormwater discharges, whether open channels or reticulated systems, introduce a significant risk of quickly conveying contaminants into highly valued environments. Cumulative adverse effects of the build up of contaminants from urban stormwater (e.g. heavy metals) are important environmental considerations.

Stormwater quality is an issue that is attracting national interest, and it is expected that in the future, there will be more pressure to improve stormwater quality. It is not expected that this will lead to national stormwater quality standards, however it is expected that regional authorities will be more vigilant of adverse effects associated with the quality of stormwater discharges.

Presently, the driver for action is the need to demonstrate compliance with the Resource Management Act 1991 (RMA) and Tasman Resource Management Plan (TRMP), and in particular Part VI of that Plan: Discharges, Chapter 36. In terms of those Plan provisions, most discharges from Council managed stormwater systems in Tasman are considered to be "Permitted Activities" and therefore there are few discharge permits required for the stormwater activity. However to be a Permitted Activity, a stormwater discharge has to comply with various conditions, one being that "…. the discharge does not cause or contribute to the destruction of any habitat, plant or animal in any water body or coastal water".

In order to formulate an approach to the District's Stormwater Quality, the Council intends to investigate:

- Current national practices and standards in stormwater quality management
- Current knowledge of Richmond stormwater quality and its impacts on the environment
- Possible approaches and strategies Council could employ to better manage stormwater quality.

Resource consents may also be required for stormwater inlet and outlet structures including tide gates on rivers and streams and on the coast; for detention and ponding areas, and flood diversion bunds within stormwater systems; and also for modifying natural streams (such as widening stream channels to increase flood flow capacity).

Subdivision developments may involve new stormwater discharges or extensions to the existing network of stormwater assets which require resource consents that Council will become responsible for when the new stormwater assets are transferred from the developer to Council.

Designations are a way provided by the RMA of identifying and protection land for future public works. Council has notified a proposed designation for stormwater drainage purposes in Richmond West (Poutama Drain), to ensure that improvements can be made to stormwater systems in the Richmond urban area.

H.2 Resource Management Act 1991

The Resource Management Act 1991 deals with:

- the control of the use of land for the purpose of the maintenance and enhancement of the quality of water in water bodies and coastal water;
- structures and works in river beds and in the coastal marine area;
- the control of the taking, use, damming and diversion of water, and the control of the quantify, level and flow of water in any water body, including:
  - the setting of any maximum or minimum levels or flows of water; and
  - the control of the range, or rate of change, of levels or flows of water; and
- the control of discharges or contaminants into water and discharges of water into water.

Whenever water is intended to be discharged or diverted, a resource consent (discharge permit, or water permit) is usually required, unless the activity is defined as being a permitted activity in the applicable resource management plan.

Councils are required to monitor the environmental impacts of their activities. The diversion of natural water courses and the discharge of contaminants into natural waters are basic environmental issues.

H.3 Resource Consents for Stormwater Activity

H.3.1. Discharges and Diversions

Most of the discharges and diversions associated with Council managed stormwater systems to natural waterways or the coast were established prior to September 1998 and are considered to be Permitted Activities provided that they comply with the conditions set out in Rule 36.4.2 of the TRMP.

Any new stormwater discharges or water diversions will require resource consent, unless they are in rural or open space zones.

Water diversions include bunds and the situations where natural streams have been piped as part of an urban reticulation system.

H.3.2. Inlet and Outlet Structures

Structures on or extending onto or over river or stream beds, or on a shoreline, may require resource consent. Inlet structures are usually installed where natural streams flow into piped systems.

Identifying the full suite of on-going resource consent requirements for stormwater structures will be influenced by provisions of the pending Part IV of the Tasman Resource Management Plan (TRMP): Rivers and Lakes, which will determine what consents are required for structures in river and stream beds.

H.3.3. Detention Dams and Ponding Areas

Detention dams and ponding areas can be used to manage peak flood flows within specific stormwater catchments, especially where urban development increases the rate of run-off. Council now has responsibilities for 12 such detention dams and ponding areas within the following urban localities around the District: Richmond (7), Wakefield (1), Ruby Bay (1), Motueka (2) and Pohara (1). The number of detention structures in Richmond is likely to change in line with the proposed improvements to the stormwater systems in the Richmond urban area.

H.3.4. Channel Widening and Other Works in Waterways

Works modifying stream beds usually require resource consent.

H.3.5. Schedule of Resource Consents and Designations

A schedule of resource consents and designations for Council managed stormwater systems is being prepared.

Where discharge or water permits, or consents for structures are required, the RMA restricts those consents to a maximum term of 35 years only. Hence there needs to be an on-going programme of "consent renewals" for those components of Council managed stormwater systems, as well as a monitoring programme for compliance with the conditions of permitted activities or resource consents.

Council will ensure that the processes / programme for lodging applications for new consents will be achieved in plenty of time before the existing consents expire, and for monitoring and reporting the Council's actual performance against the relevant conditions of each consent.

Monitoring data associated with existing consents and the conditions thereof are held with Council.

APPENDIX I. CAPITAL REQUIREMENTS FOR FUTURE RENEWALS

I.1 Renewal Strategy

Renewal expenditure on stormwater assets is major work which does not increase the asset's design capacity but restores, rehabilitates, replaces or renews an existing asset. Typically this will result in extending an asset life with varying success.

For example, renewal of a stormwater pipe is likely to be required once the pipe has reached the end of its design/asset life and requires replacing with new because it is in poor structural condition. This would be defined as a 100% renewal if the renewal pipe is the same diameter as the original, therefore providing the same hydraulic capacity or level of performance.

In the case of a tidal flood gate, renewal to a part not the whole asset may typically be required, where parts of an asset typically have lower design lives than the whole part. Renewal in this case would extend the design life but only until another part likely requires replacement.

Where replacement parts or assets have been provided and increase the level of performance, perhaps because a larger diameter pipe has been provided or the hydraulic efficiency increased at a detention dam intake, a part of this expenditure will be defined as a capital expenditure rather than wholly renewal expenditure.

Councils policy is to consider assets for renewal when one or a combination of the following conditions are met;

- When they near the end of their effective working life resulting in failure of functionality
- Once the cost of maintenance becomes uneconomical high
- Once the risk of failure becomes unacceptably high

The above considerations are used to predict the remaining number of years for an assets whole life. Council maintain an Asset Whole Life Register, part of its Asset Management, which shows an estimation of the number of years left for each stormwater assets life.

Development and implementation of the asset management software package, Confirm Enterprise, has been underway since 2003/04. It assists in the process of identifying underperforming assets. The cost of maintaining or rehabilitating those assets is determined in order to decide if renewing the asset is the most cost effective solution. The aim is to achieve a solution with the lowest long-term costs and with an affordable cash flow programme.

A schedule detailing the Asset life and depreciation value is enclosed with this Appendix. This is an output from Councils asset management system which has been developed over the past few years. For further details please refer to Appendix S: Council's Data Management, Asset Management Processes and Systems.

In addition to the Asset Register, renewal decisions are supported by the Consultant's and Maintenance Contractor's reports and programmes of work based on their knowledge of the systems.

Non-performing assets are identified through the monitoring of asset reliability, capacity and efficiency during planned maintenance inspections, operational activity and investigation of customer complaints. Indicators of non-performing assets include:

- structural failure
- repeated asset failure
- excessive rate of infiltration / inflow
- loss of hydraulic performance
- repeated joint failure
- ineffective and/ or uneconomic operation

- effluent breakthrough/ pollution events
- inefficient energy consumption

The renewal programme will be reviewed at least annually, with any deferred work re-prioritised alongside new renewal projects and a revised programme established.

Overall, many of the stormwater assets do not require a high level of renewal investment because these have remaining asset lives extending well beyond 50 years.

The main stormwater assets are open channels and reticulation pipes, of which a large proportion having been installed since the early 90's. Open channels last indefinitely provided they are maintained, and stormwater pipes also have long lives.

Renewals are identified through the maintenance contracts and through the Council's asset condition and performance assessments. The renewal forecasts include schedules of asset inspection activities to identify renewal needs and provisions for renewal works identified by the inspections.

I.2 Renewal Projects

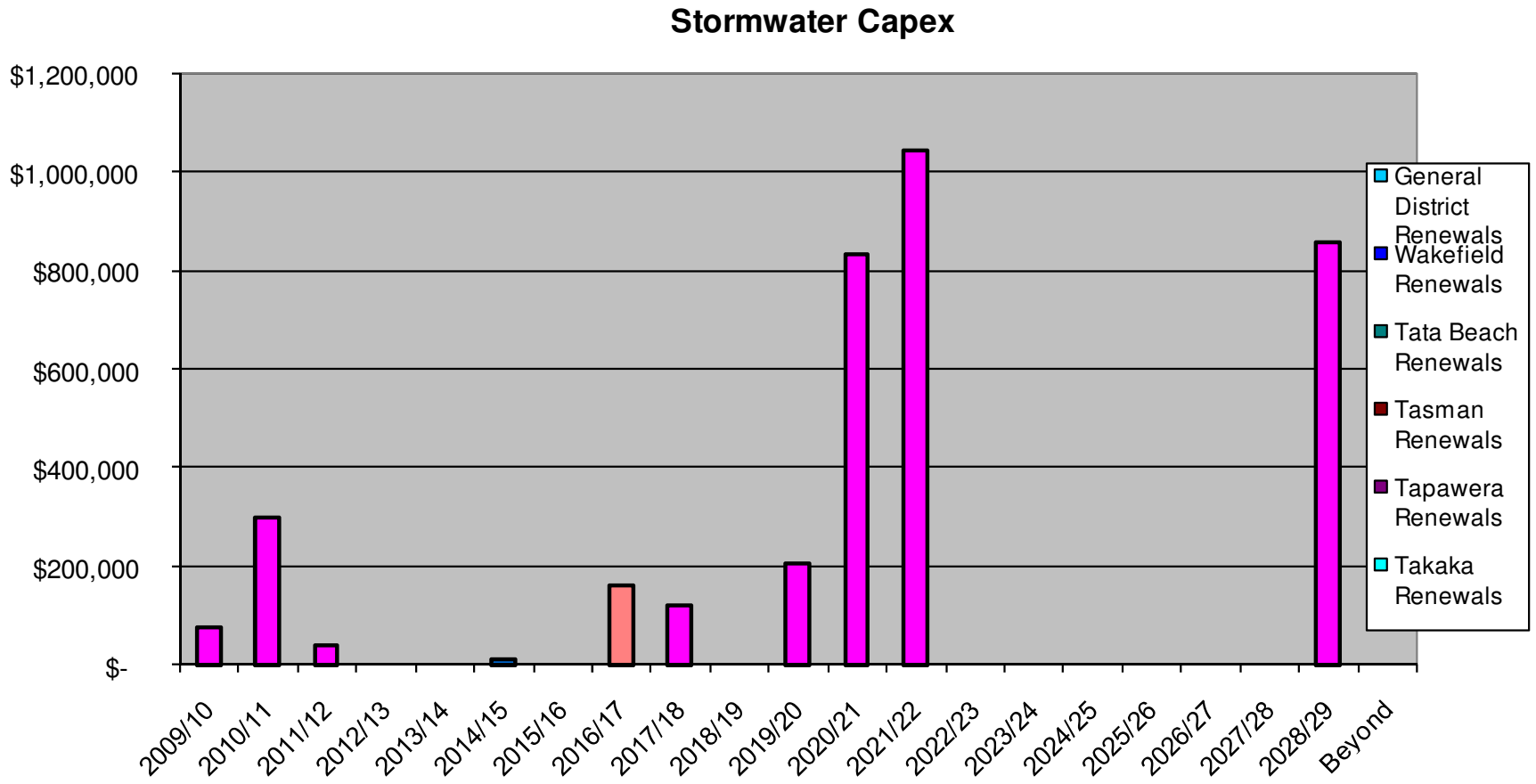
The following stormwater assets are planned for renewal:

- Motueka Tidal Gates - existing automated tidal gates require replacement
- Richmond Beach Road Drain - existing timber retaining walls require replacement
- Richmond Bill Wilkes Reserve - replace inlet structure on detention dam
- Richmond Gladstone Road - replace brick stormwater culvert
- Richmond Loadstone Park - replace inlet structure on detention dam
- Richmond Reservoir Creek - replace spillway and repair dam

Figure I-1 below shows the projected renewals expenditure on a scheme by scheme basis.

Table I-1 at the end of this appendix shows the breakdown of expenditure forecast for renewals over the next 20 years.

Figure I-1: Projected Renewal Expenditure for Next 20 Years



•	Year 1/2	Reservoir Creek Improvements	$377,329
•	Year 3	Bill Wilkes Reserve Intake	$40,780
•	Year 6	Murchison Drain Clearing	$10,840
•	Year 8	Motueka Tidal Gates	$162,859
•	Year 9	Loadstone Park	$120,851
•	Year 12/13	Beach Road Drain	$2,089,716
•	Year 20	Gladstone Road Brick Culvert	$861,565

I.3 Renewal Standards

All work shall comply with the latest TDC Engineering Standards.

The asset development/creation standards form the technical basis of all renewal contracts.

A consideration of the whole life cycle asset value is considered in evaluating renewal options, because complete replacement like for like is unlikely to be the optimal solution, given changes in current level of service and performance requirements, technological developments and legislative change.

I.4 Deferred Renewals

Renewal works may be deferred when the cost is beyond the community's ability to fund it, which can occur when higher priority works are required on other infrastructure assets, when there are short term expenditure peaks from a number of assets coming up for renewals at once, or when an inadequate rating base exists.

When renewal works are deferred, the impact on economic inefficiencies and the system's ability to achieve the required service standards will be assessed.

However, although the deferral of some renewal works may not impact significantly on the operation of assets, repeated deferral will create a liability in the longer term.

The total value of deferred works is recognised in Council's financial reporting.

Table I-1: Breakdown of Expenditure Forecast for Renewals

Total Stormwater Renewals Forecast

Item	Scheme	Project Name	Total Project Cost	Total Renewals	2009/10 Year 1	2010/11 Year 2	2011/12 Year 3	2012/13 Year 4	2013/14 Year 5	2014/15 Year 6	2015/16 Year 7	2016/17 Year 8	2017/18 Year 9	2018/19 Year 10
17	Motueka	Wharf Rd gates	$ 183,400	$ 162,859	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 162,859	$ -	$ -
19	Murchison	UDA Investigation	$ 54,200	$ 10,840	$ -	$ -	$ -	$ -	$ -	$ 10,840	$ -	$ -	$ -	$ -
23	Richmond	Beach Road	$ 4,765,600	$ 2,089,716	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
24	Richmond	Bill Wilkes Reserve	$ 93,000	$ 40,781	$ -	$ -	$ 40,781	$ -	$ -	$ -	$ -	$ -	$ -	$ -
27	Richmond	Gladstone Road	$ 982,400	$ 861,565	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
31	Richmond	Lodstone Park	$ 137,800	$ 120,851	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 120,851	$ -
37	Richmond	Reservoir Creek	$ 860,500	$ 377,329	$ 75,466	$ 301,863	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

Item	Scheme	Project Name	Total Project Cost	Total Renewals	2019/20 Year 11	2020/21 Year 12	2021/22 Year 13	2022/23 Year 14	2023/24 Year 15	2024/25 Year 16	2025/26 Year 17	2026/27 Year 18	2027/28 Year 19	2028/29 Year 20
17	Motueka	Wharf Rd gates	$ 183,400	$ 162,859	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
19	Murchison	UDA Investigation	$ 54,200	$ 10,840	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
23	Richmond	Beach Road	$ 4,765,600	$ 2,089,716	$ 208,972	$ 835,886	$ 1,044,858	$ -	$ -	$ -	$ -	$ -	$ -	$ -
24	Richmond	Bill Wilkes Reserve	$ 93,000	$ 40,781	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
27	Richmond	Gladstone Road	$ 982,400	$ 861,565	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 861,565
31	Richmond	Lodstone Park	$ 137,800	$ 120,851	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
37	Richmond	Reservoir Creek	$ 860,500	$ 377,329	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

APPENDIX J. DEPRECIATION AND DECLINE IN SERVICE POTENTIAL

The source of this information is mostly from the Long Term Council Community Plan.

J.1 Depreciation of Infrastructural Assets

Depreciation is provided on a straight line basis on all infrastructural assets at rates which will write off the cost (or valuation) of the assets to their estimated residual values, over their useful lives.

The remaining useful lives and associated rates for the stormwater infrastructure have been estimated as follows:

Stormwater	
Channel/Detention dams	Not depreciated
Stormwater pipes	120 years
Manholes	80 years
Soakpits	80 years

J.2 Decline in Service Potential

The decline in service potential is a decline in the future economic benefits (service potential) embodied in an asset.

It is Council policy to operate the stormwater activity to meet a desired level of service. Council will monitor and assess the state of the stormwater infrastructure and upgrade or replace components over time to counter the decline in service potential at the optimum times.

APPENDIX K. PUBLIC DEBT AND LOAN SERVICING COSTS

K.1 General Policy

The Council borrows as it considers prudent and appropriate and exercises its flexible and diversified funding powers pursuant to the Local Government Act 2002. The Council approves, by resolution, the borrowing requirement for each financial year during the annual planning process. The arrangement of precise terms and conditions of borrowing is delegated to the Corporate Services Manager.

> ***The Council has significant infrastructural assets with long economic lives yielding long term benefits. The Council also has a significant strategic investment holding. The use of debt is seen as an appropriate and efficient mechanism for promoting intergenerational equity between current and future ratepayers in relation to the Council's assets and investments. Debt in the context of this policy refers to the Council's net external public debt, which is derived from the Council's gross external public debt adjusted for reserves as recorded in the Council's general ledger.***

Generally, the Council's capital expenditure projects with their long term benefits are debt funded. The Council's other district responsibilities have policy and social objectives and are generally revenue funded.

The Council raises debt for the following primary purposes:

- Capital to fund development of infrastructural assets
- Short term debt to manage timing differences between cash inflows and outflows and to maintain the Council's liquidity.
- Debt associated with specific projects as approved in the Annual Plan or LTCCP. The specific debt can also result from finance which has been packaged into a particular project.

In approving new debt, the Council considers the impact on its borrowing limits (refer Section 3.2) as well as the size and the economic life of the asset that is being funded and its consistency with Council's long term financial strategy.

The detailed Borrowing Policy is found in Section 3 of Council's Treasury Management Policy that was last reviewed by Council in April 2004.

K.2 Loans

Capital works to be funded by loan over the next 10 years are projected to add up to the following costs:

Stormwater	2009/10 Year 1	2010/11 Year 2	2011/12 Year 3	2012/13 Year 4	2013/14 Year 5	2014/15 Year 6	2015/16 Year 7	2016/17 Year 8	2017/18 Year 9	2018/19 Year 10
	$	$	$	$	$	$	$	$	$	$
Loans Raised	1,281	1,704	1,827	1,520	2,112	2,003	2,919	3,583	2,197	2,478
Opening Loan Balance	9,647	10,247	11,196	12,179	12,790	13,965	14,966	16,784	19,140	20,003

Note: Figures do not include for inflation and are in thousands of dollars (i.e. x1000)

K.3 Cost of Loans

Council funds the principal and interest costs of past loans and these are added to the projected loan costs for the next 10 years in the following table.

Council is still paying off loans raised by the previous county councils and boroughs – these are called pre amalgamation loans i.e. pre 1989.

All loans raised since 1989 have been by the Tasman District Council.

The projected annual loan repayment costs over the next 10 years are:

Stormwater	2009/10 Year 1	2010/11 Year 2	2011/12 Year 3	2012/13 Year 4	2013/14 Year 5	2014/15 Year 6	2015/16 Year 7	2016/17 Year 8	2017/18 Year 9	2018/19 Year 10
	$	$	$	$	$	$	$	$	$	$
Loan Interest	670	725	795	852	916	995	1,096	1,247	1,362	1,432
Loan Principal	681	755	844	909	937	1,002	1,100	1,228	1,334	1,408

Note: Figures do not include for inflation and are in thousands of dollars (i.e. x1000)

APPENDIX L. SUMMARY OF FUTURE OVERALL FINANCIAL REQUIREMENTS

Table L-1 presents a summary of the overall future financial requirements for the Stormwater Activity in the Tasman District.

Table L-1: Forecast Costs and Income for the Next 10 Years

Stormwater	2008/2009 Budget $	2009/2010 Budget $	2010/2011 Budget $	2011/2012 Budget $	2012/2013 Budget $	2013/2014 Budget $	2014/2015 Budget $	2015/2016 Budget $	20016/2017 Budget $	2017/2018 Budget $	2018/2019 Budget $
INCOME											
General rate	-	-	-	-	-	-	-	-	-	-	-
Targeted Rate	1,909,177	1,946,868	2,264,327	2,735,901	2,889,455	3,112,628	3,199,730	3,191,155	3,486,929	3,775,364	3,955,193
Development Contributions	332,402	279,233	313,338	311,206	238,734	285,628	292,022	289,891	281,365	279,233	272,838
Fees & Recoveries	5,202	5,081	5,081	5,081	5,081	5,081	5,081	5,081	5,081	5,081	5,081
Sundry Income	119,421	115,195	134,521	137,479	138,022	138,327	138,429	138,443	138,360	138,276	138,199
TOTAL INCOME	2,366,202	2,346,377	2,717,267	3,189,667	3,271,292	3,541,664	3,635,262	3,624,570	3,911,735	4,197,954	4,371,311
OPERATING COSTS											
Richmond	538,303	514,380	692,468	688,783	661,312	725,371	699,369	584,299	595,493	668,074	598,438
Motueka	245,095	125,384	135,134	204,450	192,230	144,635	148,136	147,053	148,663	156,034	155,235
Mapua/Ruby Bay	49,635	52,276	55,937	57,275	56,873	57,678	58,848	58,742	59,324	60,116	60,080
Brightwater	30,023	32,738	35,269	36,402	35,805	36,415	37,296	36,990	37,382	37,976	37,731
Wakefield	82,937	32,314	34,819	35,948	35,346	35,952	36,826	36,515	36,902	37,492	37,241
Takaka	30,419	32,437	34,970	36,100	35,509	36,123	37,015	36,711	37,114	37,716	37,474
Murchison	13,778	14,834	15,776	16,070	16,042	16,230	16,496	16,525	16,663	16,843	16,887
General District	136,222	226,448	197,860	220,610	201,731	263,864	207,016	208,298	210,172	212,316	313,720
Loan Interest	594,614	669,506	725,248	794,778	852,165	916,452	994,784	1,096,293	1,246,566	1,362,437	1,432,036
Depreciation	473,739	815,295	909,400	940,042	1,045,851	1,070,893	1,187,184	1,240,647	1,391,871	1,437,974	1,552,929
TOTAL OPERATING COST	2,194,765	2,515,612	2,836,881	3,030,458	3,132,864	3,303,613	3,422,970	3,462,073	3,780,150	4,026,978	4,241,771
NET COST OF SERVICE (SURPLUS)	(171,437)	169,235	119,614	(159,209)	(138,428)	(238,051)	(212,292)	(162,497)	(131,585)	(170,976)	(129,540)
TOTAL FUNDS REQUIRED											
NET COST OF SERVICE (SURPLUS)	(171,437)	169,235	119,614	(159,209)	(138,428)	(238,051)	(212,292)	(162,497)	(131,585)	(170,976)	(129,540)
Capital	3,494,735	1,445,665	1,902,173	1,993,920	1,767,680	2,896,150	2,402,740	3,209,228	3,864,598	2,476,511	2,750,579
Loan Principal	506,655	680,722	755,334	843,592	908,766	936,786	1,002,104	1,100,492	1,227,855	1,333,970	1,407,642
Transfer to Reserves	-	127,045	116,859	143,977	29,071	-	6,112	18,105	16,318	3,800	5,799
	3,829,953	2,422,667	2,893,980	2,822,280	2,567,089	3,594,885	3,198,664	4,165,328	4,977,186	3,643,305	4,034,480
SOURCE OF FUNDS											
Restricted Reserves Applied	124,854	326,395	281,064	55,406	1,706	412,179	8,525	5,344	2,082	8,053	3,810
Loans Raised	3,231,360	1,280,977	1,703,516	1,826,832	1,519,532	2,111,813	2,002,955	2,919,337	3,583,233	2,197,278	2,477,741
	3,356,214	1,607,372	1,984,580	1,882,238	1,521,238	2,523,992	2,011,480	2,924,681	3,585,315	2,205,331	2,481,551
NON FUNDED DEPRECIATION											
Depreciation to be funded at income statement level	473,739	815,295	909,400	940,042	1,045,851	1,070,893	1,187,184	1,240,647	1,391,871	1,437,974	1,552,929
	473,739	815,295	909,400	940,042	1,045,851	1,070,893	1,187,184	1,240,647	1,391,871	1,437,974	1,552,929
	3,829,953	2,422,667	2,893,980	2,822,280	2,567,089	3,594,885	3,198,664	4,165,328	4,977,186	3,643,305	4,034,480

N.B Figures do not include Inflation

APPENDIX M. FUNDING POLICY, FEES, AND CHARGES

M.1 Overview

Stormwater expenditure is funded by:

- Stormwater Rates
- Loans
- Development financial Contributions (DILs)
- Sundry Income (dividends etc.)

The stormwater assets are funded in the main from a targeted rate called the "stormwater rate". The stormwater services are, therefore, operated on a "user" or "beneficiary" pays basis and are not funded by any general rate appropriation.

Council operates a closed group account for all Council owned urban stormwater schemes, and a separate closed account for the General District Area.

Major capital projects may be loan funded. When loans are established, the loan is taken out for a fixed period, usually 20-30 years, with a fixed annual principal repayment as a capital expense on the account, and interest payments as an operating expense.

M.2 Schedule of Fees and Charges

M.2.1. Stormwater Rates

Council sets a targeted rate for the purposes of stormwater works. This rate will be based on the capital value of each rating unit. The categories of property and the rates (in cents per dollar of capital value) for 2008/2009 are:

Category	2008/2009	2009/2010
Richmond UDA	0.0408 cents	0.0365 cents
Brightwater UDA	0.0408 cents	0.0365 cents
Wakefield UDA	0.0408 cents	0.0365 cents
Murchison UDA	0.0408 cents	0.0365 cents
St Arnaud UDA	0.0408 cents	0.0365 cents
Tapawera UDA	0.0408 cents	0.0365 cents
Motueka UDA	0.0408 cents	0.0365 cents
Mapua/ Ruby Bay UDA	0.0408 cents	0.0365 cents
Tasman UDA	0.0408 cents	0.0365 cents
Kaiteriteri UDA	0.0408 cents	0.0365 cents
Takaka UDA	0.0408 cents	0.0365 cents
Pohara UDA	0.0408 cents	0.0365 cents
Ligar Bay/ Tata Beach UDA	0.0408 cents	0.0365 cents
Collingwood UDA	0.0408 cents	0.0365 cents
Patons Rock UDA	0.0408 cents	0.0365 cents
General District	0.0035 cents	0.0036 cents

APPENDIX N. NOT RELEVANT TO STORMWATER ACTIVITY

APPENDIX O. NOT RELEVANT TO STORMWATER ACTIVITY

APPENDIX P. NOT RELEVANT TO STORMWATER ACTIVITY

APPENDIX Q. SIGNIFICANT ASSUMPTIONS, UNCERTAINTIES, AND RISK MANAGEMENT

This appendix is in two parts:

- Assumptions and Uncertainties
- Risk Management

Q.1 Assumptions and Uncertainties

This AMP and the financial forecasts within it have been developed from information that has varying degrees of completeness and accuracy. In order to make decisions in the face of these uncertainties, assumptions have to be made. This section documents the uncertainties and assumptions that Council consider could have a significant affect on the financial forecasts, and discusses the potential risks that this creates.

Q.1.1. Asset Data Knowledge

While the Council has asset registers and many digital systems, processes and records, Council does not have complete knowledge of the assets it owns. To varying degrees the Council has incomplete knowledge of asset location, asset condition, remaining useful life and asset capacities. This requires assumptions to be made on the total value of the assets owned, the time at which assets will need to be replaced and when new assets will need to be constructed to provide better service.

Notwithstanding this, Council considers these assumptions and uncertainties constitute only a small risk to the financial forecasts because:

- Significant amounts of asset data is known
- Asset performance is well known from experience
- There are plans to upgrade significant extents of poorly performing assets

Renewal forecasts are based on knowledge of specific condition problems and valuation life assessments. For stormwater, there are very few assets whose expected life is forecast to expire during the period of this plan, indicating a generally young asset. Therefore there are few renewals expected during the period of this plan.

The majority of the reticulation and assets are in good condition– only known exceptions to this are:

- Stormwater Pipe, Queen Street, Richmond – 900 dia. stormwater pipe with exposed reinforcement in poor structural condition from poor workmanship
- Open Channel, Beach Road, Richmond – this timber lined channel is in poor condition and has a limited life. Replacement options have been considered and Council considers that full replacement of the timber retaining wall with a reinforced concrete culvert is required

The renewal forecasts are based on limited data, however the sensitivity of the forecasts to this data is not large because of the age of the assets. As the assets age, the level of data on asset condition will need to improve to ensure condition problems are identified before they occur.

Q.1.2. Growth Forecasts

Growth forecasts are inherently uncertain and involve many assumptions. The growth forecasts also have a very strong influence on the financial forecasts, especially in Tasman District where population growth is so high. The growth forecasts underpin and drive:

- the asset creation programme
- Council income forecasts including rates and development contributions funding strategies

Thus the financial forecasts are sensitive to the assumptions made in the growth forecasts.

The significant assumptions in the growth forecasts are covered in section 5.2 and Appendix F.

Q.1.3. Network Capacity

The Council has a growing knowledge and understanding of network capacity, however, the knowledge is not complete. Council has developing a computational hydraulic model for the Richmond and Mapua catchments, and is considering implementing these for other catchments. System capacity upgrades have been planned where shortfalls are known or where growth is expected, however, the models will provide new information that may create a need for new projects and/or re-prioritisation of existing projects.

The financial forecasts lack certainty because of the lack of adequate knowledge of system performance and improvement needs. This could have a significant effect on the forecasts because asset creation to fix capacity issues can be expensive.

Q.1.4. Timing of Capital Projects

The timing of many capital projects can be well defined and accurately forecast because there are few limitations on the implementation other than the community approval through the LTCCP/Annual Plan processes. However, the timing of some projects is highly dependent on some factors which are beyond the Council's ability to fully control. These include factors like:

- obtaining resource consent, especially where there are environmental and iwi issues
- development of new growth areas
- securing land to construct new assets on

Where these issues may become a factor, allowances have been made to complete in a reasonable timeframe, however these plans are not always achieved. The effect of this will be to defer expenditure. The impact of this on the financials is not considered significant.

Q.1.5. Funding Of Capital Projects

Funding of capital projects is crucial to a successful project. When forecasting projects a number of years out, assumptions have to be made on how the scheme will be funded.

Funding assumptions are made about:

- Whether and how much should be funded from development contributions.
- Whether the work will force the need to extend or create new Urban Drainage Area
- Whether land owners will contribute directly to the works
- Whether Council or other parties will subsidise the development of the projects.

The correctness of these assumptions has major consequences on the affordability of the works. The Council has a funding strategy for each project. This will form one part of the consultation process as these schemes are advanced toward construction.

Q.1.6. Accuracy of Capital Project Cost Estimates

The financial forecasts contain many projects, each of which has been estimated from the best available knowledge. The level of uncertainty inherent in each project is different depending on how much work has been done in defining the problem and determining a solution. In many cases, only a rough order cost estimate is possible because little or no preliminary investigation has been carried out. It is not feasible to have all projects in the next 20 years advanced to a high level of accuracy. However, it is preferable to have projects in the next 3 years advanced to a level that provides reasonable confidence about the accuracy of the estimate.

To get consistency and formality to cost estimating, the following has practices have been followed:

- A project estimating template has been developed that provides a consistent means of preparing estimates
- Where practical, a common set of rates has been determined
- Specific provisions have been included to deal with non-construction costs like contract preliminary and general costs, engineering costs, Council staff costs, resource consenting costs, land acquisition costs.
- Specific provisions have been included to deal with estimate accuracy. These are described as follows.

A 15% provision has been included to get a "Base Project Estimate" to reflect the uncertainties in the unit rates used. A further provision has been added to reflect the uncertainties in the scope of the project – i.e. is the solution adopted the right solution. Often detailed investigation will reveal the need for additional works over and above that initially expected. The amount added depends on the amount of work already done on the project. Each project has been assessed as being at project lifecycle stage as below, and from this an estimate accuracy assessed. The estimate accuracy is added to the Base Project Estimate to get the Total Project Estimate – the figure that is carried forward into the financial forecasts.

Stage in Project Lifecycle	Estimate Accuracy
Concept / Feasibility	± 30% (±25% for projects >$1m)
Preliminary Design / Investigation	± 20% (±15% for projects >$1m)
Detailed Design	± 10%
Construction	± 5%
Commissioning	± 0%

Q.1.7. Significant assumptions and uncertainties for projects assigned over the next 3 years

The following table details significant uncertainties and percentage accuracies for all major projects due in the next three years of the AMP.

Activity	Estimate Accuracy	Project Estimate	Significant Uncertainties
Brightwater - Jeffries Creek	± 20%	$227,400	Requires successful outcome of land negotiations
Kaiteriteri - Rowling Road	± 20%	$263,900	Wetland solution unknown (requires investigation) Obtaining Resource Consent for wetland solution
Mapua - Ruby Bay	± 10%	$394,600	Scope of work to cross/ reinstate State Highway Extent of Service Diversions
Mapua - Seaton Valley Stream	± 10%	$696,100	Requires agreement with a number of landowners (land entry agreements) for the construction Requires successful outcome of land negotiations for stream widening and planting, and 2 No. stream culvert/ bridge crossings Resource Consent not yet awarded (application in progress)

Activity	Estimate Accuracy	Project Estimate	Significant Uncertainties
Motueka - Reticulation Improvements	± 0%	$180,000	Budget allocation for lump sum to resolve local flooding issues, to be allocated for maximum cost / benefit impact
Motueka - Pool Street High Street	± 15%	$1,030,285	Uncertainty over design depth of stormwater pipe (to pick up low spots prone to flooding) Extent of new sumps and collection system on high street
Motueka - Old Wharf Road	± 10%	$212,100	Extent of service diversions
Patons Rock - Drainage Improvements	± 20%	$494,500	There is significant uncertainty over the scope of a solution to prevent flooding on the main road in Paton Rock, particularly given a number of physical constraints which present challenges to identifying a preferred solution. This project scope is pre- feasibility stage. The budget allocated allows for a piped solution without confirmation from site investigations, completion of feasibility study.
Pohara – Drainage Improvements	± 10%	$448,000	Extent of available drainage capacity in limestone tomos which may impact on the proposed stormwater pipe size along Richmond Road
Richmond - Bill Wilkes Reserve	± 20%	$93,000	Extent of Tree replacement required
Richmond - Poutama Drain	± 15%	$1,745,700	Complexity and extent of major construction work in State Highway not yet known - extent of traffic management and of service diversions Route for culvert connection from Gladstone Road unconfirmed Scope of work does not allow for connection to the new Middlebank Drive stormwater system upgrade - work to intercept flows in Gladstone Road and a new pipe to the railway reserve and a new crossing will form part of the Middlebank Drive stormwater project (Yr 6/7) Impact of Middlebank Drive stormwater system upgrade uncertain but an estimated impact on the open channel size has been allowed Minimal allowance for landowner consultation given the completion of land designations ahead of project start
Richmond - Reservoir Creek Dam	± 20%	$860,500	Geotechnical risk / assumptions on existing condition of reservoir creek dam Land entry / negotiations for vehicular access to Reservoir creek dam Unknown scope for access road construction Extent of remedial works not completely known
Tasman - Drainage Improvements	± 20%	$253,600	State Highway reinstatement costs

Q.1.8. Changes in Legislation and Policy

The legal and planning framework under which local government operates is ever changing. This can significantly affect the feasibility of projects, how they are designed and constructed and how they are funded.

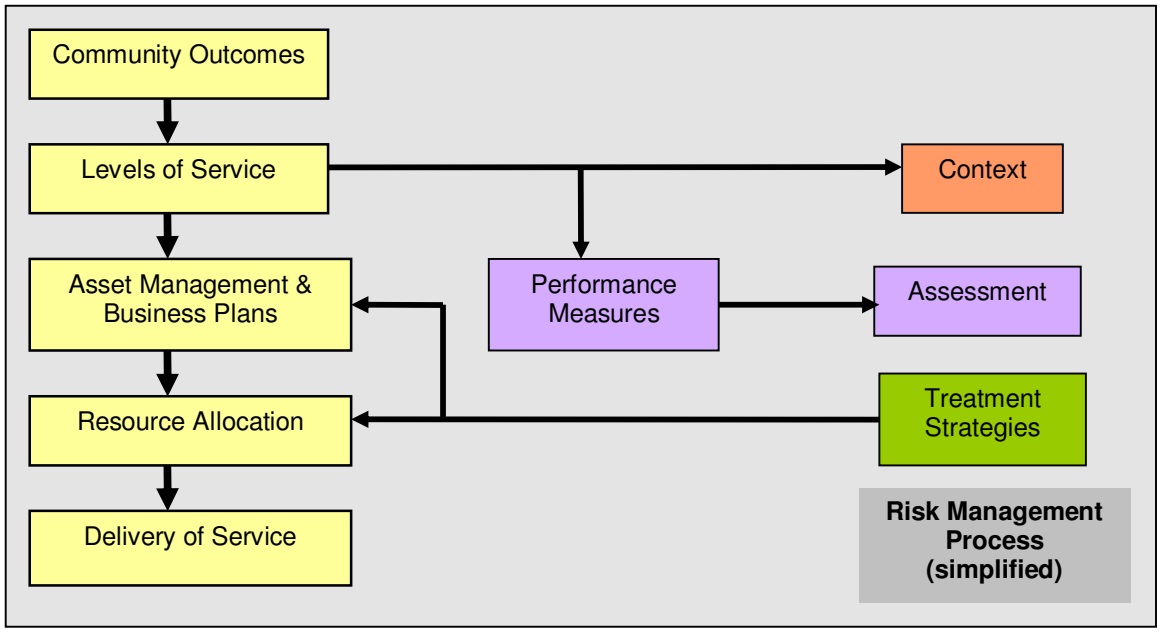
Q.2 Risk Management

Council is adopting an Integrated Risk Management (IRM) framework and process as the means for managing risk within the organisation. The process integrates with the Long Term Council Community Plan (LTCCP) process as illustrated in Figure Q-1.

The strategic goal of integrated risk management is:

"*To integrate risk management into Council's organisational decision making so that it can achieve its strategic goals cost effectively while optimising opportunities and reducing threats.*"

Figure Q-1: Integration of Risk Management Process into LTCCP Process

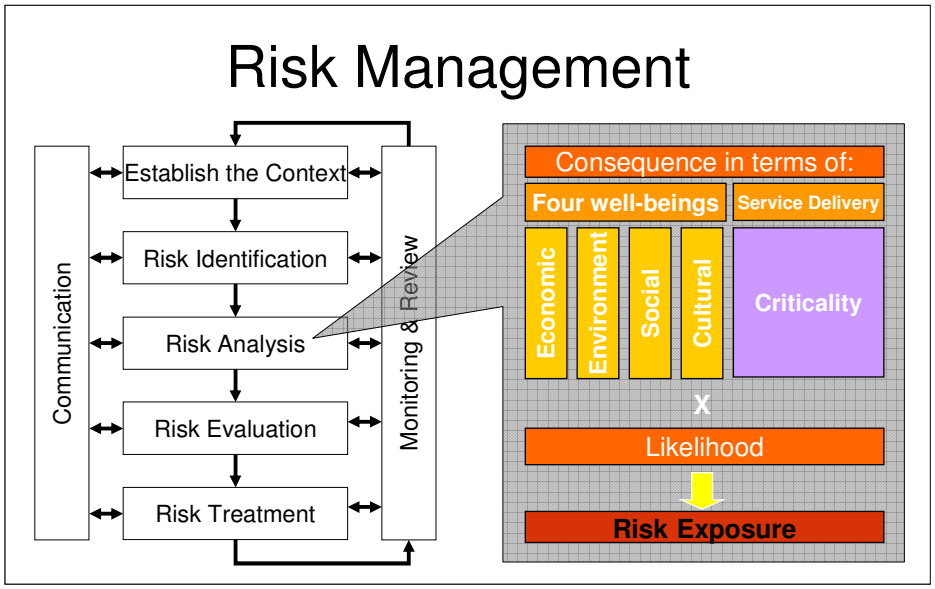


The IRM process and framework is intended to:

- To demonstrate responsible stewardship by TDC on behalf of its customers and stakeholders.
- To act as a vehicle for communication with all parties with an interest in TDC's organisational and asset management practices.
- Provide a focus within TDC for ongoing development of good management practices.
- Demonstrate good governance.
- Meet public expectations and compliance obligations.
- Manage risk from an organisational perspective.
- Facilitate the effective and transparent allocation of resources to where they will have most effect on the success of the organisation in delivering its services.

The risk management framework adopted by TDC is consistent with AS/NZS 4360:2004 Risk Management and assesses risk exposure by considering the consequence and likelihood of each risk which is identified as having an impact on the achievement of organisational objectives (Figure Q-2).

Figure Q-2: Integrated Risk Management Process



Consequence categories have been developed to reflect the impact of risk events on the four well-beings and each consequence category is scored as either “extreme”, “major”, “medium”, “minor”, or “negligible”. These categories address common consequences across any asset or project, however, they do not specifically account for the differences in assets. Therefore an additional category “Service Delivery” is used to reflect the essential reason for the ownership or management of any asset within the local authority – the delivery of a service. This means that the consequence of failure to deliver the service in question (the criticality of the service) can be used to weight the consequences to reflect the relative importance of the asset to the community and in turn to Council.

Table Q-1: Consequence Categories

Category		Description
Service Delivery		Assessment based on the asset’s compliance with Performance Measures and value in relation to outcomes and resource usage
Social/ Cultural	Health & Safety	Assessment of impact as it relates to death, injury, illness, life expectancy and health
	Community Safety & Security	Assessment of impact based on perceptions of safety and reported levels of crime
	Community / Social / Cultural	Assessment of impact based on damage and disruption to community services and structures, and effect on social quality of life and cultural relationships
	Compliance / Governance	Assessment of effect on governance and statutory compliance of Council
	Reputation / Perceptions of Council	Assessment of public perception of Council and media coverage in relation to Council
Environment	Natural Environment	Effect on the physical and ecological environment, open space and productive land
	Built Environment	Effect on the amenity, character, heritage and cultural, and economic aspects of the built environment and level of satisfaction with the amenity of the built environment
Economic	Direct Cost / Benefit	Direct cost (or benefit) to Council
	Indirect Cost / Benefit	Direct cost (or benefit) to wider community

Similarly, the likelihood of the risk occurring is scored on a scale from “almost certain” to “unlikely” with associated probabilities and frequencies provided for guidance.

The risk exposure is then determined for each identified risk by multiplying the consequence and likelihood, and is presented using semantic descriptions ranging from “extreme” to “negligible”

Treatment strategies, or strategic plans, that mitigate each risk can then be identified, and prioritised based on the risk exposure.

The consequence, likelihood scoring and risk matrix tables are all located in a separate report, TDC Integrated Risk Management - Engineering Activities. This document also contains the outputs from the Level 1 and Level 2 Risk Assessments.

There are essentially three levels of risk assessment that should be considered for each activity within Council:

- Level 1 - Organisational Risk Assessment
- Level 2 - Asset Group Risk Assessment
- Level 3 - Critical Asset Risk Assessment

Q.2.1. Level 1 - Organisational Risk Assessment

The Organisational Risk Assessment focuses on identification and management of significant operational risks that will have an impact beyond the activity itself and will affect the organisation as a whole. This approach allows the Integrated Risk Management framework to address risks at the organisational level, as well as at both the management and operational levels within the particular Council activities.

During the process of developing the integrated risk management process, Council identified a number of risk events and issues at organisational level. These are relatively generic across all activities, but have been reviewed against each particular activity to ensure relevance and adjusted to suit. The decision to implement the treatment measures identified will be at an organisational level, not activity level.

Q.2.2. Level 2 - Asset Group Risk Assessment

The same principal and consequence tables have been applied, but the focus has been at an Activity Level.

Major asset groups within the activity have been identified. An analysis of risk events was then undertaken to determine the issues arising that may prevent the assets delivering the required service. At this level of risk assessment, the risk events considered are physical events only as management and organisational risk events formed part of the earlier organisational risk assessment. Treatment strategies that mitigate each risk for asset groups have been identified.

The outcome from this process is summarised in Table Q-2, a checklist of mitigation measures that should be considered for each type of asset group.

Table Q-2: Mitigation Measures Check List

Mitigation Measures to be considered	Asset Group			
	Detention Ponds	Treatment Systems	Distribution Systems (piped)	Distribution Systems (open)
Common Asset Mitigation Measure				
Redundancy	✓	✓	✓	✓
Demand Management	✓		✓	✓
Environmental Monitoring	✓	✓		✓
Health and Safety	✓	✓	✓	✓
Engineering Standards	✓	✓	✓	✓
Proactive Maintenance	✓	✓	✓	✓
General Maintenance	✓	✓	✓	✓
Call Centre	✓	✓	✓	✓
Asset Management System/ Confirm	✓	✓	✓	
Emergency Evacuation Plans (Civil Defense)	✓	✓		✓
Regulatory Consents			✓	✓
As Built Records		✓	✓	✓
Containment/ Storage	✓	✓	✓	✓
Telemetry System		✓		✓
Stormwater Asset Specific Measure				
Buried/ Covered Asset		✓	✓	✓
Detention Dam Certification	✓			
Secondary Spillway / Outlet	✓			
Stormwater Catchment Management Plans		✓	✓	
Spill Kits	✓	✓	✓	✓
Water Quality Improvements		✓	✓	✓

Q.2.3. Level 3 - Critical Assets Risk Assessment

The next step in the Integrated Risk Management Approach will be to consider each of the individual critical assets within the asset groups of an activity. Each asset will be reviewed in terms of the consequences initially identified and mitigation measures required. The output from the process will be a recommendation of projects or operational strategies to address shortfalls.

At this time, this level of risk management has not been implemented but has been included for completion in the Improvement Plan.

Q.2.4. Projects to address Risk shortfalls

Specific risk mitigation measures that have been planned within the 20 year stormwater programme include:

- Detention Dam RMA Consents - Assess all Council owned Detention Dams
- Reservoir Creek, Richmond - Work to lower top water level and construct new spillway
- Provide Stormwater Treatment Systems to improve Stormwater Quality Discharges
- Health and Safety Operational Reviews
- Update Engineering Standards Every 3 years
- Continue to develop Asset Management System, 'Confirm Enterprises'
- Purchase 1 or 2 spill kits to contain / clean up pollution spill events

APPENDIX R. LEVELS OF SERVICE, PERFORMANCE MEASURES, AND RELATIONSHIP TO COMMUNITY OUTCOMES

R.1 Community Outcomes

Through Consultation, the Council identified eight Community Outcomes. These Community Outcomes are linked to the four well beings and Council Objectives as shown in Table R-1.

R.2 Levels of Service

Levels of service for Stormwater are described in Section 2.3, Table 2-2.

R.3 Performance Measurement

Table R-2 contains an assessment of current performance against the levels of service, and a forecast of the performance planned for within the next 3 years, and within the next 10 years.

Table R-1: The Four Wellbeings, Interim Community Outcomes, Council Objectives, Group and Activities

Community Wellbeing	Community Outcomes	Council Objectives	Council Groups and Activities	Council Activities
Environmental wellbeing	1. Our unique and special natural environment is bountiful, healthy, clean and protected. 2. Our built urban and rural environments are functional, pleasant, safe and sustainably managed. 3. Our transport and essential services are sufficient, efficient and sustainably managed.	To ensure sustainable management of natural and physical resources and security of environmental standards. To sustainably manage infrastructural assets relating to Tasman District.	Environment and Planning Transportation Sanitation, drainage and water supply	Resource Policy Resource Information Resource Consents and Compliance Environmental Education, Advocacy and Operations Regulatory services Mapua Rehabilitation Regional Cycling and Walking Strategy. Land Transportation Coastal Structures, Aerodromes Refuse Wastewater Stormwater management Rivers Water Supply
Social and Cultural Wellbeing	4. Our vibrant community is safe, well, enjoys an excellent quality of life and supports those with special needs. 5. Our community understands regional history, heritage and culture. 6. Our diverse community enjoys access to a range of spiritual, cultural, social, educational and recreational services. 7. Our participatory community contributes to district-decision making and development.	To enhance community development and the social, natural, cultural and recreational assets relating to Tasman District.	Cultural services and grants. Recreation and leisure. Community support services.	Libraries Cultural services and community grants Community recreation Camping grounds Parks and Reserves Development impact levies Community facilities Emergency management Community housing Governance
Economic Wellbeing	8. Our growing and sustainable economy provides opportunities for us all.	To implement policies and financial management strategies that advance. To promote sustainable development in the Tasman District.	Council Enterprises.	Forestry Property Council controlled organisations.

Table R-2: Performance against Current Levels of Service, and Intended Future Performance

Levels Of Service (what Council will provide)	We will know we are achieving this when…..	Current Performance	Future Performance (by Year 3)	Future Performance (by Year 10)
1. Our stormwater systems do not adversely pollute or degrade but sustain and nurture the receiving environment	We have stormwater quality catchment management plans (SQMPs) for each urban drainage area, which identify environmental values and set sustainable improvement targets to improve environmental values and amenity value to the community	We plan to complete a monitoring programme to identify the current environmental value of the major stormwater catchments in Richmond followed by other major Urban Drainage Areas (UDAs) and the remainder of the UDA's from Year 1 through to Year 4. We will complete stormwater quality catchment management plans sequentially as monitoring is completed	Complete SQMP's for Richmond, Motueka and Mapua	Complete SQMP's for all UDA's
	We have discharge consents in place for each major urban stormwater discharge (controlling stormwater quality)	No discharge consents are currently in place to control stormwater quality discharges from urban areas. We anticipate being required to comply with discharge consents for stormwater discharges from Year 3 onwards	Discharge consents in place for Richmond UDA	Discharge consents in place for all UDA's
	We control the discharge of pollutants from our stormwater systems to sustainable levels so there is minimal adverse impact on the quality of our natural freshwater and marine habitats	We plan to install pollution interception/ control measures in both upstream and downstream locations, to reduce, intercept, and eliminate stormwater contaminants, using a range of sustainable solutions	Improvement action plan to be determined	Improvement action plan to be determined
	We apply a sustainable design approach to all stormwater system upgrades. The primary aim in the design of open channels will be to nurture and provide environmental values in keeping with the surrounding environment and in providing and enhancing amenity value to the community	The 2008 engineering standards require a sustainable design approach, incorporating low impact designs and enhancing / protecting the natural environment where practicable	Continued compliance	Continued compliance

Levels Of Service (what Council will provide)	We will know we are achieving this when…..	Current Performance	Future Performance (by Year 3)	Future Performance (by Year 10)
2. Our stormwater systems collect and convey stormwater safely through urban environments, reducing the adverse effects of flooding on people and property	Stormwater drainage facilities are provided to service all Urban Drainage Areas	All 15 urban drainage areas have stormwater facilities	All UDA's continue to have stormwater facilities	All UDA's continue to have stormwater facilities
	Inlets, outlets, floodgates, detention dams, and watercourses are kept open at all times through a proactive maintenance programme	The maintenance contractor inspects these parts of the stormwater network at varying frequencies but typically 4 times yearly for open watercourses and 12 times yearly for inlets and outlets, floodgates and detention dams	Continued Compliance	Continued Compliance
	Work that is considered a priority to clear obstructions reported within the stormwater system is attended to within one working day of receiving notice, 90% of the time	This Level of service is not measured although this is a contractual requirement for the maintenance contractor	Continued Compliance	Continued Compliance
	New primary stormwater systems (comprising a combination of open channels and/ or pipes) are capable of containing a 1 in 20 year storm event	Hydraulic analysis, catchment modeling, flood inspection and catchment planning investigations show that the system is capable of draining 1 in 20 year storm events	Compliance with required Levels of Service	Compliance with required levels of Service
	New secondary stormwater systems are provided to accommodate stormwater flows from a 1 in 50 year storm event so that there is no damage to or nuisance effects on people or property	Hydraulic analysis, catchment modeling, flood inspection and catchment planning investigations show that the system is capable of draining 1 in 50 year storm events	Compliance with required Levels of Service	Compliance with required Levels of Service
	New open channels for major streams are capable of accommodating stormwater flows from a 1 in 100 year storm so that there is no damage to or nuisance effects on people or property.	Hydraulic analysis, catchment modeling, flood inspection and catchment planning investigations show that the system is capable of draining 1 in 100 year storm events	Compliance with required Levels of Service	Compliance with required Levels of Service

<table>
<tr><th>Levels Of Service (what Council will provide)</th><th>We will know we are achieving this when…..</th><th>Current Performance</th><th>Future Performance (by Year 3)</th><th>Future Performance (by Year 10)</th></tr>
<tr>
<td></td>
<td>Existing stormwater systems are capable of containing a 1 in 5 year storm event</td>
<td>
Typical level of service within each stormwater UDA showing percentage of systems capable of coping with specified flood events
<table>
<tr><th>UDA</th><th>1 in 2 Yr Storm</th><th>1 in 5 Yr Storm</th><th>1 in 10 Yr Storm</th></tr>
<tr><td>Richmond</td><td>20%</td><td>50%</td><td>30%</td></tr>
<tr><td>Brightwater</td><td>30%</td><td>50%</td><td>20%</td></tr>
<tr><td>Wakefield</td><td>40%</td><td>40%</td><td>20%</td></tr>
<tr><td>Murchison</td><td>60%</td><td>20%</td><td>20%</td></tr>
<tr><td>St Arnaud</td><td>20%</td><td>60%</td><td>20%</td></tr>
<tr><td>Tapawera</td><td>10%</td><td>40%</td><td>50%</td></tr>
<tr><td>Motueka</td><td>20%</td><td>60%</td><td>20%</td></tr>
<tr><td>Mapua/ Ruby Bay</td><td>10%</td><td>40%</td><td>50%</td></tr>
<tr><td>Tasman</td><td>40%</td><td>40%</td><td>20%</td></tr>
<tr><td>Kaiteriteri</td><td>20%</td><td>60%</td><td>20%</td></tr>
<tr><td>Takaka</td><td>30%</td><td>60%</td><td>10%</td></tr>
<tr><td>Pohara</td><td>60%</td><td>30%</td><td>10%</td></tr>
<tr><td>Ligar Bay/ Tata Beach</td><td>30%</td><td>60%</td><td>10%</td></tr>
<tr><td>Collingwood</td><td>30%</td><td>40%</td><td>30%</td></tr>
<tr><td>Patons Rock</td><td>70%</td><td>20%</td><td>10%</td></tr>
</table>
</td>
<td>Strategic upgrade work is programmed over the next 20 years, which will reduce the areas currently served with a 1 in 5 year level of service</td>
<td>Strategic upgrade work is programmed over the next 20 years, which will reduce the areas currently served with a 1 in 5 year level of service</td>
</tr>
</table>

Levels Of Service (what Council will provide)	We will know we are achieving this when…..	Current Performance	Future Performance (by Year 3)	Future Performance (by Year 10)
3. Our stormwater activities are managed at a level which satisfies the community	Our surveys show that at least 80% of customers are satisfied with the stormwater service they receive	85% satisfaction	85% satisfaction	85% satisfaction
	We receive less than 10 complaints per year regarding health nuisance (noise, smells, mosquitoes, etc...)	This Level of service is not measured but will be for the next AMP review. The recording and measurement of this will be developed over Years 1 and 2 and reportable by end of Year 3.	< 10 complaints (Year 3 only)	< 10 complaints
4. We have measures in place to prevent flood damage to property and risk to the community	We have a customer service facility for receiving and handling emergency calls 24 hours per day, 7 days per week	This is part of Councils emergency management response planning	Maintain current operation	Maintain current operation
	Council's contractor guarantees emergency response times to attend a site in the event of an immediate flooding risk to property, including the deployment of sandbags where required	This is part of Councils emergency management response planning	Maintain current service	Maintain current service
	A response to repair/ reinstate open watercourses from flood damage is completed within 24 hours 90% of the time	This Level of service is not measured although this is a current contractual requirement for the maintenance contractor. The recording and measurement of this will be developed in Years 1 and 2 and reportable by end of Year 3	Response within 24 hours 85% of the time (Year 3 only)	Response within 24 hours 90% of the time

APPENDIX S. COUNCIL'S DATA MANAGEMENT, ASSET MANAGEMENT PROCESSES AND SYSTEMS

This appendix gives an overview of:

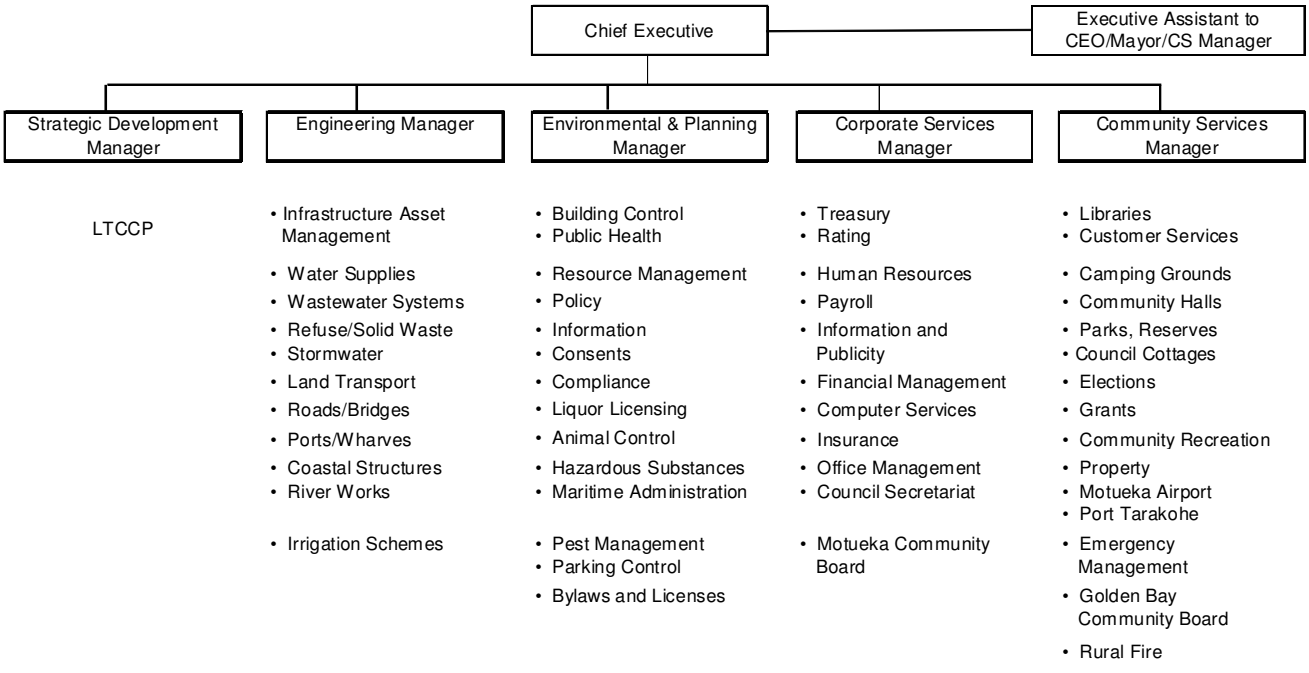
- Council's organisational structure
- How asset data is managed
- What asset management systems and processes are used
- How decisions are made.

S.1 Organisational Structure

The Engineering Manager is principal advisor to the Engineering Services Committee that has delegated powers from the Council. The Engineering Services Committee has responsibility for roads and bridges, footpaths, car parks, water supplies, refuse collection and disposal, wastewater disposal and treatment, stormwater, river works, ports and wharves and aerodromes.

The Tasman District Council organisational structure is shown in Appendix A, Figure A-1. As the chart shows, the asset management function for the stormwater asset management plan falls under the Engineering Manager.

Figure S-1: Tasman District Council Organisation Structure



S.2 Asset Data

The Council's corporate Asset Management System (AMS) is Confirm Enterprise. The Engineering Department uses it to record and track customer enquiries, maintain its asset register, and for tracking non-routine maintenance of assets. Valuations of all assets other than Roading will be done from Confirm.

The Asset Information team, Asset Managers, TDC's consultants and contractors all have access to the system with levels of access appropriate to their needs. Asset information is delivered to the Council via Explore Tasman, TDC's web-based GIS browser application. Performance and operational reports are delivered via a web-based reporting system.

Confirm has links to other core Council applications:

- NCS (Napier Computer System) for property data and water meter details
- Silent One document management system for construction and As-built plans.

A more detailed breakdown of Roading Assets is held in RAMM (Road Asset and Maintenance Management) which is maintained by MWH on behalf of TDC.

Table S-3 summarises the various data sources and how they are managed. It also provides a grading on the data accuracy and completeness where this is appropriate. The accuracy grade is based on the IIMM grading as shown in Table S-1, the completeness grade is based on the grading as shown in Table S-2.

Table S-1: Asset Data Accuracy Grade

Grade	Description	Accuracy Range
1	Accurate	N/A
2	Minor inaccuracies	± 5%
3	50% Data estimated	± 20%
4	Significant Data estimated	± 30%
5	All data estimated	± 40%

Table S-2: Asset Data Completeness Grade

Grade	Description	Accuracy
1	Complete	100%
2	Minor Gaps	90 – 99%
3	Major Gaps	60 – 90%
4	Significant Gaps	20 – 60%
5	Limited Data Available	20% or less

Table S-3: Council Asset Data Types and Confidence

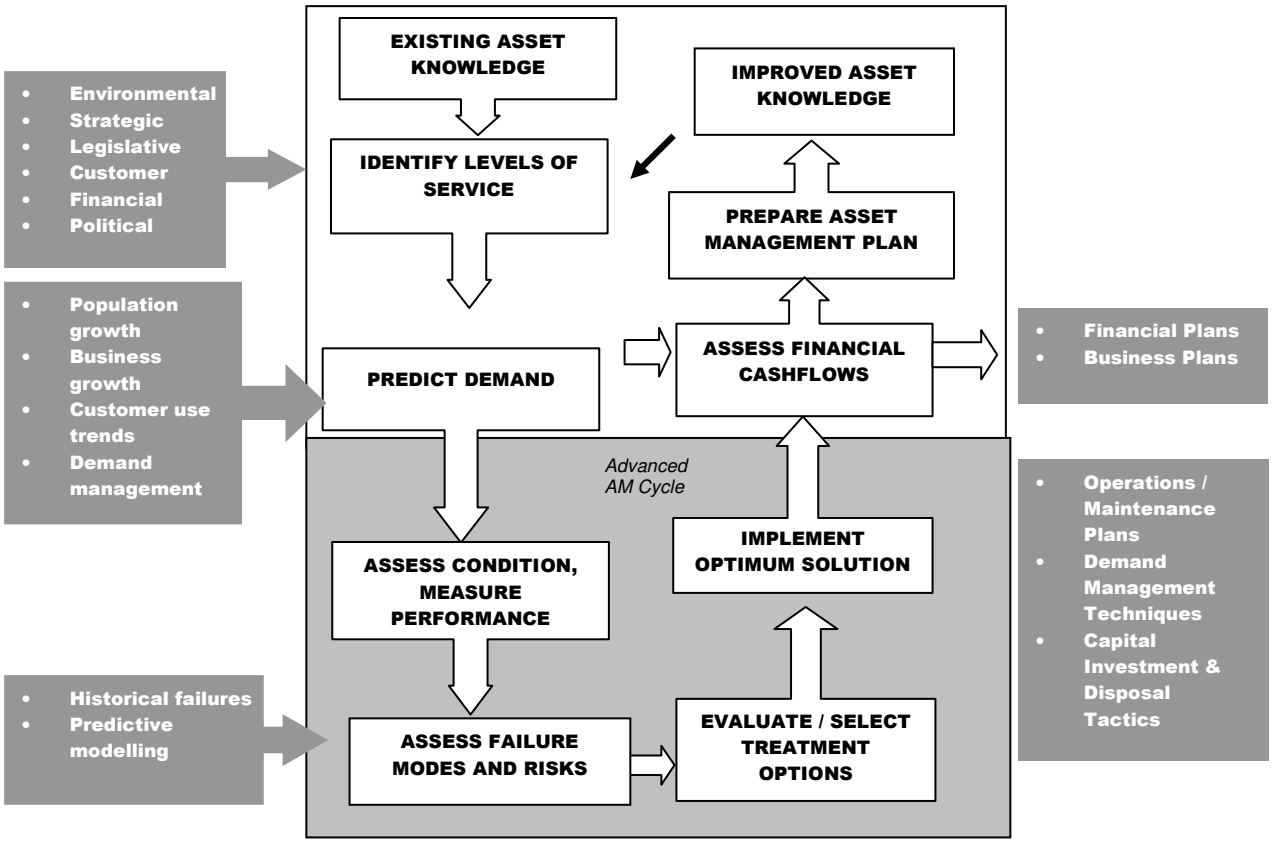
Data Type	Data Storage	Management Strategy	Data Confidence	
			Accuracy	Completeness
Asset location	GIS (line data)	GIS is being compiled from As-built data and is the first port of call for asset location, but not the last word – refer As-builts below.	2	2
	Confirm (point data)	Point data is provided in Confirm	2	2
	As-built Plans	As-builts are the primary source of asset location data. As-built plans of all new assets are scanned and incorporated into SILENTONE. This allows digital retrieval of as-builts from GIS system. Early as-builts are to a lesser quality, however in recent years as-builts quality has been significantly improved and are now prepared to specific standards and reviewed/audited on receipt.	2	2
Asset description (size, age, material)	Confirm	Confirm is the primary source for asset data. The intention is to migrate all data into Confirm eventually.	2	3
	Asset Register	The asset register prepared for valuation purposes contains information on asset extent, age, remaining life, condition etc. It has been spreadsheet based but it is being transferred into Confirm in a controlled manner so that future valuations can be done from Confirm.	2	3
Maintenance History	Confirm	A register of non routine and routine proactive maintenance is kept up to date		
Financial Information	NCS	Council Accounting and Financial systems are based on Napier Computer Systems (NCS) software and GAAP Guidelines. Long term financial decisions are based on the development of 10-year financial plans.	n/a	n/a
Resource Consents	Resource Consent Database	In October 2001, a resource consent register was developed that includes copies of all consents and an Excel spreadsheet that records the expiry details. This register is now being updated and moved into a database, along with the development of management processes to ensure all consent conditions are complied with. This will be developed and administered by the Council's professional services provider.	2	1
	Stormwater Quality	Records of the stormwater quality testing could be stored on a WINZ database system to monitor stormwater quality compliance and assist in identifying trends in data (not currently used but planned for development)	n/a	n/a
Reports	Hard Copy	A variety of investigative and design reports have been prepared and are held by various asset managers as appropriate.	2	2

Data Type	Data Storage	Management Strategy	Data Confidence	
			Accuracy	Completeness
System Records	Silent One System (electronic)	Council paper records are kept in files in the Records Room. These are classified by utility type and area. Files are kept for Roads, Bridges, Utilities and Resource Consents.	2	2

S.3 Asset Management Processes and Systems

The way the Council develops its Asset Management Strategies is in general alignment with the IIMM manual as diagrammatically shown in Figure S-2 below:

Figure S-2: Asset Management Process and Developing Asset Management Strategies (Source IIMM)



The specific processes and systems used are summarised as follows:

Process Step	Processes and Systems
Identify Levels Of Service	• Levels of Service identified taking account of Community Outcomes, Legislative Requirements, Financial constraints (affordability) and knowledge of asset performance. • Reviewed and confirmed on a 3 year basis – when AMP and LTCCP updated
Predict Demand	• Population Forecasting undertaken as described in Section 5 and Appendix F • Demand Forecasting undertaken as described in Section 5 and Appendix F • Demand Management undertaken as described in Section 11 and Appendix N
Assess Condition, Measure Performance	• Council undertook a comprehensive condition assessment of its stormwater assets in a valuation exercise in June 2007. Subsequent valuations have used the pre-existing condition assessment, but reviewing and amending with the asset management knowledge and experience gained through operation of the assets. • This draws from knowledge based on the condition and performance of assets in the form of visual inspections in accordance with maintenance contact requirements.

Process Step	Processes and Systems
	• Going forward an above ground asset condition assessment will be performed by the maintenance contractor on a 3 yearly basis • Performance against levels of service measured through a combination of operational activities, specific technical investigations and customer surveys • NRB Communitrak customer survey run every 3 years

Renewals Management	• Renewals first identified from valuation data base – when remaining life expires
	• Forecast renewals then field justified by reviewing with operations staff and asset management staff to confirm renewal requirements from valuation information and add to where there is specific knowledge of additional renewal requirements
	• Optimising review undertaken to identify opportunities for:
	  ○ "bundling" with other projects – across assets and services – e.g. roading, wastewater, power, telecom
	  ○ Optimized replacement – i.e. whether the replacement asset should be the same size, capacity or manufacture, or are there justifications to replace with something different
	  ○ Smoothing of expenditure
	• On an annual basis renewal work is programmed for implementation and managed as a programme – either through the Operations and Maintenance contract, or through specific tendered construction projects

Asset Creation Management	• Asset creation forecasts are developed every 3 years when updating this AMP.
	• The 10 year forecast from the last update of the AMP is taken as a starting point, and then the outcomes of growth and demand forecasts, level of service and performance review, the risk management and a workshop with asset managers are used to identify upgrade projects needed.
	• All capital projects identified are listed and a cost estimate developed. For consistency, a cost estimating spreadsheet has been developed and a series of base rates developed after consultation with suppliers and recent contract prices for the more common work elements. The cost estimating spreadsheets require:
	  ○ Assessment of construction and non-construction costs (i.e. Engineering, consenting costs, land costs)
	  ○ An assessment of contingency needed – on a consistent basis between estimates
	  ○ An evaluation of the project drivers – increased level of service, backlog, growth or renewal.
	  ○ An evaluation of a programme of implementation – spanning years to ensure appropriate time allowed for developing the project
	  ○ A statement of the scope of the upgrade and a statement of risks and assumptions made in preparing the estimate
	• Once estimated the forecasts are combined in a capital expenditure forecast database that records the outcomes of the estimate in a manner that allows summation of the work value against various criteria – scheme, project driver (growth, backlog, increased LOS or renewal), year or project. It is also used as an input into Council's financial system.
	• The funding of the capital forecast is modelled in Council's financial system NCS, and the implications for the forecast review at Council officer level and Councillor level. Any changes made to the projection in terms of deferring, adding or deleting projects is recorded and the implications on risk, growth or level of service stated.
	• The records of the individual project estimate sheets and the overall capital forecast spreadsheet are filed and retained.

Process Step	Processes and Systems
Risk Assessment and Management	• Council has developed an Integrated Risk Management framework to manage risks – refer to section 13.2 and Appendix Q for description.
Optimised Decision Making	• Hydraulic models of stormwater systems in Richmond and Mapua have been developed. There are plans to complete this for the stormwater system in Motueka. • These models provide knowledge of the network performance of the system and are being used to identify network shortfalls on hydraulic capacity, assess system development options to cater for growth, identify areas at risk from flooding and secondary flow paths, and generally provide improved system knowledge.

APPENDIX T. BYLAWS

There are no specific stormwater bylaws but some stormwater issues are covered in other bylaws such as the Trade Waste Bylaw.

The Council intends to review the need for a stormwater bylaw but has not yet determined if one is necessary. The need for a stormwater bylaw will be driven by Councils programme to make stormwater quality improvements and to control contaminants at source.

APPENDIX U. STAKEHOLDERS AND CONSULTATION

U.1 Consultation

U.1.1. Purpose of Consultation and Types of Consultation

Council consults with the public to gain an understanding of customer expectations and preferences. This enables Council to provide a level of service that better meets the community's needs.

The Council's knowledge of customer expectations and preferences is based on:

- feedback from surveys
- public meetings
- feedback from elected members, advisory groups and working parties,
- analysis of customer service requests and complaints and
- Consultation via the Annual Plan and LTCCP process.

Council commission's customer surveys on a regular basis, usually every 3 years, from the National Research Bureau Ltd[12]. These Communitrak™ surveys assess the levels of satisfaction with key services, including stormwater services, and the willingness across the community to pay to improve services.

Council at times will undertake focussed surveys to get information on specific subjects.

U.1.2. Consultation Outcomes

The most recent NRB Communitrak™ survey was undertaken in June/July 2008. 61% of those surveyed said they were serviced by a Council stormwater system. Of all those residents surveyed (including those who did not have a Council service) 63% were satisfied with the Stormwater service provided. This is summarised and compared against previous survey results in Figure U-2.

Figure U-1: Satisfaction with Stormwater – Overall

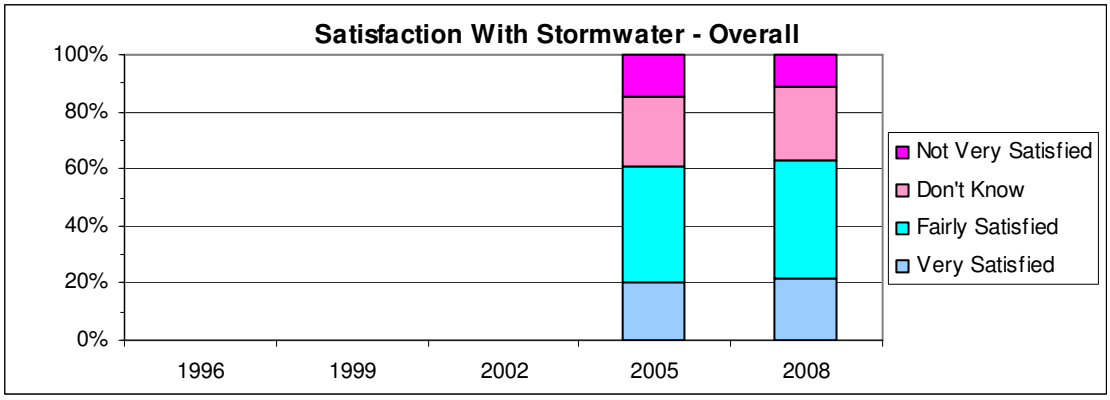
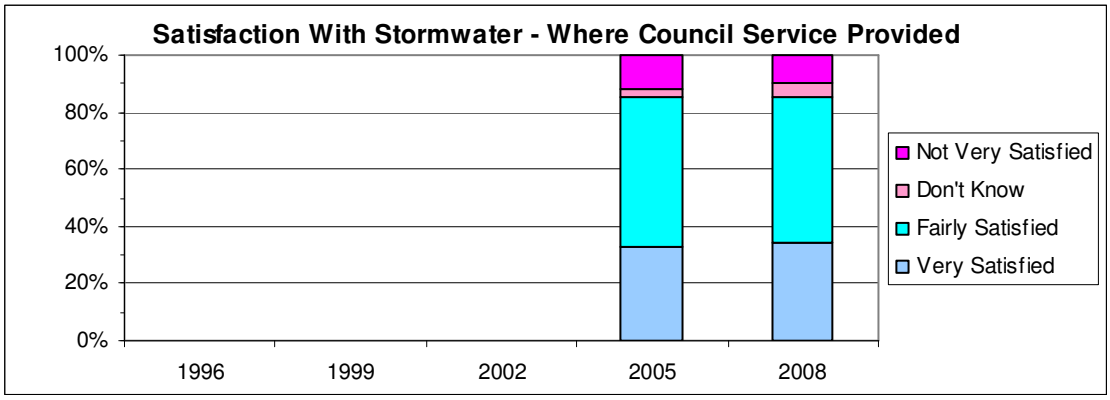


Figure U-1 shows that the number of residents "not very satisfied" has decreased. The overall satisfaction level has increased since 2005 from 61% to 63%. This is slightly greater than Council's Peer Group average (57%) but below the National average (76%).

[12] Communitrak™: Public Perceptions and Interpretations of Council Services / Facilities and Representation, NRB Ltd June/ July 2008.

For the people that are serviced by a Council stormwater system the level of satisfaction is 85%, with no change since 2005, as shown in Figure U-2 below.

Figure U-2: Satisfaction with Stormwater – Council Service Provided



The number of people who are very satisfied has increased up one percent since 2005, to 34%.

The percentage not very satisfied (11%) is below the Peer Group Average and on par with the National Average and the 2005 reading. Per Ward, the percentage not very satisfied varied as follows:

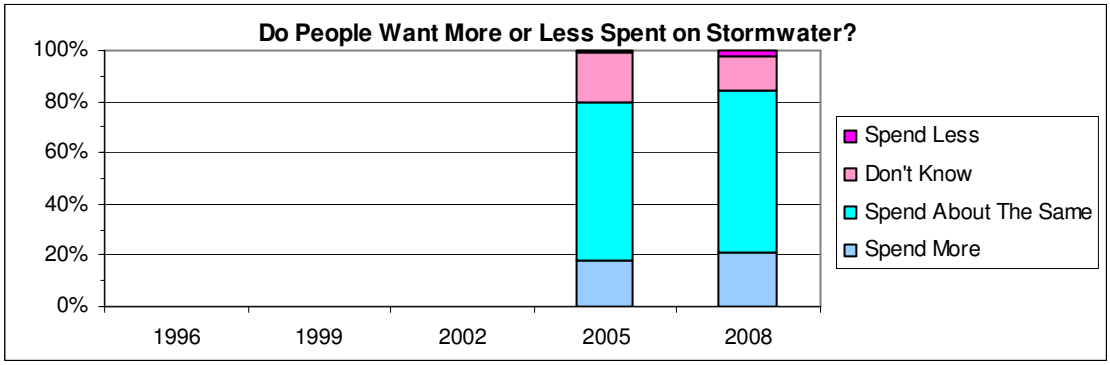
% Not Very Satisfied - by Ward	
Lakes-Murchison	11
Golden Bay	19
Motueka	20
Moutere-Waimea	4
Richmond	8

The 45 residents not very satisfied with stormwater services gave the following main reasons:

- flooding/ surface flooding
- inadequate system/ needs upgrading
- drains/ grates blocked/ needs clearing
- no stormwater service

When asked whether they would like more to be spent, less, or about the same for stormwater service provision, 84% said they would like to see the same or more (given that Council cannot spend more with increasing rates or user charges). This is shown in Figure U-3 and compared to previous results.

Figure U-3: More or Less Spending on Stormwater



This shows that few people want to spend less, and most want to spend the same or more.

Overall, the survey shows that:

- Residents connected to Council stormwater services are satisfied with the service received and are comfortable with the cost relative to the level of service provided
- A small number of people want to spend less on stormwater services
- The percent not very satisfied (11%) is below the Peer Group Average and the National.
- 21% want more spent on Stormwater knowing that this will mean higher charges
- There is a lower level of satisfaction with Councils stormwater service when residents not on a Council scheme are considered.

U.2 Stakeholders

A list of stakeholders is included in Appendix A, Section A.3.

APPENDIX V. STORMWATER SERVICES IMPROVEMENT PROGRAMME

Council plan a number of improvements to Stormwater Services over this new 20 year AMP period.

Since the last AMP review, improvements to service delivery have been made in a number of areas as detailed below in Table V-1. The main areas where improvements have been made are as follows:

- Asset Management System Development
- Policy on Stormwater Asset Ownership and access requirements
- Reviewed Levels of Service, incorporating requirements for stormwater quality improvements
- Incorporated Sustainable Engineering Design into new Design Standards

Table V-1: Improvements completed since the last AMP Review (2005)

Item	Description	Achievement
Integrated Asset Management System	Develop an Asset Management system	The Council has an Asset Management System called Confirm Enterprises. The Engineering department use this to track and record customer enquiries, maintain its asset register, and track non-routine maintenance of assets. Other areas of use are in tracking stormwater asset valuations, beginning to be used as the primary source for asset data. The confirm system also links up with the Silent One As built record database and Council GIS system (Explore Tasman).
Creating a policy on Council ownership of stormwater assets	Define ownership policy of new and existing stormwater assets, in particular for those assets created through sub division development	TDC Policy on stormwater ownership is included in the TDC Engineering Standards 2008
Resource Consents	Review requirements for Resource Consents with TDC Environment and Planning	A review has been completed and two types of consents required have been confirmed, for Detention Dams and Stormwater Discharges respectively, as detailed in Appendix H.
Asset Renewals/ Asset Valuation	Develop database of existing stormwater assets together with estimated life remaining and replacement value	An asset revaluation register/ database has been created, last updated in June 2007
UDA Reviews	Reviewed settlements within Councils district to determine suitability to incorporate into a defined Urban Drainage Area (UDA)	Five settlements were identified as suitable to incorporate into new UDA's. The Council incorporated Pohara, Ligar Bay / Tata Beach, Patton's Rock, Tasman and Tapawera into new UDA's.
Detention Dams	Review policy on ownership and use	The Council has reviewed their responsibility for ownership of stormwater detention dams throughout the district
Level of Service	Update the Levels of Service to reflect current legislation, community outcomes and desires and national practices and standards	Current levels of service have been updated to allow for stormwater quality improvements and increasing the levels of service for storm flow capacities.

Table V-2 below details a number of planned improvements which are proposed to be made to the management of Councils Stormwater Assets, forming the Stormwater Services Improvement Programme.

For each proposed improvement:

- Options have been considered and the listed improvement has been concluded as the best practicable option.
- Costs to implement each improvement have been estimated.
- An indication on the level of priority to complete each initiative/ improvement has been made.
- Financial provisions have been made in the financial forecast if Council has approved a planned improvement item. If Council has not approved the improvement item, no financial provision is made within the Stormwater Budget although the item but is retained on the list.

Table V-2: Planned Improvements

Item	Description	Benefits	Estimated Cost ($)	Priority	Financial Provision in 2008 AMP
AMP Update	Review and update AMP on a 3 year cycle. Next in 2011.	Needed to comply with L.G. Act 2002 requirements.	$55,000 every 3 years.	High	✓
Asset Valuations	Review and update Stormwater Asset Valuations on a 3 year cycle. Next due in 2010.	Needed to comply with L.G. Act 2002 requirements.	$15,000 every 3 years.	High	✓
Risk Management	The Council intends to apply a consistent approach to risk management across all asset groups and will complete a risk assessment at three levels, Organisational, Asset Group and Critical Assets.	Identifies actions/ improvements required to be made to the organisation or operation or provision of Councils assets in order that: • Council's ability to maintain levels of service as a result of organisational change and external physical events is maximised • Council's operational systems are robust.	$30,000 every 3 years.	High	✓
Detention Dam RMA Consents	Review Council's Detention Dams to obtain consents required under the RMA, which may include water diversion consent, water retaining structures consent, or a building consent.	Needed to comply with the requirements of the RMA and TRMP.	$200,000 over 10 years	High	✓
Asset Management System Development	Continuing to develop Council's Asset Management System, 'Confirm Enterprises' and integration with its related asset information systems, GIS, Silent One, etc....	Increasing the use of the Confirm system enables a 'one stop shop' for Asset Management, increasing the understanding of the Council's asset performance and ability to operate and maintain the asset systems.	$20,000 per year	Medium	✗
Asset condition identification	Completion of CCTV surveys to inspect the internal condition of stormwater pipes and also to continue to complete visual checks on the condition of	Council's intention is to incorporate the results of these inspections into the Confirm system and use these to plan for asset replacement and complete the asset	$20,000 per year	Medium	✓

Item	Description	Benefits	Estimated Cost ($)	Priority	Financial Provision in 2008 AMP
	culverts, other stormwater structures, detention dams, etc...	valuation			
Water and Sanitary Service Assessments	Identify areas where the community appear to want a higher level of service through completing a Water & Sanitary Services Assessment every 3 years	Feed into reviewing current levels of service and identifying capital upgrade / renewal projects	$25,000 every 3 years	Medium	✓
Regular Safety Audits	Records available for inspection - contractor's maintenance schedule.	Undertake regular safety audits of stormwater water structures such as intakes and detention dams to identify and rectify safety hazards	n/a	Medium	✓
Public Information on Stormwater system ownership and responsibility	Produce handouts or post information on the website showing a concise summary of Council's ownership of stormwater assets	Clarify on boundaries of ownership and responsibility for maintenance of stormwater assets between the Council and private owners	$15,000	Medium	✗
Stormwater Catchment Management Plans (SCMP) including hydraulic modelling	Hydraulic modelling of stormwater systems is planned to be completed for all Council's major urban areas. Council has already completed hydraulic models of the stormwater systems in Richmond and Mapua. SCMP's look at all stormwater flows within a rainfall drainage catchment and compare against local topography to review flooding risks to properties and wider community.	Increased understanding on flooding risks within drainage catchment to enable better stormwater flow management prioritisation on stormwater system upgrades (which will be used to review/ control impacts from future development)	$200,000	Medium	✓
Stormwater Quality Catchment Management Plans	Complete monitoring programme to identify current environmental values, identify areas for improvement where stormwater quality is poor. Complete SQCMP for the main urban areas starting with Richmond.	Improve/ protect and enhance environmental/ amenity values for receiving waters from Council's stormwater systems and within their open watercourses / drains.	$100,000 per year over 20 years	Medium	✓
Foreshore Study	Monitoring water quality in estuarine environments	Improve/ protect and enhance environmental/ amenity values in estuarine environments	$180,000	Medium	✓

Item	Description	Benefits	Estimated Cost ($)	Priority	Financial Provision in 2008 AMP
Demand Management	Review Council's policy to encourage/ require reductions in stormwater runoff from new and existing developments	Look for opportunities to reduce flows arising from urban development and to reduce the size of stormwater infrastructure required where possible	$20,000	Low	✘
Funding for land drainage improvements outside UDA's	Review methods for funding from Council to upgrade stormwater drainage systems outside UDA's	The way in which land drainage is funded and managed needs to be reviewed as there is difficulty funding any significant work under the current arrangement.	$20,000	Low	✓
Stormwater Bylaws	Review the need for a Stormwater Bylaw	The Council intends to review the need for a stormwater bylaw at a later date, however, at the moment, Councils policy on stormwater is governed by the Proposed Tasman Resource Management Plan (notified 1996) and a number of variations proposed (as discussed in Appendix A).	n/a	Low	✓
Compliance with Levels of Service	Increased monitoring to record compliance with new levels of service	Ensure systems in place to monitor performance on meeting levels of service	$10,000	Low	✘

APPENDIX W. ASSET DISPOSALS

W.1 Asset Disposal Strategy

The Council does not have a formal strategy on asset disposals. When any such assets reach a state where disposal needs to be considered, the Council will treat each case individually.

There are no current, or planned areas of operation that TDC wishes to divest itself of. Asset disposal therefore is a by-product of renewal or upgrade decisions that involve the replacement of assets.

Depending on the nature and value of the assets they are either:

- Made safe and left in place.
- Removed and disposed to landfill.
- Removed and sold.

W.2 Disposal Standards

In all cases asset disposal processes must comply with council's legal obligations under the Local Government Act 1974, which covers:

- public notification procedures required prior to sale
- restrictions on the minimum value recovered
- use of revenue received from asset disposal

W.3 Disposal Schedule

There are currently no stormwater assets programmed for disposal.

APPENDIX X. GLOSSARY OF ASSET MANAGEMENT TERMS

Abbreviations and Acronyms

AMP	Activity Management Plan
LGA	Local Government Act
LTCCP	Long Term Council Community Plan
PS	Pump Station
TRMP	Tasman Regional Management Plan
RMA	Resource Management Act
TDC	Tasman District Council
UDA	Urban Drainage Area
WSSA	Water and Sanitary Services Assessments

Activity	An activity is the work undertaken on an asset or group of assets to achieve a desired outcome.
Activity Management Plan	Activity Management Plans are key strategic documents that describe all aspects of the management of assets and services for an activity. The documents feed information directly in the Council's LTCCP, and place an emphasis on long term financial planning, community consultation, and a clear definition of service levels and performance standards.
Advanced Asset Management	Asset management that employs predictive modelling, risk management and optimised renewal decision-making techniques to establish asset lifecycle treatment options and related long term cash flow predictions. (See Basic Asset Management).
AM Plan	See Activity Management Plan.
Annual plan	The Annual Plan provides a statement of the direction of Council and ensures consistency and co-ordination in both making policies and decisions concerning the use of Council resources. It is a reference document for monitoring and measuring performance for the community as well as the Council itself.
Asset	A physical component of a facility that has value enables services to be provided and has an economic life of greater than 12 months.
Asset Management (AM)	The combination of management, financial, economic, engineering and other practices applied to physical assets with the objective of providing the required level of service in the most cost-effective manner.
Asset Management System (AMS)	A system (usually computerised) for collecting analysing and reporting data on the utilisation, performance, lifecycle management and funding of existing assets.
Asset Management Plan	A plan developed for the management of one or more infrastructure assets that combines multi-disciplinary management techniques (including technical and financial) over the lifecycle of the asset in the most cost-effective manner to provide a specified level of service. A significant component of the plan is a long-term cash flow projection for the activities.

Asset Management Strategy	A strategy for asset management covering, the development and implementation of plans and programmes for asset creation, operation, maintenance, renewal, disposal and performance monitoring to ensure that the desired levels of service and other operational objectives are achieved at optimum cost.
Asset Register	A record of asset information considered worthy of separate identification including inventory, historical, financial, condition, construction, technical and financial information about each.
Basic Asset Management	Asset management which relies primarily on the use of an asset register, maintenance management systems, job/resource management, inventory control, condition assessment and defined levels of service, in order to establish alternative treatment options and long term cashflow predictions. Priorities are usually established on the basis of financial return gained by carrying out the work (rather than risk analysis and optimised renewal decision making).
Benefit Cost Ratio (B/C)	The sum of the present values of all benefits (including residual value, if any) over a specified period, or the life cycle of the asset or facility, divided by the sum of the present value of all costs.
Business Plan	A plan produced by an organisation (or business units within it) which translate the objectives contained in an Annual Plan into detailed work plans for a particular, or range of, business activities. Activities may include marketing, development, operations, management, personnel, technology and financial planning
Capital Expenditure (CAPEX)	Expenditure used to create new assets or to increase the capacity of existing assets beyond their original design capacity or service potential. CAPEX increases the value of an asset.
Condition Monitoring	Continuous or periodic inspection, assessment, measurement and interpretation of resulting data, to indicate the condition of a specific component so as to determine the need for some preventive or remedial action
Critical Assets	Assets for which the financial, business or service level consequences of failure are sufficiently severe to justify proactive inspection and rehabilitation. Critical assets have a lower threshold for action than non-critical assets.
Current Replacement Cost	The cost of replacing the service potential of an existing asset, by reference to some measure of capacity, with an appropriate modern equivalent asset.
Deferred Maintenance	The shortfall in rehabilitation work required to maintain the service potential of an asset.
Demand Management	The active intervention in the market to influence demand for services and assets with forecast consequences, usually to avoid or defer CAPEX expenditure. Demand management is based on the notion that as needs are satisfied expectations rise automatically and almost every action taken to satisfy demand will stimulate further demand.
Depreciated Replacement Cost (DRC)	The replacement cost of an existing asset after deducting an allowance for wear or consumption to reflect the remaining economic life of the existing asset.
Depreciation	The wearing out, consumption or other loss of value of an asset whether arising from use, passing of time or obsolescence through technological and market changes. It is accounted for by the allocation of the historical cost (or revalued amount) of the asset less its residual value over its useful life.

Disposal	Activities necessary to dispose of decommissioned assets.
Economic life	The period from the acquisition of the asset to the time when the asset, while physically able to provide a service, ceases to be the lowest cost alternative to satisfy a particular level of service. The economic life is at the maximum when equal to the physical life however obsolescence will often ensure that the economic life is less than the physical life.
Facility	A complex comprising many assets (e.g. swimming pool complex, etc.) which represents a single management unit for financial, operational, maintenance or other purposes.
Geographic Information System (GIS)	Software which provides a means of spatially viewing, searching, manipulating, and analysing an electronic data-base.
Infrastructure Assets	Stationary systems forming a network and serving whole communities, where the system as a whole is intended to be maintained indefinitely at a particular level of service potential by the continuing replacement and refurbishment of its components. The network may include normally recognised 'ordinary' assets as components.
I.M.S.	Infrastructure Management System - Computer Database
Level of service	The defined service quality for a particular activity (i.e. water) or service area (i.e. Water quality) against which service performance may be measured. Service levels usually relate to quality, quantity, reliability, responsiveness, environmental acceptability and cost.
Life	A measure of the anticipated life of an asset or component; such as time, number of cycles, distance intervals etc.
Life Cycle	Life cycle has two meanings: The cycle of activities that an asset (or facility) goes through while it retains an identity as a particular asset i.e. from planning and design to decommissioning or disposal. The period of time between a selected date and the last year over which the criteria (e.g. costs) relating to a decision or alternative under study will be assessed.
Life Cycle Cost	The total cost of an asset throughout its life including planning, design, construction, acquisition, operation, maintenance, rehabilitation and disposal costs.
Life Cycle Maintenance	All actions necessary for retaining an asset as near as practicable to its original condition, but excluding rehabilitation or renewal.
Long Term Council Community Plan	The Long Term Council Community Plan (LTCCP) is the primary strategic document through which Council communicates its intentions over the next 10 years for meeting community service expectations and how it intends to fund this work. The LTCCP is a key output required of Local Authorities under the Local Government Act 2002.
Long Term Financial Strategy	The Long Term Financial Strategy has been superseded by the Long Term Council Community Plan.
LTCCP	See Long Term Council Community Plan.

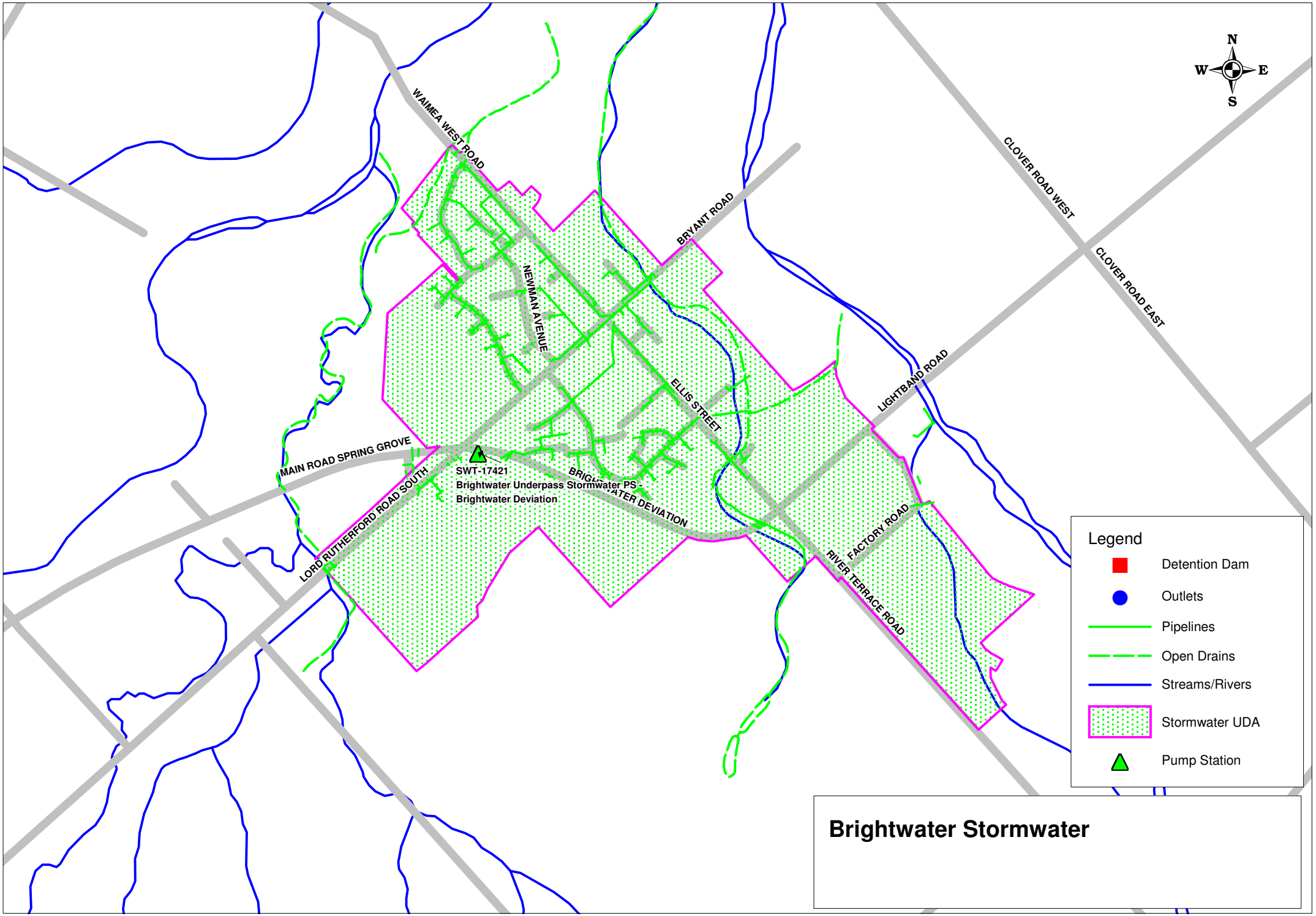
Maintenance Plan	Collated information, policies and procedures for the optimum maintenance of an asset, or group of assets.
Objective	An objective is a general statement of intention relating to a specific output or activity. They are generally longer-term aims and are not necessarily outcomes that managers can control.
Operation	The active process of utilising an asset which will consume resources such as manpower, energy, chemicals and materials. Operation costs are part of the life cycle costs of an asset.
Optimised Renewal Decision Making (ORDM)	An optimisation process for considering and prioritising all options to rectify performance failures of assets. The process encompasses NPV analysis and risk assessment.
Performance Indicator (PI)	A qualitative or quantitative measure of a service or activity used to compare actual performance against a standard or other target. Performance indicators commonly relate to statutory limits, safety, responsiveness, cost, comfort, asset performance, reliability, efficiency, environmental protection and customer satisfaction.
Performance Monitoring	Continuous or periodic quantitative and qualitative assessments of the actual performance compared with specific objectives, targets or standards.
Planned Maintenance	Planned maintenance activities fall into 3 categories : Periodic – necessary to ensure the reliability or sustain the design life of an asset. Predictive – condition monitoring activities used to predict failure. Preventive – maintenance that can be initiated without routine or continuous checking (e.g. using information contained in maintenance manuals or manufacturers' recommendations) and is not condition-based.
Recreation	Means voluntary non-work activities for the attainment of personal and social benefits, including restoration (recreation) and social cohesion.
Rehabilitation	Works to rebuild or replace parts or components of an asset, to restore it to a required functional condition and extend its life, which may incorporate some modification. Generally involves repairing the asset using available techniques and standards to deliver its original level of service without resorting to significant upgrading or replacement.
Renewal	Works to upgrade, refurbish, rehabilitate or replace existing facilities with facilities of equivalent capacity or performance capability.
Renewal Accounting	A method of infrastructure asset accounting which recognises that infrastructure assets are maintained at an agreed service level through regular planned maintenance, rehabilitation and renewal programmes contained in an asset management plan. The system as a whole is maintained in perpetuity and therefore does not need to be depreciated. The relevant rehabilitation and renewal costs are treated as operational rather than capital expenditure and any loss in service potential is recognised as deferred maintenance.
Repair	Action to restore an item to its previous condition after failure or damage.
Replacement	The complete replacement of an asset that has reached the end of its life, so as to provide a similar, or agreed alternative, level of service.

Remaining Economic Life	The time remaining until an asset ceases to provide service level or economic usefulness.
Risk Cost	The assessed annual cost or benefit relating to the consequence of an event. Risk cost equals the costs relating to the event multiplied by the probability of the event occurring.
Risk Management	The application of a formal process to the range of possible values relating to key factors associated with a risk in order to determine the resultant ranges of outcomes and their probability of occurrence.
Routine Maintenance	Day to day operational activities to keep the asset operating (replacement of light bulbs, cleaning of drains, repairing leaks, etc.) and which form part of the annual operating budget, including preventative maintenance.
Service Potential	The total future service capacity of an asset. It is normally determined by reference to the operating capacity and economic life of an asset.
Strategic Plan	Strategic planning involves making decisions about the long term goals and strategies of an organisation. Strategic plans have a strong external focus, cover major portions of the organisation and identify major targets, actions and resource allocations relating to the long term survival, value and growth of the organisation.
Unplanned Maintenance	Corrective work required in the short term to restore an asset to working condition so it can continue to deliver the required service or to maintain its level of security and integrity.
Upgrading	The replacement of an asset or addition/ replacement of an asset component which materially improves the original service potential of the asset.
Valuation	Estimated asset value that may depend on the purpose for which the valuation is required, i.e. replacement value for determining maintenance levels or market value for life cycle costing.

APPENDIX Y. STORMWATER UDA BOUNDARIES

The area boundaries are correct as at July 2008. The boundaries are revised periodically.

The current version is located in the LTCCP.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LIGHTBAND ROAD
MAIN ROAD SPRING GROVE
LORD RUTHERFORD ROAD SOUTH
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Brightwater Underpass Stormwater PS -
Brightwater Deviation
BRIGHTWATER DEVIATION
FACTORY ROAD
RIVER TERRACE ROAD
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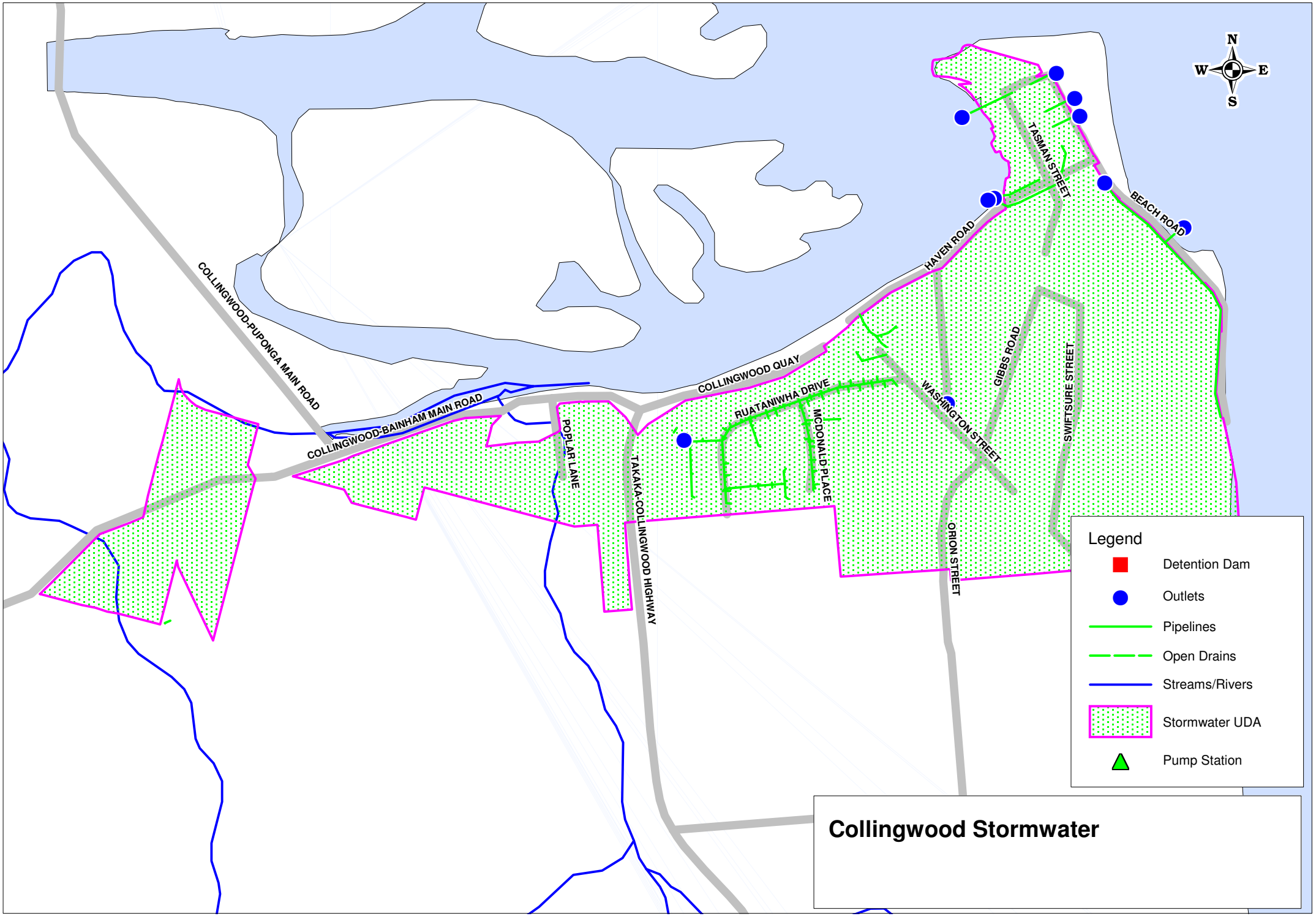
Stormwater UDA
Pump Station
Brightwater Stormwater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HAVEN ROAD
TASMAN STREET
BEACH ROAD
RUATANIWHA DRIVE
MCDONALD PLACE
WASHINGTON STREET
GIBBS ROAD
SWIFTSURE STREET
POPLAR LANE
TAKAKA-COLLINGWOOD HIGHWAY
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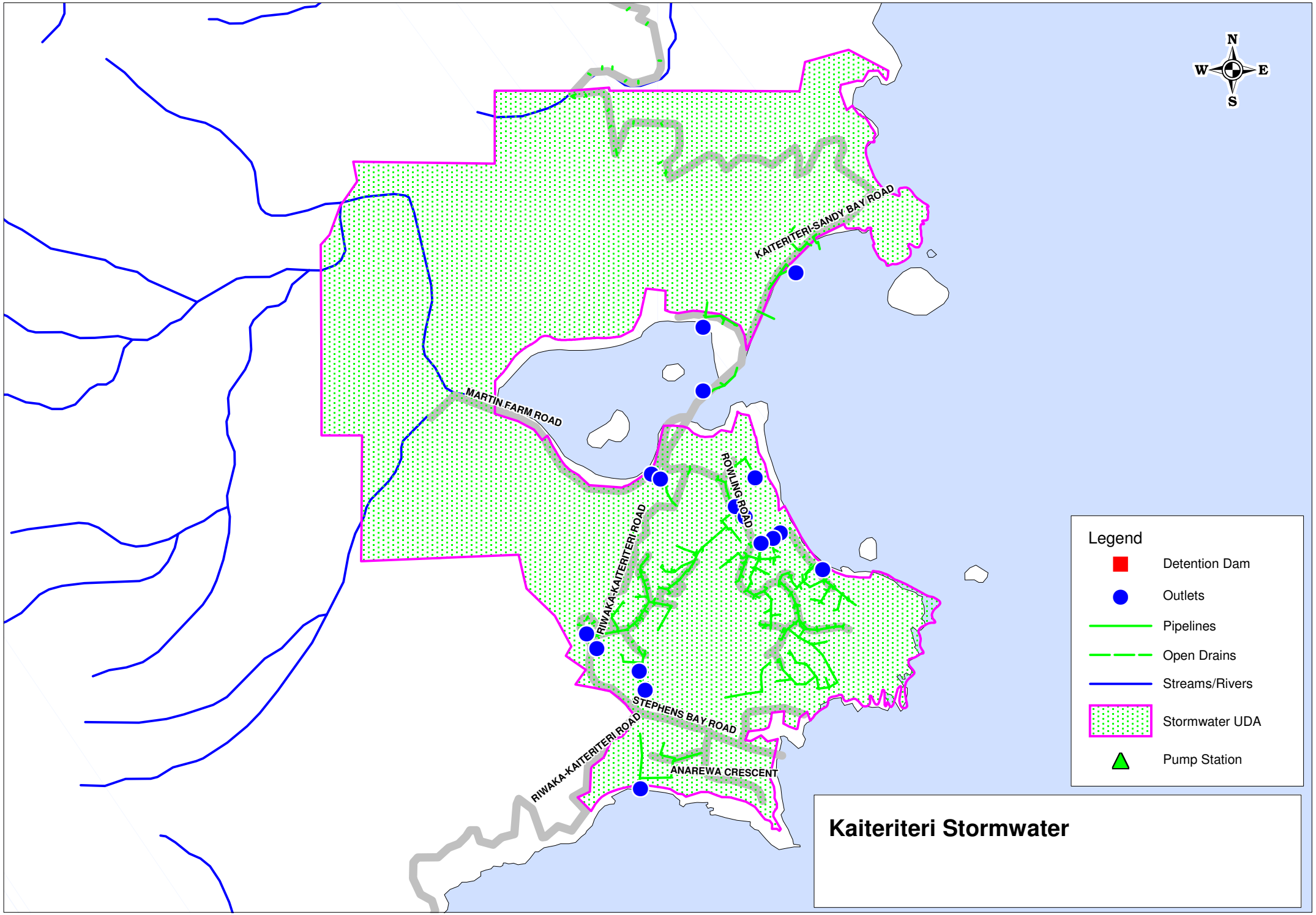
Streams/Rivers
Stormwater UDA
Pump Station
Collingwood Stormwater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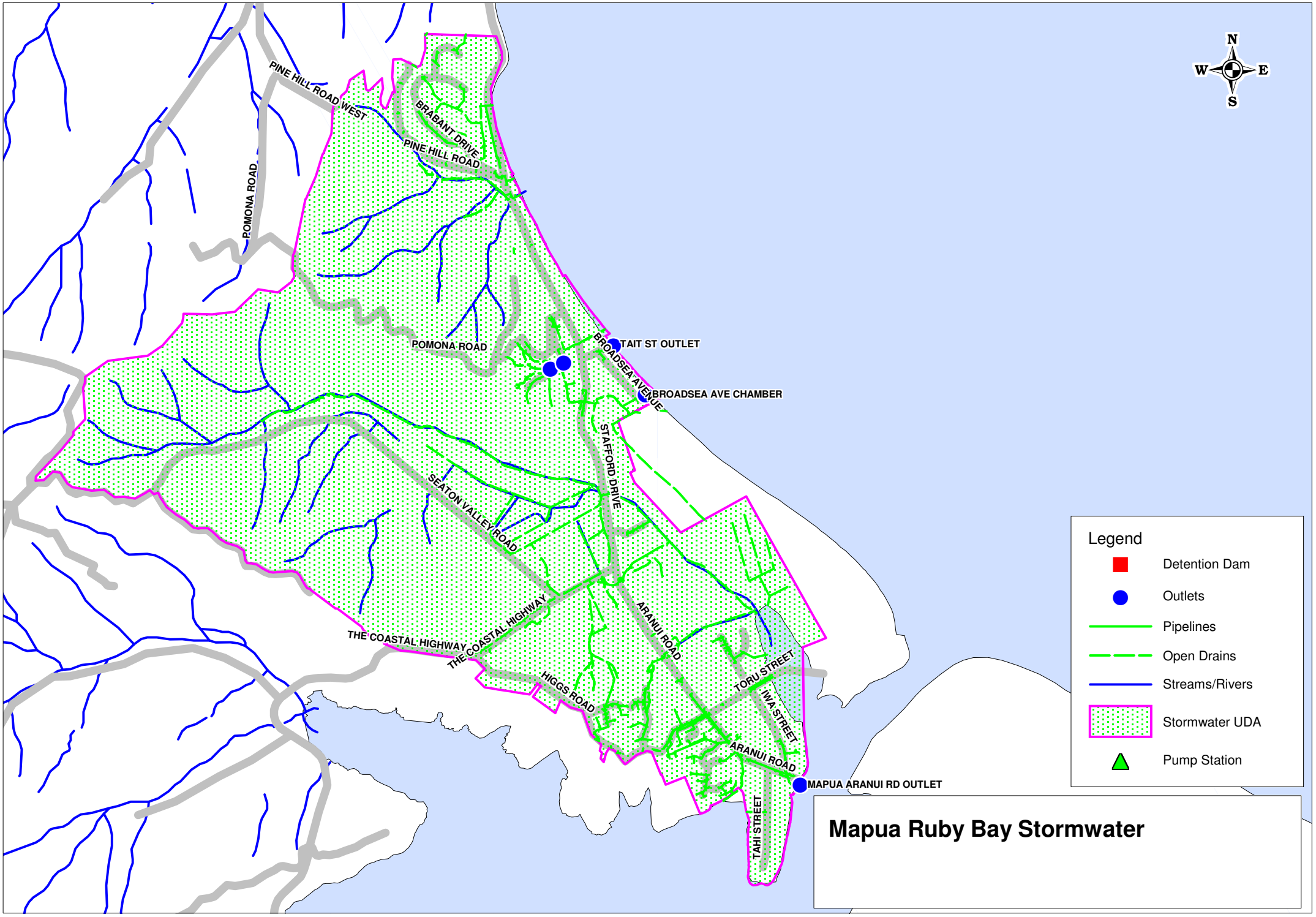
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STAFFORD DRIVE
SEATON VALLEY ROAD
THE COASTAL HIGHWAY
THE COASTAL HIGHWAY
ARANUI ROAD
HIGGS ROAD
TORU STREET
IWA STREET
ARANUI ROAD
MAPUA ARANUI RD OUTLET
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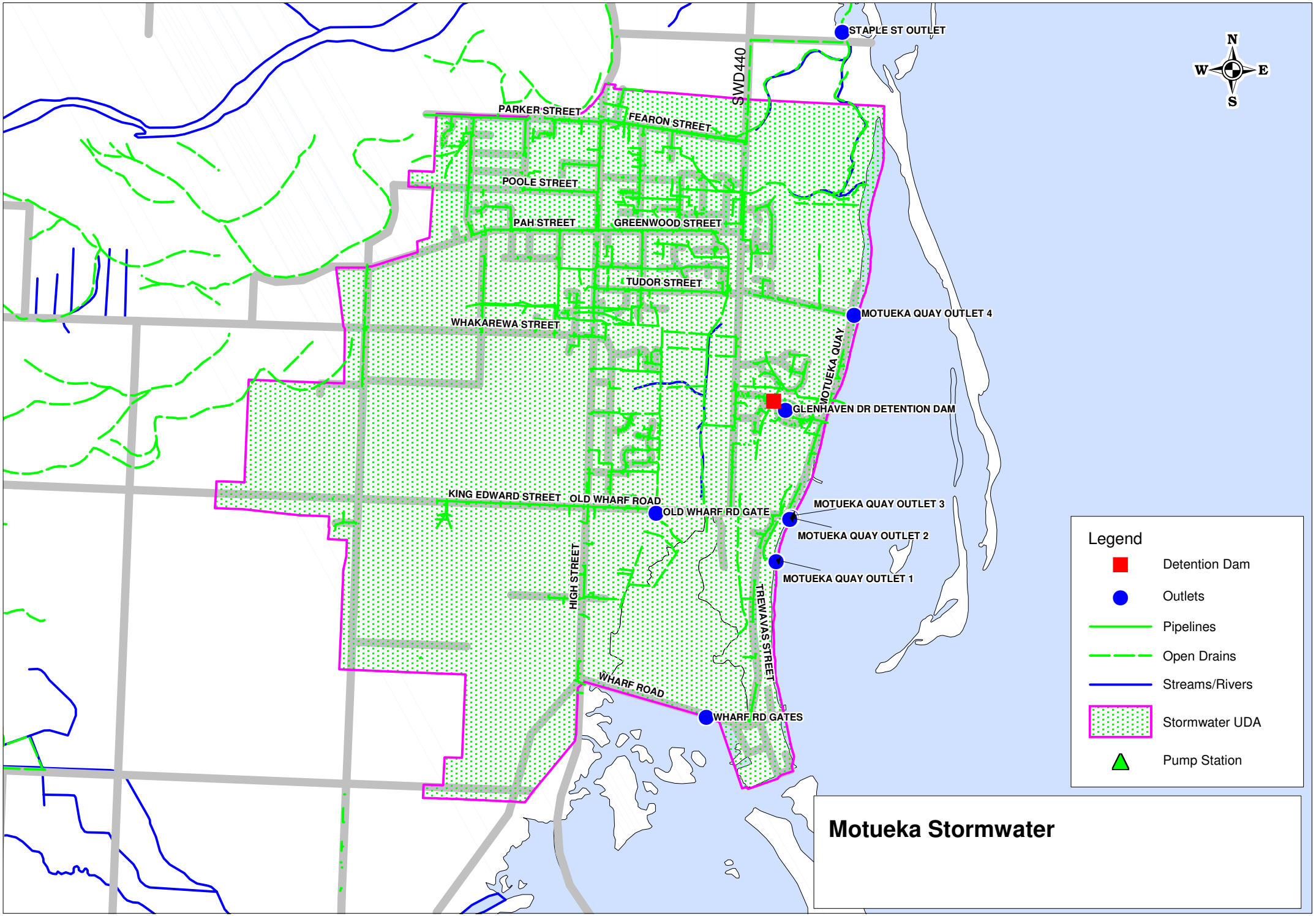
Pump Station
Mapua Ruby Bay Stormwater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WHAKAREWA STREET
MOTUEKA QUAY OUTLET 4
MOTUEKA QUAY
GLENHAVEN DR DETENTION DAM
KING EDWARD STREET
OLD WHARF ROAD
OLD WHARF RD GATE
MOTUEKA QUAY OUTLET 3
MOTUEKA QUAY OUTLET 2
MOTUEKA QUAY OUTLET 1
HIGH STREET
TREWAVAS STREET
WHARF ROAD
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Pump Station
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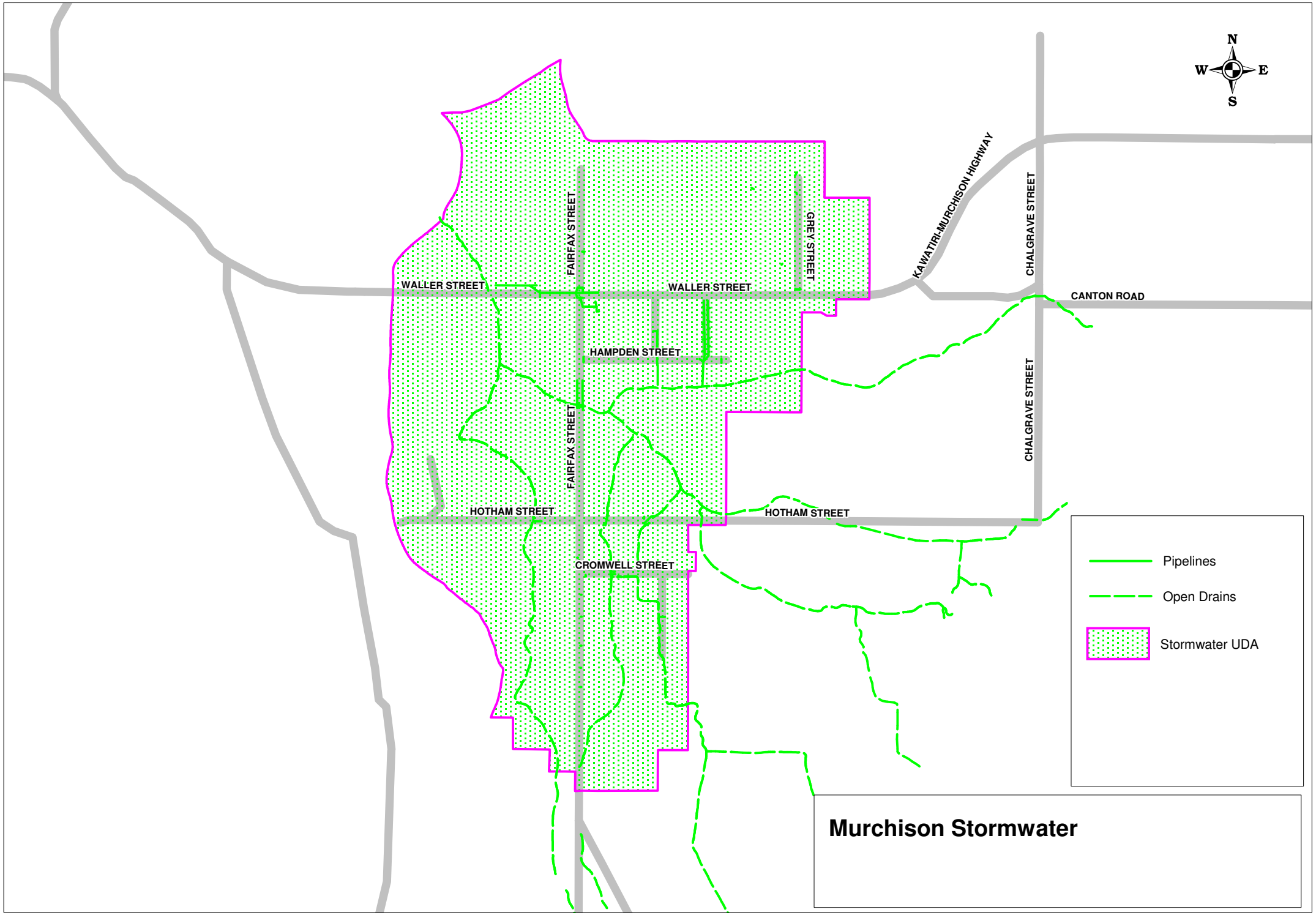
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CANTON ROAD
HAMPDEN STREET
FAIRFAX STREET
CHALGRAVE STREET
HOTHAM STREET
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CROMWELL STREET
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Stormwater UDA
Murchison Stormwater


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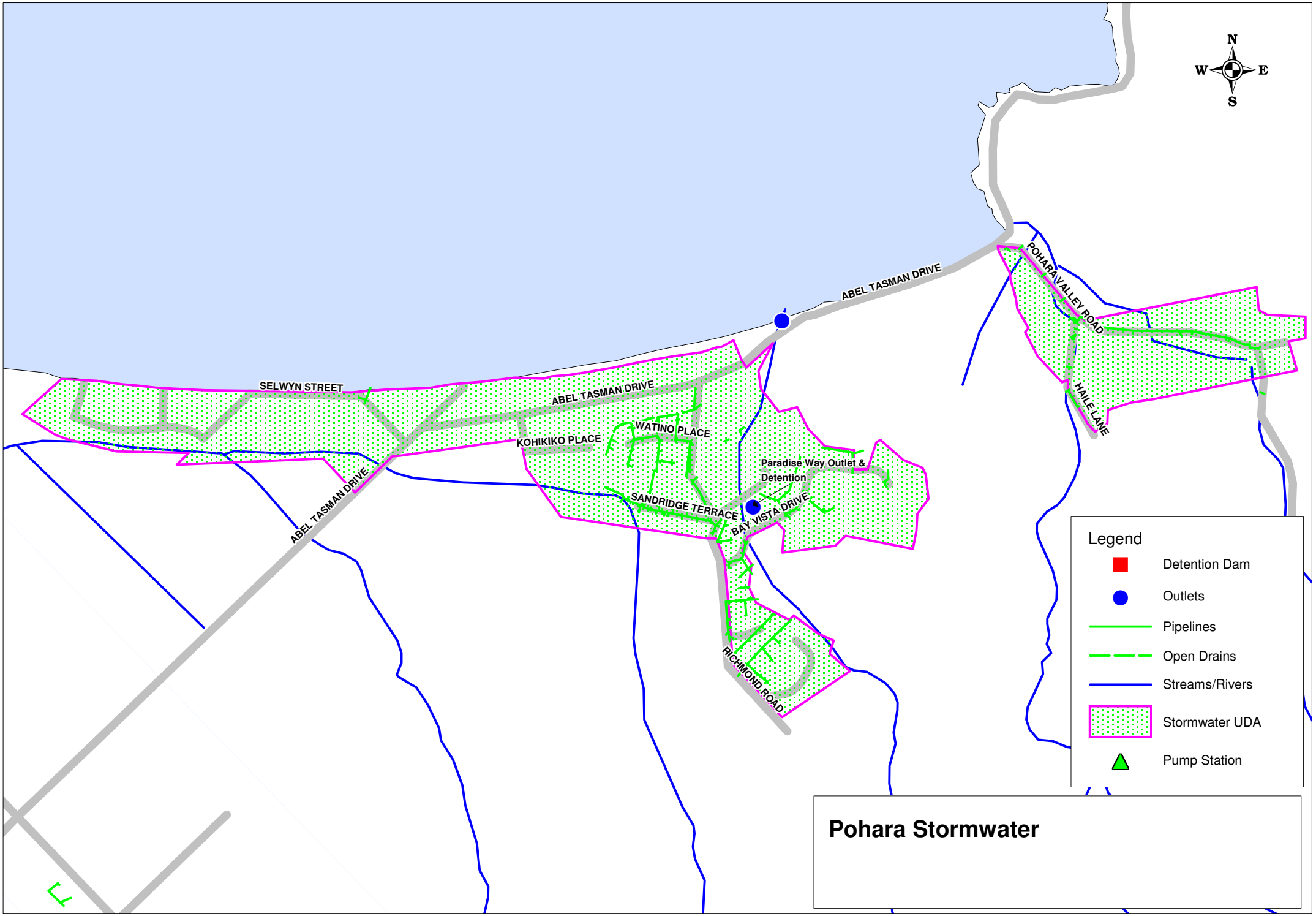
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BAY VISTA DRIVE
ABEL TASMAN DRIVE
POHARA VALLEY ROAD
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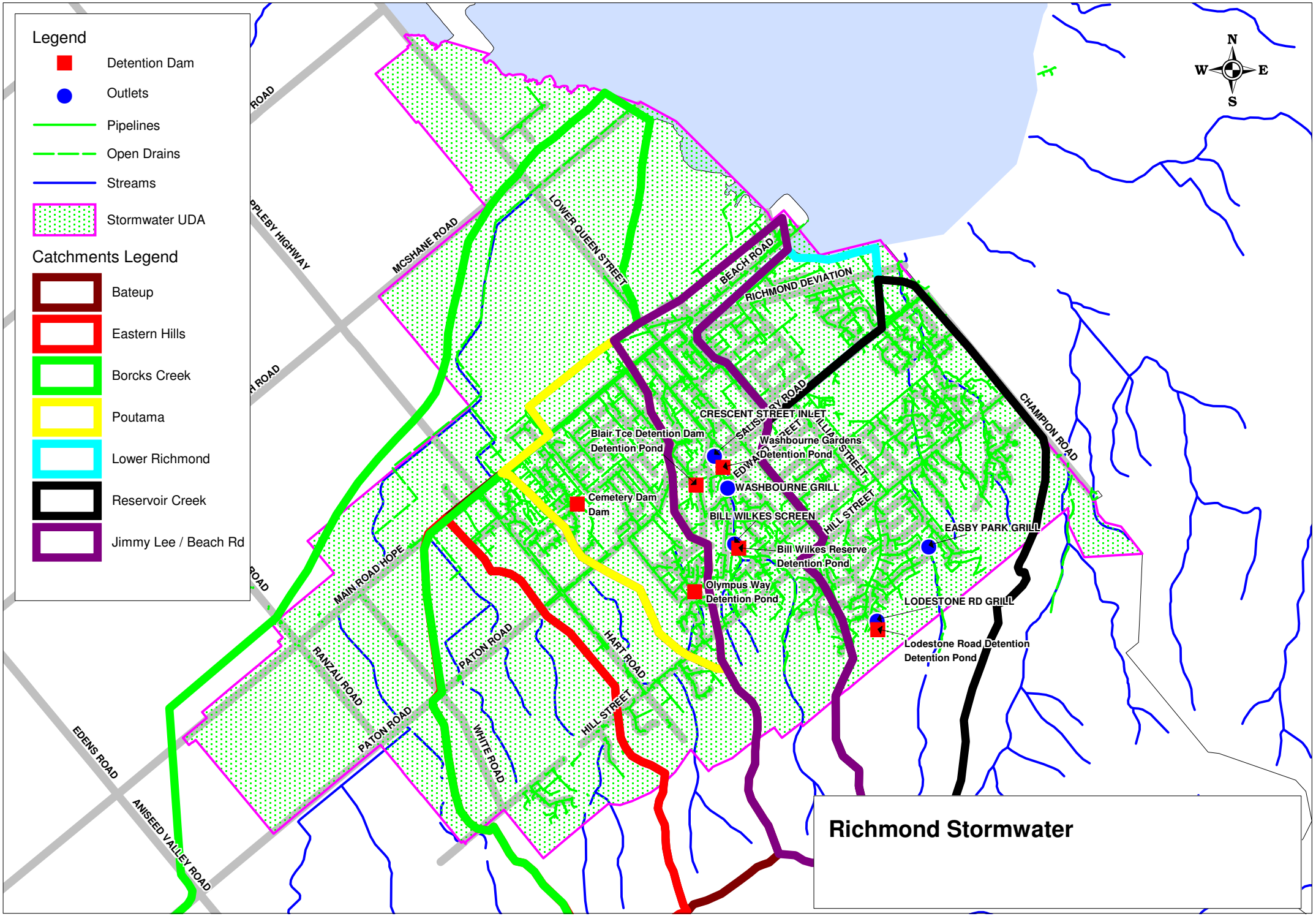
Pump Station
Pohara Stormwater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Lower Richmond
Reservoir Creek
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BEACH ROAD
RICHMOND DEVIATION
CHAMPION ROAD
HILL STREET
MAIN ROAD HOPE
PATON ROAD
RANZAU ROAD
HART ROAD
WHITE ROAD
EDENS ROAD
ANISEED VALLEY ROAD
CRESCENT STREET INLET
Blair Tce Detention Dam
Detention Pond
Washbourne Gardens
Detention Pond
WASHBOURNE GRILL
Cemetery Dam
Dam
BILL WILKES SCREEN
Bill Wilkes Reserve
Detention Pond
EASBY PARK GRILL
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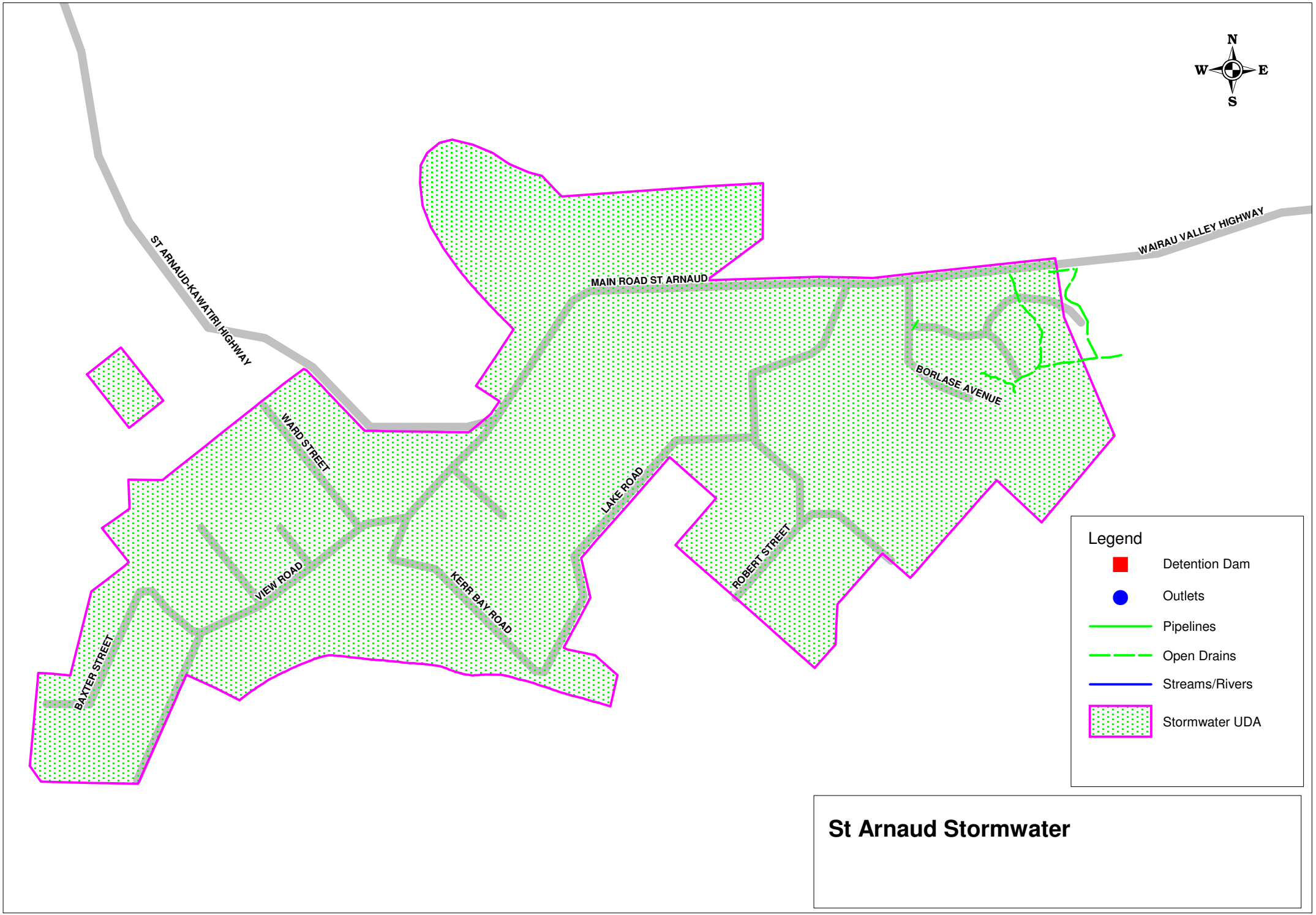
Detention Pond
LODESTONE RD GRILL
Lodestone Road Detention
Detention Pond
Richmond Stormwater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ROBERT STREET
VIEW ROAD
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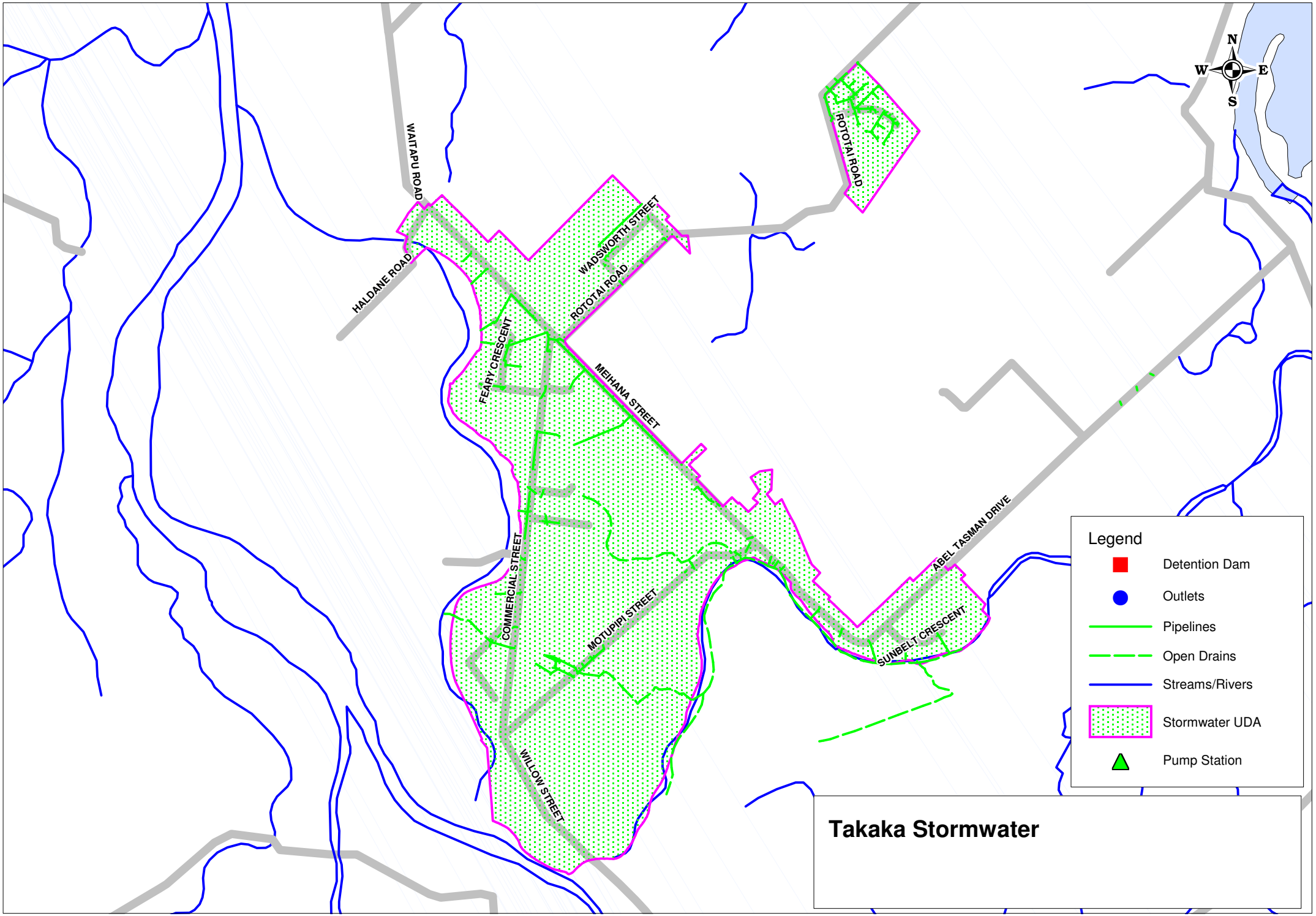
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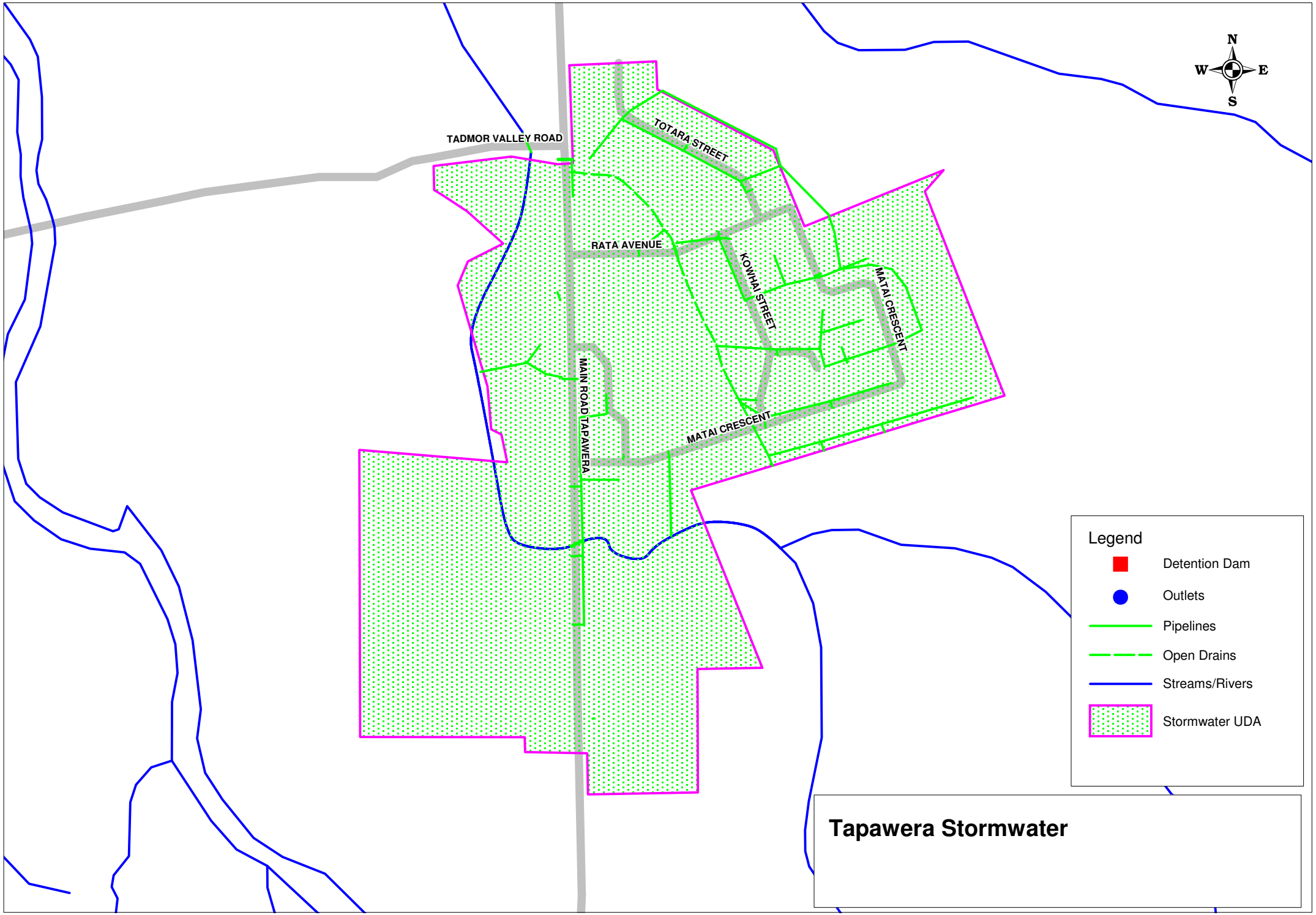
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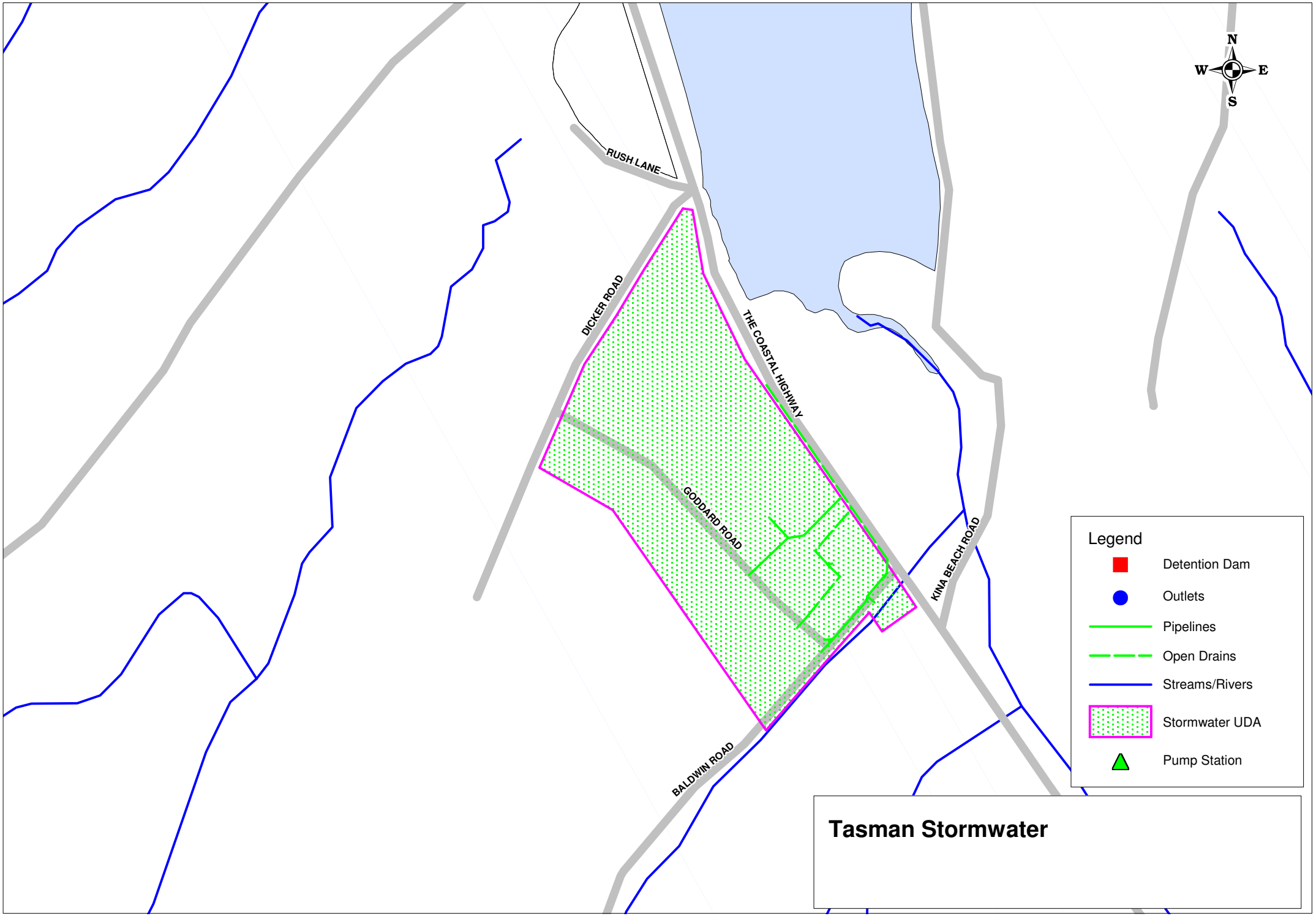
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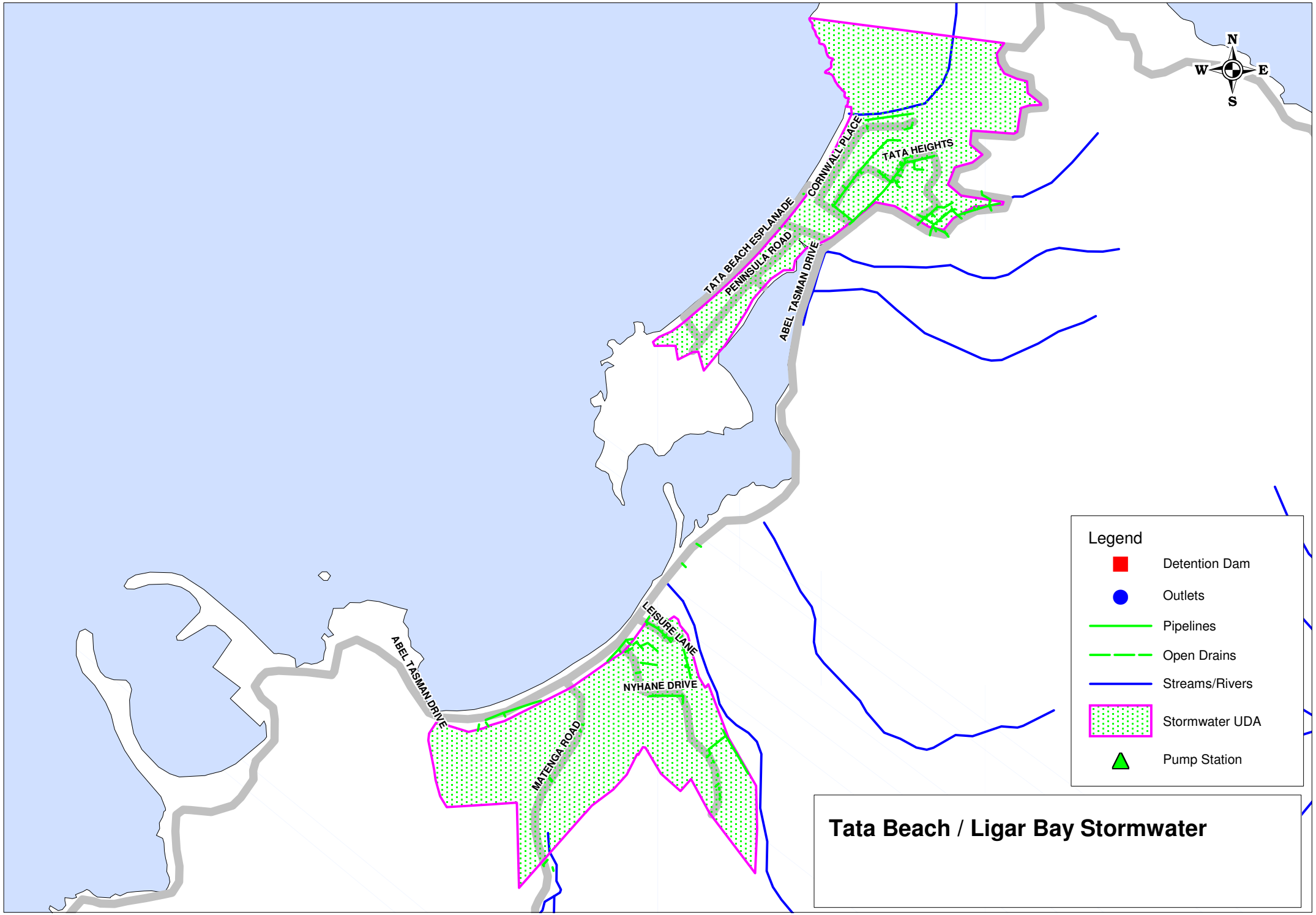
Pump Station
Tasman Stormwater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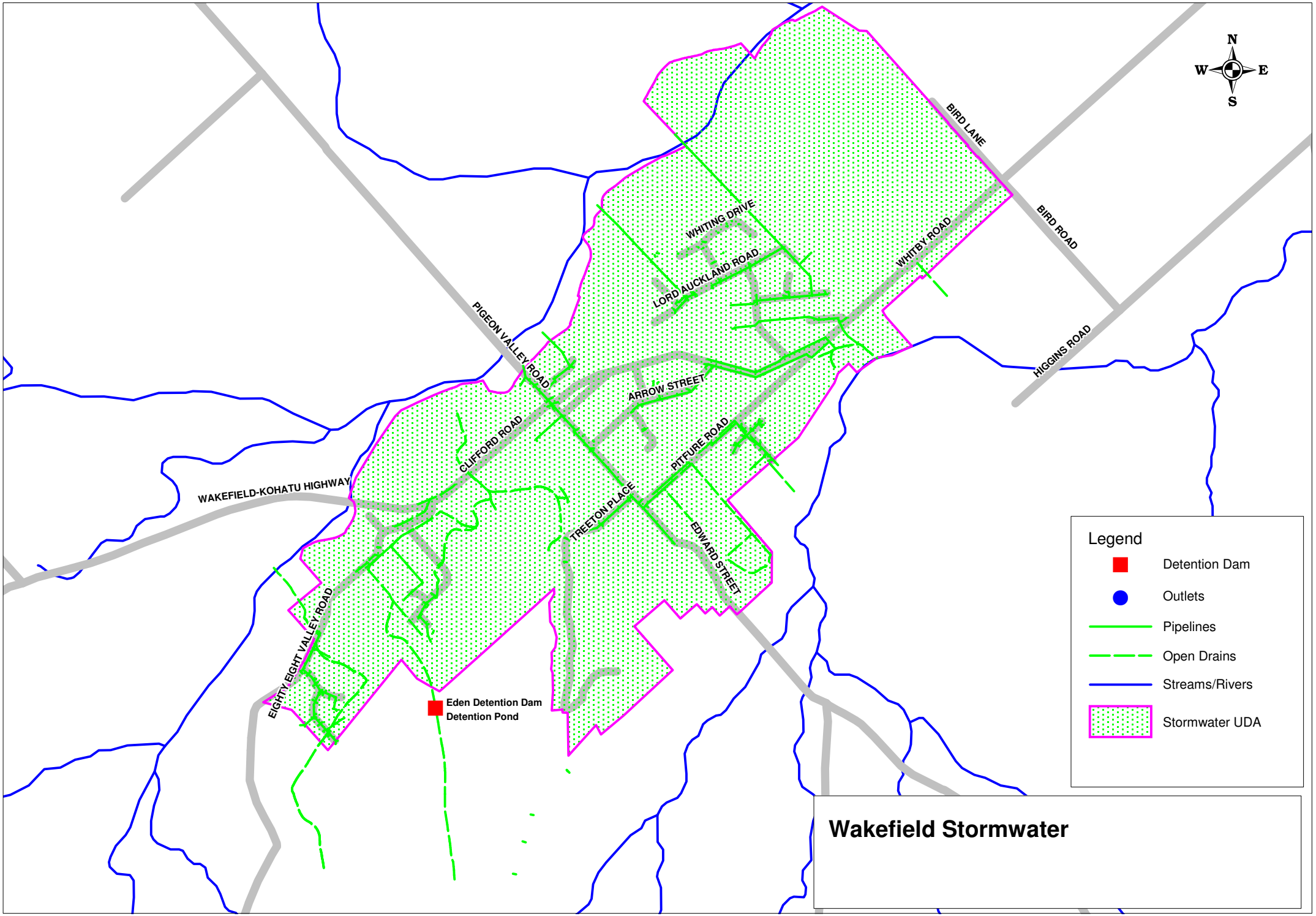
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ARROW STREET
CLIFFORD ROAD
PITFURE ROAD
WAKEFIELD-KOHATU HIGHWAY
TREETON PLACE
EDWARD STREET
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Legend
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Outlets
Pipelines
Open Drains
Streams/Rivers
Stormwater UDA
Wakefield Stormwater

APPENDIX Z. AMP STATUS AND DEVELOPMENT PROCESS – STORMWATER

Z.1 AMP Status

Version	Status	Document Approval	Signature	Date
1	Working Draft			
2	Draft for Council Officer Review	Name: Richard Lester Authority: Project Manager		31/10/08
3	Draft for Council Review	Name: Jeff Cuthbertson Authority: Asset Manager		3/2/09
4	Draft for Public Consultation	Name: Peter Thomson Authority: Engineering Manager		3/2/09
5	Final Plan Adopted by Council Council Resolution	Name: Richard Kempthorne Authority: Mayor Reference: CN09/10/15		7/10/09

Z.2 AMP Development Process

Project Sponsor:	Peter Thomson
Asset Manager:	Jeff Cuthbertson
Project Manager:	Richard Lester
AMP Author:	Sebastian Head
Project Team:	Jeff Cuthbertson, David Stephenson, Paul Barratt, Gary Beaumont – Operations and Maintenance

Z.3 Quality Plan

This quality plan comprises 3 parts:

1. Quality Requirements and Issues – identification of the quality standards required and the quality issues that might arise.
2. Quality Assurance – the planned approach to ensure quality requirements are pro-actively met – i.e. get it right first time
3. Quality Control – the monitoring of the project implementation to ensure quality outcomes are met.

Z.4 Quality Requirements and Issues

	Issues and Requirements	Description
1	Fitness For Purpose	The AMP has to be "fit for purpose". It has to comply with Audit NZ expectations of what an AMP should be to provide them the confidence that the Council is adequately managing the Council activities.
2	AMP Document Consistency	TDC want a high level of consistency between AMPs so that a reader can comfortably switch between plans.
3	AMP Document Format	The documents need to be prepared to a consistent and robust format so that the electronic documents are not corrupted (as happens to large documents that have been put together with a lot of cutting and pasting) and can be made available digitally over internet.
4	AMP Text Accuracy and Currentness	The AMPs are large and include a lot of detail. Errors or outdated statements reduce confidence in the document. The AMPs need to be updated to current information and statistics.
5	AMP readability	The AMPs in their current form have duplication – where text is repeated in the "front" section and the Appendices. This needs to be rationalised so that the front section is slim and readable and the Appendix contains the detail without unnecessary duplication.
6	Completeness of Required Upgrades/Expenditure elements	The capital expenditure forecasts and the operations and maintenance forecasts need to be complete. All projects and cost elements need to be included.
7	Accuracy of Cost Estimates	Cost estimates need to be as accurate as the data and present knowledge allows, consistently prepared and decisions made about timing of implementation, drivers for the project and level of accuracy the estimate is prepared to.
8	Correctness Of Spreadsheet Templates	The templates prepared for use need to be correct and fit for purpose.
9	Assumptions and Uncertainties	Assumptions and uncertainties need to be explicitly stated on the estimates.
10	Changes made after submission to Financial Model	If Council makes decisions on expenditure after they have been submitted into financial model, the implications of the decisions must be reflected in the financial information and other relevant places in the AMP – e.g. Levels of service and performance measures, improvement plans etc.
11	Improvement Plan Adequate	Improvements identified, costed, planned and financially provided for in financial forecasts

Z.4.1. Quality Assurance

	Issues and Requirements	Quality Assurance Approach	Responsible Person
1	Fitness For Purpose	Conduct various reviews of critical elements up front and plan to up upgrade the plans to specific requirements: 1. Scoping of AMP Upgrade Project 2. Review Of Levels Of Service 3. Review of Document Upgrade Needs	Richard Lester
		Conduct a Peer Review	Peter Thomson
2 3 4	AMP Document Consistency AMP Document Format AMP readability	Review documents in advance and prepare instructions to authors on how to upgrade	Becky Marsay
		Central Review Of AMP document deliverables	Becky Marsay
5	AMP Text Accuracy and Currentness	Authors to review each AMP in detail	Seb Head
6	Completeness of Required Upgrades/Expenditure elements	AMP Authors to workshop with relevant project team members to ensure all projects/cost elements covered	Seb Head
		Central list of issues (called a "Parking Lot") that need to be considered in each AMP	Becky Marsay
7	Accuracy of Cost Estimates	Independent Review of all cost estimates	James Tomkinson
8	Correctness Of Spreadsheet Templates	Independent Review of all templates	Richard Lester
9	Assumptions and Uncertainties and Risk Assessments	Independent Review of all cost estimates	James Tomkinson/ Denis O'Brien
10	Changes made after submission to Financial Model	Protocol prepared to ensure Quickplace is used and all parties follow instructions on how changes are made	Becky Marsay
		Ensure there is a place in the AMP documents to record any changes made and the implications of changes	Richard Lester
		AMP Authors to manage a change log for changes after submission	Seb Head
11	Improvement Plan Adequate	Prepare template in advance to ensure consistent approach	Richard Lester
		Central Review Of Improvement Plans	Richard Lester

Z.4.2. Quality Control

Quality Control Checks and Reviews are scheduled on the attached Tables. These shall be progressively completed as the AMP is developed and incorporated in the final AMP Plan in Appendix Z.

Check or Review	Person Responsible	Authority	Signature	Date
Scope Of AMP Upgrade Project Complete	Peter Thomson	Engineering Manager		9/12/08
Levels Of Service prepared to Instructions	Richard Lester	Project Manager		9/12/08
Levels Of Service Asset Manager Acceptance	Jeff Cuthbertson	Asset Manager		9/12/08
AMP Document prepared to instructions	Becky Marsay	Assistant PM		9/12/08
AMP Text Accuracy and Currentness	Seb Head	AMP Author		30/11/9
Capital Upgrade List Complete	Denis O'Brien	Programme Manager		8/12/08
Capital Upgrade List Complete - Asset Manager Acceptance	Jeff Cuthbertson	Asset Manager		9/12/08
All Issues on "Parking Lot" addressed	Seb Head	AMP Author		23/9/8
Capex Expenditure Spreadsheet Template Reviewed	Richard Lester	Project Manager		9/12/08
Project Estimate Spreadsheet Template Reviewed	Denis O'Brien	Programme Manager		23.9
All Capex Estimates Reviewed and including assessment of Programme, Project Drivers, Levels of Accuracy and assumptions/uncertainty	Seb Head	AMP Author		23/9/8
Opex Costs Spreadsheet Arithmetic Review	Seb Head	AMP Author		18/11/8
Opex Cost forecast – fitness for purpose	Jeff Cuthbertson	Asset Manager		9/12/08
Improvement Plan Prepared to instructions	Richard Lester	Project Manager		9/12/08
Improvement Plan Asset Manager Acceptance	Jeff Cuthbertson	Asset Manager		9/12/08

Check or Review	Person Responsible	Authority	Signature	Date
Capital Forecast Accepted for Input to NCS	Jeff Cuthbertson	Asset Manager		9/12/08
Change log complete and changes appropriately dealt with – after Council review	Seb Head	AMP Author		15/1/9
Change log complete and changes appropriately dealt with – after Public consultation	Jeff Cuthbertson	Asset Manager		7/10/09
Peer Review Completed	Peter Thomson	Engineering Manager		3/2/09