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# ABBREVIATIONS

<table>
<thead>
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<th>Description</th>
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<tr>
<td>AAAC</td>
<td>Average annual asset consumption</td>
</tr>
<tr>
<td>ACC</td>
<td>Adelaide City Council</td>
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<td>ARI</td>
<td>Average recurrence interval</td>
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<tr>
<td>BOD</td>
<td>Biochemical (biological) oxygen demand</td>
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<td>CRC</td>
<td>Current replacement cost</td>
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<td>CWMS</td>
<td>Community wastewater management systems</td>
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<tr>
<td>DA</td>
<td>Depreciable amount</td>
</tr>
<tr>
<td>DoH</td>
<td>Department of Health</td>
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<tr>
<td>EF</td>
<td>Earthworks/formation</td>
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<td>IAMP</td>
<td>Infrastructure and asset management plan</td>
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<td>IRMP</td>
<td>Infrastructure risk management plan</td>
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<td>GPT</td>
<td>Gross Pollutant Trap</td>
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<td>MMS</td>
<td>Maintenance management system</td>
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<td>PCI</td>
<td>Pavement condition index</td>
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<td>RV</td>
<td>Residual value</td>
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<tr>
<td>SS</td>
<td>Suspended solids</td>
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<tr>
<td>vph</td>
<td>Vehicles per hour</td>
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<td>WSUD</td>
<td>Water Sensitive Urban Design</td>
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GLOSSARY

**Annual service cost (ASC)**
An estimate of the cost that would be tendered, per annum, if tenders were called for the supply of a service to a performance specification for a fixed term. The Annual Service Cost includes operating, maintenance, depreciation, finance/ opportunity and disposal costs, less revenue.

**Asset class**
Grouping of assets of a similar nature and use in an entity's operations (AASB 166.37).

**Asset condition assessment**
The process of continuous or periodic inspection, assessment, measurement and interpretation of the resultant data to indicate the condition of a specific asset so as to determine the need for some preventative or remedial action.

**Asset management**
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.

**Assets**
Future economic benefits controlled by the entity as a result of past transactions or other past events (AAS27.12).

Property, plant and equipment including infrastructure and other assets (such as furniture and fittings) with benefits expected to last more than 12 month.

**Average annual asset consumption (AAAC)**
The amount of a local government's asset base consumed during a year. This may be calculated by dividing the Depreciable Amount (DA) by the Useful Life and totalled for each and every asset OR by dividing the Fair Value (Depreciated Replacement Cost) by the Remaining Life and totalled for each and every asset in an asset category or class.

**Brownfield asset values**
Asset (re)valuation values based on the cost to replace the asset including demolition and restoration costs.

**Capital expansion expenditure**
Expenditure that extends an existing asset, at the same standard as is currently enjoyed by residents, to a new group of users. It is discretionary expenditure, which increases future operating, and maintenance costs, because it increases council's asset base, but may be associated with additional revenue from the new user group, eg, extending a drainage or road network, the provision of an oval or park in a new suburb for new residents.

**Capital expenditure**
Relatively large (material) expenditure, which has benefits, expected to last for more than 12 months. Capital expenditure includes renewal, expansion and upgrade. Where capital projects involve a combination of renewal, expansion and/or upgrade expenditures, the total project cost needs to be allocated accordingly.

**Capital funding**
Funding to pay for capital expenditure.

**Capital grants**
Monies received generally tied to the specific projects for which they are granted, which are often upgrade and/or expansion or new investment proposals.

**Capital investment expenditure**
See capital expenditure definition

**Capital new expenditure**
Expenditure which creates a new asset providing a new service to the community that did not exist beforehand. As it increases service potential it may impact revenue and will increase future operating and maintenance expenditure.

**Capital renewal expenditure**
Expenditure on an existing asset, which returns the service potential or the life of the asset up to that which it had originally. It is periodically required expenditure, relatively large (material) in value compared with the value of the components or sub-components of the asset being renewed. As it reinstates existing service potential, it has no impact on revenue, but may reduce future operating and maintenance expenditure if completed at the optimum time, eg, resurfacing or resheeting a material part of a road network, replacing a material section of a drainage network with pipes of the same capacity, resurfacing an oval. Where capital projects...
involve a combination of renewal, expansion and/or upgrade expenditures, the total project cost needs to be allocated accordingly.

**Capital upgrade expenditure**

Expenditure, which enhances an existing asset to provide a higher level of service or expenditure that will increase the life of the asset beyond that which it had originally. Upgrade expenditure is discretionary and often does not result in additional revenue unless direct user charges apply. It will increase operating and maintenance expenditure in the future because of the increase in the council's asset base, eg. widening the sealed area of an existing road, replacing drainage pipes with pipes of a greater capacity, enlarging a grandstand at a sporting facility. Where capital projects involve a combination of renewal, expansion and/or upgrade expenditures, the total project cost needs to be allocated accordingly.

**Carrying amount**

The amount at which an asset is recognised after deducting any accumulated depreciation / amortisation and accumulated impairment losses thereon.

**Class of assets**

See asset class definition

**Component**

An individual part of an asset which contributes to the composition of the whole and can be separated from or attached to an asset or a system.

**Cost of an asset**

The amount of cash or cash equivalents paid or the fair value of the consideration given to acquire an asset at the time of its acquisition or construction, plus any costs necessary to place the asset into service. This includes one-off design and project management costs.

**Current replacement cost (CRC)**

The cost the entity would incur to acquire the asset on the reporting date. The cost is measured by reference to the lowest cost at which the gross future economic benefits could be obtained in the normal course of business or the minimum it would cost, to replace the existing asset with a technologically modern equivalent new asset (not a second hand one) with the same economic benefits (gross service potential) allowing for any differences in the quantity and quality of output and in operating costs.

**Current replacement cost “As New” (CRC)**

The current cost of replacing the original service potential of an existing asset, with a similar modern equivalent asset, i.e. the total cost of replacing an existing asset with an as NEW or similar asset expressed in current dollar values.

**Cyclic Maintenance**

Replacement of higher value components/sub-components of assets that is undertaken on a regular cycle including repainting, building roof replacement, cycle, replacement of air conditioning equipment, etc. This work generally falls below the capital/maintenance threshold and needs to be identified in a specific maintenance budget allocation.

**Depreciable amount**

The cost of an asset, or other amount substituted for its cost, less its residual value (AASB 116.6)

**Depreciated replacement cost (DRC)**

The current replacement cost (CRC) of an asset less, where applicable, accumulated depreciation calculated on the basis of such cost to reflect the already consumed or expired future economic benefits of the asset.

**Depreciation / amortisation**

The systematic allocation of the depreciable amount (service potential) of an asset over its useful life.

**Economic life**

See useful life definition.

**Expenditure**

The spending of money on goods and services. Expenditure includes recurrent and capital.

**Fair value**

The amount for which an asset could be exchanged, or a liability settled, between knowledgeable, willing parties, in an arms length transaction.

**Greenfield asset values**

Asset (re)valuation values based on the cost to initially acquire the asset.

**Heritage asset**

An asset with historic, artistic, scientific, technological, geographical or environmental qualities that is held and maintained principally for its contribution to knowledge and culture and this purpose is central to the objectives of the entity holding it.
Impairment Loss

The amount by which the carrying amount of an asset exceeds its recoverable amount.

Infrastructure assets

Physical assets of the entity or of another entity that contribute to meeting the public's need for access to major economic and social facilities and services, eg. roads, drainage, footpaths and cycleways. These are typically large, interconnected networks or portfolios of composite assets. The components of these assets may be separately maintained, renewed or replaced individually so that the required level and standard of service from the network of assets is continuously sustained. Generally the components and hence the assets have long lives. They are fixed in place and are often have no market value.

Investment property

Property held to earn rentals or for capital appreciation or both, rather than for:

(a) use in the production or supply of goods or services or for administrative purposes; or

(b) sale in the ordinary course of business (AASB 140.5)

Level of service

The defined service quality for a particular service against which service performance may be measured. Service levels usually relate to quality, quantity, reliability, responsiveness, environmental, acceptability and cost).

Loans / borrowings

Loans result in funds being received which are then repaid over a period of time with interest (an additional cost). Their primary benefit is in spreading the burden of capital expenditure over time. Although loans enable works to be completed sooner, they are only ultimately cost effective where the capital works funded (generally renewals) result in operating and maintenance cost savings, which are greater than the cost of the loan (interest and charges).

Maintenance and renewal gap

Difference between estimated budgets and projected expenditures for maintenance and renewal of assets, totalled over a defined time (eg 5, 10 and 15 years).

Maintenance and renewal sustainability index

Ratio of estimated budget to projected expenditure for maintenance and renewal of assets over a defined time (eg 5, 10 and 15 years).

Maintenance expenditure

Recurrent expenditure, which is periodically or regularly required as part of the anticipated schedule of works required to ensure that the asset achieves its useful life and provides the required level of service. It is expenditure, which was anticipated in determining the asset's useful life.

Materiality

An item is material is its omission or misstatement could influence the economic decisions of users taken on the basis of the financial report. Materiality depends on the size and nature of the omission or misstatement judged in the surrounding circumstances.

Modern equivalent asset.

A structure similar to an existing structure and having the equivalent productive capacity, which could be built using modern materials, techniques and design. Replacement cost is the basis used to estimate the cost of constructing a modern equivalent asset.

Non-revenue generating investments

Investments for the provision of goods and services to sustain or improve services to the community that are not expected to generate any savings or revenue to the Council, eg. parks and playgrounds, footpaths, roads and bridges, libraries, etc.

Operating expenditure

Recurrent expenditure, which is continuously required excluding maintenance and depreciation, eg power, fuel, staff, plant equipment, on-costs and overheads.

Pavement management system

A systematic process for measuring and predicting the condition of road pavements and wearing surfaces over time and recommending corrective actions.

Planned Maintenance**

Repair work that is identified and managed through a maintenance management system (MMS). MMS activities include inspection, assessing the condition against failure/breakdown criteria/experience, prioritising scheduling, actioning the work and reporting what was done to develop a maintenance history and improve maintenance and service delivery performance.

PMS Score
A measure of condition of a road segment determined from a Pavement Management System.

**Rate of annual asset consumption***

A measure of average annual consumption of assets (AAAC) expressed as a percentage of the depreciable amount (AAAC/DA). Depreciation may be used for AAAC.

**Rate of annual asset renewal***

A measure of the rate at which assets are being renewed per annum expressed as a percentage of depreciable amount (capital renewal expenditure/DA).

**Rate of annual asset upgrade***

A measure of the rate at which assets are being upgraded and expanded per annum expressed as a percentage of depreciable amount (capital upgrade/expansion expenditure/DA).

**Reactive maintenance**

Unplanned repair work that carried out in response to service requests and management/supervisory directions.

**Recoverable amount**

The higher of an asset's fair value less costs to sell and its value in use.

**Recurrent expenditure**

Relatively small (immaterial) expenditure or that which has benefits expected to last less than 12 months. Recurrent expenditure includes operating and maintenance expenditure.

**Recurrent funding**

Funding to pay for recurrent expenditure.

**Rehabilitation**

See capital renewal expenditure definition above.

**Remaining life**

The time remaining until an asset ceases to provide the required service level or economic usefulness. Age plus remaining life is economic life.

**Renewal**

See capital renewal expenditure definition above.

**Residual value**

The net amount which an entity expects to obtain for an asset at the end of its useful life after deducting the expected costs of disposal.

**Revenue generating investments**

Investments for the provision of goods and services to sustain or improve services to the community that are expected to generate some savings or revenue to offset operating costs, eg public halls and theatres, childcare centres, sporting and recreation facilities, tourist information centres, etc.

**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.

**Section or segment**

A self-contained part or piece of an infrastructure asset.

**Service potential**

The capacity to provide goods and services in accordance with the entity's objectives, whether those objectives are the generation of net cash inflows or the provision of goods and services of a particular volume and quantity to the beneficiaries thereof.

**Service potential remaining***

A measure of the remaining life of assets expressed as a percentage of economic life. It is also a measure of the percentage of the asset's potential to provide services that is still available for use in providing services (DRC/DA).

**Strategic Management Plan (SA)**

Documents Council objectives for a specified period (3-5 yrs), the principle activities to achieve the objectives, the means by which that will be carried out, estimated income and expenditure, measures to assess performance and how rating policy relates to the Council's objectives and activities.

**Sub-component**

Smaller individual parts that make up a component part.

**Useful life**

Either:
(a) the period over which an asset is expected to be available for use by an entity, or

(b) the number of production or similar units expected to be obtained from the asset by the entity.

It is estimated or expected time between placing the asset into service and removing it from service, or the estimated period of time over which the future economic benefits embodied in a depreciable asset, are expected to be consumed by the council. It is the same as the economic life.

**Value in Use**

The present value of estimated future cash flows expected to arise from the continuing use of an asset and from its disposal at the end of its useful life. It is deemed to be depreciated replacement cost (DRC) for those assets whose future economic benefits are not primarily dependent on the asset's ability to generate new cash flows, where if deprived of the asset its future economic benefits would be replaced.

Source: DVC 2006, Glossary

Note: Items shown * modified to use DA instead of CRC

Additional glossary items shown **
EXECUTIVE SUMMARY

Overview
This Infrastructure and Asset Management plan focuses on the management of the City of Adelaide’s Torrens Lake assets and stormwater drainage network. This plan specifies the life cycle requirements for effective management, inspection and replacement of this asset group and outlines the financial implications and standards to be adhered to. This plan is intended to demonstrate how Council will achieve this outcome by applying the principles of responsible Asset Management Planning, the object of which is to:

‘Deliver the required level of service to existing and future customers in the most cost effective way’

Council plans to operate and maintain the existing Torrens and stormwater drainage network to achieve the following strategic objectives.

- Ensure the Torrens and stormwater network contributes to the strategic objectives of residential, student, worker and visitor growth by providing the required drainage services.
- Ensure the Torrens and stormwater network is maintained at a safe and functional standard as set out in this infrastructure and asset management plan.
- Ensure the Torrens and stormwater network renewal program is sufficient to provide the required levels of service and that this profile is linked to other asset renewal profiles (roads, footpaths etc) to minimise impact on surrounding assets and the community at large.

The contribution of Torrens and stormwater services towards the strategic goals and asset management objectives will be achieved by:

- Ongoing stakeholder consultation to establish and confirm service standards.
- Implementing a program of inspections and monitoring activities to assess asset condition and performance.
- Identifying operational, maintenance, renewal and upgrade requirements and applying economic analysis to establish the most cost effective works programs.
- Ensuring services are delivered at the right price and quality.
- Continuously reviewing and improving the quality of Asset Management practices and updating the Infrastructure and Asset Management Plan as a result.

What Council Provides
Council provides a stormwater network that contributes to the strategic objectives of residential, student, worker and visitor growth by providing the required drainage services. The network comprises stormwater mains, stormwater inlet pits and pipes, stormwater manholes, stormwater nodes, stormwater channels, stormwater storage basins and gross pollutant traps. The network includes the River Torrens and Torrens Lake infrastructure of weirs, bank protection, mixers, boat ramps and boat landings.

What does it Cost?
The current stormwater drainage network has a replacement value of $67.8 Million, a written down value of $35.1 Million and an average remaining life 62.2% of expected life at the 2007 revaluation. The Torrens Lake assets have a replacement value of $14.9 Million, a written down value of $7.23 Million and an average remaining life of 63.2 % of expected life at the 2007 revaluation.

The total lifecycle cost of the Torrens and stormwater drainage asset category is $1,136,300 per year. This is the averaged annual level of spend required to ensure all assets are maintained in accordance to current standards and renewed at the end of their useful life. Actual annual expenditure requirements will differ from year to year as specific assets come up for renewal. The actual annual budget’s for stormwater expenditure will be based on these renewal profile figures and will not always compare favourably to the averaged annual figure. (i.e. in Council’s 2007/2008 budget, expenditure on the stormwater network renewal was approximately $300,000).

Levels of Service
This plan is focused on clarifying and defining key elements of service for stormwater assets and then identifying and costing future operations, maintenance, renewal and upgrade works required to meet these levels of service. The key target levels of service are presented below. This is the first step towards confirming the levels of service required by Australian Standards and expected by the community. The next step is to monitor relevant performance measures and undertake consultation with the community to confirm that these service levels are expected and relevant.

Asset Base
Existing Assets
The City of Adelaide currently has a fully developed Torrens and drainage network with little requirement for the construction of new assets. The pipe network is relatively young and has been largely developed since 1915. The
pipe network consists predominantly of durable reinforced concrete pipes.

The River Torrens and Torrens Lake weirs, landings, boat ramps and bank protection are established assets with the lake water mixers being more recent additions.

Condition and Renewal Needs
Generally, the assets are in good condition and with an expected life of 100 years for drainage assets, weirs and bank protection, 50 years for boat ramps and landings and 12 years for water mixers with only a minimal need for renewal over the next 10 years. The Torrens No 1 weir has recently undergone major refurbishment. Funding in addition to that required for renewal may be required to enable pipe renewals to be completed in conjunction with major streetscape works or major upgrades (eg. North Terrace, Grote Street). Any requirement for additional renewal expenditure will be reviewed on an annual basis in conjunction with the Annual Business Plan and Budget process.

Demand Projections
Growth
The City of Adelaide is fully developed and has a fully developed stormwater and drainage network designed to contain stormwater runoff from 90% impervious development. As a result while it is expected that the density of development within the CBD will increase, it is expected that this growth will have minimal impact on the ability of the existing stormwater network to meet the required levels of service. In deed, future detention and reuse of stormwater will likely reduce demands on Councils Stormwater Infrastructure.

Additional Demand
In order to maintain the desired level of service, it may be necessary to augment various parts of the stormwater network to reduce flooding risks. Stormwater network modelling will identify these risks and may influence future revisions of this plan however at this stage this work has not been completed and hence is not a consideration within the plan. There is increasing demand for high water quality in the Torrens Lake and this trend is reflected in the enhancement program with projects such as the bio-filtration trial.

Increase in Levels of Service
Community consultation on desired levels of service will be undertaken as part of the improvement process for this Infrastructure and Asset Management Plan. If community consultation indicates that the current levels of service are inadequate, there may be a need to upgrade the network in order to meet these new requirements. These outcomes may influence future revisions of this plan. It is anticipated that there will be requirement for new assets that improve stormwater discharge quality and Torrens Lake water quality.

Financial Projections
Operation and Maintenance Trends
This plan does not recommend any increase or decrease in operational expenditure. It is recommended that the maintenance plan is improved to ensure maintenance practices align with service levels.

Renewal Expectations
As the Torrens Lake and stormwater assets are relatively young in comparison to their expected lives, the renewal expenditure is low over the next 10 years.

10-Year Expenditure Forecast
In order to meet the renewal and operational needs of the stormwater asset group to provide the required levels of service the total annual expenditure required is estimated to vary between $160,000 and $1.82 Million per year over the next 10 years.

Conclusion
The main driver of this plan is to determine the ongoing expenditure required to manage the stormwater drainage network to provide appropriate levels of service for the Community of Adelaide. The expenditure has been determined using all existing information regarding the asset base, its condition and expected service delivery.

This plan is the first step towards an overall integrated management program for the City of Adelaide’s stormwater assets. It is anticipated that this document will be live and be updated annually as part of the Business Plan and Budget Process of Council. The plan improvements and actions resulting from this initial asset management plan include:

• Integrating this plan with other asset groups to provide an overall integrated renewal plan in line with current financial policy.

• Developing a rolling 3 year programs for the Adelaide City Council Annual Business Plan and Budget process.

• Providing financial forecasts to be incorporated into the Long Term Financial Plan

• Continuing to refine and improve this plan, specifically:
  • Improving the quality and volume of asset data through targeted data collection programs.
• Engaging the Community to verify the required levels of service for drainage assets.

• Continuing to understand industry standards and innovations with regards to stormwater drainage.
1 INTRODUCTION

1.1 Background to Plan

The format of this plan is based on the Local Government Association Infrastructure and Asset Management Plan template provided by the LGA in 2007 with the plan content based on the outdated Stormwater Drainage Total Asset Management Plan produced by Adelaide City Council in 1998. This plan has been developed in 2007 by Adelaide City Council and uses improved asset management calculations and techniques to update the previous information held within the 1998 plan.

Adelaide City's stormwater network has been a major investment by the community over a long period of time and provides a valuable service to the City. The assets have been acquired and developed over several generations and must be properly maintained and developed to continue to provide adequate service and benefits for generations in the future. This plan demonstrates Council’s responsive management of stormwater assets (and services provided from these assets), compliance with regulatory requirements and proposed funding requirements to provide the required levels of service.

This plan is intended to demonstrate how Council will achieve this outcome by applying the principles of responsible Asset Management Planning, the object of which is to:

‘Deliver the required level of service to existing and future customers in the most cost effective way’

The key elements of infrastructure asset management are:

- Taking a life cycle approach,
- Developing cost-effective management strategies for the long term,
- Providing a defined level of service and monitoring performance,
- Understanding and meeting the demands of growth through demand management and infrastructure investment,
- Managing risks associated with asset failures,
- Sustainable use of physical resources,
- Continuous improvement in asset management practices.¹

The contribution of stormwater services towards the strategic goals and Asset Management objectives will be achieved by:

- Ongoing stakeholder consultation to establish and confirm service standards.
- Implementing a program of inspections and monitoring activities to assess asset condition and performance.
- Identifying operational, maintenance, renewal and upgrade requirements and applying economic analysis to establish the most cost effective works programs.
- Ensuring services are delivered at the right price and quality.
- Continuously reviewing and improving the quality of Asset Management practices and updating the Infrastructure and Asset Management Plan as a result.

¹ IIMM 2006 Sec 1.1.3, p 1.3
1.2 Scope of the Plan

This infrastructure and asset management plan covers the following infrastructure assets:

Table 1.1: Assets Covered by this Plan

<table>
<thead>
<tr>
<th>Asset category</th>
<th>Dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stormwater Mains</td>
<td>115.1 km</td>
</tr>
<tr>
<td>Stormwater Inlet Pits and Pipes</td>
<td>3706 Inlets</td>
</tr>
<tr>
<td></td>
<td>16.0 km Inlet Pipe</td>
</tr>
<tr>
<td>Stormwater Manholes</td>
<td>998 Manholes</td>
</tr>
<tr>
<td>Stormwater Nodes</td>
<td>1107 Nodes</td>
</tr>
<tr>
<td>Stormwater Channels</td>
<td>8.9 km</td>
</tr>
<tr>
<td>Stormwater Storage Basins</td>
<td>4 Basins</td>
</tr>
<tr>
<td>Gross Pollutant Traps</td>
<td>9 Units</td>
</tr>
<tr>
<td>Weirs</td>
<td>3</td>
</tr>
<tr>
<td>Bank Protection</td>
<td>2.3 km</td>
</tr>
<tr>
<td>Lake Aerators</td>
<td>17</td>
</tr>
<tr>
<td>Boat Ramps / Landings</td>
<td>10</td>
</tr>
</tbody>
</table>

1.3 Key Stakeholders

Key stakeholders in the preparation and implementation of this infrastructure and asset management plan are listed in Table 1.2.

Table 1.2: Key Plan Stakeholders

<table>
<thead>
<tr>
<th>Capital Planning Team</th>
<th>The Capital Planning Team is responsible for the production and maintenance of this asset management plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asset Manager: Stormwater</td>
<td>Provide technical advice, Review.</td>
</tr>
<tr>
<td>(Andrew Smith)</td>
<td></td>
</tr>
<tr>
<td>City Operations (Peter Sossic</td>
<td>Provide input and review of maintenance expenditure and Service Levels</td>
</tr>
<tr>
<td>/ Darren Aesche)</td>
<td></td>
</tr>
<tr>
<td>Corporate Planning and Strategy (Clare Mockler / Nicholas Carr)</td>
<td>Annual Business Plan and Budget Process / Strategic Management Plan review</td>
</tr>
</tbody>
</table>
1.4 Relationship with other Plans

This Drainage and Waterways Infrastructure and Asset Management plan is to be read with the following associated planning documents:

- Annual Business Plan
- Strategic Management Plan
- Long Term Financial Plan
- Torrens Natural Resources Management Board Catchment Water Management Plan
- Environmental Sustainability Strategy

1.5 Plan Framework

Key elements of the plan are:

- Levels of service – specifies the services and levels of service to be provided by council.
- Future demand – how this will impact on future service delivery and how this is to be met.
- Life cycle management – how Council will manage its existing and future assets to provide the required services.
- Financial summary – what funds are required to provide the required services.
- Asset management practices
- Monitoring – how the plan will be monitored to ensure it is meeting Council’s objectives.
- Asset management improvement plan

A road map for preparing an infrastructure and asset management plan is shown below.
Figure 1.1: Road Map for preparing an Asset Management Plan

Source: IIMM Fig 1.5.1, p 1.11
2 LEVELS OF SERVICE

This section defines the service levels or performance standards that are required and why they have been selected as relevant to the Adelaide stormwater network. The service levels are introduced to support Council’s strategic goals and statutory requirements.

2.1 Introduction

A key objective of this Infrastructure and Asset Management plan is to identify the current level of service provided by the asset group. This level of service has been developed over time as a result of customer feedback and consultation and is the level of service seen in the public realm now. The levels of service defined in this section will be used:

- To inform customers of the current type and level of service they should expect.
- As a focus for the development of Asset Management strategies to meet these levels of service.
- As a measure of the effectiveness of Council’s Asset Management practices and the performance of this plan.
- To identify the costs and benefits of the services offered.
- To enable Council and customers to discuss and assess the suitability, affordability and equality of the existing service level and to determine the impact of increasing or decreasing this level in future.

The adopted levels of service for stormwater services are shown below. These standards reflect current industry standards and are based on:

- Legislative Requirements (Section 2.2): Standards, Regulations, Acts and Council By-Laws that impact the way assets are managed and perform.
- Customer Expectations (Section 2.3): Information gained from customers on expected service levels
- Strategic and Corporate Goals (Section 0): Provides guidelines for the scope of current and future services offered and defines specific levels of service which the organisation wishes to achieve.

2.2 Legislative Requirements

Adelaide City Council has to meet many legislative requirements including Australian and State legislation and State regulations. These various sources of legislation are included in Table 2.1.

<table>
<thead>
<tr>
<th>Legislation</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Government Act, 1999</td>
<td>Sets out the role, purpose, responsibilities and powers of local governments including the requirements to prepare a strategic management plan and long term financial plan supported by infrastructure and asset management plans for sustainable service delivery.</td>
</tr>
<tr>
<td>Building Code of Australia, 2007</td>
<td>Sets out minimum standards for developed properties.</td>
</tr>
</tbody>
</table>
Environment Protection Act, 1993 | Sets out requirements for discharge quality.
---|---
Environmental Protection (Water Quality) Policy 2003 | Defines what is acceptable for discharge as stormwater and sets water quality standards for stormwater receiving waters
State Water Plan/Waterproofing Adelaide | Blueprint for the management, conservation and development of water resources in Adelaide and the semi-rural area to 2025.
Natural Resource Management Act, 2004 | Sets out responsibilities and powers of local government for the management of natural waterways.
Emergency Management Act, 1994 | Requires lifeline utilities to function at the fullest possible extent during and after an emergency and to have plans for such functioning (business continuity plans)
City of Adelaide Development plan | Governs development within the City of Adelaide, regulates on-site stormwater management, detention and reuse for developments.

2.3 Customer Research and Expectations

Customer/community levels of service relate to how the community receives the service in terms of safety, quality, quantity, reliability, responsiveness, cost/efficiency and legislative compliance.

Adelaide City Council’s knowledge of customer expectations is based on the following:

- Customer satisfaction surveys.
- Analysis of customer service requests and complaints.
- Consultation for specific capital works projects.
- Feedback from elected members.
- The annual business plan and budget process.

Council undertakes a customer satisfaction survey annually, surveying City of Adelaide residents, businesses, worker, students and visitors. The survey is conducted in two polls, level of satisfaction and level of importance with Council’s services. The most recent customer satisfaction with performance levels from 2006-2007 relevant to stormwater and drainage service provision are presented in Table 2.2.

### Table 2.2: 2006-2007 Customer Satisfaction Survey Levels

<table>
<thead>
<tr>
<th>Survey Question</th>
<th>Performance (Average of user groups)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Providing safe, effective footpaths for pedestrians</td>
<td>7.18</td>
</tr>
<tr>
<td>Providing safe, effective bike paths for cyclists</td>
<td>5.8</td>
</tr>
<tr>
<td>Providing safe, effective bike roads for motor</td>
<td>7.18</td>
</tr>
</tbody>
</table>
There are no stormwater specific questions in the customer satisfaction surveys. This area has been identified for improvement in Section 7.1.

All of the customer satisfaction indicators outlined in Table 2.2 meet the target of 6.5 (See full report for more detail) with the exception of providing safe, effective bike paths for cyclists. A survey has been conducted in September 2007 to gauge the importance of performance and further analysis will be undertaken in areas where performance does not meet customer expectations. At this stage any issues pertaining directly to stormwater and drainage infrastructure will be highlighted. It is not anticipated that the low score for the provision of safe, effective bike paths for cyclists is a result of stormwater drainage system performance.

2.4 Strategic and Corporate Goals

In 2008 Council developed and adopted its Strategic Directions which set out Council’s vision and path into the future. Council’s vision is for:

"A vibrant, prosperous and sustainable Capital City built upon Adelaide’s heritage and lifestyle"

To assist Council in achieving this vision, a number of outcomes and strategies were developed. The following strategy links Infrastructure and Asset Management Plans to the strategic outcomes and direction of Council:

Strategy 52: Provide new and maintain existing Council assets and infrastructure in accord with Asset Management Plans and policies.

In addition to this, Council is required by legislation to develop a Corporate Management Plan which describes Council’s role in supporting its vision and sets out the key targets and principles that drive the operation of council. The Infrastructure and Asset Management Plans sit within this framework as part of the suite of documents that make up Council’s Corporate Management Plan and document the principles and directions for management and maintenance of council’s asset base. In order to reflect changes in asset portfolios, asset management practices and emerging strategic directions, these plans are updated annually as part of the annual business plan and budget process.

Adelaide City Council plans to operate and maintain the existing Torrens and stormwater drainage assets to meet these goals through the following strategic objectives.

- Ensure the Torrens and stormwater drainage network contributes to the strategic objectives by providing the required Torrens and stormwater drainage services.

- Ensure the Torrens and stormwater drainage network is maintained at a safe and functional standard as set out in this infrastructure and asset management plan.

- Ensure the Torrens and stormwater drainage network renewal program is sufficient to preserve the required levels of service and that this profile is linked to other asset renewal profiles (roads, footpaths etc) to minimise impact on surrounding assets and the community at large.
### 2.5 Current Levels of Service

**Table 2.3: Current Service Levels**

<table>
<thead>
<tr>
<th>Key Performance Criteria</th>
<th>Performance Measure</th>
<th>Performance Target</th>
<th>Performance Measure Process</th>
<th>Current Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer Satisfaction</td>
<td>Performance rating from customer’s satisfaction of Council providing drainage services.</td>
<td>6.5 out of 10 average for areas relevant to stormwater drainage provision.</td>
<td>Monitor community satisfaction annually through the Customer Satisfaction Surveys.</td>
<td>6.72 (2007 survey)</td>
</tr>
<tr>
<td>Environment</td>
<td>Number of contaminated discharges likely to affect aquatic life or discolour water</td>
<td>Nil discharges</td>
<td>Monitor notifications from EPA and public complaints.</td>
<td>Achieved</td>
</tr>
<tr>
<td>Environment</td>
<td>No non-stormwater discharge to Torrens Lake</td>
<td>To be developed in future revisions of this plan.</td>
<td>No current process for monitoring this performance target. Processes to be developed in future revisions of this plan.</td>
<td>Not currently known.</td>
</tr>
<tr>
<td>Safety</td>
<td>Absence of significant health safety hazards</td>
<td>All significant hazards identified and removed or mitigated where possible.</td>
<td>Periodic safety and hazard identification audit Document and Track events.</td>
<td>Achieved</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High priority hazards to be acted upon within one financial year.</td>
<td>Periodic review of service providers performance in maintaining safety.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Medium priority hazards acted upon within two financial years.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Low priority hazards acted upon within three financial years.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Key Performance Criteria</td>
<td>Performance Measure</td>
<td>Performance Target</td>
<td>Performance Measure Process</td>
<td>Current Performance</td>
</tr>
<tr>
<td>--------------------------</td>
<td>---------------------</td>
<td>-------------------</td>
<td>-----------------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>Capacity</td>
<td>Proportion of buildings with 100 year flood protection. Frequency of flooding/Flood protection Major Streets Minor Streets Park Lands</td>
<td>&gt;95% 1 in 20 years 1 in 10 years 1 in 10 years</td>
<td>Network Analysis of catchments under periodic sub-consultancies.</td>
<td>Not currently known. Capacity analysis of the stormwater network is listed as a high priority for plan improvement in the immediate future.</td>
</tr>
<tr>
<td>Design</td>
<td>Number of new assets designed and constructed in accordance with the ACC capacity standards (see Figure 2.1 below) and Urban Elements Catalogue.</td>
<td>All new stormwater assets.</td>
<td>Audit of construction sites and “as built” by project manager. Design team aware of required standards and design process.</td>
<td>Achieved</td>
</tr>
<tr>
<td>Condition</td>
<td>Assets renewed at the end of their useful life</td>
<td>All assets renewed at the end of their useful life.</td>
<td>Asset inspection program as per risk profile to model asset remaining life.</td>
<td>Achieved</td>
</tr>
<tr>
<td>Condition</td>
<td>Number of assets inspected annually to assess condition and service performance</td>
<td>One tenth of the network per year.</td>
<td>CCTV inspection of underground pipe network in accordance with the Australian Sewer Pipe Rating guidelines.</td>
<td>Working towards.</td>
</tr>
<tr>
<td>Serviceability</td>
<td>Percentage of pits cleaned in accordance with maintenance plan.</td>
<td>95%</td>
<td>Audit of drainage pits at key seasonal times during the year Development and implementation of appropriate inspection/audit program required.</td>
<td>Part Achieved - Scheduled cleaning program in place.</td>
</tr>
<tr>
<td>Key Performance Criteria</td>
<td>Performance Measure</td>
<td>Performance Target</td>
<td>Performance Measure Process</td>
<td>Current Performance</td>
</tr>
<tr>
<td>--------------------------</td>
<td>----------------------</td>
<td>--------------------</td>
<td>-----------------------------</td>
<td>---------------------</td>
</tr>
</tbody>
</table>
| Serviceability           | Percentage of pipe with identified defects repaired within 12 months | >90% Grade 1  
100% Grade 2 and 3 | Audit of repair work resulting from condition assessments. | Working towards – Defects will be identified as part of condition audits. System in place to track defects and repairs. |
| Serviceability           | Torrens Lake water levels maintained at suitable pool level. Suitable target to be developed. | To be developed. | There is currently no implemented process for monitoring this performance target. | Not currently known |
| Responsiveness           | Availability of call out services for response to system failures - Provision of 24 hour, 7 day service for emergency repairs | 100% availability | Monitor availability of customer service/operations staff. | Achieved |
| Responsiveness           | Speed of response to service requests and system failures  
Emergency  
Minor Overflow  
Minor flooding  
Written complaint | 1 hour  
2 hours  
1 day  
1 week | There is currently no implemented process for monitoring this performance target. Audit of service requests and incidents with response time records process to be developed in future revisions of this plan. | Not currently known |
<table>
<thead>
<tr>
<th>Key Performance Criteria</th>
<th>Performance Measure</th>
<th>Performance Target</th>
<th>Performance Measure Process</th>
<th>Current Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Responsiveness</td>
<td>Speed of response to public enquiries</td>
<td></td>
<td>Document response performance is monitored along with corporate monitoring of TRIM workflow. There is currently no implemented process for reporting on this performance target. Audit and analysis of public enquiry records in TRIM process to be developed in future revisions of this plan.</td>
<td>Not currently known</td>
</tr>
<tr>
<td></td>
<td>Acknowledgement correspondence (3 days)</td>
<td>100%</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Substantive response (14 days)</td>
<td>&gt;90%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Responsiveness</td>
<td>Percentage of new drainage connection applications processed within 5 working days</td>
<td>100%</td>
<td>There is currently no implement process for monitoring this performance target. Audit and analysis of new drainage requests process to be developed in future revisions of this plan.</td>
<td>Not currently known</td>
</tr>
</tbody>
</table>

Note: The data required to monitor and report on Council’s specific performance in some areas is not available. Additional service levels will be included as monitoring systems become available to provide the required data for future revisions of this plan. This is listed as a required improvement outcome for this plan.
<table>
<thead>
<tr>
<th>City drainage zones</th>
<th>Design flood protection criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Storm Water System</td>
</tr>
<tr>
<td>ZONE 1 Central Business District; O’Connell St; Melbourne St</td>
<td>Underground system: 1 in 25</td>
</tr>
<tr>
<td></td>
<td>Road Reserve: 1 in 10</td>
</tr>
<tr>
<td>ZONE 2 Remainder of Built Up</td>
<td>Underground system: 1 in 10</td>
</tr>
<tr>
<td></td>
<td>Road Reserve: 1 in 10</td>
</tr>
<tr>
<td>ZONE 3 Roads through Park Lands</td>
<td>Underground system: 1 in 10</td>
</tr>
<tr>
<td></td>
<td>Road Reserve: 1 in 10</td>
</tr>
<tr>
<td>ZONE 4 Park Lands</td>
<td>Underground system: 1 in 10</td>
</tr>
<tr>
<td></td>
<td>Open Channels: 1 in 10</td>
</tr>
</tbody>
</table>

Figure 2.1: Design Flood Protection Standards
3 FUTURE DEMAND

This section of the plan analyses the potential factors effecting demand including population growth, social and technology changes. The impact of these trends is examined and demand management strategies recommended as required to modify demand without compromising customer satisfaction.

3.1 Demand Growth Trends

3.1.1 Population Growth

The primary strategy of Council’s Strategic Management Plan 2004-07 is to “increase the number of people living, visiting, working and learning in the City to an optimum sustainable level” and has given rise to four growth plans focusing on growth in resident, worker, student and visitor populations.

Growth targets to 2010 have been set for each population area and are summarised as follows.

By 2010:

- Adelaide will have an overnight population of 34,000, including at least 26,000 permanent residents
- Adelaide will have a City workforce of at least 111,000
- Adelaide will have at least 66,000 students in institutional learning
- visitor activity in the City will have grown to generate daily movement counts of at least 140,000 in Rundle Mall

Population figures as at June 2007 are listed in Table 3.1 against the 2010 targets.

Table 3.1: Population Targets and 2007 Actuals

<table>
<thead>
<tr>
<th>Population</th>
<th>2007 Actual</th>
<th>2010 Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residents (overnight population)</td>
<td>18,427</td>
<td>26,000</td>
</tr>
<tr>
<td>Workers</td>
<td>108,007</td>
<td>111,000</td>
</tr>
<tr>
<td>Students</td>
<td>75,398</td>
<td>66,000</td>
</tr>
<tr>
<td>Visitors</td>
<td>129,982</td>
<td>140,000</td>
</tr>
</tbody>
</table>

The achievement of the 2010 targets will be dependent on a number of factors including:

- general economic conditions;
- government policy decisions;
- metropolitan investment decisions;
- consumer preferences; and
• industry trends.

The effectiveness of the projects and programs arising for each of Council's Population Growth Plans, and other Council Strategies aimed at creating the conditions for sustainable activity and quality of life, will also impact on population growth.

Based on recent growth trends:

• the 2010 resident population target appears out of reach, however continued growth is forecast
• the 2010 workforce population target appears achievable
• continued growth of student numbers is forecast
• there will be only marginal growth in visitor numbers.

The increased traffic volumes (vehicle, pedestrian, cyclists) generated via the population growth forecast in the near term are unlikely to impact significantly on the scheduled useful life of base infrastructure (roads, footpaths, street furniture etc). The impacts of student, worker and visitor population growth will largely be concentrated in the northern part of the Central Business Area and Mixed Use Zones.

The City of Adelaide is in a unique situation in comparison to the majority of other Councils as it has no large areas of land available for green field's growth. As a result population growth within the city is expected to drive increase density development only. The impact of infill development is well documented and has the ability to impact on stormwater volumes within the system and as a result reduce the observed level of stormwater performance. However, the underground network within the City of Adelaide has been designed with the assumption of full development (i.e. 90% impervious contributing area) and so infill development is not expected to have a significant impact on the delivery of service delivery of stormwater assets.

Growth in population and development within the City will however increase the number of customers expecting appropriate stormwater network performance and flooding protection. This will need to be managed along with other customer expectation issues.

3.2 Other Influences on Demand

3.2.1 Technology Advances

Technology advances applicable to the life cycle management of stormwater assets are being made available in the following areas:

• “Trench-less” technology – repair and rehabilitation techniques for underground pipes that do not require excavation of pipelines can offer savings and decrease disruption to traffic and property owners.
• Treatment Systems – new technology in the removal of pollutants from stormwater are being constantly advanced and becoming more affordable.
• Aquifer Storage and Recovery – technology and systems to treat, pump and retrieve stormwater within underground aquifers are also being constantly advanced and are becoming more affordable and desirable.
• Reuse within Buildings. Increased use of stormwater reuse within buildings.

Council will monitor and investigate advances in technology and introduce them as appropriate.
3.2.2 Legislative Changes

Legislative change has the potential to significantly affect the Councils ability to meet minimum levels of service, and may require improvements to infrastructure assets. Changes in Environmental Quality standards in particular may influence stormwater disposal options and recent amendments to the Local Government Act 1999, now requires all Councils to develop Infrastructure and Asset Management Plans for Council assets.

3.2.3 Changes in Customer Expectations

Council staff will continue to monitor customer expectation with regards to stormwater assets. Customers expect that stormwater will clear from the street almost immediately in high profile/usage areas. As these areas expand in number and size, Council will monitor the asset performance and set improvement plans as appropriate.

It is also expected that a greater emphasis will be placed on stormwater harvesting technologies and ‘Water Sensitive Urban Design’ initiatives. While this will have no direct impact on the demands placed on our existing stormwater network, the design and implementation of these systems need to take into account the overall drainage requirements and in the process may drive stormwater drainage network improvements indirectly.

There is also a general increase in concern for the quality of stormwater runoff and this is particularly relevant for North Adelaide and the Northern half of the Central Business District which drain into the River Torrens. There is an ongoing need to focus on ways to cost effectively improve the quality of local stormwater flowing into the River and to work with other Council areas upstream to do the same.

3.2.4 Environmental Sustainability & Climate Change

The impact of climate change on Adelaide City Council (as part of the Eastern Mount Lofty Ranges NRM area) relevant to stormwater drainage assets have been identified as:

- 1 – 10% decrease in annual rainfall
- Increase in storm event intensity

The impact of these changes will be monitored and changes made to design service levels, section 2.5, as appropriate.

The Environment Sustainability Strategy outlines actions in responses to climate change appropriate for stormwater drainage infrastructure as:

<table>
<thead>
<tr>
<th>Adelaide City Council Environmental Sustainability Strategy</th>
<th>Impact on Stormwater Drainage Assets</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1.3 Retain and reuse additional water supplies</td>
<td>Decreased stormwater run-off volumes where retention and reuse in practice. Positive impact on stormwater system and GPT operations and maintenance.</td>
</tr>
<tr>
<td>1.3.1 Strengthen the Development plan to advocate for rainwater capture and reuse.</td>
<td></td>
</tr>
<tr>
<td>1.3.5 Capture rainwater from council's properties to reduce mains water use</td>
<td></td>
</tr>
<tr>
<td>2.3.6 Encourage the use of green roofs, landscaping and green walls to retain runoff</td>
<td></td>
</tr>
<tr>
<td>1.1.4 Encourage alternative water supplies that reduce River</td>
<td>Decreased use of River Torrens as water supply. Neutral</td>
</tr>
</tbody>
</table>
1.3.3 Implement WSUD in Council projects and design contracts including bio-swales and wetlands. | Change in infrastructure used to deliver stormwater drainage services, including introduction of swales and wetlands.

2.1.1 Implement a carbon neutral strategy for the City | Increase in renewal, maintenance and operational asset costs.

2.4.1 Implement a strategy that will see council carbon neutral by 2020 | Increase in demand for water quality infrastructure including in line biological filter.

4.6 Change purchasing practices to reduce waste. | 

5.5 Consider environment in project management. | 

3.1 Improve habitat and water quality in the River Torrens and Torrens Lake | 

3.6.2 Enhance riparian habitats to improve water quality and reduce erosion | 

3.2.6 Glenelg Waste Water Treatment Scheme

The Glenelg Waste Water Treatment Scheme will decrease the reliance on the Torrens Lake system as a water source for parklands irrigation.

### 3.3 Impact of Trends on Infrastructure Assets

Overall increased infill development will increase stormwater run-off and the number of properties to be protected from floods. Increased population in the City will also increase customer expectations (run-off management, flood protection, water quality) with regards to the performance of the stormwater network.

Changing climatic circumstances may change stormwater run-off volumes and flood patterns. Adelaide City Council needs to monitor rainfall data and flood levels/occurrences to continuously evaluate whether design standards remain adequate as the impacts of climate change are observed.

Increased environmental awareness will also lead to increased customer expectation and in turn will require improved stormwater system design. Not only for hard environmental technologies (Pollutant traps and nets to remove sediment and rubbish, Stormwater re-use through ASR etc) but also ‘softer’ design aspects such as Water Sensitive Urban Design. This will ensure that the quality of receiving waterways are improved and relatively contaminate free.

Table 3.3 is a summary of the above issues and how they may impact on the management of stormwater assets.

<table>
<thead>
<tr>
<th>Issues</th>
<th>Impact on Stormwater Assets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Torrens use.</td>
<td>impact on Torrens Lake assets.</td>
</tr>
<tr>
<td>1.3.3 Implement WSUD in Council projects and design contracts including bio-swales and wetlands.</td>
<td>Change in infrastructure used to deliver stormwater drainage services, including introduction of swales and wetlands.</td>
</tr>
<tr>
<td>2.1.1 Implement a carbon neutral strategy for the City</td>
<td>Increase in renewal, maintenance and operational asset costs.</td>
</tr>
<tr>
<td>2.4.1 Implement a strategy that will see council carbon neutral by 2020</td>
<td>Increase in demand for water quality infrastructure including in line biological filter.</td>
</tr>
<tr>
<td>4.6 Change purchasing practices to reduce waste.</td>
<td></td>
</tr>
<tr>
<td>5.5 Consider environment in project management.</td>
<td></td>
</tr>
<tr>
<td>3.1 Improve habitat and water quality in the River Torrens and Torrens Lake</td>
<td></td>
</tr>
<tr>
<td>3.6.2 Enhance riparian habitats to improve water quality and reduce erosion</td>
<td></td>
</tr>
</tbody>
</table>

3.2.5 On-Site Retention and Reuse

Population increases, increasing development density and trends for new developments to include on-site retention and reuse of stormwater will decrease the volumes of stormwater entering the stormwater drainage network and the Torrens system. During Summer, stormwater inflow into Lake Torrens allows water turnover that reduces the risk of water quality issues such as algal blooms. Overall, reduced flows will lower the pollutant load entering Lake Torrens.

### Table 3.3: Summary of issues Affecting Stormwater Assets

<table>
<thead>
<tr>
<th>Issues</th>
<th>Impact on Stormwater Assets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Torrens use.</td>
<td>impact on Torrens Lake assets.</td>
</tr>
<tr>
<td>1.3.3 Implement WSUD in Council projects and design contracts including bio-swales and wetlands.</td>
<td>Change in infrastructure used to deliver stormwater drainage services, including introduction of swales and wetlands.</td>
</tr>
<tr>
<td>2.1.1 Implement a carbon neutral strategy for the City</td>
<td>Increase in renewal, maintenance and operational asset costs.</td>
</tr>
<tr>
<td>2.4.1 Implement a strategy that will see council carbon neutral by 2020</td>
<td>Increase in demand for water quality infrastructure including in line biological filter.</td>
</tr>
<tr>
<td>4.6 Change purchasing practices to reduce waste.</td>
<td></td>
</tr>
<tr>
<td>5.5 Consider environment in project management.</td>
<td></td>
</tr>
<tr>
<td>3.1 Improve habitat and water quality in the River Torrens and Torrens Lake</td>
<td></td>
</tr>
<tr>
<td>3.6.2 Enhance riparian habitats to improve water quality and reduce erosion</td>
<td></td>
</tr>
</tbody>
</table>

Adelaide City Council – Torrens and Stormwater Drainage Infrastructure And Asset Management Plan 2008
Population Growth  | Greater reuse potential  
| Higher standards of service required. Changing demographics will require review of flood protection standards.

Development  | Increase in stormwater reuse

Technological Change  | Little or no impact

Legislative Change  | No current legislation that will impact on stormwater assets. Future legislation may require stormwater harvesting.

Customer Expectations  | Higher level of service in the longer term to meet increased customer expectations, eg greater reuse and environmental outcomes.

Environment and Climate Change  | See Table 3.2

Onsite Retention and Reuse  | Mixed impact to Lake Torrens, Overall reduction in pollutant load and in summer negative impacts due to reduced flows

Glenelg Waste Water Treatment Scheme  | Reduced reliance on Torrens Lake as an irrigation water supply.

### 3.4 Demand Management Strategies

Demand management strategies provide alternatives to the creation of new assets in order to meet demand and look at ways to modify customer demands in order that the utilisation of existing assets is maximised and the need for new assets deferred or reduced. The objective of demand management is to actively seek to modify customer demands for services in order to

- Optimise utilisation/performance of existing assets.
- Reduce or defer the need for new assets.
- Meet organisation’s strategic objectives.
- Deliver a more sustainable service.
- Respond to changing customer needs.

Demand management is practiced constantly to maintain the total demand at reasonable levels. The 5 components of demand management are shown in Table 3.4 with examples relating to Stormwater assets. (Note not all demand components are relevant for all assets or plans)

<table>
<thead>
<tr>
<th>Demand Component</th>
<th>Stormwater Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation</td>
<td>Flood Protection.</td>
</tr>
<tr>
<td>Regulation</td>
<td>Restriction on development stormwater discharge and encourage stormwater reuse.</td>
</tr>
<tr>
<td>Incentives</td>
<td>Provide incentives for developers that build the flood protection higher than the required standard and encourage reuse of stormwater within buildings.</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Education</td>
<td>Educate the community on stormwater quality and stormwater as a resource.</td>
</tr>
<tr>
<td>Demand Substitution</td>
<td>Minimise effect of increased urban runoff (i.e. by promoting stormwater re-use on site and detention).</td>
</tr>
</tbody>
</table>

Adelaide City Council will implement the following demand management strategies:

- **Operation – Flood Protection**: Strategies relating to the level of flood protection to be provided. Setting minimum design standards relating to the level of flood protection required in different areas of the city.

- **Demand Substitution – Minimising Effect of Increased Urban Runoff**: With higher density development, environmental concerns and an increased trend towards minimising the volume of stormwater that is ‘flushed out to sea’, there may be a future need to develop drainage systems that both treat and reduce the quantity of stormwater entering the drainage system. Some alternative drainage systems that should be considered are groundwater recharge including the use of urban swales/permeable pavements (Water Sensitive Urban Design) and on-site detention/ reuse systems.
4 ASSET MANAGEMENT PRACTICES

This section identifies the strategies, practices and guidelines supporting Asset Management at Adelaide City Council. These activities have no direct impact on the condition or performance of the asset themselves, but provide the tools and functions required to support the maintenance, renewal and enhancement plans. These functions include:

- System planning and monitoring
- System record management
- Asset management planning and policy

4.1 Standards and Guidelines

Asset Management practices and processes are driven by a number of legislative requirements and assisted by developed guidelines.

Local Government Act 1999 (sets outs Councils Asset Management responsibility and the requirement to develop asset management plans)

Australian Accounting Standard 27 Financial Reporting by Local Governments 1996 (sets out the asset accounting requirements)

International Infrastructure Management Manual, NAMS (Provides guidance and direction on asset management policy and plan development)

Australian Rainfall and Runoff, (Provides code of practice for stormwater drainage design)

Local Government – Asset Management Template Document (Provides Local Government Organisations with a standard template to adopt for the development of Asset Management Plans)

4.2 Information Flow Requirements and Processes

The key information flows into this infrastructure and asset management plan are:

- The asset register data on size, age, value, remaining life of the network;
- The unit rates for categories of work/material;
- The adopted service levels;
- Projections of various factors affecting future demand for services;
- Correlations between maintenance and renewal, including decay models;
- Data on new assets acquired by council.

The key information flows from this infrastructure and asset management plan are:

- The assumed Works Program and trends;
- The resulting budget, valuation and depreciation projections;
- The useful life analysis.
These will impact the Long Term Financial Plan, Strategic Business Plan, Annual Business and Budget and departmental business plans and budgets.

Financial projections in this plan are developed in consultation with the Finance Department and are provided to the Finance department for incorporation into the Long term Financial Plan. Both capital and renewal projects identified by this plan will be the basis of rolling 3 year plans that will form the foundation of the Strategic Business Plan and Annual Budget from year to year.

New assets are added to the Hansen asset management system by the Capital Planning team. Every capital project results in a handover file that is checked by the relevant asset manager prior to forwarding to Capital Planning. Hansen and the GIS records are updated to reflect any changes made to the asset inventory. Additionally, data pertaining to the capital expenditure is capture for each asset. Once this is complete, the project is removed from the Works in Progress (WIP) ledger.

4.3 Risk Management

4.3.1 Overview

Adelaide City Council aims to manage its asset risks in a responsible manner to enable stormwater business objectives to be consistently met. The objective of the risk management process with regards to stormwater assets is to ensure that

- All significant operational and organisational risks are understood and identified.
- The highest risks that should be addressed in the short to medium term are identified.
- Risk reduction strategies and treatments are identified and applied.

An assessment of risks associated with service delivery from infrastructure assets has identified critical risks to Council. The risk assessment process identifies credible risks, the likelihood of the risk event occurring, the consequences should the event occur, develops a risk rating, evaluates the risk and develops a risk treatment plan for non-acceptable risks.

All network assets, or groups of assets with similar risk characteristics have been screened considering potential failure modes and events to identify risks.

4.4 Risk Management Strategy

4.4.1 Overview

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All network assets or groups of assets with similar risk characteristics have been screened considering potential failure modes and events to identify risks.

The adopted Adelaide City Council Risk Management Framework and Methodology presented graphically in Figure 4.1 includes the following components:

- Establishing the internal and external context;
- The identification of major business risks;
- The analysis of identified risk in terms of potential impact and likelihood of occurrence;
- An evaluation of the external and control environment to manage the risk;
- Development of action plans (treatments) to correct identified weaknesses; and
- Monitoring and reviewing the effectiveness of the risk management process.
4.4.3 Step 1 - Context - Risk Criteria and consequence of Risk

The key risk management criteria relating to Torrens and stormwater drainage assets include:

- Public health and safety.
- Service provision.
- Environmental and legal compliance.
- Security, theft and vandalism.
- Business interruption.
- Financial risk (escalating costs in deterioration).
- Damage through storms, flooding, chemical spills and vandalism.
- User group accountability.

The establishment of risk management criteria is one of the most important steps in the risk management process, as it sets the framework for consistent risk decision making.

4.4.4 Step 2 - Risk Identification

Risk identification for Torrens and stormwater drainage assets can be identified from a number of resources such as:
• Routine inspection by Council officers.
• Reports from user groups and occupants.
• Reports and complaints from general public.
• Information obtained from incidents
• Details from past insurance claims.
• Advice from professional bodies.
• Past experience.

4.4.5 Step 3 & 4 - Risk Analysis and Evaluation

Risk analysis and evaluation determines the likelihood and consequence of events and other risks to Council assets and then uses a risk rating to determine the level of risk for the particular activity or event. These risks are then evaluated against the systems currently in place to determine if they are appropriate as is to mitigate the risk or determines prioritised actions to work towards risk mitigation.

**Consequence**

Table 4.1 provides a list of various risk categories along with descriptions of the different consequences. This table is used as assistance to the assessor who will identify a hazard and then select the most relevant risk category and consequence severity. It is feasible that a hazard or event could result in any of the consequences listed, but the ones selected should be the one most likely to occur.

<table>
<thead>
<tr>
<th>Table 4.1: ACC Consequence Table</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Risk Category</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Financial</td>
</tr>
<tr>
<td>Employee Welfare/Public Safety</td>
</tr>
<tr>
<td>Legal</td>
</tr>
</tbody>
</table>
### Environment

<table>
<thead>
<tr>
<th>Adverse events that can be remedied immediately</th>
<th>Adverse events that are short term and reversible</th>
<th>Significant adverse event causing widespread damage which may be reversed through appropriate remedial action</th>
<th>Major adverse environmental event requiring continuing long term remedial attention</th>
</tr>
</thead>
</table>

### Reputation / Brand Image / Political

<table>
<thead>
<tr>
<th>Localised community concern</th>
<th>State wide adverse media attention</th>
<th>Detrimental inter governmental relationships</th>
<th>Prolonged adverse media attention state wide or national media attention</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Ongoing disagreement between State Government and Council</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Prolonged adverse media campaign</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Irreparable damage to government relations</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Lord Mayor / Councillors / CEO forced to resign</td>
</tr>
</tbody>
</table>

### Service Delivery

<table>
<thead>
<tr>
<th>Interruption to service not requiring any further remedial action (i.e. minimal impact on customers)</th>
<th>Interruption to a service that can be immediately remedied with moderate impact on customers</th>
<th>Interruption to services causing significant customer inconvenience</th>
<th>Inability to deliver an essential public service for an extended period</th>
</tr>
</thead>
</table>

### Likelihood

Each possible event must now be subjectively assigned an estimate of likelihood or probability of a hazard occurring. This is achieved with reference to the Likelihood values in Table 4.2.

#### Table 4.2: ACC Likelihood Table

<table>
<thead>
<tr>
<th>Likelihood of Occurrence</th>
<th>Descriptor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Almost Certain</td>
<td>Is expected to occur in most circumstances</td>
</tr>
<tr>
<td>Likely</td>
<td>Will probably occur in most circumstances</td>
</tr>
<tr>
<td>Possible</td>
<td>Might occur some of the time</td>
</tr>
<tr>
<td>Unlikely</td>
<td>Could remotely occur some of the time or only in exceptional circumstances</td>
</tr>
</tbody>
</table>

### Risk Rating

The overall risk rating is determined by combining the consequences and their likelihood. The following can be used to determine the overall rating for the identified risk.

#### Table 4.3: ACC Risk Rating Matrix

<table>
<thead>
<tr>
<th>Likelihood</th>
<th>Consequence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Once the risks have been assessed and rated, the most significant risks (those rated as extreme) are isolated for treatment/control. High risks are forwarded to the Asset Management group for consideration (may require future budget allocations) while those identified as moderate or low will continue to be monitored and reviewed if circumstances change.

Options to treat risk posed by Torrens and stormwater drainage assets include (but not limited to)

- risk elimination
- reduction in the cause or likelihood of the event occurring
- reduction in the consequence or severity of the event if it were to occur
- increasing the maintenance regime
- initiating council improvements
- changing operating processes and procedures
- sharing the risk through insurance or contracts
- doing nothing and accepting the risk

Some risks may require substantial capital or operating expenditure before treatment options can be undertaken. In these situations, those responsible must also consider short term controls to mitigate the risk until a solution can be implemented.

Risk Register

The overall risk rating is determined by combining the consequences and their likelihood. Table 4.4 indicates the major corporate risks posed by Torrens and stormwater drainage asset portfolio and the suggested treatment options.
### Table 4.4: Risk Register - Major Corporate Risks posed to and by Stormwater Drainage Service Delivery

<table>
<thead>
<tr>
<th>Risk Identified</th>
<th>Consequence</th>
<th>Likelihood</th>
<th>Risk Rating</th>
<th>Proposed Treatment</th>
<th>Responsibility</th>
<th>Completion Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trunk main blockage</td>
<td>Moderate</td>
<td>Possible</td>
<td>Moderate</td>
<td>Duplication of critical mains, ongoing maintenance and catch pit cleaning.</td>
<td>Maintenance and Cleaning: City Operations</td>
<td>Achieved - ongoing</td>
</tr>
<tr>
<td>Significant water loss – Weir failure</td>
<td>Major</td>
<td>Unlikely</td>
<td>High</td>
<td>Manage through existing systems and procedures.</td>
<td>Asset Manager – ongoing maintenance, inspection and renewal of assets</td>
<td>Achieved- ongoing</td>
</tr>
<tr>
<td>Significant water level drop in Torrens Lake</td>
<td>Major</td>
<td>Possible</td>
<td>Extreme</td>
<td>Develop contingency plan to mitigate and manage impacts of significant water level drop.</td>
<td>Manager – Asset Management</td>
<td>June 2008</td>
</tr>
<tr>
<td>Chemical spill within Catchment</td>
<td>Significant</td>
<td>Possible</td>
<td>High</td>
<td>Manage through existing systems and procedures</td>
<td>Chemical Spill Response Plan</td>
<td>Not Applicable</td>
</tr>
</tbody>
</table>
4.5 Accounting/Financial Systems

Adelaide City Council operates the Technology One system for management of financial information. This system is managed by the Finance Business Unit. Technology One is interfaced with the Hansen Asset Management System (see below) to enable the transfer of financial asset information between the two systems.

4.6 Asset Management System

Adelaide City Council operates the Hansen system for management of asset information. The asset management system is linked to the finance system via a software interface.

Asset managers are responsible for maintaining data pertaining to their asset area. Capital Planning are responsible for addition or deletion/expiry of new or disposed assets.

Complementing the Hansen database, geographical data is held on all assets. ArcMap software is used to display and edit geographical data.
5 LIFECYCLE MANAGEMENT PLAN

This section presents asset performance and condition information and uses the Asset Management principles and decision making presented in Section 4 to develop broad strategies and specific work programs to achieve the goals and standards outlined in Section 2 and 3.

It presents an analysis of available asset information and the life cycle management plans covering the three key work activities to manage the stormwater network;

- Operations and Maintenance Plan: Activities undertaken to ensure efficient operation and serviceability of the assets. This will ensure that the assets retain their service potential over the course of their useful life.

- Renewal Plan: Provides a program of progressive replacement of individual assets that have reached the end of their useful life. Deteriorating asset condition primarily drives renewal needs.

- Enhancement Plan: Provides a program of system enhancements to improve parts of the system performing below target service standards and to develop the system to meet any future demand requirements. Sub-standard asset performance primarily drives asset development needs.

5.1 Asset Information

The City of Adelaide stormwater network provides the runoff management and flood mitigation responsibilities for the Adelaide City Council. The network is made up of a series of road reserves, underground stormwater pipes, open channels and creeks/lakes which convey stormwater either into Torrens Lake or directly into adjoining Council stormwater systems. The Adelaide stormwater network works with a combination of a minor and major stormwater system design. The system of underground pipes and creeks are classified as the minor system and convey stormwater runoff from minor storm events (rainstorm events that occur on average once every 10 or 20 years). This minor system is required to prevent nuisance flooding along major pedestrian and vehicle routes. The major system, consisting of road reserves and Park Lands, is used to convey major storm events that produce flows that are in excess of the capacity of the minor system. During these high flow events road reserves and Park Land areas will provide overland flow paths and be inundated with stormwater for short periods of time in order to protect adjacent properties from flooding.

A map indicating the location of all stormwater drainage assets is provided in Appendix A.

The stormwater network is divided into 16 sub-catchments which drain either into the Patawalonga or Torrens Water Catchments. A map indicated the location of the stormwater catchments is provided in Appendix B. The stormwater management within these two catchments generally operates in the following manner:

Torrens Water Catchment

Most of the Central Business District (with the exception of the Southern Quarter) and North Adelaide drain either directly into Torrens Lake or the River Torrens (Sub-Catchments 7, 8, 9, 10, 11, 12, 13, 14 and 15). The majority of North Adelaide stormwater is conveyed via the underground network, while stormwater from the Central Business district drains directly from some areas while others drain into creeks within the East Park Lands prior to discharging into the Torrens (Sub-catchment 4). Three small sub-catchments (sub-catchments 2,5 and 6) on the Western edge of the City drain through Parks 23 and 24 and directly into the West Torrens Council Stormwater system, eventually finding its way into the River Torrens via their system.

Parks and Park Land roads adjacent to the River Torrens and Torrens Lake flow directly across Park surfaces and into the Torrens system. Adelaide City Council is also responsible for the operation and effective performance of the River Torrens (within its boundary), Torrens Lake and the associated weirs in order to provide amenity, recreation opportunities, habitat management, irrigation resources and flood mitigation.
Patawalonga Water Catchment

Approximately the Southern quarter of the Central Business District (Sub-Catchments 1 and 3) discharge via the underground network into Parklands Creek within the South Park Lands. This Creek then discharges directly into the Unley stormwater network beneath Greenhill Road.

River Torrens / Torrens Lake

Adelaide City Council is responsible for the operation and effective performance of the River Torrens Lakes system and the associated weirs in providing amenity, recreation opportunities, habitat management, irrigation resources and flood mitigation. The Torrens Lake weirs control the flow of water thought the Torrens River and maintains constant water levels in the three Torrens Lakes for recreation activities and aesthetic appeal of the city. Torrens Lake No.1 and its controlled gate weir also perform the important function of flood mitigation for Adelaide and downstream areas.

5.1.1 Asset Description

The assets covered by this infrastructure and asset management plan are shown in Table 5.1 below. Replacement values are as per the 2007 infrastructure asset revaluation.

Table 5.1: Stormwater Assets

<table>
<thead>
<tr>
<th>Asset Type</th>
<th>Quantity</th>
<th>Replacement Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Underground Pipe Network</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mains</td>
<td>115.1 km</td>
<td>$49,919,167</td>
</tr>
<tr>
<td>Inlets Pits</td>
<td>3706</td>
<td>$12,214,813</td>
</tr>
<tr>
<td>Inlet Connection Pipes</td>
<td>16.0 km</td>
<td></td>
</tr>
<tr>
<td>Manholes</td>
<td>998</td>
<td>$1,517,845</td>
</tr>
<tr>
<td>Junctions/Nodes</td>
<td>1107</td>
<td>$1,469,044</td>
</tr>
<tr>
<td><strong>Overland Flow Network</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Channels</td>
<td>8.9 km</td>
<td>N/A (Earth channels have not been valued)</td>
</tr>
<tr>
<td>Storage Basins</td>
<td>4</td>
<td>$776,581</td>
</tr>
<tr>
<td><strong>Environmental Treatment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gross Pollutant Traps</td>
<td>9</td>
<td>$1,067,447</td>
</tr>
<tr>
<td><strong>Torrens Lake</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weirs</td>
<td>1 Major, 2 Minor</td>
<td>$6,975,839</td>
</tr>
<tr>
<td>Bank Protection</td>
<td>2.3 km</td>
<td>$6,414,741</td>
</tr>
<tr>
<td>Boat Landings</td>
<td>10</td>
<td>$911,744</td>
</tr>
</tbody>
</table>
A brief description of the different asset groups that make up the stormwater network is provided below:

**Underground Pipe Network:**
- Mains: Convey captured stormwater run-off from roads/property
- Inlet Pits: Street inlets/catchpits that intercept stormwater runoff from kerb and watertable
- Inlet Pipes: Sometimes referred to as laterals, these pipes connect the Inlet Pits to the Mains
- Manholes: Provide access to Mains at various intervals for purposes of inspection and maintenance
- Junctions/Nodes: Underground chambers at the junction of two mains or where the main changes direction and/or gradient

**Overland Flow Network:**
- Channels: Used in Park Lands to convey stormwater away from developed areas
- Storage Basins: Used to retain large flows providing temporary flood storage and increasing the provision of flood protection to properties downstream

**Environmental Treatment:**
- Gross Pollutant Traps: Structures to collect gross pollutants and prevent them from entering the receiving creek or Lake

**Torrens Lake:**
- Weirs: Maintain Torrens Lake pool levels for recreation and aesthetics and provide flood management for Adelaide and downstream areas.
- Bank Protection: Prevents erosion of the Torrens Lake banks.
- Boat Landings: Provides access to the Torrens Lake for recreational and operational watercraft.
- Lake Aerators: Prevent stratification and increase water oxygen levels in the lake to mitigate conditions that encourage algae growth.

### 5.1.2 Asset Condition

**Pipe Network**

The length by age profile of Adelaide City Council’s stormwater pipe, Figure 5.1, shows that the majority of the pipe network has been installed since 1925. The average age of the network as at June 2006 was 61.5 years which indicates that it is not well advanced in its life cycle (the expected life for most pipe materials is 100 years).
Figure 5.2 displays the replacement cost by age profile. This plot indicates that based on an expected life of 100 years, significant portions of the network will require renewal in 2025-2034 and 2055-2074. Due to financial constraints and the impracticability of replacing large parts of the network at the same time, these peaks will be managed through practices such as rescheduling the replacement of stormwater assets with renewal work on the corresponding road and footpath network.

Figure 5.1: Asset Age Profile by Length
The majority of the stormwater pipe network is made up of reinforced concrete pipe. This is considered a best practice stormwater pipe material and is expected to have an average life of 100-120 years depending on construction methods, reinforcement, joint material and soil profiles. Adelaide City Council uses an expected life of 100 years for all concrete pipes as an appropriate figure as part of its engineering and accounting practices for stormwater assets. This figure is based on known network performance and will be reviewed as part of future asset revaluation processes.

A full condition audit has been carried out in Catchment 1. The condition profile of Council’s assets is shown in Table 5.2, while Figure 5.3 shows a graph displaying the pipe age v condition comparison.

### Table 5.2: Structural Condition Summary: Catchment 1

<table>
<thead>
<tr>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipes surveyed</td>
<td>80</td>
</tr>
<tr>
<td>Pipes with No Detected defects</td>
<td>33</td>
</tr>
<tr>
<td>Grade 1: No apparent need to investigate further</td>
<td>68</td>
</tr>
<tr>
<td>Grade 2: Consider response on a programmed basis</td>
<td>9</td>
</tr>
<tr>
<td>Grade 3: Appropriate action to be investigated urgently</td>
<td>3</td>
</tr>
</tbody>
</table>
Detected defects were scored using the Sewer Inspection Reporting Code of Australia (WSA 05 – 2002).

![Structural Condition by Age graph](image)

**Figure 5.3: Asset Age / Condition Profile**

This audit indicated that the condition of pipes within Catchment 1 were of acceptable quality except for 12 pipes that required immediate or programmed attention. These pipes had either exposed reinforcement from uneven wearing or had been damaged externally (possibly by excavation works) and had been either repaired poorly requiring additional attention or had not been repaired at all.

The good condition of pipes between 60-80 years old indicate that an expected life assumption of 100 years would not be an overly ambitious expectation and that with continual monitoring and appropriate maintenance it may be possible to extend the useful life of underground pipes beyond 100 years in the Adelaide environment.

**Gross Pollutant Traps**

Table 5.3 shows the age of the Gross Pollutant Traps (GPT’s). All GPT’s are in good working condition requiring programmed cleaning and maintenance to remain in this condition. Recently a new net was added to the Frome Road unit (as a result of damage) and it is anticipated that the Net Tech units will require ongoing inspection (during cleaning) to ensure that no damage has occurred to the net.

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Age</th>
<th>Replacement Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Botanic Road</td>
<td>CDS (5TOR-01)</td>
<td>7</td>
<td>$94,409</td>
</tr>
<tr>
<td>Morphett Street</td>
<td>ROCLA Cleansall 1350</td>
<td>7</td>
<td>$267,355</td>
</tr>
<tr>
<td>Kintore Avenue</td>
<td>ROCLA Cleansall 1350</td>
<td>7</td>
<td>$194,817</td>
</tr>
<tr>
<td>Victoria Drive</td>
<td>Ecosol RSF 6000</td>
<td>7</td>
<td>$69,983</td>
</tr>
</tbody>
</table>

Table 5.3: Age and Replacement Cost of Gross Pollutant Traps

Adelaide City Council – Torrens and Stormwater Drainage Infrastructure And Asset Management Plan 2008
| Asset Location          | Protection Type       | Quantity | Cost  
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Glover Avenue</td>
<td>CDS (5ADE-01)</td>
<td>6</td>
<td>$66,057</td>
</tr>
<tr>
<td>Jerningham Drain</td>
<td>Baramy Grate</td>
<td>6</td>
<td>$169,100</td>
</tr>
<tr>
<td>Frome Road</td>
<td>Net Tech (800)</td>
<td>5</td>
<td>$63,116</td>
</tr>
<tr>
<td>North Terrace (Convent)</td>
<td>Net Tech (600 &amp; 450)</td>
<td>2</td>
<td>$36,412</td>
</tr>
<tr>
<td>West/North Terrace</td>
<td>ROCLA Cleansall 1200</td>
<td>2</td>
<td>$172,255</td>
</tr>
</tbody>
</table>

**Torrens Lake**

Age and installation date information is available for bank protection assets which is summarised in Figure 5.4. All aerators currently in operation were installed in 2001.

![Figure 5.4: Bank Protection Replacement Cost by Installation Date](image)

Significant works have been undertaken on the No1 weir over the last 6 years including renewal of the structure and mechanical components. Maintenance requirements for the weirs have been identified through various condition reports and are summarized in Table 5.4. These works will be included in future budgets, reviewed by the Asset Manager Water as part of the annual Business Plan and Budget review process.

### Table 5.4: Weir No.1 Maintenance Tasks

<table>
<thead>
<tr>
<th>Year Range</th>
<th>Maintenance Tasks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1950 - 1955</td>
<td></td>
</tr>
<tr>
<td>1955 - 1960</td>
<td></td>
</tr>
<tr>
<td>1960 - 1965</td>
<td></td>
</tr>
<tr>
<td>1965 - 1970</td>
<td></td>
</tr>
<tr>
<td>1970 - 1975</td>
<td></td>
</tr>
<tr>
<td>1975 - 1980</td>
<td></td>
</tr>
<tr>
<td>1980 - 1985</td>
<td></td>
</tr>
<tr>
<td>1985 - 1990</td>
<td></td>
</tr>
<tr>
<td>1990 - 1995</td>
<td></td>
</tr>
<tr>
<td>Maintenance Task</td>
<td>Priority</td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>Dowel Stability</td>
<td>High Risk (Risk Mitigation procedures in place)</td>
</tr>
<tr>
<td>Downstream Cribbing</td>
<td>Medium</td>
</tr>
<tr>
<td>Sluice Valves</td>
<td>Medium</td>
</tr>
<tr>
<td>New concrete retaining wall</td>
<td>Medium</td>
</tr>
<tr>
<td>Development of Maintenance Schedules</td>
<td>Low / Medium</td>
</tr>
<tr>
<td>Stilling basin repairs</td>
<td>Low</td>
</tr>
<tr>
<td>Cathodic Protection</td>
<td>Low</td>
</tr>
<tr>
<td>Oil/Safety Boom</td>
<td>Low</td>
</tr>
</tbody>
</table>

Installation information on boat landings is incomplete. This area has been identified for improvement in Section 7.1 as part of the continuous data improvement process.

5.1.3 Asset capacity and performance

**Primary System:** Pipelines have generally been sized in accordance with the discharge derived from the Rational method of analysis. This is a conservative approach for small catchments. The design standards were shown.

The primary network is limited in its capacity to 1 in 10 or 1 in 20 as detailed in Figure 2.1. Detailed network computer modelling has not been undertaken, however isolated modelling (pulteney street Catchment) and anecdotal evidence have provided no indication that the network is underperforming to a significant degree. Network modelling in the near future is proposed and is expected to confirm this assumption.

Flood plain modelling and mapping has been undertaken for the East and South parklands creek systems.

**Secondary System:** The Central Business District is located on a ridge which splits the CBD into almost two halves. The areas South of Victoria Square drain into the Brownhill Creek system through the South Park Lands and the Northern half of the CBD and North Adelaide drain directly into the Torrens. As a result of the relatively flat nature of the City, the overflow path system is primarily contained within the cities streets and roads. As a consequence all streets and roads are designed to handle the 1% AEP flood event. The Torrens itself has a flood capacity to manage a 0.5% AEP event (1 in 200 year event) and provides ample capacity for the majority of the Cities stormwater load. Unfortunately downstream of the Park Lands the Brownhill Creek system is limited in its capacity as it flows through Unley and West Torrens and hence flooding within the Park Lands occurs on a regular basis (as often as once per year in some areas). However, the South Park Lands provide a buffer between any flood waters and City properties and do have sufficient capacity to accept and contain the Cities stormwater flows in the 1% AEP flood event. Minimum floor levels and development design requirements also protect properties from the 1% AEP event.

**Network Reliability**
As entrances to the piped system are generally well guarded by catchpit grates, inlet structure debris grills etc, materials likely to cause blockages are precluded entry. A program of regular cleaning of catchpit and entrance structures is in place.

**Safety of Network**

All components of the network are hazardous to some extent particularly during periods of high rainfall. As a measure to deny inappropriate access to the piped system, manholes are fitted with heavy duty lids necessitating the use of specialist equipment to lift and raise them. Most inlet structures are fitted with debris grates/grills and the majority of these structures are linked to the main pipe system via only a small inlet pipe preventing the entry of unauthorised persons. Creeks, the River Torrens and Torrens Lake which convey fast flowing hazardous flood waters are designed to provide slopes which are climbable or in the case of Torrens Lake, locations where the flow spreads out and slows down enabling persons to exit the watercourse.

**Water Quality**

Water quality in creeks and Torrens Lake is adversely affected by discharges from the stormwater system. The sources of these pollutants varies from natural sources (leaf litter, sediment etc) to vehicle emissions to illegal discharges from commercial, industrial and construction industries. While 98% and 70% of the stormwater flows draining into the Torrens from the CBD and North Adelaide respectively are channelled through a GPT (removing the majority of gross pollutants), the quality of stormwater in the first flush of a storm will typically exceed the levels considered safe for contact recreation. Water quality in the Torrens Lake is regularly monitored and systems are in place to mitigate risks associated with contact recreation.

### 5.2 Operations and Maintenance Plan

**5.2.1 Overview**

Operations and maintenance strategies optimise the day-to-day activities. Operational and maintenance activities fall into the following categories, each having distinct objectives and triggering mechanisms:

**Operations**: Activities designed to ensure sufficient utilisation of the asset. These are the regular tasks that are undertaken to ensure the assets achieve their service potential. Operations strategies include activities such as inspections & system monitoring.

**Maintenance**: Maintenance strategies are designed to enable existing assets to operate to their service potential over their useful life. There are two types of maintenance:

- **Unplanned Maintenance**: Work carried out in response to reported problems (i.e. clearing a blocked drain)
- **Planned Maintenance**: Work carried out to a pre-determined schedule (i.e. cleaning out of catchpits) or programmed as a result needs identified during inspection (list of remedial works to a number of catchpit chambers)

A key element of asset management planning is determining the most cost effective blend of planned and unplanned maintenance.

The operations and maintenance of the stormwater network is undertaken by Adelaide City Council City Wide Services staff.

**5.2.2 Operations and Maintenance Strategies**

The overall operations and maintenance strategy is intended to retain the current levels of service and mitigate risk while minimising cost. Currently underground pipe maintenance is undertaken on a reactive basis only. This is a target area defined for improvement and will form part of the improvement program for the next revision of this plan.
5.2.3 Operations and Maintenance Standards and Specifications

All materials used in the maintenance and repair of the stormwater system will comply with all relevant technical standards. All maintenance work undertaken will be in accordance with:

- Council’s standard specification and construction standards for stormwater drainage.
- Appropriate Transport and Traffic Regulations.
- Adequate Occupational Health and Safety provisions.

Draft service levels for maintenance undertaken by City Wide Services is outlined in the following documents:

ACC2001/5532: Service Standards - Drainage System Maintenance

ACC2001/5463: Service Standards – Drainage System Maintenance – Clear Drains

ACC2001/5460: Service Standards – Drainage System Maintenance – Clear Culverts and Catchpits

5.2.4 Operations and Maintenance Program

The Operations and Maintenance expenditure trends and forward expenditure forecasts is shown in Table 5.5.

<table>
<thead>
<tr>
<th>Year</th>
<th>Maintenance Budget</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cleaning</td>
</tr>
<tr>
<td>2004/05</td>
<td>$62,840</td>
</tr>
<tr>
<td>2005/06</td>
<td>$61,303</td>
</tr>
<tr>
<td>2006/07</td>
<td>$45,942</td>
</tr>
</tbody>
</table>

Table 5.6: Torrens Lake Maintenance Expenditure

<table>
<thead>
<tr>
<th>Year</th>
<th>Maintenance Budget</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006/07</td>
<td>$31,591</td>
</tr>
</tbody>
</table>

Maintenance expenditure levels are considered to be adequate to meet required service levels. It is currently considered that there is no deferred maintenance. Maintenance is funded from Council’s operating budget and grants where available. This is further discussed in Section 6.3.

Future revisions of this infrastructure and asset management plan will include linking the expected maintenance expenditures with defined required service levels to enable an analysis of the appropriateness of maintenance and operations expenditure.
5.3 Renewal Plan

5.3.1 Overview
Renewal expenditure is major work which does not increase the asset’s design capacity but restores, rehabilitates, replaces or renews an existing asset to its existing service potential. Work over and above restoring an asset to original service potential is considered upgrade or enhancement and is not considered within the renewal plan.

Required level of expenditure on the renewal program for stormwater will vary from year to year and will reflect:

- the age of the system
- the condition profile of the system
- the ongoing maintenance demand
- potential alignment to the renewal of other asset groups in the same location (i.e. renewal of stormwater assets within a street in conjunction with a road surface renewal).

Figure 5.5 shows the historical renewal expenditure for stormwater and Torrens Lake assets over the last 5 years. Historically there has been minimal spend on stormwater renewals as the assets are still relatively young and are in good condition and expenditure is typically new assets. The only recent renewals have included pipes which have been replaced as part of road upgrades such as North Terrace and Pulteney Street.

![Figure 5.5: Capital History](image-url)
5.3.2 Renewal Strategy

The general renewal strategy is to renew assets when justified by:

- **Risk** – When the risk of failure and associated impact justifies action (pipe can no longer provide required service, probable damage to property/person as a result of inaction)

- **Asset performance** – When the asset fails to meet the required levels of service. Non-performing assets are identified by monitoring asset reliability, capacity and efficiency during planned maintenance and inspections. Indicators of non-performing assets are repeated drain collapses, repeated blockages etc.

- **Economics** – When it is no longer economically viable to continue to maintain the asset.

Assets requiring renewal are identified from records of installation and remaining life obtained from the asset register through the ‘Renewal Model’. The renewal model is based on renewing assets within or at the expiration of their useful life. Remaining useful life is based on installation date and expected life in the instances where no condition data exists or may be adjusted based on available condition information. The expected lives used for calculating the replacement year is shown in Table 5.7. The renewal model follows the following principles:

- Stormwater infrastructure renewals are aligned where possible to street surface/pavement works or footpath works as appropriate. This may result in an asset being renewed slightly before or after expiration of useful life.

- Priority is assigned based on pipe size and location.

Where it is proposed that an asset is renewed after the expiration of its useful life, it is inspected to verify the accuracy of remaining life estimate and to confirm that the pipe can continue to provide adequate service prior to renewal.

**Table 5.7: Life Expectancy of Stormwater Drainage Assets**

<table>
<thead>
<tr>
<th>Asset category</th>
<th>Expected Life</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stormwater Mains</td>
<td>100 Years</td>
</tr>
<tr>
<td>Stormwater Inlet Pits and Pipes</td>
<td>100 Years</td>
</tr>
<tr>
<td>Stormwater Manholes</td>
<td>100 Years</td>
</tr>
<tr>
<td>Stormwater Nodes</td>
<td>100 Years</td>
</tr>
<tr>
<td>Stormwater Channels</td>
<td>Not assigned an economic life or value.</td>
</tr>
<tr>
<td>Stormwater Storage Basins</td>
<td>100 Years</td>
</tr>
<tr>
<td>Gross Pollutant Traps *</td>
<td>50 Years</td>
</tr>
<tr>
<td>Weirs *</td>
<td>100 Years</td>
</tr>
<tr>
<td>Bank Protection *</td>
<td>60 - 100 Years</td>
</tr>
<tr>
<td>Boat Landings</td>
<td>50 Years</td>
</tr>
</tbody>
</table>
* Useful lives have been identified as needing review, see Section 7.1.

5.3.3 Impact of Deferring Renewal Works
Renewal works identified in terms of renewal strategies may be deferred if the cost (or aggregate cost) is beyond the current financial ability to fund it. This can occur when there are short term renewal profile peaks or higher priority works are required on other infrastructure asset classes.

When renewal works are deferred, the impact of the deferral on the systems ability to still provide the required level of service will be assessed. Although the deferral of some renewal works may not impact significantly on the short-term operation of the assets, repeated deferral will create a liability in the longer term.

5.3.4 Renewal standards and Specifications
The standards and specifications for renewal works will reflect the best current technologies, national standards and legislative requirements. All renewal work will be carried out in accordance with the following Standards and Specifications:

- Council's Urban Elements Catalogue (contains specifications and construction standards)
- Building Code of Australia

5.3.5 Renewal Program Expenditure
Projected future renewal expenditures are forecast to increase over time as the asset stock ages. The costs are summarised in Figure 5.6. Note that all costs are shown in current 2007 dollar values.
This renewal profile is based on renewing assets at the end of their useful life (See Table 5.7). Due to the nature of the roll out of the network historically, in years beyond the 10 year projection there are several spikes, years where the replacement cost of the assets coming to the end of their useful life is in excess of the average renewal cost, $715k. In the context of the 10 year financial plan (2007-2017) the 2025 spike is of particular importance in that some assets due for renewal in 2025 will be brought forward and renewed in the next 10 years as part of re-timing the renewal profile to manage the financial implications of the spike. These assets will be brought forward to match the appropriate renewal of street pavement assets.

Renewals are to be funded from Council’s capital works program and grants where available. This is further discussed in Section 6.3.

5.4 Enhancement Plan

5.4.1 Overview

Asset enhancement works are those works that create a new asset that did not previously exist, or works which upgrade or improve an existing asset beyond its existing capacity. They may result from growth, social or environmental needs. Enhancement projects are driven from the objectives of Council’s Strategic Management Plan (see Section 2.4).

The impact on the stormwater network over the next 10 years as a result of the Enhancement Program is minimal. Proposed street upgrades (such as North Terrace and Grote Street) will provide opportunities for associated stormwater renewal works, but the current enhancement program has no projects which produce stormwater network improvements directly.

5.4.2 Standards and specifications

Standards and specifications for new assets and for upgrade/expansion of existing assets are the same as those for renewal shown in Section 5.3.4.

5.5 Stormwater Asset Disposal Plan

Disposal includes any activity associated with disposal of a decommissioned asset including sale, demolition or relocation. No assets have been identified for possible decommissioning and disposal at this time.
6 FINANCIAL SUMMARY

This section contains the financial requirements resulting from all the information presented in the previous sections of this infrastructure and asset management plan. The financial projections will be improved as further information becomes available on desired levels of service and current and projected future asset performance.

6.1 Financial Statements and Projections

The financial projections are shown in Figure 6.1 for projected operating (operations and maintenance) and capital expenditure (renewal and upgrade/expansion/new assets).

![Figure 6.1: Projected Operating and Capital Expenditure]

6.1.1 Life Cycle Costs

Life cycle costs (or whole of life costs) are the average annual costs that are required to sustain the service levels. Life cycle costs include maintenance and asset consumption (depreciation) expense.

Over the past 5 years our capital works program has had a level of funding that adequately meets condition based renewal requirements. This practice has seen all required works carried out and there is currently no funding gap or backlog of works. This amount differs from the amount that would be required to fund depreciation, therefore the comparison of life cycle expenditure to depreciation has not be used as a measure of sustainability.

Over the 100 year life cycle, maintenance and capital renewal costs average out to $1.14 Million per year.
6.2 Key Assumptions

The following general assumptions have been made when preparing the expenditure forecasts:

- Stormwater assets will remain in Council ownership throughout the planning period.
- All forecast expenditure is stated in dollar values as at June 2007 with no allowance made for inflation over the planning period, except where stated otherwise.
- Asset renewal costs in years 1 to 3 are generally based on staff assessment of renewal needs, and from year 3 on, the costs are based on the life expectancy of the asset and the proposed alignment with other asset groups.
- Maintenance costs are based largely on historical expenditure and assume there are no significant increases in service requirements, storm events or contractor/material rates.
- Assets values were adopted from the 2006-07 Adelaide City Council Infrastructure Asset Revaluation figures.
- Renewal figures are based on Brown-fields Costs.
- Lifecycle costs are averaged over 100 years.

6.3 Funding Strategy

Projected expenditure identified in Section 6.1 is to be funded from Council’s operating and capital budgets. The funding strategy is detailed in the Council’s 10 year long term financial plan.

Capital renewal costs and maintenance costs are funded from general revenue and grants where available. Major projects may attract external funding which is done on a case by case basis.

6.4 Valuation Forecasts

Asset values are forecast to increase as additional assets are added to the asset stock from construction and acquisition by Council and from assets constructed by land developers and others and donated to Council. At this stage there are no planned future disposals (refer Section 5.5) or growth (refer Section 3.1), therefore no anticipated growth in asset valuation. Figure 6.2 shows the replacement cost asset values trend over the past 2 asset revaluation (5 years).
At this stage there is no anticipated growth or asset disposal therefore no projected increase in depreciation expense in current 2007 dollars.

The depreciated replacement cost (current replacement cost less accumulated depreciation) will vary over the forecast period depending on the rates of addition of new assets, disposal of old assets and consumption and renewal of existing assets. This plan will be updated to include projected depreciated replacement cost as these figures become relevant.

Figure 6.2: Network replacement Values
7 PLAN IMPROVEMENT AND MONITORING

This section outlines the improvement and monitoring program to enhance future revisions of this plan and associated AM plan strategies and financial projections.

7.1 Improvement Plan

The asset management improvement plan was generated from a gap analysis of the current situation and information available for the development of this plan. The proposed infrastructure and asset management improvement plan tasks are shown in Table 7.1.

<table>
<thead>
<tr>
<th>Task No</th>
<th>Task</th>
<th>Responsibility</th>
<th>Resources Required</th>
<th>Timeline</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Update and revise plan to reflect changes in asset portfolio and business practices.</td>
<td>Capital Planning</td>
<td>Internal</td>
<td>Annual – part of Business Plan and Budget Process</td>
</tr>
<tr>
<td>2.</td>
<td>Review of Torrens and stormwater drainage maintenance practices to ensure alignment to service level requirements</td>
<td>Capital Planning, City Wide Services, Asset Management</td>
<td>Internal</td>
<td>Annual – part of Business Plan and Budget Process</td>
</tr>
<tr>
<td>3.</td>
<td>Ongoing rolling program of data collection.</td>
<td>Capital Planning</td>
<td>Internal, Existing Programs</td>
<td>Ongoing</td>
</tr>
<tr>
<td>4.</td>
<td>Include stormwater drainage specific questions in annual customer surveys.</td>
<td>Corporate Planning and Performance</td>
<td>Internal</td>
<td>June 2009</td>
</tr>
<tr>
<td>5.</td>
<td>Develop and review detailed risk analysis and planning for critical assets.</td>
<td>Capital Planning, Asset Management</td>
<td>Internal</td>
<td>June 2009</td>
</tr>
<tr>
<td>6.</td>
<td>Review service levels and commence Internal and Elected Member consultation on service level provision.</td>
<td>Capital Planning, Asset Management</td>
<td>Internal</td>
<td>June 2009</td>
</tr>
<tr>
<td>7.</td>
<td>Community consultation on service level provision.</td>
<td>Capital Planning, Corporate Planning and Performance</td>
<td>TBC</td>
<td>June 2010</td>
</tr>
<tr>
<td>10.</td>
<td>Review Torrens Lake assets</td>
<td>Capital Planning</td>
<td>Internal</td>
<td>2012 Asset</td>
</tr>
</tbody>
</table>
7.2 Plan Review and Monitoring

7.2.1 Plan Review

Once adopted, this plan will form part of the formal suite of plans required under the Local Government Act. This plan will remain current until replaced by an updated plan adopted in conjunction with the adoption of any New Strategic Management plan as required under the Local Government Act. At present this must occur within 2 years of a new Council being elected.

The Infrastructure and Asset Management Plan is a living document which is relevant and integral to the daily Asset Management activities at Council. To ensure the plan remains useful and relevant, the following process of AM plan monitoring and review activities will be undertaken:

- Formal adoption of the plan by Council in conjunction with the Strategic Management Plan
- Review and formally adopt levels of service
- Revise Plan annually to incorporate and document changes to work programs, outcomes of service level reviews and new knowledge resulting from the AM improvement program. (To be adopted as part of the Annual Business Plan and Budget Process each year)
- Quality assurance audits of AM information to ensure the integrity and cost effectiveness of data collected. (ongoing)

7.2.2 Plan Monitoring

The following indicators will be monitored to measure the effectiveness of this Plan.

- Compliance with legislative requirements – Audit of plan in comparison to Local Government Act, 1999 Requirements
- Quality of Services Delivery – Increasing or 100% compliance with service targets.
- Quality of Risk Management – No events occurring outside the risk profile.
- Benchmarking with comparable Councils – Maintain performance of Asset Management practices in comparison to other Local Government Organisations.
8 REFERENCES


9 APPENDICES

Appendix A  Asset Location Maps
Appendix B  Catchment Plan