City of Charles Sturt

Water Assets

Asset Management Plan

Document Control		Water Asset Management Plan			
Rev No	**Date**	**Revision Details**	**Author**	**Reviewer**	**Approver**
0	November 2020	DRAFT Water Assets - Asset Management Plan – Endorsed for Consultation	RN	SAD	

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Executive Summary

The requirements for managing our Water Assets within the Charles Sturt area are consistent with the 30-Year Plan for Greater Adelaide that aims to protect and secure our water resources by incorporating water sensitive urban design into development areas, look for opportunities to capture and re-use stormwater, and improve stormwater management.

This strategic plan aligns with the themes of the Charles Sturt Corporate and Community Plans, and aims to support the following objectives:

Our Liveability

- An urban environment that is adaptive to a changing and growing City
- City assets and infrastructure are developed and well maintained on a strategic and equitable basis
- Create valued urban places that bring people together and reflect local character and identity
- Enhance the quality and diversity of open and public spaces

Our Environment

- Continue to implement climate change mitigation and adaptation solutions
- Enhance the state of the City's environment and biodiversity
- Lead and educate to reduce the City's impact on the environment and build resilience

Our Leadership

- Be bold and innovative in our practices, leadership and decision making by identifying reductions in Council business processes
- Adaptive and sustainable management of the City's finances

Asset Management Plans play an important role in facilitating the delivery of our objectives in a considered and sustainable way. The Water Asset Management Plan (AMP) aims to establish a service level for Water Assets to ensure the overall Water Network is in suitable condition, functions correctly and has enough capacity for existing use and future demand to minimise risk of flooding, improve water quality and increase opportunities for harvesting and re-use.

Council is becoming much more advanced in its Asset Management practices and manages Water Assets at a network level using a Strategic Asset Management (SAM) system. This assists in modelling the likely timing of intervention to ensure the service level across the entire network can be managed through a sustainable funding scenario and assists Council in prioritising and integrating Water Asset works.

What are Water Assets?

Water Assets are all Council owned stormwater and recycled water assets that have a primary function of facilitating the movement and treatment of water within our City and assets that contain water for amenity and biodiversity purposes. For simplicity, Water Assets can be categorised by four (4) key functions. These include;

Water Conveyance

These assets have a primary function of moving stormwater and assisting with flood mitigation for homes, businesses and Council streets. These assets include stormwater drains, pits, pump stations, open drains and detention basins.

Water Quality

These assets have a primary function of removing rubbish, debris and sedimentation from stormwater to clean the water before it reaches our rivers, lakes and beaches. These assets can be placed at the beginning, middle and end of water conveyance assets and include litter baskets, raingardens, gross pollutant traps, wetlands and major outlet structures.

Water Capture & Re-use

These assets have the primary function of capturing treated stormwater and facilitating its re-use it to supply water to irrigate our reserves and sportsgrounds and for the third pipe (treated recycled water) network in our new

developments (St Clair). Most of these assets are associated with the Water Business Unit. These assets include Recycled Water mains, connections and valves, pump stations, injection and extraction bores, and storage tanks.

Water Amenity

These assets have traditionally been a part of this AMP because they are a vessel for water. The primary function of these assets are public amenity and biodiversity. This asset group is small and includes:

- Freshwater Lake – West Lakes
- Collins Reserve Lake – Kidman Park
- Brocas fish pond – St Clair

Asset Condition and Value

Regular condition audits occur for stormwater drains and both stormwater and recycled water pump stations. Revaluation and revision of capital expenditure has been undertaken for all Water Assets. This AMP has also reviewed maintenance and expenditure practices to ensure renewal and maintenance service levels are optimised throughout the life of the plan. Overall, it can be observed that the Water Asset network is generally in good condition, however approximately one third of the network is 'unknown' due to the lack of reliable information currently available.

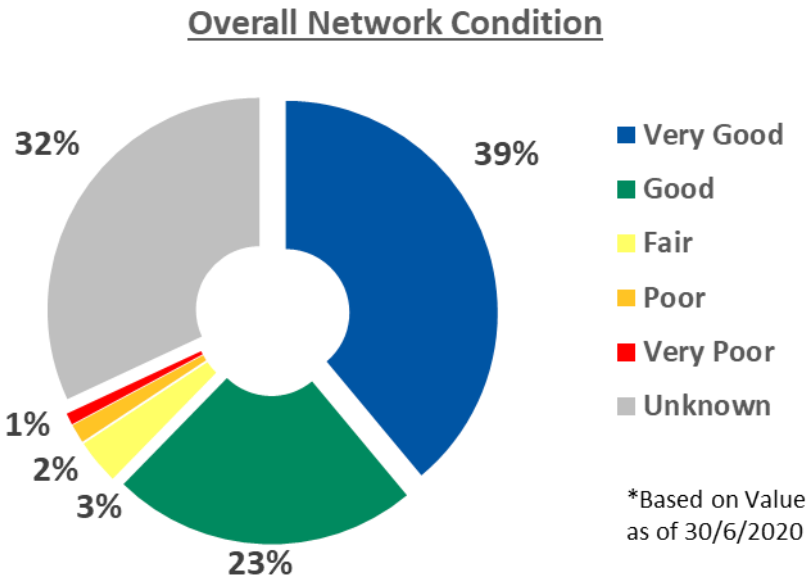


Figure 1 – Overall Network Condition

The City of Charles Sturt's Water Assets, which are financial and are represented as the book value, have a current replacement cost of **$390,278,997** (as at 30th June 2020).

Asset Strategy

This AMP aims to keep all Water Assets at a serviceable condition. Due to the nature of these assets and their ability to still effectively function, even in a relatively poor condition, the current service level for condition-based renewal or replacement of these assets is modelled at condition 5. Where reasonably feasible, the City of Charles Sturt maintains and renews assets and installs new assets consistent with the objectives and actions of endorsed corporate documents (strategic plans/City Plan). Key criteria that are considered in decision making include;

- Asset condition
- Risk
- Strategic Importance
- Function
- Capacity
- Alignment with other capital works

In order to fulfil the above asset strategy and continue to provide services over the 10-year planning in this AMP, an average spend of approximately $10,523,107 per year on maintenance, renewal and upgrade of Water Assets would be required (inclusive of strategic upgrade projects).

The major revision and inclusion of multiple asset classes into this AMP has identified that Council does not currently allocate enough funding towards its Water Assets to achieve its desired asset strategy. This is largely the result of the current approach to Water Asset renewals which focuses on box culvert replacement.

This AMP focuses on the management of Water Assets at a network level, rather than a particular asset class. This approach will ensure that major defects across the whole Water Asset network are addressed in a timely manner, in accordance with the service level in this AMP. It is estimated that this change in strategy will increase the annual capital spend for Water Assets from $5.4 million to $6.8 million for the planning period.

The spend that each asset class contributes to the overall Water Asset LTFP can be seen below. Currently Council spend 87% of funding on Water Conveyance, 9% on Water Capture and Re-use and less than 4% on Water Quality and Water Amenity, which is reflective of their portion of the overall network value.

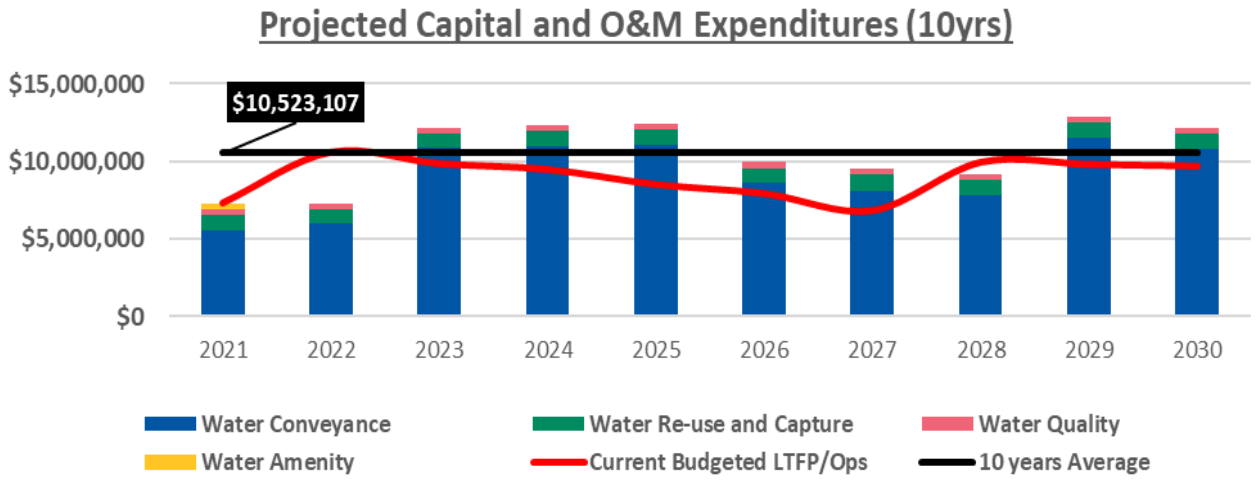


Figure 2 – Overall projected expenditure for Water Assets

Note the above graph shows entire spend of all Maintenance, Renewal and Upgrade costs for Water Assets. Hence, average spend is higher than average capital spend of $6.8 million

Endorsing this AMP allows these figures to be transferred to the Long-Term Financial Plan (LTFP). Projected expenditure required to provide services in the AMP compared with planned expenditure currently included in the LTFP are shown in the graph above.

A summary of each asset class, and a timeline of significant milestones has been provided as follows;

Water Conveyance Assets

Stormwater Drains, Pits, End Structures, Basins, and Drainage Cells

The City of Charles Sturt manage approximately 433km of drains, 14,500 pits, 14 stormwater pump Stations, and 21 detention basins, with a total worth approximately $341.1 million.

Renewal of assets over the last twenty years was focussed on box culvert replacement based on condition and risk. This strategy was adopted as box culverts are more at risk of failure due to their shape, shallowness, and reduced useful life compared to other assets. This AMP takes into consideration the condition of the wider network in formulating asset renewal over the planning period.

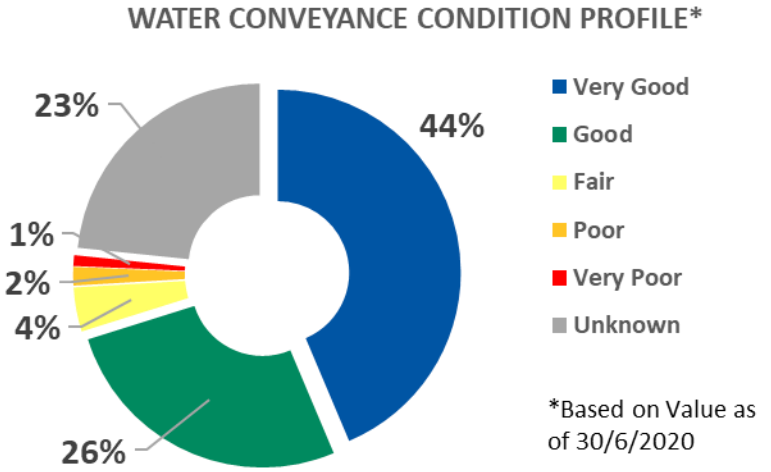
This AMP proposes an increase in funding for Water Conveyance assets. This approach will ensure that major defects across the whole Water Conveyance network are addressed in a timely manner, while continuing to undertake the replacement of high-risk box Culverts.

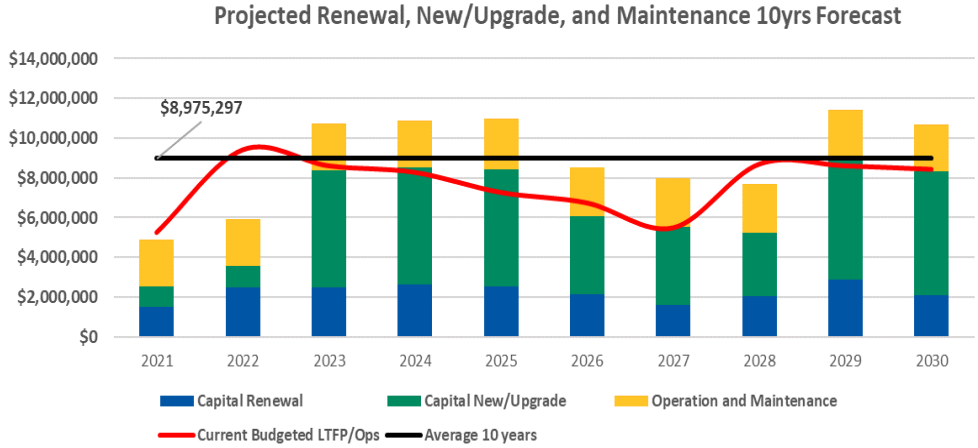
Water Conveyance assets overall are in good condition due to the significant investment in renewal, upgrade, and planned maintenance across the City since 2005.

The investment in a JetVac and Camera Van in 2005 to assess and clean our water conveyance network has assisted in maintaining these assets by pro-actively managing any blockages and recording defects for repair.

Our drains are ranked by condition based on the camera van assessment but also having regard to location (arterial road vs local road) and the type of drain. This information has been used to provide the condition profile in the adjacent pie chart and forms a major revision of the Water Conveyance LTFP.

The City of Charles Sturt is currently undertaking a comprehensive Pump Station Condition Audit which will contribute to our knowledge and condition of these assets.





Stormwater Management Plans (SMP) provide long term strategies for flood mitigation, water quality improvement and harvesting in specific stormwater catchments. The preparation of SMPs and the capital works resulting from approved SMPs are eligible for funding assistance from the Stormwater Management Authority (SMA).

The Port Road SMP completed in 2009 resulted in the Old Port Road wetlands, the recently completed Port Road Drainage project, and associated lateral drain upgrades in several streets.

The Torrens Road SMP was completed in 2015, this catchment spans across the Cities of Charles Sturt and Port Adelaide Enfield. Most of the upgrade works in the next few years is expected to occur within the City of Port Adelaide Enfield. The SMP outlines the cost sharing arrangements for maintenance, renewal and upgrade works in the catchment, and are reflected in the LTFP.

The development of the West Lakes (the lake) catchment SMP commenced in 2019 and is expected to be completed in 2021. Most of the stormwater upgrade works in the catchment are forecast to occur during 2023-2027.

The development of the HEP catchment SMP (led by the City of Port Adelaide Enfield) commenced in 2019 and is expected to be complete in 2021. This catchment spans across the Cities of Charles Sturt, Port Adelaide Enfield and Prospect, with most of the upgrade works expected to occur within the City of Port Adelaide Enfield. The SMP will outline the cost sharing arrangements for maintenance, renewal and upgrade works in the catchment, and will be reflected in future revisions of the LTFP.

Map of West Lakes (the lake) catchment

Water Quality Assets

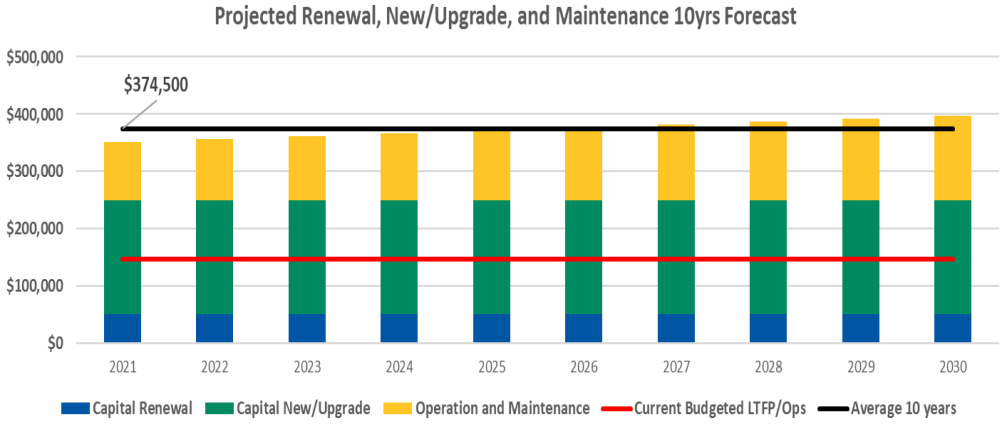
Raingardens, Gross Pollutant Traps (GPT), Sediment Traps, Trash Racks and Major Outlet Structures

The City of Charles Sturt manage 80 GPTs, 5 major outlets, 18 raingardens, 12 wetlands and 5 swales with a total worth approximately $7.7 million.

The primary function of these assets is to improve the quality of stormwater runoff prior to capture and re-use or discharging into waterways or the Gulf St Vincent. These assets can be located either at the beginning, middle or end of the Water Conveyance network.

While we continue to maintain these assets to a functional standard, currently Council do not have a specific renewal strategy across this entire asset class. They have been grouped into a new asset class for the purposes of this AMP and condition data is required to understand the impacts on managing these assets. The future renewal and maintenance strategy of this network will be presented in a future AMP.

Streetscape Raingarden – Rosetta Street, West Croydon



This AMP forecasts a progressive increase in the use of raingardens across the City to improve the quality of water, improve amenity, assist with biodiversity and reduce the impact of urban heat effects.

A total of $200,000 per annum funding has been allocated in this AMP for raingardens in the Tracey Avenue Catchment and WSUD infrastructure at other appropriate sites across the City with a marginal increase in annual operations for maintenance of these new assets.

Water Capture & Re-use Assets

Recycled Water (RCW) Mains, Valves, Hydrants, Pump Stations, and Irrigation Bores

The City of Charles Sturt manage approximately 53km RCW Mains, 600 valves and hydrants, 8 RCW pump stations, and 28 RCW and irrigation bores, with a total worth approximately $38 million.

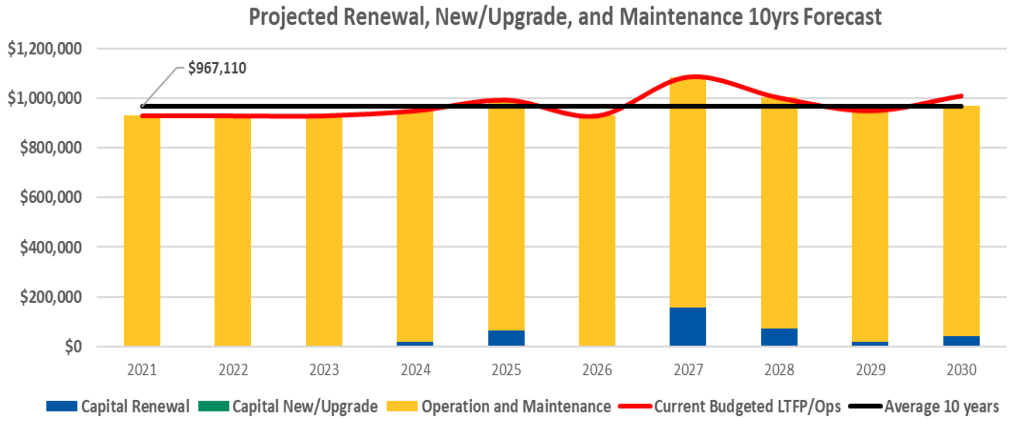
Most of our Water Capture & Re-use assets were constructed during 2010 - 2015 as part of the Water Proofing the West project.

The function of these assets is to capture, treat, and store stormwater for re-use. This water is used to irrigate our reserves and sportsgrounds and to provide an opportunity for new land developments to utilise the purple pipe network.

While we don't currently have condition data for our recycled water assets, most of these assets are less than 10 years old and are assumed to be in good or very good condition.

CCS is currently undertaking a comprehensive Recycled Water pump station condition audit which will contribute to our knowledge and condition of these assets.

Recycled Water Pump Station - St Clair



This AMP proposes no changes to the current LTFP for these assets. Our network currently supplies approximately 45 reserves, 400 households, and 6 Commercial customers.

Future expansion of the network will occur if/when they are identified by other capital projects or as required by the Water Business Unit or through State Government initiatives. As a future improvement, we plan to develop a Water Strategy document in conjunction with the Water Business Unit over the next 3 years.

Water Amenity Assets

Ponds and Lakes

The City of Charles Sturt manage 5 ponds and lakes with an estimated value of $3.4 million.

The function of these assets is to provide public amenity and biodiversity to our reserves and Council facilities.

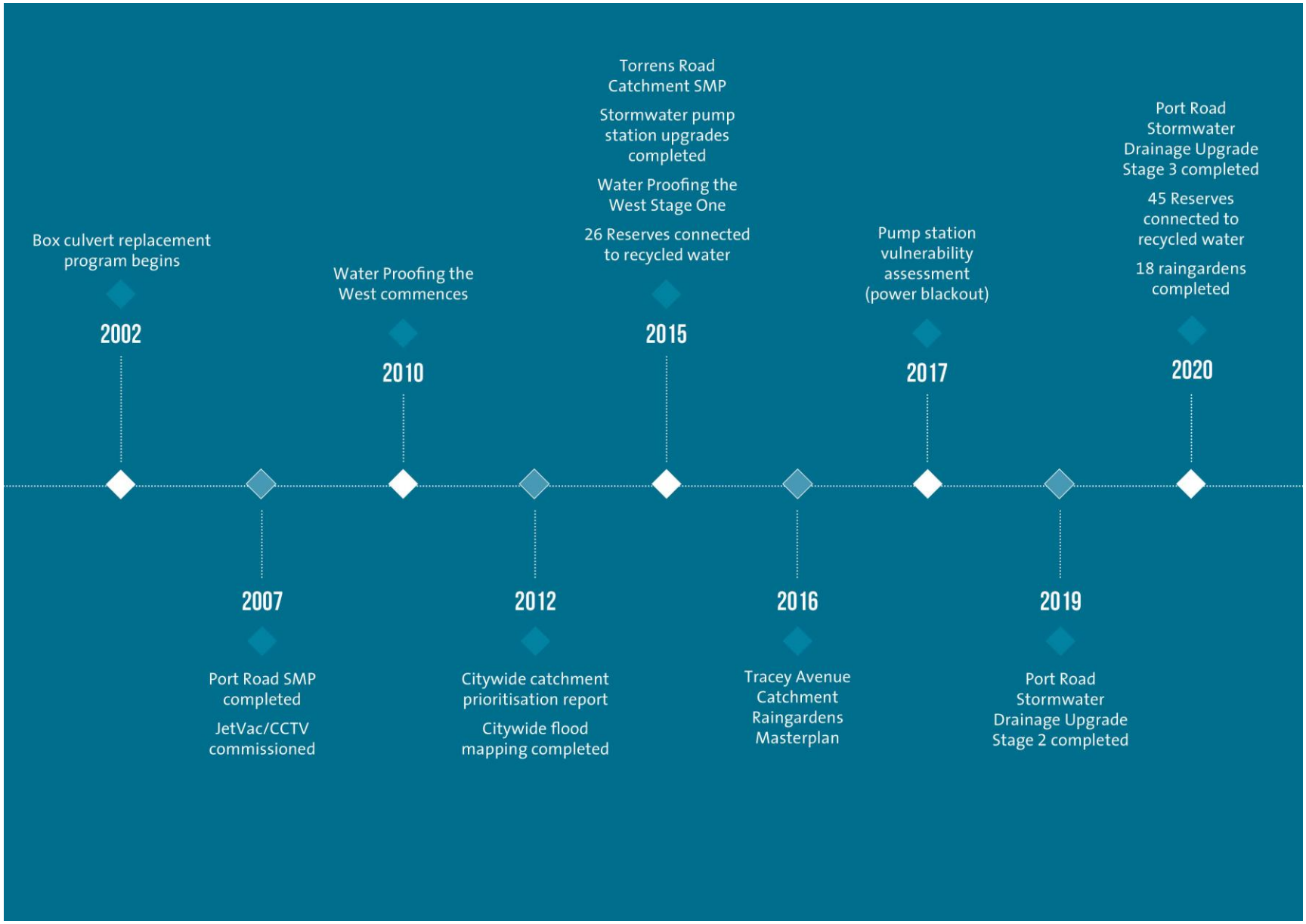
These assets have traditionally been included in the Water Infrastructure AMP because they contain water.

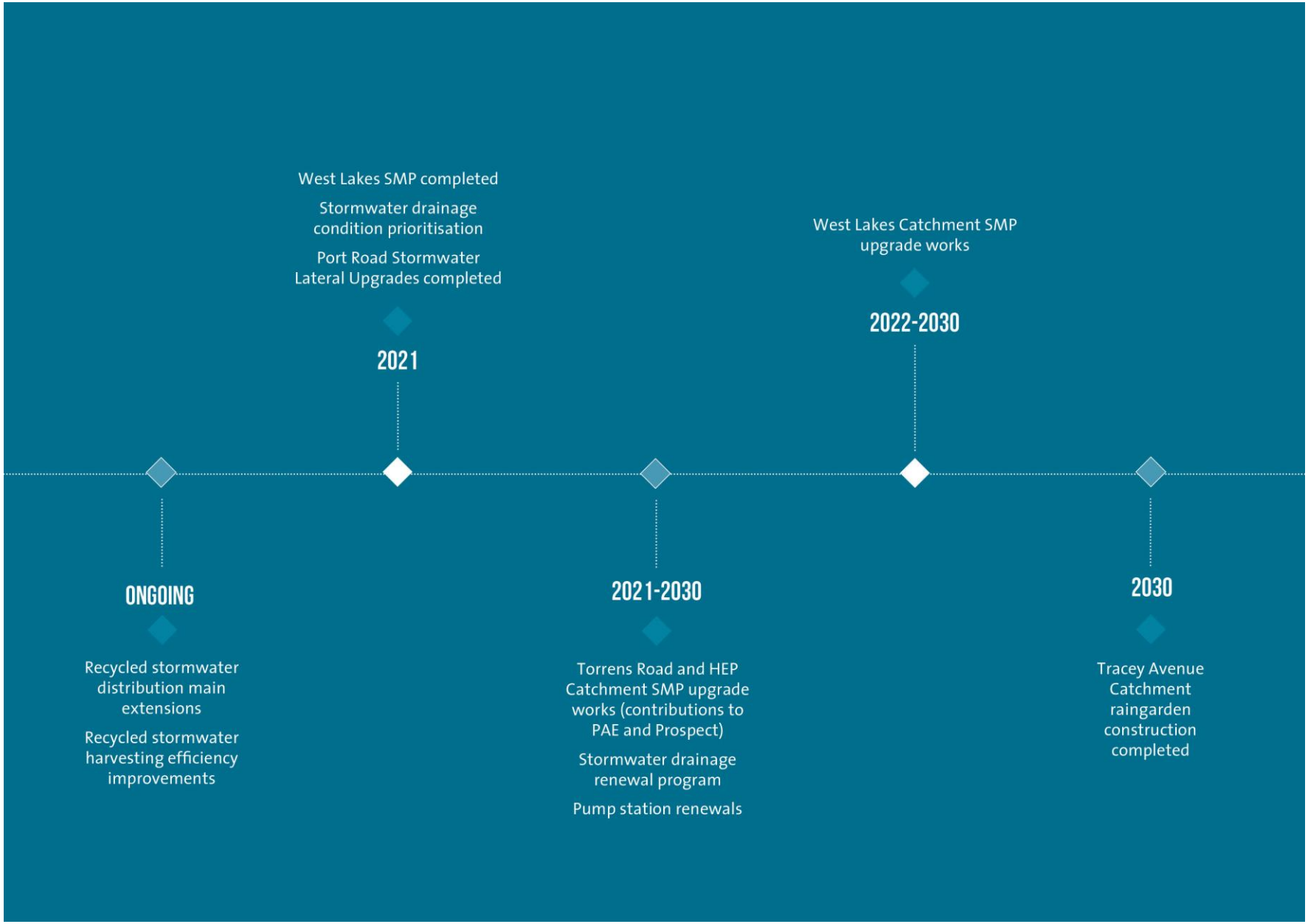
We do not currently have condition data for these assets as they have been associated with the 'living' assets (reserves) they are located within, and generally only require maintenance to keep them rubbish and weed and pest free.

As a future improvement, we plan to transfer this asset category over to the Open Space AMP, prior to the next major revision.

Freshwater Lake – West Lakes

Milestones


2002
Box culvert replacement program begins
2007
Port Road SMP completed
JetVac/CCTV commissioned
2010
Water Proofing the West commences
2012
Citywide catchment prioritisation report
Citywide flood mapping completed
2015
Torrens Road Catchment SMP
Stormwater pump station upgrades completed
Water Proofing the West Stage One
26 Reserves connected to recycled water
2016
Tracey Avenue Catchment Raingardens Masterplan
2017
Pump station vulnerability assessment (power blackout)
2019
Port Road Stormwater Drainage Upgrade Stage 2 completed
2020
Port Road Stormwater Drainage Upgrade Stage 3 completed
45 Reserves connected to recycled water
18 raingardens completed


West Lakes SMP completed
Stormwater drainage condition prioritisation
Port Road Stormwater Lateral Upgrades completed
2021
West Lakes Catchment SMP upgrade works
2022-2030
ONGOING
Recycled stormwater distribution main extensions
Recycled stormwater harvesting efficiency improvements
2021-2030
Torrens Road and HEP Catchment SMP upgrade works (contributions to PAE and Prospect)
Stormwater drainage renewal program
Pump station renewals
2030
Tracey Avenue Catchment raingarden construction completed

Introduction

This Asset Management Plan (AMP) communicates the actions required for the management of Water Assets owned and maintained by the City of Charles Sturt (and services provided from assets), compliance with regulatory requirements, and funding needed to provide the required levels of service over a 20-year planning period.

The AMP is to be read in conjunction with the City of Charles Sturt's planning documents. This should include the Asset Management Policy, along with other key planning documents:

- City of Charles Sturt Corporate Plan 2016-2027
- City of Charles Sturt Community Plan 2013-2027
- City of Charles Sturt Asset Accounting Policy
- City of Charles Sturt Asset Fund Policy
- Engineering and Open Space Guidelines
- Open Space Strategy 2025
- AdaptWest Western Adelaide Region Climate Change Adaptation Plan
- Safety Reliability Maintenance & Technical Management Plan (Recycled Water)
- City of Charles Sturt Environmental Sustainability Policy
- City of Charles Sturt Living Green to 2020 Refresh
- City of Charles Sturt Transport Plan 2016-2031
- Stormwater Management Plans
- SA Infrastructure Guidelines
- Biodiversity Action Plan
- Managed Aquifer Recharge Reliability Maintenance Management Plan
- Net Zero: our map to net zero corporate emissions 2020-2025

Water Assets are all Council owned stormwater and recycled water assets that have a primary function of facilitating the movement and treatment of water within our City and assets that contain water for amenity and biodiversity purposes. For simplicity, Water Assets can be categorised by four (4) key functions. These include;

Water Conveyance

These assets have a primary function of moving stormwater and assisting with flood mitigation for homes, businesses and Council streets. These assets include stormwater drains, pits, pump stations, open drains and detention basins.

Water Quality

These assets have a primary function of removing rubbish, debris and sediments from stormwater before it reaches our rivers, lakes and beaches. These assets can be placed at the beginning, middle and end of water conveyance assets and include litter baskets, raingardens, gross pollutant traps, wetlands and major outlet structures.

Water Capture and Re-use

These assets have the primary function of capturing treated stormwater and facilitating its re-use it to supply water to irrigate our reserves and sportsgrounds and for the third pipe (treated recycled water) network in our new developments (St Clair). Most of these assets are associated with the Water Business Unit. These assets include Recycled Water mains, connections, valves, pump stations, injection and extraction bores, and tanks.

Water Amenity

These assets have traditionally been a part of this AMP because they are a vessel for water. The primary function of these assets are public amenity and biodiversity. This asset group is small and includes:

- Freshwater Lake – West Lakes
- Collins Reserve Lake – Kidman Park
- Brocas fish pond – St Clair

This AMP update is a major revision of the Council endorsed 2017 Water AMP. This revision seeks to include and combine both recycled water and stormwater assets into a single AMP with a holistic integrated Asset Management Strategy for all Council Water Assets. Major revisions in this plan include:

- Integrating all the City of Charles Sturt's Water Assets into a single AMP. All water asset stock included in this revision of the AMP have now been grouped by the four (4) primary functions
- Independent condition audits of stormwater and recycled water pump stations - Underway
- Independent valuation of all Water Assets including depreciation - Underway
- Climate change and sustainability factors and effects on Water Assets
- Revised renewal strategy for Water Conveyance assets. This includes a major revision to the existing LTFP to increase capital spending for drain and pit renewals
- An increase to new/upgrade spending for Water Conveyance assets to undertake works in conjunction with the 4-year Roads program

- Funding for ongoing strategic Water projects, with updates to the existing LTFP;
    - The West Lakes Catchment SMP
    - Tracey Avenue Catchment raingardens
    - Water Sensitive Urban Design initiatives (WSUD)

Asset Management Framework

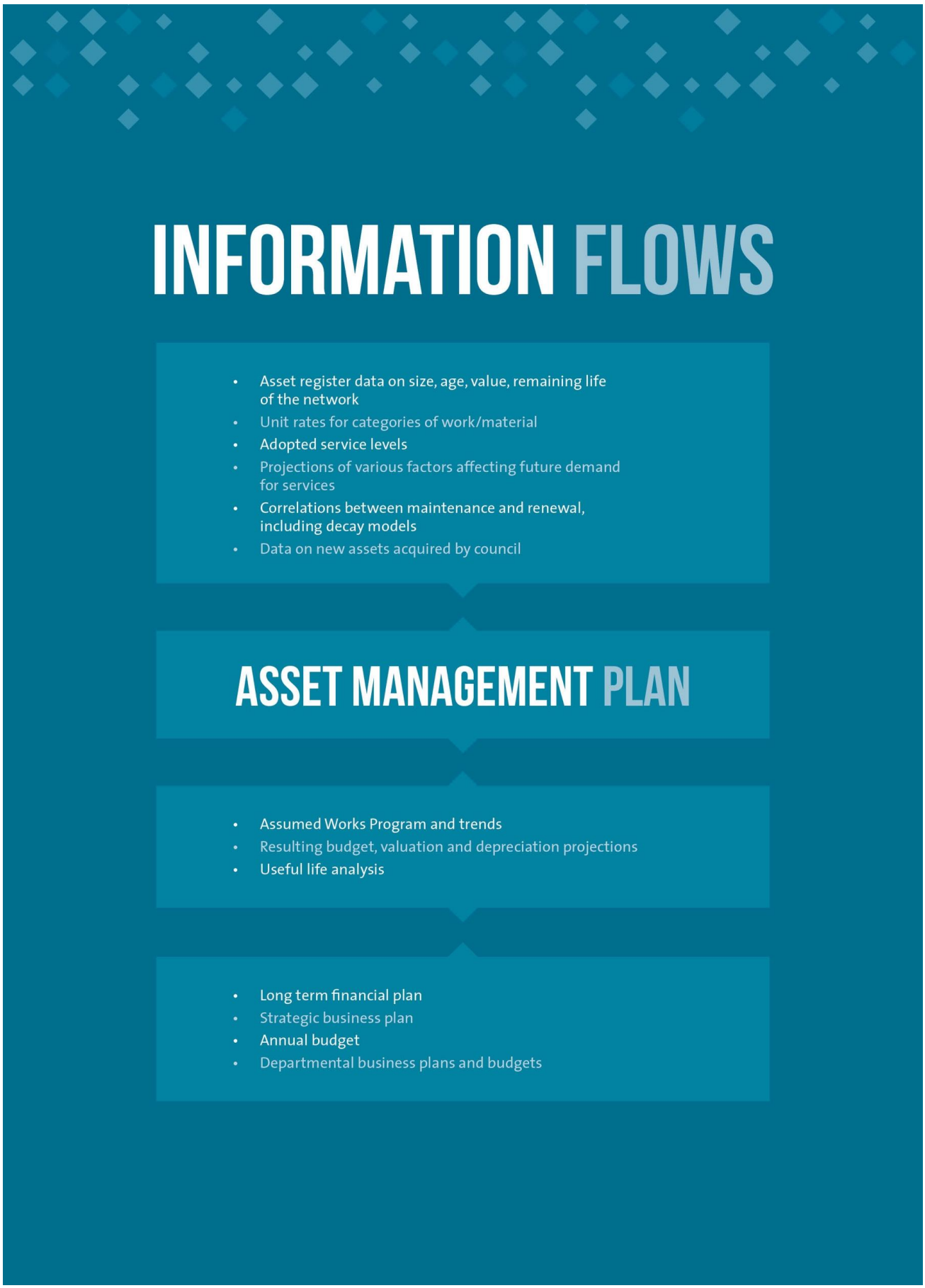
The City of Charles Sturt exists to provide services to its community, some of which are provided by Water Assets. Water Assets have been either acquired by construction undertaken by Council or through contribution of new public infrastructure from developers or the Department of Infrastructure and Transport (DIT). The organisations goal in managing Water Assets is to meet a defined level of service in the most cost-effective manner for present and future users. This AMP is prepared as a combination of 'core' and 'advanced' AMP over a 20-year planning period in accordance with the International Infrastructure Management Manual[1]. Core asset management is a 'top down' approach where analysis is applied at the system or network level. An 'advanced' asset management approach uses a 'bottom up' approach for gathering detailed asset information for individual assets.

The organisation uses a Strategic Asset Management (SAM) system which uses advanced asset management principles to model service levels, future demands and network risks. This assists in modelling the timing of intervention to ensure the service level across the entire network can be managed through a sustainable funding scenario and assists Council in integrating Water Assets into single projects where possible.

Whilst the AMP will focus on network level Water Assets, most of the data used in generating this AMP has been built up from individual assets using advanced principles.

The process the City of Charles Sturt follows for preparing an asset management plan is shown on the following page.

[1] IPWEA, 2020, IIMM.


INFORMATION FLOWS
Asset register data on size, age, value, remaining life of the network
Unit rates for categories of work/material
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
ASSET MANAGEMENT PLAN
Assumed Works Program and trends
Resulting budget, valuation and depreciation projections
Useful life analysis
Long term financial plan
Strategic business plan
Annual budget
Departmental business plans and budgets

Level of Service for Water Assets

Levels of Service are a commitment to carry out a given action or actions within a specified time-frame in response to an event or asset condition. The levels of service defined in this section will be used to:

- Identify the desired level of service that our customers seek and clarify the level of service that our customers should expect;
- Identify works required to meet these levels of service;
- Identify the costs and benefits of the services offered; and
- 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 Water Assets are based on legislative requirements, customer expectations and technical requirements set out by industry standards.

Legislative Service Level Requirements

There are many legislative requirements and regulations relating to the management of assets. Council must comply with these requirements and ensure their assets meet these legislative service levels these include;

- South Australian Local Government Act 1999
- South Australian State Records Act 1977
- Environment Protection Act 1993
- Development Act 1993 / Planning, Development and Infrastructure Act 2016
- Work Health and Safety Act 2012 and Regulations 2012
- Return to Work Act 2014
- Environment Protection (Water Quality) Policy 2015
- Australian Standards
- Water Industry Act 2012 and regulations 2012
- Landscape South Australia Act 2019
- Dangerous Substances Act 1979 and associated Regulations 2008
- Public Health Act 2011

Community Level of Service

The Community Level of Service measures how the customer receives the service and whether value to the customer is provided. The City of Charles Sturt undertook a Community Survey in March 2020 to capture resident's satisfaction with various aspects of services and facilities provided by Council. This task is also undertaken to test the importance of specific aspects of service provided to the community.

The survey results indicate that community is generally satisfied with stormwater infrastructure, however the Community Survey results do not provide us with specific reasons as to why an individual is satisfied, dissatisfied or neutral towards Water Assets. Future Community Survey questioning will be structured to provide more clarity in this regard across the asset classes.

	Importance	Satisfaction (2020)	Change in satisfaction (since 2019)
Stormwater Infrastructure	-	66%	No Change

Table 1 - Community Survey Report Results 2020

Upon Council endorsement of the draft version of this AMP the City of Charles Sturt will seek to consult with the local community to gather more detailed information on their understanding of and satisfaction with the services provided by Water Assets.

It should also be noted that the service level strategy in this AMP is a long-term renewal and maintenance strategy in the early years of its implementation. It is expected that the results of the strategy and any associated changes to community satisfaction will not be evident until some 18 months or more into the AMP planning period.

Environmental awareness is increasing throughout the community and so are their expectations regarding the services Council provide. As part of Council's climate change adaptation program (AdaptWest), Council is seeking to better understand climate change risks and impacts on its operations and services. Western Adelaide is continuing to experience hotter temperatures and reduced annual rainfall with less frequent but more intense rainfall events, all which impact Water Assets. Water Assets can assist with the impact of climate change and be more sustainable in the services they provide to our community in the future, particularly in contributing to:

- Improving Water Sensitive Urban Design practices
- Improving water quality
- Diversification of water supply options i.e. recycled stormwater
- Increasing the urban tree canopy
- Increasing street greening
- Improving flora and fauna biodiversity

Flood Mitigation

Catchment wide stormwater flood mitigation continues to be a major issue for local communities in some areas within the Council. Following the major stormwater upgrade works in the Port Road catchment between 2010 -2020, the West Lakes (the lake) catchment has been identified as the next focus area for flood mitigation.

In the past several years, Council has also responded to service level improvement requests from residents for localised flood mitigation by investigating and implementing cost effective solutions.

Technical Level of Service

Supporting the Community Level of Service are operational or technical measures of performance. These technical measures relate to the allocation of resources to service activities to best achieve the desired outcomes and demonstrate effective performance.

Council's Technical Level of Service measures are linked to ensure the correct activities and appropriate budgets exist to cover the intended service level.

Operations & Maintenance

The activities necessary to retain assets as near as practicable to the City of Charles Sturt's desired service level throughout the network. Maintenance activities enable an asset to provide service for its planned life (e.g. JetVac cleaning out stormwater drains, CCTV inspections, street sweeping, wetland maintenance, pump station maintenance).

Renewal

The activities that return the service capability of an asset up to that which it had originally (e.g. stormwater drain replacement, pump replacements) or in line with current standards.

Upgrade/New

The activities to provide a higher level of service (e.g. increasing the size of a stormwater drain) or a new service that did not exist previously (e.g. a new stormwater drain).

The table below identifies the City of Charles Sturt's Technical levels of service for all Water Assets.

Technical levels of service			
Maintenance/Operations			
Water Assets are well maintained, and the service provides clean and effective capture, re-use and disposal of stormwater runoff for the local community			
Water Conveyance	**Water Quality**	**Water Capture and Re-use**	**Water Amenity**
Stormwater assets are well maintained and functional to provide efficient disposal of stormwater run-off and assist with stormwater inundation mitigation.	Water quality assets are functional and regularly cleaned to improve the quality and facilitate the disposal of stormwater run-off.	Recycled water assets are well maintained and functional to provide maximum opportunity to capture and re-use water.	Amenity assets are clean and well maintained to remain visually appealing to the community.
Renewal			
Water Assets are renewed and replaced in accordance with their asset lifecycle requirements			
Water Conveyance	**Water Quality**	**Water re-use and capture**	**Water Amenity**
Identify, plan and deliver stormwater renewal programs that ensure effective operation of the network and are designed to incorporate adjacent land uses and anticipated stormwater flows.	Identify, plan and deliver renewal programs for water quality assets that ensure that assets are fit for purpose and capacity so that stormwater run-off meets water quality standards.	Identify, plan and deliver recycled water renewal programs that ensure effective operation of the network to maintain operation, service and supply	Identify, plan and deliver renewal programs for ponds and lakes on an as needs basis or as part of a reserve or streetscape upgrade project.
Upgrade/New			
Water Assets are constructed or upgraded to meet current and future function or demand in the network			
Water Conveyance	**Water Quality**	**Water re-use and capture**	**Water Amenity**
New or upgrades to stormwater assets are constructed to improve the capture and diversion of stormwater run-off that have been identified as under capacity.	New or upgrades to water quality assets occur when there is an opportunity to improve water quality at the beginning, middle or end of the stormwater network.	New and upgrades to our recycled water network will occur when there is a recognised benefit in extending our water supply network.	New ponds and lakes will occur where Council works with developers to identify opportunities to beautify a new land development area using water sensitive urban design.

Table 2 - Technical Levels of Service

Water Asset Lifecycle Management

Asset Strategy

Water Asset requirements can differ considerably in different areas of the City and each design or configuration is reviewed on a case by case basis depending on different demand drivers. Generally, there is an aim for assets in high density areas to incorporate the competing demands of open space, urban greening, stormwater detention, and water quality.

Population density, land use, road network, technology, legislation and environmental impacts influence the requirements and demand for Water Assets. As these factors change, the way Water Assets that are used will also change and subsequently alter the demand for Water Assets.

This AMP's strategy is to ensure Water Assets are renewed depending on how they fit into the larger strategy, both now and in the future. The City of Charles Sturt uses the following main criteria to prioritise Water Assets when undertaking renewal, upgrade and new planning;

- Condition
- Risk
- Strategic Importance
- Function
- Capacity
- Alignment with other capital works

Condition and risk form the basis of renewal required in the network with the remaining criteria used to prioritise works. These key criteria are broken down into many test points to develop renewal/new/upgrade programs using the Council's Strategic Asset Management system. This strategy has been developed specifically by the City of Charles Sturt for the City of Charles Sturt and uses all principles from the Asset Management Lifecycle (refer Figure 3 below).

Condition

Council regularly audits the condition of Water Assets to ensure data is up to date and the overall condition of the network is understood. Even in very poor structural condition, the majority of Water Assets can still effectively function.

Conditions are determined as per table 3 below;

Condition Grading	Description of Condition
1	**Very Good**: no defects, insignificant deterioration, only planned maintenance required
2	**Good**: minor defects, minor deterioration, only planned maintenance required
3	**Fair**: minor defects, moderate deterioration, minor maintenance plus planned maintenance
4	**Poor**: moderate defects, significant deterioration, significant maintenance required
5	**Very Poor**: significant defects, significant deterioration, likely requires replacement within 1-15 years

Table 3 - Description of Condition

Risk

Council uses risk assessment as a key criterion to evaluate and prioritise maintenance and replacement of assets.

e.g. Focused proactive maintenance activities conducted in flood prone areas prior to forecast heavy rain event.

e.g. A Box Culvert in an arterial road would be replaced prior to a concrete pipe in the same condition in the same location because box culverts are more at risk of failure due to their shape, shallowness, and reduced useful life compared to pipes.

Strategic Importance
Assets that form part of a Council endorsed strategy are a key driver for the future of the network. Prioritising assets with a high weighting on this criterion will ensure the network can cater for future demands and community expectations.

Function
The City of Charles Sturt has minimum standards/sizes for certain assets in order to improve performance, minimise maintenance and comply with Legislative requirements.

e.g. the minimum recommended size for a stormwater drain is a 375mm diameter Reinforced Concrete Pipe (RCP). Stormwater assets that do not meet the minimum standard will be prioritised over those that do when they are due for renewal at the same time, or an opportunity arises for replacement during road works.

e.g. replacement of steel reinforced concrete pit lids with light weight composite fibre instead, to minimise maintenance and reduce manual handling risk.

Capacity
The City of Charles Sturt is undergoing significant urban redevelopment. This redevelopment and re-zoning of land changes the demand on the Water network and changes the required capacity of assets to adequately service these different uses.

e.g. Stormwater Management Plans identify the required capacity of assets to cater for future demands. Assets that are below capacity will be prioritised over drains that have capacity when they are due for renewal at the same time.

Alignment with other Capital works
As most Water Assets are located underground, the construction activities associated with them can have significant impacts on surrounding assets, particularly roads, which can also increase the cost. To minimise this impact, both the renewal of and construction of new/upgraded assets are adjusted to align with other Capital works where possible, including works in main roads that are managed by DIT.

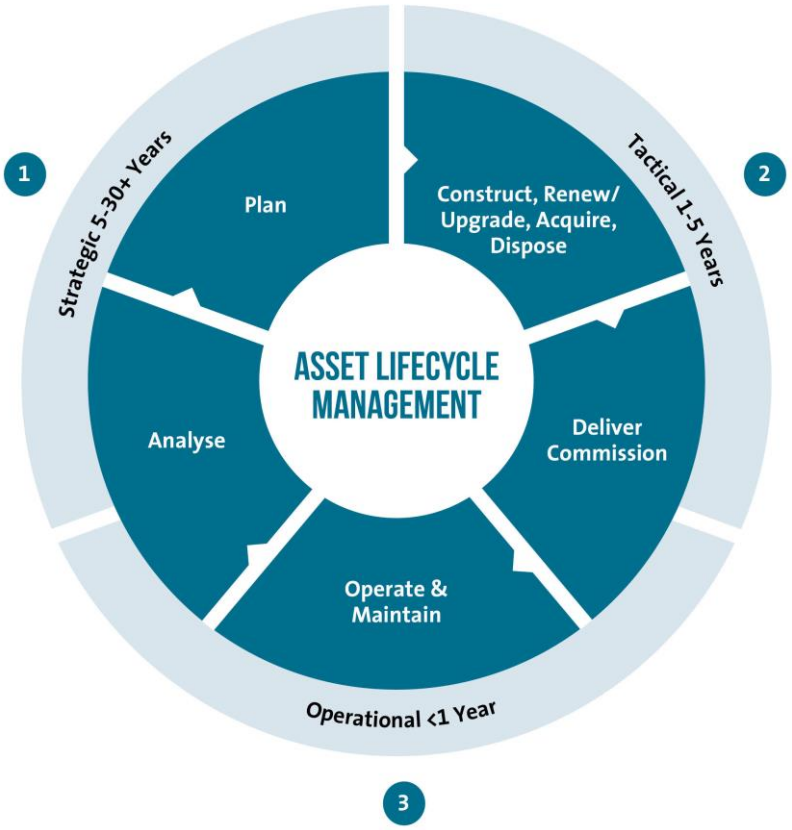


Figure 3 - Asset Lifecycle Management

Asset Maintenance Strategy

In order to minimise risks and keep service levels acceptable during the life of the asset, Council undertakes key maintenance tasks to ensure all Water Assets are still serviceable until they require replacement.

Each asset class requires a different strategy for maintenance intervention and associated expenditure.

The estimated annual costs associated with Water Asset Maintenance strategy is as follows;

Asset Class	Activity	Annual Budget	Maintenance Tasks
Water Conveyance	Stormwater Maintenance	$1,065,000.00	Replacement of components, drain cleaning, inspection, and open drain maintenance funded through Council's operating expenditure.
	Contribution to PAE	$125,000.00	Contribution to Port Adelaide Enfield Council for operating and maintenance expenses for HEP and Torrens Road catchment infrastructure funded through Council's operating expenditure.
	Street Sweeping	$1,160,000.00	Mechanical sweeping of kerb assets to remove debris prior to entering the stormwater system funded through Council's operating expenditure.
Water Quality	Raingarden Maintenance	$20,000.00	Weeding, replanting and rubbish removal to ensure raingardens are functioning optimally funded through Council's operating expenditure.
	Wetland Maintenance	$82,000.00	Weeding, replanting and rubbish removal to ensure wetlands are functioning optimally funded through Council's operating expenditure.
Water Capture & Re-use	Irrigation Bores	$115,000.00	Planned maintenance is undertaken to bores and pumps to ensure they are well maintained based on their condition and specific technical requirements. Funded through Council's operating expenditure.
	Recycled Water Maintenance	$815,000.00	Planned maintenance is undertaken to bores and pumps to ensure they are well maintained based on their condition and specific technical requirements. Funded through Council's operating expenditure.
Water Amenity	Freshwater Lake	$35,000.00 **	Dewatering and cleaning of Freshwater Lake, occurs every 10 years. Funded through Council's Annual Operating Project expenditure.

Table 4 – Water Asset Maintenance Strategy- Estimated Annual Costs

** Cost smoothed over 10 years – actual cost $350,000 cost incurred every 10 years.

Water Asset Risk Management

The purpose of risk management for this AMP is to understand and document consequences and outcomes related to the risks associated with managing Water Assets at a network level. Risks identified in the Water Asset Risk Assessment have been used to form the basis of analysing and determining priorities. Risks need to be managed in a way to ensure operations, maintenance and renewal follow the same principles to ensure all risks are managed throughout the network consistently.

Risk priorities are determined based on risk consequence, risk likelihood, strategic priorities, capacity and asset condition. CCS manages risks in the following way;

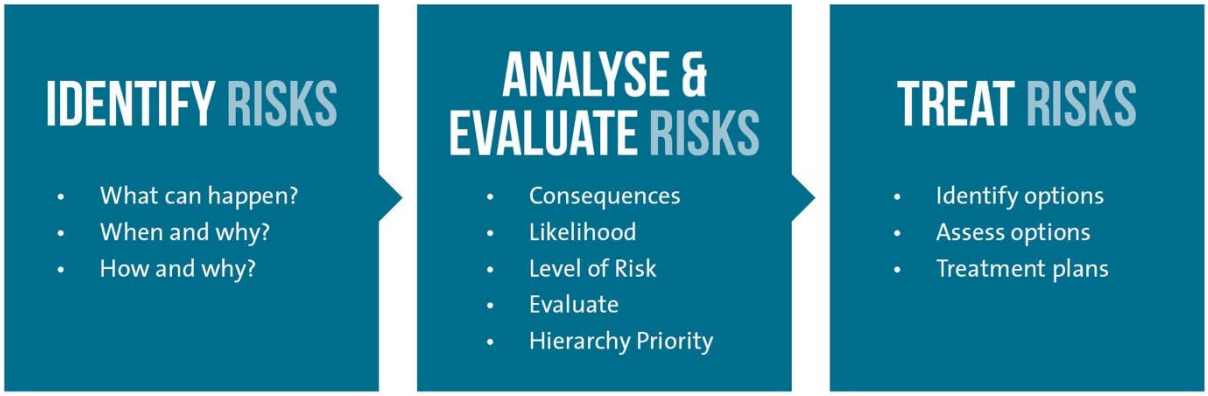


Figure 4 - Risk Management Process

The above risk assessment process:

- identifies credible risks
- identifies the likelihood of the risk event occurring
- identifies the consequences should the event occur
- evaluates the risk
- develops a risk treatment plan for unacceptable risks

The organisation has prioritised decisions made in adopting this AMP to obtain the optimum benefits from its available resources. Council has an existing budget that allows the AMP to balance the risks of Water Assets, and the asset register data provides a basis for where the AMP and future works are generated from. The LTFP that coincides with this AMP ensures major risks are mitigated and the network remains safe and useable for all users.

There are some operations and maintenance activities and capital projects that are unable to be undertaken within the 20-year planning period. These include:

- Upgrading the entire Water Conveyance network to 5-year Average Recurrence Interval (ARI) standard
- Upgrading the entire Water Conveyance network to prevent stormwater flooding
- Replacement of all drainage infrastructure in poor condition

Operations and maintenance activities and capital projects that cannot be undertaken as a result of the above will affect the level of service of the network and pass on risks to users. These could result in flooding, restricted access to homes and businesses, reduced ability to provide recycled water, and reduced water quality.

Financial Summary

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

The expenditure and valuations projections in this AMP are based on best available data. Currency and accuracy of data is critical to effective asset and financial management.

Data confidence is assessed as reliable with high confidence for this AMP. Data is based on sound records, procedures, investigations and analysis, documented properly but has minor shortcomings, for example some of the data is old, some documentation is missing and/or reliance is placed on unconfirmed reports or some extrapolation. The Water Asset data is complete and estimated to be accurate ± 10%.

Asset valuations

The overall value of Water Assets as at 30th June 2020 is approximately $390 million*, and the value of each asset class can be found below;

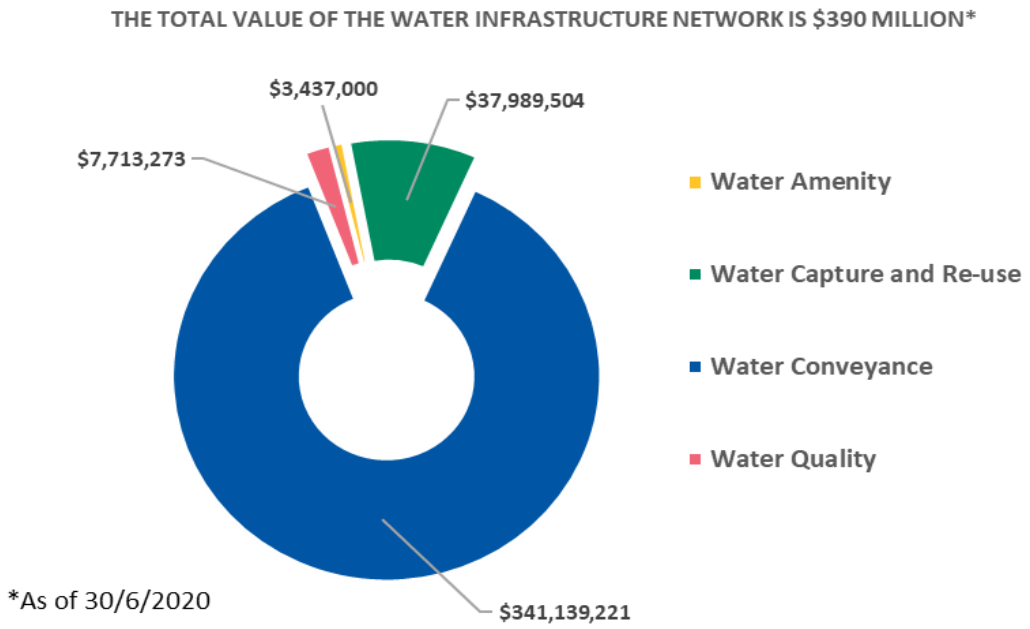


Figure 5 – Water Asset Network Values

The best available estimate of the value of assets included in this Asset Management Plan are outlined below;

- Gross Replacement Cost $390,278,997.07
- Written Down Value $227,824,802.90
- Annual Average Asset Consumption $5,194,858.81

Gross Replacement Cost

Refers to the current replacement value of all Water Assets.

Written Down Value (WDV)
Refers to the current replacement cost of an asset less, where applicable, accumulated depreciation calculated based on such cost to reflect the already consumed or expired future economic benefits of the asset.

Annual average asset consumption
Refers to the ratio of annual asset consumption relative to the depreciable amount of the assets. It measures the amount of the assets that are consumed in a period (depreciation) expressed as a percentage of the depreciable amount. This is based on a straight-line depreciation.

Long Term Asset Renewal Funding Costs

Life cycle costs (or whole of life costs) are the average costs that are required to sustain the service levels over the asset life cycle. Life cycle costs include, renewal, operations and maintenance expenditure and asset consumption (depreciation expense). The life cycle cost for the services covered in this asset management plan is **$8,860,559** per year (average operations and maintenance expenditure plus depreciation expense projected over 10 years).

This AMP has identified the current City of Charles Sturt's LTFP contains a funding deficit. This occurs as the AMP proposes an increase in overall renewal replacement of Water Conveyance assets.

Life cycle expenditure over the 10-year planning period is **$5,992,607** per year (average operations and maintenance plus capital renewal budgeted expenditure in LTFP over 10 years).

The proposed LTFP Life cycle expenditure is **68%** of life cycle costs and reflective of the very long estimated useful life of Water Assets. The comparison of life cycle costs and life cycle expenditure highlights any difference between present outlays and the average cost of providing the service over the long term. If the life cycle expenditure is less than that life cycle cost, it is most likely that outlays will need to be increased or cuts in services made in the future.

Sustainability of service delivery

Two key indicators for service delivery sustainability that have been considered in the analysis of the services provided by this asset category are:

- asset renewal funding ratio; and
- long term budgeted expenditures/projected expenditure (over 10 years of the planning period).

Projected expenditures for Long Term Financial Plan

LTFP's and projected expenditure can be found above in the executive summary of Water Assets and asset categories.

Expenditure projections are in 2020 real values. It is evident that Water Assets are a major asset class for the City of Charles Sturt and have significant impact on LTFP spending. Due to changes in renewal and new/upgrade strategies proposed in this AMP, the projected capital requirements to achieve 68% of life cycle costs have identified an average funding gap of **$1,476,487** per year for the life of the plan with the City of Charles Sturt existing LTFP (2017).

Building for the future

Future Demand

Our population has continued to grow over the past 12 months with the current estimated resident population being 117,382. The chart below shows the growth in our City's population in the past 7 years, increasing in that time by 7,459 people. Based on such projections over the 20-year planning period for this AMP it is expected that population will increase by approximately 20,000 people.

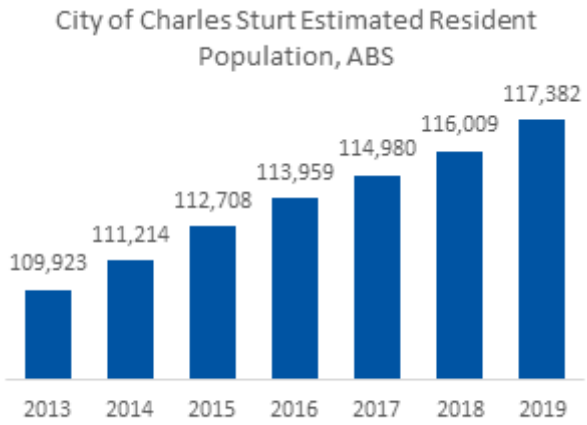


Figure 6 - City's Population Growth

This population growth will largely be achieved through increased housing density by new land developments and localised urban infill. This will result in increased impervious areas and subsequent runoff volumes, and subsequently, demand for additional stormwater drainage capacity will increase.

For large scale land developments, the new assets required to meet demand and growth of the community will be acquired free of initial cost from developers through construction of new public infrastructure. Acquiring these new assets will commit the organisation to fund ongoing operations, maintenance and renewal costs of these assets for their economic lives.

For infill development, the approach in existing Development Plans has been to require individual sites to manage stormwater onsite, ensuring that any flows leaving the site do not exceed pre-development levels. This approach is also envisaged in the draft Planning and Design Code.

Climate Change

We are already feeling the effects of climate change. Predictions for Western Adelaide indicate further reduction in annual rainfall but more intense rain events, more frequent and intense heatwaves along with sea level rise. Despite global efforts to mitigate greenhouse gas emissions, the momentum of the climate system means that the observed climatic changes will continue with increasing magnitude, for many decades to come.

With respect to the management of Water Assets, the key risks associated with the projected changes in climate are as follows:

- A reduced level of service (greater frequency of flooding) due to the higher intensity rainfall events resulting in higher peak flows.
- Higher downstream water levels as a result of rising sea levels.
- Rising groundwater levels as a result of rising sea levels.
- Impacts on the function of existing water harvest and reuse schemes due to changes in rainfall patterns and increasing evapotranspiration.

The City of Charles Sturt is committed to understanding these risks and impacts to better inform decision making through the improvement plan in this AMP.

The AdaptWest Climate Change Action Plan (URPS, 2016) was developed collaboratively by the City of Charles Sturt, Port Adelaide-Enfield and West Torrens. It aimed to identify the regional specific implications of climate change and provide realistic strategies for communities within the region to adapt.

The City of Charles Sturt is working to adapt to climate change and reduce our environmental footprint. This requires investigation into renewing Water Assets with a focus on Water Sensitive Urban Design to contribute to street greening, increasing tree canopies and biodiversity, and reducing the urban heat island effect.

Water Sensitive Urban Design (WSUD)

Implementing WSUD is a high priority of the SA Government and strongly aligns with the biodiversity, sustainability and climate change resilience objectives identified in many of Councils strategic documents. WSUD can address stormwater, environment, and liveability issues all at once, and help communities become more pleasant places to live and work.

WSUD infrastructure throughout the City will help develop adaptable and sustainable aquatic environments, which are integral to supporting biodiversity improvements and a thriving urban forest. They follow on from previous streetscape raingardens to create fauna habitats which will improve urban biodiversity through connected and biodiverse resilient landscapes. WSUD infrastructure also ensures that our streetscapes continue to provide living and walkable streets by maintaining amenity and reducing the Heat Island effect.

Council have recently endorsed additional funding for the continued construction of raingardens with the Tracey Avenue Catchment and to widen the installation of WSUD infrastructure across the City in association with other Capital projects. This funding is reflected in this AMP and will be also incorporated in the next revision of the LTFP.

Continuous Improvement

In February 2017, Council endorsed the previous revision of the Water AMP. That revision aimed to undertake significant improvements prior to this revision, which have been achieved:

- Consistency in the capture of asset data and improvement in the analysis.
- Development of 'Criticality' rating that categorises the risk of an asset by pipe type, location and condition.
- Completion of Port Road Drainage project.

To undertake this AMP, the City of Charles Sturt undertook the following tasks;

- Scheduled Financial Valuation of Water Assets (underway)
- Scheduled Condition Audit of pump stations (underway)
- Scheduled Condition Audit of recycled water valves (late 2019)
- Rolling Condition Audit of stormwater drains (ongoing)
- Revision of Water Conveyance Renewal Strategy (mid 2020)
- Revision of the LTFP for Water Assets (late 2020)
- Aligning State and Council strategic objectives to Water Asset Management

This AMP will be reviewed during annual budget planning processes and amended to show any material changes in service levels and/or resources available to provide those services as a result of budget decisions.

The AMP will be updated every 2-4 years to ensure it represents the current service level, asset values, projected operations, maintenance, capital renewal and replacement, capital upgrade/new and asset disposal expenditures and projected expenditure values incorporated into the LTFP.

The AMP has a life of 4 years but is due for complete revision and updating within 2 years of the upcoming Council election.

Improvement Plan

This AMP aims to undertake the following actions over the planning period to ensure continual improvement of the Water AMP.

Action	Timeframe
Review and update Water Assets Risk Assessment	Within 6 months of AMP endorsement
Develop a Water Asset Strategy document to guide future integrated decision making	3 years
Improve asset data quality through continuation of internal & independent audits	Ongoing
Strategic improvements to user access and safety	Ongoing
Further develop the Asset Operations & Maintenance Strategy	Ongoing
Designing for future climate conditions and understanding cost implications	10 years

Table 5 - Improvement Plan Actions

Conclusion

This Asset Management Plan (AMP) communicates the actions required for the management of Water Assets owned and maintained by the City of Charles Sturt (and services provided from assets), compliance with regulatory requirements, and funding needed to provide the required levels of service over a 20-year planning period.

The identified funding scenarios and asset lifecycle management strategies in this AMP have been designed to ensure that Water Assets facilitate the movement and treatment of water within our City, while ensuring the overall asset network is in an acceptable and safe condition.

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