



WATER ASSET MANAGEMENT PLAN

2024-2033

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EXECUTIVE SUMMARY

BACKGROUND

Livingstone Shire Council's Water Supply assets are critical to the delivery of a clean, safe and reliable water supply which is vital to the economic, social and physical well-being of our community. Their effective management is crucial to the sustainable delivery of those services to meet community needs and aspirations now and in the future. Local Governments exercise their duties to maintain, operate and improve their infrastructure networks under increasing pressures that include:

- Limited budgets: with competition for funding across a range of services
- Limited resources: both human resources and materials
- Mature networks: which have a significant maintenance demand
- Increased accountability: to customers and funding providers
- Increasing public expectations: the public are increasingly informed and expect a higher level of service from their assets

Despite these challenges, Council is responsible for effectively accounting for and managing its assets and having regard for the long term and cumulative effects of its decisions. This is a core function of local government authorities and is reflected in the Local Government Act. Furthermore, a strong and sustainable local government system requires a robust planning process to ensure that these assets are managed in the most appropriate way on behalf of local communities.

The aim of this plan is to enhance the sustainable management of Livingstone Shire Council's water supply assets by encouraging 'whole of life' and 'whole of organisation' approaches and the effective identification and management of risks associated with the use of the assets. It encourages a long-term view of asset management and requires Council to understand and then meet the impacts of social, economic and environmental change in ways that ensure sustainable use of physical and financial resources whilst meeting community expectations.

Asset management plans form part of Council's Asset Management System that supports the Community's Plan. The Community Plan provides a vehicle for the community to express its long-term aspirations. However, these aspirations will not be achieved without sufficient resources – time, money, assets and people – to carry them out. The Asset Management System is a critical link when it comes to translating these strategic objectives into actions.

This plan documents asset management planning information. It includes a review of strategic trends facing the Council and potential impacts on the asset stock; asset condition and performance against key indicators; long term financial forecasts; and an improvement plan for managing the assets. Financial implications for providing required levels of service into the future are also provided based on modelling.

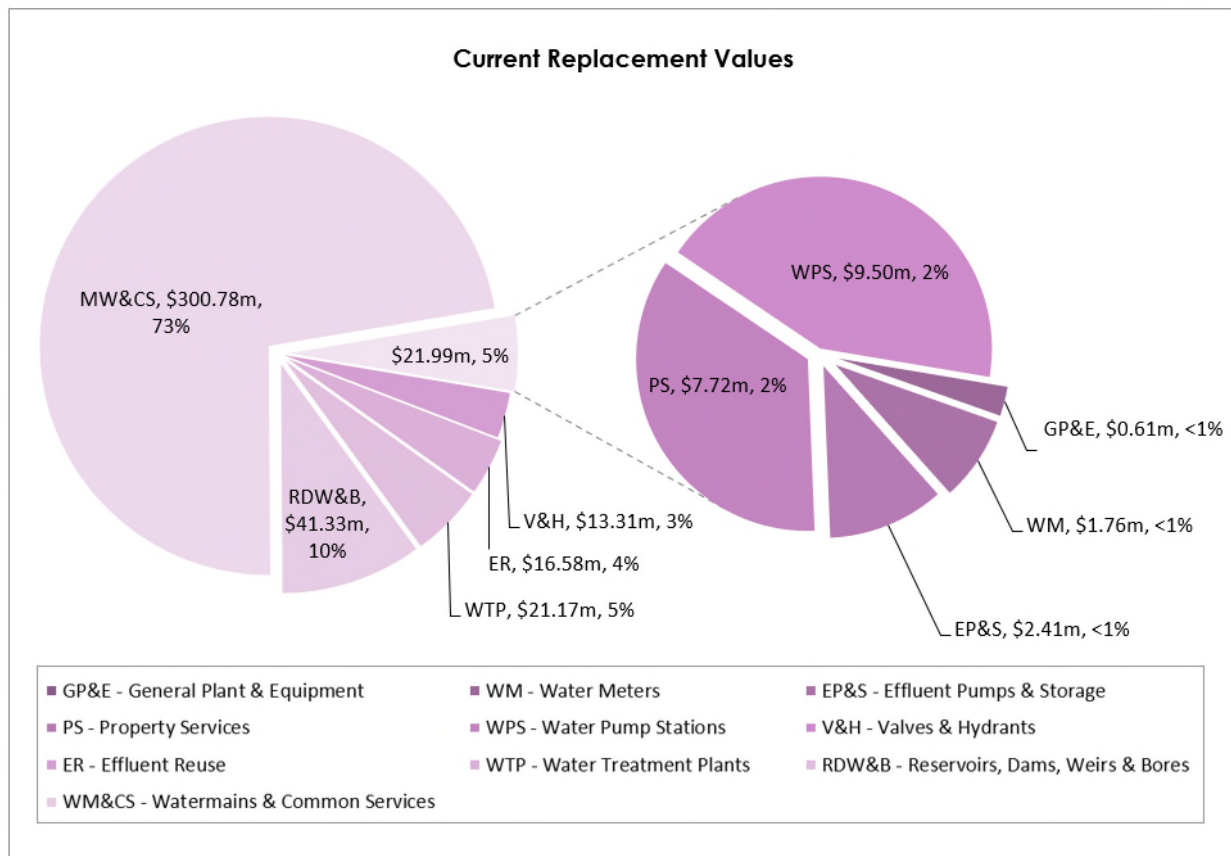
OUR WATER ASSETS

Council operates three potable and one non-potable water supply schemes and two recycled water schemes providing water to urban and rural customers in several localities throughout its local government area. Water for the Capricorn Coast is sourced from Water Park Creek in Woodbury and through a bulk water purchase arrangement with Rockhampton Regional Council. A bore water catchment to tap scheme serves the community of Marlborough with the entire potable water supply for Livingstone Shire areas immediately to the north and south of Rockhampton sourced from the Glenmore Water Treatment Plant reticulation network.

Recycled effluent is sourced from Council's Sewage Treatment Plants (STP) at Emu Park and Yeppoon. Assets covered by this Asset Management Plan are listed below:

	Property Services	Water Meters	Valves	Hydrants	Water Mains	Pumping Stations	Reservoirs	Treatment Plants
Water Supply	11,428	13,468	3,472	3,467	587,395m	21	22	2
Recycled Water	NA	37	130	NA	36,879m	3	3	NA

These assets have a current replacement value of approximately \$415 million. Assessment of the condition of our water supply assets was undertaken in 2022 during a comprehensive revaluation. The assets are rated on a one to five scale with one being the highest rating and five the lowest.



LEVELS OF SERVICE

Livingstone Shire Council aims to provide reticulated potable water supply to the consumer to meet the demands imposed upon it by both consumers and fire-fighting requirements. It is acknowledged that in some cases, the desired standards of service may not be met. In these situations, Council aims to meet the standards to the greatest degree practicable. Council has adopted the following Customer Level of Service objectives in relation to its potable water supply assets:

Level of Service	Objective
Reliability	The water supply system will provide water twenty-four (24) hours a day seven (7) days a week
Adequacy of supply	The objective of the water supply system is to provide to the consumer a reticulated potable water supply to meet the demands imposed upon it by both the consumer and firefighting requirements.
Quality of supply	Livingstone Shire Council will ensure that the water quality is generally in accordance with recognised standards that safeguards community health.
Value for Money	Water will be priced fairly, costs recovered equitably, and sustainability ensured for future generations.
Environmental impacts	The environmental impacts of the water supply network are minimised in accordance with community expectations.

FUTURE DEMAND AND CAPACITY

Future demand is catered for by expenditure for new works in the forward capital works program.

The main demands for new services are created by:

- Population Growth
- Demography Change
- Property Development

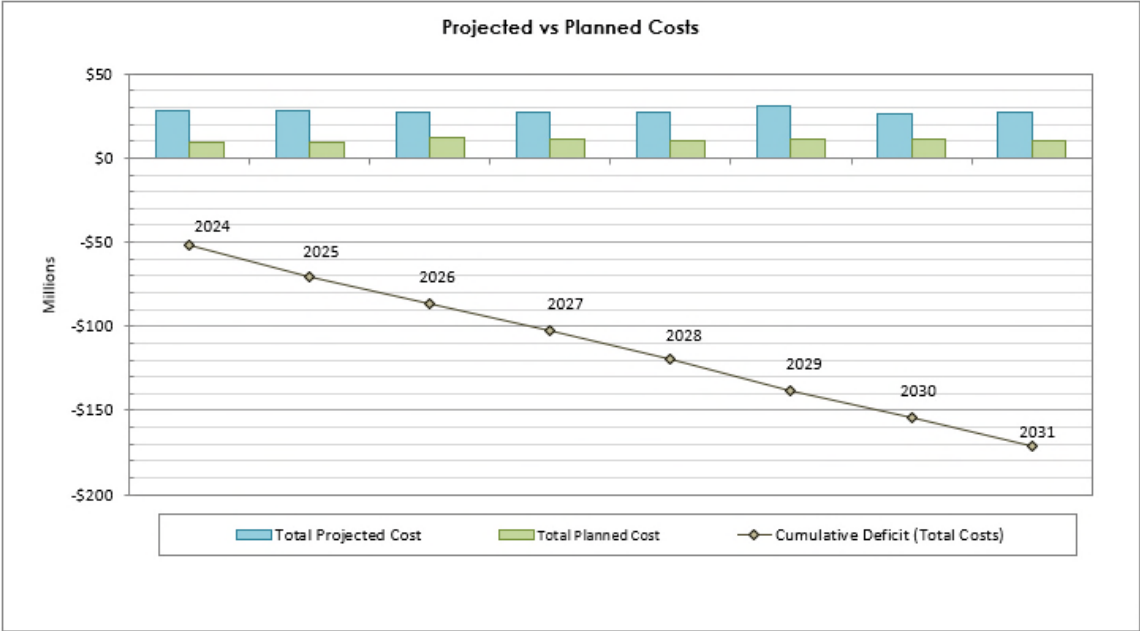
Additional actions which will have an effect on future demand include:

- Livingstone Shire Council Planning Scheme – Part 4 Local Government Infrastructure Plan (LGIP)
- Livingstone Shire Council Drinking Water Quality Management Plan (DWQMP)
- Livingstone Shire Council Customer Service Standards – Water & Sewerage Services
- Kelly's Off-stream Storage Emergency Action Plan
- Bulk Water Supply Agreement Between Rockhampton Regional Council & Livingstone Shire Council
- Livingstone Shire Council Drought Management Plan
- Water Park Creek Operating Rules MSP.034
- Environmental Management Plan – Woodbury WTP
- Our Living Coast - Livingstone Coastal Hazards Adaptation Strategy (CHAS)

LIFECYCLE EXPENDITURE

The projected outlays necessary to provide the services covered by this Asset Management Plan (AMP) includes operations, maintenance, depreciation, renewal and upgrade of existing assets over the planning period is \$274.6 million or \$27.5 million on average per year. Estimated available funding for this period is \$137.9 million or \$13.8 million on average per year which is 50% of the cost to provide the service. This is a funding deficit of \$13.7 million on average per year.

There is obvious risk exposure here that Council is prepared to accept that could see over the ten-year life of the AMP the number of assets in condition 5 – poor – increase, this would come with a corresponding increase likely in maintenance costs particularly reactive maintenance costs and an increase in service failures and failure to meet Council’s desired level of service.



OPERATIONS AND MAINTENANCE

The average of the previous 7 years maintenance is \$3.0 million per annum with a projected maintenance expenditure of \$3.0 million in 2023/24.

NEW AND UPGARDE WORKS

Planned (Budgeted) new and upgrade works over the next 10 years to 2032/33 totals approximately \$14.8 million, as outlined in Councils Forward Works Program. This will increase annual depreciation by approximately \$1.6 million by 2032/33.

RENEWALS

Total ‘planned’ renewal spend as outlined in Councils Forward Works Program is \$19.3 million over the next 10 years.

The ‘projected’ renewals have been determined from a combination of the 2022/23 comprehensive water revaluation and associated condition assessments. These are renewals based on the desired levels of service or engineering life of assets and total approximately \$74.5 million over the next 10 years or 18% of the current total water replacement cost.

At present, comparison between projected and planned renewals has identified a possible trend of underspending on renewals by approximately \$5.5 million per annum over the 10-year life of this plan.

IMPROVEMENT PROGRAM AND PLAN MONITORING

A 12-month program is included in this AMP for implementing the improvement actions identified in preparing this plan. This AMP and Improvement Program will be reviewed and updated annually.

ASSET SUSTAINABILITY

A financial measure of satisfactory levels of expenditure on asset replacements is the Asset Sustainability Ratio – the net capital expenditure on renewals as a percentage of depreciation. It indicates whether the amount of replacement exceeds or is less than the amount of depreciation, that is whether assets are being replaced at the rate they are wearing out.

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INTRODUCTION

PURPOSE OF THE PLAN

The purpose of this Asset Management Plan (AMP) is to assist Council in:

- Demonstrating responsible management
- Communicate & justify funding requirements
- Outlining the measurable service levels
- Complying with regulatory requirements

This plan documents asset management planning information for the water assets of the Livingstone Shire Council. This includes a review of strategic trends facing the Council and potential impacts on the asset stock, asset condition and performance against key indicators, long term financial forecasts for the 10-years 2023/24 to 2032/33 and an improvement plan for managing the assets. Financial implications for providing the required levels of service into the future are based on the associated separate spreadsheet model for the AMP.

KEY STAKEHOLDERS

The key stakeholders in the preparation, implementation and future revisions of this asset management plan are all those who have an interest in the assets and their operations. Stakeholders are summarised in Table 1.

It should be noted that the below expectations can only be achieved in full if council provides the necessary funding to do so. It is anticipated that service trade-offs may well be required because of inadequate funds being available to meet the required funding requirements outlined within this plan.

Table 1: Stakeholders and Expectations

Stakeholder	Expectations
The Community of Livingstone Shire as represented by their Councillors	Assets are maintained and operated in good condition. Assets are safe to visit and use.
Council staff in particular Community Assets as custodians of the plan and Water & Waste as custodians of the assets.	Assets are maintained and operated in a financially sustainable manner. Appropriate systems and tools are in place to perform the required asset management functions. Risks to the assets are known and managed at the appropriate level. A robust evidenced based decision-making process enables applicable funding applications to be made to enable the assets to be operated and maintained to the required LOS.
Livingstone Shire Council - Councillors	Financially sustainable decision-making ensuring inter-generational equity and an appropriate level of risk exposure.
Suppliers, Contractors (incl. RRC & FRW)	Contractual obligations are upheld. A partnership approach is adopted.
Developers	Development Application and Legislative obligations are upheld. A partnership approach is adopted.
State, Federal Government including Department of Transport & Main Roads (DTMR)	Assets are built, operated, maintained and disposed in compliance with any legislative and regulatory requirements. All financial and reporting obligations are upheld.

COUNCIL SYSTEMS

ASSET MANAGEMENT

An asset management system (AMS) provides the framework for assets to contribute to the delivery of Council's goals and strategies included in the Corporate Plan 2020-30 and assists by providing evidenced-based decision-making to inform the annual planning process and Long-Term Financial Plan. The AMS comprises the following asset management documents:



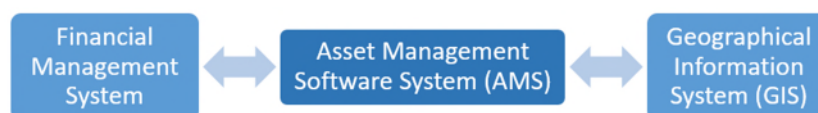
The Asset Management Policy provides the guiding principles and framework to strategically manage infrastructure services and physical assets owned or controlled by Council with a focus on the organisations long life infrastructure assets including water supply.

The Strategic Asset Management Plan (SAMP) documents information that specifies how organisational objectives are to be converted into asset management objectives, the approach for developing asset management plans, and the role of the asset management system in supporting achievement of the asset management objectives and the portfolio level decision making criteria.

Service Delivery Plans direct Council's operational plan and budget toward achieving community plan goals and report on progress toward achieving corporate plan outcomes and deliverables against key performance indicators.

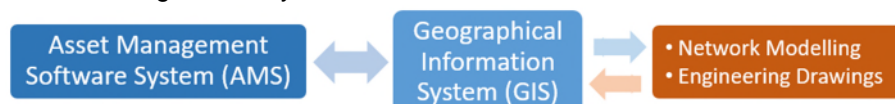
ENABLING SYSTEMS

Council's AMS has a direct connection and interdependency with the following council systems:



MODELLING & ANALYSIS

Water asset information recorded in Council's AMS has direct and indirect links to other databases and systems used for modelling and analysis:



COUNCIL'S GOALS

Council's Corporate Plan 2020 to 2030 centres on the goals of our community (as outlined in the Community Plan) and guides strategic direction, operational activities and annual budget. The Corporate Plan is structured around the five (5) themes of the Community Plan and outlines the following:

- Council's Statement of Intent
- Goals
- What we will do (outcomes & deliverables)
- Performance Indicators

THE COMMUNITY'S VISION

Livingstone Community Plan: Towards 2050 is a 30-year community planning project guided by the Livingstone community, for the community. Livingstone Shire Council led a whole of community planning process to develop a 30-year vision with clear community priorities for the region. The process will shape and define the future priority projects and strategies which Council implements and / or influences. This asset management plan has been developed to align with the Community's vision:

"Livingstone is welcoming, connected, and resilient with a relaxed community spirit, celebrated for its natural beauty, vibrant culture and thriving economy."

The planning process identified where the community is now, as well as where it wants to be in the future. It provided a clear set of strategies with a view to achieving the community's priorities and aspirations for the future. The five (5) key themes from the Community Plan are outlined below with the relevant statement of intent.

Table 2: Community Plan Themes

Strategic Theme		Statement of Intent
1	Liveable Livingstone	A 'Liveable Livingstone' will support and advocate for services for the wellbeing of the people of Livingstone at any age and with any ability
2	Thriving Livingstone	A 'Thriving Livingstone' will prioritise the Traditional Owners and the importance of the place and country of Indigenous people; offer a diverse range of cultural activities and events; and develop and sustain a diverse economy
3	Natural Livingstone	A 'Natural Livingstone' will protect, sustainably manage and enhance the natural beauty, landscapes and resources of the country of the Darumbal and Woppaburra people in order to safeguard the sustainability and environmental resilience of the region into the future
4	Leading Livingstone	A 'Leading Livingstone' will provide transparent, accountable leadership which listens to the needs of the Livingstone community and advocates for Livingstone's interests to State and Federal Governments
5	Future Livingstone	A 'Future Livingstone' will become a resilient community prepared for future economic, social, environmental and infrastructure challenges to ensure Livingstone retains its unique character and thrives into the future

INTERLINKED PLANS & STRATEGIES

In addition to the abovementioned strategic framework, several other Council planning documents inform and influence this Asset Management Plan. These include:

- Livingstone Shire Council Planning Scheme – Part 4 Local Government Infrastructure Plan (LGIP)
- Livingstone Shire Council Drinking Water Quality Management Plan (DWQMP)
- Livingstone Shire Council Customer Service Standards – Water & Sewerage Services
- Kelly's Off-stream Storage Emergency Action Plan
- Bulk Water Supply Agreement Between Rockhampton Regional Council & Livingstone Shire Council
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SUSTAINABLE MATERIAL SELECTION

Council is committed to sustainable construction material selection when constructing new or renewing existing water assets. Council's goal is to increase recycled material content by investigating the use of recycled plastics, glass and other technologies.

'Environmental Protection' is a sound contracting principle in Council's Procurement Policy set out in the Local Government Act 2009. Council's Environmental Sustainability Policy includes principles relevant to sustainable material selection; 'Procuring Goods & Services', 'Sustainable Planning, Design & Infrastructure'. Council as a participating local government in the Capricorn Municipal Development Guidelines committee will explore options to incorporate sustainable material selection principals into CMDG technical documents.

ASSET MANAGEMENT PLAN ACTIONS

The actions taken by the Water Asset Management Plan to address Council's community and corporate planning goals and outcomes are outlined over page.

Table 3: Strategic Planning Linkages to this AMP

Strategic Themes		Community Plan Goals	Corporate Plan Outcomes	Asset Management Actions	
2	Thriving Livingstone	2.3 A welcoming & desirable place to visit	2.3.3 Maintain foreshore facilities to a high standard for the benefit of the community and to continue to attract visitors	2.3.2 Council provides and maintains infrastructure which encourages business and tourism growth	Develop clear level of service for Foreshore assets
	3	Natural Livingstone	3.1 Enhanced reuse & recycling of resources	3.1.1 Investigate options for locally-based, accessible re-use and recycling systems for waste, water and energy	3.1.1 Enable and support sustainable waste management technologies, services and facilities which provide innovative and compliant solutions to reduce the environmental impacts of Council's waste collection & resource recovery operations
3.1.2 Support transitions to alternative forms of energy			3.1.2 Partner with the community to divert and minimise waste and invest in renewable energy	Identify opportunities for transition to renewable energy, reduce council's energy use and increase energy efficiency.	
3.2 Protection of coastlines & waterways		3.2.1 Secure clean drinking water sources and protect drinking water catchments.	3.2.1 Assess alternative options to increase water sources	Identify water supply constraints and review AMP following development of Regional Water Supply Security Assessment	
		3.2.2 Develop coastline and ocean health strategies to minimise pollution, protect Livingstone's unique marine environment and manage future sea level rise	3.2.4 Plan Council's response to climate change by implementing the actions in the Coastal Hazard Adaption Strategy	Align Asset Management Plan with Coastal Hazard Adaptation Strategy	
		3.2.3 Pursue excellence in environmental and industry practices to protect and enhance environmental health	3.2.3 Collaborate with partners to reduce sediments and nutrients in waterways	Collaborate with State Government and relevant agencies to develop catchment health strategies	
4	Leading Livingstone	4.1 Innovative & accountable leadership to achieve a shared future	4.1.1 Ensure that all decisions are strategically aligned with Livingstone Community Plan: Towards 2050 and regularly report the progress against the Plan to the community.	4.1.1 Implementation of the Community Plan and Corporate Plan is well co-ordinated across Council and through a delivery mechanism which provides clear line of sight, accountability, and performance measurement for all employees	AMP is a delivery mechanism for implementation of Community and Corporate Plan.
			4.1.2 Ensure that Council expenditure is sustainable and rating systems are equitable	4.1.2 Council produces and delivers against sustainable financial forecasts as a result of best practice Capital and Asset Management Plans which guide project planning and service delivery across the Shire	AMP forecasts and analysis are used to assess financial sustainability across all asset classes. This guides project planning and service delivery.
			4.1.3 Provide financial data to the community which makes transparent costs and subsidies of all services and to all locations across Livingstone	4.1.3 A continuous improvement focus underpins the organisation, creating a supportive environment for ideas and positive, well-managed change which enhances internal and external outcomes	Continuous improvement of council's asset management facilitated by Strategic Asset Management Plan (SAMP) and AMP improvement program actions. AMP's published on the LSC website for transparency.
			4.1.4 Pursue financial sustainability through effective use of Council's assets and resources and prudent risk management	4.1.4 Provide leadership and contemporary management systems which drive a co-ordinated and connected organisation	Review AMP to ensure assets are managed and maintained to target service levels. This AMP includes commentary on required financial expenditure to ensure sustainability of the Council's assets.
	4.3 Engagement with the community as advisors & partners	4.1.6 Risk management practices are embedded into decision making processes	4.1.6 Risk management practices are embedded into decision making processes	AMP references Enterprise Risk Management Procedure (ERMP) and Asset Criticality Management Plan.	
		4.3.1 Serve the community by providing great customer experience, valued for money and quality services	4.3.1 Plan, develop and implement high-quality customer-focused services	Review and update AMP to ensure Council's assets are managed and maintained to target service levels.	
		4.3.3 Engage with the community in meaningful dialogue and demonstrate how community participation is being used to inform decisions	4.3.3 Take actions to enable the use of meaningful tools to engage the community on diverse issues so that the community is well informed and can contribute to decision making	Explore opportunities for community engagement with Council's Asset Management processes.	
5	Future Livingstone	5.1 Balanced environmental & development outcomes	5.1.1 Maintain the distinct qualities of the Livingstone identity and ensure that new development is sympathetic to the characteristics and local needs of particular localities	5.1.1 Maintain a clear and comprehensive planning vision for the region	Develop a methodology for identifying characteristics and local needs of particular localities to inform Asset Management Planning

UNDERSTANDING OUR ASSETS

Livingstone Shire Council supplies potable and non-potable water to urban and rural customers in several localities throughout its local government area. Council's Water asset class incorporates both Active and Passive assets. The Active assets include items such as Water Treatment Plants, Water Pump Stations, Reservoirs, Dams, Bores, Effluent Pumps and Storage and General Plant and Equipment. The passive assets include items such as Mains, Valves, Hydrants, Water Meters and Property Services.

ASSET INVENTORY AS AT JULY 2022

The total of the asset stock covered by this plan is outlined below.

Function	Quantities		Replacement Value	No. of Assets	Annual Depreciation	Written Down Value	% Written Down
Effluent Pumps & Storage	Number	6	\$2,413,435	33	\$59,065	\$1,684,528	70%
Effluent Reuse	Pipe Length	36,879m	\$16,873,466	311	\$227,513	\$12,382,686	73%
	Valves	130					
	Meters	36					
General Plant & Equipment	Number	41	\$612,714	41	\$40,951	\$237,696	39%
Property Services	Pipe Length	122,624m	\$7,715,257	11,428	\$198,003	\$3,591,852	47%
Reservoirs, Dams, Weirs & Bors	Number	19	\$41,325,125	125	\$593,069	\$25,268,785	61%
Valves & Hydrants	Valves	3,472	\$13,314,385	6,939	\$422,865	\$5,858,187	44%
	Hydrants	3,467					
Water Meters	Number	13,468	\$1,756,057	13,468	\$150,228	\$866,166	49%
Watermains & Common Services	Number	587,395m	\$300,783,746	3,576	\$3,707,014	\$181,433,775	60%
Water Pump Stations	Number	21	\$9,496,074	192	\$279,491	\$4,219,557	44%
Water Treatment Plant	Number	2	\$21,160,197	148	\$428,148	\$9,072,964	43%
TOTALS			\$415,450,456	36,261	\$6,106,347	\$244,616,196	

Table 4: Total Asset Inventory

WATER SUPPLY SCHEMES

Council operates three potable and one non-potable water supply schemes.

CAPRICORN COAST SCHEME

Servicing the communities of Yeppoon, The Causeway, Kinka Beach, Zilzie, Emu Park and Keppel Sands, The Capricorn Coast Scheme is a multiple entity potable scheme that has 2 distinct water supplies. The first supply is Water Park Creek which is harvested into the Kelly's Off-stream Storage. Water from this storage is conventionally treated and disinfected by the Woodbury Water Treatment Plant (WTP), which is operated by Livingstone Shire Council.

Raw water is pumped from the intake at Water Park Creek, situated above a weir impounding around 300 ML and consisting of a fixed single intake pipe structure approximately one metre beneath the normal water level. The duty/standby low lift pumps of ~ 150 L/sec capacity pump water a distance of approximately 400 m to the Water Park Creek High Lift Pump Station (2 pumps of ~150 L/sec capacity each) which then pumps the water about 20 km to the 1,200 ML Kelly's Off-Stream Storage, located in Woodbury, ~ 17 km north of Yeppoon, which serves as a buffer storage for the Woodbury WTP.

The intake structure at Kelly's Off-Stream Storage consists of nine different inlets located at different depths. The Kelly's WPS contains two duty/standby centrifugal pumps each with a capacity of 500 L/sec. These pumps are used to supply raw water from the Kelly's Off-Stream Storage about 800 m to the Woodbury WTP inlet.

Commencing operation in 1988, the Woodbury WTP has a design capacity of 21.6 ML/d, with a peak flow of 250 L/s. However, as the Capricorn Coast supply is supplemented by the Rockhampton-Yeppoon pipeline, the WTP typically produces 10-12 ML/day, or 75% of the required supply, with a typical peak flow of ~190L/s. At times of higher demand, water supply from the pipeline is increased, and the proportion of water produced is dependent on demand. Under current operating procedures the maximum

daily capacity of Woodbury WTP is around 17 ML, the design supply can be produced, but not for extended periods without increasing risk of contamination.

Water is then pumped to the distribution system by the Woodbury high-lift pump station located on the Woodbury WTP site. The Woodbury high-lift WPS supplies water along 15-20 km of trunk main to the St Faith's Reservoir complex. Part way along this trunk main water is diverted to fill the small Woodbury Heights Reservoir. It is also possible to pump water from the Woodbury high-lift WPS via the Yeppoon West Valve Facility located on the Rockhampton to Yeppoon Water Supply Pipeline to fill the Taranganba Reservoir.

From the St Faith's Reservoir complex, water is gravity fed to the reticulation network in Central Yeppoon and Pacific Heights Reservoir which supplies the reticulation network to the north of Yeppoon, and to the Meikleville WPS which pumps water to fill the Meikleville Hill Reservoir. To the north of the Pacific Heights Reservoir a trunk main supplies water to a privately owned and operated reservoir for the Iwasaki Resort. Water is also pumped from the St Faith's Reservoir complex to supply the reticulation area in West Yeppoon.

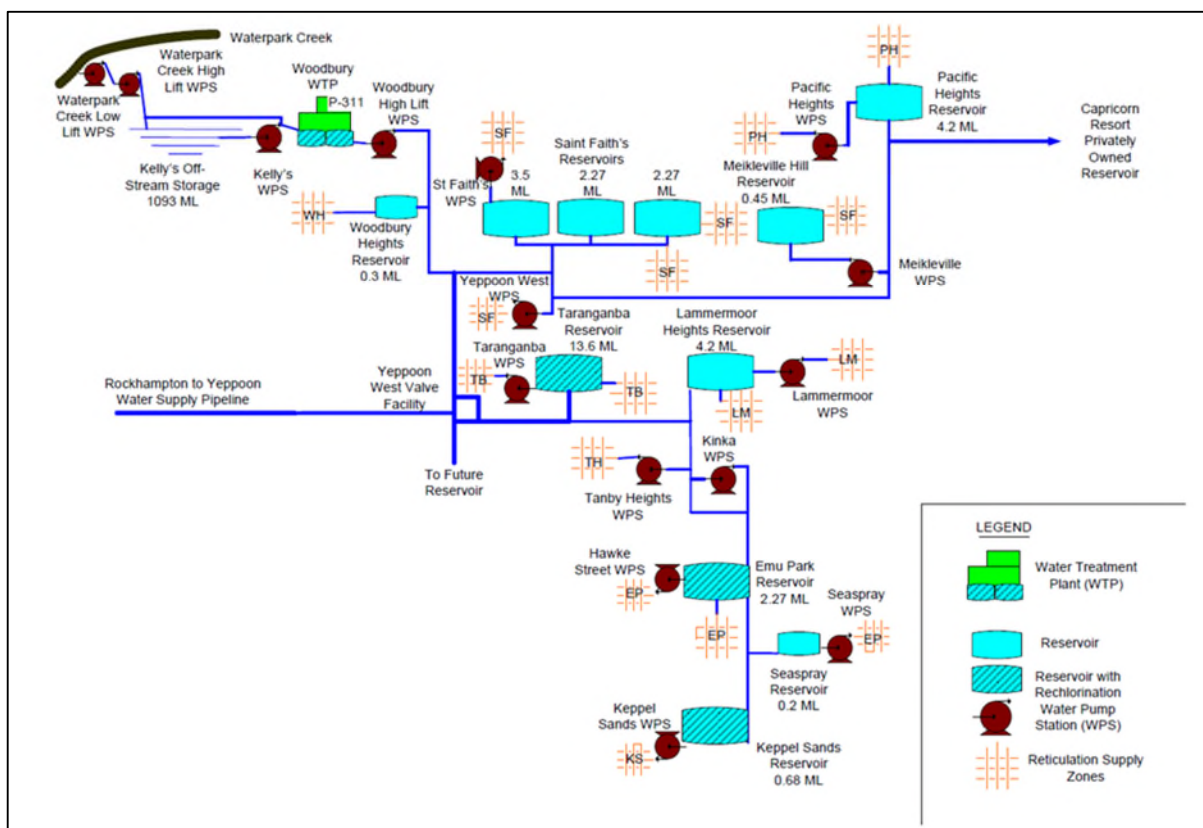


Figure 1. Capricorn Coast Water Supply Network

Water from the Woodbury WTP is supplemented by a second water supply via the Rockhampton to Yeppoon Water Supply Pipeline. The ~40 km pipeline supplies water treated conventionally by Fitzroy River Water (FRW), a business unit of Rockhampton Regional Council, at their Glenmore WTP.

The Glenmore WTP draws raw water from the Barrage on the Fitzroy River. The Barrage sits at the bottom of the Fitzroy River Catchment which is the second largest in Australia covering in excess of 140,000 km². Due to the size of the catchment and the predominantly sub-tropical climate, the system is subject to highly variable but historically reliable flows with an average discharge between 5,000,000 and 6,000,000 ML/year. The Glenmore high-lift water pump station (WPS) pumps water from the WTP through a network of trunk distribution mains to fill the Yaamba Road Reservoir which is the normal reservoir that supplies water to Livingstone Shire Council.

The Ibis Avenue WPS pumps water from the Yaamba Road Reservoir along the Rockhampton to Yeppoon Water Supply Pipeline to the Boundary Reservoir located halfway between Rockhampton and

Yeppoon. The point of supply is on the outlet of the Boundary Reservoir. From here, the water is gravity fed through 23.87 km of 600 mm DICL pipe to the Yeppoon West Valve Facility, and from here through a further 3.3 km 750 mm and 1.6 km of 600 mm DICL dedicated mains to the Taranganba Reservoir. There are also 6 km of 600 mm DICL mains from the Yeppoon West Valve Facility that enter the existing trunk mains from the water treatment plant to the St Faith's Reservoir. There is a single control valve at the Yeppoon West Valve facility that is operated by the WTP operators remotely but is set manually. The Bulk Water Supply Agreement requires that a minimum of 3 ML/day is supplied through the pipeline.

The Taranganba Reservoir supplies a local reticulation network and also gravity feeds water to fill the Lammermoor Heights Reservoir and the Emu Park Reservoir which supply local reticulation networks. The reticulation network in the community of Keppel Sands and the Keppel Sands Reservoir are supplied with water that is gravity fed from the Emu Park Reservoir. This reservoir also feeds the Zilzie reservoir that supplies Seaspray Resort. Drinking water is re-chlorinated with sodium hypochlorite at Taranganba, Emu Park and Keppel Sands.

There are more than 30 pumps in the reticulation network that are used to transfer water and/or maintain pressure within the network. Pressure is maintained throughout the network except for Cliff, Freeman, Lamberton and Misfield Streets where additional booster pump sets have been installed. Overall, the scheme consists of:

- 9,774 Property Services
- 12,274 Water Meters
- 3,067 Valves
- 3,021 Hydrants
- 528,409m Water Mains
- 16 Water Pumping Stations
- 12 Distribution Reservoirs
- 1 Reservoir (Kelly's Dam)
- 1 Water Treatment Plant

THE CAVES AND NERIMBERA SCHEME

The entire potable water supply for Livingstone Shire areas immediately to the north and south of Rockhampton are sourced from and are zones within the Glenmore Water Treatment Plant reticulation network. Livingstone Shire Council has no role in treating the water for these zones with the exception of re-chlorination at Mt Charlton reservoir. The Livingstone-Rockhampton local government boundary separates these areas from the Glenmore WTP reticulation network. The Caves and Nerimbera distribution areas are separate and distinct.

The Caves area, located to the North of Rockhampton, includes the Mt Charlton, Ramsay Creek, Etna Creek, Glenlee, Glendale and Rockyview, and The Caves communities. The Capricorn Correctional Centre is a major customer in this zone. The Yaamba Road / Boundary Road Reservoirs gravity feeds / pumps water to supply the Glenlee, Glendale, Rockyview and Etna Creek areas as well as filling the Mt Charlton Reservoir. The Caves Reservoir is filled by the Caves WPS. The point of supply from Rockhampton to Livingstone Shire Council for The Caves area of the scheme is immediately downstream of Ramsay Creek. There is also a water meter at Argyle Avenue, where responsibility is again assumed by Fitzroy River Water.

The Mt Charlton Reservoir is a fully enclosed and vermin proof 9 ML concrete reservoir constructed in 1925. The existing roof and supporting structure were replaced in 2022 with a brand-new timber and corrugated iron trim deck structure. Reservoir re-chlorination manages the risks due to the long service line from Rockhampton, and following re-chlorination, The Caves receives good residuals from Mt Charlton, but can receive low residuals when the supply bypasses the reservoir at times of high demand. In contrast, the correctional centre and areas between the point of supply and the Mt Charlton reservoir often have difficulties maintaining disinfection residual. Livingstone Shire Council does not have any disinfection facilities between the point of supply and Mt Charlton, so relies on FRW to manage the risk.

Nerimbera is a small community located southeast of Rockhampton, and pressure is maintained by the Lakes Creek Road Water Pump Station owned and operated by FRW. Livingstone Shire Council has no pumps or reservoirs in the Nerimbera zone. There is an abattoir located at the far end of this reticulation zone, and this is considered to be a high-risk customer. There is no further treatment or re-chlorination in this zone. The Yaamba Road Reservoir also gravity feeds to the Lakes St Pump station which maintains

pressure in the Nerimbera scheme. The point of supply to Nerimbera is located on the outlet of the bulk water meter. There are also 6 houses off Hartington Ave that are directly fed using FRW infrastructure.

The Nerimbera zone is small, but at the end of the Glenmore reticulation area, and the entire area can be considered as having long detention times. There are several dead ends in the scheme including the line on which the abattoir is located. A sampling point has been established on this line and a second sampling point was installed in Nerimbera in 2015. Routine sampling has not detected E. coli. The Livingstone Shire Council assets within the scheme include:

- 1,505 Property Services
- 421 Hydrants
- 3 Distribution Reservoirs
- 1,090 Water Meters
- 52,784 m Water Mains
- 1 Water Pumping Station
- 378 Valves

MARLBOROUGH SCHEME

A bore water catchment to tap scheme serves the community of Marlborough. Bore water is treated by bag filtration and reverse osmosis prior to disinfection. It is fully owned and operated by Livingstone Shire Council. The scheme is supplied with water from two shallow bores (RN 91861 and RN 91966 on Department of Natural Resources and Mines groundwater database) located 2-3 km to the north of the Marlborough township on Glenprairie Road. The bores draw water from two shallow aquifers, the Marlborough Creek Alluvium aquifer (12-15 m depth) and a deeper decomposed granite aquifer (18-20 m depth).

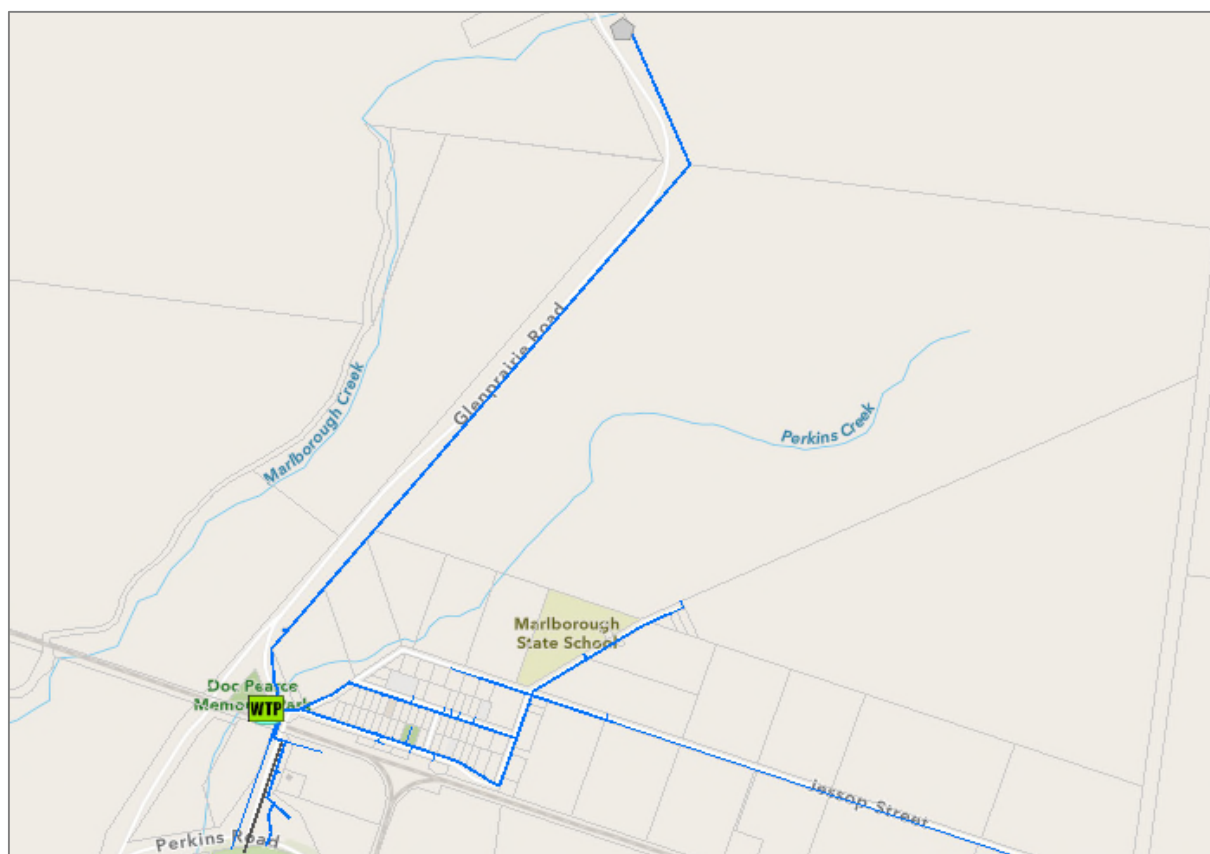


Figure 2. Marlborough Water Supply Network

The bores were drilled in late 1995 and early 1996, are approximately 20-25 m deep with about 7 m depth to water level and each bore is capable of producing water at about 5 L/sec. Pump tests conducted in early 1996 following an extended period of drought suggest that a yield of 3.9 L/sec be adopted as the target sustainable pumping rate during drought conditions. Duty/standby bore pumps with a capacity of 3.5 L/sec each are used to pump raw water from the bore site to the Marlborough WTP. The duty bore pump begins pumping when the raw water tank drops to 70% and shuts down at 91%.

The Marlborough WTP consists of 2 parallel 50kL/day reverse osmosis (RO) treatment trains. Typically, both RO trains operate simultaneously. Potable water is chlorinated prior to being directed into the top of two 45kL clear water tanks that are balanced with a third 45kL clear water tank. Reject RO concentrate water produced during the reverse osmosis treatment process is stored in two 45kL reservoirs that can be accessed by water carriers for non-potable water applications such as road construction or firefighting purposes. The remaining reject water is used to irrigate the park area surrounding the Marlborough WTP and the Helipad.

Treated water is reticulated via a three pump WPS that operates in duty/standby mode to supply water at a constant pressure (~380 kPa) to the reticulation system. The Marlborough distribution system does not consist of any other reservoir storages and due to its small size and good penetration of free chlorine, no re-chlorination is required.

As the Marlborough area often experiences extended power outages, a diesel generator has been installed that is capable of powering the entire Marlborough WTP and the three pump WPS to allow continued treatment and supply of drinking water until mains power is restored. The bore pumps are not connected to the generator, but this is not normally an issue as the WTP has 2 days' supply of treated water, and an additional storage of 1 days' supply of raw water that can be treated using the diesel generator. The RO membranes are not cleaned, and whilst this reduces membrane life, the membranes only require replacement every 2 years, and it is more cost effective to replace the membranes than to routinely clean them. Bag and cartridge filters are replaced by the Maintenance team every 2-3 months. The Livingstone Shire Council assets within the scheme include:

- 56 Property Services
- 56 Water Meters
- 18 Valves
- 24 Hydrants
- 2,972 m Water Mains
- 2 Water Pumping Stations
- 3 Distribution Reservoirs
- 2 RO Reject Water Reservoirs
- 1 Water Treatment Plant

OGMORE NON-POTABLE SCHEME

Raw water is pumped from an impoundment on Montrose Creek to supply the village of Ogmoo through a periodic flow distribution system where residents each have a small receiving water tank on their property. The scheme is fully owned and operated by Livingstone Shire Council. The Livingstone Shire Council assets within the scheme include:

- 93 Property Services
- 48 Water Meters
- 9 Valves
- 1 Hydrants
- 3,230 m Water Mains
- 2 Water Pumping Station
- 1 Distribution Reservoir

RECYCLED EFFLUENT SCHEMES

Effluent is recycled at both the Yeppoon and Emu Park Sewage Treatment Plants (STPs) to produce recycled water.

YEPPOON RECYCLED WATER SCHEME

The Yeppoon Recycled Water Scheme provides treated effluent from the Yeppoon Sewage Treatment Plant (YSTP) to Yeppoon and surrounds. Effluent from the existing pump station at the YSTP is currently pumped via a 450-diameter main North to the unformed section of Millroy Road, south of the Keppel Park Racecourse, a 300 diameter branch flows westward to deliver effluent to the Barmaryee lagoons, while another branch goes to supply Yeppoon itself.

The pump station at Barmaryee Lagoons pumps effluent from the lagoons through the 300-diameter pipeline South along Neils Road and East back along Millroy Road to feed Yeppoon. The pump station can also be used to pump from the lagoons into Corduroy Creek. Council is currently undertaking a significant project to upgrade and augment the Yeppoon Sewer Treatment Plant to allow for more efficient pumping and storage of the effluent water it produces. The effluent is used by a number of community

organisations and schools as well as by LSC to irrigate sports fields, parks and gardens. The current reticulation system around the area of the STP is shown schematically below.

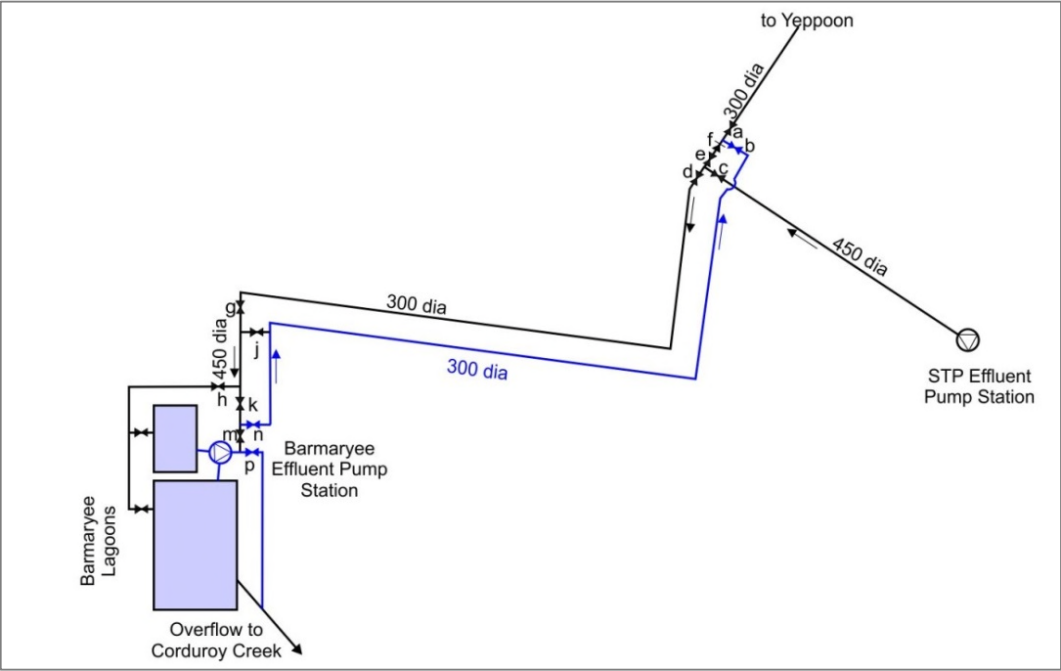


Figure 3. Yeppoon Recycled Water Scheme

EMU PARK RECYCLED WATER SCHEME

The Emu Park Recycled Water Scheme provides treated effluent from the Emu Park Sewage Treatment Plant (STP) to the Emu Park Golf Club and the Hartley Street Sports Complex. The current reticulation system around the area of the STP is shown below:

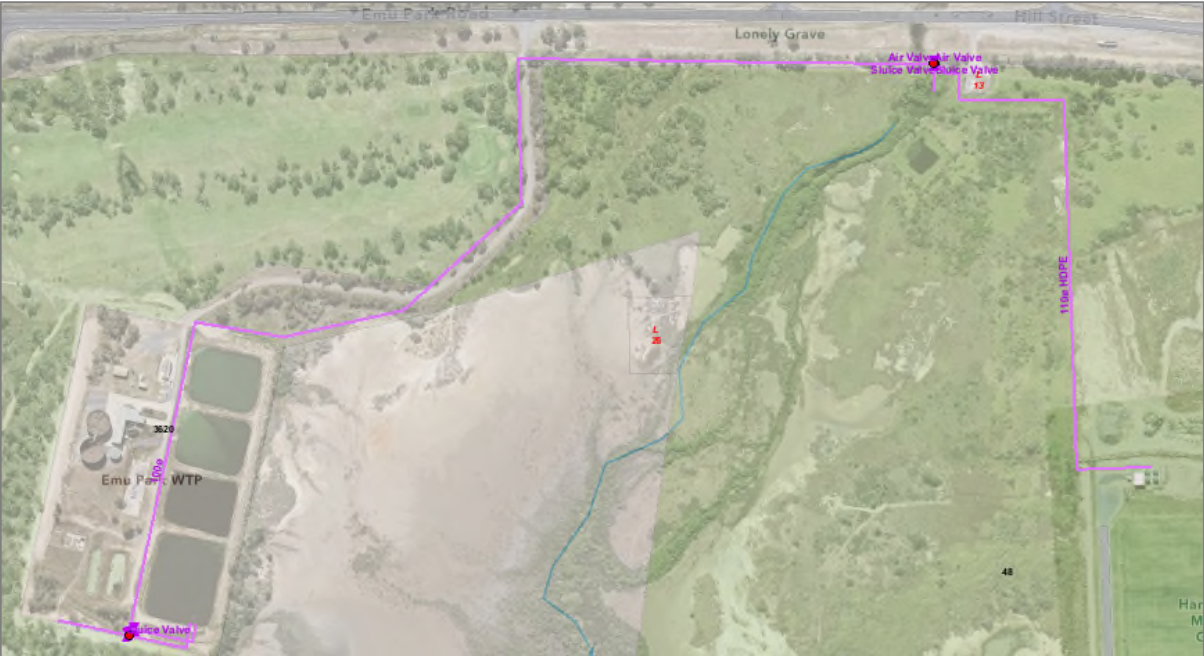


Figure 4. Emu Park Recycled Water Scheme

The Emu Park STP produces around 0.8 ML/day of treated effluent of which around 85% is purchased by the Emu Park Golf Club to irrigate their course. Around 0.1 ML/Day is used by Livingstone Shire Council to irrigate the Hartley Street Sports complex with any remainder released into the nearby

Cawarral Creek. The scheme has only a small number of assets, as the Golf Course is adjacent to the treatment works and the Club is responsible for the pipework within their boundary.

MT CHARLTON PIPELINE

The Mount Charlton pipeline was initially constructed in 1920 as a buried, unlined, mild steel lock-bar pipe. At some point after its construction leaks began appearing and by World War II the pipeline was dug up, reconditioned, lined with concrete and lifted onto concrete plinths. The pipe is 15.1 km long and services all the Caves / Rockyview / Glenlee / Glendale area. It is a critical asset to this supply area and its replacement would require significant capital expense, likely exceeding \$20 million. Given the approach of the end of the pipe's estimated useful life of 100 years, Livingstone Shire Council and Rockhampton Regional Council have had a number of investigations undertaken over the last ten years to determine when the main will need to be renewed. Each of these reports had provided an indicative expiry somewhere between 2025-2055, depending on maintenance and increased pressure, but none has been conclusive with each recommending further investigation. There is no alternative supply so failure of this critical asset would require highly expensive and disruptive tanker supplies to up to 1,400 properties depending on the point of failure.

In 2018, Livingstone Shire Council undertook an external inspection of the pipeline that identified a number of areas of high pipeline defects. In 2019-2020 a consultant was engaged to undertake non-destructive in-service testing of both areas where defects were found and areas where they were absent. Based on the worst-case scenario for the defects found, occasional through wall pinhole leaks are anticipated (around 10 over the next 2 to 3 years) as the near through wall internal defects continue to grow. The consultant recommended that the pipeline continues to be monitored for evidence of pinhole leaks and inspections are considered at the same locations in 3 years' time should these predicted leaks materialize hence confirming lining failure. This will provide information on the rate of growth of the defects.

As at the writing of this document the 2022-2023 inspection program is currently underway, and the results of this assessment will be included in future revisions of this document.

ASSET REPLACEMENT VALUE

The replacement value of assets included in this Asset Management Plan are shown below and are based on the information provided following completion of the 2022-23 Water revaluation. The current replacement cost for water assets is valued at \$415 million. Assets are valued at Fair Value in accordance with the relevant Australian Accounting Standards Board (AASB) Standards.

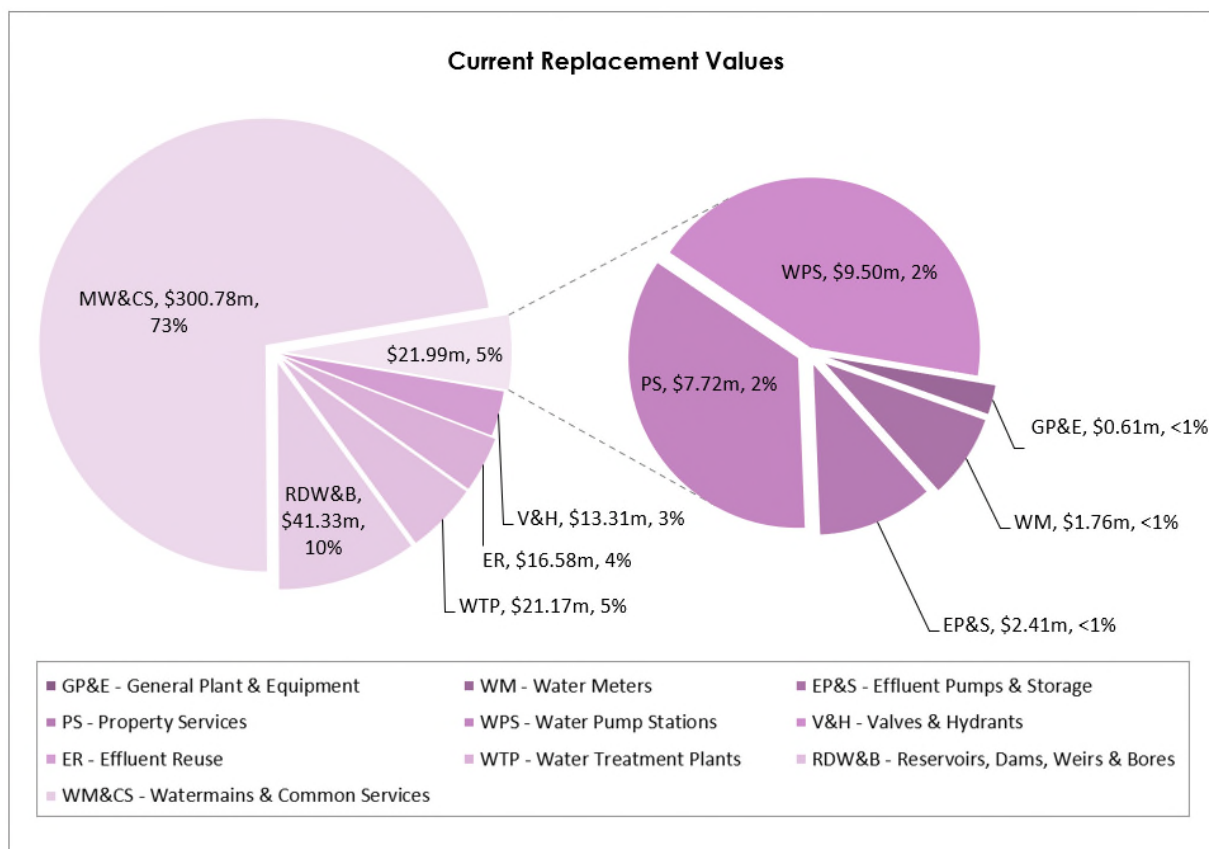


Figure 5. Current Asset Replacement Value

AGE AND CONDITION

Council rates the condition of its assets on a one to five scale in line with the Institute of Public Works Engineers' *Condition Assessment & Asset Performance Guidelines, Practice Note 7, Water Supply & Sewerage* with 1 being the highest rating and 5 the lowest.

In 2022-23 a comprehensive re-valuation was carried out on the Water asset class that included an assessment of condition. Active assets such as Treatment Plant, Pumping Stations, and Reservoir assets were inspected and assessed by the valuer. Given the difficulty inherent in determining condition of underground assets, passive asset condition was determined based on age and remaining life. Adjustments were also made to expiry dates for assets that had known issues, for example pipelines with a history of breakages. Aged, based condition was then assigned on a straight-line basis on remaining useful life.

Ongoing condition assessment of all asset classes will ensure that up to date information is provided to plan for condition forecasting as the assets age and the level of service they provide begins to decline. This plan will be monitored and updated to ensure that changes are reflected when condition information is reviewed.

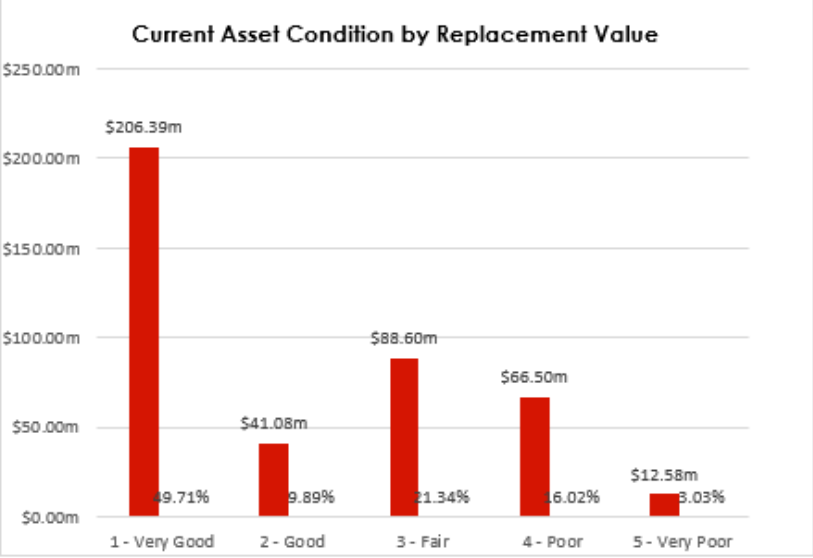


Figure 6. Current Asset Condition Profile

While the condition profile in Figure 6 shows that Council has generally kept its assets in good condition, there is a minor backlog (approximately 3% of the overall replacement cost of the class or \$12.6 million) of renewal work that is required to be completed to ensure that some of our aged assets meet the community’s expectations into the future.

Figure 7 below attempts to illustrate the effect on these same assets condition should council elect to not adequately fund the above-mentioned renewal backlog, or adequately fund any future projects or programs as outlined in this plan. A future council of the day would need to fund a predicted \$63.7 million dollar backlog (or 15% of the overall replacement costs of the class in current dollars).

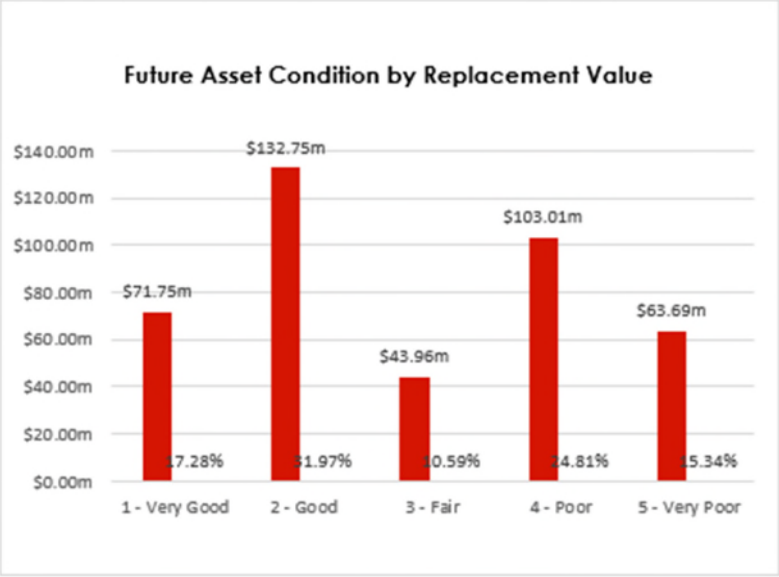


Figure 7. Future Asset Condition Profile

The modelled Future Asset Condition in Figure 3 above was calculated by assuming that an asset stays in each of the 5 condition states for a quarter of its life. By comparing the difference between an assets age and its useful life one can then determine what condition it currently is in and then forecast forward to see what theoretical condition it will be in the future.

USEFUL SERVICE LIVES

Council's Long Term Financial Plan provides for renewals and upgrades over the life of this plan (see Renewing the Water Network section of this plan for details). The Useful Life of an asset is the period over which it is expected to provide a service to the community. It is the estimated or expected time between placing the asset into service and removing it from service. The actual time between commissioning a new asset and disposing of it will vary significantly within each class.

The following table provides a breakdown of useful service lives for asset functions and associated asset types.

Asset Function	Asset Type	Useful Life (years)
Effluent Pumps & Storage	Civil & Structural	50
	Instrumentation & Telemetry	15
	Mechanical & Electrical	30
	Valves & Pipework	40
Effluent Reuse	Effluent mains - all diameters, all other materials and all depths	80
General Plant & Equipment	Computers, Safety monitoring, equipment and telemetry	10
Property Services	Property services - all diameters, all other materials and all depths	40
Reservoirs, Dams, Weirs & Bores	Civil & Structural	80
	Instrumentation & Telemetry	15
	Mechanical & Electrical	30
	Valves & Pipework	50
Valves & Hydrants	Valves	30 - 50
	Hydrants	40
Water Meters	Water Meters	10
Watermains & Common Services	Watermains - all diameters, HOBAS & GRP and all depths	60
	Watermains - all diameters, Steel and all depths	100 - 115
	Watermains - all diameters, all other materials and all depths	80
Water Pump Stations	Civil & Structural	50
	Instrumentation & Telemetry	15
	Mechanical & Electrical	30
	Valves & Pipework	40
Water Treatment Plant	Civil & Structural	80
	Instrumentation & Telemetry	15
	Mechanical & Electrical	20 - 30
	Valves & Pipework	50

Table5 . Useful Service Lives

SETTING STANDARDS & MEASURING PERFORMANCE

A key objective of asset management is to match the standard of service the organisation provides with what the community expects. To ensure we are meeting the expectations of our community it is important for Council to describe what level of service we intend to deliver and then to measure both what we have done to deliver that service and how well our community has received it.

STATUTORY REQUIREMENTS

Statutory requirements often set the framework for managing infrastructure. The following legislative instruments are relevant to this asset management plan.

- The *Water Act 2000* provides a framework for the effective operation of water authorities; the sustainable management of Queensland's water resources; and the sustainable and secure management of water supply and demand.
- The *Water Supply (Safety and Reliability) Act 2008* provides a regulatory framework for providing water and sewerage services in Queensland.
- The *Local Government Regulation 2012* sets out the mechanisms to enable local governments to develop their own approaches to meet communities' needs through rates and charges. The Regulation also expressly requires the development of long-term asset management plans.
- The *Australian Accounting Standards* set out the financial reporting standards relating to the valuation and depreciation of Councils infrastructure assets.
- *Australian Drinking Water Quality Guidelines (ADWG)*, issued by the National Health and Medical Research Council, provide guidance to water regulators and suppliers on monitoring and managing drinking water quality.
- *Technical Guideline for Disposal of Effluent via Irrigation 2020* prepared by Science & Technology, Environmental Monitoring & Assessment Sciences Division, Department of Environment & Science.

LEVELS OF SERVICE

Levels of Service (LoS) are a key business driver and influence all of Council's asset management decisions. LOS are defined in two terms, customer levels of service and technical standards of service.

CUSTOMER LEVELS OF SERVICE

Levels of Service measure how the customer (i.e., the community) receives the service and whether value is provided to the customer. Council has adopted the following Customer Level of Service objectives in relation to its potable water supply assets:

Table 6: Customer Level of Service Objectives

	Objective
Reliability	The water supply system will provide water twenty-four (24) hours a day seven (7) days a week
Adequacy of Supply	Provide a reticulated potable water supply to meet the demands imposed upon it by both the consumer and firefighting requirements.
Quality of supply	Ensure that the water quality is generally in accordance with recognised standards that safeguards community health.
Value for Money	Water will be priced fairly, costs recovered equitably, and sustainability ensured for future generations.
Environmental Impacts	The environmental impacts of the water supply network are minimised in accordance with community expectations.

TECHNICAL STANDARDS OF SERVICE

Livingstone Shire Council aims to provide reticulated potable water supply to the consumer to meet the demands imposed upon it by both the consumers and the fire-fighting requirements. It is acknowledged that in some cases, due to local circumstances, the desired standards of service may not be met. In these situations, water supply trunk infrastructure aims to meet the standards to the greatest degree practicable. The desired standards of service for the water supply system are detailed below and are outlined in the Department of Energy and Water Supply 'Planning Guidelines for Water Supply and Sewerage'.

Table 7: Desired Service Standards

Criteria	Measure
Average Day (AD) Demand	500 litres per equivalent person per day (L/EP/Day)
Maximum Day (MD) Demand	1.9 x average day (AD) (950 L/EP/Day)
Maximum Hour (MH) Demand	1/12 x maximum day (MD) (79 L/EP/hr)
One (1) equivalent tenement (ET)	2.7 equivalent persons (EP)
Minimum Service Pressure	22 metres head at the point of supply of the residential lot during normal diurnal flow in the reticulation non-trunk network
	For trunk network to be a minimum 1-meter head at all times
Desirable Upper Service Pressure	50 metres head at the point of supply of the residential lot during normal diurnal flow in the reticulation non-trunk network
Maximum Service Pressure	80 meters head at the point of supply of the residential lot in the reticulation non-trunk network
	90 meters for the trunk network
Fire Fighting Pressure	12 metres minimum in the reticulation non-trunk water supply network
Fire Flow for residential area in the reticulation non-trunk network	15 litres per second for a duration of two (2) hours at minimum pressure of 120 kilopascals (kPa)
Fire Flow for industrial/commercial area in the reticulation non-trunk network	30 litres per second for a duration of four (4) hours (from up to 3 hydrants) at minimum pressure of 120 kilopascals (kPa)
Pipeline design maximum velocity	Two (2) metres per second (1.5m/sec desirable for optimum energy useage)
Reservoir Capacity	One (1) Maximum Day for the supply zone
Trunk Water Main sizing	Average Day (AD) supply to Trunk Storage
	Maximum Day (MD) supply to Distribution Reservoirs
	Maximum Hour (MH) supply to reticulation

TECHNICAL PERFORMANCE MEASURES

Technical Performance Measures support the customer service levels and are operational or technical measures of performance. These technical measures relate to the allocation of resources to service activities to best achieve the desired customer outcomes and demonstrate effective performance.

To support water service providers in delivering safe and reliable services, the Department of Regional Development, Manufacturing and Water (DRDMW) has introduced a mandatory performance reporting framework which requires annual reporting on key performance indicators (KPIs). Council has adopted a number of these KPIs as Performance Targets. Performance targets and current performance are defined separately for each scheme.

Table 8: Technical Levels of Service and Performance Measures

Technical Performance Measure		Water Supply Schemes								Recycled Water Schemes (Effluent)			
		Cap Coast		The Caves & Nerimbera		Marlborough		Ogmore (non-potable)		Yeppoon		Emu Park	
		Target	2022	Target	2022	Target	2022	Target	2022	Target	2022	Target	2022
Reliability	AS8 ¹ : Water main breaks per 100 km water main	<40	3.3	<40		<40	0	<40	11.5	<10	0		0
	CS15 ¹ : Average duration unplanned interruptions: water (mins)	120	16.46	120		180	20	240		240		240	
	CS17 ¹ : Average frequency unplanned interruptions per 1000 connections: water	6	124.4	2		2	180.3	4		2		2	
Adequacy	CS10 ¹ : Water service complaints per 1000 connections	<5	0	<5		<5	0	<5	0	<5	0	<5	0
Quality	CS9 ¹ : Water quality complaints per 1000 connections	<5	3.9	<5		<5	16.4	<5	0	<5	0	<5	0
	Compliance with Australian Drinking Water Guideline requirements	>95%	100%	>95%		>95%							
Value	Operation and maintenance cost per connection as a percentage of PR44 ¹ : Typical residential bill: water	95-105%		95-105%		95-105%		95-105%		95-105%		95-105%	
Environment	EN9 ¹ - Greenhouse gas emissions: water per 1000 connections (T CO ₂)	10	MD*	10	MD*	10	MD*	10	MD*	10	MD*	10	MD*

¹ NPR SWIM Codes as Defined in Key performance indicators for annual performance reporting for Queensland urban water service providers - Definitions Guide

* Missing Data See Action Plan

PLANNING FOR THE FUTURE

This section of the Water Asset Management Plan attempts to predict future demand for services in order to identify the most effective means of managing that demand. This allows Council to make optimised decisions regarding its asset investment proposals.

DEMAND FORECASTS

It is important to note that demand forecasts are often proven wrong given the passage of time. Influences on demand such as changes in government policy, technological advances and community preferences cannot be predicted with certainty over long periods. As a consequence, assumptions made about factors may change between and during the development of forecasts. Assumptions are often based on judgements that consider past performance and the likelihood of future change. Therefore, the following forecasts should be treated with some caution and taken as possible future outcomes rather than definitive statements. Any assumptions essential to the following forecasts have been noted for each factor considered.

POPULATION GROWTH

Population change is generally the key driver for growth in all areas and drives demand for services provided by Council and, in turn, the number and type of assets that are required to provide these services.

Livingstone Shire's population is projected to increase modestly over the next 10 years with an increase from the current 37,638 residents (at June 2018) to an estimated 46,480 residents (by June 2031) (QGSO, 2018). This increasing population will necessitate additional land development that will in turn lead to an expanded water supply network.

The Livingstone Planning Scheme 2018 anticipates land development to produce over 3,200 equivalent tenements over the life of this plan. The Queensland Government Statisticians Office's Regional land development activity profile is less optimistic and projects a total dwelling yield of 1,808 for the same time period (QGSO, 2020). It is likely that the eventually realised number of tenements will be somewhere between these two figures. The majority of this development is expected to take place within the Priority Infrastructure Areas identified by the Planning Scheme 2018. These areas are focussed in and around the Capricorn Coast and will have the greatest effect on that scheme.

DEMOGRAPHY CHANGE

Livingstone Shire's aged demographic is expected to increase from 6,306 residents aged 65 years or older at June 2016 to 13,688 residents aged 65 years or older by June 2031 (QGSO, 2018). One effect of an ageing demographic that is particularly relevant to Water Supply services is a likely increase in chronic kidney disease. Chronic kidney disease is common in older people and its prevalence increases in parallel with age which is expected to lead to increased demand for home haemodialysis, which requires a stable water supply. Council will need to take into account these particularly vulnerable users when considering service levels related to supply interruptions and should consider development of a specific service standard to manage these users.

PROPERTY DEVELOPMENT

The draft strategic framework in Council's Planning Scheme establishes the preferred urban growth areas for the next 20 years. This growth pattern balances the efficient supply of infrastructure with the need to protect natural features and avoid areas of natural hazard risk. New development will include higher levels of infill and medium density development within existing urban areas, to consolidate the use of existing infrastructure. New urban expansion will occur mostly in existing, approved subdivisions, with longer term expansion south of Yeppoon. Urban growth in the strategic framework is divided broadly into four categories:

- Urban consolidation - redevelopment to accommodate medium density residential close to facilities, within 10 years (2015 – 2025).
- Urban – existing urban areas and extensions within 10 years (2015 -2025).
- New urban – urban development beyond 2025.
- Future urban - possible expansion beyond 2036

Development is expected in four main locations as indicated on the strategic framework maps:

- 2015 – 2025: Urban consolidation in Yeppoon and Emu Park centres
- 2015 – 2025: Infill and small expansion areas around Yeppoon, Lammermoor, Emu Park and Zilzie
- 2025 – 2036: new urban development south of Yeppoon and infill areas in Emu Park and Great Barrier Reef International Resort.
- 2036 and beyond: future urban between the Pines and Yeppoon, Great Barrier Reef International Resort and Emu Park west.

CONSTRAINTS

WATER SOURCE LIMITATIONS

Livingstone Shire Council holds the following licences:

A licence to interfere by impounding, and a licence to take water from Water Park Creek which is subject to a minimum pass-flow in Water Park Creek of at least 50 L/sec (approx. 4.3 ML/d). The licence to take water allows for maximum extraction of 17 ML/day or 4,400 ML/annum (average of 12ML/Day).

A licence to interfere with the flow of water in Montrose Creek and a licence to take water from that impoundment. The maximum volume of water stored at full supply level is not to exceed 12 ML and the maximum height of impounded water at full supply level is not to exceed 0.5 metres above the natural bed level at the downstream limit of the impoundment. The licence to take water is not limited but applies only to the impounded water.

As part of the Lower Fitzroy River Infrastructure Project, Livingstone is also likely to enter into an agreement for 4,000 ML per annum from that impoundment to supply the Caves/ Nerimbera and Capricorn Coast schemes. Council has no plans to take and treat this water itself, and instead intends to allow FRW to use the allocation and to continue to purchase treated water from them under the Bulk Water Supply Arrangement.

INFRASTRUCTURE CAPACITY LIMITATIONS

The Woodbury WTP has a design capacity of 21.6 ML/day however, under current operating procedures, the plant has a maximum capacity of around 17 ML/day compared to a peak demand of 34 ML/day for the Capricorn Coast Scheme. Glenmore WTP has a capacity of 120 ML/day and a reported peak demand of 114 ML/day. Under the current Bulk Water Supply Agreement, Livingstone Shire Council must accept a minimum of 3 ML/day from FRW into the pipeline supplying the Capricorn Coast. The pipeline has a

maximum capacity of around 37 ML/day. 3,600 ML/year is currently stipulated as the maximum supply (above which Livingstone Shire Council is subjected to excess charges), or an average of 9.9 ML/Day including the supplies into The Caves and Nerimbera.

Current and future demand can be met with existing infrastructure as the proportion of flow to Capricorn Coast from the pipeline is able to be increased. At present, the Fitzroy Barrage is heavily reliant on seasonal inflows from the Fitzroy River to maintain continuity of supply. Analyses demonstrate that “storage levels could fall from full to below minimum operating level in well under 12 months (assuming no further inflows to the storages during this period and minimal groundwater contributions from the surrounding area to the storage)” (Building Queensland, 2017). The Rookwood weir project will alleviate some of these concerns; however it is important to note that the Capricorn Coast scheme is not self-sufficient and relies on seasonal inflows, FRW and the Rockhampton to Yeppoon Pipeline to maintain supply.

A Regional Water Supply Security Assessment is currently being undertaken by Livingstone Shire Council in conjunction with the Queensland Government which will further explore water security and supply issues. This plan will be updated to reflect any concerns raised after the completion of that assessment (refer Action Plan Item 0).

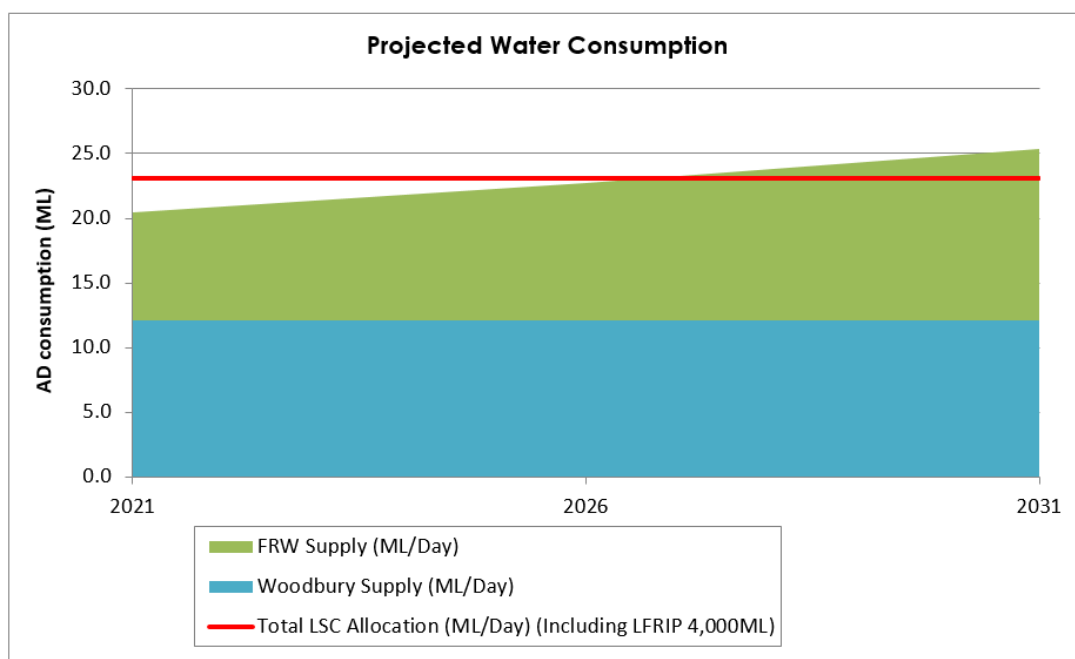


Figure 8. Projected Water Consumption

EFFLUENT CONSTRAINTS

The Emu Park STP produces around 0.96ML of effluent per day of which 0.5ML is utilised by the Golf Club and Hartley Street Sports Complex. At present, limitations in the Golf Club’s irrigation system mean that it cannot operate a sufficient number of sprinklers simultaneously to irrigate the Golf Club during the agreed irrigation time. Council has recently undertaken hydraulic analysis of the Golf Course irrigation system and is in planning with the Club to improve their system and increase the volume of effluent re-used. Process water supply to the Emu Park STP has also been identified as a separate use case for the treated effluent. A project is currently under consideration to modify the STP pipework to allow this use.

The Yeppoon STP produces around 4.6 ML of effluent per day of which about of 2.4ML is utilised. Supply currently exceeds demand leading to discharge into Corduroy Creek. Council is attempting to implement a Release Reduction Strategy with a goal of 90% of average dry weather flows being re-used. The network currently cannot meet the demands of customers due to constraints within the network and the

current operating system. This operating system produces a significant risk of contamination of the treated effluent during retention in the lagoons and a system to protect the Class A recycled water quality needs to be introduced to protect public health.

An upgrade to the Yeppoon STP and the Recycled water supply network is in progress to allow Class A recycled water to be pumped directly into the reticulation system thereby preventing deterioration of the water during storage in the Barmaryee Lagoons.

MANAGING DEMAND

As a physically supplied good, demand for water can be managed in a much more active manner than many other Council assets. Council has adopted the following demand management practices to encourage water-wise behaviour and ensure water remains available in the long term.

TARIFFS AND REBATES

A two-part access and tiered consumption tariff system has been implemented as a key demand management tool. This system encourages water-wise behaviour through a stepped tariff for that is currently implemented at 75kL and 150kL. Livingstone Shire Council has also introduced residential rebates to encourage the use of water saving products.

WATER RESTRICTIONS

Demand for water during periods of uncertain supply is managed under Council's Drought Management Plan. This plan sets out a number of trigger points for the Capricorn Coast, Marlborough, Ogmoo and Caves/ Nerimbera schemes and the corresponding restrictions to be imposed when those triggers are met. Council has not triggered these restrictions since de-amalgamation.

MANAGING DEMAND FOR INFRASTRUCTURE

Demand for new services will be managed through a combination of upgrading of existing assets and providing new assets to meet demand. Expansion of the reticulation network is not anticipated to impact Council's capital expansion expenditure as these assets are generally constructed and contributed by developers. Similarly, upgrades to treatment and distribution facilities are funded through infrastructure charges levied on developers and will not subject Council to direct capital cost impositions.

ASSET RESILIENCE

CLIMATE CHANGE – EFFECT ON WEATHER

There is moderate consensus among climate models under all RCP scenarios that the East Coast of Australia is likely to experience more variable rainfall and warmer temperatures by 2030 (CSIRO, n.d.). This is likely to increase demand for water generally as well as increase the volume of water required during heatwave events (peak demand). The effect is difficult to predict or model within the 10-year timeframe of this plan however the following potential outcomes might be expected by 2030:

- the average annual temperature is expected to be around 1°C warmer than in the 1990's.
- the average number of days over 35 °C is expected to increase from 16 to 26.
- longer dry periods interrupted by more intense rainfall events will occur, increasing the likelihood of flooding affecting infrastructure in low lying areas.
- water quality will be lower as a result of increased floods, storms, bushfires and drought.

For the purposes of this plan an annual 0.5% increase in water consumption has been included to model increased water use associated with increasing temperatures.

CLIMATE CHANGE – COMMUNITY AWARENESS

Perhaps the most significant impact of climate change on the water network will be the community's awareness of the issue motivating a change in consumption patterns and a demand for sustainable practices. The Australia Institute's Climate of the Nation 2019 research report found that "78% of Australians are concerned climate change will lead to water shortages in our cities". The report also found that 55% of Australians think their governments (at all levels) are not doing enough on climate change (Quicke & Bennett, 2020).

The community of Livingstone Shire has further emphasised their conservation and climate change concerns when developing the Livingstone Community Plan. Council has in turn committed to conservation efforts including sustainable construction material selection when constructing new or renewing existing assets. Council's goal is to increase recycled material content by investigating the use of recycled plastics, glass and other technologies.

COASTAL HAZARDS

In 2022 Council adopted its coastal hazard adaptation strategy (CHAS) that addresses climate change impacts on our coastal communities. The Our Living Coast Strategy is intended to provide a strong evidence base for future decision making and a coordinated response for what actions Council will take to adapt to and manage coastal hazard risks. The strategy identified potential risks to the community, assets and values associated with coastal hazards, specifically:

- Temporary flooding of coastal areas due to storm tide;
- Temporary loss of land due to coastal erosion; and
- Permanent loss of land due to coastal erosion and sea level rise.

The CHAS found that:

- Water assets around Yeppoon, Rosslyn, Mulambin, Nerimbera and Keppel Sands are impacted by all coastal hazards under all planning horizons, including present day Highest Astronomical Tide (HAT).
- Water assets around Farnborough/Bangalee and Emu Park are not impacted under present day HAT but are impacted by all other coastal hazards under all planning horizons.
- Water assets in Ogmoo are impacted by 1% Annual Exceedance Probability (AEP) Storm Tide hazards under all planning horizons and all coastal hazards under the year 2100 timeframe.

A range of strategic adaptation actions have been identified in the Draft CHAS for each impacted area (refer to *Our Living Coast – Livingstone Coastal Hazards Adaptation Strategy* section 4.5).

WATER NETWORK PROJECTS

This section of the Asset Management Plan looks at expansion and renewal requirements, compared with projects which have been identified in Council's Forward Works Program. The total value of the Water Supply asset class is expected to grow by almost \$19.5 million over the life of this plan.

FORWARD WORKS PROGRAM SUMMARY						
Year	Total	Cost Split		Funding Split		No. of Projects
		Expansion	Renewal	Developer	Council	
2023	\$8,001,260	\$4,632,467	\$3,368,793	\$1,856,667	\$6,144,593	14
2024	\$4,005,753	\$667,500	\$3,338,253	\$62,500	\$3,943,253	13
2025	\$2,849,164	\$1,265,000	\$1,584,164	\$350,000	\$2,499,164	5
2026	\$3,064,453	\$180,000	\$2,884,453	\$180,000	\$2,884,453	4
2027	\$2,428,678	\$270,000	\$2,158,678	\$120,000	\$2,308,678	5
2028	\$4,785,653	\$2,495,067	\$2,290,586	\$2,495,067	\$2,290,586	4
2029	\$4,128,942	\$2,590,000	\$1,538,942	\$2,590,000	\$1,538,942	3
2030	\$3,493,695	\$2,170,000	\$1,323,695	\$2,170,000	\$1,323,695	4
2031	\$3,985,695	\$2,382,000	\$1,603,695	\$2,382,000	\$1,603,695	6
2032	\$3,186,695	\$1,863,000	\$1,323,695	\$1,863,000	\$1,323,695	5
2033	\$2,307,695	\$984,000	\$1,323,695	\$834,000	\$1,473,695	7

Table 10: Forward Works Program Summary

EXPANDING THE WATER NETWORK

Capital expenditure is a relatively large (in accounting terms, material) expenditure, which has benefits expected to last for more than twelve months. Expansion works are those that create a new asset that did not previously exist or works which will upgrade or improve an existing asset beyond its existing capacity. Assets may also be acquired at no cost. They may result from growth, social or environmental needs.

The majority of the projected increase in Livingstone Shire Council's passive water reticulation network is expected to come from developer contributions or private works. These assets will not impose a direct capital expenditure burden on Council, but their operation, maintenance and eventual replacement could have a significant effect on the Water Asset Class over the life of this plan.

Trunk mains and active supply and distribution assets such as reservoirs and pumping stations have been identified in Council's Local Government Infrastructure Plan (LGIP); a part of the Livingstone Planning Scheme 2018. One of the purposes of the LGIP is to identify those assets that will be required to support future growth and allow Council to fund the construction of these assets through infrastructure charges levied on development.

PROJECTED EXPANSION REQUIREMENTS

Expenditure on new assets and services in the capital works program will be accommodated in Council's Long Term Financial Plan where required, but only to the extent of the available funds. The acquisition of new assets will have lifecycle cost implications, as the organisation will need to commit to the funding of ongoing operations, maintenance, and renewal costs for the period that the service provided by the assets is required. The increased maintenance and renewal burden caused by these assets is included in the maintenance and renewal sections of this plan.

Based on the demands predicted in this plan, Figure 9 below provides an estimate of the projected expansion requirements.

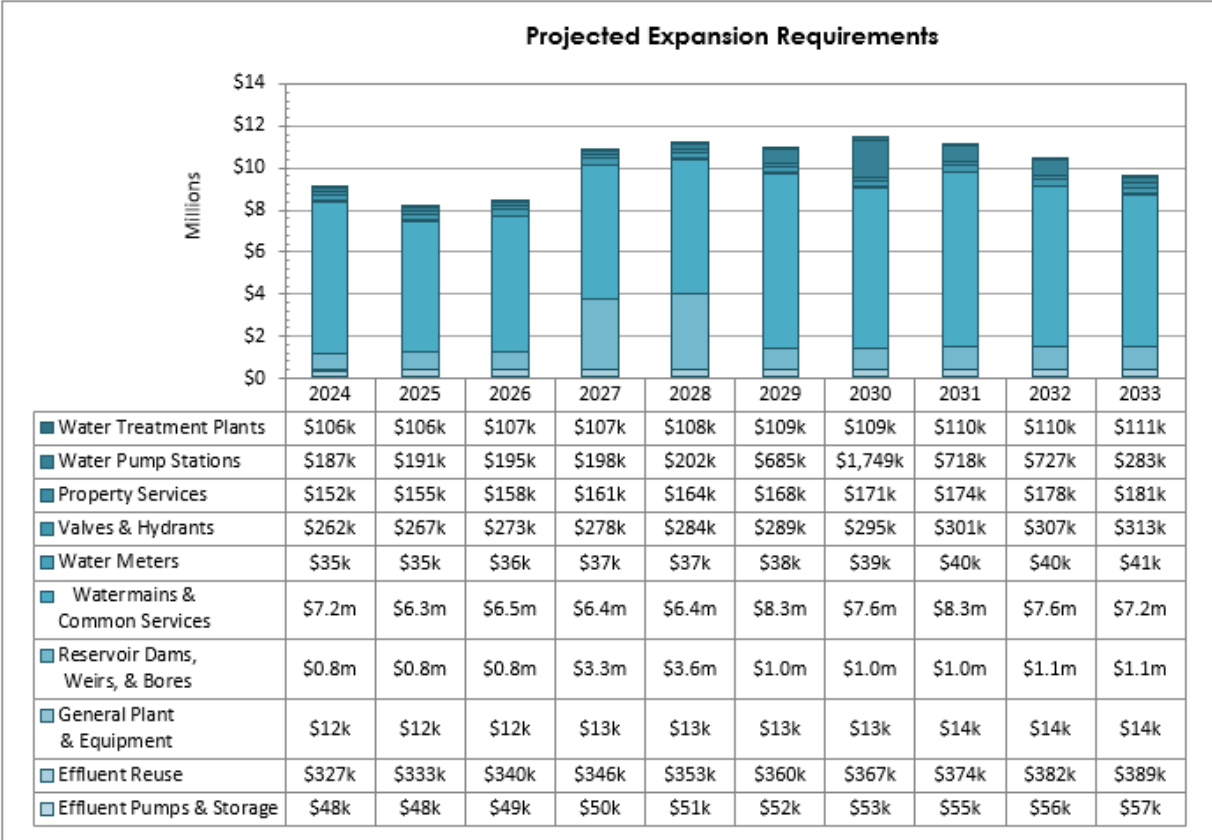


Figure 9. Projected Expansion Requirements

PLANNED EXPANSION PROJECTS

The following expansion projects are currently identified in Council’s Forward Capital Works Program:

- 2023 – Emu Park West – Reservoir
- 2023 – Inverness – Water Pump Station
- 2024 – Kelly’s Dam Remedial Works
- 2028 – Yeppoon West - Reservoir
- 2030 – Carige Boulevard – Trunk Watermain
- 2030 – Taroomball – Water Pump Station
- 2031 – Mulambin – Trunk Watermain
- 2031 – Yeppoon West – Water Pump Station
- 2032 – Adelaide Park Road – Trunk Watermain
- 2032 – Yeppoon West – Trunk Watermain
- 2033 – Woodwind Valley – Water Pump Station
- 2033 – Panorama Drive – Water Pump Station
- 2033 – Taroomball – Trunk Watermain

Should the above projected and planned expansion projects occur as predicted, Figure 10 provides an estimate of the future replacement cost of the water assets. Modelling indicates that by 2033 the water asset class will have a replacement cost of \$537 million (shown in real dollars).

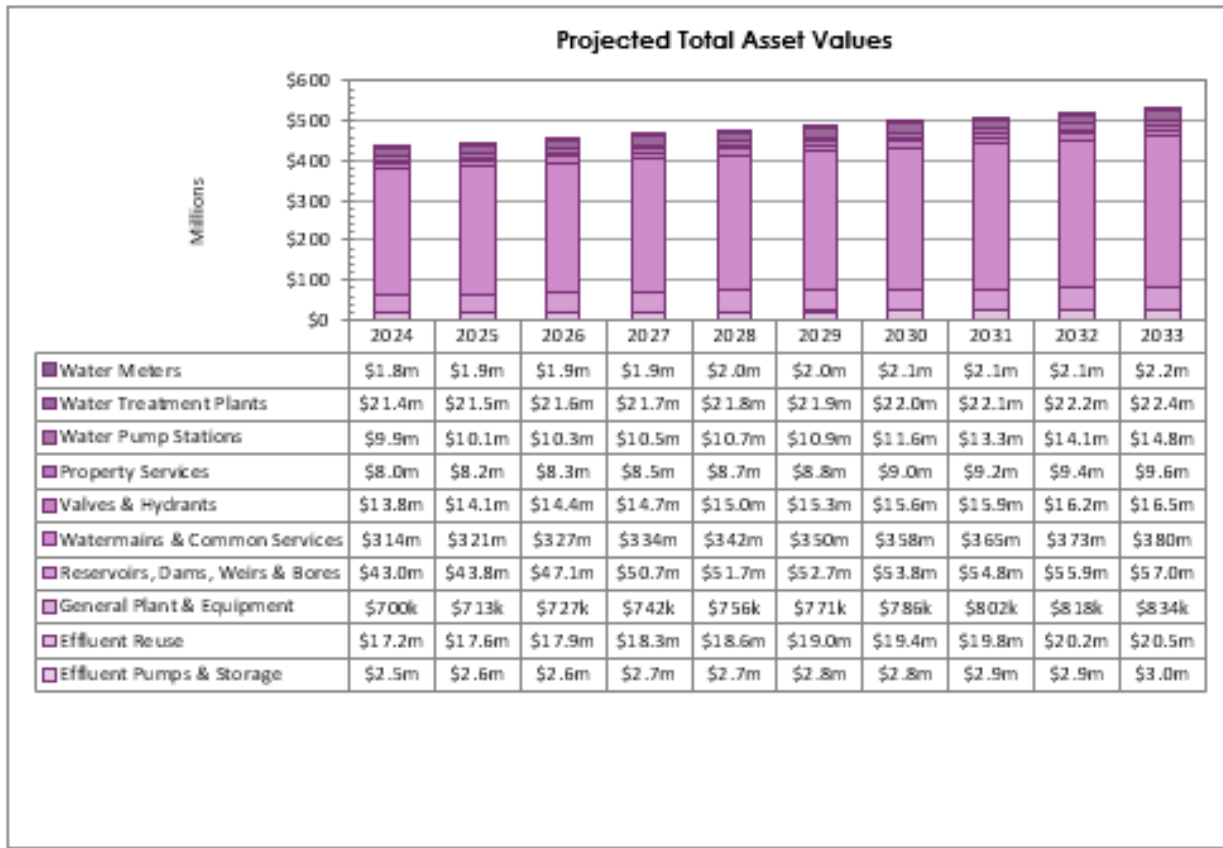


Figure 10. Projected Future Total Asset Values

RENEWING THE WATER NETWORK

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 original service potential.

Council has not identified any requirement for asset obsolescence resulting in disposal during the life of this plan, that is to say capital expenditure is modelled to renew current assets in perpetuity.

The projected renewal and replacement expenditures based on current asset condition assessments are summarised below.

PASSIVE RENEWAL PROGRAMS

Some passive asset types have been allocated projected renewal programs that afford the Water & Waste business unit flexibility to determine which assets are replaced in a given year. This allows the team to realise economies of scale by deploying resources to specific locations or on planned routes, to minimise the cost of establishment/ dis-establishment, traffic control, customer notifications etc.

At present, valves, hydrants, meters and property services have been identified as asset types to be renewed according to annual programs. These have been determined based on the following formula:

$$\text{Annual Renewal Program} = \frac{\text{Asset Value at EOFY}}{\text{Useful Life}}$$

Expansion of the network is included in each year's Annual Value at EOFY figure.

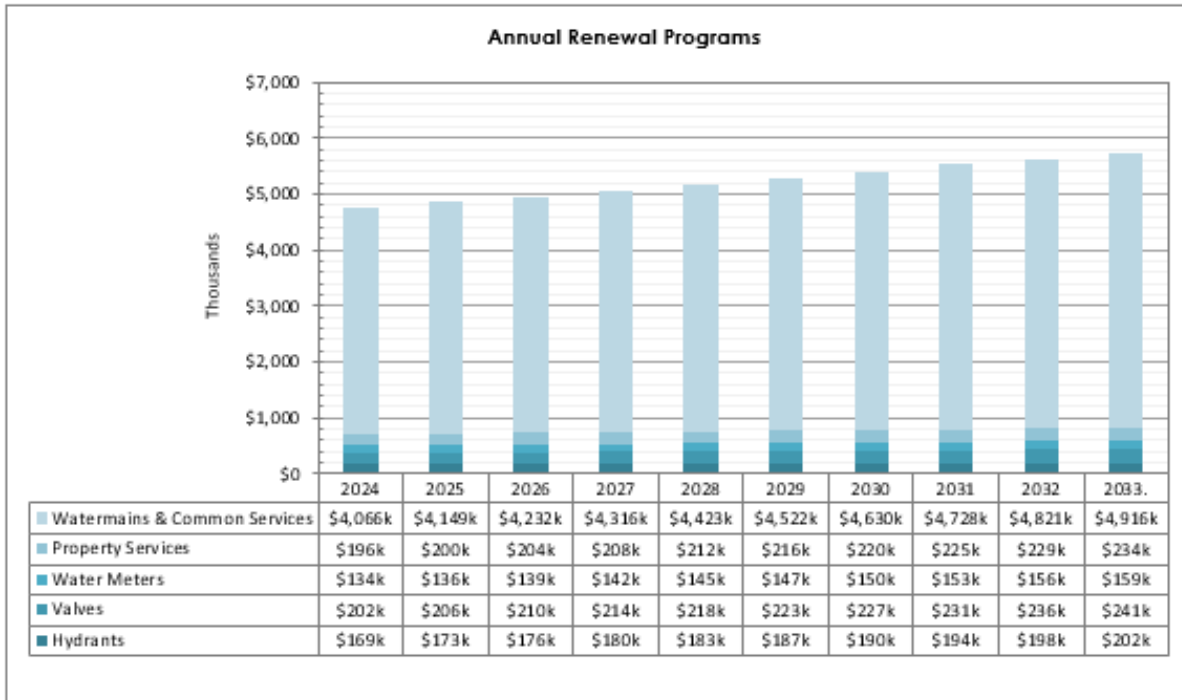


Figure 11. Annual Renewal Programs

PROJECTED RENEWAL REQUIREMENTS

For asset types that have not been allocated an annual renewal program, projected renewal requirements are identified from estimates of remaining life obtained from the asset register. It is important to note that the expiry date including in the asset register indicates only a best estimate of end-of-life. In reality each asset type will have a useful life range with some assets failing before their expiry and others remaining in service far past it. The renewal requirements identified are therefore often unlikely to be required to be spent in the years indicated and are provided only as a guide. Further investigations are undertaken to determine true condition before any asset approaching end-of-life is budgeted for renewal.

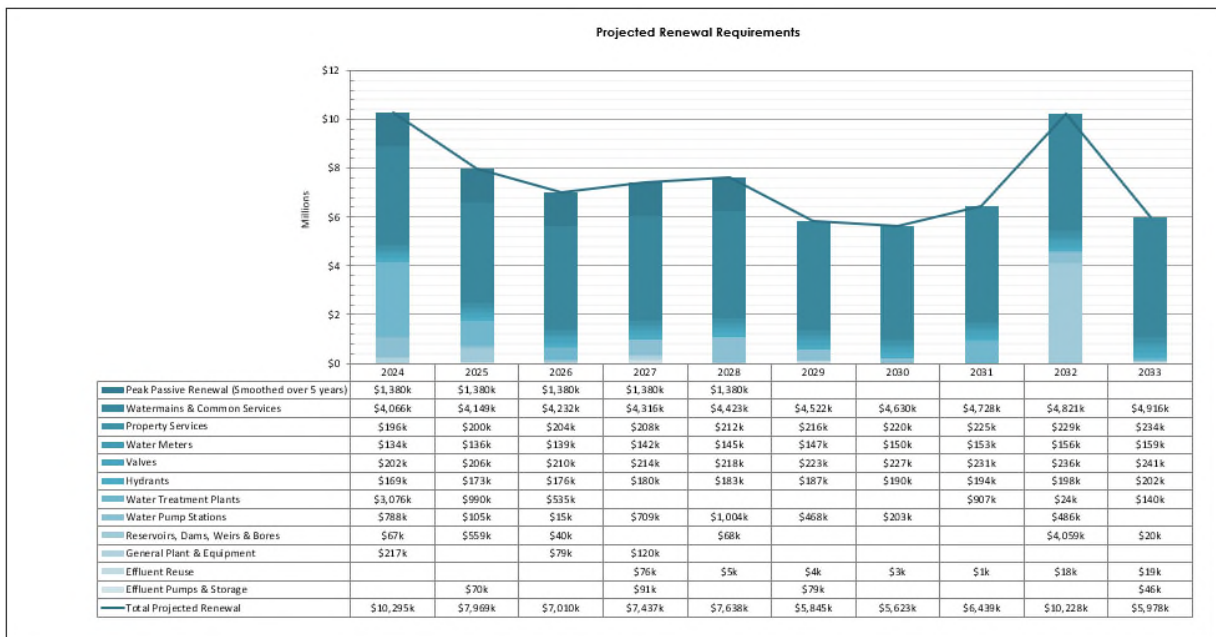


Figure 12. Projected Renewal Requirements

PLANNED RENEWAL PROJECTS

In addition to these allocated projects, the FWP includes provision for renewals based on previous asset management planning exercises. ‘Unallocated’ renewals are funding that has been identified as a requirement, however the exact asset type and the proportion of spend is yet to be finalised.

Figure 13 provides a forecast of the notional renewal funding required to keep the assets in satisfactory condition (“Projected”) and compares it to the available funding provided in Councils adopted FWP (“Planned”). It shows that Council currently has not allocated sufficient funding in the 10-year outlook to ensure its water assets are maintained in a satisfactory condition.

This underfunding is primarily due to a combination of a modelled \$6.9 million peak in Passive (underground) asset renewals in 2027 as well as a perceived underfunding of annual renewal programs of approximately \$39.7 million across the life of this AMP.

To fund the modelled peak passive asset renewals Council has spread the replacements over the first 5 years of this asset management plan period, resulting in an additional \$1.4 million in renewal funding required between 2024 – 2028 (as shown below).

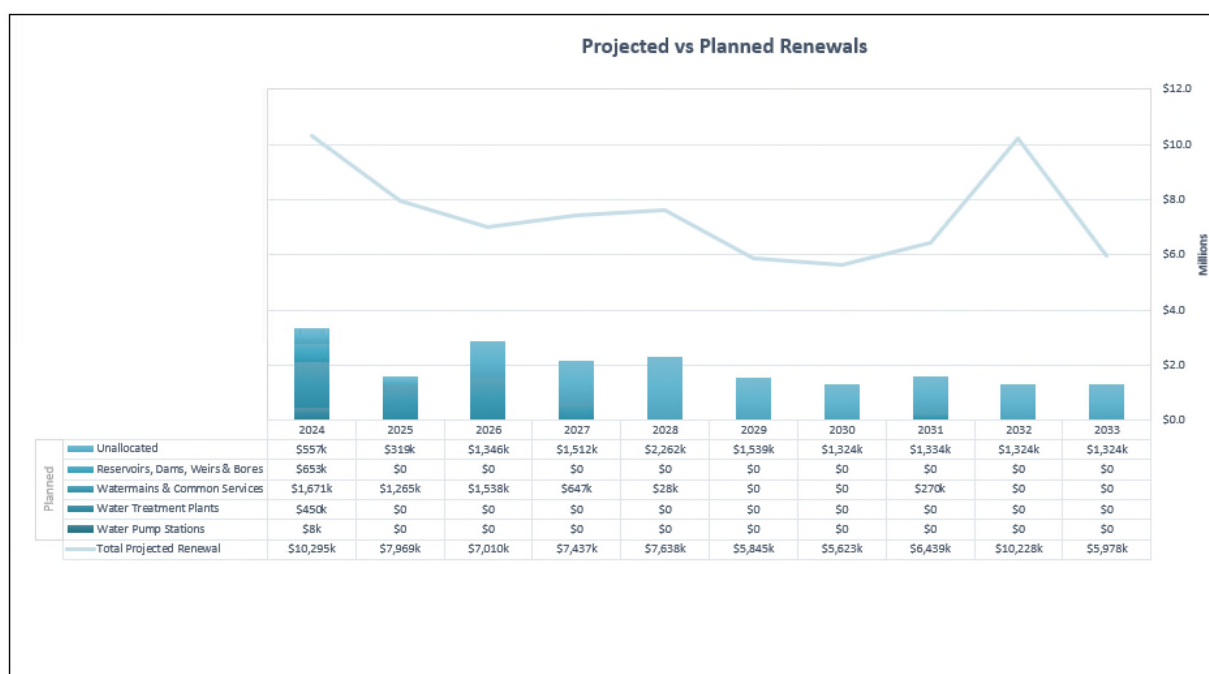


Figure 13. Planned vs Projected Renewals

OPERATING & MAINTAINING WATER SUPPLY ASSETS

Routine maintenance is the regular on-going work that is necessary to keep assets operating, including instances where portions of the asset fail and need immediate repair to make the asset operational again. Maintenance includes all actions necessary for retaining an asset as near as practicable to an appropriate service condition including regular ongoing day-to-day work necessary to keep assets operating.

Figure 14 below, taken from IPWEA Practice Note 7 shows the relationship between condition, asset remaining useful life and operating & maintenance budgets. What it illustrates is that any potential delay in capital renewal expenditure will lead to an increase in operating and maintenance budgets.

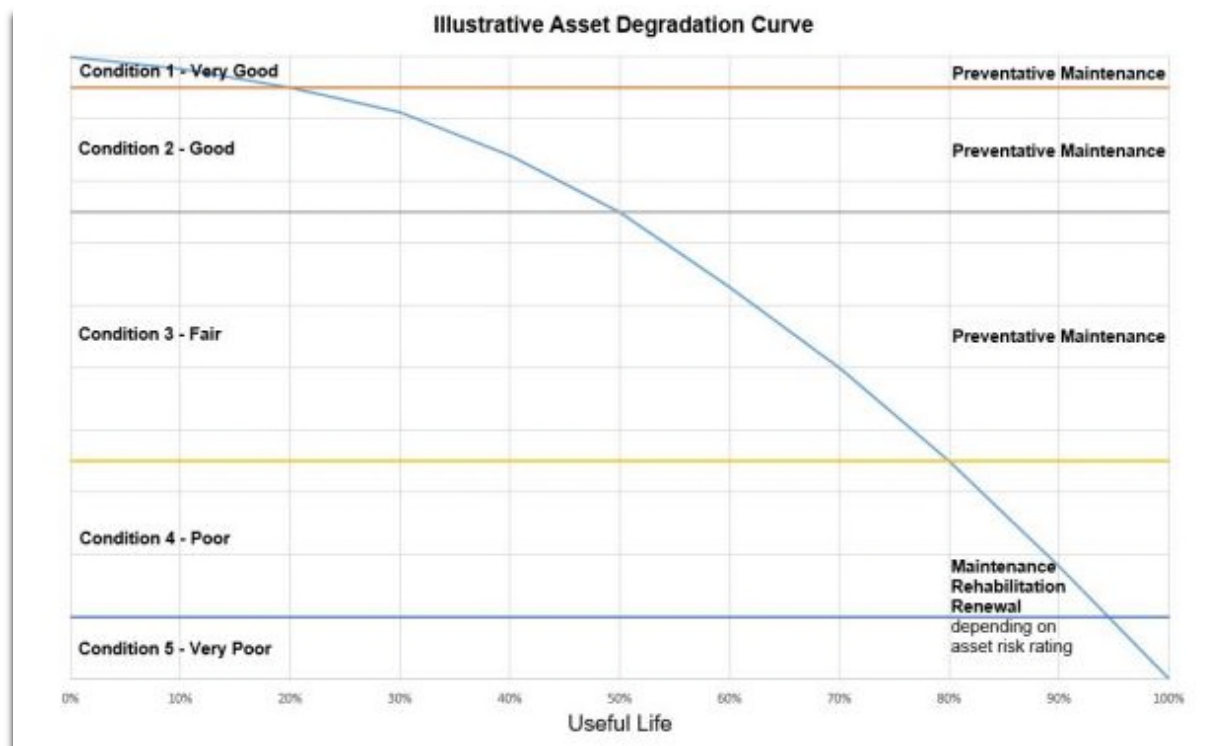


Figure 14. Asset Deterioration versus Remining Useful Life

ROUTINE MAINTENANCE

Routine maintenance includes regular maintenance activities such as valve exercising, hydrant testing and flushing along with cyclical maintenance activities such as mechanical servicing.

PASSIVE ASSETS

Routine maintenance of passive assets generally consists of the following major activities:

- Valve exercising
- Hydrant testing
- Mains flushing

ACTIVE ASSETS

Routine maintenance of active assets consists of:

- Servicing of electrical and mechanical assets
- Inspections of reservoirs, pumps stations, treatment plant assets
- Reservoir cleaning
- Dam inspections

REACTIVE MAINTENANCE

Maintaining Council's assets through regular investment is the most effective way to preserve their condition and reduce the risk of defects occurring and intervention becoming necessary. However, even with regular investment, defects will occur; reactive maintenance refers to works that are carried out as a matter of urgency, usually to repair these defects for reasons of safety.

When responding to defects with reactive maintenance, Council takes a safety-first approach. Where there are clear implications for public safety, we will act to allay the danger. Where danger is not implicit, we will balance our actions and responses against other criteria and priorities as set out in this plan

Livingstone Shire Council will endeavor to meet the performance targets outlined in its Customer Service Standards for the delivery of water services to customers. This includes responding to water burst and leak incidents within 2 hours for the Capricorn Coast and Caves/ Nerimbera schemes, 3 hours for the Marlborough Scheme and 4 hours for the Ogmore Scheme.

PROJECTED MAINTENANCE REQUIREMENTS

Projected maintenance is currently forecast using a top-down approach where key analysis has been applied at the 'system' or 'network' level and is based on past costs. Future revisions of this plan will improve maintenance forecasting following development of more granular maintenance plans.

Future maintenance expenditure is forecast to trend in line with the size of the asset stock as shown in the figure below. Note that all costs are shown in current 2022-23-dollar values (i.e., real values). Council has currently accurately budgeted sufficient funds in the LTFFP to accommodate future projected maintenance costs.

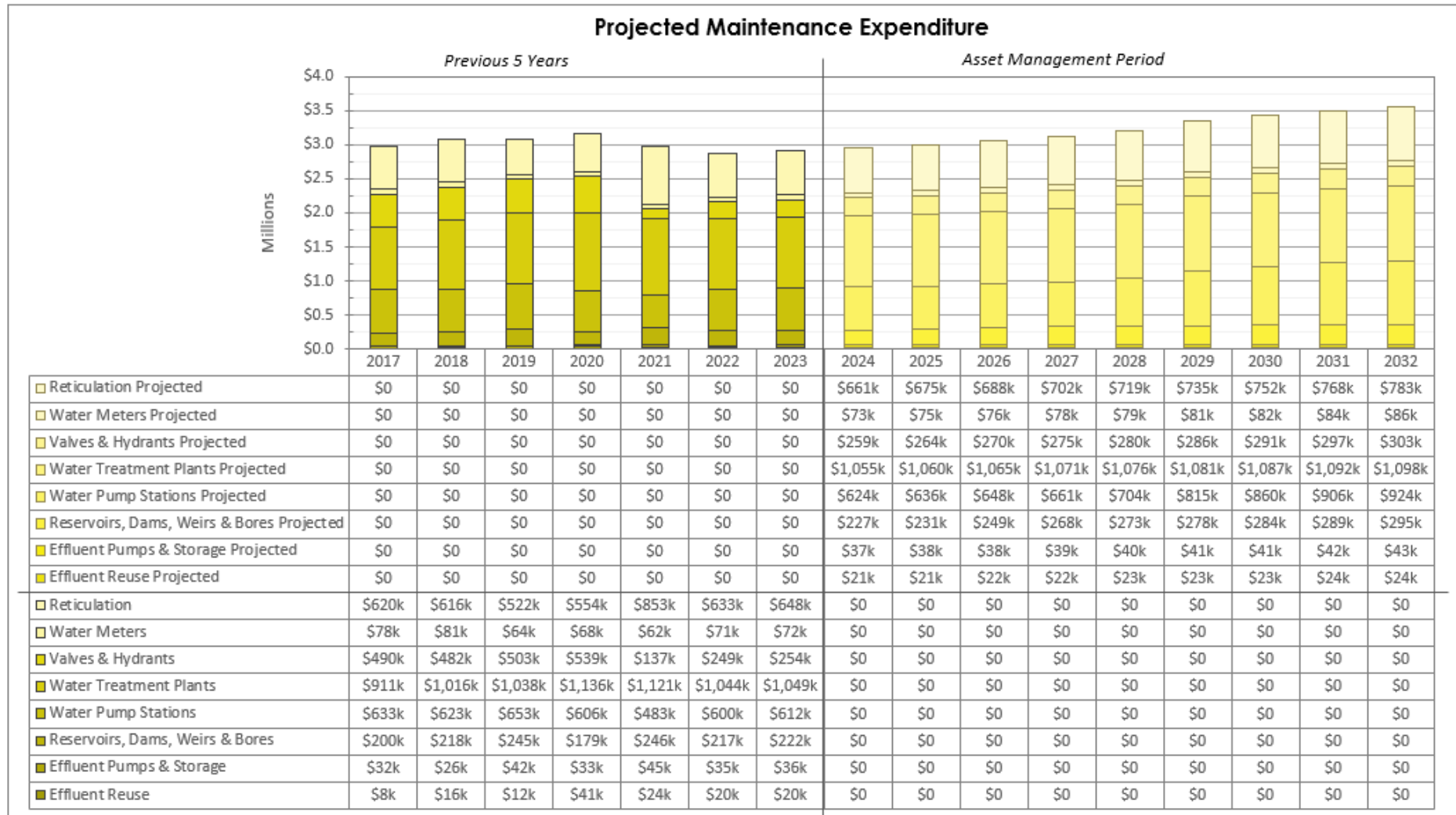


Figure 15. Projected Maintenance Expenditure

LIFECYCLE COSTS

Lifecycle costs are the total costs council needs to budget for to manage and operate its water assets at the approved level of service.

The financial projections from this plan are shown below in Figure 16. These projections include forecast costs for maintenance, renewal, expansion, disposals, and depreciation shown relative to the adopted costs in the budget.

The bars in the graph represent the budgeted costs needed to minimise the lifecycle costs associated with providing the service. The proposed budget line indicates the estimate of available funding based on what has been allocated in Councils LTFP. The gap between the forecast work and the proposed budget is the basis of the discussion on achieving balance between costs, levels of service and risk to achieve the best value outcome.

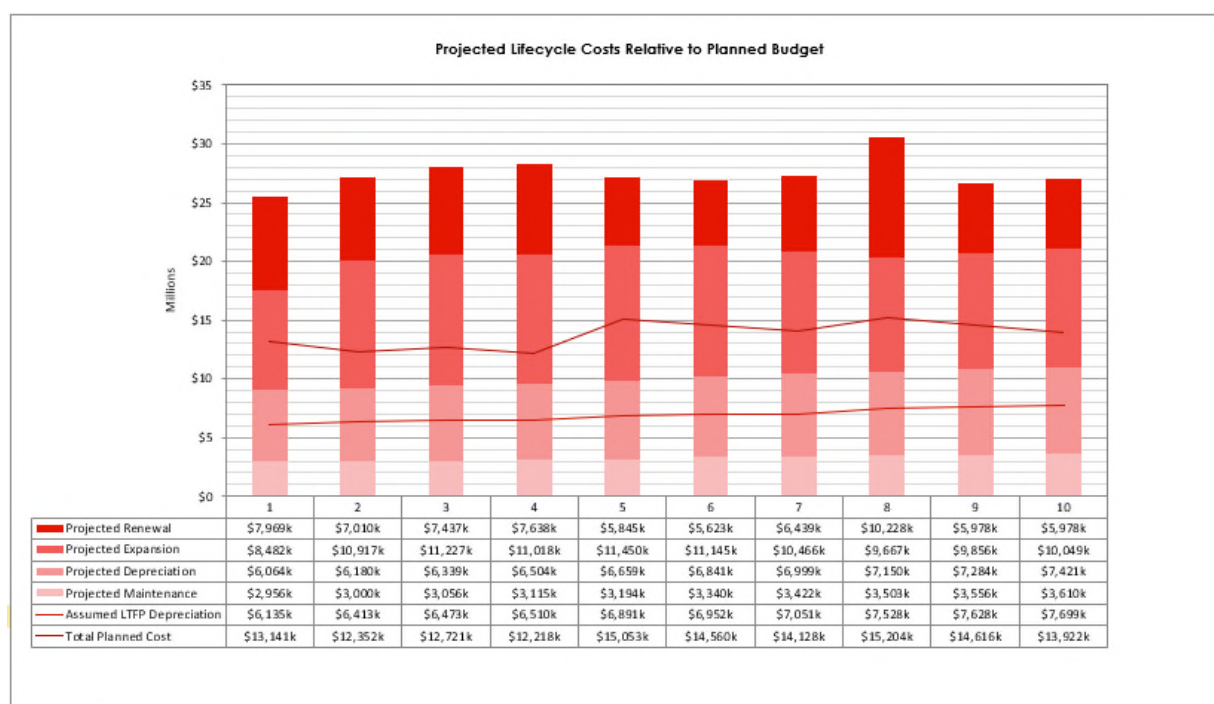


Figure 16. Planned versus Projected Lifecycle Costs

The planned (budgeted) expenditure does not meet the forecast costs for all the years. The average annual planned and projected expenditures are approximately \$13.2 million and \$27.4 million respectively. Council has allocated sufficient funding in its LTFP to address the projected maintenance and depreciation costs across the life of the AMP.

However as discussed in previous sections there is currently a funding shortfall over the 10 year life of this plan.

RISK MANAGEMENT

The purpose of infrastructure risk management is to document the results and recommendations resulting from the periodic identification, assessment and treatment of risk associated with providing services from infrastructure, using Council's Enterprise Risk Management Framework, Policy and Procedure as a guide.

Council's risk management process is detailed in these documents and is an analysis and problem-solving tool designed to provide a logical process for the selection of treatment plans and management actions to protect the community against unacceptable risks.

Public safety risk assessments are undertaken by:

- Council's inspector as part of the annual routine defect inspections and condition assessments.
- Council officers, with responsibility for asset maintenance, when potential hazards are brought to their attention via requests logged into Council's customer service system (Pathway); and
- Council officers, with responsibility for asset maintenance, when undertaking ad hoc inspections, while undertaking other duties on site.

Any deferred renewal (i.e., assets that have been identified for renewal through this plan and not schedule in the capital works program) should also be included in the above-mentioned risk management document.

CRITICAL ASSETS

Critical assets are defined as those which have a high consequence of failure causing significant loss or reduction of service. Similarly, critical failure modes are those which have the highest consequences. Assessment of an Asset's criticality is fundamentally a risk management process and is undertaken following Council's Enterprise Risk Management Procedure (ERMP). Criticality is the consequence of the asset failing and as such is assessed using Council's Risk Consequence Table as included in Appendix 3 of the ERMP.

For some asset classes, the number of individual assets is relatively small, and assessment can be undertaken at the asset level. For network assets like water supply this process would be arduous. Instead, these assets are assessed based on the information available in Council's Asset Management and Geographic Information Systems. Council is currently developing an Asset Criticality Management Plan and this plan will be updated to reflect the outcomes of that process.

MONITORING & IMPROVING THE PLAN

The effectiveness of this asset management plan can be measured in the following ways:

- The degree to which the required cash flows identified in this plan are incorporated into council's long term financial plan
- The degree to which 1–3-year detailed works programs, budgets, business plans and organisational structures consider 'global' works program trends provided by this plan
- The degree to which sustainability ratios outlined below meet their targets; and
- Progress toward achieving the outcomes listed in the Improvement Plan

Providing services from infrastructure in a sustainable manner requires the matching and managing of service levels, risks, projected expenditures and funding to achieve financial sustainability over the life of the Asset Management Plan. The following ratios provide a set of Key Performance Indicators that will enable Council to measure and report its overall asset management sustainability more readily.

ASSET SUSTAINABILITY RATIO

A financial measure of satisfactory levels of expenditure on asset replacements is the Asset Sustainability Ratio - the net capital expenditure on replacements as a percentage of the depreciation. It indicates whether the amount of replacement exceeds or is less than the amount of depreciation, that is, whether assets are being replaced at the rate they are wearing out.

An index of less than 100% on an ongoing basis indicates that capital expenditure levels are not being optimised to minimise whole of life cycle costs of assets or that assets may be deteriorating at a greater rate than spending on their renewal. The then Department of Infrastructure, Local Government and Planning proposed a conservative target of equal to or greater than 90%.

The Asset Sustainability Ratio over the life of this plan based on planned renewals and projected depreciation is 27.9%.

Should Council proceed with the adoption of the projected renewal funding outlined in this document the Asset Sustainability ratio over the life of this plan would increase to 101.1%. This would indicate that some of the funding exceeds the service levels adopted by Council and that further work is required to ensure Council is meeting its obligations.

IMPROVEMENT PROGRAM

A 12-month improvement plan is included for implementing improvement actions identified in preparing this Asset Management Plan. This AMP and Improvement Plan will be reviewed annually.

Table 11: Improvement Actions

	Action	Outcome	Responsibility	Due Date
1	Collect and report on emissions data	Ability to report on Environmental outcomes	Manager Water & Waste	July 2023
2	Review asset useful lives as part of next Water revaluation considering condition/age data captured in that time	Improve lifecycle costing incorporated into AMP	Asset Engineer	July 2026
3	Review modelled projected expansion costs against actual costs in future revisions of this document and its model	Improve lifecycle costing incorporated into AMP	Asset Engineer	Ongoing
4	Migrate current water model to Assetic Predictor platform. Update Water AMP document accordingly	Improve lifecycle costing incorporated into AMP	Asset Engineer	February 2024
5	Develop an inspection program (and associated business case) utilising new technologies for valves and hydrants to try and understand the true condition of the network to better inform renewal forecasting	Transition asset management system from 'age based' to 'condition based' valuation & analysis.	Manager of Water & Waste and Assets Engineer	November 2023
6	Update AMP to reflect adoption of Asset Criticality Management Plan	Improved risk management outcomes	Asset Engineer	July 2024
7	Continue development and review of the watermain renewal program with the intention to develop a 10-year prioritised program that will be review annually ahead of budget workshops	Determine renewal forecast	Manager Water & Waste, Manager of Engineering Services and Asset Engineer	November 2023
8	Continued testing of AC main coupons to identify condition. Data to be included in future revisions of AMP modelling	Transition asset management system from 'age based' to 'condition based' valuation & analysis	Manager of Water & Waste and Assets Engineer	Ongoing
9	Continue to undertake 3 yearly SmartCAT assessments of the Mount Charlton pipeline to determine the optimal point for renewal	Determine renewal forecast	Manager Water & Waste	January 2026
10	Develop a business case to complete a planning project to determine the true renewal costs for the Mount Charlton pipeline and whether any land acquisitions are required	Improved understanding of demands and financial impacts	Manager Water & Waste and Manager of Engineering Services	November 2023
11	Update AMP to align with outcomes of LGIP review	Improved understanding of demands and financial impacts	Asset Engineer	February 2024

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