GOONDIWINDI REGIONAL COUNCIL

WATER SUPPLY SERVICES

ASSET MANAGEMENT PLAN

Version 4.0
June 2018

Document Control					
Document ID:					
Version No	**Date**	**Details**	**Author**	**Reviewer**	**Approver**
1.0	31 Jan 2018	Document for Engineering Services consideration	Chris Egbars, Shepherd Services	Steve Forbes, Shepherd Services	Stephen Hegedus Shepherd Services
2.0	9 March 2018	Includes feedback from Council and financial modelling based on capex in QTC model	Chris Egbars, Shepherd Services	Steve Forbes, Shepherd Services	Stephen Hegedus Shepherd Services
3.0	19 April 2018	Includes feedback from Council on financial modelling at workshop 16 April	Chris Egbars, Shepherd Services	Steve Forbes, Shepherd Services	Stephen Hegedus Shepherd Services
4.0	6 June 2018	Revisions based on feedback from Mger Water & Sewerage 18 May and 6 June	Chris Egbars, Shepherd Services	Steve Forbes, Shepherd Services	Stephen Hegedus Shepherd Services

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ABBREVIATIONS

AAAC	Average annual asset consumption
AC	Asbestos Cement
AMP	Asset Management Plan
AMS	Asset Management System
CAPEX	Capital Investment Expenditure
CICL	Cast Iron Cement Lined
CoF	Consequences of Failure
CP	Cathodic Protection
CRC	Current replacement cost
CSS	Customer Service Standard
DA	Depreciable amount
DEWS	Department of Energy and Water Supply
DICL	Ductile Iron Cement Lined
DMP	Drought Management Plan
DNRM	Department of Natural Resources and Mines
DoH	Department of Health
DWQMP	Drinking Water Quality Management Plan
EP	Equivalent Persons
GIS	Geographic Information System
GRP	Glass Fibre Reinforced Plastic
IRMP	Infrastructure risk management plan
KIM	Knowledge Information Mapping
LCE	Life Cycle Expenditure
LCC	Life Cycle Cost
LGIP	Local Government Infrastructure Plan
LoF	Likelihood of failure
LOS	Levels of Service
MMS	Maintenance management system
NPR	National Performance Reporting
PI	Performance Indicator
Poly	Polyethylene
PVC	Poly Vinyl Chloride
RCP	Reinforced Concrete Pipe
RV	Residual value
SS	Suspended solids
SWIM	state-wide Water Information Management
VSD	Variable Speed Drive
WPS	Water Pump Station

EXECUTIVE SUMMARY

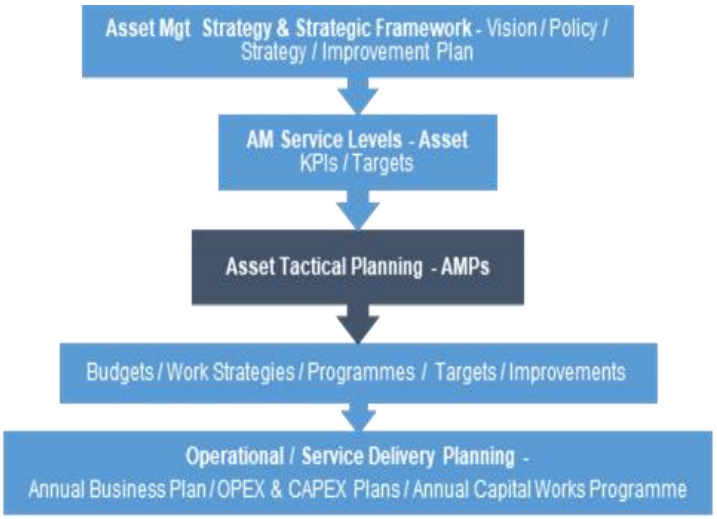
ASSET MANAGEMENT

The objective of asset management is to meet a required level of service, in the most cost effective manner, through the management of assets for present and future customers. Effective asset management provides better accountability, sustainability, risk management, service management and financial efficiency

An Asset Management Plan (AMP) is usually for at least 10 years. It outlines the asset activities and programmes for each service area and resources applied (including technical and financial) to provide over the lifecycle of the assets a defined level of service in the most cost effective manner. A significant component of the plan is a long term cash flow projection for the activities, since the objective is to look at long-term costs (rather than short-term savings) when making decisions.

Asset Lifecycle Activities

Council is developing a strong planning coordination vertically through the business, from the strategic to the operational level, including AMPs for undertaking tactical asset management planning as shown in the Figure below. The AMP is also the means for driving strategic goals through to the day-to-day activities of Council in managing its assets.



BACKGROUND

The purpose of this plan is to document asset management planning information for the Council owned water supply assets at the 3 principal towns, Goondiwindi, Inglewood, Texas, plus smaller townships, Yelarbon, Talwood, Toobeah and Bungunya. The plan includes the extent of assets, asset condition and performance against key indicators, long term financial forecasts for the 10 years 2018/19 to 2027/28 and an improvement plan. Financial implications for providing the required levels of service into the future are provided based on the separate spreadsheet model.

ASSETS

There are in total approximately 186.5 km of mains, services and rising mains, 18 raw and system pumping stations, 3 bores, 2 weirs, 2 barrages, 13 reservoirs and tanks and 5 treatment plants, including over 2 sites at Goondiwindi.

Value

Water supply assets as at the 30th June 2017 have a provisional gross replacement cost of approximately $64.2 million, fair value (written down value) of approximately $39.6 million and annual depreciation approximately $1.1 million. Underground assets comprising mainly mains comprise 52% of total gross replacement value.

Age

The average age of mains is 35 years although a portion are relatively old. Approximately 25% ($7.9 million) of the replacement cost is for mains 15 years and younger, 50% for mains 26 years and older and 25% for mains 50 years and older.

The age profile for pump station assets indicates relatively aged electrical and mechanical assets. The average age is 16 years. 50% of the total replacement cost is for assets older than 15 years.

The age profile for reservoir assets indicates a few relatively aged structure assets –Inglewood 450kL concrete on ground reservoir and Toobeah reservoir stand are 65 years old; and McLean Water tower is 54 years old. The average age of assets is 30 years. 50% of the total replacement cost is for assets older than 33 years old.

The average age of treatment plant assets is 16.5 years. Approximately 25% ($3.2 million) of the replacement cost is for assets 5 years and younger, 50% for assets 30 years and older and 25% for assets 32 years and older. Approximately 25% ($5.3 million) of the replacement cost is for assets less than 13 years of age younger, 50% for assets older than 17 years and 25% for assets 19 years and older.

Condition and Remaining Life

It is critical that Council has it's "finger on the pulse" in relation to asset condition and the implication for future rehabilitation/replacement expenditure. The majority (92%) of underground assets are in average or better condition based on age, 1.1% ($0.4 million) are in poor condition and 6.8% ($2.3 million) require replacement based on condition.

The majority (96%) of above ground assets are in average or better condition, 3.1% ($0.9 million) are in poor condition and 1.4% ($0.4 million) require replacement based on condition.

The average remaining useful life is 46 years for underground assets and 22 years for above ground assets.

For the assets approaching the end of their useful life it is paramount that Council collects some condition and performance data for these categories and additionally for critical assets, since their failure is generally not acceptable.

LEVELS OF SERVICE

Council has to meet many legislative requirements including Australian and State legislation, and State regulations. Council aims to provide an affordable and reliable water supply service within the regulated guidelines. Water supply assets are to be maintained in a reasonable usable condition and defects found or reported that are outside of service standards are repaired within defined maintenance response times.

The Water Supply (Safety and Reliability) Act 2008 and in 2014 specific changes enacted aimed to simplify regulatory requirements require the Council to collect data on a pre-determined list of key performance indicators. On or before 1 October the data for the previous financial year is submitted to the regulator in a performance report about each of the indicators. The results indicate all targets for 2017 were met.

Council has no set levels of service other than those proposed in the legislated Customer Service Standard prepared 2009.
Proposed measures and revised targets for consideration based on a review of recent data, regulatory requirements, affordability and financial viability are:

- Less than 1 Drinking water quality complaint per 1,000 connections per year (i.e. <5 quality complaints per year)
- Less than 50 water service complaints per 1000 connections per year (i.e. <210 service complaints per year)
- Less than 120 mins in at least 90% of instances for response time to incidents (bursts and leaks)
- Less than 8 hours for restoration of service
- Less than 25 main leaks / breaks per 100 km mains per year (i.e. <45 per year)
- Minimum 98% Microbiological compliance and 96% chemical/physical compliance for water samples.

DEMAND AND CAPACITY

All potable water and raw-non potable water treatment plants have sufficient capacity to meet annual demand, although the raw-non potable water plants are approaching their capacity (78% - 79% for 2016/17 demands). Water supply systems are stressed when high demand occurs over more than a week – a serious issue for Goondiwindi, Talwood and Yelarbon. Although the output capacity of all treatment plants meets current average day demands, there is insufficient water reservoir capacity to cater for periods of higher demand at Goondiwindi, Inglewood, Talwood and Yelarbon (less than 1 day storage).

In theory, average day potable water day needs for ultimate populations for all towns appear to be met by current capacities of plants. However, the planned abattoir and other possible enterprises at or near Goondiwindi in the coming years will impact the demand for water supply services and increase stress on the system during peak demand periods. Aside from providing additional reservoirs, it is not certain that treatment plants can cope into the future with prolonged large demand in summer (typically a couple of weeks to even a month at a time).

System augmentations have been completed resulting from network analyses done 4 to 5 years ago. There is a need to further review system capacities and undertake network analysis for towns, including Goondiwindi, Texas, Yelarbon and Inglewood to confirm works to cater for peak demands now and into the future. Planning reports need to be updated.

Capital works proposed to address system issues have been included in the forward works program, although the majority require verification and confirmation of extent through analysis work, for example, a pressure system proposed for Yelarbon to meet firefighting needs.

OPERATIONS APPROACH

Each of the water supply system assets is operated by Council to ensure the:

- Standard of the asset does not decline below a level at which the standard of service can be achieved
- Appropriate service objectives (i.e. Levels of service, statutory/regulatory requirements, and obligations, etc.) Are achieved at the least cost and that the impact of any breakdowns or outages is minimised
- Consumers get value for money.

The individual water supply systems are different. Council strives to operate each system to deliver the same levels of service where treated water is provided. Substantial investment in telemetry has occurred over the last 5 years at each water supply system including at Yelarbon last year, to monitor and control assets. Now the whole water supply system is connected and can be monitored by office staff and changes made. Council has been reviewing resourcing requirements and proposes a revised organisational structure for management of water supply (and sewerage) services.

INSPECTIONS AND MAINTENANCE

Council's maintenance policies and procedures are yet to be established. Planned maintenance is adhoc and in general not carried out for the majority of asset categories.

Council has the 'Reflect' software developed by Asset Edge which is slowly being used more often. Expanded use of 'Reflect' for fixed interval inspection and/or maintenance activities is required. There would appear capacity to undertake this as a priority activity for current staff, once activities/jobs are agreed and set up the software.

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OPERATIONS AND MAINTENANCE EXPENDITURE

Total spend in 2016/17 was approximately $2.2 million (67% operations, 33% maintenance). Goondiwindi comprised the majority - 40% of operations and 60% of maintenance spend. Operations spend is increasing annually whilst maintenance spend is variable year to year.

Allowing for a nominal 10% increase in spend (not allowing for inflation) over the next 10 years due to increased demand, the annual operations expenditure is estimated to be $1.51 million in 10 years (2027/28) and annual maintenance $0.72 million (2017/18 budget plus 10% in current 2017/18 dollar values).

However, the current maintenance spend is only 1% of replacement value. A higher proportion is likely desirable and projected at $0.96 million in 10 years.

CAPITAL WORKS EXPENDITURE

New and Upgrade Works

Little information is available as a basis for proposed new and upgrade projects on the forward works program – costs and scopes are yet to be confirmed. A rigorous planning and analysis approach (e.g. network analyses) is required to be implemented to identify, confirm and prioritise new and upgrade infrastructure projects.

New and upgrade works planned for the 10 years 2018/19 to 2027/28 total $6.85 million.

Beyond the next 10 years the majority of spend is for the new Goondiwindi treatment plant - $20 million over 5 years between 2029 and 2034.

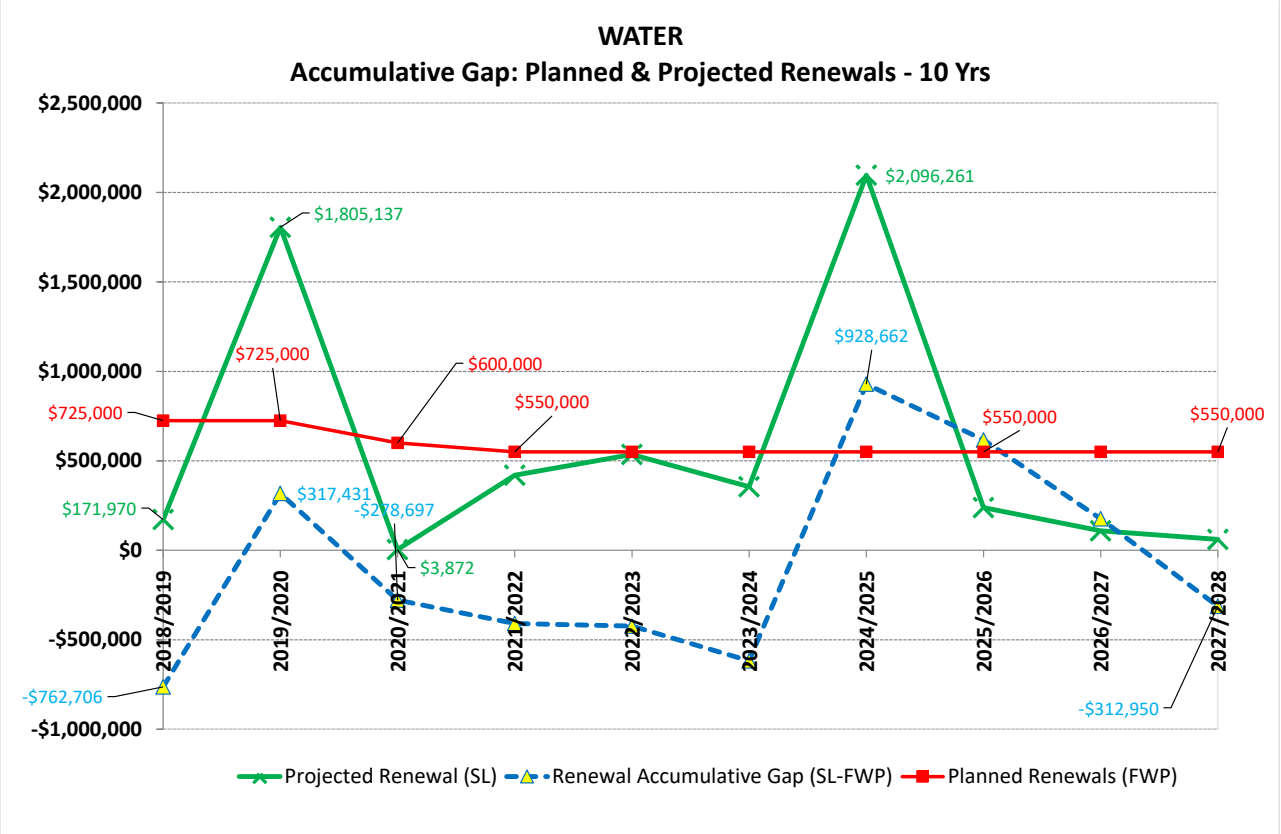
Renewal Works

Council's 'planned' renewals expenditure for the 10 years 2018/19 to 2027/28 totals $5.9 million. This closely matches the 'projected' required expenditure of $5,976,700 determined from the predicted remaining useful lives of assets used in the 2017 asset valuations.

Renewals due in the next 5 years from the valuations need to be considered for the immediate renewals program.

Over the longer term, next 20 years, 'projected' required renewals expenditure is $11.7 million ($2.7 million for underground and $8.9 million for above ground).

The figure below indicates the accumulative gap in renewal funding between what Council plans to spend and projections of required renewals over the next 10 years (allowing for 2017/18 spends). A positive gap indicates underspending on renewals, although the gap is negative at 10 years indicating sufficient spending on renewals over the period.



It is concluded that Council needs to:

i. Undertake the necessary evaluations and condition assessments where possible, to confirm replacements planned and projected for the next 10 years are warranted or otherwise. This will be aimed at avoiding unnecessary/too early replacements or replacements that if not carried out in time will results adverse LOS impacts; and

ii. Allow for total renewals expenditure over the next 10 years (2018/19 to 2027/28) of $5.9 million in line with projections in this AMP.

It should be noted that at this is a newly developed Asset Management Plan, the planned renewals referenced in the Plan are primarily based upon modelling using age profiles, condition assessments and some planned upgrade works. These planned works don't include new works, such as additions to the network, and upgrades for such things as aligning with current standards and increases to capacity. It is hoped that as the Plan matures over time these items, wherever possible, will also be included to give a more complete financial projection moving forward.

SUSTAINABILITY

..Life Cycle Cost versus Expenditure

The Life Cycle Cost (LCC) from valuation data projections is the average cost required to operate and maintain the asset over its life including renewal. The Life Cycle Expenditure (LCE) is Council's planned average cost for this. An acceptable target ratio, named the life cycle sustainability index, of Council's planned versus projected (LCE:LCC) is 0.90 or greater in order to maintain service levels.

The index average of 1.01 over 10 years indicates Council is adequately matching the required funding for renewals.

Asset Sustainability Ratio

This ratio (net capital expenditure on replacements as a percentage of the depreciation) 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 1.0 on an ongoing basis indicates that capital expenditure levels are not being optimised so as 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 index averages 0.54 for 'planned' and 0.53 for 'projected' renewals over the next 10 years indicating asset sustainability will not be achieved and may result in not meeting service levels.

IMPROVEMENT ACTIONS

The high priority improvement actions mainly aimed at improving processes and procedures to capture and input to corporate systems sufficient asset data for informed decision making are:

High Priority Improvement Action	Description
Establishing Service Levels	
Confirm Key Performance Measures	Consider KPIs provided in this AMP
Confirm targets for LOS	Consider targets provided in this AMP
Asset Risk Management	
Critical Spares	Identify, list and procure if necessary spares for critical assets and components.
Asset Life Cycle Management	
Develop Maintenance Management Plans	Develop as a minimum routine maintenance management plans with activities/jobs that align with technical service measures- use of 'Reflect'
Confirm assets for short term renewal programs for asset categories	Adopt asset renewal profiles for asset categories from valuations used for this AMP. Examine 5 yr. renewal profile and confirm assets for short term (3 yr.) renewal programs for categories from condition/performance assessment.
New/upgrade capital works projects confirmed from system analyses/ planning reports	Planning Reports including system analyses provide the information for verifying the need, extent, timing and cost of proposed new/upgrade capital works projects
Implement project prioritisation method for new and upgrade projects	Confirm the project prioritisation tool in this AMP aligns with the principles of the asset management policy and implement for all new and upgrade projects.
Develop clear work scope for projects at planning stages	Scope of works are required - necessary for complex projects
Complete as constructed and project completion documentation	As constructed and project completion documentation to be completed in a timely manner so as project capitalization and mapping updates can occur before knowledge is lost
Measuring and Managing Asset Performance	
Improve field capture and input to corporate systems for the inspection and maintenance activities and condition information for facilities / asset classes	Inspections results and maintenance works should be formally documented. Implement on mobile devices ('Reflect') where appropriate to capture data for corporate use, e.g. main failures - asset ID, material and location, routine inspections/maintenance activities
Update mapping and map pipework failures on GIS	Mapping needs to be updated. Map water main failures on GIS as a layer (previous from operational knowledge and future from new collection measures)

1. INTRODUCTION

1.1 Background

The objective of asset management is to meet a required level of service, in the most cost effective manner, through the management of assets for present and future customers. Effective asset management provides better accountability, sustainability, risk management, service management and financial efficiency

An Asset Management Plan (AMP) is usually for at least 10 years. It outlines the asset activities and programmes for each service area and resources applied (including technical and financial) to provide over the lifecycle of the assets a defined level of service in the most cost effective manner. A significant component of the plan is a long term cash flow projection for the activities, since the objective is to look at long-term costs (rather than short-term savings) when making decisions.

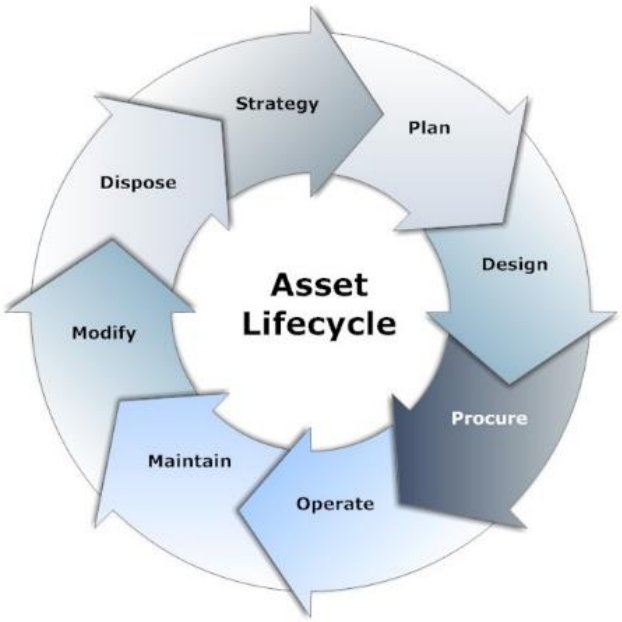


Figure 1.1.a Asset lifecycle activities

Council is developing a strong planning coordination vertically through the business, from the strategic to the operational level, including AMPs for undertaking tactical asset management planning as shown in the Figure below. The AMP is also the means for driving strategic goals through to the day-to-day activities of Council in managing its assets.

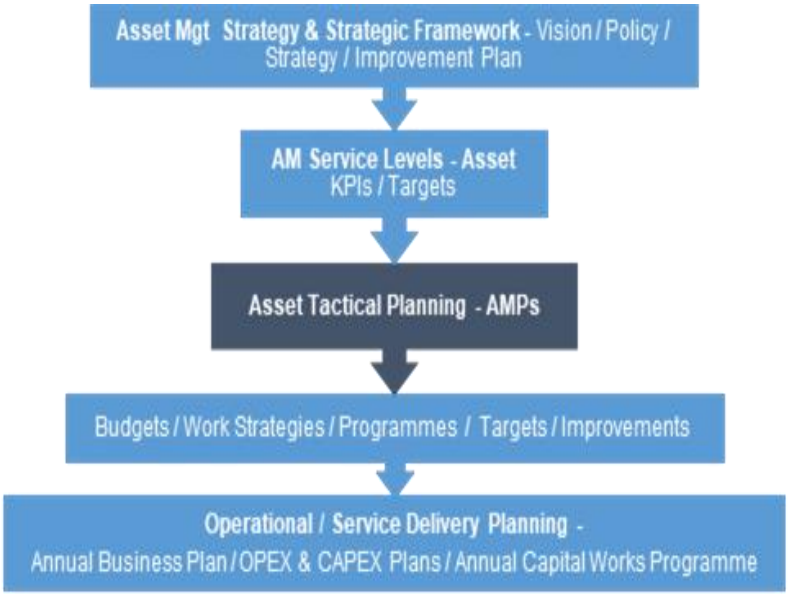


Figure 1.1.b Asset planning hierarchy

The Council exists to provide services to its community. Some of these services are provided by infrastructure assets. Council has acquired water supply infrastructure assets by 'purchase', by contract, construction by council staff and by donation of assets constructed by developers and others to meet increased levels of service.

This AMP is to demonstrate responsive management of water supply assets (and services provided from these assets), compliance with regulatory requirements, and to communicate forecast funding required to provide the required levels of service.

The infrastructure assets covered comprise water supply mains, structures, electrical and mechanical, pipework and fittings including valves and miscellaneous.

The AMP is to be read with the following associated Council planning documents:

- Valuations 2017
- Corporate Plan 2014 – 2019
- Operational Budget 2017/2018
- Operational Plan 2017/2018
- Annual Report 2015-16
- Asset Management Strategy 2016
- Customer Service Standards for Water Supply and Sewerage Services May 2009.

Key stakeholders in the preparation and implementation of this AMP are:

• Government	Provision of various grants and subsidies
• Councillors	Review and approval of Asset Management Plan
• Community	End users of services provided
• Staff	Implementation of Asset Management Plan
• Utility Service Providers	Interaction in service delivery
• Developers	Investing new assets
• Insurers	Risk management

1.2 Goals and Objectives

This AMP is prepared under the direction of Council's vision, mission, goals and objectives as provided in the Goondiwindi Regional Council Corporate Plan 2014 – 2019. Relevant Council corporate goals and objectives and how these are addressed in this AMP are provided in Table 1.2.a.

Table 1.2.a Council Corporate Goals and how these are addressed in this Plan

Goal	Objectives	How Goal and Objectives are addressed in AMP
1.0 COMMUNITY A vibrant, inclusive and healthy community with access to services and facilities reflecting the unique character, role and needs of communities throughout the Regional Council area	1.1.3 Implement and enforce community health regulations whilst ensuring the timely and effective response to emerging health issues.	A safe water supply is an integral part of this plan.
	1.2.1 Plan and provide community infrastructure and support services to best meet community needs throughout the Regional Council area.	This plan will assist in developing 10-year forward works programs.
2.0 ECONOMY A strong and sustainable regional economy that supports the growth of new and existing industry and business activities that enhance local lifestyle and provide long term employment opportunities.	2.2.3 Encourage strong and sustainable business to expand or establish in the region.	An adequate water supply system is a key requirement of business expansion.
	2.4.1 Develop an integrated approach to land planning and infrastructure provision to reflect the needs and aspirations of our communities.	This plan considers all water supply infrastructure and whole of life costs

Goal	Objectives	How Goal and Objectives are addressed in AMP
3.0 ENVIRONMENT A sustainable, well managed and healthy environment that provides a balance between the development of built infrastructure and the conservation of the regions diverse natural and cultural resources.	3.3.1 Ensure a coordinated and integrated approach to infrastructure planning implementation, maintenance and renewal.	This plan will be a key driver of achieving these objectives.
	3.3.2 Maintain integrated asset management systems that enable adequate recording maintenance and replacement of community assets.	This plan is supported by Councils asset management system.
	3.3.3 Use financial sustainability principles in planning, funding, creating and maintaining infrastructure with consideration given to the impacts on future generations.	This plan develops its financial strategies around optimising levels of service and affordability. It will provide significant input to Councils 10 year financial sustainability plan
4.0 GOVERNANCE A proactive, ethical and efficient organisation providing best practice service delivery through exemplary leadership and policy making together with effective management of people, assets and finances.	4.3.1 Establish, implement and manage long term financial planning strategies to ensure the future sustainability of Council.	This plan will support the 10 year financial sustainability plan.
	4.3.2 Minimise Council's financial risks while acknowledging the requirements of our communities.	This plan incorporates the principles of risk management.
	4.3.3 Ensure effective financial, asset and risk management practices to ensure the efficient and accountable delivery of Council's operations.	This plan provides a mechanism to assess the efficiency and accountability of Councils operations.

2. ASSET DESCRIPTION

2.1 Schemes

This AMP is for the water assets located at the Council operated water supply schemes at the 3 principal towns, Goondiwindi, Inglewood and Texas (all potable), plus the smaller townships of Bungunya, Toobeah and Weengallon (all non-potable), Talwood (restricted non-potable and potable) and Yelarbon (potable). Schematic Overviews are provided in the Appendix.

2.2 Physical Parameters

The passive and active water assets included in this Asset Management Plan based on 2017 valuations data are shown in the following tables. Passive assets are generally below ground linear assets and not easily accessible. Active assets are above ground, in most instances accessible and visible. The extent of key assets for water supply systems at towns are listed as follows:

Goondiwindi

- River water pump station with two 157 L/sec pumps delivering to the McLean Street water treatment plant
- Mclean Street water treatment plant with two 50 L/sec and one of 60 L/sec clarifiers each providing coagulation, flocculation and sedimentation
- 0.69 ML settled water storage tank
- Settled water pump station with two 155 L/sec pumps delivering to the George Street water treatment plant
- Sludge pump station with two 6 L/sec pumps delivering to the George Street water treatment plant
- George Street water treatment plant with four 40 L/sec pressure filters, three 2.5 ML sludge lagoons, PAC dosing, disinfection, fluoride dosing plant, and supernatant return
- 10 ML storage reservoir
- High lift pump station equipped with three VSD controlled 142 L/sec pumps delivering to the distribution system (two pumps operating in parallel deliver 235 L/sec)
- 0.27 ML elevated storage in McLean Street and 0.45 ML elevated storage in Francis Street
- Booster pump station in Riddle Street with one pump, the output of which varies with demand on the system
- North Booster pump station with 35 L/sec output at Old Cunningham Highway, providing constant flow/pressure.
- Approximately 103 km of reticulation mains, ranging in size from 50 mm to 375 mm diameter.

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Inglewood

- Weir on the MacIntyre Brook
- Raw water pump station with two 29 L/sec pumps delivering to the water treatment plant and 200 mm diameter raw water rising main
- 23.5 L/sec capacity water treatment plant which provides chemical dosing, flocculation, sedimentation, filtration and disinfection
- 450 kL and 2 ML storage reservoirs
- Clear water pump station equipped with two 27 L/sec pumps delivering to the reticulation system
- Approximately 25.6 km of reticulation, ranging in size from 50mm to 450mm diameter.

Texas

- Raw water pump station equipped with two pumps each discharging 24 L/sec to the water treatment plant and raw water rising main
- Bore equipped with a pump discharging 20 L/sec to the water treatment plant
- 25 L/sec water treatment plant which provides pre-oxidation for the bore water, chemical dosing, flocculation, sedimentation, filtration, backwash pumping and disinfection
- Two 27 L/sec settled water pumps delivering to the 2 ML service reservoir (0.5 ML and 0.35 ML now out of service)
- Approximately 20.8 km of rising and reticulation mains, ranging in size from 50 mm to 225mm diameter.

Talwood

- Weir on the Weir River
- Two 5 L/sec submersible pump and 100 mm diameter raw water rising main delivering water from the Weir River to the water treatment plant
- 8 L/sec capacity water treatment plant providing flocculation, sedimentation, filtration, disinfection and including filter and backwash pumps and reuse pumping from settling ponds
- 22.5 KL settled water tank
- Clear water pump station with two pumps each discharging up to 10 L/sec and smaller 1-3 kW pump
- 110 KL elevated storage
- Approximately 2.5 km of rising and reticulation mains, ranging in size from 32mm diameter to 150mm diameter.

Yelarbon

- Two 8.5 L/sec submersible pumps delivering to the water treatment plant and 150 mm diameter raw water rising main?
- 9 L/sec capacity package water treatment plant providing flocculation, sedimentation, filtration, disinfection and including filter and backwash pumps.
- Clear water pump station equipped with two 10 L/sec pumps
- 110 KL elevated storage
- Approximately 5.6 km of rising and reticulation mains, ranging in size from 100 mm to 150mm diameter.

Toobeah

- Artesian bore free flowing at 15.8 L/sec to an elevated storage and 63mm poly delivery main
- Surface water pump station equipped with two 1.6 L/sec submersible pumps and 80 mm diameter raw water rising main delivering to the ground level storage
- 20 KL ground level reservoir
- High lift pump station equipped with two 2.5 L/sec to pumps delivering to a lawn use reticulation system
- 8 KL elevated tank
- Approximately 1.8 km of rising and reticulation mains, ranging in size from 40mm diameter to 80mm diameter incl dual mains.

Bungunya

- Bungunya Barrage Earth Storage Tank (Yarrilwanna)
- Yarrilwanna Creek pump station equipped with a 2.8 L/sec pump and 50 mm diameter raw water rising main delivering to the elevated storage
- Weir River pump station equipped with a 1.5 L/sec submersible pump and raw water rising main delivering to the elevated storage
- 22 KL elevated storage
- Approximately 2.1 km of 100 mm reticulation mains.

Plus, the Weengallon Barrage earth storage tank and bore water scheme.

2.2.1 Extent of pipework assets

There are approximately a total 186.5 km of water and rising mains and services. The majority are reticulation mains comprised of AC (39%) and PVC types (47%). The problematic RC pipes (3%) are systematically being replaced and it is expected that the failure rate in aged asbestos cement pipes will increase. Details of the pipe assets are shown in Table 2.2.1.a.

Table 2.2.1.a Details of water mains and services

Diameter (mm)	Material						Total Length (m)
	AC	CI	PE	PVC types	RC	STEEL	
Mains incl rising							
40			147.3				147.3
50	78.4		10,630.3	102.8			10,811.47
63			1,855.5				1,855.49
80	3,667.6		105.2	2,063.2			5,836.01
100	43,564.4		529.6	38,783.8	6,085.3		88,962.98
150	19,411.6		3,769.1	30,825.1	68.0		54,073.72

Diameter (mm)	Material						Total Length (m)
	AC	CI	PE	PVC types	RC	STEEL	
200			872.0	8,792.8		40.1	9,704.9
225	3,540.4		220.5	1,203.5			4,964.37
250		297.0		198.0			495
300	1,349.0			2,536.7			3,885.7
375	307.0			1,217.0			1524
450	110.4						110.38
Subtotal	72,028.7 (39%)	297.0 (0.2%)	18,129.4 (10%)	85,722.8 (47%)	6,153.3 (3%)	40.1 (0.02%)	182,371.3
Services (20-150)			4,098.4	25			4,123.4
Total	**72,028.7**	**297.0**	**22,227.8**	**85,747.8**	**6,153.3**	**40.1**	**186,494.7**

2.3 Asset Valuations

Water assets as at the 30th June 2017 have a gross replacement cost of $64,158,489 a fair value (written down value) of $39,551,746 and annual depreciation $1,077,886. Passive assets comprise 52% of total gross replacement value. Details for asset categories are provided in Table 2.3.a.

Table 2.3.a Asset valuations at 30th June 2017

Type	Current Replacement Costs ($)	Written Down Value ($)	Annual Depreciation ($)
Passive (below ground)			
Water Mains	$33,422,224	$20,278,511	$418,942
Active (above ground)			
Barrage	$668,814	$625,522	$9,391
Bore	$1,452,603	$1,116,155	$18,519
Intake Works	$2,198,675	$1,243,409	$64,469
Pump Stations	$307,000	$130,856	$10,624
Reservoirs	$4,942,667	$2,735,019	$66,503
Water Treatment Plant	$21,166,505	$13,422,275	$489,438
Subtotal	$30,736,265	$19,273,236	$658,944
Total	**$64,158,489**	**$39,551,746**	**$1,077,886**

2.4 Age Profile

The age profile for water mains (passives) is illustrated below. The average age is 35 years. Approximately 25% ($7.9 million) of the replacement cost is for mains 15 years and younger, 50% for mains 26 years and older and 25% for mains 50 years and older.

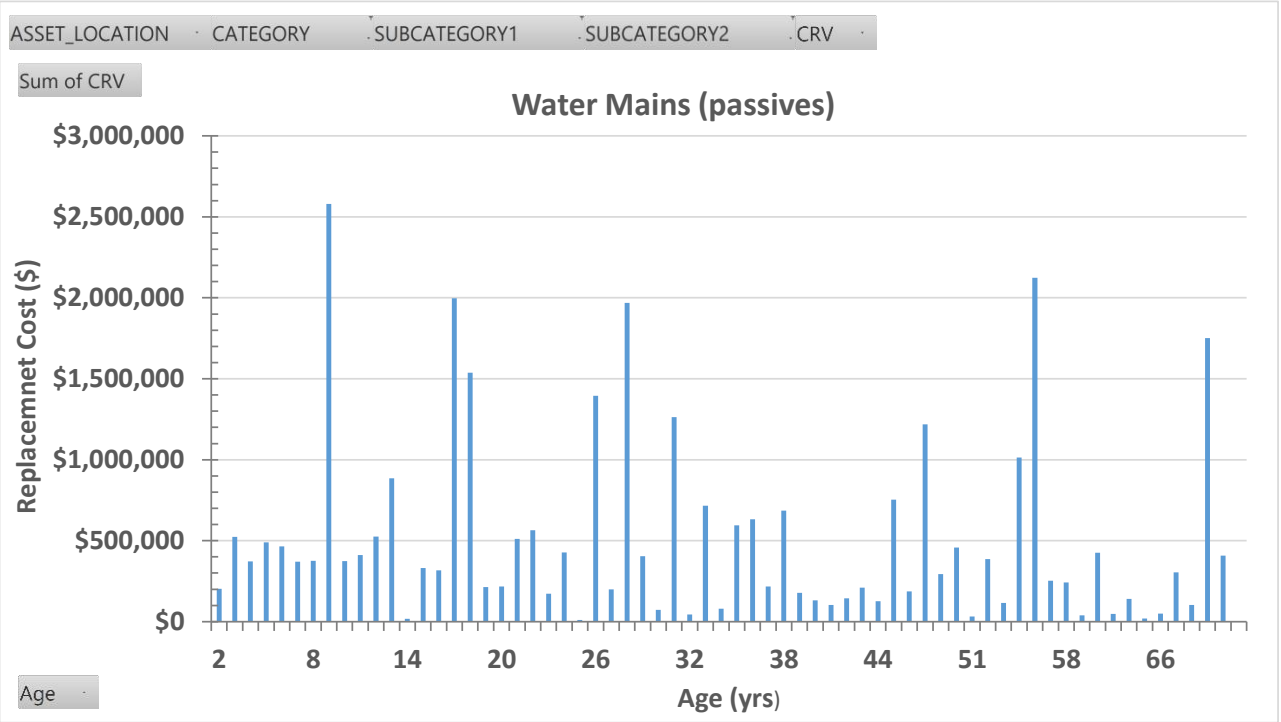


Figure 2.4.a Water mains age profile

The age profile for the 4 barrage assets is below. The average age of assets is 30 years. The Talwood weir structure (replacement cost $0.54 million) is 4 years old and remainder (replacement cost $0.4 million) 38 years old.

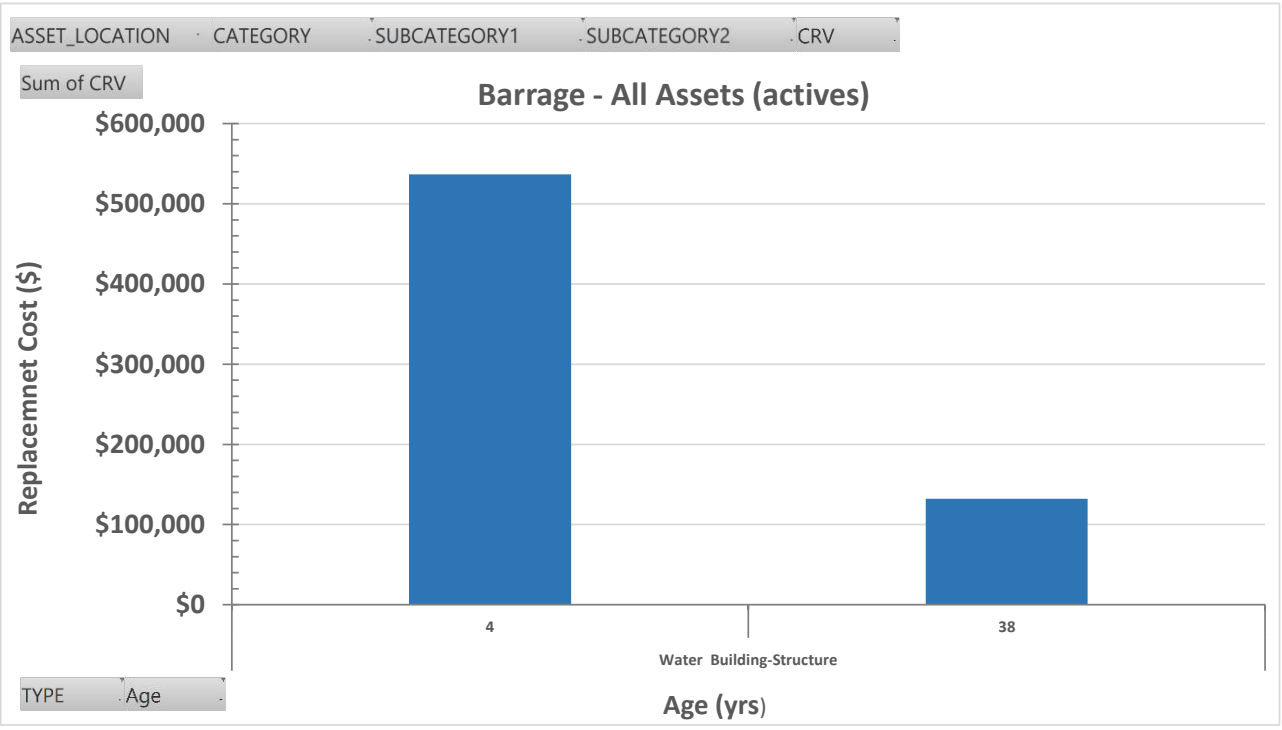


Figure 2.4.b Barrage – all assets age profile

The age profile for bore assets is below. The average age of assets is 16 years. 50% of the total replacement cost is for assets older than 21 years.

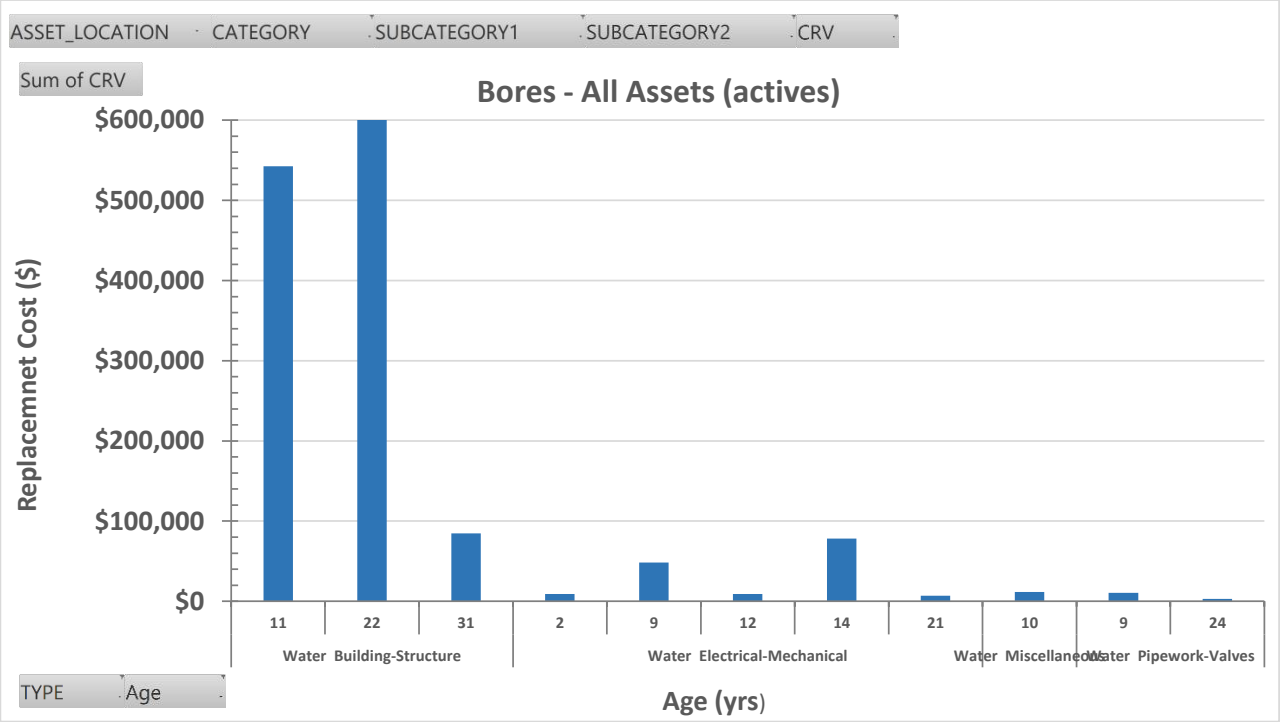


Figure 2.4.c Bores – all assets age profile

The age profile for intake works assets is below. The average age of assets is 16 years. 50% of the total replacement cost is for assets older than 14 years.

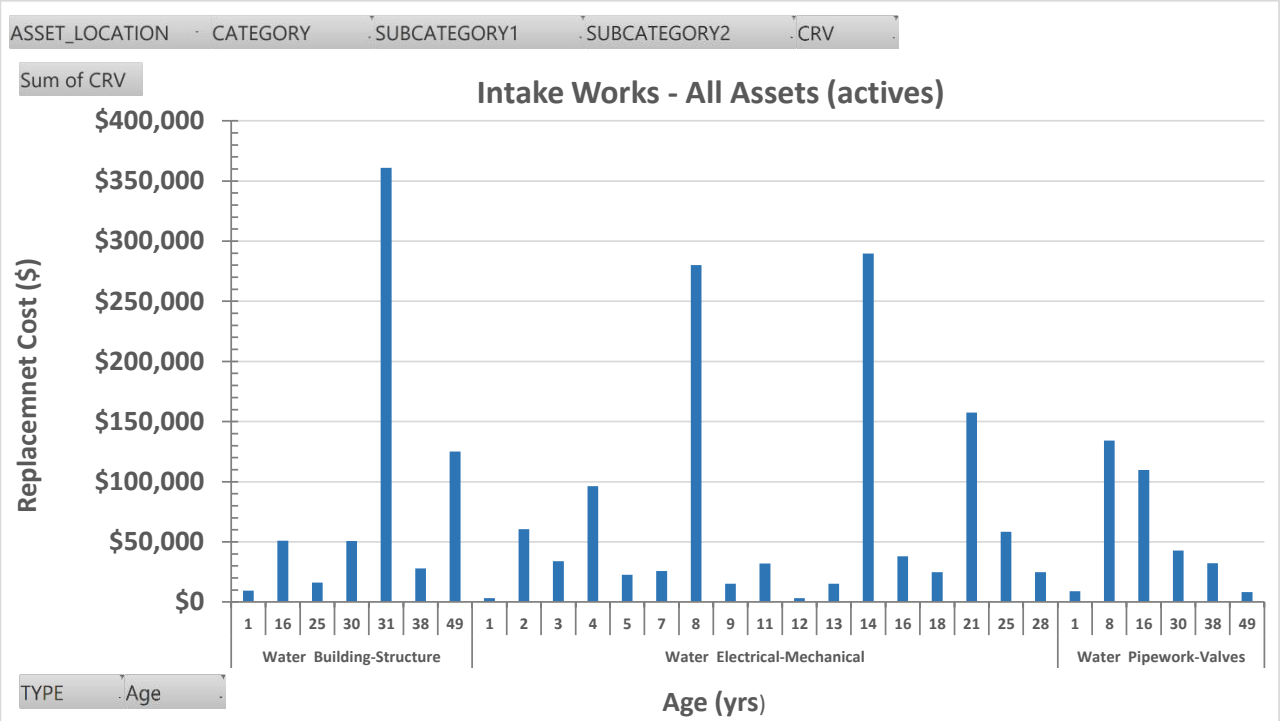


Figure 2.4.d Intake works – all assets age profile

The age profile for pump station assets indicates relatively aged electrical and mechanical assets ($0.23 million replacement cost). The average age of assets is 16 years. 50% of the total replacement cost is for assets older than 15 years.

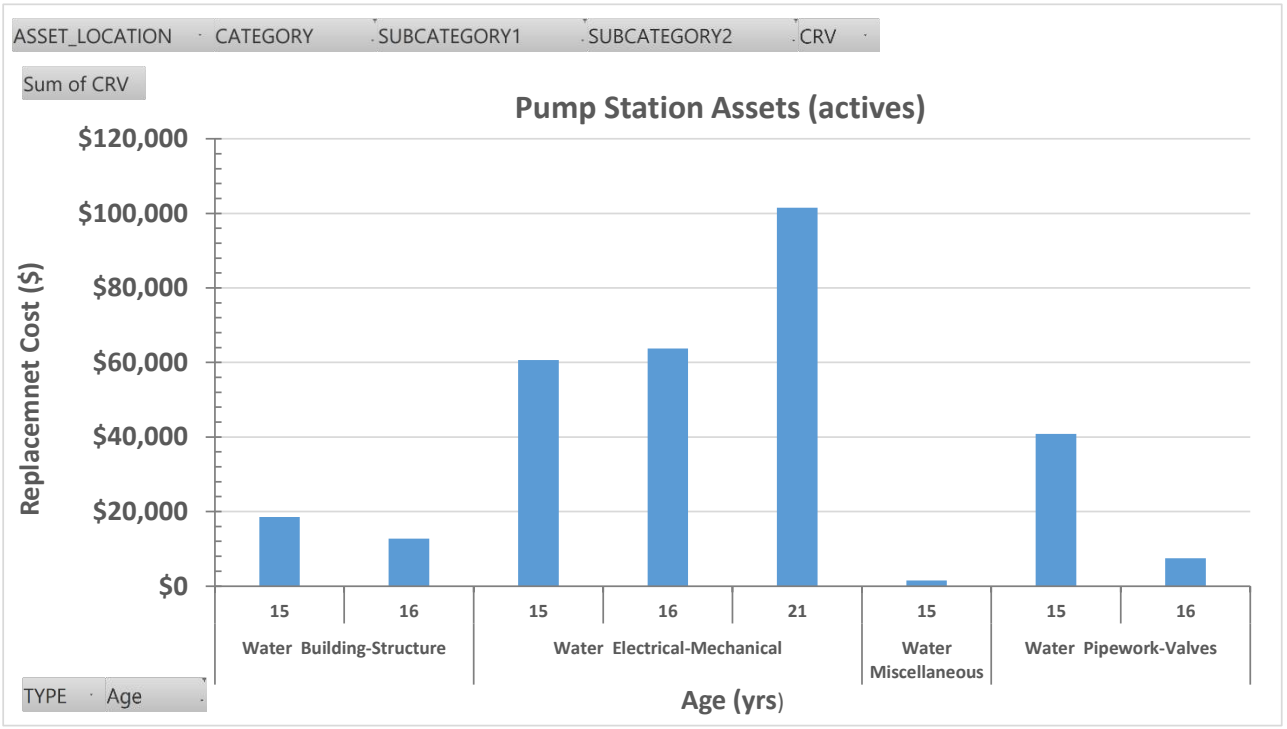


Figure 2.4.e Water pump station assets age profile

The age profile for reservoir assets indicates a few relatively aged structure assets –Inglewood 450kL concrete on ground reservoir and Toobeah reservoir stand are 65 years old; and McLean Water tower is 54 years old. The average age of assets is 30 years. 50% of the total replacement cost is for assets older than 33 years.

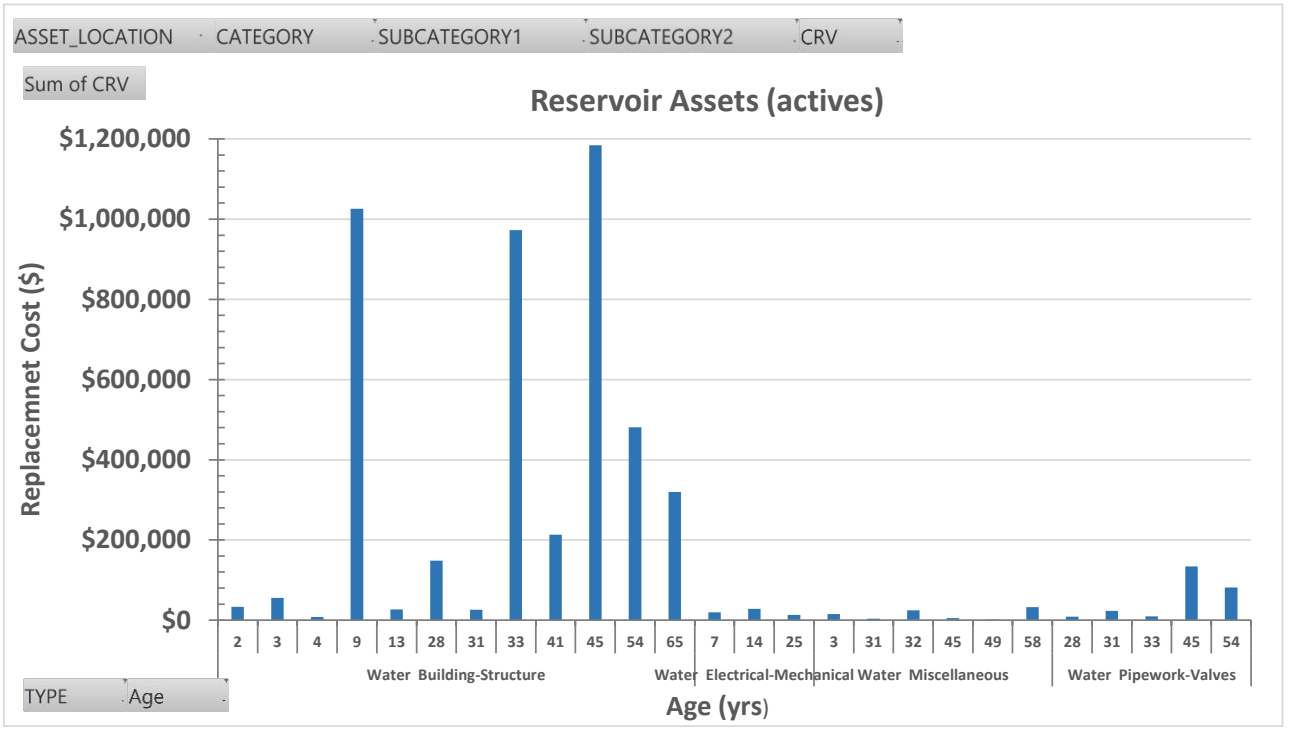


Figure 2.4.f Water reservoirs age profile

The profiles for all assets and asset types at treatment plants are provided below. The average age of assets is 16.5 years. Approximately 25% ($5.3 million) of the replacement cost is for assets less than 13 years of age younger, 50% for assets older than 17 years and 25% for assets 19 years and older.

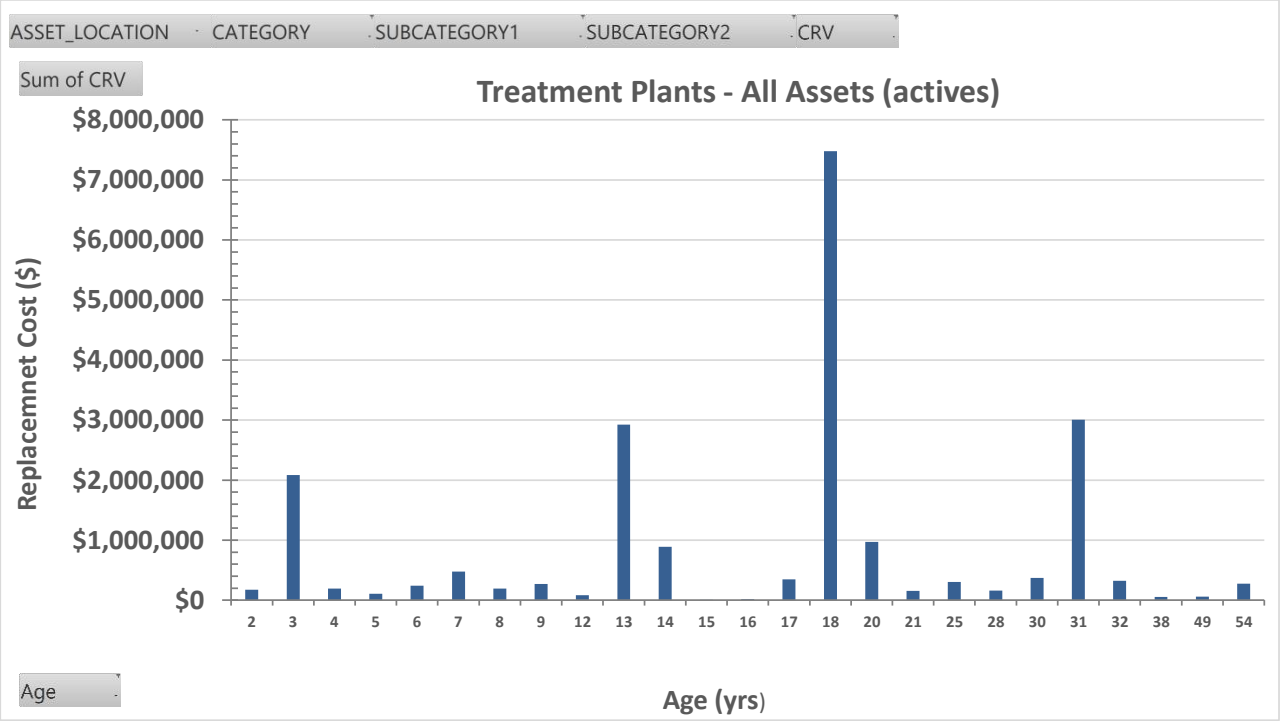


Figure 2.4.g Treatment plants - all assets age profile

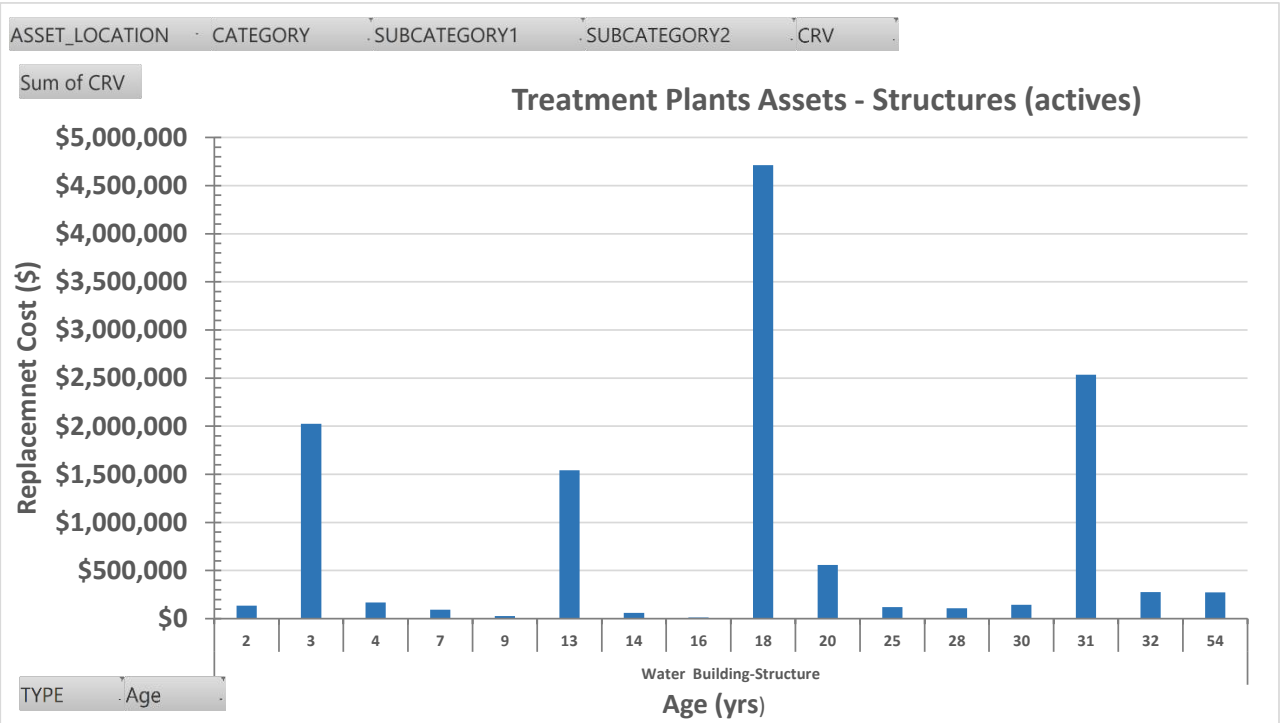


Figure 2.4.h Treatment plants assets – structures age profile

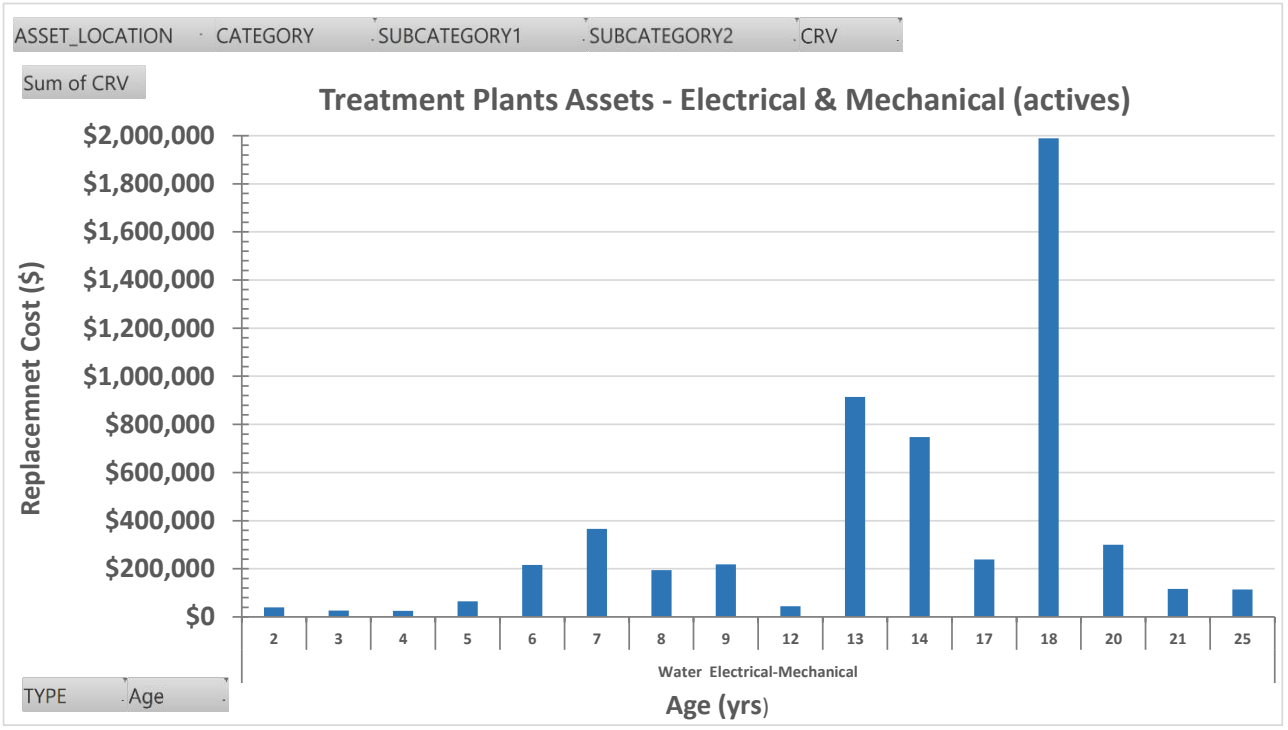


Figure 2.4.i Treatment plants assets – electrical and mechanical age profile

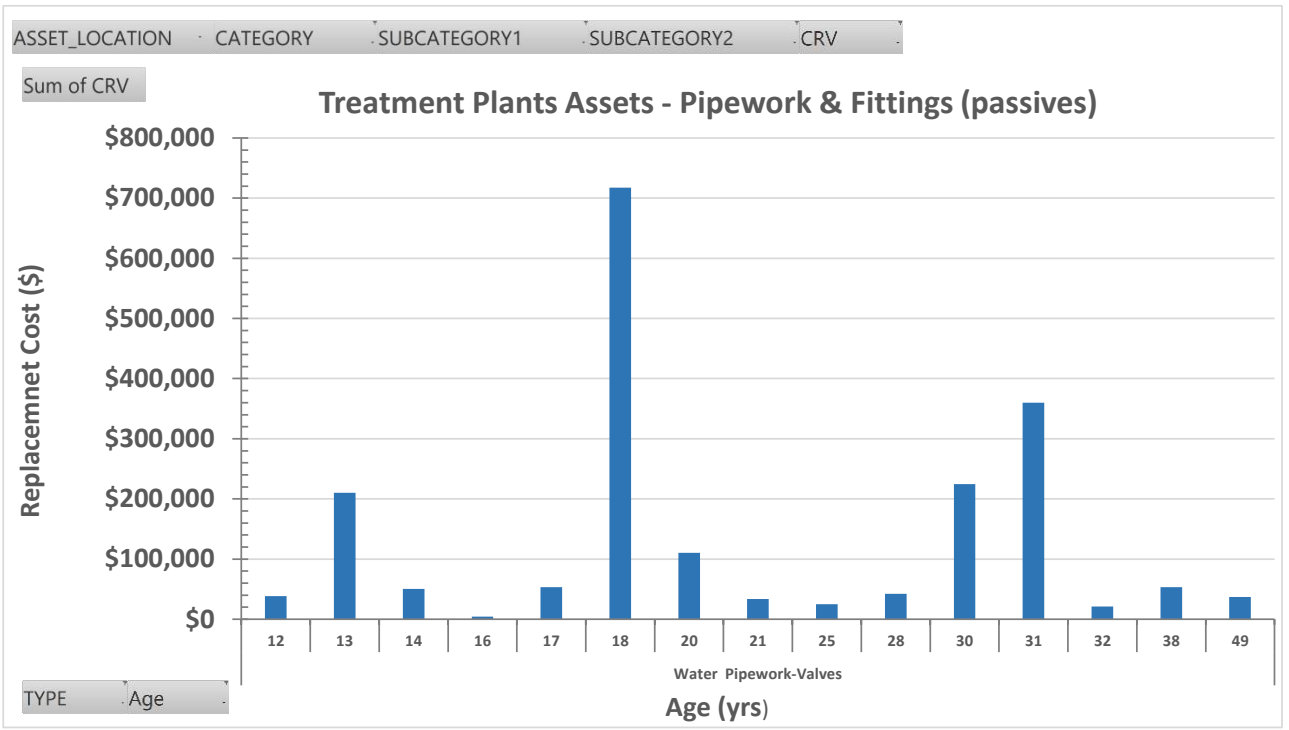


Figure 2.4.j Treatment plants assets – pipework and fittings age profile

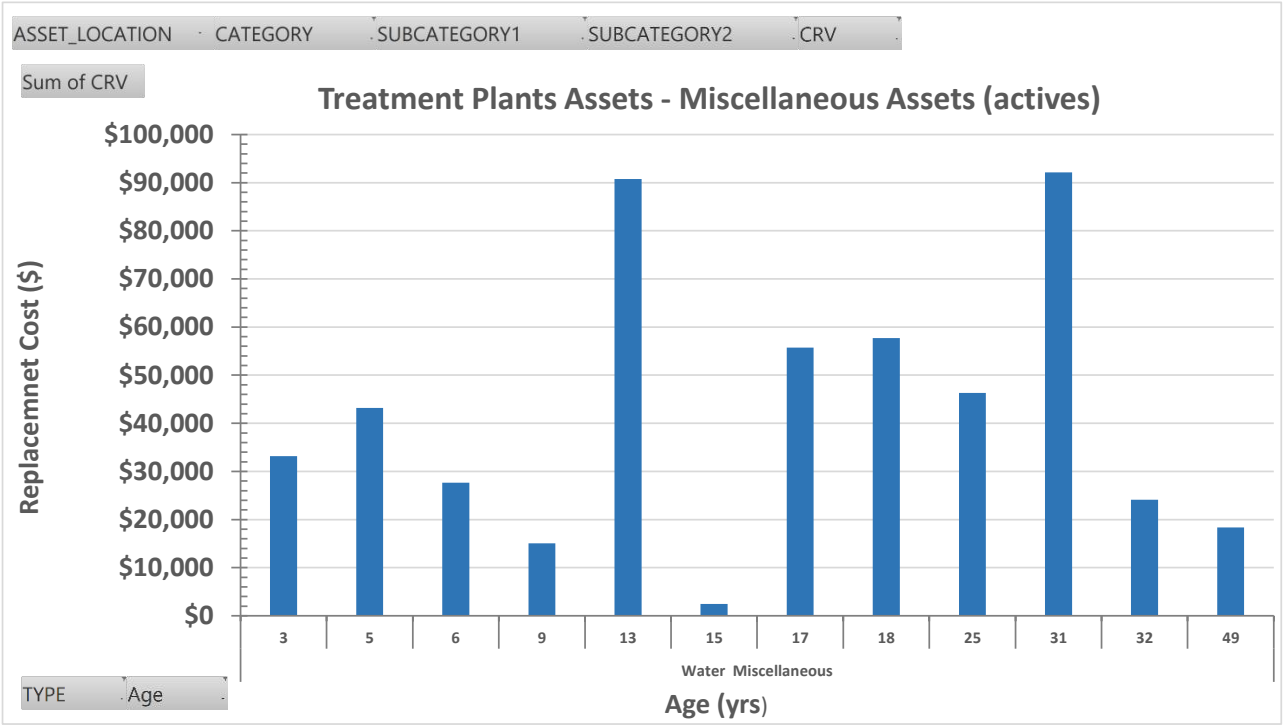


Figure 2.4.k Treatment plants – miscellaneous assets age profile

2.5 Asset Condition

Historically, Council has relied almost solely on the knowledge of staff for any available asset condition information and this knowledge is not systematically collected and documented. As part of the comprehensive asset valuation process undertaken every 4 years condition is determined for above ground assets that can be visually condition assessed and rated. Condition is typically not observable for underground assets (e.g. mains) and is determined from age or performance.

The 2017 valuations give remaining useful life (RUL) for all assets and can also be used to back calculate a condition rating.

The description of condition ratings based on percentage of remaining useful life is provided in Table 2.5.a for civil assets, water mains and electrical and mechanical assets. Figure 2.5.a and 2.5.b summarise condition assessment results for active and passive assets respectively. Condition ratings for individual assets based on RUL can be found in the spreadsheet data model.

Table 2.5.a Condition ratings based on remaining useful life

Rating	Description	% Remaining Useful Life (RUL)
0	No Information Available	Not applicable
1	Excellent (only normal maintenance required)	100% to 80%
2	Good (minor defects only/minor maintenance required up to 25%)	80% to 50%
3	Average (significant maintenance required 50%)	50% to 20% (25% for E&M)
4	Poor (requires replacement within next 1-2 years)	20% to 5% (25% to 10% for E&M)
5	Asset Failure (requires immediate replacement)	5 % to 0% (10% to 0% for E&M)

Source: IPWEA Practice Note 7 V3 2016

The majority (92%) of the $33.4 million underground assets are in average or better condition. 1.1% ($0.4 million) are in poor condition (rating 4) and 6.8% ($2.3) million likely requiring replacement (rating 5).

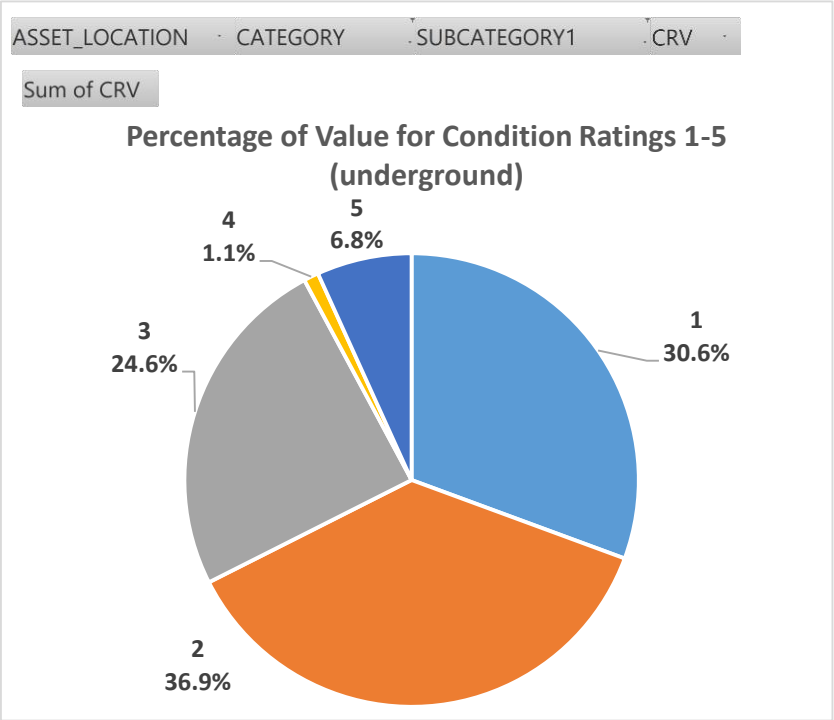


Figure 2.5.a Underground (passive) assets condition ratings

The majority (96%) of $30.7 million above ground assets are in average or better condition. 3.1% ($0.9 million) are in poor condition (rating 4) and 1.4% ($0.4 million) likely requiring replacement (rating 5).

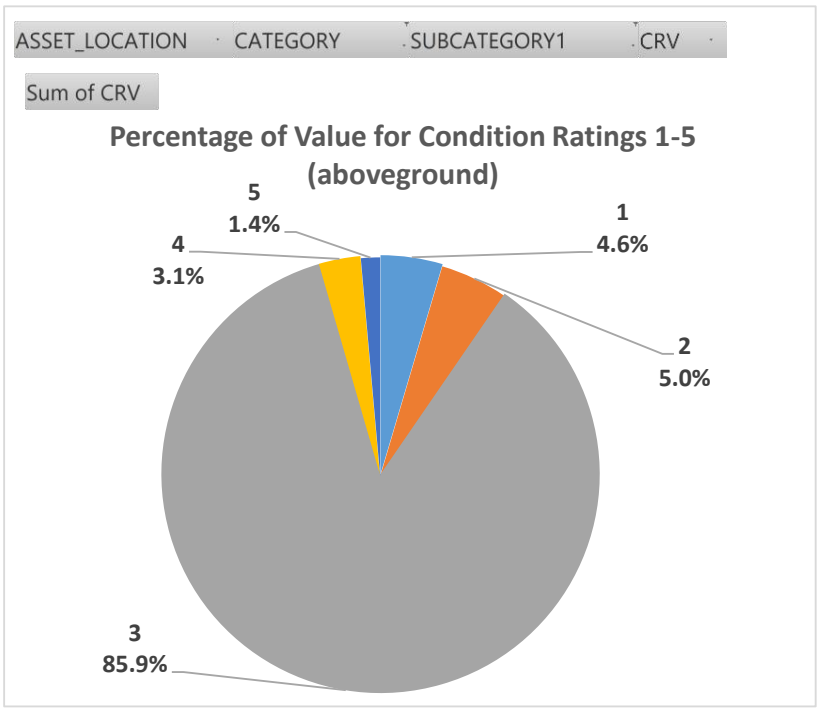


Figure 2.5.b Above ground (active) assets condition ratings

Proposed actions for condition assessment of assets:

- Capture failure data as corporate data, e.g. water main asset ID and location (performance data can be used to estimate condition)
- Improve field capture of inspection and condition information by implementing where appropriate 'Reflect' as the data collection tool to capture failure and repair data for corporate use
- Map water main failure data on GIS as a layer.

2.6 Asset Remaining Useful Life

The valuation results for assessment of remaining useful life (RUL) of assets are shown for under and above ground assets in the following figures. It is estimated 8% (total value $2.3 million) of the underground assets and 2% (total value $0.7 million) of the above ground assets have a RUL of 5 years or less. These assets are listed in the Appendix and comprise the draft renewal program.

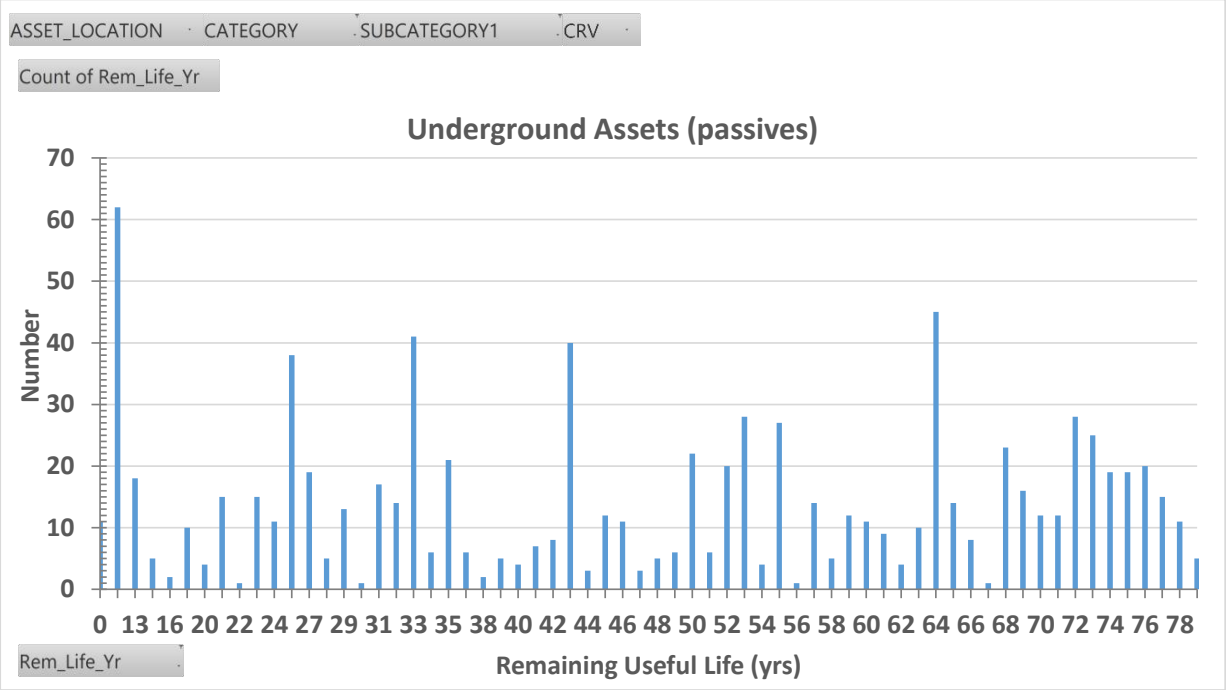


Figure 2.6.a Underground (passive) assets remaining useful life profile

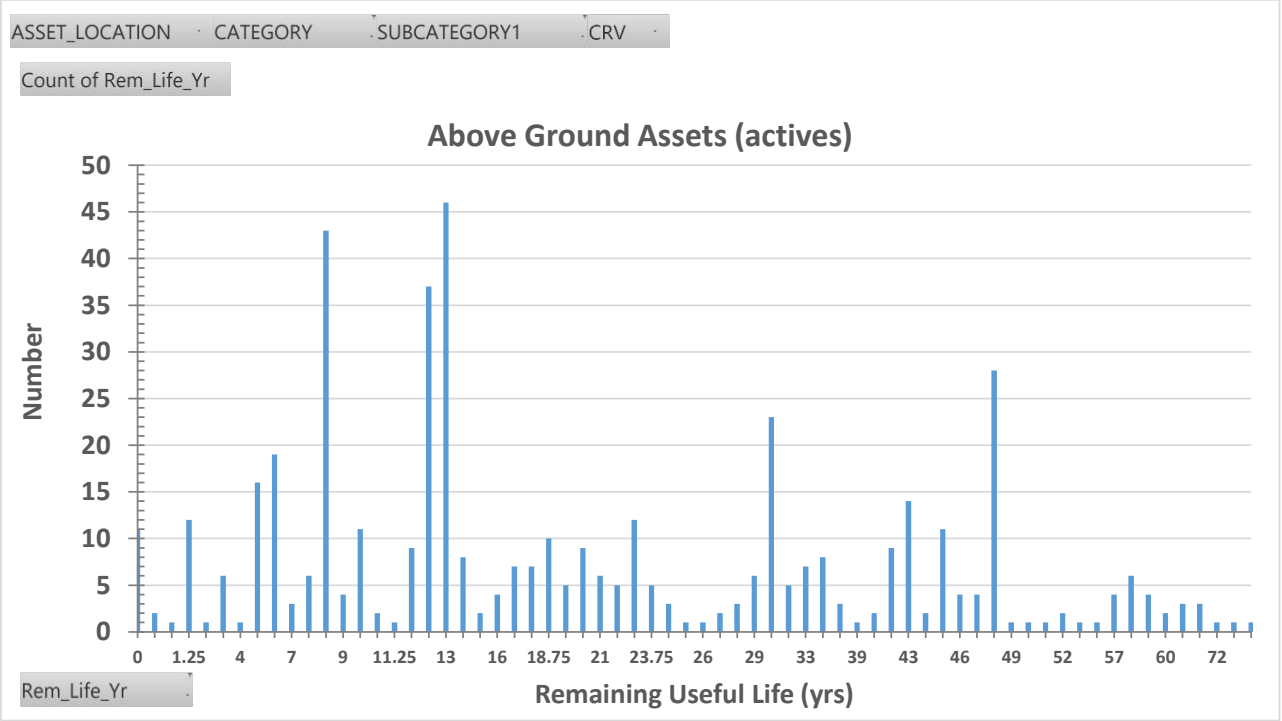


Figure 2.6.b Above ground (active) assets remaining useful life profile

RUL by asset category is shown in Table 2.6.a. The average RUL is 22 years for all above ground and 46 years for all underground assets.

Table 2.6.a Average remaining useful life for asset categories

Category	No. of Assets (with value)	Remaining Useful Life (Years)				
		Overall Average	Building - Structure	Electrical Mechanical	Pipework-Valves	Miscellaneous
Underground (passives)						
Mains		46		-	-	-
Above Ground (actives)						
Barrage	4	52	52	-	-	-
Bore	18	27	36	12	43	51
Intake Works	67	20	33	14	36	-
Pump Stations	15	24	46	10	27	46
Reservoirs	37	31	44	11	22	16
Water Treatment Plant	308	21	39	12	34	19

Council manages approximately $64 million of water supply infrastructure assets with the annual depreciation approximately $1.1 million. Thus, it is critical that Council has its “finger on the pulse” in relation to asset condition and the implication for future rehabilitation/replacement expenditure.

For the assets approaching the end of their useful life, it is paramount that Council collects some condition and performance data for these categories and additionally for critical assets, since their failure is generally not acceptable.

3. LEVELS OF SERVICE

3.1 Customer Research and Expectations

At present, indications of desired levels of service are obtained from various sources including residents' feedback to Councillors and staff, service requests and correspondence. No formal customer research or community survey has been undertaken to determine levels of service for infrastructure assets covered by this Asset Management Plan. The completion of a customer survey has been added to the improvement plan. Survey results will be used to inform future updates of the AMP and in particular the levels of service. Council will also use this information in developing the Operational Plan and in allocation of resources in the budget.

3.2 Legislative Requirements

Council has to meet many legislative requirements including Australian and State legislation and State regulations. The requirements of key legislation that have a direct impact on asset management activities are shown in Table 3.2.a.

Table 3.2.a Key legislative requirements

Legislation	Requirement
Local Government Act 1993, 2009	Sets out role, purpose, responsibilities and powers of local governments including the preparation of a long term financial plan supported by asset management plans for sustainable service delivery, the acquisition and disposal of assets and requirements for corporate and operational plans. The Local Government (Finance, Plans & Reporting) Regulation is subordinate legislation.
Electrical Safety Act 2002 (Qld)	This Act is directed at eliminating the human cost to individuals, families and the community of death, injury and damage/destruction of property that can be caused by electricity.
Environmental Protection Act 1994	The object of this Act is to protect Queensland's environment while allowing for development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends (ecologically sustainable development). Services to conform to state-wide integrated conservation strategy. Treatment plants are to be licensed in accordance with the Act. Responsible for the protection of air and water supply quality, and the control of pollution, waste, noise and radiation.
Public and Environmental Health Act (Waste Control Regulations) 2005	Public health is dedicated to preserving, protecting and promoting good health and preventing illness and injury
Queensland Competition Authority Act 1997 (Qld)	The Queensland Competition Authority (QCA) to develop criteria to assist the Premier and the Treasurer (the Ministers) in deciding whether to declare a government business activity to be a government monopoly business activity. QCA ensures monopoly businesses operating in Queensland, particularly in the provision of key infrastructure, do not abuse their market power through unfair pricing or restrictive access arrangements. Achieved through investigating and monitoring pricing practices of certain monopoly businesses and regulating third party access to essential infrastructure.
Water Act 2000	Sustainable management of water and other resources. Regulatory framework for providing water and water supply services. Delivery of service to conform to regulatory requirements. Drought Management Plan (DMP) included in 2005. This includes regulating the management, control and removal of asbestos in the workplace (including residential premises which are a 'workplace' when work is undertaken by a contractor).
Water Supply (Safety and Reliability) Act 2008	A regulatory framework for providing safe and reliable water and water supply services in the State, including functions and powers of service providers, a regulatory framework for providing recycled water, primarily for protecting public health and protecting the interests of customers of service providers. Since 2014 specific changes to the Act were enacted aimed to simplify regulatory requirements. The Council is required to collect data (SWIM) on a pre-determined list of key performance indicators and submit to the regulator each year on or before 1 October a performance report about each of the indicators each financial year occurring immediately after the financial year ends.
Work Health and Safety Act 2011	The objective of this Act is to prevent a person's death, injury or illness being caused by a workplace, by a relevant workplace area, by work activities, or by plant or substances for use at a relevant place. Sets out roles and responsibilities to secure the health, safety and welfare of persons at work

3.3 Service Standards and Performance

Council aims to provide an affordable and reliable water supply service that meets health compliance requirements. Water supply assets are to be maintained in a reasonable usable condition and defects found or reported that are outside of our service standards are repaired within defined maintenance response times.

The actual levels of service provided are monitored through information recorded by the following means:

- Service Complaints /Action Requests
- Planned Service Interruptions
- Microbiological Quality test results
- SWIM data collected for mandatory performance reporting to State Government.

Monitoring of consumer comments and complaints provides valuable information on potential problems that may not have been identified by performance monitoring of the water supply systems. All complaints are recorded and investigated.

This Water Supply AMP has defined service levels in two terms.

1. ***Community Levels of Service*** - related to how the community receives the service in terms of safety, quality, quantity, reliability, responsiveness, cost/efficiency and legislative compliance.

2. ***Technical (operational) Levels of Service*** - measures of performance developed to ensure that the minimum community levels of service are met.

The performance indicators (PI) the Council has adopted are easily measurable and the targets set for each PI are reviewed annually with assistance from the following:

- Community satisfaction measured by numbers of and nature of complaints received and results of annual customer survey
- Examination of movements of key performance indicators
- Changes in asset condition
- Annual valuation of water supply infrastructure assets.

The main objective of reviewing standards of service is to determine to what degree the target levels of service are being achieved.

Council prepared a legislated Customer Service Standard (CSS) in 2009 to address day to day continuity of supply and adequacy and quality of normal supply. Performance against indicators and targets adopted in 2009 from SWIM data are shown in Table 3.3.a. Further details are provided in the Annual SWIM reports to State Government.

The results indicate all targets for SWIM were met in 2017.

Council has no set levels of service other than those proposed in 2009. A review and update of standards is overdue.

Proposed revised targets based on a review of recent SWIM data, regulatory requirements, affordability and financial viability are given in Table 3.3.b. These service levels can be adjusted in future revisions of this AMP as better data is obtained.

Table 3.3.a Performance against Levels of Service Targets

Level of Service	Performance Measure (performance indicator)	SWIM code	CSS Target (2009)	GRC Overall Performance # ☺ achieves / ☹ fails				Proposed Target (overall)
				2015	2016	2017	Comment	
COMMUNITY LEVELS OF SERVICE								
Quality - Provide good quality water	Drinking water quality complaints per 1,000 connections per year+	CS9	Less than 30	0.7 ☺	0.7 ☺	1.0 ☺	Totals – 3 in 2015 & 2016 4 in 2017	Less than 1
	Drinking water quality incidents per year +	-	Less than 20	1 ☺	0 ☺	0 ☺		0
	Number of water service complaints	CS22	N/A	194	127	239	Goondiwindi -167 in 2015, 110 in 2016, 186 in 2017.	Less than 210
	Number of water service complaints per 1,000 connections per year	CS108	N/A	46.9	30.6	57.4		-
Function - Provide adequate pressure	Minimum water pressure at boundary	-	Generally, 20 m except during fire fighting	-	-	-		Generally, 20 m except during fire fighting
	Connections with deficient pressure at boundary per 100 km of mains+	-	Less than 100	1.1 ☺	0.5 ☺	11.5 ☺	Low flow / pressure complaints per 1000 conn – 0.5 in 2015,0.2 in 2016, 5 in 2017	N/A
Safety - Provide water safe for use	Microbiological / physical / chemical properties of water	-	Meet Australian Drinking Water Guidelines more than 90% of the time	All towns 100% zero E Coli ☺	All towns 100% zero E Coli ☺	All towns 100% zero E Coli except 98% at Goondiwindi ☺	2017 - 1 of 47 results was 38 E-Coli	Minimum 98% Microbiological compliance achieved for total population (HL3) Minimum 96% chemical/physical compliance
Safety - Respond to incidents in a timely manner	Response time to water incidents (bursts and leaks)+ Note: problem may not be fixed on initial response	CS37	Less than 5 hours	Max 1.5 hrs Avg 7 mins ☺	Max 2 hrs Avg 6 mins ☺	Max 1.5 hrs Avg 7 mins ☺		Less than 120 mins in at least 90% of instances
TECHNICAL LEVELS OF SERVICE								
Condition - Provide infrastructure of adequate condition to maintain supply	Connections affected by interruption per 100 km of mains per year	-	Less than 200	178 ☺	63.6 ☺	0.6 ☺		Less than 200
	Water main leaks / breaks per 100 km of mains per year+	AS8	Less than 200	17 ☺	24.7 ☺	23.6 ☺	Totals – 31 in 2015, 45 in 2016, 43 in 2017	Less than 25 (NPR 15/16 median is 12.8)

Level of Service	Performance Measure (performance indicator)	SWIM code	CSS Target (2009)	GRC Overall Performance # ☺ achieves / ☹ fails				Proposed Target (overall)
				2015	2016	2017	Comment	
Accessibility - Provide a continuous supply of water	Unplanned interruptions per 1,000 connections per year+	CS17	Less than 200	66 ☺	2.9 ☺	0.2 ☺	Totals – 273 in 2015, 12 in 2016, 1 in 2017	Less than 10
	Time for restoration of service	-	Less than 8 hours	Max 14 hrs ☹ Avg 2.8 hrs ☺	Max 16.7 hrs ☹ Avg 2.9 hrs ☺	Max 22 hrs ☹ Avg 3.2 hrs ☺		Less than 8 hours
	Customer interruption frequency per year	-	Less than 5 for each individual customer	-	-	-		Less than 5 for each individual customer
	Duration of interruption (planned and unplanned) +	-	Less than 8 hours	Max 14 hrs ☹	Max 2.5 hrs ☺	Max 4 hrs ☺		Less than 8 hours
Cost Effectiveness - Provide a balance	Ratio of planned to unplanned interruption incidents	-	Less than 0.1	0.2	8.7	0		Less than 0.1
Minimise unaccounted for water	System water loss (Litres per connection, day) +	AS10	Less than 200	-	-	-	Total apparent losses (165 ML in 15/16)	Less than 200

+ - Required under Water Act 2000; # - SWIM data

Table 3.3.b Proposed KPIs and Targets

Key Performance Measure (performance indicator)	Proposed Target (overall)	*Current Equivalent Target (overall)*
Number of Drinking water quality complaints per 1,000 connections per year	Less than 1.0	Less than 5 per year in total
Number of water service complaints per 1,000 connections per year	Less than 50	Less than 210 in total
Response time to water incidents (bursts and leaks) NB: problem may not be fixed on initial response	Less than 120 mins in at least 90% of instances (State median 49 mins in 15/16)	-
Time for restoration of service	Less than 8 hours	-
Number of water main leaks / breaks per 100 km of mains per year	Less than 25	Less than 45 per year in total
Number of unplanned interruptions per 1,000 connections per year	Less than 10	Less than 42 per year in total
% of water samples complying for Microbiological / physical / chemical properties of water	Minimum 98% microbiological compliance Minimum 96% chemical/physical compliance	-

4. DEMAND

4.1 Current

The 2015/16 SWIM data gives a total of 4,153 connections (and 4,144 connections given in LG Comparative Report). Residential and non- residential connections and volumes of potable water produced and raw- non potable supplied for each location are provided in Table 4.1.a.

All potable water and raw-non potable water plants have sufficient capacity to meet current annual demands, although the raw-non potable water plants are approaching their capacity (78% - 79% for 2016/17 demands).

Table 4.1.a Water Treatment Plant Production and Capacity Details

Location	No. of Connections[#]			Plant Capacity (ML/d)	Volume (ML/yr) [#]	% Volume of Capacity
	Residential	Non Residential	Total			
Potable Water (produced)						
Goondiwindi	2,262	558	2,820	11	1,570.9 (16/17) 1,597.8 (15/16) 1,592 (14/15)	39% (16/17) 40% (15/16) 40% (14/15)
Inglewood	412	146	558	1.69	237.4 (16/17) 204.6 (15/16) 201 (14/15)	38% (16/17) 33% (15/16) 33% (14/15)
Talwood	50	19	69	0.36	33.4 (16/17) 44.4 (15/16) 44 (14/15)	25%(16/17) 34% (15/16) 35% (14/15)
Texas	361	103	464	1.8	180.6 (16/17) 178.5 (15/16) 192 (14/15)	27% (16/17) 27% (15/16) 29% (14/15)
Yelarbon	133	36	169	0.612	79 (16/17) 82.5 (15/16) 84 (14/15)	35% (16/17) 37% (15/16) 38% (14/15)
Total	**3,218 (79%)**	**862**	**4,080**	**15.462**	**2,101.3 (16/17)** **2,108 (15/16)** **2,113 (14/15)**	**37% (16/17)** **37% (15/16)** **37% (14/15)**
Raw – Partially Treated Water (supplied)						
Bungunya	19	11	30	0.05	14.5 (16/17) 11.5 (15/16) Unavailable(14/15)	79% (16/17) 63% (15/16)
Toobeah	29	14	43	0.05	14.3 (16/17) 11.2 (15/16) Unavailable (14/15)	78% (16/17) 61% (15/16)
Total	**48 (66%)**	**25**	**73**	**0.1**	**28.8 (16/17)** **22.7 (15/16)**	**79% (16/17)** **62% (15/16)**

[#] Source: 2014/15 SWIM, 2015/16 SWIM, 2016/17 SWIM

Water supply systems are stressed when high demand occurs over more than a week– a serious issue for Goondiwindi, Talwood and Yelarbon. Although the output capacity of all treatment plants meets current average day demands, there is insufficient water reservoir capacity to cater for periods of higher demand at several towns, including Goondiwindi, Inglewood and Talwood (less than 1 day storage). For typical 10 ML/d use at Goondiwindi in summer periods, storage capacity issues are evident given there is only 10 ML storage at the Goondiwindi Water Treatment Plant. There is no room to upgrade intake and settling facilities on river bank. New facilities will need to be located at pressure filtration plant and water storage at George St. At Talwood, high demand in summer is supplemented with trickle supply from a bore.

4.2 Future

Factors affecting demand include population change, changes in demographics, seasonal factors, environmental awareness, product pricing etc. The impact of these trends needs to be regularly examined and demand management strategies are recommended as a technique to modify demand without compromising customer expectations.

Growth is typically approximately 1.6% per annum for Goondiwindi, with a steady number of new house approvals occurring each month (11 house approvals alone in November 2017). Lower growth has occurred at Inglewood and Texas water and little if any growth at the other towns.

Future average day potable water production needs derived from LGIP data of forecast equivalent persons (EP) are shown in Table 4.2.a. In theory, average day potable water day needs of ultimate populations for all towns appear to be met by current capacities of plants. However, the planned abattoir and other possible enterprises at or near Goondiwindi in the coming years will impact the demand for water supply services and increase stress on the system during peak demand periods. Aside from providing additional reservoirs, it is not certain that treatment plants can cope into the future with prolonged large demand in summer (typically a couple of weeks to even a month at a time).

Table 4.2.a Future Potable Water Treatment Plant Production and Capacity Details

Location	Plant Capacity (kL/d)	2016		2021		2026		2031		Ultimate		
		EP	kL/EP/d	*EP*	kL/d	*EP*	kL/d	*EP*	kL/d	*EP*	kL/d	% Plant Capacity
Goondiwindi	11,000	*5,271*	0.8165	*5,377*	4,390	*5,485*	4,479	*5,592*	4,566	*8,803*	7,188	65%
Inglewood	1,690	*683*	0.9523	*697*	664	*711*	677	*726*	691	*1,089*	1,037	61%
Talwood	360	*70*	1.3072	*71*	93	*73*	95	*75*	98	*232*	303	84%
Texas	1,800	*660*	0.7497	*674*	505	*687*	515	*699*	524	*2,159*	1,619	90%
Yelarbon	612	*225*	0.9619	*231*	222	*235*	226	*238*	229	*618*	594	97%

An abattoir is planned for construction near Goondiwindi, construction starting during 2018 and operational 2 years later. As it will require approximately 380 persons to operate, this will result in a substantial additional approximate 1000 EP loading on the town water supply system. Other enterprises are also possible in the coming years which will impact the demand for water services. An additional 1,000 EP in 2021 equates to 5,200 kL/d (compared to 11,000 kL/d capacity).

System augmentations have been completed resulting from network analyses done 4 to 5 years ago. There is a need to further review system capacities and undertake network analysis for towns including Goondiwindi, Texas, Yelarbon and Inglewood to confirm works to cater for peak demands now and into the future. Planning reports need to be updated.

Capital works proposed to address system issues have been included in the forward works program, although the majority require verification and confirmation of extent through analysis work, for example, a pressure system proposed for Yelarbon to meet firefighting needs.

5. LIFECYCLE MANAGEMENT PLAN

5.1 Operations

5.1.1 Approach

Operations is defined as the active process of utilising an asset which will consume resources such as manpower, energy, chemical and materials and operational costs are part of the lifecycle costs of an asset. Effective and efficient (or proper) operation results in optimum utilisation and contributes to a reduction in breakdowns and maintenance need.

Each of the water supply system assets is operated by Council to ensure the:

- Standard of the asset does not decline below a level at which the standard of service can be achieved
- Appropriate service objectives (i.e. Levels of service, statutory/regulatory requirements, and obligations, etc.) Are achieved at the least cost and that the impact of any breakdowns or outages is minimised
- Consumers get value for money.

The individual water supply systems are different. Council strives to operate each system to deliver the same levels of service where treated water is provided – the water supply system components are operated to continually meet ADWG requirements for Physical, Chemical and Microbiological water quality and as per other levels of service.

Substantial investment in telemetry has occurred over the last 5 years at each water supply system including at Yelarbon last year, to monitor and control assets. Now the whole water supply system is connected and can be monitored by office staff and changes made. The server is at the George St site, Goondiwindi with a backup server at the McClean St site. Texas and Inglewood are standalone systems.

Council's revised organisational structure as of June 20918 for management of water supply (and sewerage) services is shown in Figure 5.1.1.a.

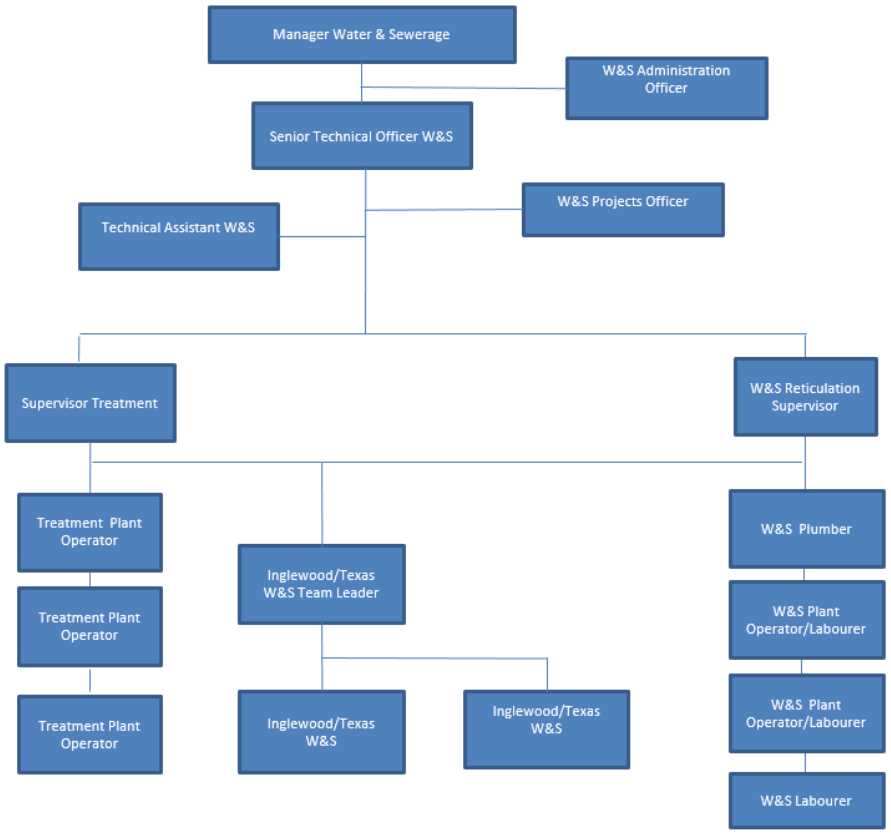


Figure 5.1.1.a Water and Sewerage Organisation

The ‘Manager Water and Sewerage’ has responsibility for overall management of the section and is also engaged in specific project pre work.

The position of ‘Technical Officer Assistant’ is a project officer role for planning capital works projects. To date the officer in the role has been engaged 75% of time on telemetry activities and ongoing problem solving with operational benefits. This is hindering preparing for and implementing capital works - projects are not ready and are not being delivered as proposed. Given the current lack of resourcing and quantity and extent of upcoming capital works projects, Council can consider additional resources and out sourcing project preparation and delivery activities.

The position of ‘Senior Technical Officer’ will be an operational coordinator role and the ‘Water and Sewerage Supervisor’ position will be responsible for day to day operation (and maintenance) of water assets.

Treatment plant operators will be managed by the ‘Supervisor Treatment’. Plant operators that manage the Goondiwindi, Yelarbon and Talwood plants are based at Goondiwindi. The Inglewood and Texas plants are managed by separate operators, with a plumber servicing both towns.

Operators monitor treatment plant performance by undertaking testing daily and testing for legislative purposes is sent away to a NATA laboratory for analysis.

For Goondiwindi, 3 out of 8 operational staff are available for after hours (1 x operator and 1 x maintenance and 1 x floater). Overall, there are effectively 5 in the maintenance team for reactive work.

Capital works are generally contracted out and backup provided by consultants for asset management activities due to a shortage of staff.

The roles and responsibilities of operational and maintenance staff are clearly defined in their respective position descriptions, which ensures accountability for operational and maintenance activities.

In conjunction with these key roles the Council Customer Contact Centre receives and notifies operational staff to action customer enquiries.

5.1.2 Risk Management and Critical Assets

Condition ratings from valuations for assets, performance data or indeed age where no other information is available can be used as a surrogate for Likelihood of failure (LoF). However, Consequences of Failure (CoF) and thus risks for the water supply systems are yet to be identified and assessed.

Examples of likely assets at risk, consequences and treatments are -

1. Water supply pipelines - breaks can interrupt supply. Record mains break data, continue mains replacement program.
2. Water supply pipelines - algae and slime build up can affect water quality and result in increased chlorination. Implement a yearly mains air scouring program to ensure all mains are scoured on a cyclic basis.
3. Pumps - pumps can fail due to wear, blockage or power failure resulting in a loss of supply. Implement a regular pump maintenance program, spare pumps and portable/fixed standby generators.
4. Reservoirs – contamination and poor water quality. Implement a regular 5 yearly internal inspection and clean.

For critical assets, if failure occurs, the consequences are typically higher/significant. Knowledge of critical assets can feed into decision making, for example, control measures, critical spares, more frequent pro-active condition assessment and inspections, maintenance or renewal earlier before failure occurs. The intent is to avoid failures for such critical assets.

Critical assets will include the following infrastructure categories:

- Barrages
- Raw and trunk water supply mains (particularly those supplying critical customers/failure has significant impacts)
- Treatment plants, in particular key electrical and mechanical equipment
- Reservoirs/tanks (where contamination would immediately impact on serviced levels)
- Pump stations
- Control valves
- Bores
- Chlorinators.

The key staff and contractors involved in maintenance/renewal decisions need to confirm the most critical assets. Based on an agreed risk framework any other high risks in addition drinking water quality related can then be identified and risk management strategies developed and documented for critical assets.

The following is a preliminary listing of the consequence of failure assessment categories identified to for which a qualitative measure of severity (e.g. minor, moderate, and extreme) can be weighted and scored:

- Environmental Impact
- Type of Customer impacted
- No of disrupted customers
- Disruption to Transportation and/or potential to damage other utility assets
- Risk to Public Health and Safety
- Difficulty of Repair
- Cost of Repair
- Quantity of water lost to the environment.

An example is a distribution main failure in residential area on busy road with loss of supply to school or public venues – the weighted scoring for consequences converts to a CoF of '4' ('major').

With LoF and CoF determined Council can apply the risk based decision management model shown in Figure 5.1.2.a.

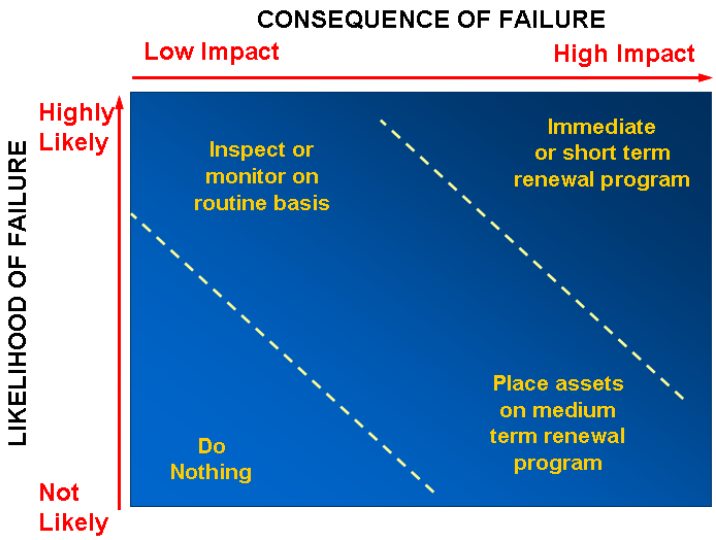


Figure 5.1.2.a Risk Based Decision Model

Risks will be considered and assessed in the preparation of the Drinking Water Quality Management Plan (DWQMP). The plan will include a risk register and improvement plan addressing unacceptable residual risks which can be assigned additional risk treatments. Residual risks rated very high or high are likely to include:

- Deterioration of water quality in reservoirs as a result of variable residence times; stagnation
- Poor mixing within reservoirs
- Backflow
- Formation of disinfection by-products.
- Stormwater runoff ingress through bore casing and insecure bore head

As an outcome, the procedures likely required by Council to reduce significant risks are:

- Mains Hygiene
- Mains Flushing
- Reservoir and Bore Inspections
- Reservoir Cleaning
- Management of Reservoirs CCP for Chlorination
- Response to water quality complaints
- Response to customer complaints
- Water quality monitoring and testing

The DWQMP will provides the operational monitoring schedule, operational limits, verification monitoring testing schedule and source water monitoring parameters. The DWQMP also provides the incident and emergency actions for levels of incidents, from operational (low) to emergency (high).

5.2 Inspections and Maintenance

Each of the water supply system assets, particularly critical assets, must be maintained to a standard to avoid failure and ensure:

- The standard of the asset does not decline below a level at which the standard of service can be achieved
- The appropriate level of service is maintained
- The consumers get value for money.

In the longer term the maintenance activities can be modified as necessary to reflect:

- The age of assets relative to expected economic life cycle
- The risk of failure of critical assets
- Changes in the desired level of service
- The nature and timing of asset upgrading/ development works.

Reactive maintenance (unplanned repair work) is carried out by Council staff in response to service requests and management/supervisory directions. Field staff use tablets to collect failure data and then onto SWIM 'local'. Informal asset inspections are undertaken on a regular basis by suitable qualified and experienced staff.

Planned maintenance is the basic regular on-going work that is necessary to keep assets operating and is usually identified and managed through a maintenance management system (MMS). MMS activities include inspection, assessing the condition against failure/breakdown experience, prioritising, scheduling, actioning the work and reporting what was done to develop a maintenance history and improve maintenance and service delivery performance.

Council's maintenance policies and procedures are yet to be established. Planned maintenance is adhoc and in general not carried out for the majority of asset categories.

Council has the 'Reflect' software developed by Asset Edge which is slowly being used more often. Expanded use of 'Reflect' for fixed interval inspection and/or maintenance activities is required. There would appear capacity to undertake this as a priority activity for current staff (once activities/jobs are agreed and set up the software).

Reactive and fixed interval inspection and/or maintenance activities (refer Table 5.2.a) is required for:

- Bores
- Reservoirs
- Telemetry
- Treatment Plants
- Pump Stations
- Reticulation pipework – work is largely of a reactive nature and is unplanned. Main breaks are attended to as soon as possible so as to restore water supply to customers within the maximum time frame targets specified in the Customer Service Levels. The work is generally identified via customer complaints that are communicated to Council's operational staff. Regular planned flushing of water mains does not occur.
- Hydrants – maintenance resulting from flow and pressure tests.
- Valves - air, pressure reducing, scour non return, actuated control and backflow prevention.

As an example, maintenance intervals for network assets are provided in Table 5.2.a.

Table 5.2.a Network Planned Maintenance

Asset / Activity	Frequency
Valves - Backflow, Actuated Control, Air , Pressure Reducing, Non return; water mains crossing	1 year
Hydrants	4 years - focus on priority areas
Valves – Isolation, scour	5 years or less
Reservoirs	3 Months - external inspection 5 years - internal inspection & clean (de silt)

Aside from pipes and fittings for main breaks, spares (assets/components) need to be identified, listed and procured if necessary, especially for critical infrastructure.

5.3 Operations and Maintenance Expenditure

5.3.1 Historical

Details of historical operations and maintenance expenditure (Opex) for the previous 3 years are summarised in Table 5.3.1. and following figures.

Table 5.3.1.a Summary of Operations and Maintenance Expenditure

	2014/15	2015/16	2016/17
Goondiwindi			
Operations	$613,776	$578,825	$578,335
Maintenance	$417,239	$347,003	$428,957
subtotal	$1,031,015	$925,828	$1,007,292
Inglewood			
Operations	$192,059	$200,263	$272,519
Maintenance	$37,036	$58,144	$62,586
subtotal	$229,095	$258,407	$335,105
Talwood			
Operations	$93,061	$82,863	$98,608
Maintenance	$47,010	$58,263	$87,304
subtotal	$140,071	$141,126	$185,912
Texas			
Operations	$98,881	$106,350	$110,985
Maintenance	$111,144	$89,388	$54,496
subtotal	$210,025	$195,738	$165,481
Yelarbon			
Operations	$82,560	$78,904	$92,375
Maintenance	$27,575	$34,797	$59,725
subtotal	$110,135	$113,701	$152,100
Small Towns			
Operations	$18,416	$11,839	$16,271
Maintenance	$36,347	$10,322	$20,592
subtotal	$54,763	$22,161	$36,863
All Areas			
Operations	$229,419	$304,400	$298,926
Total	**$2,004,523**	**$1,961,361**	**$2,181,679**

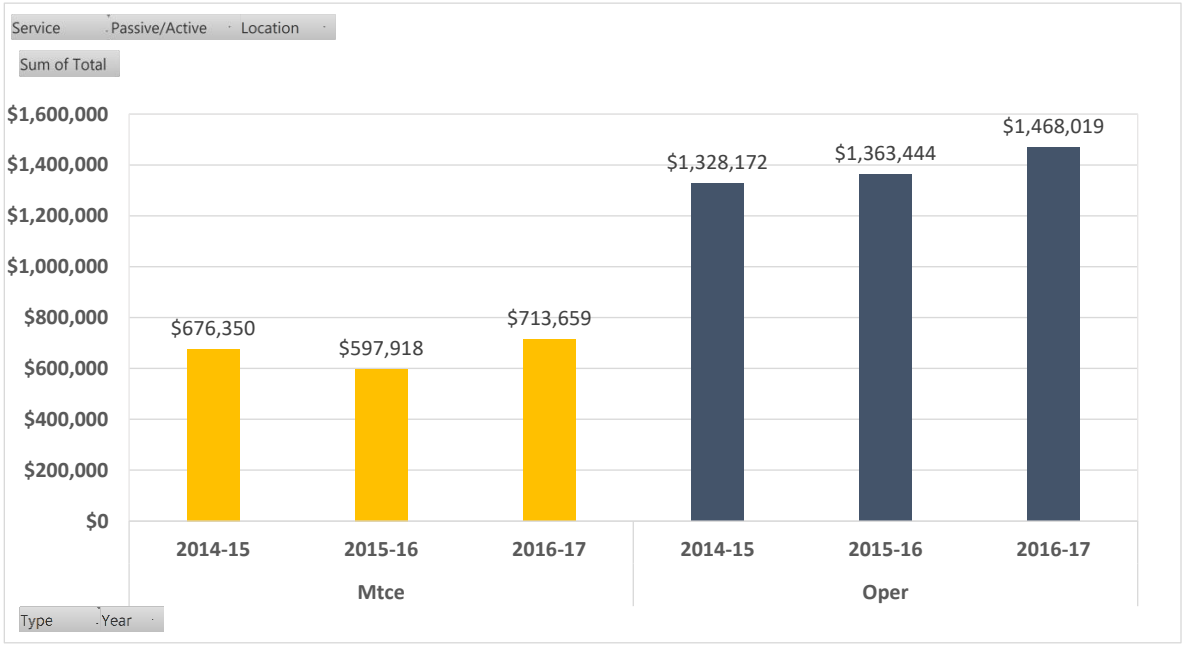


Figure 5.3.1.a Operations and Maintenance Expenditure

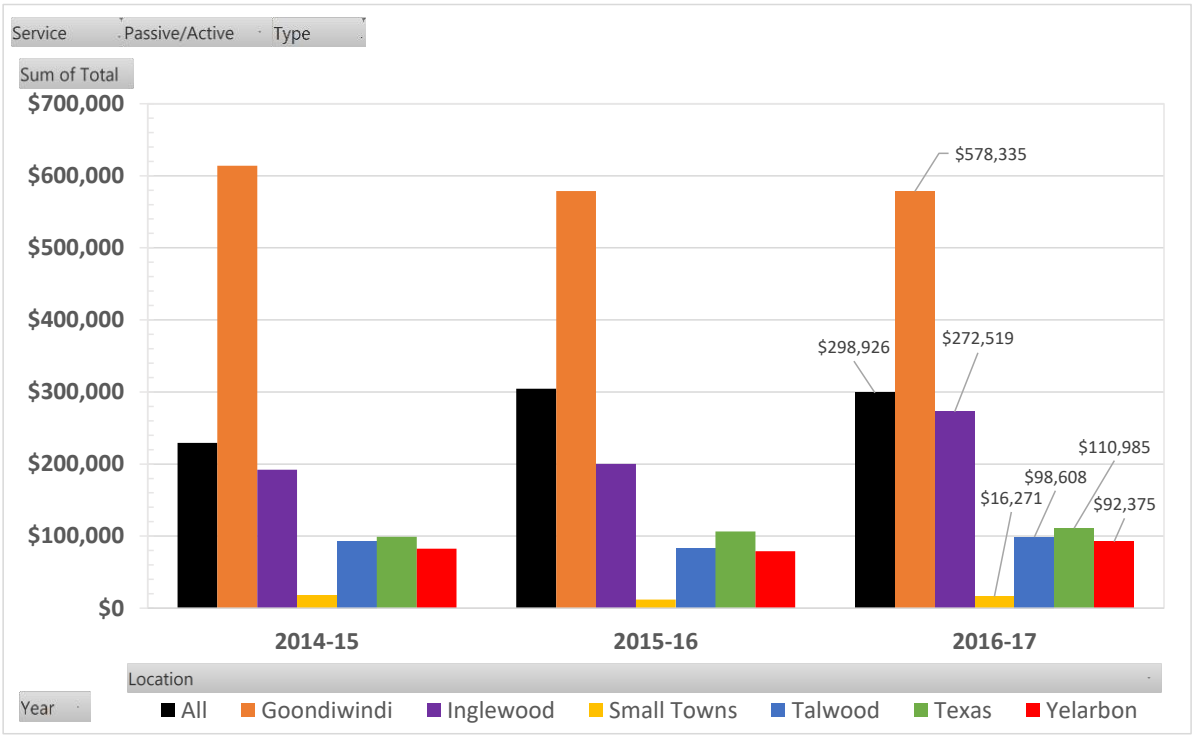


Figure 5.3.1.b Towns Operations Expenditure

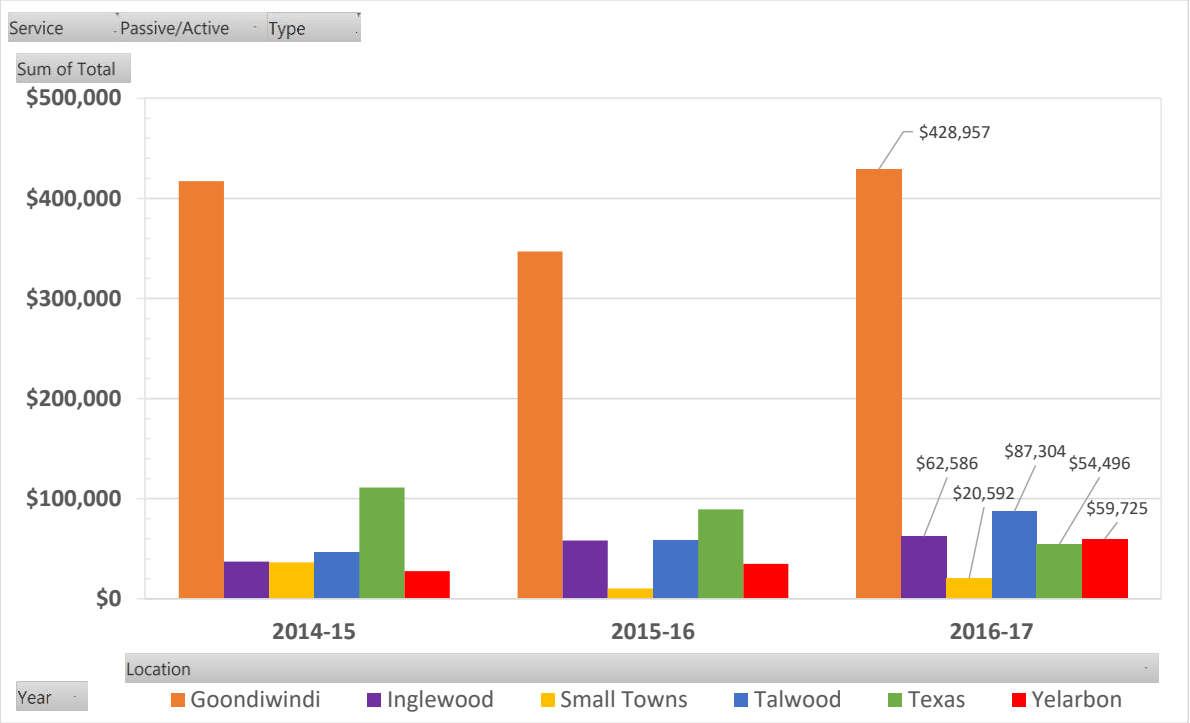


Figure 5.3.1.c Towns Maintenance Expenditure

Key observations:

i. Total opex in 2016/17 was approximately $2.18 million - 67% operations and 33% maintenance;

ii. Total annual operations spend is increasing whilst total annual maintenance spend is variable;

iii. In 2016/17 operations spend was $0.29 million for underground and $1.17 million for above ground assets;

iv. In 2016/17 maintenance spend was $0.35 million for underground and $0.37 million for above ground assets

v. In 2016/17 Goondiwindi comprised 40% of operations and 60% of maintenance spend; and

vi. Annual maintenance spend in 2016/17 comprised 1.12% of underground and 0.91% of above ground asset replacement values respectively.

5.3.2 Projected

The 2017/18 water services budget of approximately $2.03 million is estimated to comprise, based on historical spend:

- Operations - $1.37 million ($1.12 million above ground and $0.25 million below ground)
- Maintenance - $0.66 million ($0.28 million above ground and $0.38 million below ground).

An allowance is made for a nominal 10% increase in spend (not allowing for inflation) over the next 10 years due to increased demand.

The annual operations expenditure is estimated to be $1.51 million in 10 years (2027/28) and annual maintenance expenditure $0.72 million (2017/18 budget plus 10%).

However, the current maintenance spend is only 1% of replacement value. A higher proportion is likely desirable. Thus, for $6.85 million of proposed new and upgraded works over the 10 year period giving a total replacement value of $71 million adopting 1.5% for underground and 1.2% for above ground assets gives projected $0.96 million annual maintenance in 2026/27 shown in the figure following.

Note that all costs are shown in current 2017/18 dollar values. Council is advised to monitor the operations and maintenance expenditure impacts for the new assets and increase expenditure if warranted.

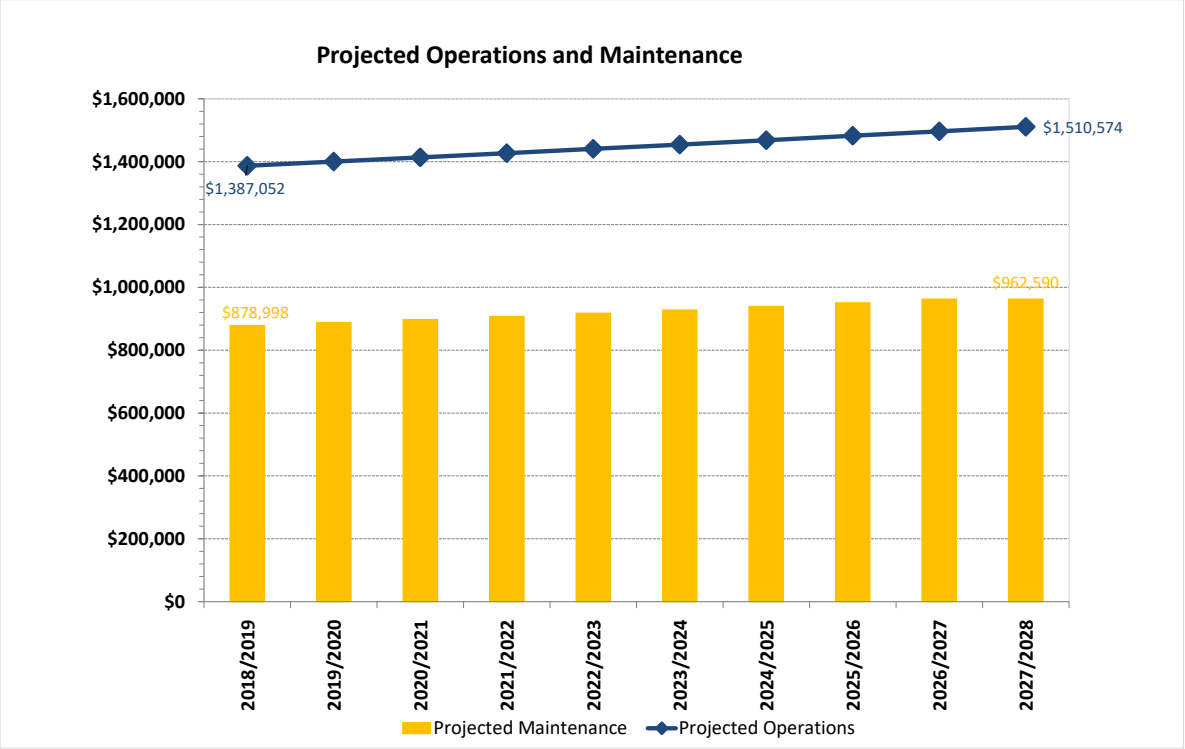


Figure 5.3.2.a Projected Operations and Maintenance Expenditure

5.4 Capital Expenditure

5.4.1 New and Upgrade Works

Selection Criteria

Little information is available for proposed new and upgrade projects on the forward works program – costs and scopes are yet to be confirmed. A rigorous planning and analysis approach (e.g. network analyses) is required to be implemented to identify, confirm and prioritise new and upgrade infrastructure projects. Currently, new assets and upgrades of existing assets are typically identified from community feedback, Councillor suggestions and engineering staff knowledge of deficiencies and experience. Candidate projects are inspected to confirm need and an estimated project cost is determined. Verified proposals are to be ranked by priority and available funds. The priority ranking criteria is detailed below.

Table 5.4.1.a Project Selection Criteria

Criteria	Weighting
System performance improvement	35%
Reliability of treatment improvement	35%
Maintenance minimisation	10%
Links to Community Plan and Corporate Plan	5%
Links to works programs and strategies	5%
Community request	10%

10 Years 2018/19 to 2017/28

Key new and upgrade works planned for the 10 years 2018/19 to 2027/28 taken from Council's forward works plan are listed in Table 5.4.1.a for underground, Table 5.4.1.b for above ground and summarised in Figure 5.4.1.a. Note, some 'upgrade' projects have been apportioned to part 'upgrade' and part 'renewal' expenditure. Total expenditure for the 10 years is $6.85 million

Note that all costs are shown in current 2017/18 dollar values.

Table 5.4.1.a 10 Years (2018/19-2027/28) 'Planned' New and Upgrade Expenditure – Underground Assets

ID	Infrastructure	Project Description	Type	Start Year	Finish Year	Project Total ($)	New/Upgrade Amount
W04#	Water Trunk Main >150mm	Upgrade potable water main from reservoir to town	Upgrade & Renewal	2023	2028	$400,000	$83,333
W09#	Water Trunk Main >150mm	Upgrade Raw water main	Upgrade & Renewal	2017	2022	$800,000	$166,667
W011#	Water Trunk Main >150mm	Upgrade Raw water main	Upgrade & Renewal	2023	2028	$300,000	$62,500
W013#	Water Trunk Main >150mm	Upgrade Potable water Rising main	Upgrade & Renewal	2023	2028	$1,200,000	$250,000
W031	Water Leakage and Pressure Management	Pressure Zone implementation	New	2023	2028	$400,000	$333,333
	Total					**$3,100,000**	**$895,833**

Table 5.4.1.b 10 Years (2018/19-2027/28) 'Planned' New and Upgrade Expenditure – Above Ground Assets

ID	Infrastructure	Project Description	Type	Start Year	Finish Year	Project Total ($)	New/Upgrade Amount
W01	Water Reservoirs	New reservoir	New	2017	2022	$200,000	$166,667
W02	Water Reservoirs	New reservoir	New	2017	2022	$200,000	$166,667
W08	Water Reservoirs	New reservoir	New	2017	2022	$1,000,000	$833,333
W010#	Water Bores, Pump Stations & Boosters	Upgrade Riddles Booster Pump	Upgrade & Renewal	2017	2022	$300,000	$62,500
W020	Systems Improvement (minor)	Generator for Raw Water	New	2017	2022	$60,000	$50,000
W024	Systems Improvement (minor)	Generator for Raw Water	New	2017	2022	$30,000	$25,000
W030	Systems Improvement (minor)	Water Quality Upgrade	Upgrade	2017	2022	$300,000	$250,000
	Total					**$2,090,000**	**$1,544,167**

The effect of this capital works expenditure on depreciation requirements and maintenance spend over 10 years is also shown in Figure 5.4.1.a. Additional depreciation of approximately $119,200 and additional maintenance of approximately $92,400 is forecast.

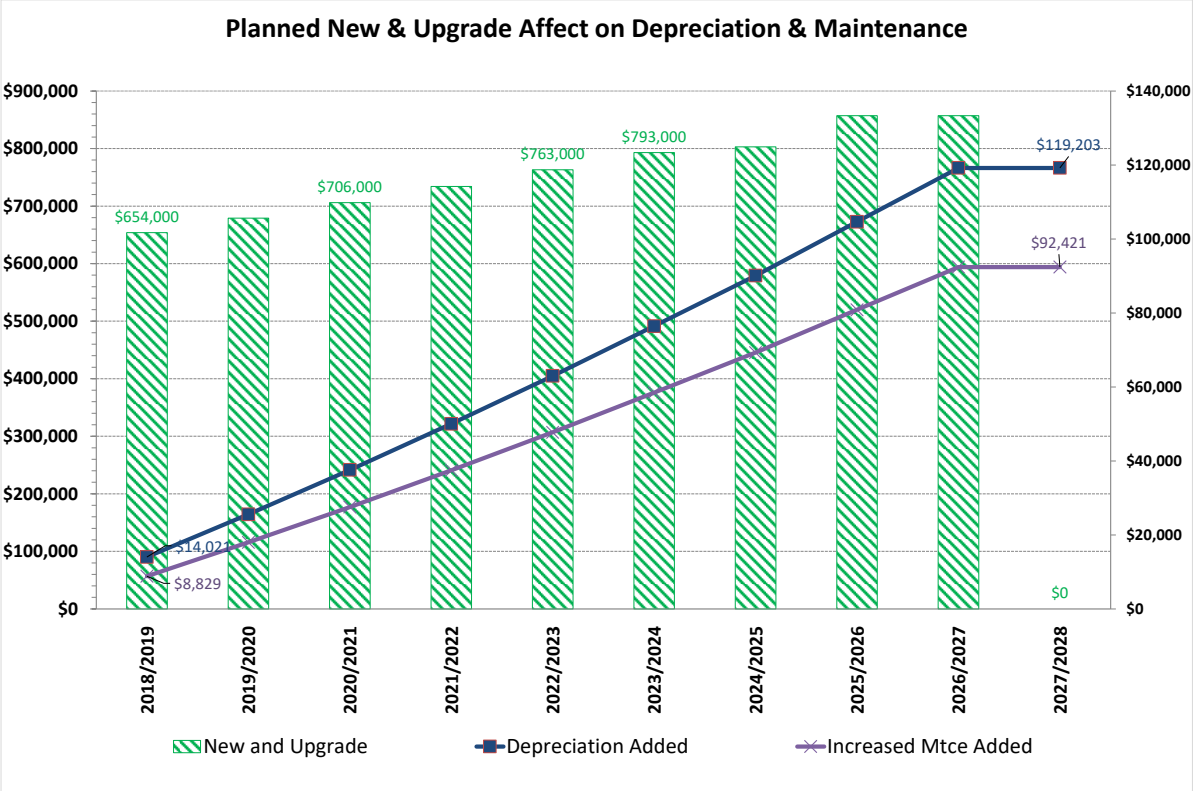


Figure 5.4.1.a Impact of New and Upgrade Capital Expenditure on Depreciation and Maintenance

Acquiring these new assets will commit Council to fund ongoing operations and maintenance costs for the period that the service provided from the assets is required. These future costs are identified and considered in developing forecasts of future operating and maintenance costs.

Long Term

Beyond 2027/28, the majority of spend is for the new Goondiwindi treatment plant - $20 million between 2029 and 2034.

5.4.2 Renewals

10 Years 2018/19 to 2017/28

Council's 'planned' renewals expenditure for the 10 years 2018/19 to 2027/28 totals $5.9 million to closely match the 'projected' required expenditure of $5,976,726 determined from the predicted remaining useful lives of assets used in the 2017 asset valuations. Note, some 'upgrade' projects have been apportioned to part 'upgrade' and part 'renewal' expenditure.

Renewals due in the next 5 years are listed in the Appendix for consideration.

Key costed projects are listed in Tables 5.4.2.a and b. Council also advises of other projects under consideration, pump replacement at Goondiwindi Treatment Plant (George St), possible works for pressure zones for better efficiency and meeting standard supply and firefighting requirements, and pressure pumps at Yelarbon to meet the same requirements.

Note that all costs are shown in current 2017/18 dollar values.

Table 5.4.2.a 10 Years (2018/19-2027/28) 'Planned' Renewals Expenditure – Underground Assets

ID	Infrastructure	Project Description	Start Year	Finish Year	Project Total ($)	Renewals 10 Years ($)
W04#	Water Trunk Main	Upgrade potable water main from reservoir to town	2023	2028	$400,000	$250,000
W09#	Water Trunk Main	Upgrade Raw water main	2017	2022	$800,000	$500,000
W011#	Water Trunk Main	Upgrade Raw water main	2023	2028	$300,000	$187,500
W013#	Water Trunk Main	Upgrade Potable water Rising main	2023	2028	$1,200,000	$750,000
W028	Water Trunk Main	Replace Bore Rising Main	2023	2028	$50,000	$41,667
	Total				**$2,750,000**	**$1,729,167**

- project part renewal and part upgrade

Table 5.4.2.b 10 Years (2018/19-2027/28) 'Planned' Renewals Expenditure – Above Ground Assets

ID	Infrastructure	Project Description	Start Year	Finish Year	Project Total ($)	Renewals 10 Years ($)
W010#	Water Bores, Pump Stations & Boosters	Upgrade Riddles Booster Pump	2017	2022	$300,000	$187,500
W014	Telemetry (Control Systems)	Replace Telemetry	2023	2028	$150,000	$125,000
W015	Telemetry (Control Systems)	Replace Telemetry	2023	2028	$100,000	$83,333
W016	Telemetry (Control Systems)	Replace Telemetry	2023	2028	$300,000	$250,000
W017	Telemetry (Control Systems)	Replace Telemetry	2023	2028	$150,000	$125,000
W018	Telemetry (Control Systems)	Replace Telemetry	2023	2028	$100,000	$83,333
W019	Telemetry (Control Systems)	Replace Telemetry	2023	2028	$80,000	$66,667
W025	Water Bores, Pump Stations & Boosters	Replace Raw Pumps	2023	2028	$50,000	$41,667
W027	Water Bores, Pump Stations & Boosters	Replace Pressure pump system	2017	2022	$30,000	$25,000
W029	Water Bores, Pump Stations & Boosters	Raw Water Pump Replacement	2023	2028	$60,000	$50,000
	Total				**$1,320,000**	**$1,037,500**

- project part renewal and part upgrade

20 Years and Long Term

The following figures show 'projected' 20 years and long term required renewals expenditure ($2.7 million for underground and $8.9 million for above ground) determined from the predicted remaining useful lives of assets used in the 2017 asset valuations. Additional individual plots of 20 year renewals for underground assets and above ground assets (structures, electrical and mechanical, and pipework, fittings and miscellaneous) are provided in the Appendix.

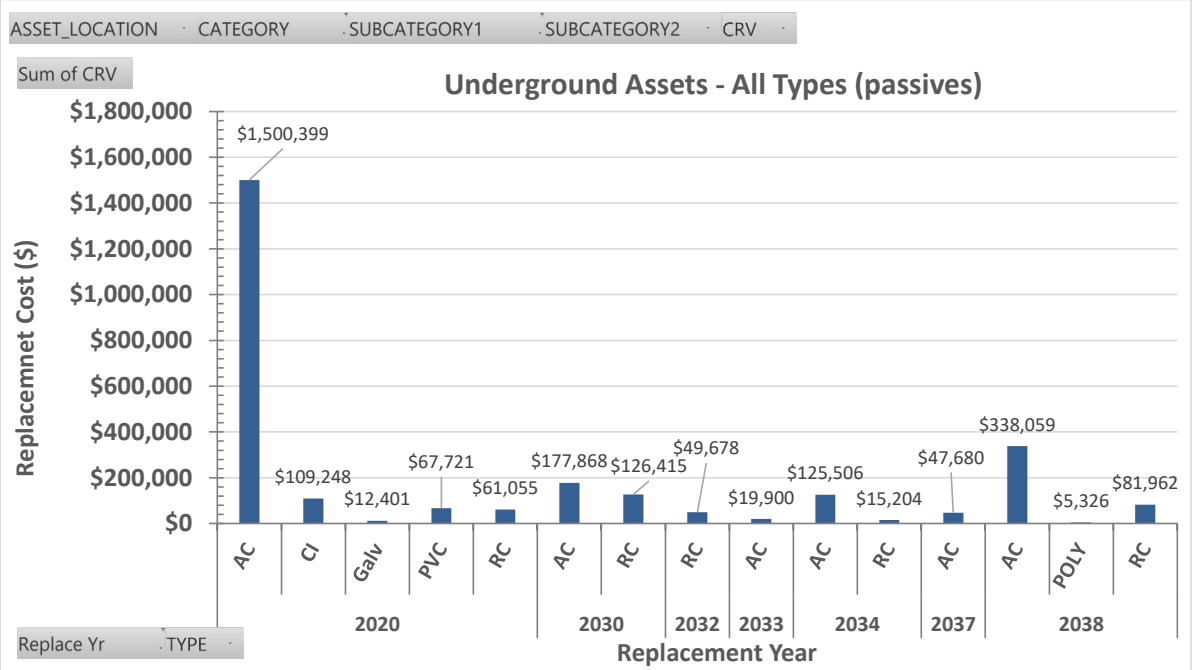


Figure 5.4.2.a Projected 20 Years Renewal Needs – Underground Assets

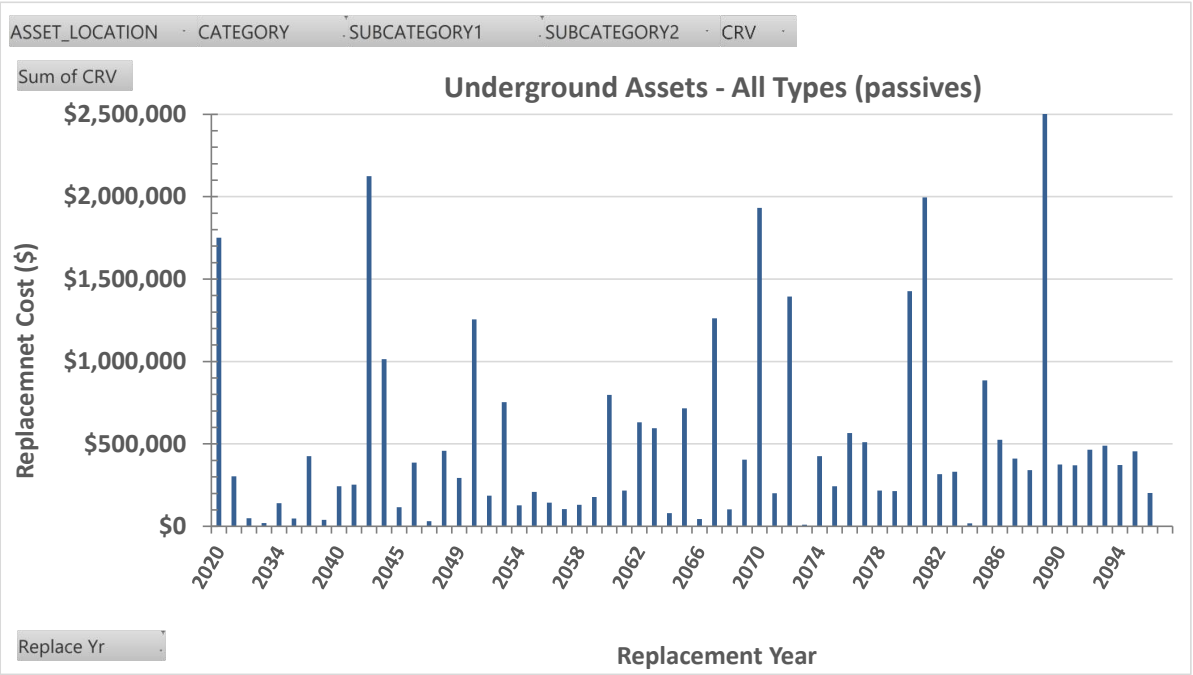


Figure 5.4.2.b Projected Long Term Renewal Needs – Underground Assets

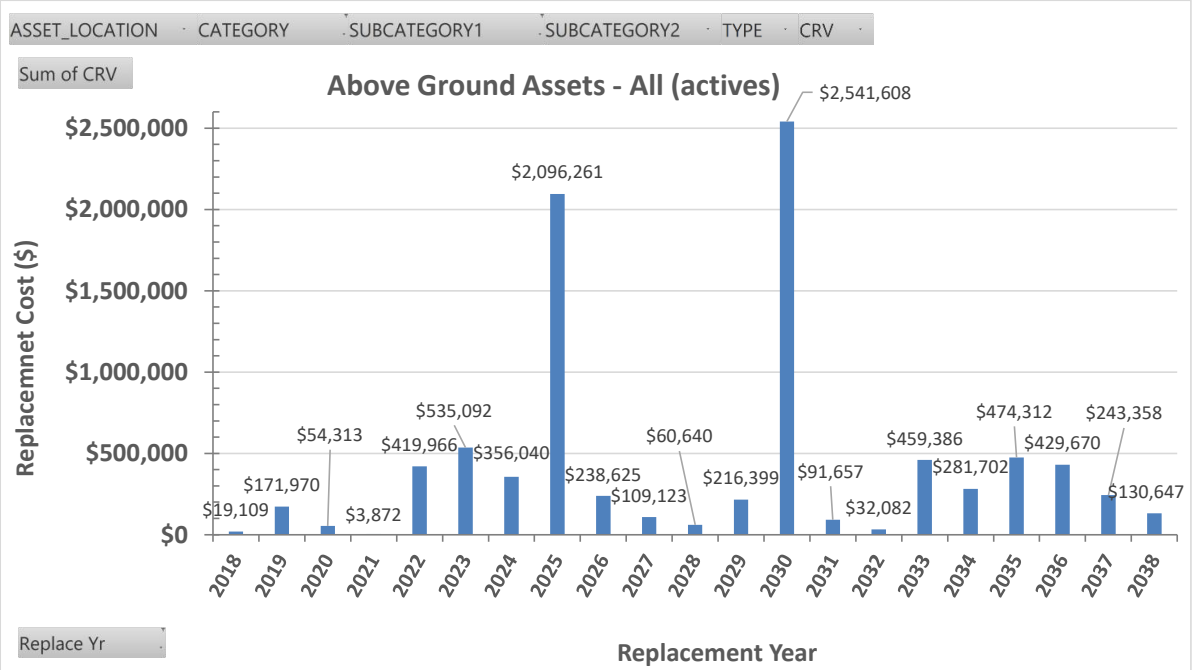


Figure 5.4.2.c Projected 20 Years Renewal Needs – Above ground Assets

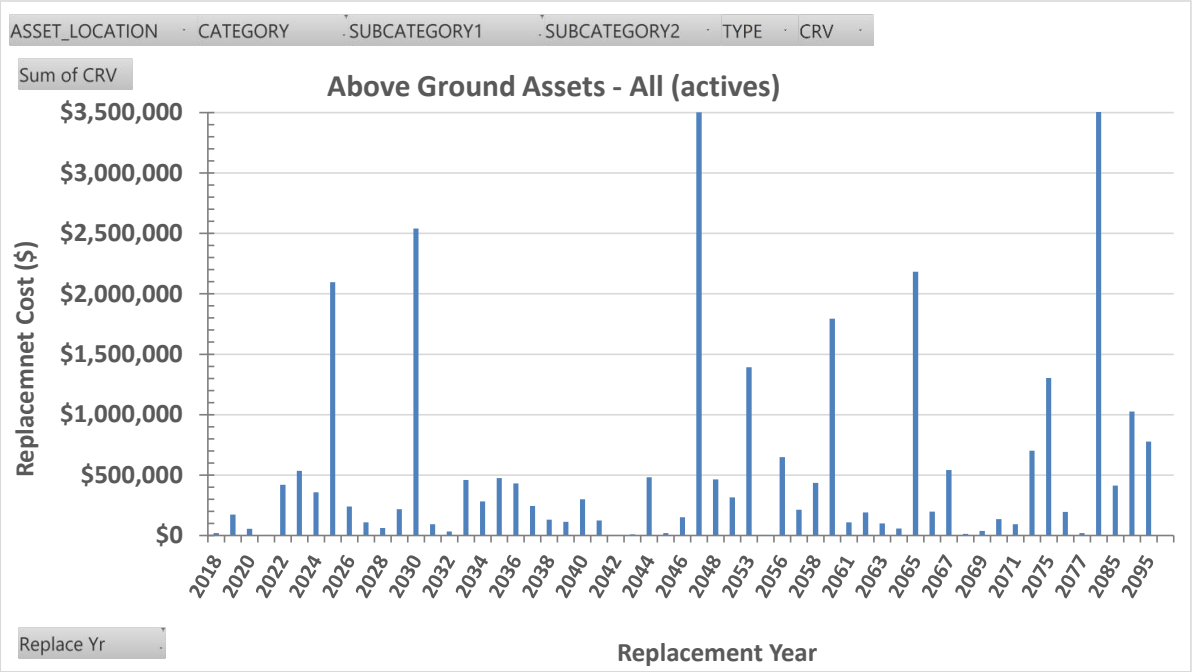


Figure 5.4.2.d Projected Long Term Renewal Needs – Above ground Assets

Renewals Gap

Figure 5.4.2.e indicates the accumulative gap in renewal funding between what Council plans to spend and projections of required renewals over the next 10 years (allowing for 2017/18 spends). A positive gap indicates underspending on renewals, although the gap is negative at 10 years indicating sufficient spending on renewals over the period.

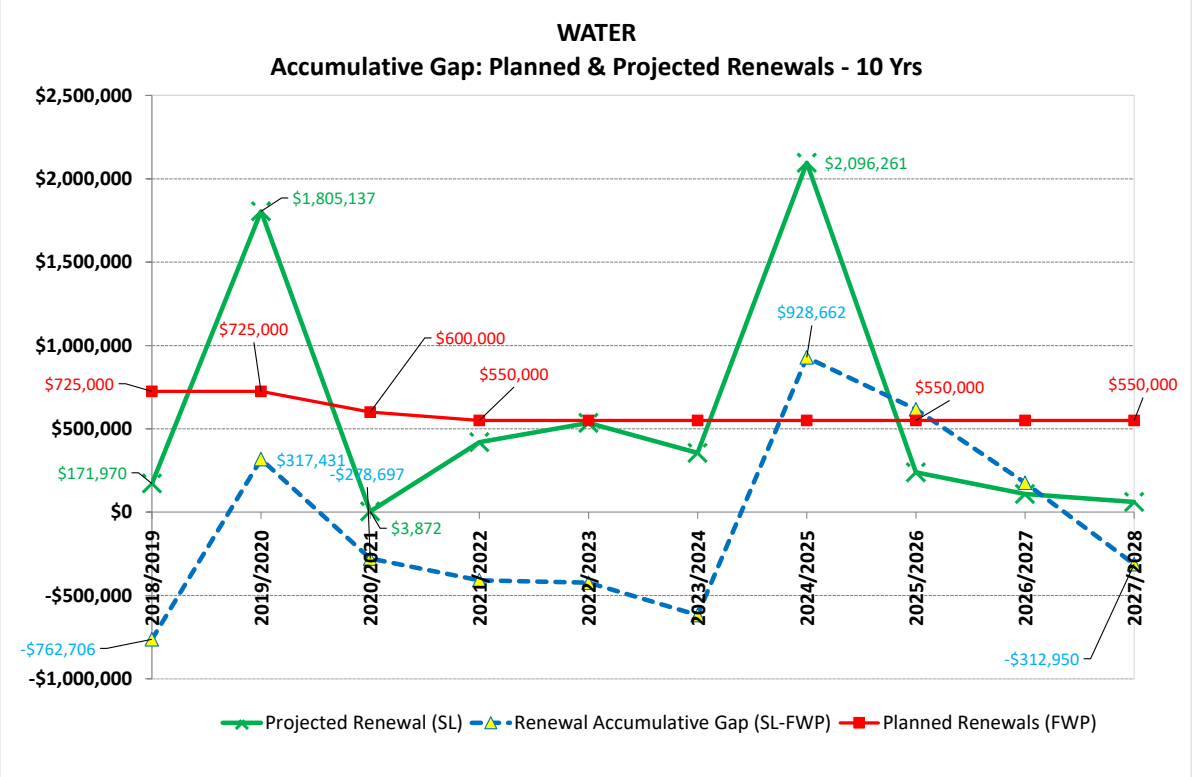


Figure 5.4.2.e Accumulative Gap Between Planned and Projected Renewals for 10 Years

It is concluded that Council needs to:

iii. Undertake the necessary evaluations and condition assessments where possible, to confirm replacements planned and projected for the next 10 years are warranted or otherwise. This will be aimed at avoiding unnecessary/too early replacements or replacements that if not carried out in time will results adverse LOS impacts; and

iv. Allow for total renewals expenditure over the next 10 years (2018/19 to 2027/28) of $5.9 million in line with projections in this AMP.

It should be noted that at this is a newly developed Asset Management Plan, the planned renewals referenced in the Plan are primarily based upon modelling using age profiles, condition assessments and some planned upgrade works. These planned works don't include new works, such as additions to the network, and upgrades for such things as aligning with current standards and increases to capacity. It is hoped that as the Plan matures over time these items, wherever possible, will also be included to give a more complete financial projection moving forward.

5.5 Disposals

Disposal includes any activity associated with disposal of a decommissioned asset including sale, demolition or relocation. At present no water supply assets are being considered for disposal. Future updates of this plan may identify assets for possible decommissioning and disposal. A future example may be McClean St water tower replaced by pressure pumping.

5.6 Asset Sustainability

5.6.1 Life Cycle Cost versus Expenditure

The Life Cycle Cost (LCC) from valuation data projections is the average cost required to operate and maintain the asset over its life including renewal. The Life Cycle Expenditure (LCE) is Council's planned average cost for this. An acceptable target ratio, named the life cycle sustainability index, of Council's planned versus projected (LCE:LCC) is 0.90 or greater in order to maintain service levels.

The index average of 1.01 over 10 years indicates Council is adequately matching the required funding for renewals.

5.6.2 Asset Sustainability Ratio

A 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 1.0 on an ongoing basis indicates that capital expenditure levels are not being optimised so as to minimise whole of life cycle costs of assets, or that assets may be deteriorating at a greater rate than spending on their renewal.
Predictions for 'planned' and 'projected' renewals over the next 10 years are illustrated in Figure 5.6.2.a against a proposed conservative target of equal to or greater than 0.90.

The index averages 0.54 for 'planned' and 0.53 for 'projected' renewals over the next 10 years indicating asset sustainability will not be achieved and may result in not meeting service levels.

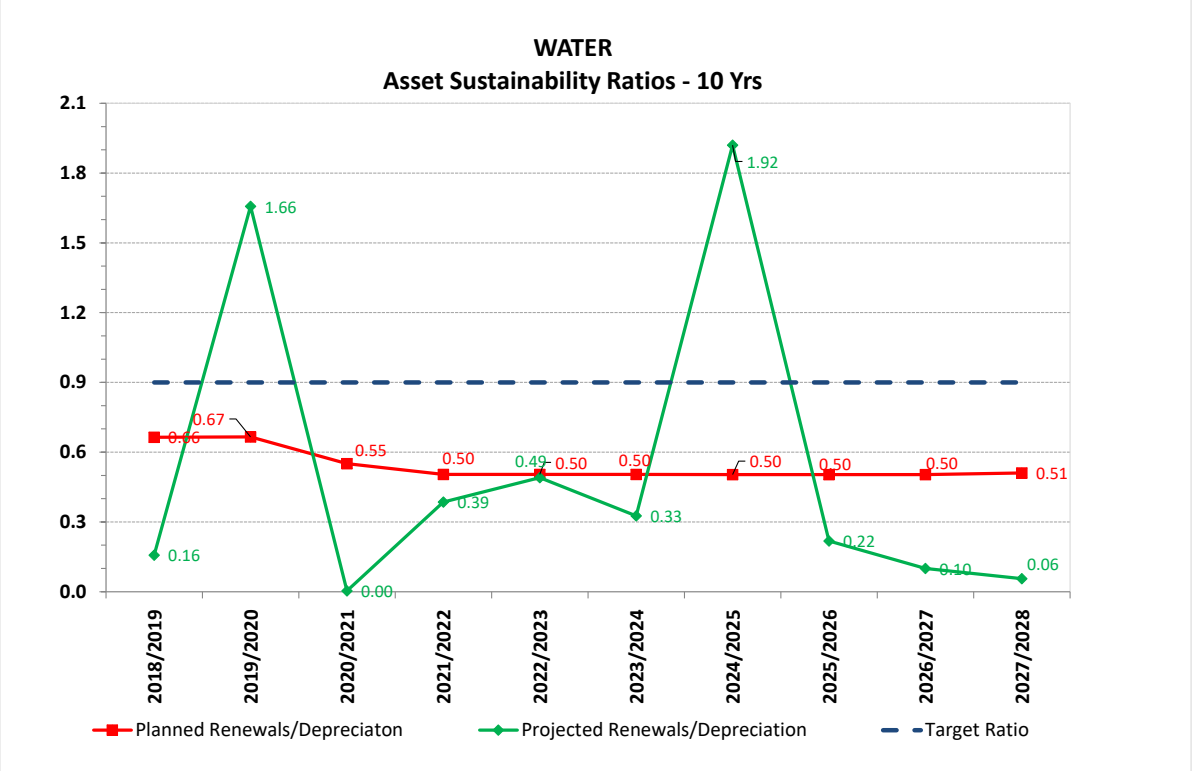


Figure 5.6.2.a Asset Sustainability Ratios

Another similar measure of asset consumption is the fair value as a percentage of replacement cost. The 2017 valuations indicate only 62% with the percentage improving to 88% over the next 10 years for 'planned' renewals. The Appendix provides a summary of 10 years forecast lifecycle costings.

6. FINANCIAL SUMMARY

Providing services in a sustainable manner will require matching of projected asset renewals to meet agreed service levels with planned capital works programs and available revenue.

A gap between projected asset renewals, planned asset renewals and funding indicates that further work is required to manage required service levels and funding to eliminate any funding gap.

6.1 Summary Financial Projections

Projected Opex and Capex is shown in Figure 6.1.a. For comparison, the planned Opex and Capex for the next 10 years based on 2017/18 budgeted is shown in Figure 6.1.b.

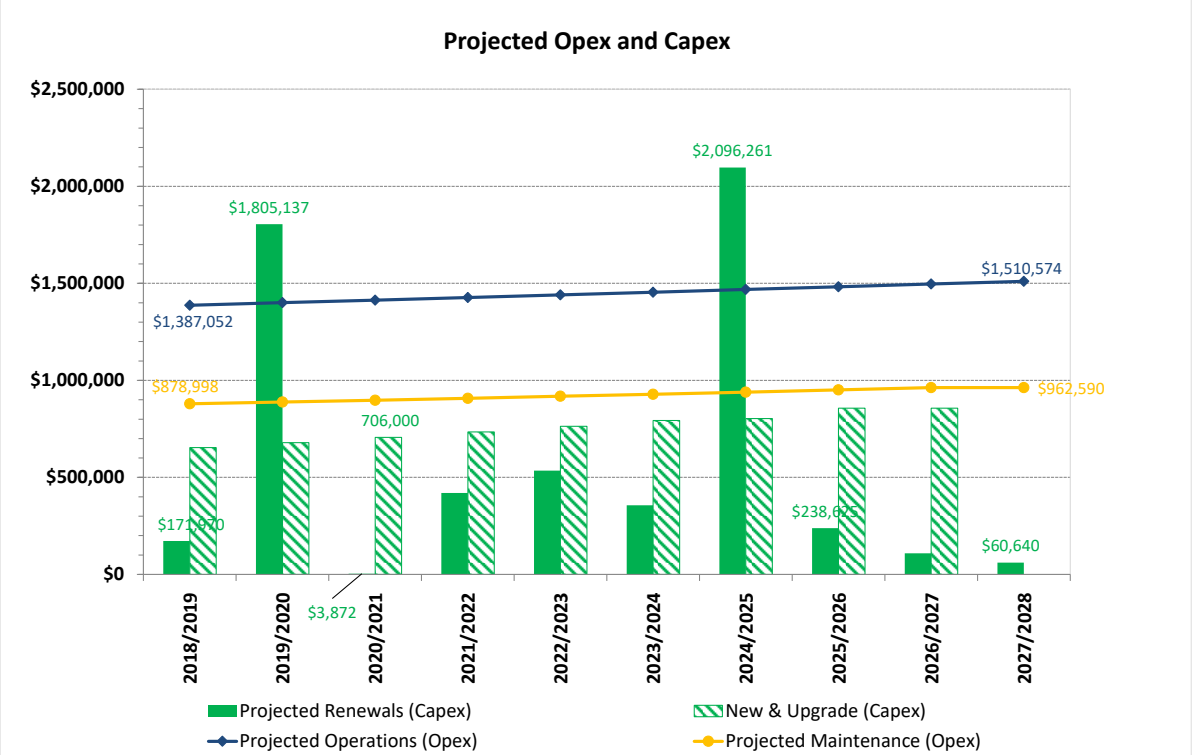


Figure 6.1.a Summary Projected Opex and Capex

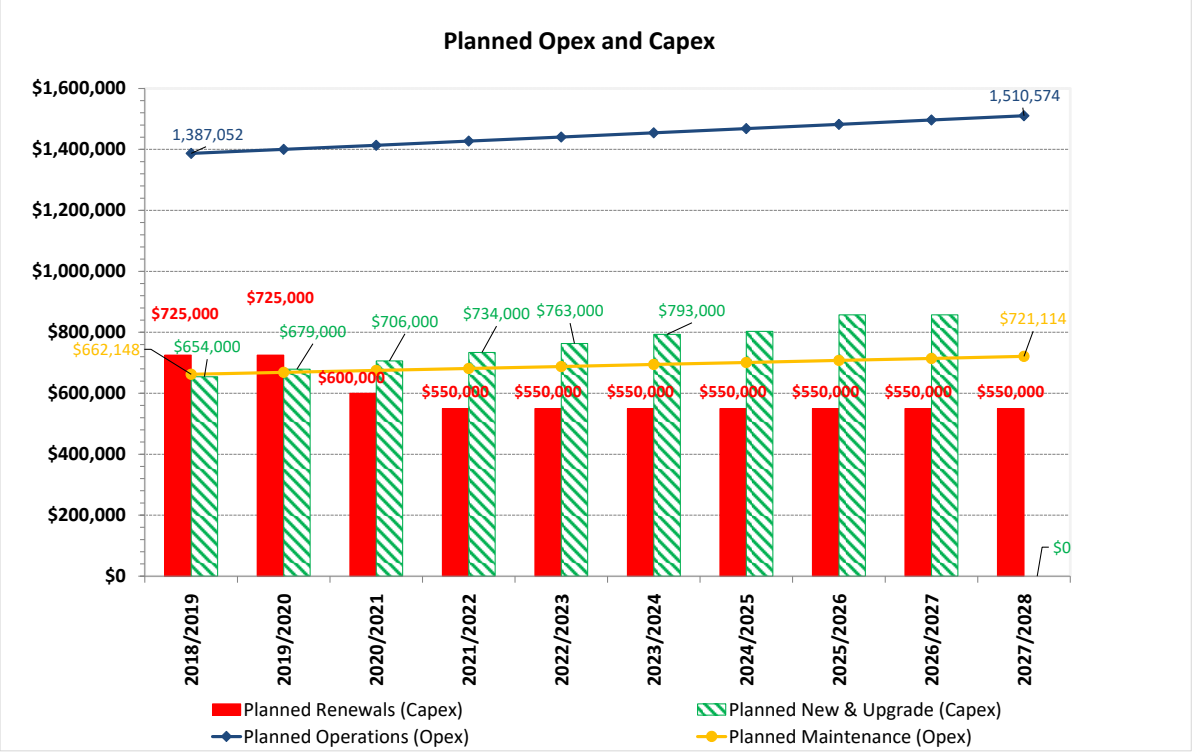


Figure 6.1.b Summary Planned Opex and Capex

6.2 Future Valuations

Council will be adding approximately $6.19 million of new and upgraded assets over the next 10 years to the asset stock (a 13% increase over 2017 values).

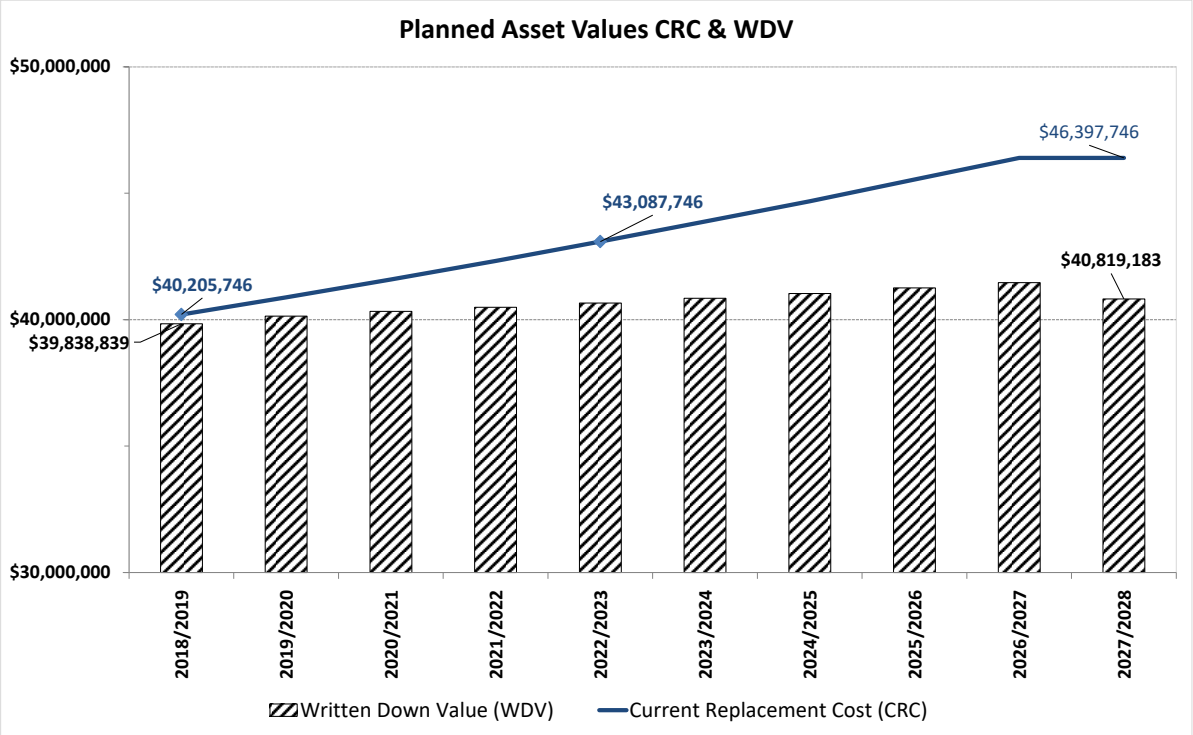


Figure 6.2.a Asset Values from Planned New and Upgrade Capex

7. FINANCIAL AND ASSET MANAGEMENT PRACTICES AND SYSTEMS

7.1 Financial

Council uses a standard computerised general ledger system for all of its financial (accounting) operations. The integrated accounting software used to manage all of Councils accounting operations is the Civica Plus System.

The asset accounting manual details the process by which Council manages its infrastructure asset data and describes the asset accounting procedures involved. Asset infrastructure attribute data is stored in the MapInfo System and the assets financial data in the Practical Plus System, using the Asset Code as the link between the two systems. The process adopted is a simplistic and effective model, which has been developed taking into account Council's limited resources and budget

The chart of accounts used within the general ledger is structured to facilitate the ease of data extraction required for various financial reporting requirements (e.g. annual budget, internal management reporting, job costing monthly reports, annual financial statements etc).

Asset Accounting encompasses the entire lifetime of the asset from purchase order or the initial acquisition (managed as an asset under construction or Works in Progress) through its retirement. All costs considered to be of a capital nature are costed to the relevant Works in Progress Account by class. Once completed, they are transferred to the Fixed Asset Register by class. Each asset is separately recorded and identified with other pertinent details such as in-service date, description, depreciation rate, residuals, location, category etc. Based on this information, the Civica system calculates, to a large extent automatically, the values for depreciation, revaluation increments/decrements sales proceeds, profit/loss entries if retired. These details are also recorded by directorate and there is a report for depreciation forecasting and simulation of the development of asset values.

The day to day administration of Councils financial system is managed through the Financial Services Section.

Council subscribes to the following asset recognition thresholds - $5,000 for non-infrastructure and $10,000 for infrastructure. All assets above these recognition thresholds are capitalised into the Fixed Asset Register and depreciation over their economic lives. Assets under these thresholds are expensed in the Operating Statement.

7.2 Asset Management

An asset management system is a combination of processes, data and software applied to provide the essential information outputs for effective management of risk and optimum infrastructure maintenance and renewal.

The MapInfo GIS system holds asset data including physical information (attributes). The GIS is not being regularly updated with asset changes, e.g. water main replacements for several years. Also, the accuracy of pipe material types on the GIS is not the best - on repairing pipework it is often found to be a different material type. The KIM (Knowledge Information Mapping) GIS software tool is used to manage assets and their associated information. It allows users to perform powerful GIS data analysis, querying and reporting tasks in the office or on the move.

Other than wider use of current asset management systems to better manage assets, there are no system changes resulting from this plan.

7.2.1 Responsibility

The primary division responsible for preparation of this AMP resides with Engineering Services with support from Finance Services. The CEO reports to Council on development and implementation of the AMP.

The role of the Asset Management Steering Group includes:

- Developing Councils infrastructure and asset management practices, including the 10 year asset management plans.
- Key performance indicators such as financial ratios, statistics etc.
- Managing and providing strategies and systems to ensure a whole of Council understanding and improvement in asset management practices.
  Managing and estimating the consumption, residuals, and revaluation decrements/increments of all assets.

8. IMPROVEMENT PROGRAMME AND PLAN MONITORING

8.1 Improvement Programme

A 3 year programme is included in Table 8.1.a for implementing the improvement actions identified in preparing this initial plan. Note, Task ID is from the overall list of Asset Management Improvement Program Tasks.

Table 8.1.a Improvement Programme

ID	Improvement Action	Description	Priority
1.0	**Establishing Service Levels**		
1.1	Confirm Key Performance Measures	Consider KPIs provided in this AMP	High
1.2	Confirm targets for LOS	Consider targets provided in this AMP	High
1.3	Update Customer Service Standard	CSS is dated 2009	Medium
1.4	Further develop community consultation	CSS says surveys will be done every 3 yrs. Further develop community consultation to inform strategic asset based decision making.	Low
2.0	**Asset Risk Management**		
2.1	Confirm condition ratings for underground derived from age	Sampling of network ages to prove condition based on age where no other data available	Medium
2.2	Assign criticality (consequences of failure) to assets	Develop asset criticality criteria (consequences of failure) for asset categories and apply to assets.	Low
2.3	Identify and assess risks using condition as a surrogate for likelihood.	Include assessment of asset criticality and active management of associated risks at asset class level.	Low
2.4	Develop condition ratings and renewal triggers based on condition/performance	E.g. One burst break or leak in past 12 months, or 2 or 3 failures in past 3 years is condition 4 – consider for renewal	Low
2.5	Develop risk programs.	Develop risk based inspection and condition assessment programs.	Medium
2.6	Critical Spares	Identify, list and procure if necessary spares for critical assets and components.	High
3.0	**Asset Life Cycle Management**		
3.1	Develop Maintenance Management Plans	Develop as a minimum routine maintenance management plans that align with technical service measures- use of 'Reflect'	High
3.2	Confirm assets for short term renewal programs for asset categories	Adopt asset renewal profiles for asset categories from valuations used for this AMP. Examine 5 yr renewal profile and confirm assets for short term (3 yr) renewal programs for categories from condition/performance assessment.	High
3.3	New/upgrade capital works projects confirmed from system analyses/ planning reports	Planning Reports including system analyses provide the information for verifying the need, extent, timing and cost of proposed new/upgrade capital works	High
3.4	Develop a project management framework for Capital Expenditure Planning	Develop a project management framework incorporating stage-gating and whole of life cost consideration. Pre-construction activities need to be identified and programmed, e.g. planning, pre-feasibility and options studies, approvals, design, procurement etc.	Medium

ID	Improvement Action	Description	Priority
3.5	Implement project prioritisation method for new and upgrade projects	Confirm the project prioritisation tool in this AMP aligns with the principles of the asset management policy and implement for all new and upgrade projects.	High
3.6	Develop clear work scope for projects at planning stages	Scope of works are required - necessary for complex projects	High
	Complete as constructed and project completion documentation	As constructed and project completion documentation to be completed in a timely manner so as project capitalization and mapping updates can occur before knowledge is lost	High
4.0	**Measuring and Managing Asset Performance**		
4.1	Develop and implement condition assessment plans for asset categories., e.g. reservoirs	Develop condition assessment plans that identify asset condition and defects.	Medium
4.2	Improve field capture and input to corporate systems for inspection and maintenance activities and condition information for facilities / asset classes	Inspections results and maintenance works should be formally documented. Implement on mobile devices (‘Reflect’) where appropriate to capture data for corporate use, e.g. main failures - asset ID, material and location, routine inspections/maintenance activities	High
4.3	Update mapping and map pipework failures on GIS	Mapping needs to be updated. Map water main failures on GIS as a layer (previous from operational knowledge and future from new collection measures)	High

8.2 Plan Monitoring and Review

The effectiveness of the AMP can be measured in the following ways:

1. The degree to which improvement actions are implemented.
2. The degree to which the required cash flows identified in this AMP are incorporated into Council’s long term financial plan
3. The degree to which 1 to 5 years detailed works programs, budgets, business plans and organisational structures and initiatives take into account the works program trends provided by this AMP.

This Asset Management Plan should be fully reviewed every 3 years (2020/2021 financial year) and the Improvement Programme updated annually.

APPENDICES

Appendix A Glossary Of Terms

Activity
The work undertaken on an asset or group of assets to achieve a desired outcome.

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

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

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

Asset management
The combination of management, financial, economic, engineering and other practices applied to physical assets with the objective of providing the required level of service in the most cost effective manner.

Asset management plan
A plan developed for the management of one or more infrastructure assets that combines multi-disciplinary management techniques (including technical and financial) over the lifecycle of the asset in the most cost effective manner to provide specified level of service. A significant component of the plan is a long term cash flow projection for the activities.

Asset management system (AMS)
A system (usually computerized) for collecting, analysing and reporting data on the utilization, performance, lifecycle management and funding of the existing assets.

Assets
Future economic benefits controlled by the entity as a result of past transactions or other past events (AAS27.12). Property, plant and equipment including infrastructure and other assets (such as furniture and fittings) with benefits expected to last more than 12 months.

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

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

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

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

Capital funding
Funding to pay for capital expenditure.

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

Capital investment expenditure (capex)
See capital expenditure definition

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

Capital (asset) renewal expenditure
Major expenditure on an existing asset, which returns the service potential or the life of the asset up to that which it had originally. Replacement, renewing, restoration or rehabilitation to original size and design capacity of an asset or the component of the asset. Renewals are "capitalized", so that the cost can be depreciated over the future life of the asset. It is periodically required expenditure, relatively large (material) in value compared with the value of the components or sub-components of the asset being renewed. As it reinstates existing service potential, it has no impact on revenue, but may reduce future operating and maintenance expenditure if completed at the optimum time, e.g. replacing a material section of a pipe network with pipes of the same capacity. Where capital projects involve a combination of renewal, expansion and/or upgrade expenditures, the total project cost needs to be allocated accordingly

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

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

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

Condition Monitoring
Continuous or periodic inspection, assessment, measurement and interpretation of resulting data, to indicate the condition of a specific component so as to determine the need for some preventative or remedial action.

Core Asset Management
Asset management which relies primarily on the use of an asset register, maintenance management systems, job/resource management, condition assessment and defined levels of service, in order to establish alternate treatment options and long term cash flow predictions. Priorities are usually established on the basis of financial return gained by carrying out the work (rather than risk analysis and optimised renewal decision making).

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

Critical Assets
Assets for which the financial, business or service level consequences of failure are sufficiently severe to justify proactive inspection and rehabilitation. They have lower threshold for action than non-critical assets

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

Current replacement cost "As New" (CRC)
The current cost of replacing the original service potential of an existing asset, with a similar modern equivalent asset, i.e. the total cost of replacing an existing asset with an as NEW or similar asset expressed in current dollar values.

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

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

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

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

Design Life
The theoretical life of an asset assumed in its design

Economic life
See useful life definition.

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

Fair value
The amount for which an asset could be exchanged, or a liability settled, between knowledgeable, willing parties, in an arm's length transaction.

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

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

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

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

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

Life Cycle Cost
The life cycle cost (LCC) is average cost to provide the service over the longest asset life cycle. It comprises annual maintenance and asset consumption expense, represented by depreciation expense. The Life Cycle Cost does not indicate the funds required to provide the service in a particular year.

Life Cycle Expenditure
The Life Cycle Expenditure (LCE) is the actual or planned annual maintenance and capital renewal expenditure incurred in providing the service in a particular year. Life Cycle Expenditure may be compared to Life Cycle Cost to give an initial indicator of life cycle sustainability.

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

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

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

New assets
Activities that create an asset that did not exist previously or extend an asset beyond its original size or capacity. New assets are also "capitalized", but they increase the asset base rather than restore its capacity to perform.

Operation
The active process of utilizing an asset that will consume resources such as manpower, energy cleaning products and materials. Operation costs are part of the life cycle costs of an asset.

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

Performance measure
A qualitative or quantitative measure of a service or activity used to compare actual performance against a standard or other target. Performance indicators commonly relate to statutory limits, safety, responsiveness, cost, comfort, asset performance, reliability, efficiency, environmental protection and customer satisfaction.

Physical Life
The actual life of an asset.

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

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

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

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

Reactive maintenance
Unplanned repair work carried out in response to service requests & management / supervisory directions.

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

Rehabilitation
See capital renewal expenditure definition above.

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

Renewal
See capital renewal expenditure definition above.

Repair
Action to restore an item to its previous condition after failure or damage.

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

Risk management
The application of a formal process to the range of possible values relating to key factors associated with a risk in order to determine the resultant ranges of outcomes and their probability of occurrence.

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

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

Scheduled maintenance
Maintenance carried out in accordance with a routine (predetermined) maintenance schedule.

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

Sub-component
Smaller individual parts that make up a component part.

Trunk Mains
Large diameter) pipelines which supply drinking water to the community via smaller diameter water mains.

Unscheduled maintenance
Work carried out in response to reported problems of defects.

Upgrading
The replacement of an asset or addition/replacement of an asset component which materially improves the original service potential of the asset.

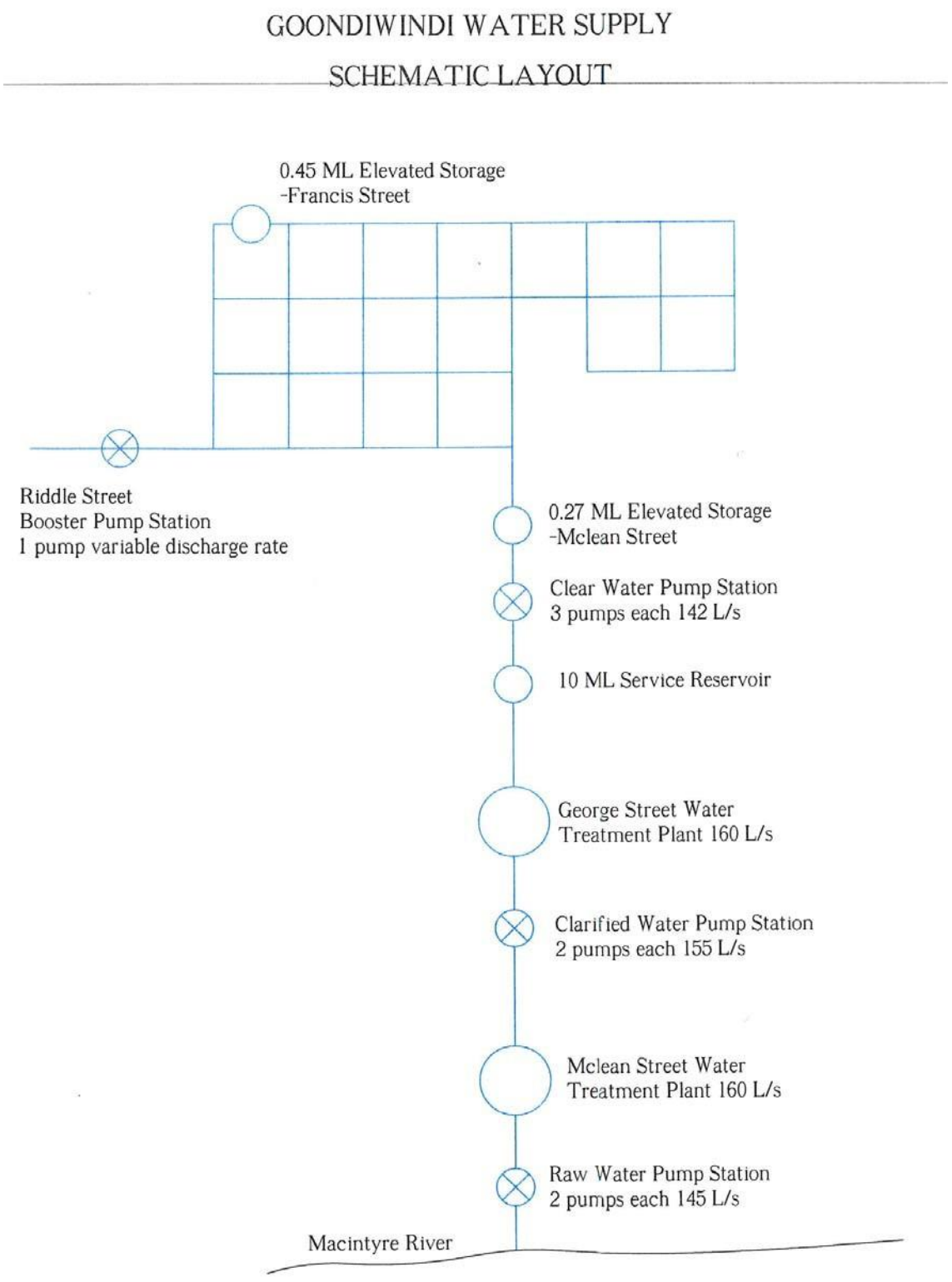
Useful life
Either:(a) the period over which an asset is expected to be available for use by an entity, or
(b) the number of production or similar units expected to be obtained from the asset by the entity.

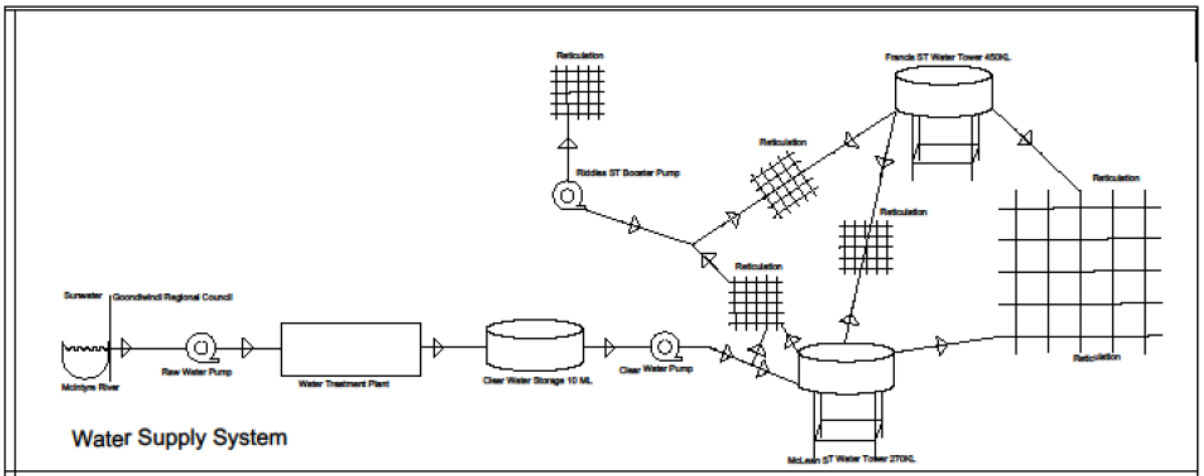
It is estimated or expected time between placing the asset into service and removing it from service, or the estimated period of time over which the future economic benefits embodied in a depreciable asset, are expected to be consumed by the council. It is the same as the economic life.

Valuation
Estimate asset value which may depend on the purpose for which the valuation is required, i.e. replacement value for determining lifecycle costing or insurance valuation.

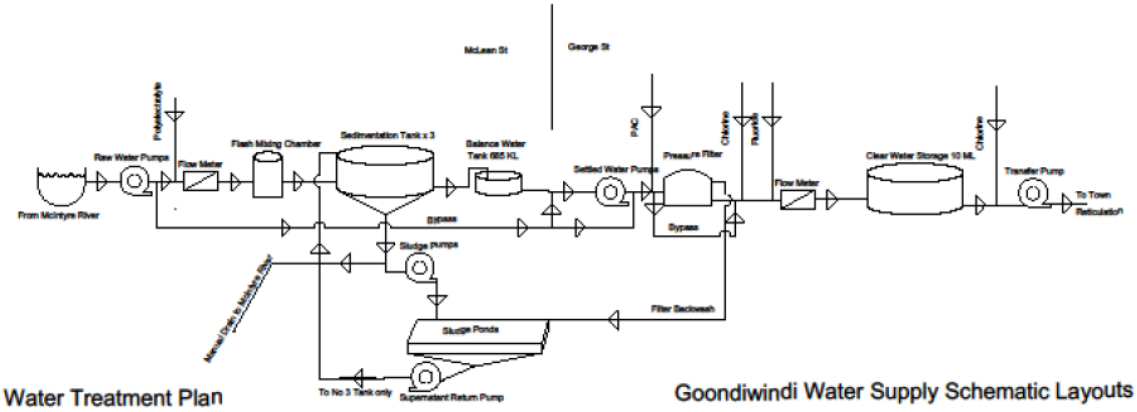
Water mains
375mm diameter and smaller pipes located underground along public streets or appropriate rights-of-way used for distributing water to individual customers for public or community use.

Appendix B Water Supply Schematic Layouts



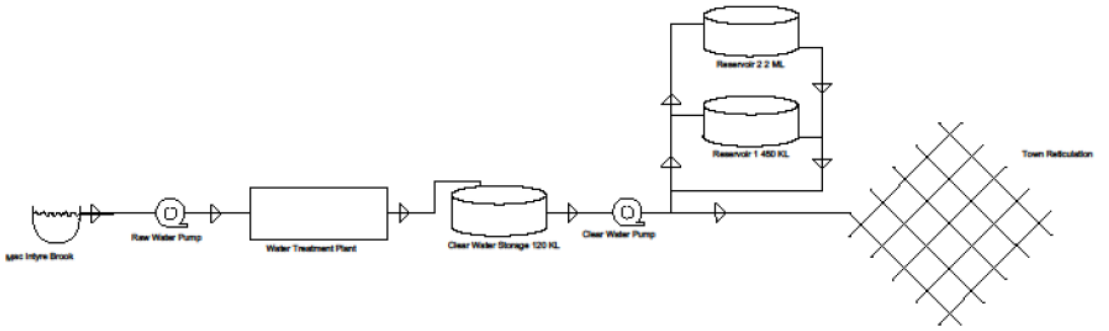


Water Supply System

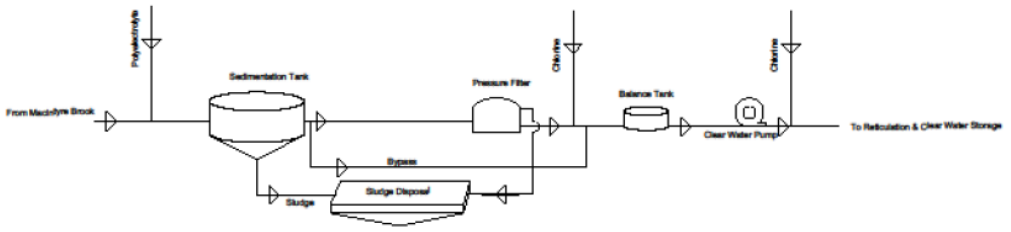


Water Treatment Plan

Goondiwindi Water Supply Schematic Layouts



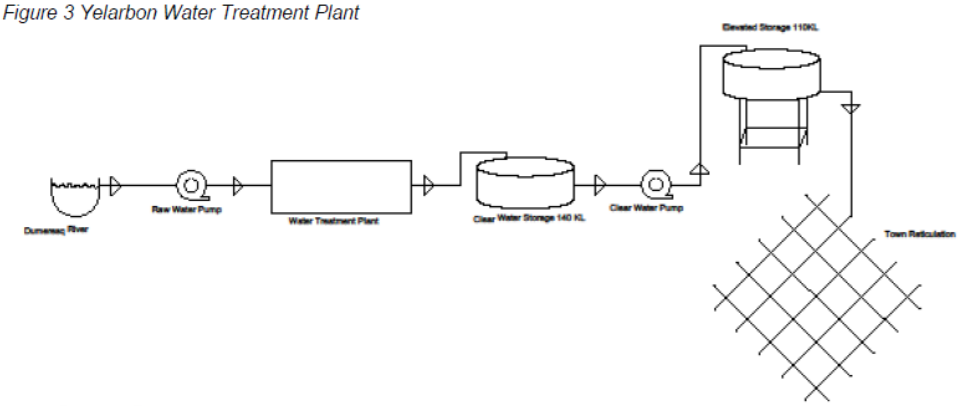
Water Supply System



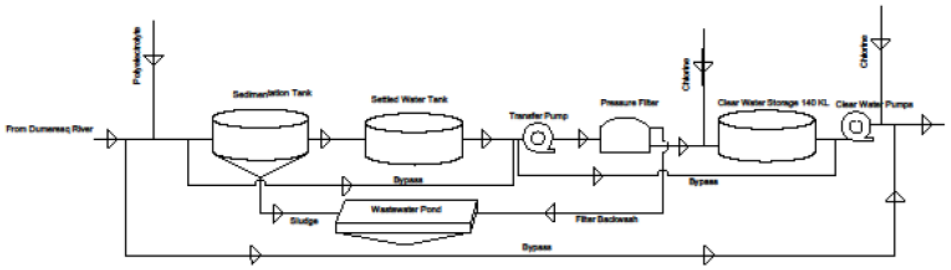
Water Treatment Plan

Inglewood Water Supply Schematic Layouts

Figure 3 Yelarbon Water Treatment Plant



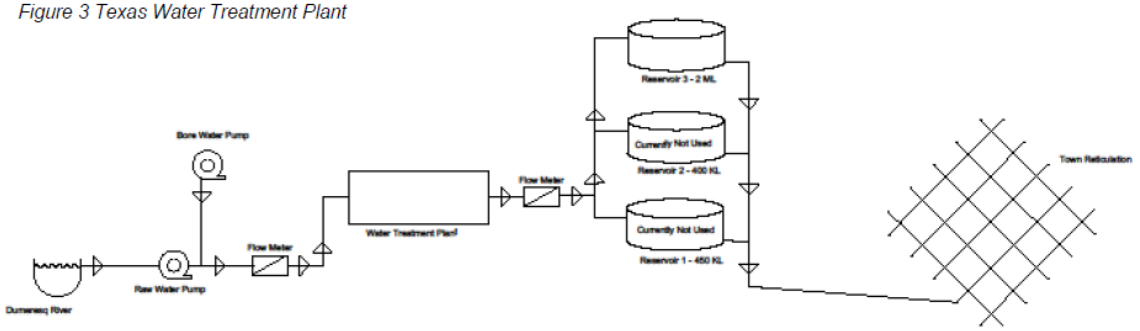
Water Supply System



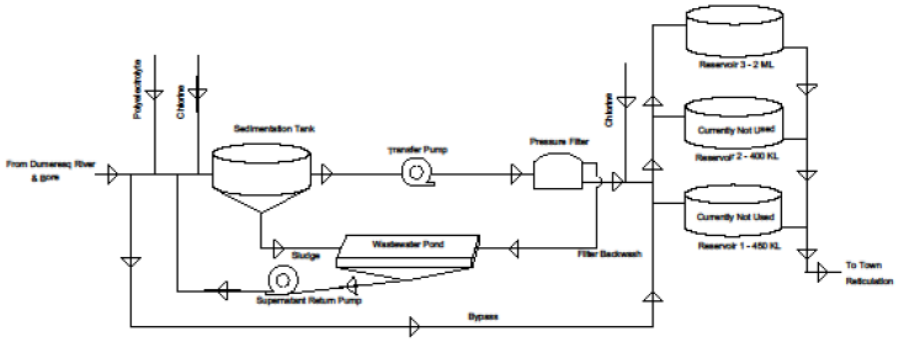
Water Treatment Plan

Yelarbon Water Supply Schematic Layouts

Figure 3 Texas Water Treatment Plant



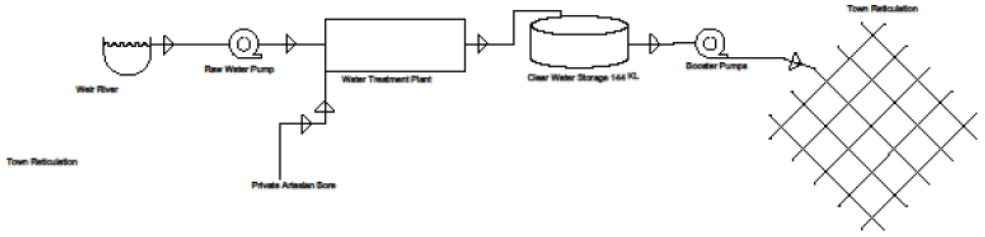
Water Supply System



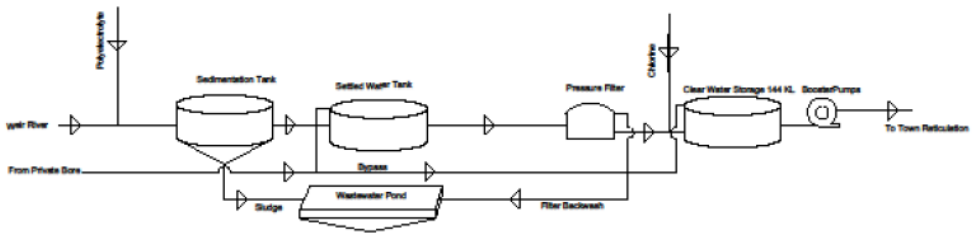
Water Treatment Plan

Texas Water Supply Schematic Layouts

Figure 3 Talwood Water Treatment Plant



Water Supply System



Water Treatment Plan

Talwood Water Supply Schematic Layouts

Appendix C Assets with 5 years or Less Remaining Useful Life

Underground

Year and Assets	Sum of CRV
2017	**$510,419**
AC	**$510,419**
Ex Rising Main - Pumpstation Road - Texas - 150 mm AC	$403,400
Water Main - Flemming Texas - 150 mm AC	$4,446
Water Main - Main St Talwood - 100 mm AC	$43,983
Water Main - Rae Street Talwood - 100 mm AC	$20,270
Water Main - Railway St Talwood - 100 mm AC	$15,169
Water Main - School St Talwood - 100 mm AC	$23,151
2020	**$1,750,824**
AC	**$1,500,399**
Private Line - Chilcott Inglewood - 100 mm AC	$4,297
Rising Main - Rising Main Texas - 100 mm AC	$2,306
Water Main - Albert St Inglewood - 100 mm AC	$37,723
Water Main - Alice St Inglewood - 100 mm AC	$37,981
Water Main - Alice St Inglewood - 150 mm AC	$31,323
Water Main - Brook Inglewood - 100 mm AC	$4,009
Water Main - Callandoon Inglewood - 100 mm AC	$92,345
Water Main - Callandoon Inglewood - 150 mm AC	$97,369
Water Main - Chilcott Inglewood - 100 mm AC	$3,955
Water Main - Denison Inglewood - 100 mm AC	$29,109
Water Main - Denison Inglewood - 150 mm AC	$16,323
Water Main - East Inglewood - 100 mm AC	$20,313
Water Main - Elizabeth Inglewood - 100 mm AC	$56,687
Water Main - Frey Inglewood - 225 mm AC	$37,920
Water Main - Frey Inglewood - 450 mm AC	$74,167
Water Main - George Inglewood - 100 mm AC	$67,776
Water Main - Great Rd St Inglewood - 100 mm AC	$44,705
Water Main - Grey Inglewood - 100 mm AC	$38,661
Water Main - Grey Inglewood - 150 mm AC	$53,432
Water Main - Hospital Inglewood - 100 mm AC	$172,911
Water Main - Inglewood Reservoir Inglewood - 150 mm AC	$604
Water Main - King Inglewood - 100 mm AC	$64,622
Water Main - Lloyd Inglewood - 100 mm AC	$52,425
Water Main - Macintyre Inglewood - 100 mm AC	$38,673
Water Main - Macintyre Sports Field Inglewood - 225 mm AC	$84,826
Water Main - Mcintyre Street West - crossing Frey St	$1,389
Water Main - Mcintyre West Inglewood - 100 mm AC	$1,614
Water Main - Nicholas Inglewood - 100 mm AC	$18,016
Water Main - Princess Inglewood - 100 mm AC	$51,735
Water Main - Queen Inglewood - 100 mm AC	$64,235
Water Main - Regent Inglewood - 100 mm AC	$64,187
Water Main - School Inglewood - 100 mm AC	$14,514
Water Main - School Inglewood - 50 mm AC	$8,521
Water Main - Slack Inglewood - 100 mm AC	$33,930
Water Main - Tomkins Inglewood - 150 mm AC	$77,797
CI	**$109,248**
Water Main - Mclean St Goondiwindi - 250 mm CI	$109,248
Galv	**$12,401**
Private Line - Queen Inglewood - 75 mm	$12,401
PVC	**$67,721**
Water Main - Chilcott Inglewood - 150 mm PVC	$62,338
Water Main - Mcintyre West Inglewood From Albert St to bend	$5,383
RC	**$61,055**
Water Main - Herbert St Goondiwindi - 100 mm RC	$36,221
Water Main - Moffatt St Goondiwindi - 100 mm RC	$10,551
Water Main - Moffatt St Goondiwindi - 150 mm RC	$14,283
Grand Total	**$2,261,243**

Above Ground

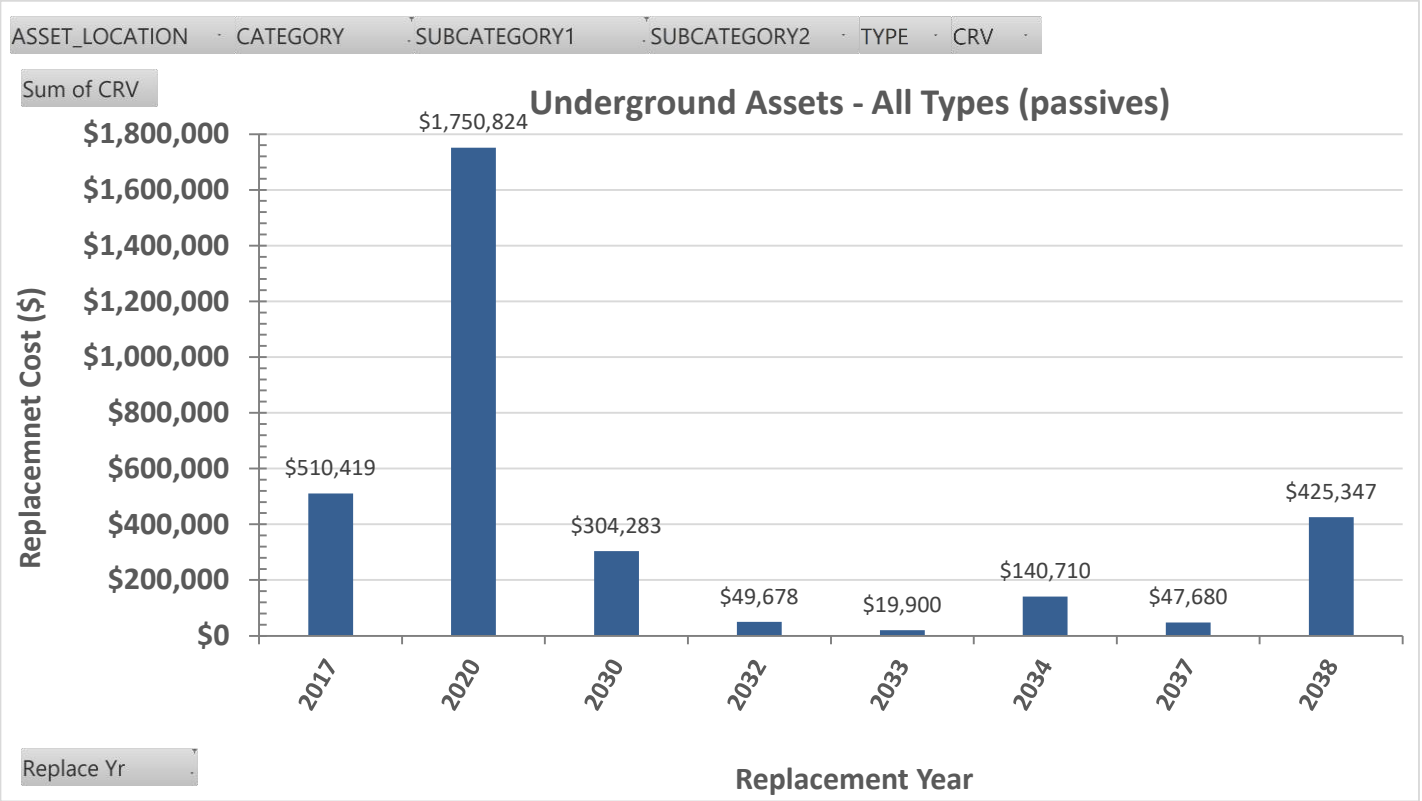
Year and Assets	Sum of CRV
2017	**$24,796**
Intake Works	***$24,796***
Bungunya Intake Works (Weir) Flowmeter	$2,861
Bungunya Intake Works Switchboard (Windamal)	$21,935
2018	**$19,109**
Reservoirs	**$13,157**
Goondiwindi Water Tower Francis Street Electrical	$13,157
Water Treatment Plant	**$5,952**
Inglewood WTP - Chemical Area 1000 litre coagulant tank	$2,442
Talwood WTP - Chemical Area Land Line	$3,510
2019	**$171,970**
Intake Works	**$58,423**
Bungunya Intake Works(Weir) Pump and Motor	$6,676
Talwood Intake Works Intake Works Pump/Motor	$46,709
Yelarbon WTP - Water Intake Works - Flowmeter	$5,039
Water Treatment Plant	**$113,546**
Goondiwindi WTP - Sed Tank - Switchboard	$103,286
Inglewood WTP - Electrical Switchboard	$3,903
Talwood WTP - Chemical Area Chlorine Pumps	$6,358
2020	**$54,313**
Reservoirs	**$32,515**
Talwood WTP - Security Fencing 1.8m high	$32,515
Water Treatment Plant	**$21,798**
Talwood WTP - Chemical Area Safety Bund	$5,484
Yelarbon WTP - Chemical Area Safety Bund	$6,526
Yelarbon WTP - Instrumentation Lab Flocculator	$9,789
2021	**$3,872**
Water Treatment Plant	**$3,872**
Inglewood WTP - Turbidity Meter Turbidity Meter	$3,872
2022	**$419,966**
Bore	**$7,040**
Texas Bore Water Bore Ancillaries	$576
Toobeah Bore Water Flow Meter to Tower	$6,464
Intake Works	**$157,584**
Bungunya Intake Works (Bungunya) Pump Control board	$21,935
Bungunya Intake Works Intake Works Switchboard	$37,755
Goondiwindi Raw Water Pump Station - Switchboard	$77,531
Yelarbon Water Intake Works Motor	$5,248
Yelarbon WTP - Intake Works - Pump and Motor 1 - 3.7 kW	$15,116
Pump Stations	**$101,478**
Goondiwindi Water Booster Pump Station Switchboard	$101,478
Water Treatment Plant	**$153,863**
Goondiwindi Settled Water Storage - Electrical	$26,712
Goondiwindi WFP - Dosing Regulator (x2) CHLORINE	$17,808
Talwood WTP - Chemical Area Pump And Motor	$3,861
Talwood WTP - Chemical System 1 - Pump And Motor	$15,181
Texas WTP Lagoon Pump	$8,857
Yelarbon WTP - Pressure Filter Pipework	$33,413
Yelarbon WTP - Town Water Motor 2	$16,707
Yelarbon WTP - Town Water Pump 2	$31,325
Grand Total	**$694,026**

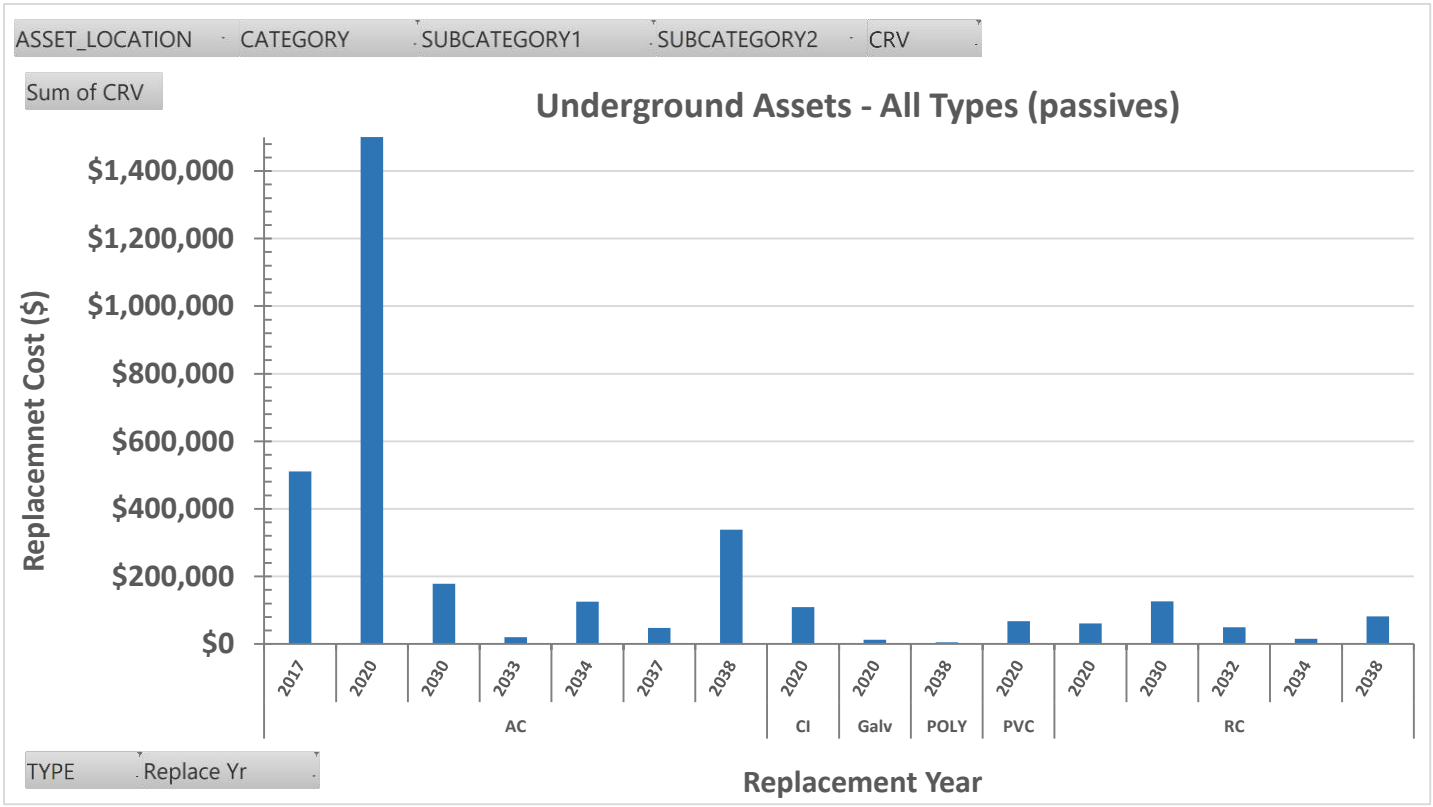
Appendix D Summary of Forecast Lifecycle Costings

	2017/2018	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Renewal Capex (FWP) Existing assets only	$764,000	$725,000	$725,000	$600,000	$550,000	$550,000	$550,000	$550,000	$550,000	$550,000	$550,000
Renewal Capex (SL)	$554,324	$171,970	$1,805,137	$3,872	$419,966	$535,092	$356,040	$2,096,261	$238,625	$109,123	$60,640
Accumulative Gap (FWP-SL) Positive is a short fall in funding. Negative is overspend (before condition or service requires).	-$209,676	-$762,706	$317,431	-$278,697	-$408,731	-$423,639	-$617,599	$928,662	$617,287	$176,411	-$312,950
Operations (FWP)	$1,373,967	$1,387,052	$1,400,262	$1,413,598	$1,427,061	$1,440,652	$1,454,372	$1,468,224	$1,482,207	$1,496,323	$1,510,574
Maintenance (FWP)	$655,901	$662,148	$668,454	$674,820	$681,247	$687,735	$694,285	$700,897	$707,572	$714,311	$721,114
Maintenance (SL)	$870,169	$870,169	$870,169	$870,169	$870,169	$870,169	$870,169	$870,169	$870,169	$870,169	$870,169
New Capex (FWP)	$420,000	$654,000	$679,000	$706,000	$734,000	$763,000	$793,000	$803,000	$857,000	$857,000	$0
Maintenance (New Capex)	$0	$8,829	$9,167	$9,531	$9,909	$10,301	$10,706	$10,841	$11,570	$11,570	$0

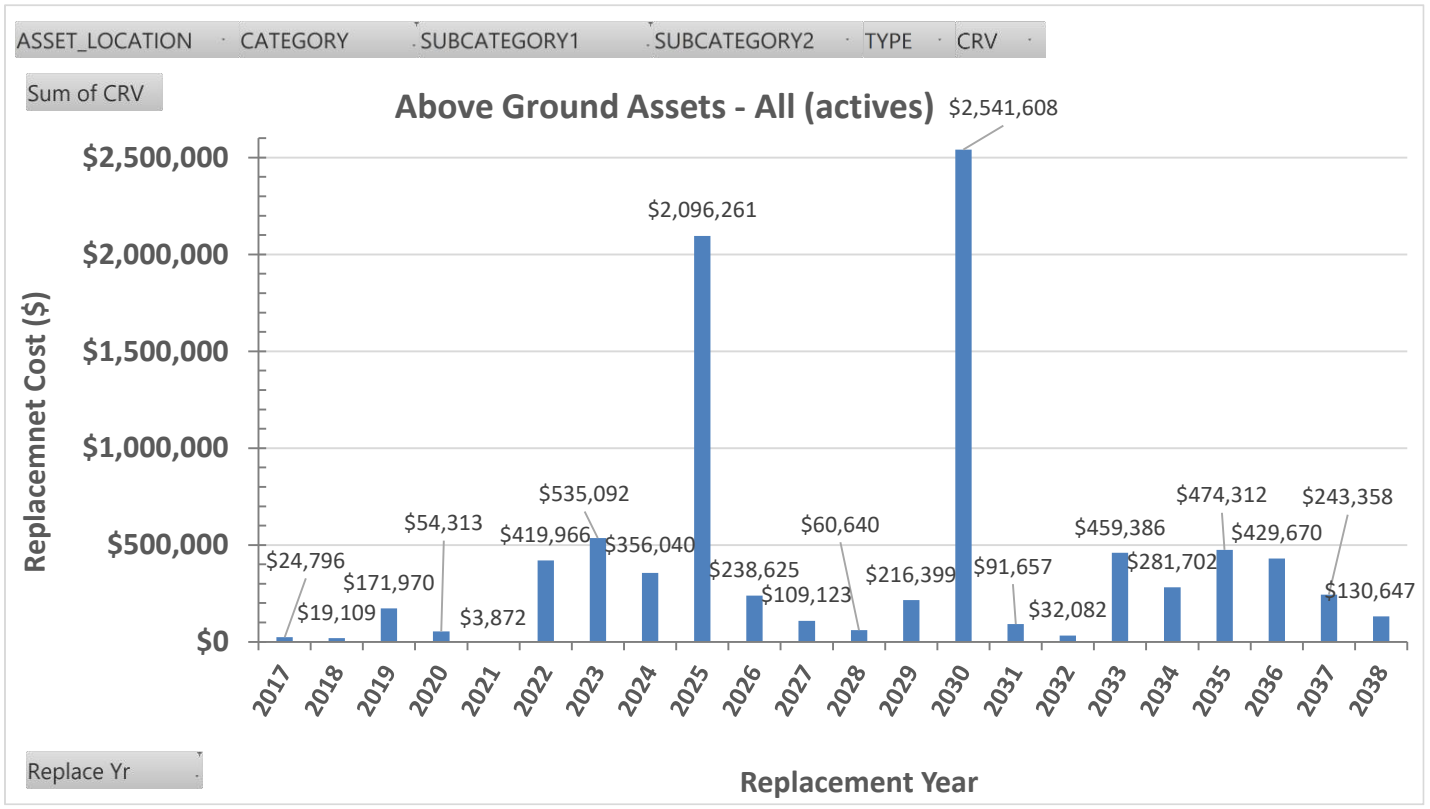
Appendix E 20 Years Renewals Profiles

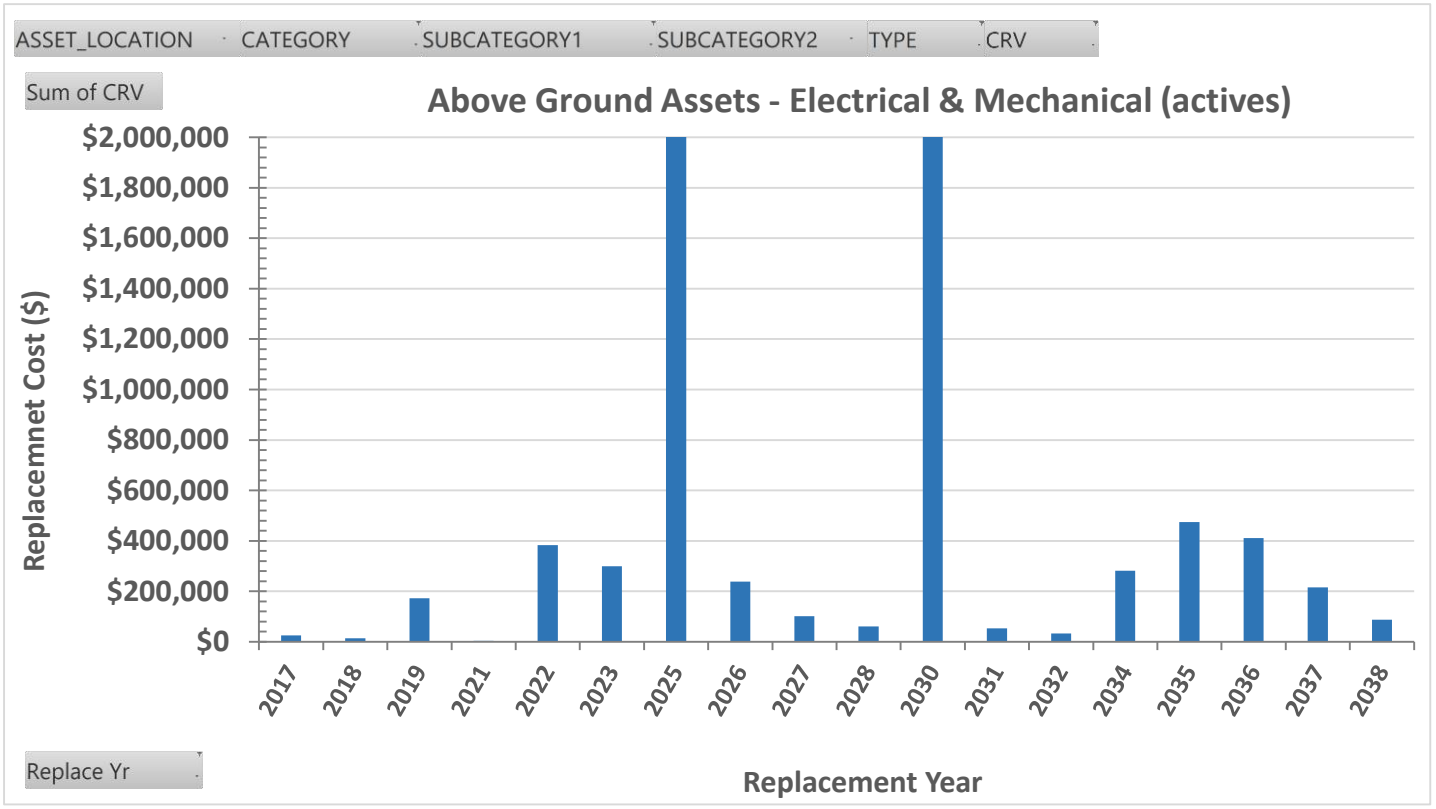
Underground

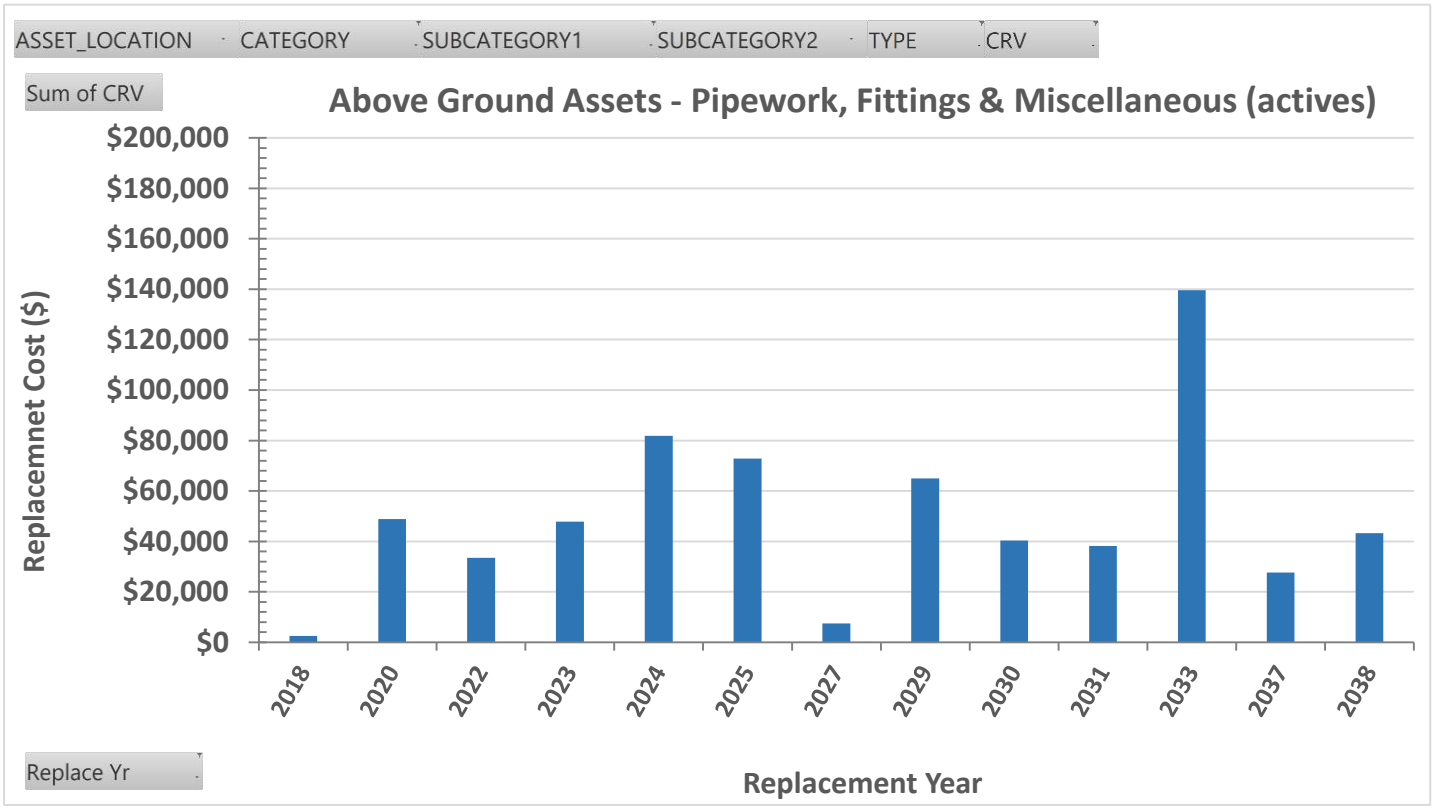




Above Ground




ASSET_LOCATION
CATEGORY
SUBCATEGORY1
SUBCATEGORY2
TYPE
CRV
Sum of CRV
Above Ground Assets - Electrical & Mechanical (actives)
$2,000,000
$1,800,000
$1,600,000
$1,400,000
$1,200,000
$1,000,000
$800,000
$600,000
$400,000
$200,000
$0
Replacemnet Cost ($)
2017
2018
2019
2021
2022
2023
2025
2026
2027
2028
2030
2031
2032
2034
2035
2036
2037
2038
Replace Yr
Replacement Year


ASSET_LOCATION
CATEGORY
SUBCATEGORY1
SUBCATEGORY2
TYPE
CRV
Sum of CRV
Above Ground Assets - Pipework, Fittings & Miscellaneous (actives)
$200,000
$180,000
$160,000
$140,000
$120,000
$100,000
$80,000
$60,000
$40,000
$20,000
$0
Replacemnet Cost ($)
2018
2020
2022
2023
2024
2025
2027
2029
2030
2031
2033
2037
2038
Replace Yr
Replacement Year