

Water Supply Asset Management Plan

May 2019

v 3.1

(Water & Wastewater Unit)

Version Control

This Document is a live Council document and is subject to periodic review. The validity and currency of the document is critical in applying its content as it contains significant asset management and performance data that is “real-time” based.

If you are reading this document please check the version date below to make sure that the document is correct.

Version	Version Date	Status
1.0	April 2011	Final Draft - Water Unit Submission to EMT
1.1	April 2011	Final Draft - Water Unit Submission to Council for Exhibition
1.2	May 2011	Amended Final - LOS for fire fighting requirements in Table 2
2.0	February 2013	Final Draft - Water Unit Submission to Manager Water
2.1	July 2013	Final Draft - Water Unit Submission to EMT
3.0	March 2019	Final Draft - Water Unit Submission to ELT
3.1	May 2019	Water Unit Submission to Council for adoption

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1 Introduction

1.1 Background

This Asset Management Plan (AMP) outlines how Tweed Shire Council meets their responsibilities and delivers their water services in a manner that is both functional and cost effective. It assists Council in the decision making process and is presented at a high level to provide key information that can be used in the determination of levels of service and funding required. The AMP is to be read with Council's Asset Management Policy, Asset Management Strategy and Asset Management Manual.

Water supply infrastructure assets covered in this AMP include:

- Dams and Weirs.
- Water Mains.
- Pump Stations.
- Reservoirs.
- Treatment Plants.

Further details of the water supply assets managed by Council can be found at Council's webpage at <https://www.tweed.nsw.gov.au/WaterAndWastewater>.

1.2 Review Period

This AMP will be reviewed every 4 years, commencing 1 July of each election year ready for public exhibition in April the following year.

1.3 Water Supply Principle Objectives

Council's principal objectives for the provision of water supply services are:

- To provide water supply services within a strategic business planning framework.
- To meet legislative requirement including licence requirements regarding surface and ground water supply extraction conditions.
- To provide additional system capacity to meet sustainable growth projections.
- To efficiently and sustainably operate the water supply systems.
- To provide an equitable, responsive and cost effective water supply service.
- To provide a high quality, reliable and sufficient water supply service.
- To promote water cycle education including conservation and reuse.
- To manage assets on a whole of life cycle cost basis to ensure the on-going effective provision of water supply services.
- To put in place a sound management regime for all matters relating to the provision of the water supply service.

Council has several roles with respect to water supply services:

- To co-ordinate the setting of community outcomes for water supply services.
- To monitor and report the progress that is being made towards achievement of those outcomes.
- To provide water supply services to the urban community.
- To properly manage the water supply assets.
- To ensure that all customers are provided with safe and adequate water supplies.
- To ensure that fire hydrants are installed in the reticulated areas, and that they are maintained and charged with water.

Council services the main urban communities of the Shire. Council works with the wider rural community to promote the use of alternative water supply systems such as rainwater tanks, groundwater sources and recycled water.

2 Current State of Council's Assets

2.1 Key Indicators

The extent of Council's water supply asset stock along with their replacement value as of 30 June 2018 is shown in

Table 1. These figures are updated annually, the latest figures can be found at Council's website at <https://www.tweed.nsw.gov.au/WaterFactsAndFigures>.

Table 1 Asset Key Indicators

Asset Class	Quantity	Gross Replacement Cost	Depreciated Replacement Cost	Percent Depreciated	Annual Depreciation Expense
Water Mains	720 km	\$364,101,098	\$311,747,998	14%	\$3,642,071
Pump Stations	25	\$23,718,001	\$13,341,148	44%	\$653,059
Reservoirs	35	\$45,402,453	\$33,730,841	26%	\$682,723
Dams & Weirs	1 Dam 2 Weirs	\$75,838,522	\$66,573,079	12%	\$452,600
Treatment Plants	3	\$100,160,581	\$78,925,387	21%	\$1,916,002
TOTAL		\$609,220,655	\$504,318,453	17%	\$7,346,455

2.2 Water Supply Status

The condition rating scales used for assessing Council's water supply assets¹ is shown in

Table 2.

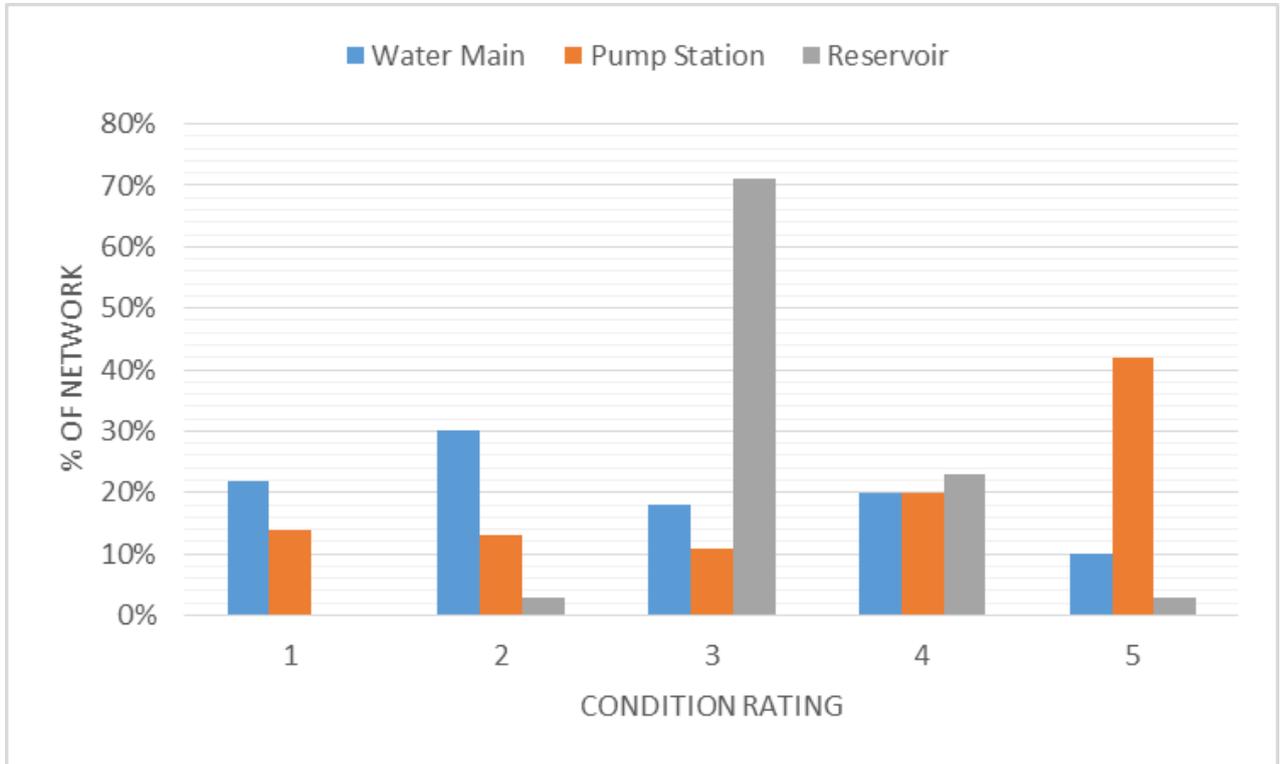
Table 2 Condition Grading

Condition Rating	Community Rating	Description of Asset Condition
1	Excellent	Excellent physical condition. Observable deterioration is insignificant. No adverse service reports.
2	Good	Observation and/or testing indicates that the asset is meeting all service requirements. Sound physical condition; minor deterioration/minor defects observed.
3	Fair	Moderate deterioration evident; minor components or isolated sections of the asset need replacement or repair now but not affecting short term structural integrity.
4	Poor	Serious deterioration and significant defects evident affecting structural integrity. Asset is now moving into zone of failure.
5	Very Poor	Failure imminent. Need to replace most or all of asset. Asset life less than or equal to its useful life.

¹ Treatments plants, dams and weirs are currently not assessed in this method.

The breakdown of each water supply asset class's condition rating as of June 2018, is shown in Figure 1.

Figure 1 Asset Class Condition Breakdown



The replacement value of each water supply asset class broken down into their condition ratings, as of June 2018, is shown in Figure 2.

Figure 2 Asset Class Condition Breakdown for Replacement Value

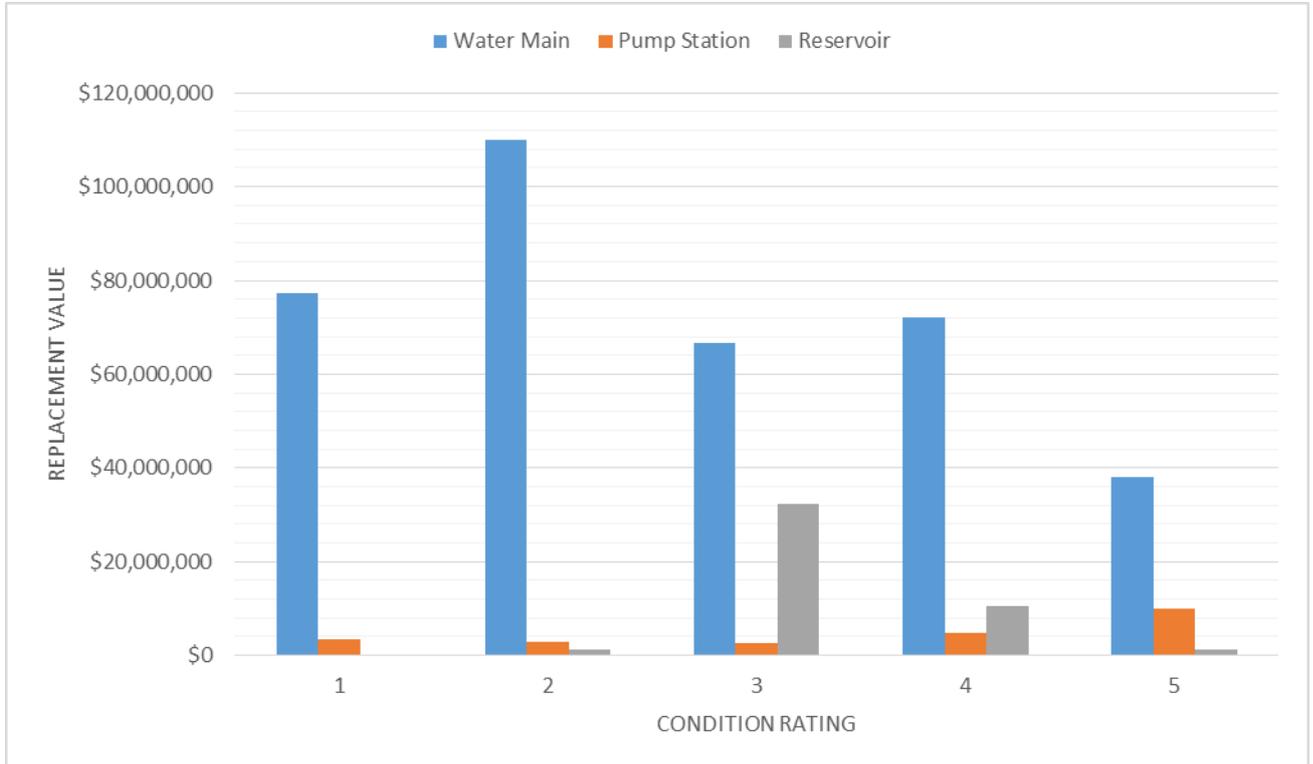
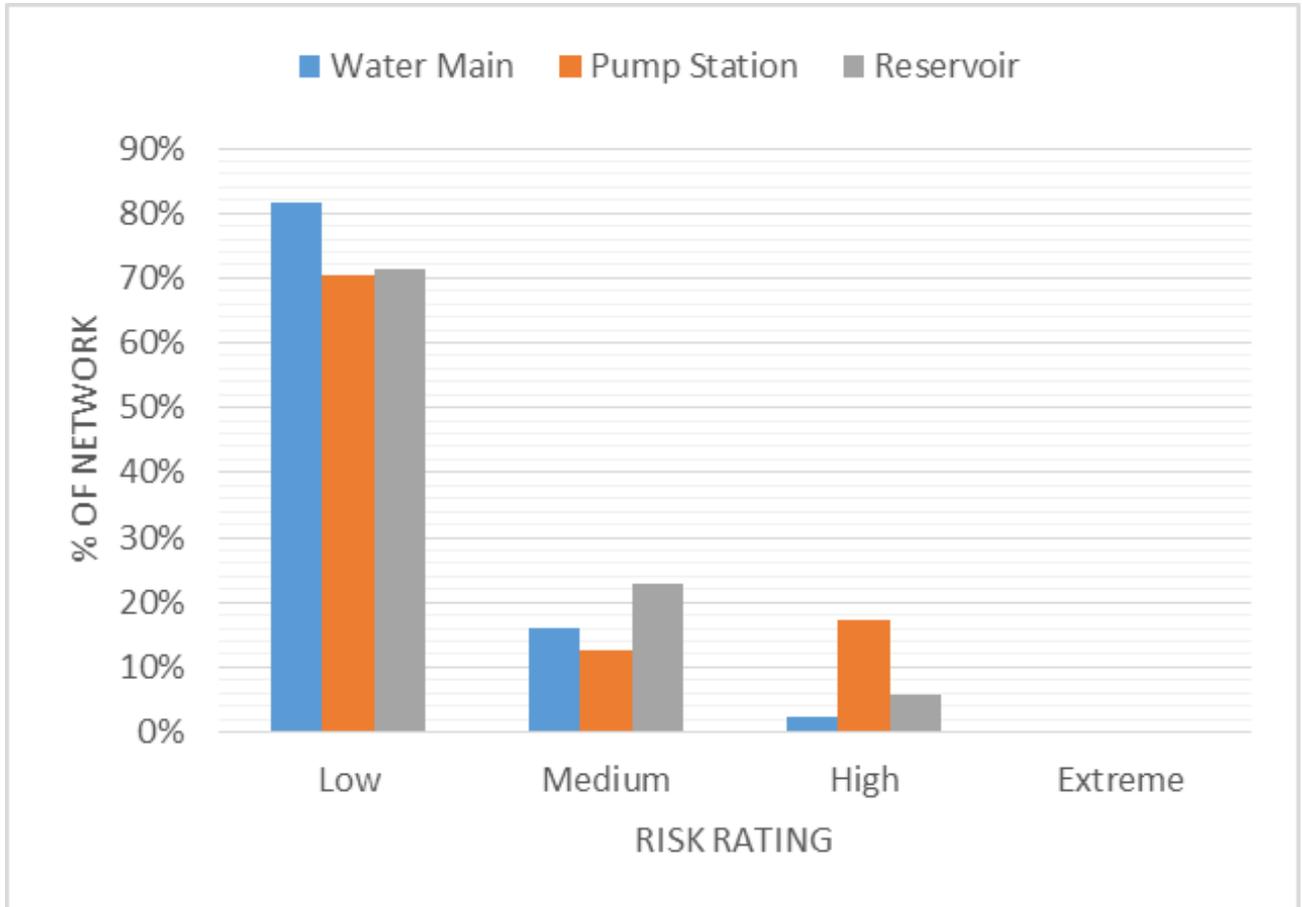


Figure 3 shows the breakdown of risk ratings for water supply asset classes as of June 2018. The risk rating has been determined using asset condition against consequence of failure; refer to 6.1 for further details.

Figure 3 Asset Class Risk Rating Breakdown



2.3 Asset Registers

Council has three asset registers, one register for maintenance management, the second for non-maintenance assets, and the third for financial reporting purposes.

The maintenance system, MEX, holds the majority of above ground and accessible assets, including mechanical and electrical equipment and their life cycle history information. Maintenance records for this equipment are entered into the database. This system has work procedures developed for mechanical and electrical equipment at treatment plants and pumping stations, however it is only in the very early stages of implementation for some civil and underground assets, such as critical control valves.

The assets that do not require regular maintenance, typically below ground assets such as water reticulation pipework, have their relevant spatial attributes and asset data contained in the Munsys Oracle spatial database and viewed through Weave.

The financial register, Assetic, is used for financial reporting purposes and contains a list of all Council's water supply assets grouped by financial classifications.

Overall, the confidence in the asset data registers is relatively high and is regularly reviewed and updated. This includes making sure that data is not captured for data's sake, and that resources are available to keep the data up to date.

3 Levels of Service

3.1 Legal and Regulatory Requirements

In determining levels of service Council needs to meet many legislative requirements, including Federal and State legislation and State regulations, along with industry best practises, standards and guidelines.

General legal and regulatory requirements for asset management are set out in the:

- Local Government Act 1993.
- Local Government Amendment (Planning and Reporting) Act 2009.
- Local Government (General) Amendment (Planning and Reporting) Regulation 2010.

Specific legal and regulatory requirements for water assets are listed below:

- Fluoridation of Public Water Supplies Act 1957.
- Dams Safety Act 1978.
- Environmental Planning and Assessment Act 1979.
- Water Supply Authorities Act 1987.
- Independent Pricing and Regulatory Tribunal (IPART) Act 1992.
- Protection of the Environment Operations Act 1997.
- Water Management Act 2000.
- Catchment Management Authorities Act 2003.
- Water Industry Competition Act 2006.
- Public Health Act 2010.
- Plumbing and Drainage Act 2011.
- Water NSW Act 2014.

Standards, guidelines and specifications relevant to water assets are:

- Guidelines for Best Practice Management of Water Supply and Sewage 2007.
- Australian Drinking Water Guidelines 2011.
- WSA Water Supply and Sewer Codes.
- ISO 55001 Asset management – Management systems – Requirements.

3.2 Operational Level of Service

Table 3 details customer's expectations for the water supply service and Council's service indicators and target levels. The information is grouped under service attributes for the quadruple bottom line categories of environment, social/cultural, economic and governance.

Table 3 Water Supply Levels of Service

Quadruple Bottom Line	Service Attributes	Customer Expectations	Level of Service Indicator	Target
Environment (protecting the environment)	Sustainable	Potential environmental impacts will be identified and properly managed by Council in providing and managing the service.	Energy consumption	< 180 kWh per 1000 connected assessments
				< 160 net tonnes CO2 (equivalents of GHG emissions per 1000 connected assessments)
	Efficient		Percentage of unaccounted for water.	< 10% of annual treated water production volume.
			Average annual residential water supplied (kL/property)	180 kL/year
			Average annual water supplied (L/p/day)	300 L/p/day
			Percent increase in annual volume of water extracted	< percentage increase in population growth
			% of extracted water treated and delivered to system	> 95%
Social/cultural) (supporting community life)	Quality	Connected properties will receive good quality drinking water delivered under pressure, which is clear and has no obvious taste or smell.	Percent of time treated water supplied to ADWG.	100%
			Number of water quality complaints	< 3 per 1,000 connected assessments per year
			Number of moderate / major water public health incidents.	Nil

Quadruple Bottom Line	Service Attributes	Customer Expectations	Level of Service Indicator	Target
Social/cultural) (supporting community life)	Reliable	Connected properties can be assured of a continuous supply.	Unplanned interruption time.	Service to 95% restored in < 5 hours.
			Notified Planned interruption time.	Service to 95% restored in < 12 hours.
			Number of unplanned interruptions.	< 35 per 1000 connected assessments per year.
			Number of water main failures.	< 10 breaks per 100 km of mains per year.
			Number of water service connection failures.	< 10 breaks per 1000 connected assessments per year.
			Meets 5/10/10 Rule	Duration < 5% of the time Frequency < 10% of years Reduction in demand > 10%
	Available	Properties designated rateable to water supply are able to connect to the system.	Residential water services installed in 10 working days of application	100%

Quadruple Bottom Line	Service Attributes	Customer Expectations	Level of Service Indicator	Target
	Sufficient	Council will provide a water supply service of sufficient capacity	Percent of properties meeting a minimum flow of 4.5 L/min and pressure of 200 kPa at the property boundary	100%
			Maximum water pressure at the property boundary of 780 kPa.	100%
			Percent of properties meeting design flow and pressure as determined from the current land use zoning density and Council's publicised design criteria	100%
		Water will be provided (and appropriately located) for firefighting.	Minimum flow and water pressure at hydrant for firefighting	11 L/s. at 150 kPa (residential) 22 L/s. at 150 kPa (commercial, industrial, high rise) 15 L/s. at 150 kPa (local commercial)
		Council will ensure assets are of sufficient capacity	Inspection of assets acquired from land developers prior to Council's acceptance.	100%
Economic (strengthening the economy)	Capacity	Council will provide a water supply service sufficient to meet planned demand.	Planned annual capital expenditure for growth.	> 85%
	Affordable	The service is being provided at a reasonable cost.	Annual bill based on 200 kL/annum will be comparable across region and metropolitan centres	< 10% annual increase

Quadruple Bottom Line	Service Attributes	Customer Expectations	Level of Service Indicator	Target
Governance (civic leadership)	Responsive	Information and requests in relation to the service and complaints will be dealt with properly and in a timely manner.	Notification time for planned interruptions to affected connected assessments.	> 48 hrs
			Availability of information on problems with water supply	Information on problem provided on Council's Service Centre line within 30 mins.
	Equitable	Customers are treated equally with charges fairly calculated and applied.	A user pays system is implemented (fixed service charge and pay for each kilolitre of water used)	Annual review and adoption of user pays tariff charges
	Compliant	Council meets its legislative requirements.	Number of occurrences where legislative requirements are not met	Nil
	Effective	Customers satisfied with the level of service provided.	Number of water supply system customer requests	< 30 per 1000 connected assessments

4 Managing Demand into the Future

Planning for future growth and demand is imperative to provide economically sustained services to meet the future needs of the region. Council recognises that future demands for water supply services will be influenced by:

- Population growth and demographics.
- Changes in community expectations.
- Industrial demand.
- Technological change.
- Changes in legislation.
- Integrated Water Cycle Management initiatives.

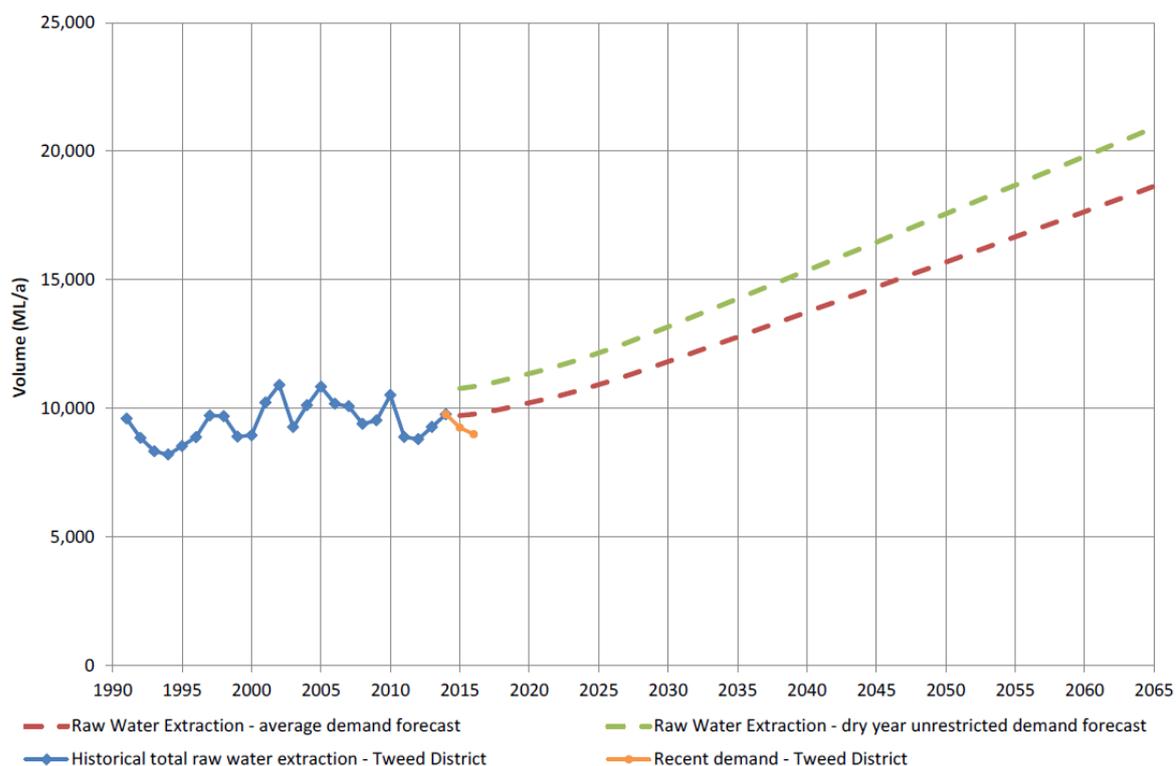
Demand for new services will be managed through a combination of managing existing assets, upgrading of existing assets and providing new assets to meet demand and demand management. Demand management practices include non-asset solutions, insuring against risks and managing failures.

In addition to assets constructed by Council, new water supply assets are also acquired from land developments. Acquiring these new assets commits Council to fund the additional operating, maintenance and renewal costs associated with the assets. Council undertakes hydraulic modelling to determine what infrastructure is required to service new development and maintain levels of service for existing customers.

The Water Efficiency and Demand Management Review, Part 1: Review of Efficacy of Demand Management Strategy and Implementation Plan (Hydrosphere Consulting, 2017) report was compiled to comprehensively analyse historical and future demand. An extract from this report is shown in Figure 4 for the comparison of recent demand with the Tweed District demand forecast (Hydrosphere Consulting, 2014). The entire report can be found at Council's website at <https://www.tweed.nsw.gov.au/DemandManagement>.

A review of Council's current water supply strategies is about to commence and is expected to be completed by February 2020. This will further Council's understanding and assist with managing demand for water supply services into the future.

Figure 4 Comparison between recent demand and the demand forecast: Tweed District



5 Operations and Maintenance Plans

5.1 Operations

The purpose of Operations is to ensure that service objectives (Levels of Service, statutory & regulatory requirements and obligations) are achieved at the least cost and that the impact of any breakdowns or outages is minimised.

Existing operational systems, processes and procedures routinely deliver services that comply with levels of service and regulatory requirements. Rapid changes in the operating environment in terms of customer expectations, improved environmental outcomes, resource conservation, and higher regulatory standards will require commensurate improvements in operations.

Key operational matters include:

- Asset condition and monitoring program.
- Monitoring of operational performance.
- Review and document operating procedures.
- Implementation of mains and reservoir cleaning program to maintain water quality as part of ongoing operations procedures.
- Conducting a review of energy usage.

Operational activities are those regular activities that are required to continuously provide the service including asset inspection, dam surveillance, water quality testing, telemetry systems, cleaning, valve exercising, scouring/flushing, electricity costs, plant and overheads.

5.2 Maintenance

Maintenance covers all actions necessary for retaining an asset as near as practicable to an appropriate service condition whilst minimising risk of failure until the end of their useful life. It includes instances where portions of the asset fail and need immediate repair to make the asset operational again but excludes rehabilitation or renewal.

Maintenance includes reactive, planned and specific maintenance work activities.

- Reactive maintenance is unplanned repair work carried out in response to service requests. It includes undesired breakdowns as well as maintenance for less critical assets that are intentionally run to failure and for situations where scheduled maintenance is not possible.
- Planned maintenance is repair work that is identified and managed through a maintenance management system maintenance which can be fixed-time intervals or condition based intervals (e.g. every 10,000 pump run hours). These activities are programmed based on inspections, 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.
- Specific maintenance is replacement of higher value components/subcomponents of assets that is undertaken on a regular cycle including repainting, building roof replacement, etc. This work generally falls below the capital/maintenance threshold.

Current maintenance expenditure levels are considered to be adequate to meet required service levels. Assessment and prioritisation of reactive maintenance is undertaken by operational staff using experience and judgment.

5.3 Operations and Maintenance Strategy

Council will operate and maintain assets to provide the defined level of service to approved budgets in the most cost-efficient manner. The operation and maintenance activities include:

- Scheduling operations activities to deliver the defined level of service in the most efficient manner.
- Undertaking maintenance activities through a planned maintenance system to reduce maintenance costs and improve maintenance outcomes. Undertake cost-benefit analysis to determine the most cost-effective split between planned

and unplanned maintenance activities (50 – 70% planned desirable as measured by cost).

- Maintain a current infrastructure risk register for assets and present service risks associated with providing services from infrastructure assets and reporting Extreme and High risks to management and Council.
- Review current and required skills base and implement workforce training and development to meet required operations and maintenance needs.
- Review asset utilisation to identify underutilised assets and appropriate remedies, and over utilised assets and customer demand management options;
- Maintain a current hierarchy of critical assets and required operations and maintenance activities.
- Review and update as required Operations and Maintenance Manuals.
- Develop and regularly review appropriate emergency response capability.
- Review management of operations and maintenance activities to ensure Council is obtaining best value for resources used.

6 Capital Renewal Plan

Renewals works are capital work on an existing asset to replace or rehabilitate it to a condition that restores the capability of the asset back to an acceptable level of service.

Council preforms renewal analysis based on broad assumptions and best available knowledge to date. Modelling is not an exact science and deals with long term averages across the entire asset stock. Work will continue on improving the quality of our asset registers and systems to increase the accuracy of our renewal models. Renewal work is carried out in accordance with Water Services Association of Australia (WSAA) standards and plumbing codes.

Council's water supply asset renewal policy is risk based. Subsequently, asset renewal determination is a combination of consequence of failure and condition. As a result of this policy:

- Some high risk assets will be replaced before they reach their useful life.
- Some low risk assets will remain in service past their useful life and will not be replaced until they become a maintenance problem.

6.1 Prioritising Renewals

Assets requiring renewal will generally be identified from estimates of remaining life and condition assessments obtained from the asset register and models. Assetic Predictor is used to predict at what time in the future an asset will require replacement based on this risk matrix shown in Table 4:

Table 4 Risk Matrix

		CoF				
		1	2	3	4	5
OCG	6	Low	Medium	High	Extreme	Extreme
	5	Low	Medium	High	Extreme	Extreme
	4	Low	Low	Medium	High	Extreme
	3	Low	Low	Low	Medium	High
	2	Low	Low	Low	Low	Medium
	1	Low	Low	Low	Low	Low
	0	Low	Low	Low	Low	Low

Asset Consequence of Failure (CoF) is determined using a number of factors including:

- Environmental impact.
- Type of customer.
- Disruption to customers.
- Disruption to transport.
- Risk to public health and safety.
- Difficulty of repair.
- Quantity spilt to environment.
- Occupational health and safety.

Overall Condition Grade (OCG) is calculated from a number of condition grades:

- Course Condition Grade (CCG) based on age versus useful life.
- Performance History Grade (PHG) based on the service history of the asset (number and frequency of failures).
- Field Condition Grade (FCG) based on observed physical condition of an asset obtained from repairs carried out, programmed inspections and pipe thickness measurements.

Asset replacements are programmed as follows:

- Extreme Risk – In the financial year its risk is first predicted as Extreme.
- High Risk – In the period between the first year its risk is predicted as high and before the first year its risk is predicted to become Extreme.
- Medium/Low Risk –When the asset becomes a maintenance problem based on its service history.

7 Asset Funding Levels

7.1 Forecast 10-Year Funding Required

The Long Term Financial Plan for Council's expenditure on renewals, growth and operating of water supply assets over the next 10 years as of July 2018 is shown in Table 5. This 10 year forecast is updated annually, the latest figures refer to Council's webpage at <https://www.tweed.nsw.gov.au/WaterFactsAndFigures>.

Table 5 10 Year Funding Forecast

Year	Renewal Expenditure	Growth Expenditure ²	Operating Expenditure
2019	\$7,320,025	\$4,942,500	\$21,748,164
2020	\$2,039,445	\$13,278,000	\$21,523,417
2021	\$2,155,819	\$11,024,000	\$21,702,897
2022	\$1,904,416	\$9,110,000	\$22,041,096
2023	\$8,643,738	\$26,176,000	\$22,581,773
2024	\$8,940,159	\$24,060,000	\$23,165,708
2025	\$17,066,625	\$11,044,500	\$23,533,796
2026	\$13,555,326	\$2,200,000	\$23,853,494
2027	\$8,371,695	\$511,600	\$24,430,843
2028	\$18,555,409	\$1,434,700	\$25,142,777
Total	\$88,552,657	\$103,781,300	\$229,723,965

² Where a project incorporates both renewal and growth components, 100% of project costs are reported under Expenditure Growth.

7.2 Financial Ratios

Infrastructure asset management performance indicators for water supply assets are calculated annually and are published in Council's financial statement under special schedule 7. The latest financial statement is published on Council's webpage at <https://www.tweed.nsw.gov.au/ManagementPlan>. These indicators are a requirement of the Code of Accounting Practice and Financial Reporting under Special Schedule 7. The financial ratios used for performance indicators include:

- Infrastructure renewal ratio.
- Infrastructure backlog ratio.
- Asset maintenance ratio.
- Cost to bring assets to agreed service level.

8 Improvement Plan

Ongoing monitoring, review and updating of this plan is undertaken to improve the quality of asset management planning and accuracy of the financial projections. This process uses improved knowledge of customer expectations and enhanced asset management processes, systems and data to optimise decision making, review outputs, develop strategies and extend the planning horizon.

The priority asset related improvement actions over the next 4 years considered to be the most important for delivery of the water supply service are listed in Table 6.

Table 6 Improvement Plan

Delivery Programme Key Actions	Responsibility	Financial Year			
		18/19	19/20	20/21	21/22
Formally document risk based asset renewal planning process	Engineer, Asset Management	X	X		
Review current supporting Asset Management documentation with view of consolidating and streamlining into new process and procedural documentation	Engineer, Asset Management	X	X		
Continue to extend coverage of risk based asset renewal planning to treatment plants	Engineer, Asset Management		X	X	X

Delivery Programme Key Actions	Responsibility	Financial Year			
		18/19	19/20	20/21	21/22
Continue to enhance drawing register and develop process for capturing and storing asset information	Engineer, Asset Management		X	X	X
Improve condition assessment of major trunk mains	Engineer, Asset Management		X	X	X
Develop high level criticality assessments of treatment plants to determine critical spares, conditioning monitoring programs and renewal plans	Engineer, Asset Management		X	X	X
Develop a consistent data structure for linkage of the maintenance and financial asset registers	Engineer, Asset Management		X	X	X

END OF REPORT





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