Asset Management Plan Wastewater

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Contents

1 EXECUTIVE SUMMARY

Shoalhaven City Council has responsibility for the provision of wastewater services in most urban areas of the Shoalhaven Local Government Area (LGA). Council meets these responsibilities and delivers water and wastewater services through Shoalhaven Water, a defined Business Group of Council.

Shoalhaven Water seeks to manage the assets associated with the provision of wastewater services in a manner that meets the agreed level of service in the most cost-effective manner for present and future consumers.

This Asset Management Plan (AMP) has been developed to provide a sustainable approach to the management of wastewater assets (and the services provided by those assets) for the Shoalhaven LGA. This AMP is prepared under the umbrella of Council's Community Strategic Plan and its vision, mission, objectives and strategies. This AMP is a support document to Council's Delivery Program and Operations Plan and complements the overall Shoalhaven Water Strategic Business Plan to ensure that the facilities are provided within economic, environmental, and social sustainable criteria.

The asset replacement value for all wastewater assets is over $900M. The wastewater asset base is generally in good condition; however, capacity limitation of major treatment facilities will drive renewals because of significant increase in demand along the coastal fringe which is impacted by high tourist demand during holiday periods. Further quantitative analysis is also required for some areas to determine the condition of underground assets.

The focus of the capital works program in recent years has been the Major upgrades of Nowra & Bomaderry STP which were completed in 2020 and the construction of new wastewater schemes to un-serviced areas (known as backlog areas) in Woollamia and Coolangatta (Completed 2020). Current work includes the expansion of the wastewater network to new urban release areas in Badagerang. This project includes new pumping stations and major pipelines to the Bomaderry STP. Other capital works projects include pipeline relining and replacement programs, emergency storages, at critical sewer pumping stations and future urban release areas such as Mundamia, Cabbage Tree Lane and Culburra.

1.1 Key Achievements

The asset management improvements achieved since 2011 are summarised briefly below:

- Review of Shoalhaven City Council Asset Management Strategy & Plans
- Asset management maturity assessment 2021.
- Adoption of a Community Engagement Policy, customer surveys and reporting.
- Critical Assets and customers being mapped into GIS.
- Development of an Asset Information Framework.
- Implementation of a Capital Investment Framework and Prioritisation Methodology and documentation of the business processes and policy.
- Implementation of project management framework and methodology
- Development of improved long term financial planning
- Water and Wastewater, Development service plans & servicing strategies to provide a program for system augmentation and capital works.
- Asset Criticality Framework and Management strategies, Criticality Framework Implementation and Critical Assets Management Strategies.

- Development of a Framework for the Water and Sewer Asset Management Plans.
- Development of Shoalhaven Water's Asset Management Steering Committee and a Terms of Reference.
- Asset Data Hierarchy Review.
- Asset Information Confidence Rating.
- Development of Customer Service Plan
- Adoption of the WSAA NSW Regional Water & Sewer Codes
- Componentisation of complex assets in AMS
- Asset valuation at component level
- Development of unit rate cost database
- Development and implementation of an integrated Asset Management System (Tech One).
- Development of the Investment Review Committee and PPM capability
- Development and implementation of works management system in TechOne and WorXOnline program.
- Schedule Maintenance Program Development

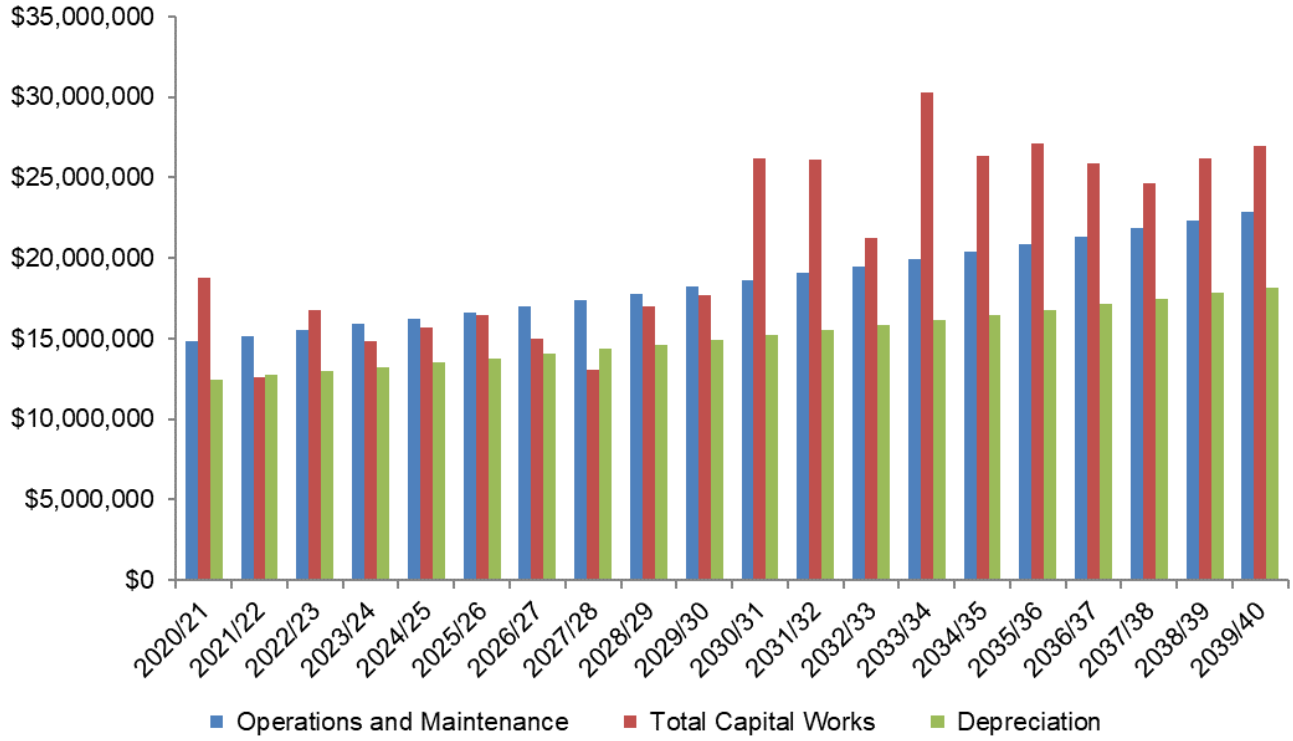
As the integration of Council's various information technology systems becomes more mature, this asset management plan will be improved through access to more data. Future improvements are now focused on the development of scheduled maintenance within the TechOne works system, the ongoing development of our dam safety management system, improved operation and maintenance of critical infrastructure and risk management.

The detailed actions to improve this asset management plan and to take it to an advanced approach are set out in Section 11.

1.2 Forecast Key Projects and Financials

Shoalhaven Water is in the process of developing Water and Wastewater Servicing Strategies to replace the June 2013 document. This project includes the development of detailed hydraulic models for both water supply and sewerage services. These documents provide an understanding of the demand for wastewater services over the period from 2024 – 2054 and assist to identify the capital works requirements to accommodate this growth. The demand for wastewater services is expected to increase over the period to 2054 with the highest growth rate anticipated in the Nowra/Bomaderry area as demonstrated in Section 5.4 of this AMP. The current 20-year financial plan allows for a capital works program of $370 M which includes renewals, growth and asset enhancement works. The overall expenditure profile is shown below.

Figure 1-1 20-Year Financial Forecast (June 2022)



The key capital works projects are summarised below

Table 1-1 Key Projects, Costs and Timing (full list is available in appendix)

Project	Expenditure Category	Approximate Project Cost and Timing ($M)					
		2023/24	2024/25	2025/26	2026/27	2027/28	2028/29
Sewer Electrical Cabinet Upgrades	Renewal		0.75	0.3	0.3		
St Georges Basin STP Upgrades	Renewal	0.1			1	1.9	
Ulladulla STP Upgrades	Renewal	0.1	0.5	1	4	10	10
Mundamia SPS N-F4 - RM and GM	Growth			4.5			
Nowra Lyrebird SPS2 GM Upgrade	Growth	0.2		1.8			
Sussex Inlet STP Augmentation	Growth				1.5	2.0	
South Nowra Surcharge Main Upgrades	Renewal	5.1	5.6	5.2			
Moss Vale Rd expansion area - WWtr	Growth	3.0					
Huskisson SPS 7 & Rising Main Upgrade	Renewal	2.9	3.2				
Culburra STP Upgrades	Growth			3	5	5	5
Erowal Bay Sewer Protection	Enhancement	1.7					
Tomerong Sewer Scheme	Enhancement				0.5	1	5

Expenditure for renewal projects will dominate the capital expenditure over the next 10 to 15 years. To support that further work is required to develop more robust projections of future best practice, particularly in the mechanical and electrical areas and condition assessment data to target renewals programs. The implementation of the scheduled maintenance and improvements in works management (TechOne) will remedy issues associated with data management from field inspections.

1.3 Future Improvements

The following key asset management improvements are planned for the next three-year period.

- Progressively update the new AMP framework.
- Regular updates to Shoalhaven Water's Asset Management Strategy.
- Develop a Replacement Costs Reference Database.
- Develop a water and wastewater Capital Program Plan for projects approved within the program (eg over 4-5 years) and those projects that fall outside of the program to be undertaken at a later date.
- Develop and implement a proactive operational, maintenance and renewals program using scheduled maintenance programs. The initial focus on the most critical assets as identified in the critical asset identification process, as per the critical asset policy and implementation project.
- Review of Asset Information Handover Procedures and Asset Data and Drawing Standards.
- Undertake analysis to determine success rates and criteria for measuring future investment benefits.
- Continue to develop a risk register and risk action plan for Risk Management.
- Implement the identified management actions as specified in the Critical Assets Management Strategies Report.
- Improve data gather using mobile device inspection and condition assessment capacity for works management system.

2 INTRODUCTION

2.1 Background

Shoalhaven City Council has responsibility for the provision of wastewater services for the Shoalhaven Local Government Area (LGA). Council exercises its wastewater functions under Division 2 Part 3 Chapter 6 Local Government Act 1993. Council ensures its legal and regulatory requirements are met, and delivers water and sewerage services, through Shoalhaven Water, a defined Business Group of Council.

The purpose of this Asset Management Plan (AMP) is to formally document the management philosophy that is applied to all of the Shoalhaven's wastewater assets. This approach ensures that acceptable levels of service are provided in the most cost-effective manner. AMPs are a key component of the strategic planning and management of Council, with links to the Shoalhaven Water Strategic Business Plan and Community Strategic Plan.

2.2 The Shoalhaven Region

Shoalhaven, although designated a city, is a dispersed region of 4,567 km2 in the south-eastern coastal region of New South Wales, spread over 125 km of coastline with most of its population located in the north-east around Nowra/Bomaderry and along the coast at; Jervis Bay, Saint Georges Basin, and Sussex Inlet, and Milton/Ulladulla. The estimated resident population of the City of Shoalhaven for 2022 is 107,857.

Shoalhaven is bordered by the mountains, coastal plains and 109 magnificent beaches, and includes 49 towns and villages. From Sydney, it's an easy two hours' drive 160 km south, and from Canberra, it's a two and a half hour's drive north of around 200 km.

2.3 Economy

The Shoalhaven has a mature but growing economic base. With broad diversity in many value adding sectors such as aircraft maintenance and overhaul, general manufacturing and logistics, the economic base is supported by domestic and international trade. Government administration and services are strong as is education, health and the construction industry. Many localities are also highly oriented to tourism and retail.

2.4 Population Growth

Population growth, based on in-migration from metropolitan areas, continues to grow the labour force and provide extension to existing and new businesses. A skilled workforce supports the business base and utilises the resources of local training facilities of the University of Wollongong and TAFE NSW.

The Shoalhaven population forecast for 2022 is 107,857 and is forecast to grow to 137,673 by 2051 (.idcommunity).

The growth and demand section shows how the population, age structure and household types will change each year between 2022 and 2051. The forecasts are designed to provide community groups, Council, investors, business, students and the general public with knowledge to make confident decisions about the future.

These forecasts were last updated in 2022 by .id, the population experts, on behalf of Shoalhaven City. Forecasts are available for each year from 2016 to 2051 which an estimated 21.6% increase https://forecast.id.com.au/shoalhaven

2.5 Overview of Asset Management Planning

2.5.1 Goals and Objectives of Asset Management

Effective asset management includes the planning, creation, operation, maintenance and review of assets over their whole life cycle to achieve the required Levels of Service at an affordable cost while satisfying corporate goals and statutory/regulatory requirements. Council acquires assets via purchase by contract, construction by Council staff and by handover of assets by developers.

The AMP delivers a range of benefits to the community as well as to the provider of the services, the main ones being:

- Maintain, replace and develop assets over the long term to meet required delivery standards and foreseeable future needs at minimal cost
- Continually improve asset management practices and service delivery to the customers
- Comply with strategic and regulatory requirements.

The NSW Government is currently reviewing the Water Industry Regulations and the Last Resort Provider Provisions for the Water Industry Competition (General) Regulation. As these reviews are ongoing this Asset Management Plan does not include any requirements, comments or recommendations which may impact on Shoalhaven Water as a result of being appointed as an “Operator of Last Resort”. When these reviews are finalised and a regulatory requirement become clear, a more detail response will be provided in future revisions of this document.

2.6 AMP Timeframes and Development

This AMP covers a 20 year timeframe from July 2024 until June 2054.

The original version of the Wastewater AMP was completed in Sep 2015 and is updated annually. Major updates are completed every 3 to 5 years depending on changes within the AMS. It has been developed with collective input from Shoalhaven Water Staff and Consultants. Much of the content has been derived from, existing plans, reports, and research.

This AMP will be reviewed prior to annual budget preparation and amended to recognise any changes in service levels and/or resources available to provide those services as a result of the budget decision-making process.

2.7 Roles and Responsibilities

Shoalhaven Water has established an Asset Management Steering Committee (AMSC). The purpose of the AMSC is to ensure that there is an effective level of governance in place to drive the asset management improvements required within Shoalhaven Water. The AMSC has responsibility for the business enhancement project tasks associated with Shoalhaven Water's Asset Management Capability – Progress Update (Sep 2014). These improvement tasks are given in the Plan Improvement (Section 11) in this AMP. The AMSC is responsible for providing and endorsing project rationale and objectives, making investment decisions, defining and realising benefits, and monitoring risks, quality and timeliness.

The AMSC consists of the following permanent members:

- Executive Manager Shoalhaven Water (Executive Sponsor)
- Water Asset Planning & Development Manager (Project Sponsor)
- Unit Manager Portfolio and Assets (Committee Chair)
- Water Operations Manager
- Water Business Manager
- Finance Business Partner
- Unit Manager Water Capital Portfolio

The AMSC will invite other representatives to attend meetings as required, including but not limited to the External Advisor (as required).

The AMSC meets monthly for approximately 1 to 2 hours, or at any point throughout the project where key information or a key decision is to be made and the timing of the next meeting would result in an untimely delay in the decision-making process.

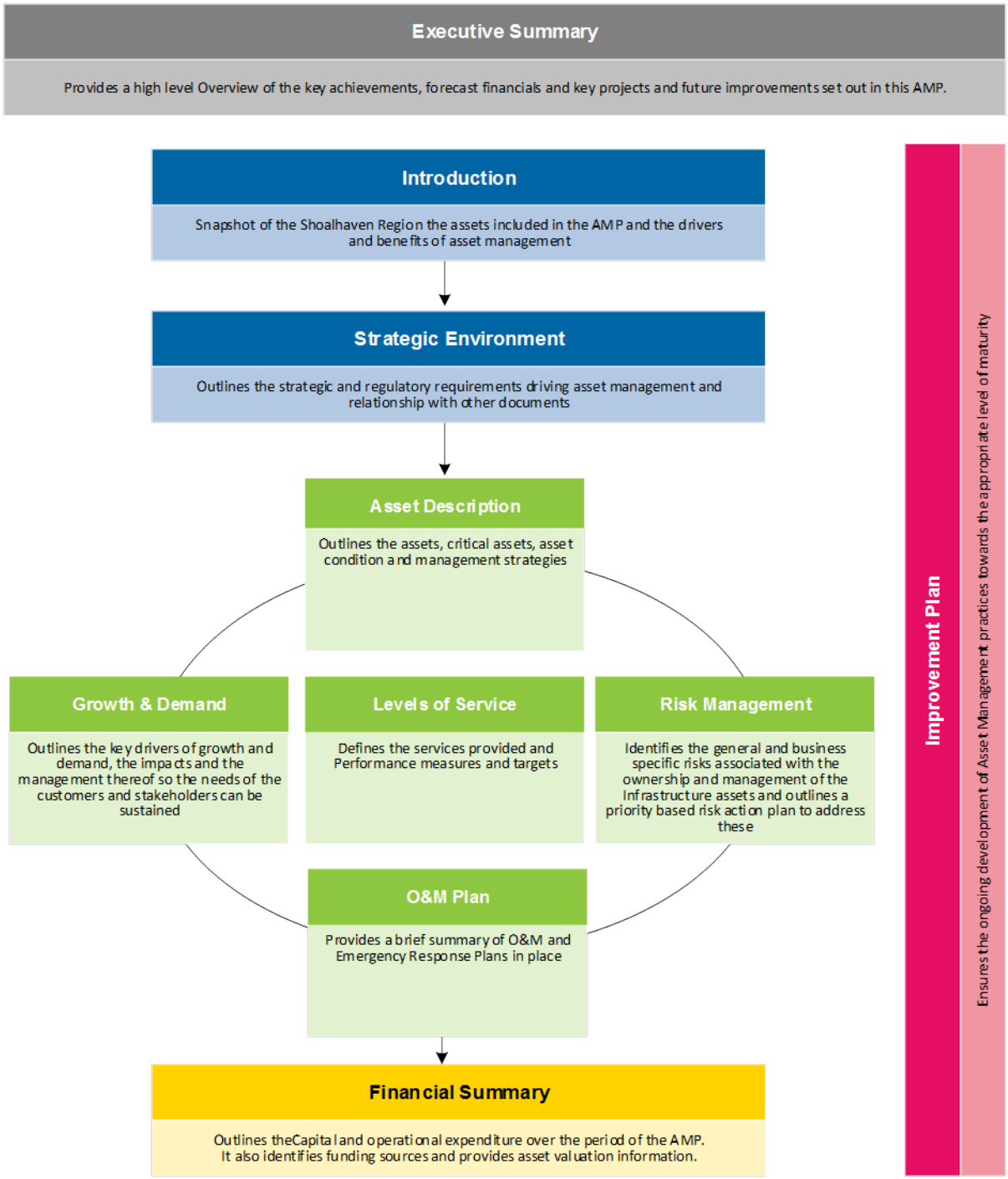
A Terms of Reference (April 2015) document provides overarching purpose and focus to the AMSC.

Minutes, agenda and other relevant information from the AMSC is located on Council's electronic filing system HPE Content Manager and on Shoalhaven Water's Asset Management Sharepoint Site.

2.8 AMP Scope

The plan format shown below outlines the sections contained within this asset management plan (AMP), and how those sections link together.

Figure 2-1 AMP Scope

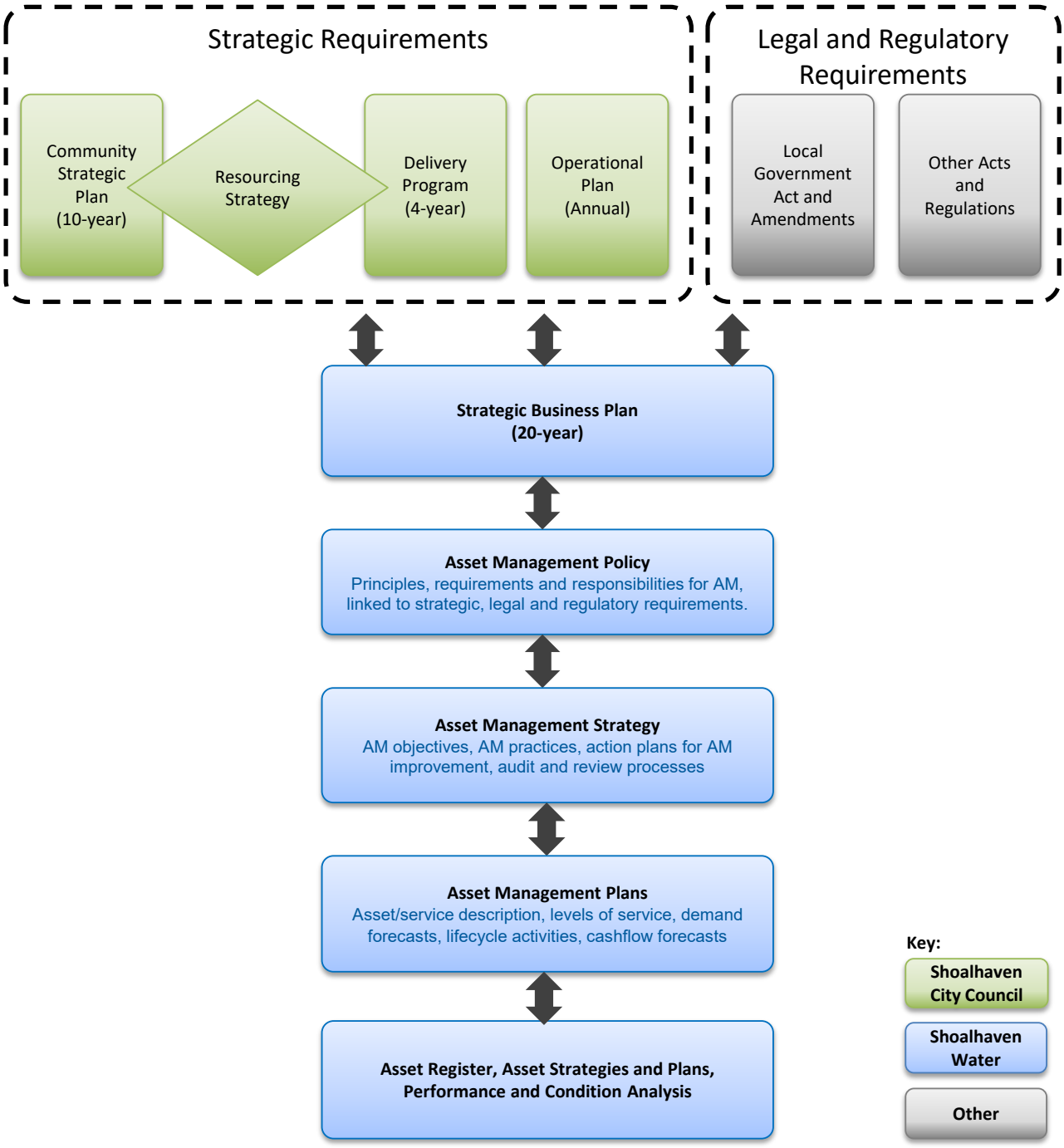


3 STRATEGIC ENVIRONMENT

3.1 Strategic Overview

Council seeks to manage the wastewater assets in a manner that meets the required level of service in the most cost-effective manner for present and future consumers. The key documents are set out in Figure 3-1.

Figure 3-1 Key Document Linkages



3.2 Asset Management Policy Linkages

The Shoalhaven City Council's Asset Management Policy presents a full summary of the strategic, legal and regulatory requirements for asset management, as well as the policy statements which are necessary to facilitate and support achievement of these requirements.

The primary objective of the Policy is to underpin Council's responsibility to achieve sustainable asset outcomes for the community, with consideration of the long term and cumulative effects of decisions and their impact on current and future generations.
Council's asset management activities align with the following asset management principles:

Community benefit

- Continuously work toward an appropriate balance of community expectations and the resources of Council through the development and monitoring of agreed levels of service and appropriate community engagement;
- Improve the resilience of Council's infrastructure to support communities.
- Enhance the protection of the community against future natural hazards and climate change.

Financial Sustainability

- Asset planning decisions for infrastructure will consider the "Life Cycle Cost" of an asset including costs of construction, operation, maintenance, and disposal.
- Asset planning decisions will be made in the context of a sustainable Long Term Financial Plan.
- Adopt a 'Renewal before Upgrade or New' philosophy for asset planning as appropriate. The intent of this philosophy is to ensure priority is given to sustainable management of renewals to deliver optimal asset lifecycle before implementing asset upgrades or new assets.

Environmental Sustainability

- Encourage the efficient use of resources in the planning and delivery of infrastructure activities.
- Embed protection of the natural environment into asset strategies and asset planning, utilising a risk-based approach in decision making.
- Acknowledge that climate adaptation and environmental protection considerations are fundamental to sustainable asset management.

Continuous Improvement

- Support the continuous improvement of Council's asset management practices by providing and maintaining systems and data necessary to achieve Policy outcomes and facilitate informed asset planning decisions based on reliable data and consistent with an Intermediate maturity (as defined in IIMM 2020).
- Continually develop and maintain digital platforms that enable community access to data where appropriate.

The key business drivers to support this policy are summarised below.

3.3 Shoalhaven City Council Strategic Requirements

3.3.1 Shoalhaven City Council Community Strategic Plan

The Community Strategic Plan sits at the top of the Council planning hierarchy and identifies the community's main priorities for the future and the ways to achieve these goals. Council's vision is set out in the Community Strategic Plan (CSP) as:

"We will work together in the Shoalhaven to foster a safe and attractive community for people to live, work, stay and play; where sustainable growth, development and environmental protection are managed to provide a unique and relaxed lifestyle"

In delivering Council's vision through a 20 year planning horizon for the provision of water supply and sewerage services, Shoalhaven Water's vision is set out in the Shoalhaven Water Community Strategic Business Plan 2020/21. The Shoalhaven Water Customer Service Plan also identifies that ***leading the***

way towards a bold future can sustain growth and economic development while retaining a lifestyle which is uniquely Shoalhaven, and describes our mission is to "Provide efficient, effective water and wastewater services to the Shoalhaven".

3.4 Legal and Regulatory Requirements

As the Water Utility provider for the community, Shoalhaven Water operates as a Group within Shoalhaven City Council and subsequently there is a requirement to comply with the Local Government Integrated Planning & Reporting Guidelines. This includes a requirement to prepare;

- Community Strategic Plan (CSP),
- Resourcing Strategy,
- 4 year Delivery Program,
- Annual Operational Plan, and
- Annual Report

3.4.1 Local Government Act, and Regulation

The key 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.

The following key documents are used to guide asset management planning activities.

3.4.1.1 Integrated Planning and Reporting (IPR) Guidelines

The Integrated Planning and Reporting (IPR) Guidelines for local government in NSW list all the mandatory requirements from the Local Government Act and the Local Government Amendment Regulation 2013. Councils must comply with the Essential Elements set out in the IPR Guidelines when planning and reporting to comply with the Local Government Act.

3.4.1.2 New Regulatory & Assurance Framework

From July 1, 2022, the Best Practice Management of Water Supply and Sewerage guidelines have been replaced with the new Regulatory Framework. This framework contributes to the implementation of relevant NSW Government commitments under the National Water Initiative, National Competition Policy, and the NSW Water Strategy. This regulatory and assurance framework applies to local water utilities in regional NSW from 1 July 2022. It covers:

- local government councils exercising water supply and sewerage functions under Division 2 Part 3 Chapter 6 of the NSW Local Government Act 1993 (Local Government Act)
- water supply authorities exercising water supply and sewerage functions under the NSW Water Management Act 2000 (Water Management Act)
- guidelines for managing the provision of water supply and sewerage services by councils under section 409(6) of the Local Government Act National Water Initiative (NWI)

The Australian Government established the National Water Commission (NWC) to implement the National Water Initiative (NWI). Whilst the role of the NWC has been delegated to the Bureau of Meteorology, the NWI provides a national water performance reporting framework that requires annual reporting by Shoalhaven Water on several key indicators and subsequent benchmarking with the results tabled in a National Performance Report each year. Council is also required to review and provide an

action plan addressing any areas of under-performance identified in the NSW Government Triple Bottom Line Summary each year.

3.4.2 Other Acts and Regulations

Other Acts and Regulations are also relevant to the management, development and environmental management of the wastewater system as listed below.

Table 3-1 Acts, Regulations, Guidelines and Standards

Type	Name
Acts and Regulations	Catchment Management Authorities Act 2003
	Dams Safety Act 2015
	Dam Safety Regulations 2019
	Environmental Planning and Assessment Act 1979 and related: The Water Administration Act 1986 The Catchment Management Act 1989 The Soil Conservation Act 1938
	Environmentally Hazardous Chemicals Act 1985
	Fisheries Management Act 1994
	Fluoridation of Public Water Supplies Act 1957
	Independent Pricing and Regulatory Tribunal (IPART) Act 1992
	National Parks and Wildlife Act 1974
	Noxious Weeds Act 1993
	NSW OHS Act 2000 and OHS Regulation 2001 and Occupational Health and Safety Amendment Act 2011 No 11
	Occupational Health and Safety Act 1983
	Ozone Protection Act 1970
	Pesticides Act 1978
	Protection of the Environment Operations Act 1997
	Protection of the Environment Operations (Waste) Regulation 1996
	Public Health Act 2010 and Public Health Regulation 2012
	Soil Conservation Act 1938
	Threatened Species Conservation Act 1995
	Trade Practices Act 1974
	Waste Disposal Act 1970
	Water Act 2007

	Water Industry Competition Act 2006
	Water Management Act 2000
	Water Regulations 2008
Guidelines	Australian Drinking Water Guidelines 2011
	Developer Charges for Water Supply, Sewerage & Stormwater 2016
Standards & Policies	Australian Standard 4360: Risk Management 2008
	NSW Non-Urban Water Metering Policy
	Australian Accounting Standards

For a full description of the Acts and Regulations, refer to the Shoalhaven Water Strategic Business Plan.

3.5 ISO Requirements

The three ISO Asset Management Standards that are now published will potentially impact all organisations that have asset management responsibilities. These Standards, while framed on the management of physical assets, can be utilised for any asset type and by any sized organisation. They address the requirements for a management system (not software) for the management of assets and comprise:

- ISO 55000 Asset Management – Overview, principles and terminology
- ISO 55001 Asset Management – Management systems – Requirements
- ISO 55002 Asset Management – Management systems – Guidelines for the application of ISO 55001
- ISO 55010 – Asset Management – Aligning Financial and Non-Financial Functions in Asset Management

ISO 55001 is the most critical Standard in that it details the things required to be done – some 70 requirements with several sub elements. It documents 'What to do', not 'How to do it', thus providing a systematic management specification while allowing organisations to structure their activities to suit their needs, resources, capabilities, and objectives.

ISO state that the main aim of Standards is to promote good practice, not to be there purely for compliance.

Shoalhaven Water have analysed how the new ISO Standards are mapped to the sections proposed in the new AMP framework and the overall Shoalhaven Asset Management Framework. Certification under this Standard has been identified as a goal of the AMSC, however ongoing Asset Management Maturity Assessments will be undertaken every 5 years to monitor performance and map progress.

3.6 Shoalhaven Water Strategies and Plans

3.6.1 Shoalhaven Water Strategic Business Plan (2020-2021)

Shoalhaven Water's vision, mission and values are presented in the Strategic Business Plan (SBP) 2020/21 (D21/197512) as follows:

Vision:

Defined by our spectacular beaches, surrounding natural forests and lakes, Shoalhaven Water connects distinct communities with water supply and sewerage services. ***Our Vision is "Through our Business Excellence, we will be a leader in the Water Industry".***

Mission:

Leading the way towards a bold future that can sustain growth and economic development while retaining a lifestyle which is uniquely Shoalhaven, our Mission is to ***"Provide efficient, reliable water and wastewater services.***

Values:

An effective council listens to stakeholder needs and responds appropriately given competing demands, finite resources and a prescriptive legislative environment. This requires:

- *A Council that can deliver services effectively and efficiently*
- *A culture that understands the needs, desires and expectations of our Community and Customers*
- *The ability and willingness to support Councillors*

Shoalhaven City Council has commenced an organisational development (OD) program. This is called the FOCUS Program and it will run over 3 years.

It is based on the premise that:

- *organisations don't change, people change*
- *change begins with self*

Core Values

Core values are the fundamental beliefs of a person or organisation. Our values guide our behaviour and help us live in balance with our unique environment and each other to fulfill our goals. We are committed to behaving and acting in ways that reflect our values.

Respect

We are mindful of and care about the feelings, wishes and rights of others

Integrity

We are committed to maintain high ethics and standards

Adaptability

We are ready for change and willing to embrace a new situation

Collaboration

We enjoy working together to deliver for our community

3.6.2 Other Shoalhaven Water Policies, Strategies and Plans

Table 3-2 Shoalhaven Water Policies, Strategies and Plans

Type	Name
Policies	Asset Management Policy
	Risk Management Policy
	Asset Capitalisation Policy
	Community Engagement Policy
Key Management Plans	Demand Management Plan
	Drinking Water Quality Management Plan
	Drought Management Plan
	Emergency Response Plan
	Business Continuity Plan
	Risk Management Plans
	Integrated Water Cycle Management Strategy
	Operation Environment Management Plan
	Water Conservation Plan
Asset Management Strategies and Plans	Asset Management Improvement Plan
	Critical Assets Framework and Strategy
	Development Servicing Plan – Sewer
	Sewerage Transportation Strategy
	Treatment Plant Strategy
	Shoalhaven Water Customer Service Plan

4 ASSET DESCRIPTION

4.1 Asset Summary

Shoalhaven Water is responsible for the following asset groups:

Table 4-1 Wastewater Asset Summary (quantities as per Asset Valuation 30-06-2023)

Asset Category	Gross Replacement Cost ($)
Wastewater Treatment	$358,114,953.28
Pipe System (including manholes)	$448,636,933
Reclaimed Water	$53,902,661.83
Pump Stations	$127,787,858.53
Pressure Sewer Units	$20,643,967.34
Buildings	$23,522,285.61
Microwave Network	$130,175.35
Other Reclaimed Water (TTERM*)	$17,411,531.52
Total	$1,051,742,580.36

**Tertiary Treated Effluent Reuse Management*

Gross Replacement Cost (GRC) is a methodology for measuring the estimated replacement cost of the wastewater asset, adjusted for new technologies and the changing nature of the fit of the asset within the developing network.

Revaluation of Shoalhaven Water's assets was undertaken at component level as part of the 21/22 asset accounting processes. Full details of the revaluation methodology and associated processes is available in Shoalhaven Water's 2022 Asset Revaluation Report (D23/50522). Ongoing valuations will be based on unit rates and base lives that are regularly revised and consider the local context using the Benchmarking Software Package which is currently being developed as part of Shoalhaven Water's asset management improvements.

Figure 4-1 Wastewater Asset Value Graph (30/06/2023)

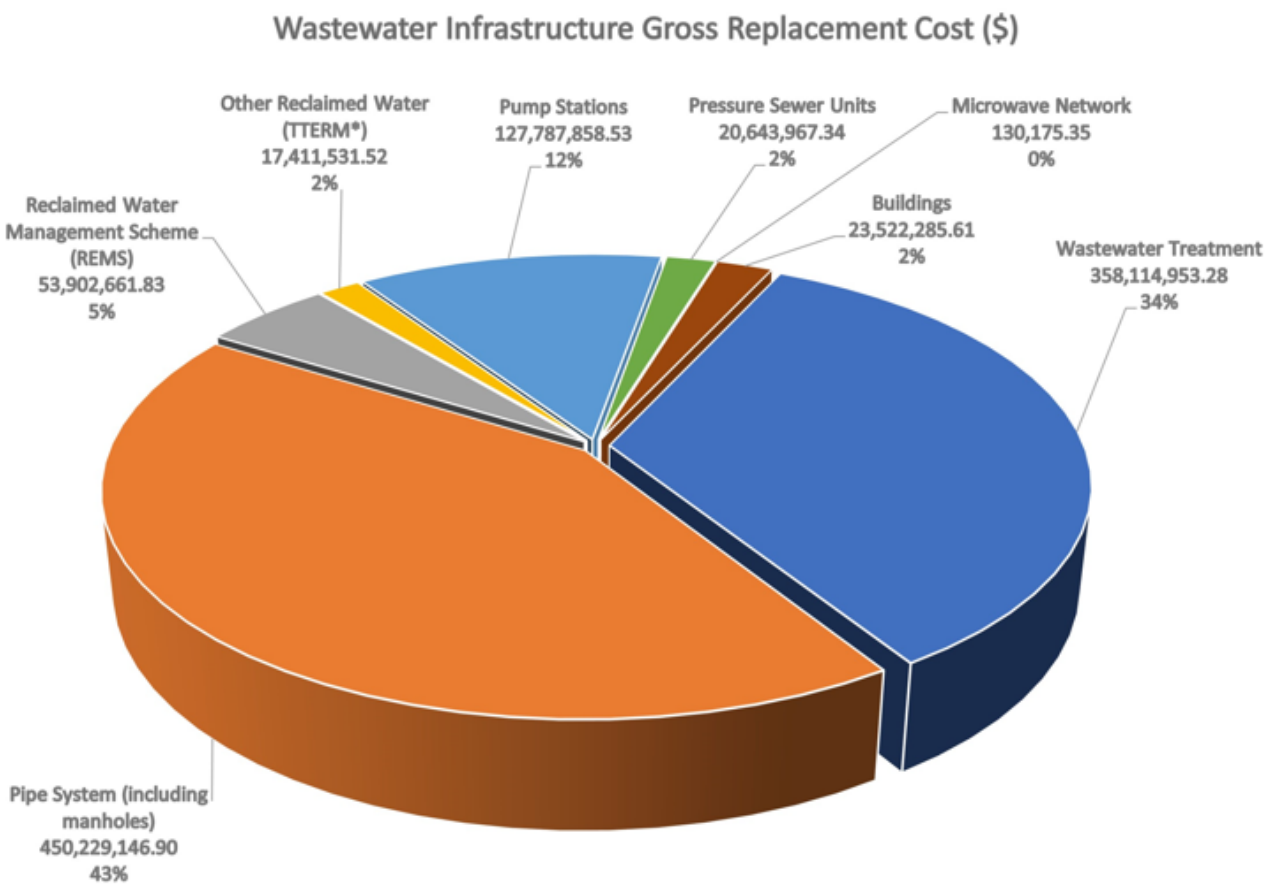


Figure 4-2 Shoalhaven Wastewater Network

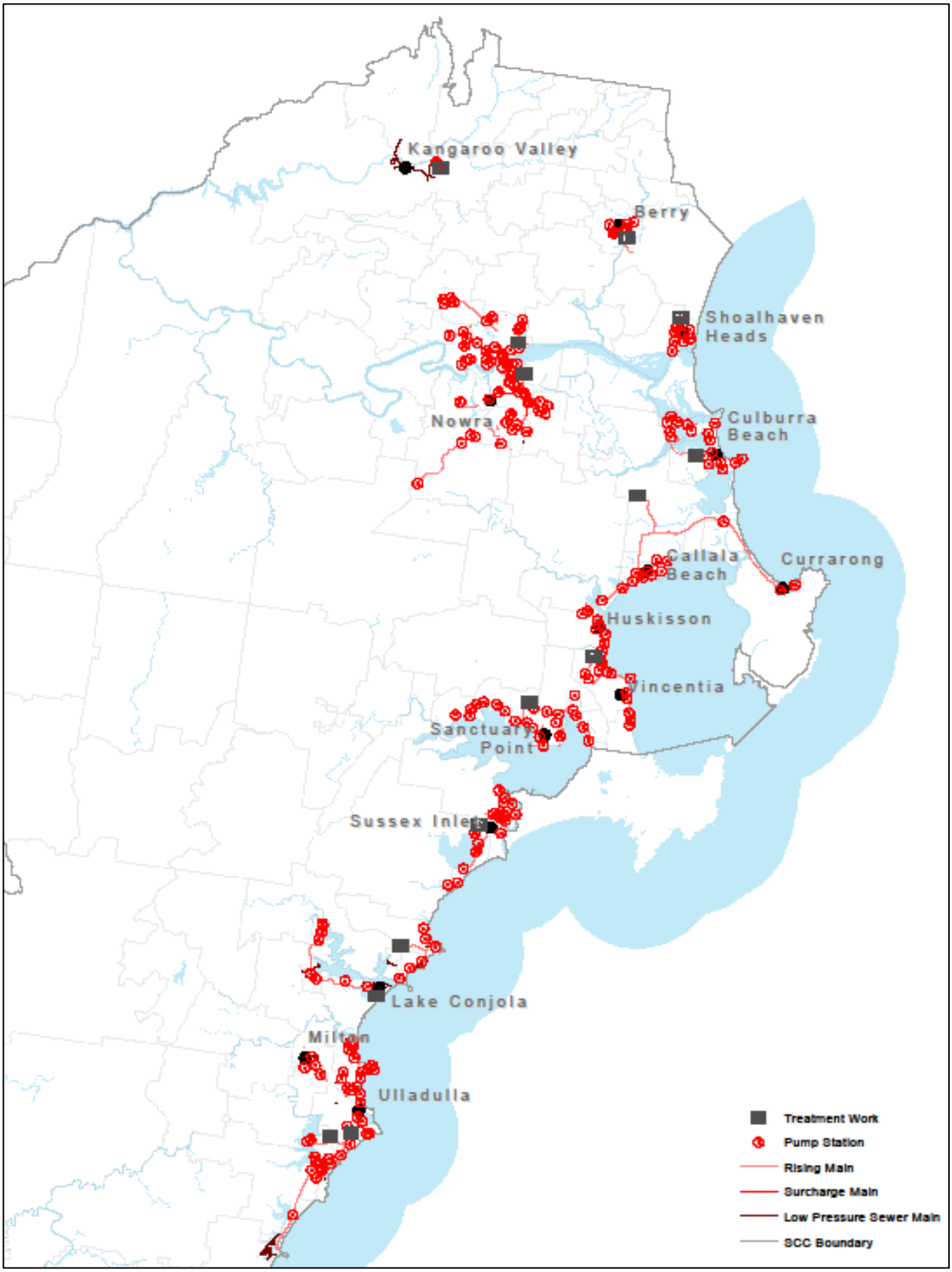


Figure 4-3 Wastewater Schematic – Northern

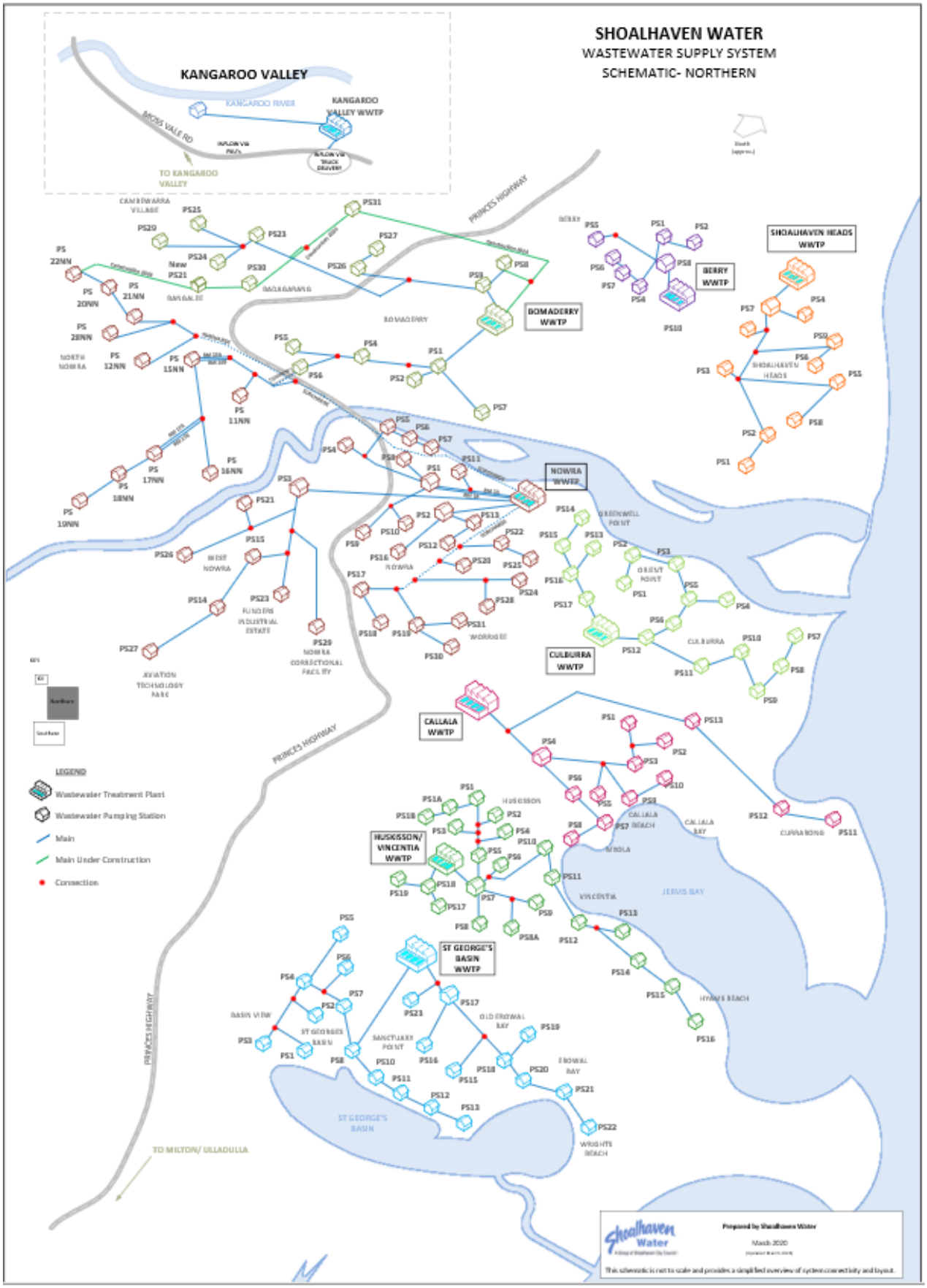
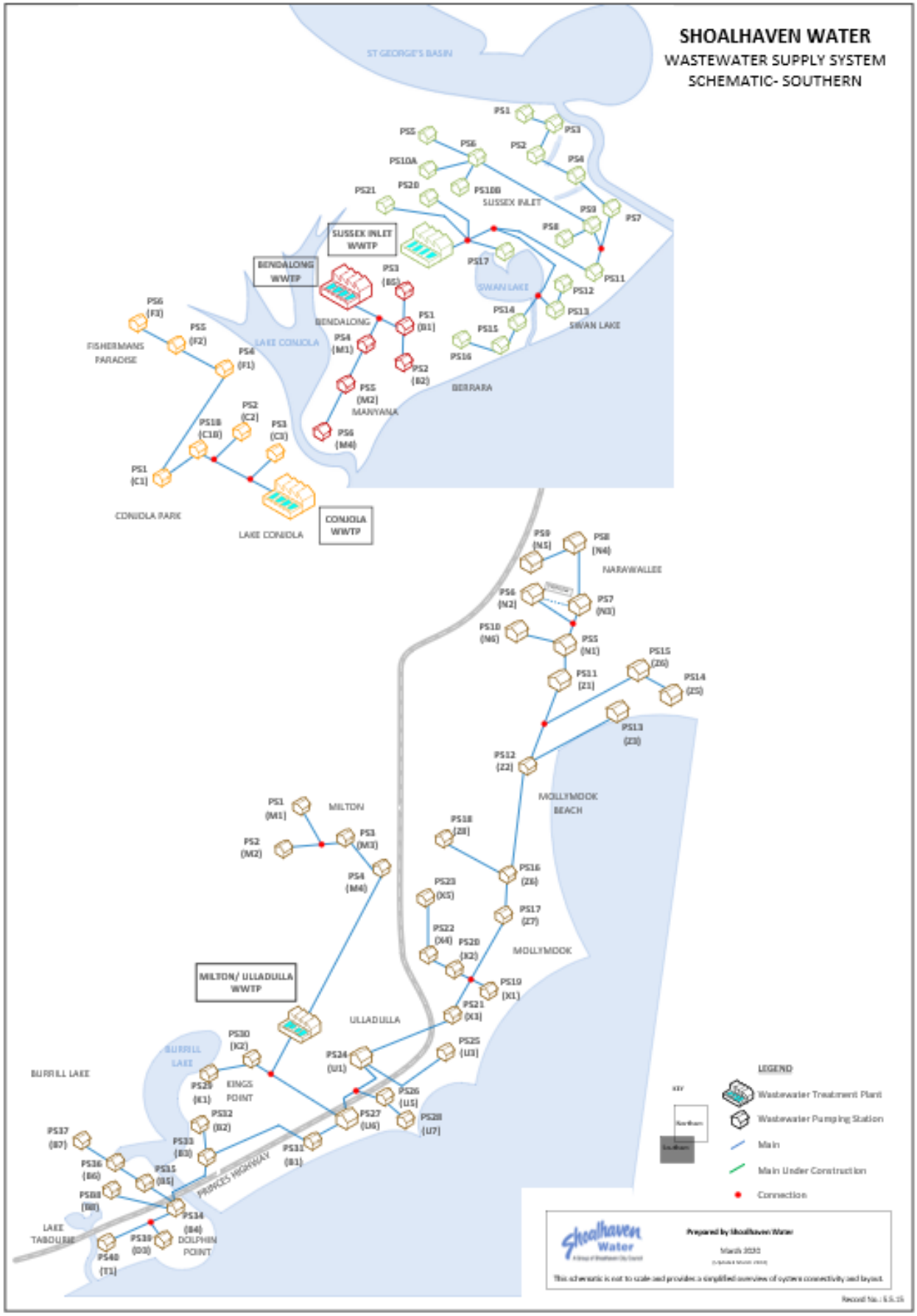


Figure 4-4 Wastewater Schematic – Milton/Ulladulla and Kangaroo Valley



4.2 Asset Detailed Description

4.2.1 Treatment Plants

Shoalhaven Water operates thirteen Wastewater Treatment Plants within Shoalhaven City, from Berry & Kangaroo Valley in the north to Ulladulla in the south. Areas serviced by wastewater schemes are shown in Figure 4.1. The wastewater systems are licensed through the NSW Environment & Protection Authority as part of the Department of Climate Change, Energy, the Environment and Water.

Wastewater is currently treated to secondary treatment at two plants and varying levels of 23,200 tertiary treatment at the remaining eleven plants. The treatment levels of reclaimed waters are compatible with the environmental standards for receiving waters. Secondary treatment includes the removal of gross solids and grit, gravity sedimentation (primary treatment) and involves aerobic biological treatment which breaks down and removes much of the organic compounds in the wastewater.

Tertiary treatment is a further step in treatment and includes, physical, chemical and/or biological processes, i.e. filtration, disinfection, nutrient removal, or UV treatment.

Table 4-2 provides a summary of treatment plants, when they were upgraded, their design capacity in Equivalent Persons (EP) and their replacement cost.

Table 4-2 Wastewater Treatment Summary Information (quantities as per Asset Valuation 30/06/2023)

Name	Last Upgrade	Upgrade/Commissioned	Capacity (EP)	Value ($)
Berry	2006	2006	3,000	$12,719,204
Shoalhaven Heads	2012	2011/12	8,000	$18,727,378
Bomaderry		2020	23,200	$44,969,517
Nowra		2020	49,300	$70,658,773
Culburra Beach	2002	2001	11,000	$21,475,398
Callala	2010	1999	6,000	$15,042,666
Vincentia	2002	2002	14,000	$44,700,837
St Georges Basin	2010	1991	16,000	$29,257,173
Sussex Inlet	1990	1990	8,000	$15,515,638
Bendalong	2007	2007	4,600	$11,973,239
Lake Conjola	2007	2007	2,700	$9,662,842
Kangaroo Valley	2013	2013	1,410	$16,741,188
Milton-Ulladulla	2012	2012	28,000	$21,289,558
Total				$332,816,448

Scheme specific characteristics are summarised below, including nominal design capacity in equivalent persons (EP) and any recent or planned works in relation to the treatment plants.

4.2.1.1 Berry Wastewater Treatment Plant

A new 3,500 EP intermittently decanted extended aeration unit was commissioned in February 2006. The treated effluent from the aeration unit is then passed through pressure sand filtration units and UV disinfection to produce high quality reclaimed water. Wet weather flows in excess of the plant's capacity are temporarily held in a 1 ML 'storm' pond for later treatment. Phosphorus reduction is available at this plant through two stage alum dosing. Reclaimed water is re-used by a local farmer (by agreement) with excess discharge to Broughton Mill Creek.

4.2.1.2 Shoalhaven Heads Wastewater Treatment Plant

This plant now has 2 x 4,000 EP intermittently decanted extended aeration units. Reclaimed water is re-used by a local turf farmer with excess being discharged to sand dune exfiltration basins. The plant has been in operation since 1983 with a recent upgraded completed in 2011/12. The recent upgrade was to cater for growth in the area and to improve the quality of effluent produced which has enabled extension of the reuse scheme to the nearby golf course.

4.2.1.3 Bomaderry Wastewater Treatment Plant

The Bomaderry plant was replaced as part of the REMS 1B project with a revised EP capacity of 15,750 EP. Allowance for future growth will expand the capacity to 23,200 EP (2041). A pipeline under the river has been constructed to connect Bomaderry to the REMS scheme via the Nowra treatment plant. Reclaimed water from this plant is then pumped to the Callala REMS storage dam for use on farms in the Terara area.

The upgraded plants consist of SBR/MBR treatment with UV disinfection.

4.2.1.4 Nowra Wastewater Treatment Plant

The Nowra plant was upgraded as part of the REM 1B project from 21,000EP's to 37,100 EP (2026) and 49,300 EP (2041).

The upgraded plants consist of SBR/MBR treatment with UV disinfection which returns approximately 2ML per day to local farmers.

4.2.1.5 Culburra Beach Wastewater Treatment Plant

This plant has been operating since 1982 and underwent a major upgrading as part of the REMS scheme. The plant's two intermittently decanted extended aeration units have a total upgraded capacity of 11,000 EP with a diffused aeration system and the reclaimed water is now filtered, chlorinated UV disinfected to REMS standard for transfer to the irrigation Reclaimed Water Management Scheme. Wet weather flows in excess of the plant's capacity are temporarily held in a 12.2 ML storm' pond for later treatment. Phosphorus removal can be undertaken at this plant if required.

As one of the four STPs currently connected to the REMS scheme, reclaimed water which is not able to be used immediately for irrigation can be transferred to the 600 ML bulk storage dam or discharged to ocean at Penguin Head, Culburra Beach.

4.2.1.6 Callala Wastewater Treatment Plant

This plant has a 6,000 EP intermittently decanted extended aeration unit and was constructed to meet REMS water quality standards, which includes filtration and chlorination. Callala STP was

commissioned in May 1999 and was the first plant connected to the REMS irrigation scheme in November 2001. Phosphorus removal can be undertaken at this plant if required.

As part of the REMS 1B project UV disinfection was installed at the plant to bring the discharge quality up to current reclaimed water standards.

4.2.1.7 Vincentia Wastewater Treatment Plant

This plant has been in operation since 1973 and was augmented in 2002 to include a 6,000 EP intermittently decanted extended aeration unit (diffused air tank). During periods of higher load, the existing 4 x 2,000 EP intermittently decanted extended aeration units (pasveer channels) are progressively operated. Reclaimed water from the plant as well as the reclaimed water received from St Georges Basin STP is filtered and chlorinated at Vincentia STP to REMS standard prior to transfer to the irrigation scheme. As part of the REMS 1B project UV disinfection was also added to the treatment process to bring the plant up to current reclaimed water standards.

Wet weather flows are temporarily held in 'storm' ponds and during extended wet weather, reclaimed water from St Georges Basin can be stored either at that plant in the 7-day emergency storage pond or the 60 ML storage pond at Vincentia plant.

In the event of extreme inflow unused reclaimed water can be release into Jervis Bay at Plantation Point. Due to the more sensitive receiving waters environment, chemical phosphorus removal will be undertaken if releases to Plantation Point are required.

4.2.1.8 St Georges Basin Wastewater Treatment Plant

This plant was commissioned in November 1991 and has 2 x 8,000 EP intermittently decanted extended aeration units with 3.5 days detention at average dry weather flow (ADWF). Reclaimed water is pumped to Vincentia STP for filtration and chlorination prior to transfer to the REMS irrigation scheme. Phosphorus removal can be undertaken at this plant if required.

4.2.1.9 Sussex Inlet Wastewater Treatment Plant

This plant has 2 x 4,000 EP intermittently decanted extended aeration units with a 1-day detention at ADWF. Reclaimed water is then passed through pressure sand filters and chlorinated prior to discharge into a sand dune exfiltration system at Cudmirrah Beach. The plant was commissioned in August 1990.

4.2.1.10 Bendalong Wastewater Treatment Plant

This plant, consisting of 2 x 2,300 EP intermittently decanted extended aeration units, was commissioned in May 2007. The treated effluent from the extended aeration units is disinfected with chlorine gas before being discharged under Lake Conjola to a sand dune exfiltration system on the southern side of the lake.

4.2.1.11 Conjola Wastewater Treatment Plant

This plant, consisting of 2 x 1,350 EP intermittently decanted extended aeration units, was commissioned in May 2007. The treated effluent from the extended aeration units is disinfected with chlorine gas before being discharged to a sand dune exfiltration system adjacent to the treatment plant.

4.2.1.12 Ulladulla Wastewater Treatment Plant

This plant, consisting of 2 x 14,000 EP intermittently decanted extended aeration units, was commissioned in December 2005. Treated effluent from the extended aeration units passes through an ultraviolet disinfection unit before discharge to an offshore ocean release.

The existing trickling filter and intermittently decanted extended aeration units which had been in operation respectively from 1975 and 1981 have been decommissioned.

4.2.1.13 Kangaroo Valley Wastewater Treatment Plant

This new plant was completed in 2013 with a capacity of 1,410 EP (Membrane Bioreactor treatment facility). The 250 properties within the scheme are served by a pressure wastewater system.

4.2.1.14 Ferrous Dosing Unit – Milton-Ulladulla/T1

This ferrous dosing unit was completed in 2012.

4.2.1.15 Planned Treatment Plant Projects

Shoalhaven Water is currently assessing the operation and capacity of several sewage treatment plants (STPs) in the region. These plants include Culburra, St Georges Basin, Sussex Inlet, and Ulladulla. The review aims to address existing capacity issues and plan for future needs.

- The key points:

Concept Options Development: Major projects are in the concept options development phase for these STPs. This phase involves exploring different approaches and strategies to enhance capacity and efficiency.

- Timeline for Expenditure:

2026/27: Major expenditure is planned to begin with the investment to continue over the next 15years.

- Upgrade Priority:

Culburra STP: It will be the first plant to undergo upgrades. These enhancements will support the approved West Culburra development, which is expected to start construction from 2026 onward. Ulladulla and Sussex Inlet plants will follow with upgrades over the next 10 years. This proactive approach ensures that the region's wastewater treatment infrastructure remains robust and capable of meeting future demands.

4.2.2 Pipe System

The function of the pipe system is to convey wastewater away from developed areas, minimising risks to the environment and public health. Pipes assets make up 48% of the total wastewater asset value.

Table 4-3 Sewer Pipe Assets (quantities as per Asset Valuation 30/06/2023)

Asset sub-category	Length / quantity	Value ($)
Gravity Pipes	1031 km	$365,516,889.34
Rising Mains	184 km	$69,120,795.06
Low Pressure Mains	37 km	$8,183,285.36
Surcharge Mains	11km	$5,034,488.29
Outfall Mains	5km	$2,373,688.85
Total Pipes	1,268km	$450,229,146.90

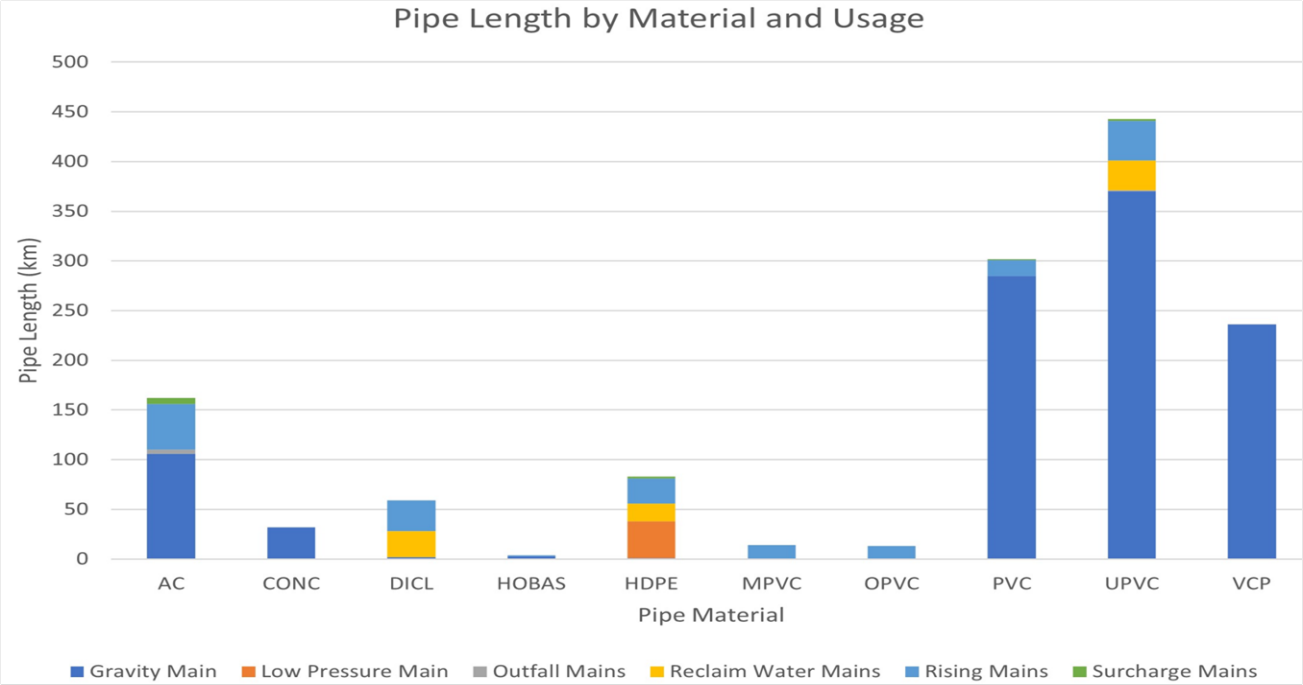
Manholes & Maintenance shafts	23,565	Not valuation item (included in pipe value above)

Source – Length data - SW GIS database. (Manholes and maintenance shafts includes dead ends and lamp holes)

Note: the above list excludes REMS assets.

The pipes are predominately UPVC, PVCP/VCP and Asbestos Cement (AC). Low pressure pipes are largely HDPE.

Figure 4-5 Pipe Material by Length and Type (30/06/2023)



The majority of pipes are 150 mm diameter gravity mains. The largest pipe diameter is 900 mm which is ~73 m long.

As part of the 2021/22 valuation Shoalhaven Water completed a review of asset life for all gravity sewer mains. This review was in line with Shoalhaven Water's Asset Information Framework report (April 2013) and is detailed in Shoalhaven Water's Asset Revaluation Report 2022. The results of this review are shown in the table below.

Table 4-4 Results of Review

Pipe Type	Current Useful life	Report Recommendations (Years)	Local Water Utility (Years)	Operations Advice	Revised life (Years)
UPVC & PVCP	70	80	80	Nil issues	80
AC	45	60	80	No major issues	80
CONC	45	80	80	Under normal conditions no major issues	80
DICL	40	80	60	Nil issues	80
HDPE	80	100	100	Nil issues	100

VCP	70	70		Some issues in certain areas.	70
GRP	70	80	Nil	Nil issues	80

Figure 4-6 Pipe Diameter by Length and Type (30/06/2023)

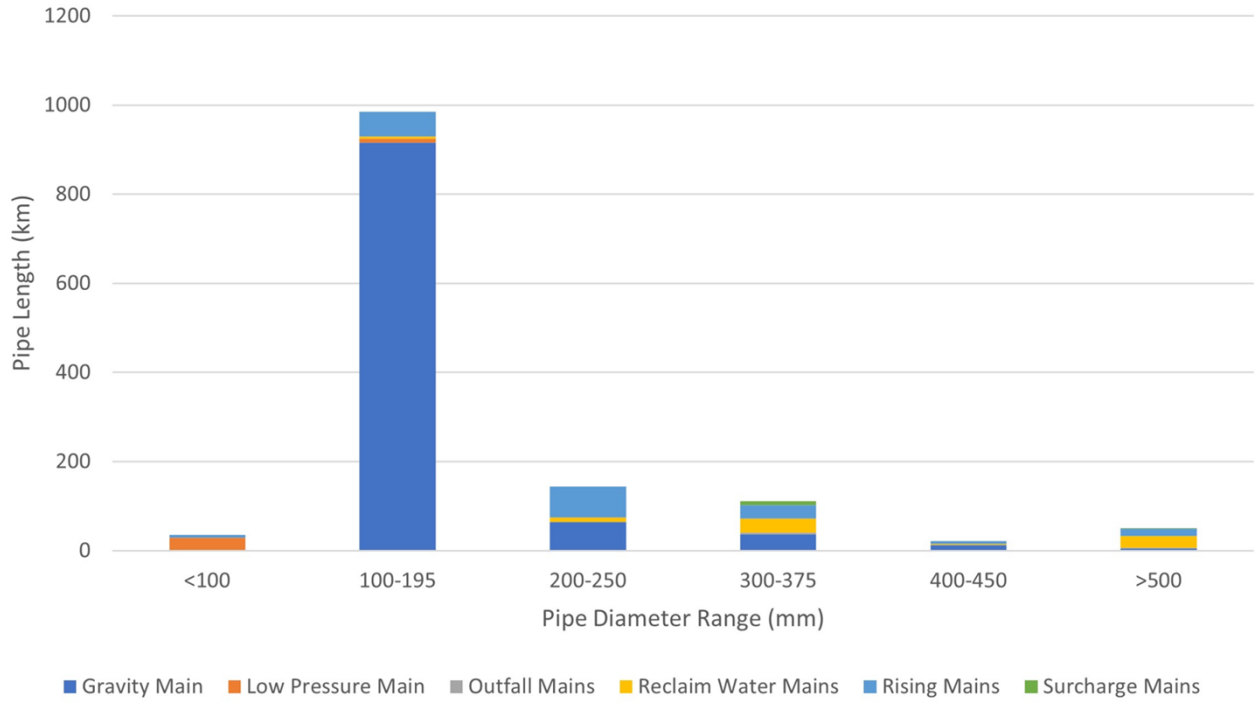
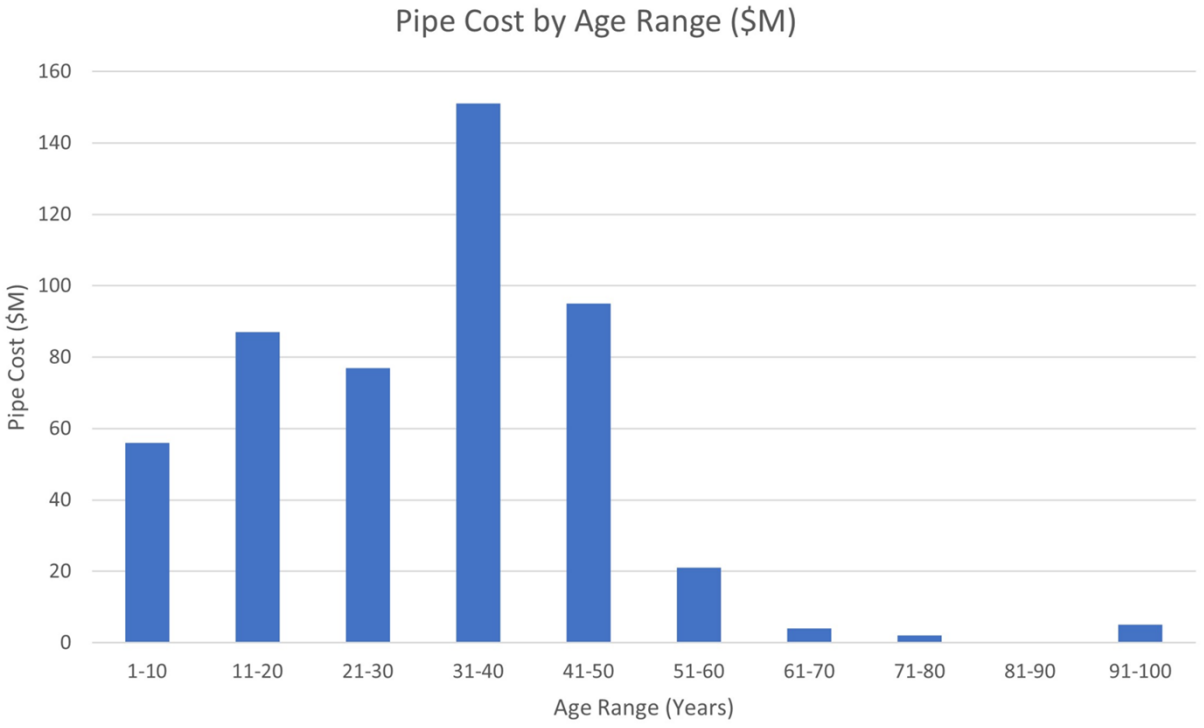


Figure 4-7 Age Profile of All Wastewater Pipes (30/06/2023)



4.2.2.1 Planned Wastewater Pipeline Projects

- Moss Vale Rd Expansion Area project consists of 3 new pump stations (replacing 2 existing), 2.5km of gravity sewer mains and 4.5km of rising mains. The project is currently in construction at a combined cost of over $25M. The project will support the urban release area of Moss Vale Rd which will consist of over 3000 lots.
- The South Nowra Surcharge Main Project which includes rising main and gravity main replacements in the Worrigee and South Nowra areas. This project will extend to the new Nowra STP increasing asset resilience, reducing odour complaints and sewer overflows resulting from capacity constraints in the existing network. This project is due for completion in 25/26 at a cost of ~$15M.
- Other growth projects include the Mundamia/Cabbage Tree Lane gravity and rising mains and the Mundamia URA which will include gravity mains, pump station and rising main. These projects were highlighted in the Shoalhaven Water – Wastewater Servicing Strategy (Feb 2013). The proposed works are detailed in Table 4.5 below –

Table 4-5 Other Growth Projects

Project	Main Type	Size (mm)	Length (m)	Notes
Mundamia	Rising	150	2000	
	Gravity	225	150	Lengths do not include developer works
Cabbage Tree Lane	Rising	225	2300	
	Gravity	225	980	Lengths do not include developer works

The Mundamia/Cabbage Tree Lane projects are expected to cost around $2M respectively and will be subject to development commencing within the catchment area.

4.2.2.1.1 Manholes

Manhole types and quantities are summarised below. Manholes form part of the pipeline asset valuation.

Table 4-6 Manhole Types (quantities as per GIS 30/6/2023)

Asset sub-category	Quantity
Standard Manhole	19,140
Special Manhole	102
Maintenance Shaft	636
Dead ends	1,068
Lamp Hole	2,684
Total	23,630

4.2.3 Reclaimed Water Management Scheme (REMS)

The Shoalhaven Water REMS scheme was commissioned in November 2001 and consists of collecting reclaimed water from St Georges Basin, Vincentia, Callala and Culburra Wastewater Treatment Plants and utilising that water for irrigation to farms in the Terara area and on golf courses, sporting fields and parklands. Stage 1B of the project was completed in 2019/20 which consists of upgrades to both Nowra and Bomaderry STP and connection of the plants to the existing 600ML bulk storage dam at Coonemia. Water not immediately used by farmers is stored in a bulk storage dam. Excess reclaimed water can be discharged to an ocean release at Penguin Head during extended wet weather periods.

Designs and investigations have been completed for the next stage REMS 2.0 project which consists of a 900ML bulk storage dam in addition to the existing 600ML. Funding for this project is not currently available therefor funds are being sought through Federal and State Government Grants. Start date for this project is funding dependant.

Table 4-7 REMS Assets (quantities as per Asset Valuation 30/06/2023)

Asset sub-category	Length / quantity	Value ($)
REMS Pipes	75 km	$ 48,074,982.06
REMS Nodes (SV's, Scours etc)	297	N/A (included in pipe value above)

There are 81 km of pipe in the REMS network with 12.7 km of 600 mm diameter and 6.2 km of 750 mm diameter. The pipes are largely UPVC and Ductile Iron Concrete Lined (DICL) materials.

4.2.3.1 Planned REMS Projects

The REMS 2.0 project is being investigated however the project is not fully funded within Shoalhaven Water's capital budget.

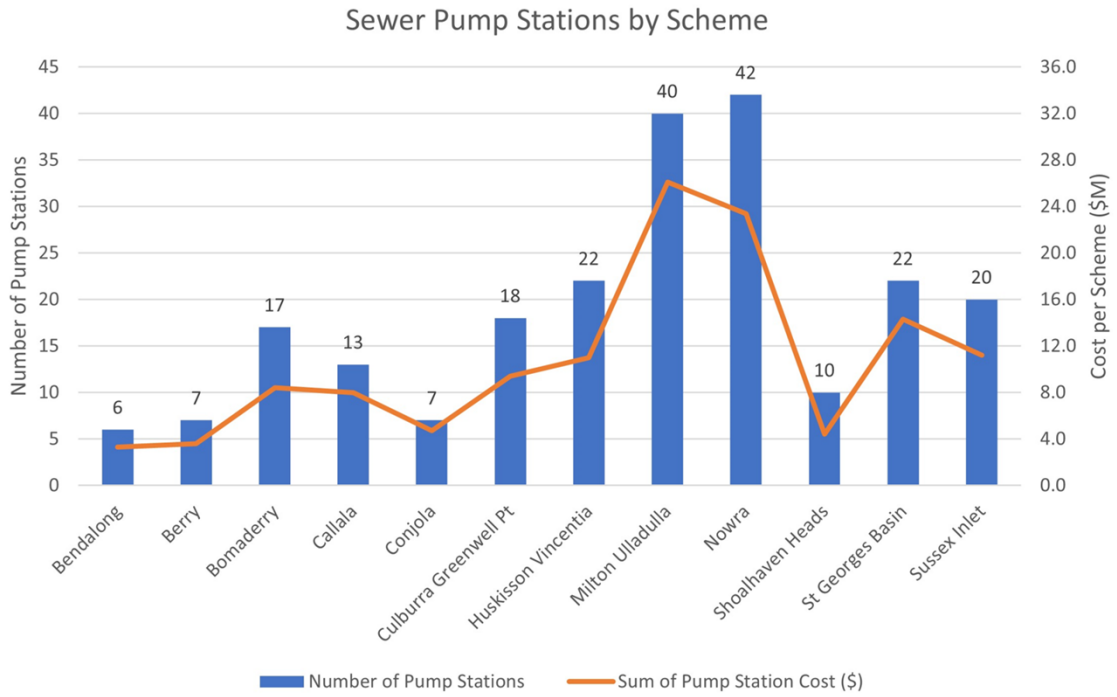
4.2.4 Pump Stations

Pump stations are strategically located to pump wastewater from low points within the network to maintain gravity flow to the treatment plants. There are a total of 224 pump stations in the Shoalhaven Water wastewater network making up 12% ($116M) of the total asset value.

Table 4-8 Pump Station Asset Types (quantities as per Asset Valuation 30/06/2023)

Asset sub-category	Quantity	Value ($)
Pump stations	224	$127,787,858.53
Pressure pump units	1375	$20,643,967.34
Pump station buildings	43	$2,729,292.30
TOTAL		$151,161,118.17

Figure 4-8 Pump Stations by Scheme (30/06/2023)



As demonstrated in Figure 4-6 the Milton-Ulladulla and Nowra schemes have the most pump stations. Detailed pump station information is provided for the critical pump stations in the Critical Asset section of this report (Section 3.3).

4.2.4.1 Recently Completed Pump Station Projects

- Shoalhaven Water is undertaking a major pump replacement program of its aging wastewater pumping station to increase reliability, reduce operation and maintenance costs and increase the efficiency of the pumps. To data a total of 165 pump sets have been upgraded at a total cost of $4.5 Million. This project is ongoing with budget allocated to replace all these assets prior to the asset reaching end of life.
- Major upgrades to storage capacity at 19 of Shoalhaven Water's wastewater pump stations. This project is to increase wet weather storage and reduce sewer overflows to the environment.
- Switch Control replacement program commenced in 2017 to replace existing aging switch control assemblies at sewer pump station. To date the program has replaced 46 cabinets over at a cost of $3M. This program will continue over the next 10 years with between 5 & 10 panels to be replaced annually.
- St Ann St and Lyrebird Park pump station upgrade project was completed in 2022/23 financial year. The total project cost is more than $5M.
- Three new pumpstations have been construction as part of the Moss Vale Rd expansion area. These new stations will transfer sewerage from the Moss Vale Rd URA to the Bomaderry STP. This project is currently in construction as part of the overall contract with a combined value of $25M.

4.2.4.2 Planned Pump Station Projects

- The pump replacement has been ongoing for the past 10 years with over 260 pumps replaced at 131 pump stations. This project is to upgrade the pump capacity to support increase efficiency and reliability of these critical assets. This project will continue over the next 5 years to replace aging infrastructure.
- Work is currently underway for the replacement of SPS 7 in the Huskisson/Vincentia scheme. This pumpstation is a critical assets discharging directly into the sewer treatment plant. The replacement will include new well, emergency storage, electrical upgrades and a new rising main and gravity main to support growth within the catchment area.
- Other pumpstation projects include the final stages of the Worrigee urban release area with SPS D currently in the early phase of development.
- A new pump station is also under development as part of the South Nowra Surcharge Main Project. This project is to enhance the existing network to support growth and demand into the future.

4.2.5 Buildings

The buildings asset group includes all property assets, including pump station housing. The quantity of the building assets is given below.

Table 4-9 Building Types, Quantities (30/06/2023)

Asset sub-category	Quantity
Admin & Depots	4
Other	1
Pumping	45
Treatment	72
Grand Total	122

4.2.5.1 Planned Building Projects

Shoalhaven Water is recently completed the construction of a new amenities building to support electrical and fitters at Flinders Depot. Construction of this project was completed in 2023 at a cost of $10M.

4.2.6 Criticality

This section of the AMP summarises the framework in place to identify critical assets, the process followed to develop this framework, the critical assets identified and general strategies in place for their management. Improvement tasks are identified to further improve the criticality assessment.

It is important that Shoalhaven Water has a clear understanding of which assets within these systems are critical and why they are critical. Identifying critical assets will allow Shoalhaven Water to develop appropriate management strategies that minimise the risk of catastrophic events and achieve an optimum balance between the risk of asset failure and the lifecycle costs of inspecting, maintaining, repairing, and renewing assets.

4.2.7 Criticality framework development and assessment

In 2012-2013 Shoalhaven Water, developed a criticality assessment framework and general management strategies for critical assets, and subsequently utilised the framework to identify critical wastewater assets. A series of workshops were conducted involving relevant staff across the organisation to agree upon the criticality criteria for each asset type. Analysis was carried out to identify

which assets are critical and datasets were produced for use in management systems planning. The entire network was then assessed in further workshops to identify which assets were critical.

To ensure the new or gifted assets are assessed, as assets are brought into Shoalhaven Water systems they continue to be assessed and updated in the AMS and GIS system.

4.2.8 The definitions of critical assets

Asset criticality is defined in terms of the consequences of asset failure. Three criticality grades have been defined as follows:

Extremely Critical: Assets where the consequences of failure are unacceptable and must therefore be reduced.

Critical: Assets where the consequences of failure are sufficiently serious that it is desirable to avoid the failure of these assets to the extent that it is practicable to do so.

Non-critical: Assets where the consequences of failure are not significant enough that Shoalhaven Water should actively commit resources to preventing their failure.

4.2.9 Critical asset identification criteria

Assets are potentially critical if their failure would have significant detrimental impacts on service delivery or compliance, on the local community, or on the financial performance of Shoalhaven Water.

The wastewater assets considered for the criticality test included treatment plants, pump stations, pipes (gravity and rising mains), manholes and odour control devices.

Generally, the following attributes discussed in this section apply to potentially critical assets. Assets which fall under the categories explained below were assessed based on the significance of the consequences of asset failure which include both operational and social impacts.

Operational impacts of the asset failure are the effects on Shoalhaven Water's ability to operate, measured by the cost and time required to repair the asset, and the effect on Shoalhaven Water's ability to maintain compliance with legislative requirements.

Social impacts of the asset failure are the effects on customers and the community, measured by the severity of the effects, their magnitude or scale, and their duration.

The following criteria were used to define critical assets:

Table 4-10 Critical Asset Identification Criteria

Criteria	Description
Assets serving large populations	For wastewater, asset failures do not result in a disruption of service. However, the failure of wastewater assets serving large populations can potentially pose significant health risk or cause environmental damage due to the resulting overflow volumes. They are also typically larger, more expensive to repair and take longer to repair. The population and pipe size thresholds for critical wastewater assets are ≥ 10,000 and ≥ 300mm, respectively. These thresholds are indicative based on previous experience with comparable wastewater service providers.
Assets near critical	Overflows of untreated wastewater pose a public health risk or can cause environmental damage. Wastewater assets are considered potentially critical if they are located inside or within 50m from the edge of waterways and

receiving environments	beaches, boundary of food production sites, or environments of ecological significance. The 50m buffer zone is recommended, but this should be reviewed dependent on the topography and extended as appropriate. They are also considered critical if failure of the asset would likely cause untreated wastewater to flow into any of the specified environments above and are within the specified floodplain (either the 100, 50, or 25 year ARI as agreed by Shoalhaven Water).
Assets serving extremely critical customers	Critical customers are stakeholders or customers particularly sensitive to the public health risk or disruption posed by wastewater overflows. Liquid trade waste customers and the owners and operators of facilities (private and public) such as beaches, water bodies, and food production sites where contamination is an issue, areas with a significant public presence (eg public mall), and facilities with sensitive or mobility restricted populations (eg kindergartens, hospitals, schools, prisons) are considered critical customers.
Assets likely to disrupt critical infrastructure or services	Critical infrastructure or services include heavily trafficked roads or rail lines, access to emergency services (such as hospitals, fire stations, police station, or ambulance stations), and access to key facilities (such as airports and ports). The failure of assets in these locations can result in significant disruption to the local community or other infrastructure services. Disruption may occur as a direct result of damage caused by failure of the wastewater asset.
Assets required for compliance with legislative requirements	Some levels of service and monitoring requirements are mandated by legislation. Failure of assets which provide those levels of service or monitoring functions would cause Shoalhaven Water to be non-compliant with legislative requirements. Wastewater assets which fall under this category include wastewater treatment plant assets identified through Environmental Protection Authority (EPA) license agreements, and wastewater treatment plant re-use scheme assets.

4.2.10 Critical assets

A summary of critical wastewater assets is provided in the table below. All of the treatment plants and surcharge mains are considered critical.

Table 4-11 Sewer Critical Assets (as at 30/06/2022 based on Criticality Assessment)

Asset Category	Asset Sub-category	Asset Class	Total quantity	Percentage critical
Treatment Plants			12	100%
Pipe System	Gravity Pipes	Gravity Mains	440 km of 1039 km	42%
		Outfall Mains	4.7 km of 4.7 km	100%
		Overflow Mains	1.5 of 1.9 km	79%
		Total	446 km of 1045 km	43%
	Rising Mains (excludes low pressure mains)	Rising Mains	176 km of 205 km	86%
		Surcharge Mains	11 km	100%
		Total	187 km of 216 km	87%
	Total Pipes (Gravity + Rising)		633 km of 1,261 km	50%

	Manholes	4,387 of 23,579	19%
Pump Stations		135 of 225	59%

The total quantities on the table above are reliant on GIS data and only include in-service Shoalhaven Water owned assets. Note that above ground or facility assets were assessed at facility level only, and not to the component level.

The knowledge of critical assets can be used to enhance various operation and maintenance regimes such as the following:

- To develop, assign and implement appropriate management strategies for critical assets
- To develop an accurate renewals program that programs critical assets for replacement before their anticipated failure date
- To inform shutdown procedures for planned and unplanned shutdowns involving critical assets or customers
- To flag incidents involving critical assets for rapid response or escalation
- To achieve operational efficiencies by targeting more frequent inspections to critical assets, and potentially reducing frequency of inspection, maintenance or replacement of assets whose consequence of failure is not critical.

4.2.11 Critical wastewater pump stations

The table in Appendix 1 lists the wastewater pump stations determined to be critical, including the rationale for the criticality grading.

The data in the Storage Available and 2011 Storage Requirement columns (marked *) has been extracted from the Wastewater Servicing Strategy, June 2013 (GHD), where available, to provide an indication of the hours of storage available at each pump station.

Storage time availability should not be used as a criterion for increasing/decreasing criticality; however, it can be used to assess the likelihood of failure and inform the development of appropriate management strategies.

4.3 Asset Management Strategies

This section identifies the management strategies for the following asset types:

- Gravity wastewater and rising mains.
- Treatment plants and pump stations.

The management strategies are focussed on critical assets. As part of the asset management improvement plan these strategies are reviewed annually to ensure they are consistent with current management procedures and processes.

4.3.1 Management Strategies - Gravity Mains and Rising Mains

4.3.1.1 Gravity Main Management Strategies

There are three primary modes of failure for gravity wastewater mains:

- Catastrophic collapse resulting in loss of hydraulic capacity

- Chokes or blockages caused by foreign objects, sediment, or tree roots, which result in loss of hydraulic capacity.
- Minor leaks which result in some water loss or infiltration, but which do not detrimentally affect operation of the wastewater.

The detection and repair of minor leaks is not likely to be a priority unless the volumes of leakage or infiltration become problematic. In most utilities this is addressed through (a) prioritised repair of reported leaks or overflows, and (b) an inflow and infiltration program.

Unlike pressurised water mains, gravity wastewater and manholes are accessible during periods of low flow for inspection and cleaning. Methods for cleaning wastewaters include rodding, jetting, root cutting, and root foaming (chemical treatment).

As well as maintenance inspections, there are well established protocols for assessing pipe condition based on CCTV footage. The condition of gravity wastewaters can therefore be easily monitored, and end-of-life reliably predicted to inform renewals decision making.

The inspection and maintenance strategy for critical gravity wastewater mains is determined by the need to prevent blockages from occurring. Wastewater chokes or blockages may be caused by foreign objects, sediment accumulation, fat, oil and grease accumulation, or tree root penetration of wastewater pipes. Tree root penetration is the most common cause of wastewater chokes in Australia.

Preventing chokes from occurring requires that critical wastewaters should be inspected and cleaned on a regular basis.

To assist in the management of these assets Shoalhaven Water is utilising mobile asset inspection technology to inspect and condition assess these assets on an ongoing basis. The manhole inspection programs should be a 5-yearly program. In addition, CCTV inspection programs are planned over the next 5 years on high risk assets or assets prone to blockage or failure history.

4.3.1.2 Rising Main Management Strategies

Wastewater rising mains operate under pressure. The same failure modes apply as for water mains, although it should be noted that wastewater rising mains can be subject to more rapid internal corrosion depending on the wastewater composition.

Since rising mains are not susceptible to blockage like gravity wastewaters, the management strategy for critical rising mains is therefore determined by the need to establish the optimum time to replace a rising main before catastrophic failure occurs as a result of deterioration.

The guidance provided for pressurised water mains is applicable to wastewater rising mains. Wastewater pump stations typically run between 3 to 6 times per hour, with pump operation being automatically triggered by the water level in the pump wet well. This is too frequent to allow inspection of the rising main without taking the pump station out of service. This means that wastewater rising mains are generally not accessible for inspection and condition assessment.

The condition of wastewater rising mains can be monitored using the same techniques as for pressure water mains and end-of-life predicted to inform renewals decision making.

The following table summarises the review of current critical asset management practice for gravity wastewaters and rising mains and identifies specific strategies and recommendations requiring further action.

Table 4-12 Summary of Management Strategy Practice for Gravity Wastewaters and Rising Mains

Target Practice			Current Practice	Recommendations	Status	Responsibility
Category		Description				
Resilience Strategies	Control & Containment	Controlled overflow points and containment locations (lagoons / tanks)	Some overflow points are in GIS, but not for all pump stations. Have approximately 8 hours storage. Some store wet weather overflows. Flow monitoring data being captured to identify infiltration. Regular overflows monitored but need for longer term solution.	Map all overflow points Map system storage to be modelled for all SPS's Current strategy and growth to be considered along with modelling (Innovyze) Commence on critical SPS's	2022 2022 2022	CS CS CS
	Redundancy	Need for duplication based on failure risk analysis	Some redundancy, but needs review	Use critical asset list to assess need for more redundancy (especially Nowra bridge). Sewer modelling project	Complete	CS
	Spares Holding	Spares held for all critical wastewaters	Spares held and are interchangeable with water.	Review spares holding in light of critical assets.	Ongoing	IW
Operations & Maintenance Practices	Routine Inspection & Maintenance	Routine cleaning of wastewaters with known choke history	DWF overflows 1 day from choke points normally maintenance only needed. Permanent Wastewater Cleaning Register identifies 17 sections of gravity wastewater which are routinely cleaned on a weekly, fortnightly, monthly, or three-monthly basis to prevent chokes. Relining where necessary.	Review jet washing crew schedule to focus on critical gravity wastewaters. Data from inspection to be completed using ArcGIS collector.	Ongoing Ongoing	IW IW

			Use of mobile inspection applications to condition assess mains and manholes.			
		Other wastewater cleaning programmed based on results of CCTV inspection	Developers provide CCTV post practical completion of vested assets. Target inflow based on isolation. Gully traps to be protected. Flood risk not so much of an issue for infiltration.	I/I reduction programme. Identify high I/I areas through flow monitoring / inspections. Target these for maintenance. SCADA upgrade to improve quality of data. Sewer modelling project	2022 Complete 2022	IW CS
	Asset Location	All critical mains are located in GIS	Mains in GIS are identified as critical.	Need to review all incoming works to assess criticality in accordance with current critical asset register. Need to document the date the asset is recorded as critical and why.	Ongoing	CS
		Operators have critical assets maps	Critical assets are identified in GIS viewer and map base.	Need to advise all staff of new asset field and update to identify critical assets. Critical asset review to be undertaken for all new assets constructed or accepted into system. Asset section to develop risk assessment and consequence for failure matrix for all incoming assets. Several options: Handheld electronic devices. Note that need to resolve accuracy issues and cell coverage. Working through confidence levels in data.	Completed Completed Completed	MK MK MK
Age & Condition Data	Age	Ages for all wastewaters are recorded in asset	The information in asset register/Asset, management information system is good.		Complete	MK

		management system				
	Performance Data	Choke history recorded in asset management system	TechOne system will require asset to be assigned to allow for recording choke history in AMS.		Ongoing	IW
	Physical Condition Data	Programmed CCTV inspections (5 yearly or annually if asset known to be in poor condition)	CCTV undertaken.	Internal resources for ad hoc. Consideration of dedicate CCTV crew or utilisation of external contract resources.	Ongoing CCTV program in progress	IW IW
Renewals forecasting	Risk-based forecast, with Likelihood of failure determined using:	Physical condition data Performance data (choke history)	Renewals programme is currently reactive	Assess the programme of renewals to consider age, criticality and failure.	In progress	CS

Table 4-13 Summary of Recommendations for Gravity Wastewaters and Rising Mains

Management Strategies	Recommendations
Redundancy	Use critical asset list to assess need for more redundancy.
Spares Holding	Review spares holding in light of critical assets.
Routine Inspection & Maintenance	Review jet washing crew schedule to focus on critical gravity wastewaters. I/I reduction programme. Identify high I/I areas through flow monitoring / inspections. Target these for maintenance.
Renewals forecasting	Assess programme of renewals to consider age, criticality and failure

4.3.2 Treatment Plants and Pump Stations

Wastewater treatment plants will generally require upgrading either through insufficient capacity due to growth in the catchment or due to changing licence conditions by the regulator. As shown in Table 4.2, only three treatment plants have not been upgraded in the last 10 years (Sussex Inlet, Culburra Beach, Vincentia). Two other treatment plants Nowra and Bomaderry were recently augmented as part of the REM 1 B project.

As part of our ongoing process monitoring Shoalhaven Water is in the process of undertaking process reviews at Culburra, St Georges Basin, Sussex Inlet and Ulladulla STP's. These plants are ageing and are subject to infiltration or process inefficiencies which impact on the quality of effluent released to the environment. The outcomes of this investigation will be used to develop improvement plans for these plants.

4.3.2.1 Mechanical Equipment

Mechanical equipment includes pumps, motors, aerators, screens, etc. These assets typically have multiple moving components which wear at different rates (eg for a pump: bearings, drive shafts, impeller). Shoalhaven Water are in the process of developing and resourcing our maintenance planning and schedule maintenance system development to manage the scheduled maintenance and condition assessment of these assets so asset replacement can be monitored and budgeted before assets reach the end of their useful lives.

Individual components of mechanical assets may be replaced multiple times over the useful life of the asset. At some point, however, performance and reliability of the asset will decline, the life cycle costs of continuing to preventively maintain the asset will increase, or key structural components of the asset will reach the end of their useful lives (eg pump casing). At this point, the whole asset should be renewed.

4.3.2.2 Master Flow Meters and Flumes

Shoalhaven Water has Master Flow Meters and flumes that are used within sewer treatment plants to measure inflow and outflows of sewerage and effluent. These meters are reportable to the EPA (licence requirements) and the Department of Climate Change, Energy, the Environment and Water (National Performance & Triple Bottom Line reporting). To ensure accurate and consistency of reporting, the meters are to be inspected and validated 12 monthly in accordance with NSW Government Gazette No 27 Maintenance Specifications 29th March 2019. Test reports, maintenance data and specifications are then stored in Council document management system within the Flow Meter Verification file 63534E. Council's Asset Management System is used to manage the maintenance and operation of these meters and all meters are mapped within the GIS system.

4.3.2.3 Electrical & Electronic Systems / Equipment

Common components of electrical and electronic systems include

- Cabling
- Connections
- Circuit boards
- Programmable Logic Controllers
- Digital Storage Mediums
- Switches
- Indicators
- Displays
- Transmitters/Receivers/ Antennae
- Rotors / Windings
- Lights
- Batteries
- Detectors
- Solar Panels
- Keypads

For any of the above components, at least one of the following failure modes applies:

- **Complete failure:** The device or component suddenly stops working, does not switch on, or cannot be switched off. The fault may be permanent or intermittent. This failure mode is applicable to all electrical devices/components.
- **Performance drift:** The device or component continues to function but is either unable to maintain normal operational parameters or the range of function becomes limited. This could mean inaccurate measurement, operating temperature too high or too low, speed too high or too low, etc. This failure mode applies to some kinds of electrical devices/components.

For critical assets, occurrence of either of the above failure modes would likely result in loss of service. It is therefore desirable to replace critical electrical or electronic equipment before either of the above failure modes occurs. The management strategy for critical electrical and electronic equipment is determined by the following requirements:

- For all electrical/electronic equipment, the need to replace components before failure occurs or becomes likely.
- For equipment which only operates in emergencies (and is normally “off”), the need to ensure that the equipment has not failed while sitting idle.

The following table summarises the review of current critical asset management practice for treatment plants and pump stations and identifies specific strategies and recommendations requiring further action.

Table 4-14 Summary of Management Strategy Practice for Treatment Plants and Pump Stations

Target Practice			Current Practice	Recommendations	Status	Responsibility
Category		Description				
Resilience Strategies	Redundancy	Need for stand-by assets based on failure risk analysis	Currently have two pumps at each station. Pump replacement program undertaken to ensure pumps have 100% redundancy due to duty/standby and design to PWW. Treatment plants designed well above current peak flows. All treatment plants have redundancy in clarifiers and filters.	Review ongoing pump replacement program and review single pump station and containment min 24hr. Wastewater modelling	Ongoing 2022/23	Andrew Truran Craig Singleton
	Spares Holding	Dual electrical feeds or back-up generator	Some pumps stations have dual feeds. Backup generators are located at strategic sites and can be relocated at short notice.	Dual feed at Nowra and Bomaderry STP's Backup generators at new STP's 10 backup generators located through area located at critical location. Generator replacement program to be considered as part of plant replacement program.	Ongoing Tech one dependent	IW Fleet
		Spares held for all critical equipment	Different brands of pump currently being used, but being replaced with standard types, so that spares can be held.	Spares held by supplier. Pump replacement program standardised pumps at 120+ pump stations. Ongoing pump replacement program being considered	Ongoing	IW
	Emergency Supplier Arrangements	Contract with emergency supplier in place with agreed	Supplier has pumps for hire. Have submersible pumps which have a lead time up to 6 weeks.	Internal maintenance crew to maintain and managed. Condition data recorded for replacement	Ongoing Ongoing Ongoing	IW

		levels of service (ie response times)	Hold enough spares but could shift to suppliers. Suppliers won't hold specific pump as not interchangeable. Some pump stations will have place for a 3rd pump	program using Scheduled maintenance in TechOne. Goodwin and Sykes pumps available for emergency using bypass.		
Operations & Maintenance Practices	Routine Inspection & Maintenance	Regular cleaning and basic preventative maintenance as per manufacturers' instructions or accept industry practice	All mechanical equipment is routinely inspected and basic preventive maintenance undertaken on fixed six-monthly, annual, or 1000-hr schedules. Daily flow checks and data telemetry checks. Each week all pump stations are visually checked. With preventative maintenance, 6 monthly on bigger pump stations and 12 monthly on smaller ones.	Internal crews used for programmed maintenance Develop scheduled maintenance program for all STPs & SPS Data recorded using mobile applications in Tech One & WorXonline.	Ongoing 2022/23 Ongoing	IW AG CD
	Detecting Failure	All critical equipment monitored via SCADA	SCADA is used to identify issues with a web based system.	SCADA system upgrade in progress to improve data	Complete	IW/AG
Age & Condition Data	Age	Ages for all critical equipment are recorded in AMIS	Age information accurate	Improvements asset data in AMS as part of componentisation project. Ongoing data cleansing and data acquisition using One Council WO system.	Complete Ongoing	MK CD
	Performance Data	Failure history recorded	Failures are recorded but there is no loop back to a central system. Works order and CRM systems will enable failure analysis.	Breakdown maintenance recording as part of TechOne solution	Ongoing	CD
	Physical Condition Data	Observations of physical condition during routine inspections and maintena	Proactive pump replacement programme. Replace electrical and mechanical systems at the same time if required.	Development of condition assessment rating system as part of TechOne Solution.	In progress	CD

		nce activities				
		Advanced condition inspection /analysis techniques (eg vibration analysis) carried out on a programmed basis	Vibration analysis is also carried out on key pumps on annual schedules.	Develop advanced condition inspection analysis based on best practice for critical pump station Use of power meters to fault detect electrical issues	2023 Ongoing	IW
Renewals forecasting	For Assets with Redundancy	Renewal based on lifecycle costs		Development of replacement cost data base in progress	2022/23	CD
	For Assets without Redundancy	Renewal based on lifecycle costs and reliability/ operational difficulty		Schedule maintenance development	2022/23	CD

Table 4-15 Summary of Recommendations for Treatment Plants and Pump Stations

Management Strategies	Recommendations
Redundancy	Review pump configuration and operation for redundancy.
Spares Holding	Review spares held based on criticality.
Emergency Supplier Arrangements	Suppliers have available spares and hire equipment
Condition Assessment	Development of condition assessment system that can be integrated with asset register and mobile solutions.

4.4 Asset Condition

4.4.1 Condition Reporting and Assessment

Condition assessment and reporting is undertaken by Shoalhaven Water using the following codes and documents

- IPWEA Condition Assessment & Asset Performance Guidelines - Practice Note 7 Water Supply & Sewerage
- WSAA Condition Assessment Guidelines for Civil Structures 2017
- WSAA Tank Inspection Reporting Code 2017
- WSAA Conduit Inspection Reporting Code of Australia WSA 05-2006 Second Addition V 2.1
- WSAA Condition Assessment Guidelines for Mechanical and Electrical Assets

4.4.2 Regulatory Reporting of Asset Condition

Council is required to include the condition of its wastewater assets as part of Special Schedule 7 in its annual financial statements. The asset condition for each asset category (wastewater is one asset category) is defined using a "key" as per the NSW Local Government Asset Accounting Manual. This "key" is as follows:

The wastewater information in the 2019/20 Special Schedule 7 is as follows:

Table 4-16 Asset Condition Reported in Annual Financial Statements (SCC Annual Financial Statements 30 June 2023)

Level	Condition	Description	GRC	Percent
1	Very Good	No work required (normal maintenance)	$174,559,910	17%
2	Good	Only minor maintenance work required	$379,924,510	37%
3	Satisfactory	Maintenance work required	$431,265,660	42%
4	Poor	Renewal required	$30,804,690	3%
5	Very Poor	Urgent renewal/upgrading required	$10,268,230	1%
		Total	$1,026,823,000	

**Assets in Condition as a % of GRC. SS7 increase is due to change in calculation methodology in financial statements.*

This information only provides an overall "snapshot" of the wastewater asset condition.

Shoalhaven Water has undertaken condition assessment of assets as part of a revaluation and annual asset accounting practices. Relining and CCTV programs.

As part of the 2022 revaluation Shoalhaven Water undertook a project to inspect, condition assess and componentise all above ground headworks assets. The results of this project are noted below.

Table 4-17 Asset Condition Grading table

Grade Rating	Pump Station Components	Percentage	Wastewater Treatment Plant Components	Percentage	Overall %
Condition 1	482	27%	213	12%	20%
Condition 2	423	24%	511	30%	27%
Condition 3	793	45%	874	51%	48%
Condition 4	69	4%	93	5%	5%
Condition 5	6	<1%	10	<1	<1%
Asset not rated	1	<1%	28	2%	<1%
Total Components	1774		1729		3503

This information is in the progress of being updated in the asset management system and to priorities capital expenditure.

4.5 Asset Systems

Shoalhaven City Council has completed the implementation of the TechOne One Council Asset Management System (T1-AMS). Stage 1 consisted of the integration of the finance system, new asset register and works management modules.

The migration to the new system presented an opportunity to establish a new asset register, which is as up to date as possible. Shoalhaven Water utilised the GIS database as well as Conquest (the current asset information system), as the master source of asset data. This information was migrated by the Portfolio and Assets Team and reviewed by Shoalhaven Water staff for completeness, accuracy, and functionality. The Asset Data Migration Program addresses several data fixes and improvements required to prepare for the migration to a new system, including fixing known data issues and implementing recommended improvements in GIS. This data was then transferred into the new TechOne system in July and October 2020. From 6th October 2020 the TechOne, One Council program will be the system used for asset transaction and accounting within Shoalhaven Water

Following the migration, a component-level valuation was undertaken on all assets as part of the 2021/22 revaluation project. This project entailed the engagement of an external consultant, internal staff, and multiple sources of information to value, componentise and determine the condition of all above ground assets. Further projects included the establishment of the asset hierarchy and data dictionary within the TechOne System. Information from these projects was then used as the basis to drive further componentisation in the AMS and to design the asset data base within the TechOne One Council program.

Development of the new asset system will continue as more data is made available by the Works Management Module and the future implementation of the TechOne Strategic Asset Management Module.

Critical assets identified in Critical Asset Report have been identified in the asset management system/GIS. For more information on the above projects refer to the Improvement Program in this AMP.

4.6 Data Confidence and Completeness

Table 4.18 provides a summary of the asset data confidence by asset group with Table 4.19 providing an explanation of the asset information rating framework.

Table 4-18 Asset Data Confidence (as at June 2022)

Sewer Asset Group	Creation Date	Type & Dimension	Condition Rating	Unit Rates & Base Lives
Wastewater Treatment Plants				
Sewer Pump Stations				
Gravity Sewers				
Rising Mains				
Low Pressure Sewers				
REMS Pipes				
REMS Nodes				
Manholes				
Pressure Pumps				
Pressure Pump Units				
Buildings				

Key: Highly Reliable | Reliable | Uncertain | Very Uncertain | Unknown

Table 4-19 Recommended Confidence Rating Scale for Asset Creation Date

Confidence Rating		Meaning	Basis of Confidence Rating for Different Data Attributes			
			Asset Creation Date	Asset Type and Dimensions	Asset Condition Rating	Standard Unit Rates & Base Lives
Highly Reliable	1	96-100% certain the correct asset data is captured in Conquest	The asset creation date is based on: As-built plans and construction records.	The asset type and dimensions are based on: Documented asset information collected during planned/unplanned maintenance, site investigation, survey or measurement using accepted industry practice; or As-built plans and construction records.	The condition rating is based on: Documented condition inspection and assessment by qualified personnel consistent with industry best practice not more than 3 years old.	Unit rate and base life data is based on: Independently peer reviewed and benchmarked rates/lives prepared for valuation purposes and not more than 3 years old. Unit rates are correctly escalated to current year rates based on accepted indices.
Reliable	2	76-95% certain the correct asset data is captured in Conquest	The asset creation date is based on: Documented extrapolation from highly reliable contextual data.	The asset type and dimensions are based on: Documented extrapolation from very reliable contextual data.	The condition rating is based on: Actual condition data 3-5 years old; or Documented extrapolation from highly reliable contextual data not more than 3 years old; or Output from an industry-standard deterioration model based on very reliable data sources not more than 5 years old.	Unit rate and base life data is based on: Documented extrapolation of highly reliable rates/lives for comparable asset types and not more than 3 years old. Base life data may be based on industry standard lives confirmed by consensus of experienced personnel with local knowledge. Unit rates are correctly escalated to current year rates based on accepted indices.

Uncertain	3	51-75% certain the correct asset data is captured in Conquest	The asset creation date is based on: "Best guess" based on consensus of experienced personnel but not verified by field investigation or as-built records.	The asset type and dimensions are based on: "Best guess" based on consensus of experienced personnel but not verified by field investigation or as-built records.	The condition rating is based on: Actual condition data 5-10 years old; or "Best guess" based on consensus of experienced personnel but not verified by field investigation or other analysis techniques; or	Unit rate and base life data is based on: Documented local contract rates/standard base lives, not independently peer reviewed or benchmarked. Unit rates are between 5-10 years old and are correctly escalated to current year rates based on accepted indices.
Very Uncertain	4	0-50% certain the correct asset data is captured in Conquest	The asset creation date is based on: Unconfirmed verbal reports.	The asset type and dimensions are based on: Unconfirmed verbal reports.	The condition rating is based on: Actual condition data more than 10 years old Unconfirmed verbal reports	Unit rate and base life data is based on: Industry standard unit rates/base lives, not independently peer reviewed or benchmarked. Unit rates are more than 10 years old and are no escalated to current year rates based on accepted indices.
Unknown	5	The source of data in Conquest has not been verified or default values have been entered.	The asset creation date has not been verified or a default date has been entered.	The asset type and/or dimensions have not been verified or default values have been entered.	The asset condition rating has not been verified or a default rating has been entered (this includes where the Condition Rating is based solely on the consumed useful life of the asset).	The unit rate and/or base life data has not been verified.

Table 4-20 Asset Data Completeness (as at June 2022)

Asset Type	0-50%	50%	60%	70%	80%	90%	100%
Wastewater Treatment Plants						✓	
Sewer Pump Stations						✓	
Gravity Sewers				✓			
Rising Mains					✓		
Low Pressure Sewers						✓	
REMS Pipes						✓	
REMS Nodes						✓	
Manholes			✓				
Pressure Pumps						✓	
Pressure Pump Units						✓	
Buildings						✓	

5 LEVELS OF SERVICE

5.1 Introduction

One of the basic cornerstones of sound asset management is:

"To provide Levels of Service in the most cost-effective manner, through the management of assets that the present and future community expect and are prepared to pay for".

Asset management planning enables balance to be determined between the cost of the service and the level of the service delivered (ie the price/quality relationship).

Well defined levels of service (LOS) can be used to:

- Inform customers of the current level of service provided and any proposed changes to level of service and the associated costs
- Measure performance against these defined levels of service
- Develop AM strategies to deliver the required level of service
- Identify the costs and benefits of the services, and
- Enable customers to assess suitability, affordability and equity of the services offered.

5.2 Drivers for Levels of Service

There are three main drivers of LOS:

External Environment – legislative and other external requirements that impose minimum standards

Internal Environment – strategic goals and objectives, availability of resources, financial constraints

Customer Environment – customer expectations of the quality of service, balanced against the price they are willing and able to pay for that service

These drivers influence the decisions that Shoalhaven Water makes regarding the range, quality and quantity of services provided.

5.3 Engaging the Community in Developing Levels of Service

Shoalhaven Water has reviewed its LOS documentation d a new Customer Service Plan (CSP) and an updated Strategic Business Plan. The CSP is modelled on the requirements of the NSW Office of Water's Water & Sewer Strategic Business Guidelines. Council has adopted both the CSP and the Strategic Business Plans in 2021/22.

The Community Strategic Plan sits at the top of the Council planning hierarchy and identifies the community's main priorities for the future and the ways to achieve these goals. Council has adopted a Community Engagement Policy which is a planned process whereby Council will work with the whole of the community to address issues affecting their well-being.

Shoalhaven Water conducts Stakeholder Engagement and Project Delivery Plans for major capital works and seeks comment, feedback and opinion on a continual basis via website, telephone or mail.

As a proactive measure to engage the community, Shoalhaven Water attends sponsors and takes an active role in a range of Community Events where the services and capital works projects are publicly displayed.

5.4 Wastewater Levels of Service

Shoalhaven Water has developed LOS statements for the wastewater assets with the CSP. The review was conducted in accordance with SMART (Specific, Measurable, Achievable, Relevant and Time bound) principal to ensure they are achievable, useful and relevant.

Shoalhaven Water has several historical performance measures and targets relating to managing the wastewater assets. Performance measures and targets are used for:

- development of the resourcing strategy
- identifying capital works requirements
- reporting progress to Council and the community
- state and national performance reporting

The existing performance measures are as follows:

Table 5-1 Performance Measures and Targets

SEWER					
Standards	**Description**	**Target**	**Priority***	**Comments**	**Benchmark**
Wastewater overflows to customer properties.	Wastewater overflows to customer properties may occur either as a result of onsite plumbing or offsite sewerage issues. Customers are advised in the first instance to contact their plumber if their system is blocked by tree roots etc. If the plumber identifies the issue is with the sewerage system, Shoalhaven Water will reimburse the plumber/customer for the work and undertake rectification. Most overflows occur during wet weather periods as a result of high inflow/infiltration of stormwater to the wastewater system. The system is designed to cater for limited inflows, events greater than this (ie widespread flooding) are excluded.	< the median average for sewerage main breaks and chokes.	1	Section 2.1 Our Services – Wastewater collection, treatment and disposal. Section 5 Your rights and responsibilities.	National Performance Benchmarking Report (A15 – Property Connection sewer breaks and chokes per 1,000 properties)
Wastewater odour complaints.	Wastewater odour complaints can be generated as a consequence of a range of shortcomings with operational maintenance of the system. Action is taken to minimise the disruption from such occurring.	< the NSW statewide median average for odour complaints.	2	Section 2.1 Our Services – Wastewater collection, treatment and disposal. Section 5 Your rights and responsibilities.	NSW Triple Bottom Line Sewerage Performance (21 – Odour Complaints per 1,000 properties)
Effluent quality from Sewage Treatment Plants.	To meet and ensure ongoing compliance with licence regulations by the EPA for the operation of the Sewage Treatment Plants (STP's).	All STP works compliant at all times.	NA	Section 2.1 Our Services – Wastewater collection, treatment and disposal.	National Performance Benchmarking Report (E5 – Number of sewage treatment works compliant at all times)

* For further details see Shoalhaven Water's Customer Service Plan 21820E

Actions to close the gaps – Nil

Table 5-2 New Performance Measures

Performance Measure	Current Performance Target		2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
Wastewater odour complaints (per 1000 properties)	< NSW statewide median	Statewide median	1.00	1.00	1.00	1.00	1.00	1.00
		Shoalhaven	1.00	1.00	0.00	0.00	0.07	1.00
Percent of sewage treated that was compliant (%)	100%	Statewide median	97.20	92.60	94.07	N/A	N/A	83.23
		Shoalhaven	100.00	91.98	88.40	97.89	80.38	83.57
Sewer overflows (# per 100km of main)	< NSW statewide median	Statewide median	10.24	19.71	14.86	13.93	17.67	19.46
		Shoalhaven	22.12	23.53	32.99	34.30	37.73	29.84
Recycled water (% of effluent recycled)	24%	Statewide median	7.44	11.60	15.00	13.00	7.85	5.20
		Shoalhaven	17.22	30.18	27.00	27.00	13.80	8.00
Operating cost - wastewater ($/property)*	$321	Statewide median	319	315	328	302	372	372
		Shoalhaven	318	300	342	401	390	372
*nominal values								

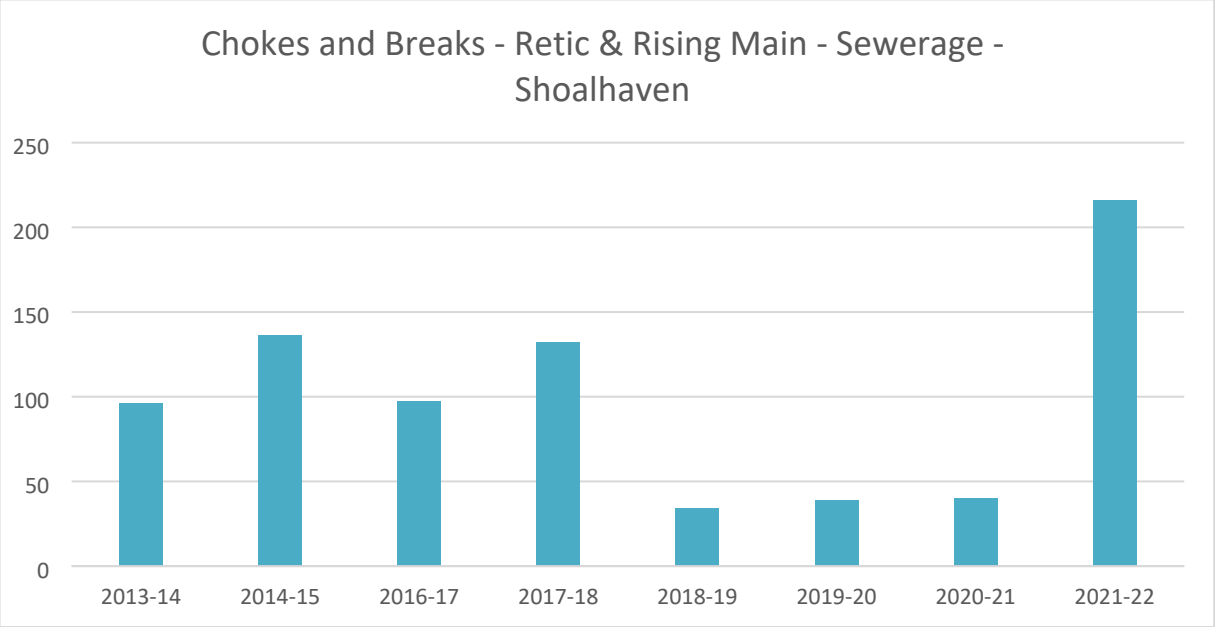
5.5 Performance Monitoring and Reporting

Actual performance is reported to the DPI Water, NSW Department of Health and EPA. Internally, performance is reported in half-yearly reports for non-reportable and reportable items in an effort to drive process improvement and to support process audits and process monitoring.

Operational data relating to performance (eg number of wastewater chokes) is held in a separate system (CRM) and cannot be automatically linked to individual assets identified in TechOne however the recent implementation of the TechOne Works Management module will allow for assets to be assigned to work orders which will in turn allow for detailed analysis of the data to feed into relining programs in targeted areas.

The graph below provides an example of the information from the CRM system on wastewater chokes.

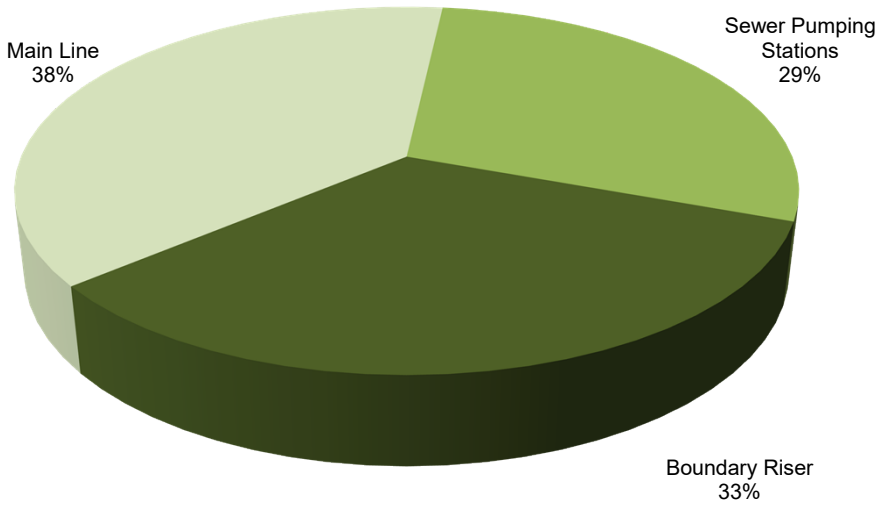
Figure 5-1 Chokes and Breaks – Retic and rising main – Sewerage - Shoalhaven



*Source – NSW Government – Department of Planning and Environment - Water – accessed 07 February 2024 https://water.dpie.nsw.gov.au/local-water-utilities/local-water-utility-performance

Shoalhaven Water has maintained the number of chokes per annum below the target of 15 per 100 km of wastewater pipe. There is a relatively even distribution of type of wastewater choke as demonstrated in Figure 5.2 below.

Figure 5-2 Distribution Types Wastewater Chokes



6 GROWTH AND DEMAND

6.1 Introduction

Planning for future growth and demand is imperative to provide economically sustained services to meet the future needs of the region and its visitors.

This section describes the key growth and demand trends in the Shoalhaven Region, the demand forecast for wastewater services, and the strategies that Shoalhaven Water will adopt to manage growth and demand related to this business unit.

6.1.1 Growth and Demand Definitions

Growth and demand planning allows for the identification and quantification of areas within the region that are likely to experience significant pressures. Although growth and demand are considered together in this section, it is worth noting that they do have different implications regarding the on-going function/delivery of the Shoalhaven Water services.

Growth in relation to the wastewater activity mainly refers to the growth/changes in population or areas that are growing due to new residential developments. These changes increase the demand for wastewater services and essentially lead to an increase in the volume of wastewater that needs to be collected, treated, and disposed of. Growth can also relate to increases in commercial/industrial activities, particularly if they produce trade wastes.

Demand for wastewater services can be influenced by population and economic growth, climate change, type of developments (eg commercial development will generally have greater requirements) and customer expectations.

6.2 Key Demand Drivers for Shoalhaven Water

A number of factors affect the demand for wastewater services including:

- Population and demographic patterns
- Residential growth and development

- Commercial/industrial growth and development
- Environmental factors including climate change
- Technological changes
- Changing regulations, government policy or priorities
- Seasonal factors

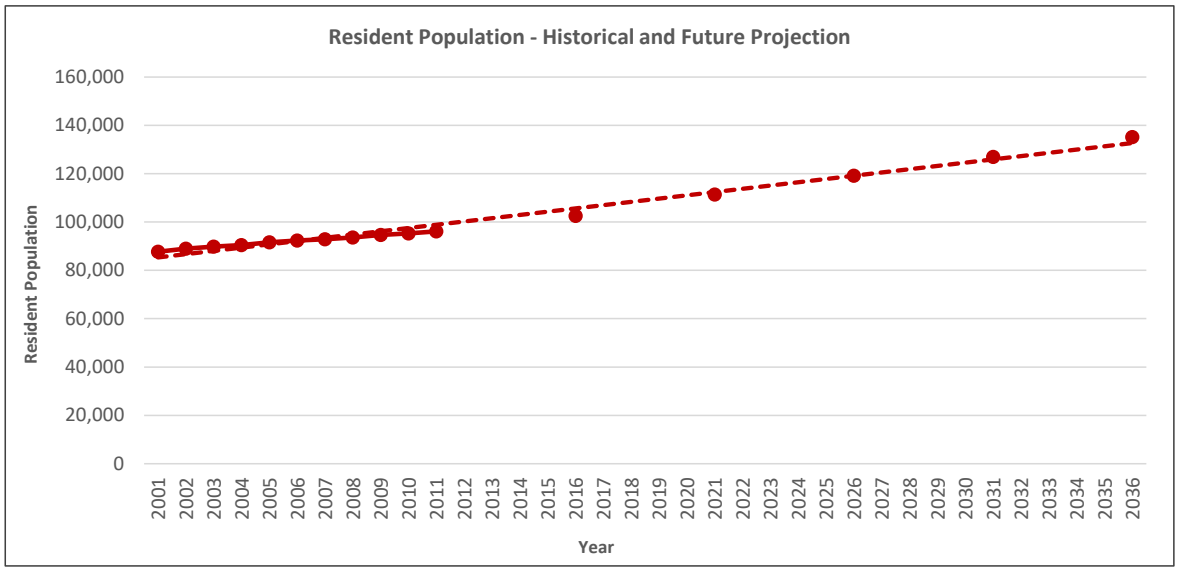
6.3 Growth and Demand Trends and Forecasts

The growth and demand trends and forecasts are described in this section.

6.4 Population Growth

The Shoalhaven population is 108,531 (2021 ABS) and is forecast to grow to 136,174 by 2041(.Id).This information is used to develop the Growth Management Strategy for the Council as shown in Figure 6-1 below. The extent of natural growth (the difference between birth and deaths) and the net migration are the two main factors that affect population. For Shoalhaven, rate of natural growth is considerably small compared to the rate of net immigration. Figure 6-2 below indicates the population growth distribution within the Shoalhaven City Council area.

Figure 6-1 Resident Population Growth of Shoalhaven

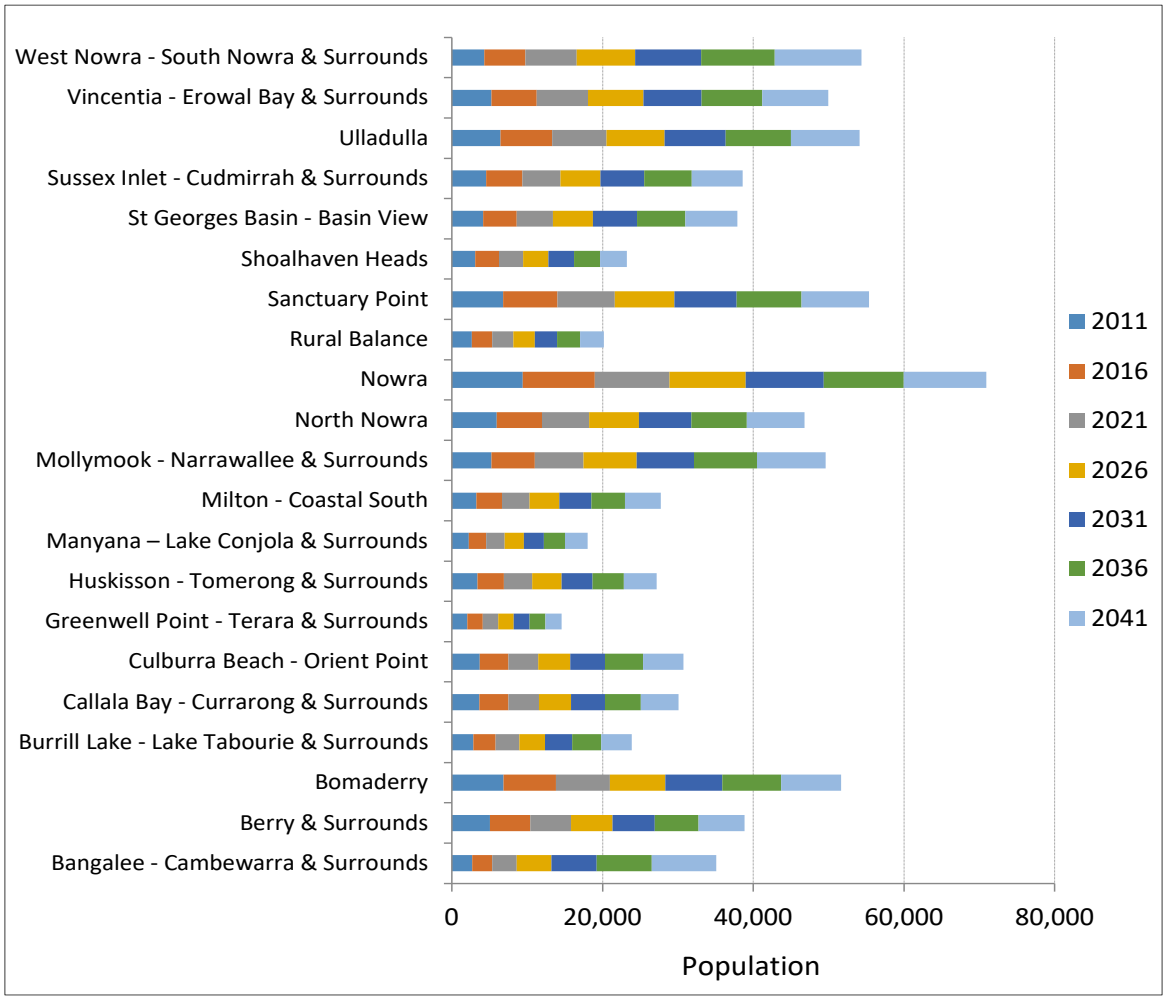


Source: Growth Management Strategy Version 1, adopted 14th December 2012

Table 6-2 Forecast Growth and Dwelling

Summary	Forecast Year					Total
Year	2021	2026	2031	2036	2041	
Population Increase	4,795	4,660	5,809	6,101	6,278	27,643
Additional Dwelling required for Population Increase	2,911	2,864	3,054	2,996	2,990	14,815
Average Annual Change	0.92%	0.86%	1.02%	1.02%	1.00%	N/A

Figure 6-3 Population Distribution by Area



Source: Water & Wastewater Servicing Strategy Part A (June 2013)

Key demographic features of Shoalhaven City are summarised below.

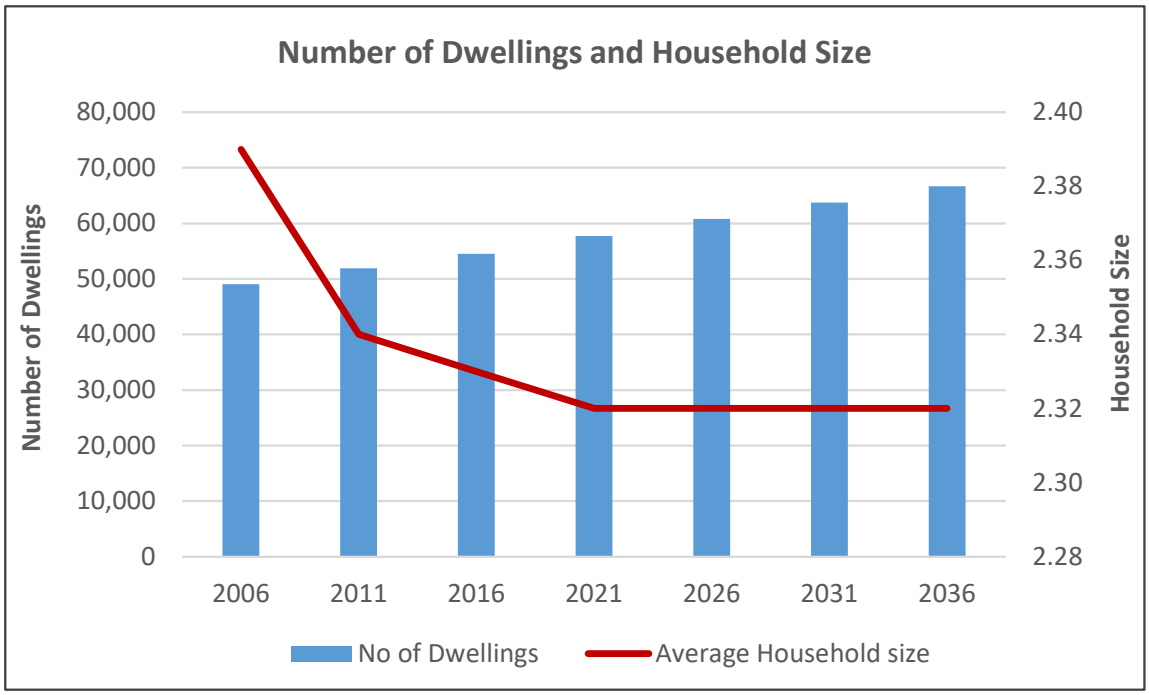
- Population Distribution by Area: Within Shoalhaven, Nowra/Bomaderry area has the highest population. However, most of the growth within last 20 years has been within the South Nowra and Worrigee areas.
- Population Distribution by Age: Shoalhaven has a higher average age compared to other cities in NSW. The number of people aged over 65 is expected to increase by 43.9% and represent 24.6% of the population by 2021. The number of people aged under 15 is forecasted to increase by 10.3% representing 17.6% of the population by 2021.
- Household Structure: In 2006 the dominant household type in Shoalhaven was couples without dependants, which accounted for 35.5% of all households. This is forecasted to be increased, comprising 39.8% of all households by 2021.
- Tourist Population: During the peak summer holiday period, total population of Shoalhaven grows up to three to five times of the residential population, increasing the demand for services and facilities.

6.5 Residential Growth

The forecast for number of dwellings in Shoalhaven up to 2036 is shown in Figure 6.3 below. The factors that contribute to the residential growth are:

- Population growth
- Decrease in household size (as shown in Figure 6.3)
- Relative housing affordability which encourages migration from the Sydney great metropolitan and Canberra areas
- A large proportion of older residents requiring accommodation that is adaptable to their particular needs.
- A demand for temporary accommodation from tourists

Figure 6-4 Residential Growth in Shoalhaven

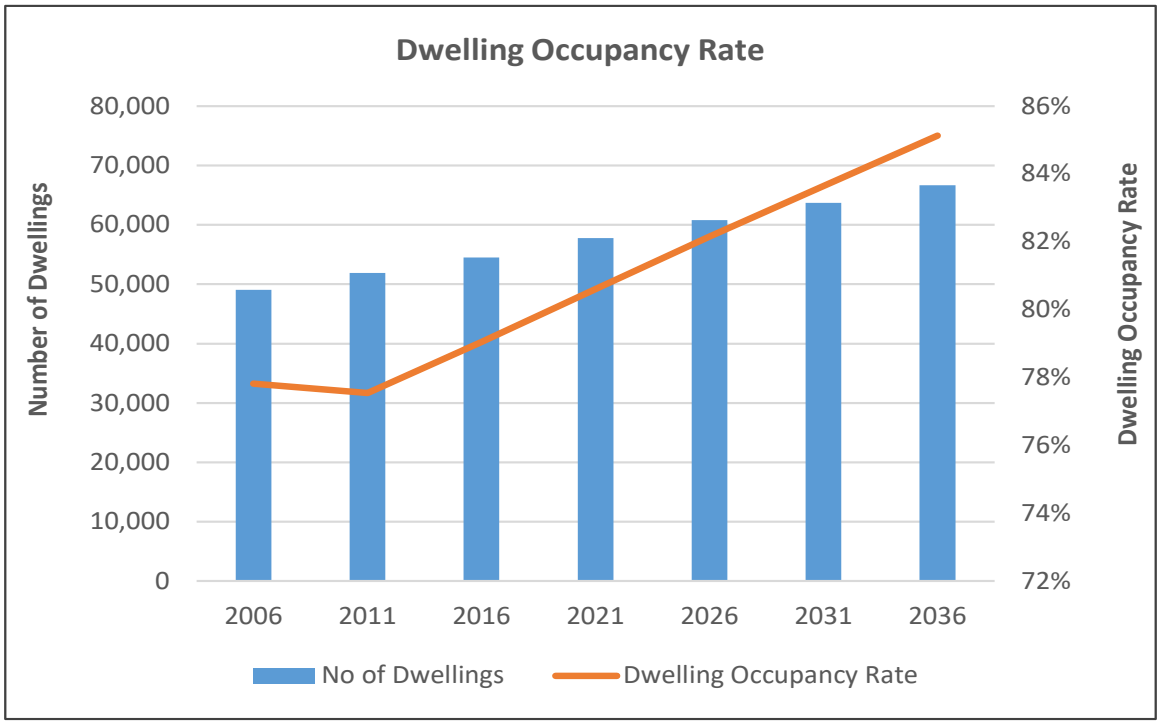


Source: Growth Management Strategy Version 1, adopted 14th December 2012

About 88% of the dwellings in Shoalhaven are single houses. The number of people living in caravans as permanent accommodation is higher than the state average.

Shoalhaven has a high rate of 'not permanently occupied' dwellings due to high tourist population. It is expected that, as the population ages and retirees start to move from Sydney and Canberra into their holiday homes, the vacancy rate will reduce. The figure below illustrates the expected change in dwelling occupancy rate.

Figure 6-5 Change in Dwelling Occupancy Rate



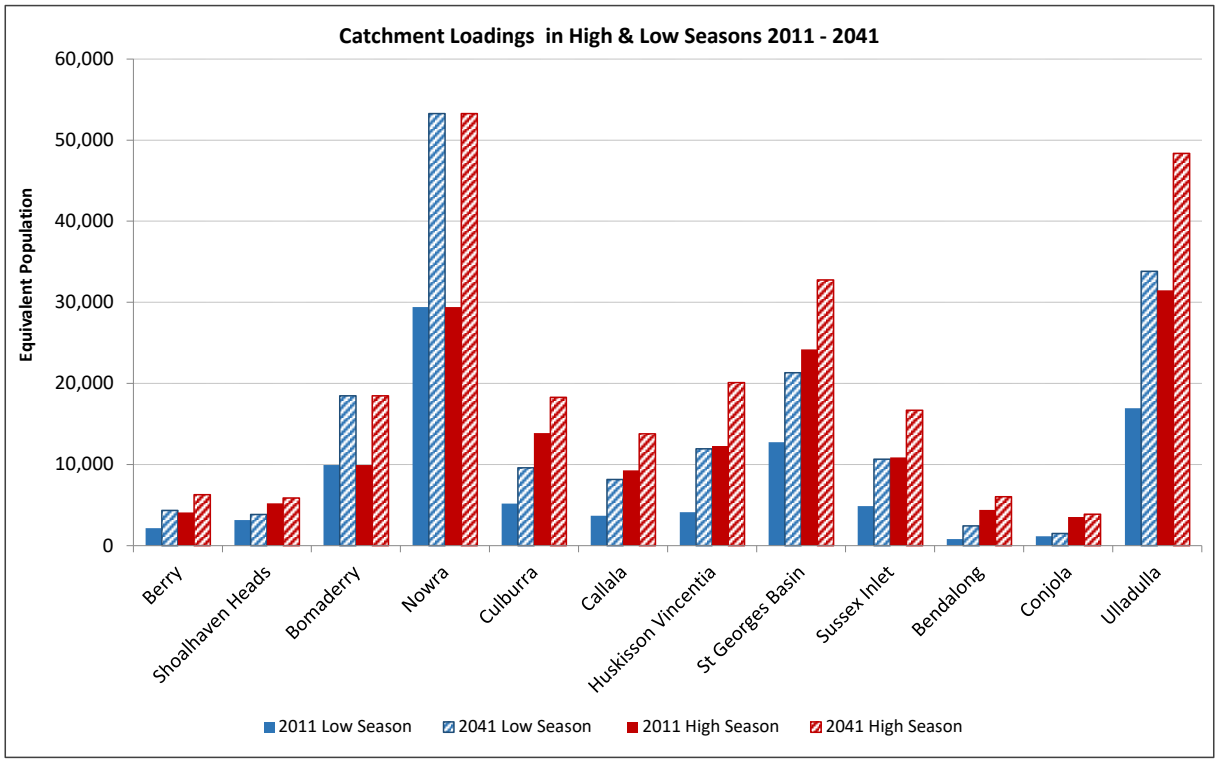
6.6 Growth and Demand Impacts and Strategic Response

Shoalhaven Water has developed Water and Wastewater Servicing Strategies (June 2013) however because of the release of the Final 2016 Developer Charges Guidelines for Water Supply, Sewerage and Stormwater a review of the Strategies and Development Servicing Plans is being undertaken and is expected to be completed by early 2023. The review will be used to understand the demand for water and wastewater services over the period from 2022 – 2056 and to identify the capital works requirements to accommodate this. The Part A of this strategy estimates the water demand over the period of 2022 – 2056 by analysing the historical demand and demand affecting factors.

The Part B of this strategy identifies the expected change in wastewater catchment loadings from 2011 to 2041, expressed in Equivalent Population (EP) as shown in the figure below. Revised sewer strategies are expected to be completed in 2024.

Equivalent Population: This is calculated based on water consumption and an assumed return to sewer. Population and dwelling projections for low and high (peak summer holiday period) seasons developed by Forecast id have been used in deriving this.

Figure 6-6 Wastewater Catchment Loadings in High & Low seasons 2011 – 2041



Source: Water and Wastewater Servicing Strategy Part B (June 2013)

6.7 Asset Solutions

Growth in population and other demand trends can result in capital works being required to increase capacity of the network and expand the network footprint in certain areas. The Shoalhaven Water strategic response to these trends is explained below.

The Servicing Strategy has assessed the capacity and performance of existing infrastructure to identify the work requirements to address the wastewater demand up to 2041 as outline below:

- The augmentation requirements to existing infrastructure and additional emergency storage at pump stations as summarised in Table 6-1 below.

The requirements to service new developments as summarised in

- Table 6-2 below, and
- The sewage treatment plant upgrade requirements by major process unit (Part C of the strategy).

Table 6-2 Augmentation Requirements to Existing System

Town	Requirement of Upgrades			Requirement of New Assets			Additional Pump Station Storage Requirements - No of Pump Stations
	No. of Pump Stations	Gravity Sewer: length (m)	Rising Mains: Length (m)	No. of Pump Stations	Gravity Sewer: length (m)	Rising Mains: Length (m)	
Berry (Option 3)	6	0	1040	0	0	0	3
Shoalhaven Heads	4	455	0	0	0	0	2
Bomaderry (Option 1 - Refined)	16	1075	5095	2	5310	3185	10
Nowra	15	3235	7870	0	2180	0	6
Culburra (Option 2)	1	0	0	0	0	0	7
Callala	Not Required			Not Required			2
Huskisson-Vincentia	12	235	770	0	0	0	13
St. Georges Basin	11	0	250	0	0	0	8
Sussex Inlet	7	0	0	1	0	0	8
Bendalong	1	0	0	0	0	0	3
Conjola	Not Required			Not Required			0
Ulladulla (Option 3)	23	1355	3105	0	0	9737	14

Table 6-3 Work Requirements to Service New Developments

Town	No. of Pump Stations	Rising Mains: Length (m)	Gravity Sewer Diameter >150mm: length (m)
Berry (All Options)	0	0	180
Shoalhaven Heads	0	0	0
Bomaderry (All Options)*	1	4140	2725
Nowra	7	8365	2180
Culburra Option 1	4	2490	160
Culburra Option 2	4	280	160
Callala – Shaolin Temple	1	8500	0
Huskisson-Vincentia	1	330	0
St. Georges Basin	1	200	0
Sussex Inlet	0	0	0
Bendalong	1	940	0
Conjola	3	870	0
Ulladulla (All Options)	1	0	0

** Figures for Bomaderry include some 150mm diameter sewers*

Shoalhaven Water's current key growth projects include:

- Growth areas within the Shoalhaven region have now switched to the Moss Vale Rd URA, West Nowra, Culburra and Ulladulla with a number of key projects in the planning and delivery phase. Moss Vale Rd will require rising mains, pump station and gravity mains to support the development and these projects are currently in construction phase with works expected to be completed by July 2024.
- Growth works in Milton Ulladulla area consist of the now complete wastewater trunk main replacement. This project was highlighted in the Shoalhaven Water – Wastewater Servicing Strategy (Feb 2013). The strategy provided augmentation options to support current and future growth based on the predicted growth within the catchment. Recently completed works include 270m of 450mm gravity wastewater and a new wastewater rising main from pump station M4 to the Milton WWTP over 5km of DN 300 and DN 600 main. The upgrade works cost over $5.5 M dollars.
- Shoalhaven Water invested $130M in REMS 1B Project which consists of the renewal, enhancement and replacement of two existing wastewater treatment plants to meet future growth. Work. This project was completed 2020. The next phase of this project is the 900ML storage dam at Callala STP. This project is ready for construction however funding is required to complete the project and Shoalhaven Water are currently seeking support from the State and Federal Government to complete this project.
- St Anns Street pump station and rising main replacement, this project is to support growth in the catchment and will result in a new pump station and rising main. The works will increase the existing capacity at the pump station. The rising main component was completed in early 2022 with the SPS upgrade completed in 2023 along with the Lyrebird Park SPS upgrade project.

The full list of capital projects is available in Appendix 2.

6.7.1 Non-Asset Solutions

Non-asset solutions provide an alternative to the creation of new or improved assets in order to meet demand changes. They address ways of modifying customer needs in order that the utilisation of existing assets is maximised and the need for new assets is deferred or reduced.

Non-asset solutions that may be considered by Shoalhaven Water include:

- Education programmes to minimise waste and harmful substances
- Water use reduction through education and technological changes
- Inflow and infiltration reduction programmes
- Technology and innovation
- Grey water reuse and recycling initiatives

The non-asset solutions planned by Shoalhaven Water over the next period are:

- Demand Management Plan
- Reclaimed Water Management Policy
- Shoalhaven Water's funds and supports an education program "Tapstar" which visits schools and agricultural shows promoting water wise programs and water efficiency and explains the water cycle processes. Educational packs are also available to a teacher which promotes water conservation and education of water cycles. This is an ongoing program.

- Shoalhaven Water's website also details water saving initiatives, water wise gardening and grey water reuse information. A rebate program also exists for rainwater tanks and a re-washer service for eligible households. Ongoing program.
- Other non-asset solutions include the pricing strategy which is structured in such a way to encourage water conservation for domestic and commercial customers.
- Flushable wipes education program which is to educate customers about the risks associated with the use of flushable wipes.

6.7.2 Assumptions

- Population and residential growth in Shoalhaven area will happen as per the predictions developed by Forecast id.

7 OPERATIONS AND MAINTENANCE PLANS AND ENVIRONMENTAL STEWARDSHIP

7.1 Introduction

Operations and Maintenance Plans aim to maintain the current levels of service (achieve the performance targets), mitigate risk, and minimise cost by implementing a balanced programme of planned and reactive works.

The operations of Shoalhaven Water facilities are undertaken in accordance with:

Operating Environment Management Plans (OEMPs),

Operations manuals that are produced during asset commission or upgrading and/or

Operations manuals that have been prepared for each Wastewater Treatment Plant.

Shoalhaven Water Emergency Response Plan

The key acts and regulations that set out the statutory requirements relating to environmental stewardship are summarised in Section 3.3 of this plan.

Specific operations and maintenance practices for individual asset groups are set out within the Management Strategies in Section 4.4 of this plan. Monthly reports are prepared by each operational area.

7.2 Operational Environment Management Plans (OEMPs)

OEMPs are in place for:

- Huskisson/Vincentia OEMP
- Culburra Beach and Callala Sewerage Schemes OEMP
- REMS Reclaimed Water Management Scheme OEMP

The objectives of the OEMPs are to:

- Address the environmental protection requirements of the Protection of the Environment Operations Act, 1997 (POEO) and
- Meet the requirements identified in the Environmental Impact Statement and Clause 91 Reports.
- Ensure effective management of scheme operation to prevent or mitigate potential environmental impacts associated with operation of the sewerage system.

- Bring together environmental protection measures and controls previously identified for the system into one concise document.

The OEMP provides environmental protection objectives for Shoalhaven Water in regard to the management of the sewerage schemes to achieve ecologically sustainable development. The OEMP sets out the actions required to minimise identified environmental risks and to fulfil all conditions set by development approvals and operational licences.

The POEO Act (Schedule 1) contains a core list of activities that require licences from the EPA. Activities relevant to the management of sewerage facilities include:

- Activity 71: Sewage Treatment System
- Activity 90: Miscellaneous Licenced discharge to Waters (Wet Weather Only)
- Activity 91: Miscellaneous Licenced discharge to Waters (At Any Time)

Currently Activity 71 is applicable to the treatment plant discharges. There are no licence conditions applicable to reticulation overflows.

7.2.1 Clause 91 Report Requirements

The Environmental Impact Statement determination report (Clause 91) required the preparation of an Environmental Management Plan to address environmental performance monitoring during operation. An overarching plan has been developed and is known as the REMS Operations Environment Management Plan (2001). The frequency and parameters of sampling are developed in consultation with the EPA and are reported to the EPA on a regular basis in accordance with scheme licence conditions.

7.2.2 EPA Licence Requirements

The EPA licence number 2419 for REMS scheme covers all treatment plants involved in REMS scheme. The REMS Licence is issued to the Shoalhaven City Council under the Protection of the Environment Operations Act 1997 by Department of Environment and Conservation on behalf of the Minister for Environment and Conservation. The licence permits the scheduled activity of operating a sewage treatment system, including the plant, reticulation and distribution system owned and operated by the licensee. The Licence includes the following associated systems:

- St Georges Basin STP
- Vincentia STP
- Callala STP
- Culburra Beach STP

The licence sets out:

- Licensed Discharge Points
- Pollutant Load Limits
- Water Quality Requirements for Discharge Points

EPA licences are also in place for the following plants:

- EPA Licence #1736 – Berry
- EPA Licence #1735 – Bomaderry
- EPA Licence #12357 – Bendalong
- EPA Licence #4128 – Shoalhaven Heads

- EPA Licence #1734 – Nowra
- EPA Licence #20244 – Kangaroo Valley
- EPA Licence #446 – Ulladulla
- EPA Licence # 3936 – Sussex Inlet

7.3 Emergency Response Plan

Shoalhaven Water has developed an Emergency Response Plan for sewer overflows. The plan is a step-by-step guide for field staff that is used in the event of a sewage overflow. The plan is a controlled document and is regularly updated.

A rostered on-call system operates, ensuring that an experienced wastewater operator is always on call. Whilst on-call the operator can monitor the pump stations and treatment plants via remote telemetry and receive event alarms through the paging systems.

The requirements for reporting incidents are provided in Shoalhaven Water's Emergency Response Plan. Relevant Environment Protection Licences specify that the EPA must be notified of all incidents causing or threatening material harm to the environment as soon as practicable after an incident.

8 DISPOSAL PLAN

Disposal of an asset includes any activity associated with the disposal of a decommissioned asset including sale, demolition, or relocation. Shoalhaven Water has several decommissioned wastewater assets that will require further examination for future disposal or ongoing maintenance options, including the Old Ulladulla Wastewater treatment plant. Where possible sites are decontaminated for reuse such as industrial land or other suitable uses. Other disused facilities within a number of treatment plants are regularly reviewed for use options and condition.

Disposal of Shoalhaven Water's assets will need to be compliant with Council's Policy. Costs associated with the disposal of assets is managed in accordance with the AIFMM (Australia Infrastructure Financial Management Manual) and costs associated with asset disposal are drawn from the operational budgets unless the disposal is part of a capital work project.

9 RISK ASSESSMENT AND MANAGEMENT

9.1 Overview

This section covers the risk management implemented by Shoalhaven Water and how it applies to current and future wastewater activities.

Risk management is a process used to identify the specific business risks, together with any possible risks associated with the ownership and management of the wastewater assets. This can be used to determine the direct and indirect costs associated with these risks and form a priority-based action plan to address them.

The outcome of this evaluation is to be used to:

- Emphasize the importance of continuing to provide Council's wastewater services and manage inherent risks
- Continually identify improvements required to Council wastewater services to avoid risk events, or minimise their impact or to realise identified opportunities

A ***Risk*** is defined in AS/NZS ISO 31000:2009 – *Risk management – Principles and guidelines, as:*

"Effect of Uncertainty on Objectives"

Effect: Deviation from the expected – positive or negative.

Objectives: Can have different aspects (see Risk Types) and can apply at different levels (see Risk Hierarchy Levels).

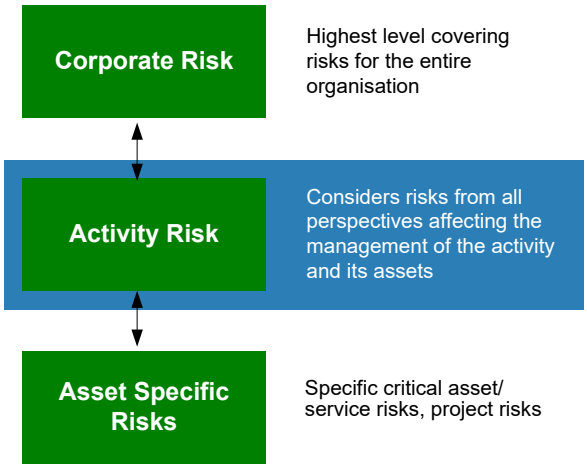
Risks: Often characterized by reference to potential events and consequences and is often expressed in terms of a combination of the consequences of an event and the associated likelihood.

Uncertainty: The state, even partial, of deficiency of information related to, understanding or knowledge of an event, its consequence, or likelihood.

9.1.1 Level of Risk

The purpose of this risk plan is to identify the risks associated with the wastewater activity and assets. This requires approaching the risks from many perspectives including financial, operational, reputational, public health and safety. These risks are pertinent to both a higher, corporate level, and to a more detailed asset –specific level, but do not substitute for more specific risk analysis at those levels (see Figure 9-1). The next step beyond this risk analysis is to develop more detailed risk plans where the criticality of specific assets is assessed and an action plan developed as appropriate.

Figure 9-1 Risk Hierarchy Levels



9.2 Current Situation

A risk register is currently maintained at a Shoalhaven City Council level, site level and at an individual project level. Shoalhaven Water has identified that there is a need to develop a risk register at an activity level specific to the wastewater activity and this is a key task identified in the Improvement Plan.

9.2.1 Risk Types

Risks events will derive from, or impact in one or more of the following ways. These risk types are considered when populating the risk register.

Table 9-1 Risk Types Considered for Risk Register

Operational	Risks that affect the efficient operation of the service or facility and its' ability to function effectively.
Financial / Economic	Risks related to the financial management of Shoalhaven Water and its' ability to fund Council services now, and into the future Risks resulting from the external economic environment.
Health and Safety	A risk event with adverse impacts on the health and safety of the community and Council staff.
Reputation / Image	Risks that affect the way Council and staff are perceived: By the community By staff Nationwide and internationally By stakeholders By the media
Legislative	A risk event that results in Shoalhaven Water either unknowingly or knowingly breaching statutes and regulations, or being exposed to liability

9.2.2 Risk Assessment Methodology

The overall risk exposure an asset represents to Shoalhaven Water is a combination of Condition (likelihood of failure) and Criticality (consequences of failure). The procedure for identifying and assessing risks is summarised below.

9.2.2.1 Identify Possible Activity Risks

All possible risks affecting the asset activity need to be identified. Once identified, risks are entered into the risk register (see Table 9-5). The register is used to record and summarise each risk and to outline current mitigation measures and potential future management options.

9.2.2.2 Determine Likelihood and Consequence for Initial Risk Factor

Table 9-1 and Table 9-2 demonstrate the scales used to determine the likelihood and consequence levels, which are used to evaluate a risk event.

The likelihood of occurrence and severity of consequences should be based on as much real data as possible; for example, local knowledge or recorded events such as maintenance records and weather events.

The likelihood scales identify how likely, or often, a particular event is expected to occur, these are shown in the table below.

Table 9-2 Likelihood Rating Scale

Likelihood	Level	Description
Almost Certain	5	Is expected to occur nearly every year e.g., 80% chance within the next 12 months
Likely	4	Will probably occur often e.g. 25% chance within the next 12 months or once in 4 years
Possible	3	Might occur from time to time e.g. 10% chance within the next 12 months or once in 10 years

Unlikely	2	Could occur only very occasionally e.g. 4% chance within the next 12 months or once in 25 years
Rare	1	May occur in exceptional circumstances e.g. 1-2% chance within the next 12 months or once in 50+ years

Table 9-3 Consequence Rating Scale

Consequence	Level	Description
Catastrophic	5	Disaster with extensive loss and long term consequences; Threat to viability of service or operation
Major	4	Critical loss or event requiring replacement of property or infrastructure; Long term impact on organisation
Moderate	3	Significant loss with temporary disruption of services; medium term impact on organisation
Minor	2	Minor loss with limited downtime; Short term impact; mostly repairable through normal operations
Very Minor	1	Isolated or minimal loss; short term impact; repairable through normal operations

After the likelihood and consequence factors have been determined, the level of risk is calculated by multiplying the likelihood of occurrence and consequence rating together.

Risk = the likelihood of an event occurring X the consequence of such an event.

The final outcome is a risk rating. The risk rating enables definition between those risks that are significant and those that are of a lesser nature. Having established the comparative risk level applicable to individual risks, it is possible to rank those risks. Four risk categories have been used: Extreme, High, Medium, and Low.

Table 9-4 Risk Factor Assessment Matrix

Likelihood	Consequence				
	Very Minor (1)	Minor (2)	Moderate (3)	Major (4)	Catastrophic (5)
Almost Certain (5)	Medium	Medium	High	Extreme	Extreme
Likely (4)	Medium	Medium	Medium	High	Extreme
Possible (3)	Low	Medium	Medium	High	Extreme
Unlikely (2)	Low	Low	Medium	Medium	High
Rare (1)	Low	Low	Low	Medium	Medium

Table 9-5 Risk Level

Overall Risk Level	Actions
Extreme	Immediate action required to reduce risk
High	Senior management attention to manage risk
Medium	Management responsibility must be specified and risk controls revised
Low	Managed by routine procedures

The initial risk is calculated based on considering the likelihood and consequences as if there are no measures in place to prevent or mitigate the risk occurrence. Essentially, initial risk is an exercise to determine “What is the worst that could happen?” Once the initial risk is determined it is necessary to evaluate the effectiveness of current systems and processes to identify the revised risk and then formulate an action plan to further reduce the likelihood or consequences of identified risks occurring.

9.3 Risk Register and Action Plan

Critical events relating to the wastewater activity have been identified as part of a preliminary risk assessment and the controls and risk treatment are summarised in the table below.

Table 9-6 Risk Register and Action Plan

Risk / Consequence	Type / Category	Controls	Rating	Responsible Officer
R000268 - Contamination of water supply or sewer system - trade waste discharges, cross connection in to REMs system/pressure sewer mains, illegal connection to water main. **Open** Consequences - increased damage to the sewerage network lead to increased maintenance and replacement costs; breaches of EPA license; lead to environmental overflow; illegal discharge to sewer	Operational Environment	C001464 Backflow prevention (Inspections, policies, Australian Standards, installation of devices) C001465 Separate Water & Sewer maintenance crews C001466 Water and Sewer pipes are different types and colour C001467 Management system, including sample testing C000598 trade waste approval policy & system for discharges C000599 Regulate known sources C000600 Implementation of testing equipment C000601 Trade Waste policy C000602 Inspection/ audit program and random monitoring water & sewer system C000603 Enforcement procedure C000604 Education as part of approval process	Residual **Medium** Inherent **High**	Executive Manager - Shoalhaven Water
	Task		Due	Task Responsible
	RT000106 - Increased monitoring		03/02/20	Manager - Water Asset Planning & Development
R000278 - Illegal use/ tamper to gain access to water supply system, which could impact other properties ability to access water during critical times e.g. natural disaster. **Open** Consequences - Financial impact and community safety issues during natural event e.g. lack of access to water	Operational People	C001469 Awareness program for the Public regarding regarding bushfire seasons and illegally installed stand pipes C000629 Regular monitoring by rangers and SW staff C000898 Regular scheduled meter readings C000900 Asset Management plan	Residual **Medium** Inherent **Extreme**	Manager Water Business Services

Risk / Consequence	Type / Category	Controls	Rating	Responsible Officer
during bushfires due to illegal connections to water infrastructure	Task		Due	Task Responsible
	T00000759 - Public Education Program to remove illegally installed connections to the water infrastructure, which caused issues during the bushfire re water pressure down the line		31/10/22	Manager - Water Asset Planning & Development
	T00000760 - Electronic metering on monthly accounts - task not required		27/04/21	
R000279 - Fraud and corruption resulting in loss, or damage to reputation **Open** Consequences - Financial loss and reputational damage	Operational Financial	C000901 Fraud prevention measure currently being implemented by SCC. E.g Tender process C000889 Separation of duties, meter readers, monitoring of usage over time and invoicing C000890 Code of conduct training by staff C000891 IT back up system in place C000892 Multistep approvals for all high value transactions	Residual **Medium** Inherent **Medium**	Executive Manager - Shoalhaven Water
	No outstanding tasks			
R000280 - Major gas or chemical leakage at Shoalhaven Water sites **Open** Consequences - potential to injure or kill people; will require evacuation; impact of plant functioning	Operational People	C000630 Emergency Response Procedures C000631 Regular training C000632 Proactive Maintenance C000633 Sensor alarm networks C000634 Automatic chlorine shut off valves C000635 PPE, SCBA Self Contained Breathing Apparatus	Residual **Medium** Inherent **Extreme**	Manager - Water Operations & Maintenance
	No outstanding tasks			
	Operational	C000636 Fleet of generators	Residual	

Risk / Consequence	Type / Category	Controls	Rating	Responsible Officer
R000281 - Power Failure causing major water, sewer and communications infrastructure outages **Open** Consequences - Loss of sewerage services; loss of water supply; leads to environmental impact; health issues	Property & Infrastructure	C000637 24/7 on call, telemetry monitoring C000638 Emergency Response plan C000639 BCP C000640 Training of staff C000874 Emergency generators connection points on all critical facilities C000875 All pump stations have adequate emergency storage. C000876 Additional onsite storage for greater retention capacity on critical sites	**Medium** Inherent **Medium**	Manager - Water Operations & Maintenance
	Task		Due	Task Responsible
	RT000115 - Onsite generators; dual power supply		28/02/19	Manager - Water Operations & Maintenance
	RT000116 - Capital program for onsite storage for greater retention capacity		01/02/24	Manager - Water Operations & Maintenance
	Operational		Residual	

Risk / Consequence	Type / Category	Controls	Rating	Responsible Officer
R000282 - Critical Infrastructure - Potential damage, failure or disruption of services related to water, wastewater and communication infrastructure, due to natural events, vandalism, cyber attack, third party damage or supply chain issues **Open** Consequences - Result in major disruption of a critical infrastructure service; financial impact; major community impact	Property & Infrastructure	C000877 CIRMP - physical security - Security (man proof) fencing for critical sites C000878 CIRMP - physical hazard - Dial before you dig (DBYD) C000897 CIRMP - natural hazard - Drought management plans for dam storages C000641 CIRMP - natural hazard - Emergency Response Plan C000642 CIRMP - physical hazard - Proactive maintenance on critical equipment/assets C000643 CIRMP - Physical hazard - Capital upgrade program (ongoing program) C000644 CIRMP - supply chain - Redundancy, additional stock of critical chemicals C000645 CIRMP - supply chain - Major spares; fleet of generators; use of Council emergency tankers C000646 CIRMP - physical security - Security systems & CCTV C000647 CIRMP - natural hazard - Emergency Operational Centre support C000648 CIRMP - natural hazard - Asset protection zone C001477 CIRMP - personnel hazard - Recruitment process & reference checking C001478 CIRMP - personnel hazard - monitoring of staff access and use of critical system C001479 CIRMP - Supply chain - Alternative treatment methods pending availability of critical chemicals	**Medium** Inherent **Medium**	Executive Manager - Shoalhaven Water

Risk / Consequence	Type / Category	Controls	Rating	Responsible Officer
		C001480 CIRMP - natural hazards - resilience upgrade to broadcasting towers e.g. generators, deluge system s		
	Task		Due	Task Responsible
	RT000117 - New plants are designed above flood level		28/02/19	Manager - Water Asset Planning & Development
	RT000118 - Maintain staff knowledge and spares to repair possible major damage		28/02/19	Manager - Water Operations & Maintenance
R000284 - Significant injury to staff member from undertaking high risk activities, e.g. working from heights, confined spaces, working near water, etc. **Open** Consequences - employee injuries potential death; LTI	Operational People	C000652 Appropriate staff training in required disciplines C000653 WHS Mgt system C000654 permit to work system - high risk tasks C000879 Safety Committees C000880 Safety in design e.g engineering solutions for working at heights or confined spaces C000881 Adequate supervision of staff	Residual **Medium** Inherent **Extreme**	Director - Shoalhaven Water
	Task		Due	Task Responsible
	RT000122 - Regular training		28/02/19	Manager - Water Operations & Maintenance
	RT000123 - Use of improved technology to minimise safety risk		28/02/19	Manager - Water Operations & Maintenance
	RT000124 - Regular review of SWMS		28/02/19	Manager - Water Operations & Maintenance
	RT000125 - WHS Quality Officer position		28/02/19	Manager - Water Operations & Maintenance
	RT000126 - Engineering solutions to minimise the needs for working at heights or confined spaces		28/02/19	Manager - Water Operations & Maintenance
	Operational		Residual	

Risk / Consequence	Type / Category	Controls	Rating	Responsible Officer
R000293 - Inappropriate use of raw water provided to customers **Open** Consequences - health issues potential; potential litigation	People	C000703 Yearly advice on appropriate use of raw water sent to RW users C000704 Capital works program to reduce number of customers using raw water	**Medium** Inherent **Extreme**	Manager - Water Operations & Maintenance
	No outstanding tasks			
R000429 - DSMS - Environmental (bushfire/storm) or seismic event damage to critical dam infrastructure **Open** Consequences - Loss of life, Loss of access, Reputation Loss, Financial loss, Service interruption, Water quality risk & Environmental damage	Operational Property & Infrastructure	C000908 Dam condition monitoring (SCADA & visual) C000909 Dam safety management system (DSMS) C000910 Capital works program to ensure dam remains in condition state 3 or above C000911 Regular site inspections and condition inspections C000912 Epoch Surveys C000913 Training C000914 Instrumentation & Telemetry	Residual **Medium** Inherent **Medium**	Manager - Water Asset Planning & Development
	No outstanding tasks			
R000430 - DSMS - Mechanical, electrical failure or automated system failure of critical dam infrastructure **Open** Consequences - Loss of life, Loss of access, Reputation Loss, Financial loss, Service interruption, Water quality risk, Environmental damage	Operational Property & Infrastructure	C000915 Dam condition monitoring (SCADA & visual) C000916 Dam safety management system (DSMS) C000917 Capital works program to ensure dam remains in condition state 3 or above C000918 Regular site inspections and condition inspections C000919 Double redundancy on critical outlet valves C000920 Training C000921 Instrumentation/telemetry C001482 Regular schedule of maintenance via OneCouncil system	Residual **Medium** Inherent **Medium**	Manager - Water Asset Planning & Development

Risk / Consequence	Type / Category	Controls	Rating	Responsible Officer
	No outstanding tasks			
R000431 - DSMS - Uncontrolled erosion, seepage or loss of stability of dam due to water **Open** Consequences - Loss of life, Loss of access, Reputation Loss, Financial loss, Service interruption, Water quality risk, Environmental damage	Operational Property & Infrastructure	C000922 Dam condition monitoring (SCADA & visual) C000923 Dam safety management system (DSMS) C000924 Capital works program to ensure dam remains in condition state 3 or above C000925 Regular site inspections and condition inspections C000926 Training C000927 Dam Surveys	Residual **Medium** Inherent **Medium**	Executive Manager - Shoalhaven Water
	No outstanding tasks			
R000482 - Climate change ref AP-R14 - Infrastructure & service impacts from heat & Fire - There is a risk that as a result of an increase in the number of hot days within the LGA, combined with ageing electricity supply infrastructure, power outages and brown outs **Open** Consequences - Environmental, property and assets	Operational Property & Infrastructure	C001483 Power purchase agreement for Shoalhaven Water sites C001484 Use of solar power at some sites C001264 Asset Management Plans C001265 Recovery into resilience project C001266 Sustainable Energy Policy	Residual **Medium** Inherent **Not Rated**	Manager - Water Operations & Maintenance
	Task		Due	Task Responsible
	T00000821 - Liaise with Endeavour Energy regarding current management plans and upgrades to reduce power outages		30/06/22	Manager - Water Operations & Maintenance
R000483 - Climate change ref AP-R17 - Reduced rainfall and water quality - As a result of an increase in the number of hot days annually there could be reduced stream flow into the catchment, greater evaporation at water storage areas. **Open** Consequences - Environment, asset management, community	Operational Environment	C001267 REMS C001268 Water supply integration program C001485 Drought management plan reduces the reliance on Shoalhaven Water dams C001486 Yield analysis identified robust water supply with limited medium term impact from drought C001487 Water conservation education program	Residual **Medium** Inherent **Medium**	Manager - Water Asset Planning & Development

Risk / Consequence	Type / Category	Controls	Rating	Responsible Officer
	Task		Due	Task Responsible
	T00000822 - To be removed - Water efficiency education program for residents. Implement restrictions as required.		30/06/22	Manager - Water Operations & Maintenance
	T00001056 - Review drought management plan		30/06/24	Manager - Water Operations & Maintenance
R000498 - Climate change ref AP-R16 - Reduced rainfall and water quality -Decreased levels of rainfall may cause severe drought, resulting in impacts on the natural environment economy and liveability of urban areas **Open** Consequences - Community, financial, environmental	Operational Environment	C001299 REMS C001300 Drought management Plan C001391 Demand Management Plan	Residual **Medium** Inherent **High**	Manager - Water Asset Planning & Development
	Task		Due	Task Responsible
	T00000815 - Review REMS program and recycled water supply and capacity to meet needs in times of drought.		30/06/22	Manager - Water Operations & Maintenance
R000271 - Potential change to legislation requiring the removal of asbestos pipes from our infrastructure **Open** Consequences - Potential for significant cost if required to replace ACM pipes if legislation changes or land owners require removal.	Operational Financial	C000886 Monitor relevant legislation C000887 Process undertaken to remove asbestos pipes on private property when works are required C000616 Remove ACM pipes by opportunity- no new asbestos pipes used C001468 Asbestos/Cement Water & Sewer Pipe Management Guidelines ASEA	Residual **Low** Inherent **Medium**	Executive Manager - Shoalhaven Water
	Task		Due	Task Responsible
	RT000108 - Develop policy position or ACM replacement		03/02/20	Manager - Water Asset Planning & Development
R000285 - Dry weather sewerage overflows that have an environmental impact to third parties causing potential health impacts to members of the public e.g. aquaculture or recreational areas **Open** Consequences - Health and environmental issues; Property damage; litigation; reputation	Operational People	C000882 New technologies e.g IOT devices to monitor sewerage systems C000655 Emergency Response Procedures C000657 Telemetry monitoring system C000658 Proactive maintenance and capital program C000659 Specialist staff; 24hr on call staff	Residual **Low** Inherent **Extreme**	Manager - Water Operations & Maintenance

Risk / Consequence	Type / Category	Controls	Rating	Responsible Officer
	Task		Due	Task Responsible
	RT000127 - Major SCADA telemetry upgrade incl implementation of report monitoring system to alert to problems within the system sooner		28/02/19	Manager - Water Operations & Maintenance
R000286 - Use of unfit for purpose re-claimed water **Open** Consequences - Potential health issues; litigation, environmental breaches and reputational damage	Operational People	C000661 High level of treatment at STP C000662 Upgrading existing STP's to UV C000663 Guidelines for water recycling and quality monitoring C000664 Agreement with end users C000665 RPZ critical control point monitoring at sewer treatment plants	Residual **Low** Inherent **High**	Manager - Water Operations & Maintenance
	No outstanding tasks			
R000290 - Storage water supply falls to critical levels in major (dam) storages **Open** Consequences - Impact on community; possible restrictions.	Operational People	C000855 Drought Management Plan C000687 BCP C000689 Agreement with Water NSW C000690 Water licensing C000691 REMS - reclaimed water management scheme C000692 Demand Management Plan	Residual **Low** Inherent **Medium**	Manager - Water Asset Planning & Development
	No outstanding tasks			
R000292 - Critical chemical supply chain failure	Operational		Residual	

Risk / Consequence	Type / Category	Controls	Rating	Responsible Officer
Open Consequences - incorrect treatment of water; non compliance with ADWG; potential for unfit water; reputation impact; community health impact	People	C000699 Formal agreement with supplier; number of alternative suppliers available C000700 Regular monitoring of stock levels C000701 Regular deliveries C000702 Multiple storage locations/ large number of stock points C001396 Purchasing Procedure to clearly identify specific chemical names for purchasing officer C001397 Chemical supplier to provide email confirmation of order with chemical type C001398 All chemical deliveries to contact Water Treatment Operator prior to plant entry C001399 Correct signage on all chemical delivery points and storage facilities C001400 Delivery Driver and Operator to check delivery docket and chemical type before transfer of chemical	**Low** Inherent **Medium**	Manager - Water Operations & Maintenance
	No outstanding tasks			
R000424 - Asset Renewal Funding **Open** Consequences - failure to deliver capital works programs	Operational Financial	C000872 Forecast scheduling of maintenance against upcoming budget C000873 Implementing scheduled maintenance of all assets C000862 Asset Management System upgraded to integrated system C000863 Up to date Asset Management Plans & strategies C000864 Implement T1 SAM module	Residual **Low** Inherent **Low**	Executive Manager - Shoalhaven Water
	Task		Due	Task Responsible
	T00000551 - Implement Control C000864 - Implement T1 SAM module		02/03/20	Manager - Water Asset Planning & Development

Risk / Consequence	Type / Category	Controls	Rating	Responsible Officer
R000428 - Project or Contractual Disputes **Open** Consequences - Financial Loss, Reputational loss & Legal proceedings	Operational Financial	C000893 Contract & Project Management training for staff managing contracts and projects C000894 Use of standard contracts for project and contract management C000895 Contract management framework C000896 Development of project management system	Residual **Low** Inherent **Medium**	Manager - Water Asset Planning & Development
	No outstanding tasks			
R000463 - DSMS - Partial or full dam failure (wall or other critical components) **Open** Consequences - Loss of critical water infrastructure.	Operational Property & Infrastructure	C001114 Dam condition monitoring (SCADA & visual) C001115 Dam safety management system C001116 Capital works program to ensure dam remains in condition state 3 or above C001117 Regular site and condition inspections C001118 Epoch surveys C001119 Staff training C001120 Instrumentation & telemetry	Residual **Low** Inherent **Medium**	Manager - Water Operations & Maintenance
	No outstanding tasks			
R000464 - DSMS - flood damage to critical dam infrastucture **Open** Consequences - Consequences Loss of critical water infrastructure.	Operational Property & Infrastructure	C001133 Dam condition monitoring (SCADA & visual) C001134 Dam safety management system C001135 Capital works program to ensure dam remains in condition state 3 or above C001136 Regular site and condition inspections C001137 Epoch surveys C001138 Staff training C001139 Instrumentation & telemetry	Residual **Low** Inherent **High**	Manager - Water Operations & Maintenance
	No outstanding tasks			
	Operational	C001320 QA certified contractors	Residual	

Risk / Consequence	Type / Category	Controls	Rating	Responsible Officer
R000504 - DSMS - Damage to dam as a result of modification, construction or decommissioning **Open** Consequences - Loss of life, Loss of access, Reputation Loss, Financial loss, Service interruption, Water quality risk, Environmental damage	Property & Infrastructure	C001321 Use of qualified consultants C001322 Quality management system C001323 Procurement process, includes tender evaluation and specifications	**Low** Inherent **High**	Manager - Water Asset Planning & Development
	No outstanding tasks			
R000505 - DSMS - Human error resulting in damage to dam or unplanned large volume release of water **Open** Consequences - Loss of life, Loss of access, Reputation Loss, Financial loss, Service interruption, Water quality risk, Environmental damage	Operational Property & Infrastructure	C001324 Training and development of staff C001325 System process documentation in DSEP and O&M plans	Residual **Low** Inherent **Medium**	Manager - Water Operations & Maintenance
	No outstanding tasks			

9.3.1 Future Improvements

- Risk workshops are regularly under quarterly or in the event of an incident to identify all risks at a tactical level. Work is currently underway to analyse the level of risk and identify controls to reduce the level of risk to an acceptable level. Develop and implement a risk action plan.
- Develop risk action plan format, including person responsible, target date to be monitored and reported against and method and frequency of monitoring.
- Populate and complete risk action plan.

9.3.2 Climate Change Resilience Planning

Shoalhaven Water's asset portfolio is valued more than $1.9B and due to the geographical location, these assets are highly susceptible to environmental change. A changing environment with higher sea levels, increase in temperature and increased frequency of extreme weather events may provide significant risk to the assets under the control of Shoalhaven Water, therefore it has been identified by Shoalhaven Water's management that these risks need to be identified, quantified, assessed with a risk management approach implemented to manage the ongoing risk of asset failure or reduced asset useful life due to these changes in the environment.

From an asset management perspective there are two important dimensions of resilience that are particularly relevant. These are technical or asset resilience and organisational resilience. Consideration of risk and resilience outcomes for new and upgraded infrastructure needs to be embedded in project business case guidelines, capital asset planning and assurance processes as a matter of course.

The International Infrastructure Management Manual provides a risk management approach to resilience planning - Section 3.2.8 – Assessing Infrastructure Resilience.

The NSW State Infrastructure Plan also recommended that -

To ensure whole-of-life assessment of infrastructure risk and resilience issues, and to ensure Shoalhaven Water's assets are managed in a sustainably, Shoalhaven Water needs to:

- consider risk and resilience outcomes for new and upgraded infrastructure be embedded in project business case guidelines, capital asset planning and assurance processes as a matter of course.

- as part of the new asset management processes Shoalhaven Water undertake periodic assessments of the vulnerability of assets to the impacts of climate change (such as sea level rise), natural disasters (such as floods, bushfires, heatwaves, and storms) and human-related threats (such as cyberattacks).

9.3.2.1 Resilience Planning Steps

1. Identification of asset to determine hazards and vulnerability. Short term/long term impacts.

2. Risk assessment to determine likelihood and consequence – short term/long term impact.

3. Lifecycle cost analysis of high risk assets (maintenance costs, remaining useful life, rehab - replace or renewal options, cost benefit analysis of options, other issues).

4. Determine resilience approach, Accommodate, Protect/defend or Retreat based on cost benefit/business cases.

5. Consult with stakeholders.

6. Priorities and implementation of mitigation measures, or resilience approach.

7. Imbed asset resilience planning in asset planning processes.

9.3.2.2 Other Options

- Financial resilience – having funds available to deal with unplanned events
- Links to the emergency management
- Designing for resilience at the planning and concept stage of asset development.
- Resilience in supply chain.

9.3.2.3 Adaptation

To improve resilience, Shoalhaven Water will need to consider how to adapt to these risks. The IPWEA Practice Note 12 identifies climate change adaption as a range of response that are implemented with the expectation of reducing the impact of climate change.

Adaptation measures include –

- Accommodate;
- Protect/defend; or
- Retreat.

Accommodate is described as accommodating the affects in a harmonious way without resisting or retreating. This involve modifying existing infrastructure in situ without any addition protection methods. An example of this would be to utilising pressure sewer system in the same location to provide an alternative approach to the management of wastewater services.

Protect/defend is described as placing a physical barrier between the asset and the impact zone to reduce the expose. This option would include the construction of retaining structures or sea walls however if these measures are implemented then the measure themselves should become assets which would require management into the future and adequate budgeting would need to be allocated for the whole of life costs of these protection assets.

Retreat from climate changes is self-explanatory. This option is identified as the most difficult particularly with high value long life assets such as SPS and STP's.

To determine the most effective and cost-effective approach Shoalhaven Water will need to undertake a cost benefit analysis considering the whole of life costs of options to determine the most cost-effective approach which is consistent with Shoalhaven Water's/Council's levels of service.

The effects of natural disasters and climatic change has the potential to significantly affect Shoalhaven Water's assets and the operation of those assets and affords a significant risk to the organisation if not managed effectively. As part of the new asset management processes Shoalhaven undertake periodic (5 yearly) assessments of the vulnerability of assets to the impacts of climate change on these assets.

10 FINANCIAL SUMMARY

10.1 Introduction

10.1.1 Expenditure Definitions

Expenditure and revenue projections within this plan have been classified as capital (new and renewal) or operating, in accordance with generally accepted accounting practice.

Shoalhaven Water has developed an asset management policy that reflects accounting treatment of activities for infrastructure asset components. It has approved the use of this policy, and these definitions have been applied during the development of this asset management plan.

Expenditure on infrastructure assets can be categorised into five main areas:

- Operations and Maintenance (Sustaining Assets)
- New Works - Growth
- New Works – Asset Enhancement
- Renewals/Replacement
- Disposals

These are discussed below.

Operations and Maintenance (Sustaining Assets)

Operations and maintenance expenditure that is required for the day-to-day operation of the network whilst maintaining the current levels of service. Examples of this type of expenditure are:

Routine maintenance

- This includes day to day maintenance which is required on an ongoing basis and is budgeted for, and reactive maintenance is unexpected and necessary to attend to immediately to continue operation of the service.

Major periodic replacements

- This includes non-day-to-day maintenance which is identified in advance and is incorporated into a maintenance budget for a certain time period.

Other operating costs

- These include energy consumption costs, cleaning costs, fleet and management and administration costs.

New Works - Growth

These are the capital costs for meeting growth in service demand. Capital new works involves the creation of new assets, or works, which upgrade or improve an existing asset beyond its current capacity or performance in response to changes in usage or customer expectations.

New Works – Asset Enhancement

Enhancing service delivery (ie the level of service provided by the business unit) through upgrades to the asset base.

Renewals/Replacement

Renewal expenditure includes rehabilitation and replacement of assets to restore an asset to its original level of service, ie capacity or the required condition. Renewals expenditure forecasts cover the cost of asset renewal through its whole lifecycle through to disposal of the asset.

Renewal expenditure is work that restores an existing asset to its original level of service, ie capacity or the required condition.

Rehabilitation involves the repair of an existing asset, or asset component. Rehabilitation doesn't provide for a planned increase in the operating capacity or design loading. It is intended to enable the assets to continue to be operated to meet the current levels of service.

Disposals

Disposal is the retirement or sale of assets whether surplus or superseded by new or improved systems. Assets may become surplus to requirements for any of the following reasons:

- Under utilisation
- Obsolescence
- Provision exceeds required level of service
- Assets replaced before its predicted economic life
- Uneconomic to upgrade or operate
- Policy changes
- Service provided by other means (eg private sector involvement)
- Potential risk of ownership (financial, environmental, legal, social).

Disposals shall be considered and undertaken in accordance with Council's Asset Accounting Policy (Other Than Land and Buildings) POL22/73.

10.1.2 Assumptions

Shoalhaven Water has adopted a 20-year planning horizon for water and sewer,. The following assumptions are incorporated into the current 20 year model:

- No State Government subsidies for water supply
- CPI increases for future years = 3% p a
- Loan borrowings – Period of loan = 15 years
- Interest rates for new loans = 8.75%

10.2 Asset Valuation

In 2021/22 Shoalhaven Water undertook a full revaluation of assets at component level. The level of componentisation is consistent with the Asset Accounting Standards, ISO 55000, Council's Asset Valuation Procedure and the AIFMM. The revaluation was undertaken utilising internal & external resources. Cost estimating tools included, Rawlinsons Construction Handbook, recent works contract, internal cost estimating tools & the NSW Reference Rates Asset valuations. Further details on the revaluation process and ongoing asset accounting practices is available in the Asset Accounting and revaluation reports for each respective year.

The asset value and annual depreciation has more than doubled since 2005/06, and the asset replacement value for wastewater assets is now over $948M.

Figure 10-1 Historical Asset Value

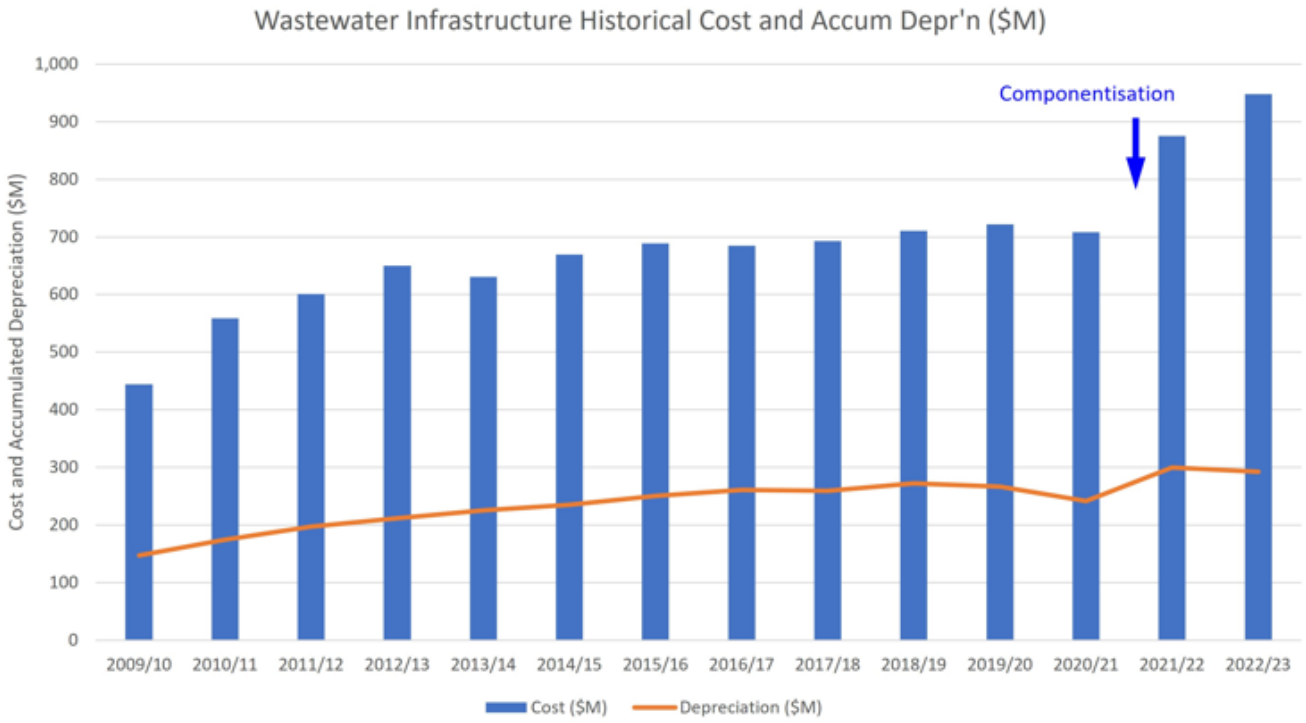
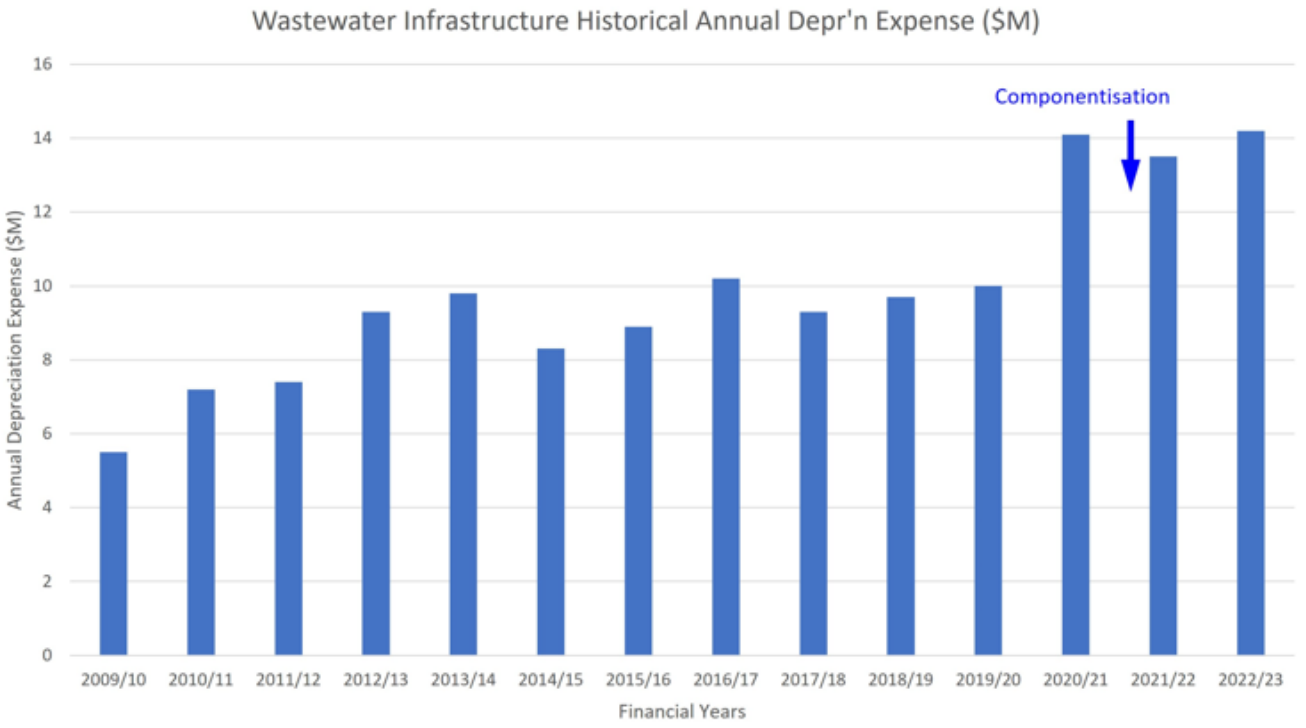


Figure 10-2 Historical Annual Depreciation (30/06/2023)



10.2.1 Financial Treatment for Relined Assets

Relining assets are capitalised based on the following processes. This allows for updating of the assets condition, useful life and capitalisation of the works which is consistent and in accordance with asset accounting standards. The treatment of this capital in the asset register can be summarised as per the process below.

Table 10-1 Asset Capitalisation – Sewer Re-lining

Process	Changes made in asset register
New works capitalisation	Value of relining for individual asset added as capital
Asset creation date changed	"Year Created" changed to reline date in asset register
Condition assessment undertaken	Condition rating given "Excellent" = 1 in asset register
Asset Expiry modified	Expiry date = relining date + 50 years in asset register
Description and relining identified for individual assets	Asset Description updated to included "Relined" Relining field in database ticked and asset notes updated in asset register
Residual value changed to zero	Residual value field set to zero and manual calc of residual value ticked in asset register
Post Capitalisation reports run	Reports run from asset register
Asset depreciated	Batch Depreciation undertaken in asset register & reported
Asset indexed	Batch indexation undertaken in asset register & reported

This process was decided after discussion with SCC accountants, asset section and the Shoalhaven Water's Executive Manager. Direction was sought from auditors and other industry bodies with several differing methodologies provided. The decision to follow the path above was determined based on the following assumptions.

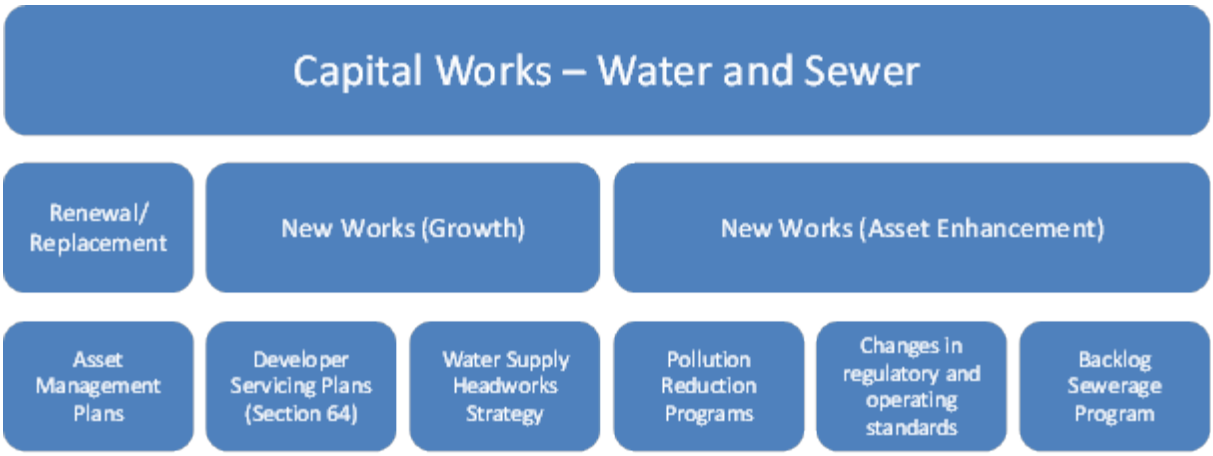
- 40% residual held in existing asset has now been used and in future full replacement of the asset would be required after relining.
- Date of relining is effectively the creation date of the asset.
- Expiry date of 50 years is estimated from limited research and will need to be refined once further information is available.
- Condition of relining is as new.

The Asset Information Framework report (April 2013), prepared by GHD, included a review of SW unit rates and base lives. That report also included recommendations with respect to Shoalhaven Water's valuation practices and development of a new component-level valuation methodology by 2017.

10.3 Capital Investment Decision-Making

The water and wastewater funds provide for capital programs each year for renewal/ replacement works, new works for growth and new works for asset enhancement (including backlog wastewater works). The "building blocks" or drivers of these programs are given in the diagram below.

Figure 10-3 Building Blocks for Capital Investment Programs



10.3.1 Capital Investment Program

The wastewater capital program has been dominated over the past 5 years by the REMS 1B project. This project comprised renew, growth and asset enhancement components with the upgrading of the existing Bomaderry and Nowra STP's and the new REMS mains linking these plants with the existing REMS infrastructure at Callala STP. With the completion of that project focus has now turned to renewal programs such as St Annes and Lyrbird Park SPS and rising main projects and new works project such as the Moss Vale Rd, Mundamia and more recently the West Culburra URA.

Council models the 20-year financial forecasts as required under the Strategic Planning Framework. The water and sewer funds are managed in a manner to achieve an operating surplus in each fund and seek to pay a dividend to Council. Dividends have been paid to Council's General Fund in accordance with The Department of Climate Change, Energy, the Environment and Water requirements. Further guidance on the payment of dividends is available in Shoalhaven Water's (Strategic Business Plan 2020/21 (Pg 19).

10.3.2 Project Prioritisation

Capital Works Projects are prioritised based on a series of key strategic drivers. The strategic drivers are summarised as follows:

Population Affected:

- Rates projects based on the projected scope and impact of the project in relation to the size of the population that may be impacted. For example, this assessment may consider the population served by assets addressed by the project, or the impact on population if the assets were to fail. Higher impact projects are given priority.

Time Criticality:

- Rates projects based on the timeframe required to complete resolution of the project in comparison to the anticipated deadline for completion. Priority is given to projects whose time to completion is greater than or close to the time to deadline.

Failure Risk:

- Rates projects based on the Risk to Shoalhaven Water in the event of failure of the assets, or failure of the project to be completed on time. Failure risk considers financial impacts as well as reputational risk, risk to service provision etc. Projects with higher risk are given priority.

Operational Efficiency:

- Rates projects on their potential to provide a tangible operational efficiency improvement (and therefore reduce costs). Projects with higher benefit: cost ratio are given priority.

Sensitivity of Affected Environment:

- This rating is only considered for Wastewater portfolio projects. It rates projects based on the sensitivity of the potential receiving environment to sewage spills or overflows. Projects targeting assets in the vicinity of highly sensitive environments are given priority.

Each strategic driver for each project is rated on the following scale:

- None
- Low
- Moderate
- Strong
- Extreme

The strategic drivers are weighted based on a consensus weighting determined by the Shoalhaven Water Investment Review Committee. Driver weightings are:

- Water Projects:
    - Population Affected – 41.2%
    - Failure Risk – 29.3%
    - Time Criticality – 22.0%
    - Operational Efficiency – 7.5%

- Wastewater Projects:
    - Failure Risk – 26.2%
    - Population Affected – 25.3%
    - Sensitivity of Environment – 22.1%
    - Time Criticality – 19.8%
    - Operational Efficiency – 6.6%

Once rated, a project weighted score is determined which is used to rank all projects in priority order. Projects are then selected for inclusion in the capital works plan based on priority order, and compared against resources and funds availability. The final selection of projects aims to maximise the number of priority projects executed within the business' constraints.

10.3.3 Renewal/Replacement Decision Making

Assets are renewed when it is more cost effective in the long term to replace rather than continue to maintain the asset. There are two elements to renewal decision-making:

- **Renewal financial forecasts** are based on asset depreciation, lifecycle costs and reliability/operational redundancy.
- **Asset renewal decisions** are identified through analysis of criticality, condition and performance information gained through inspections, advanced analysis techniques and maintenance activities.

Renewal decision-making has been reviewed in conjunction with Asset Criticality Framework & Management Strategies Report (GHD 28 March 2013). This report used population, critical customer, environmental considerations, critical infrastructure and legislative requirements to categorise

infrastructure. The data is programmed to be workshopped to compare with historical data on main breakage/overflows and maintenance costs.

Renewal forecasting for sewerage pumps and capacity has been undertaken based criticality, environmental factors and design life.

10.3.4 New Works (Growth and Enhancements) Decision Making

In 2013, servicing strategies were developed for the wastewater transportation systems and Wastewater treatment plants (STPs). These strategies provide a program for system augmentation and capital works that allows Shoalhaven Water to plan for the future.

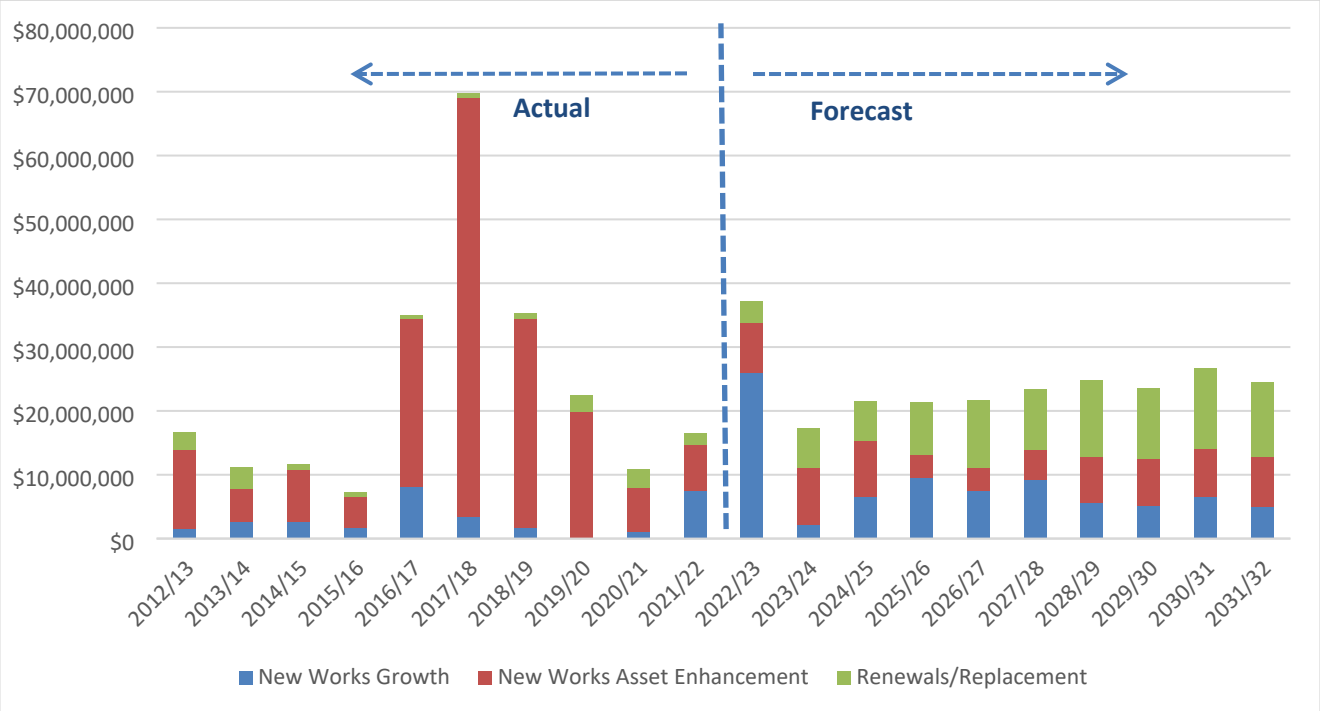
10.4 Financial Statements and Projections

10.4.1 Capital Works Expenditure

10.4.1.1 Capital Expenditure History

Over the last 11 years the amount of wastewater capital works has been very significant and dominated by backlog works (defined within the Asset Enhancement category). Over $230M has been spent on wastewater capital works over the last 10years. This is shown in the graph below.

Figure 10-4 Capital Works Expenditure History (June 22)



These figures provide a broad based categorization of the drivers for the capital works program, but some caution also needs to be applied. Individual projects do not necessarily fall neatly into a “growth”, “renewal” or “enhancement” category and can be a combination of all three, which would not be reflected in the financial information for the project.

10.4.1.2 Capital Expenditure Forecast

A 10-year capital expenditure forecast is provided in the graph and table below.

Figure 10-5 Capital Works Expenditure Forecast (June 2022)

New works growth expenditure dominates the capital works forecast, particularly over the first year. This is driven by the Moss Vale Rd URA project which is estimated to cost around $25M concluding in 2024. Beyond 2024 the focus has shifted to renewal projects and other growth projects throughout the region. Following the 2023 Financial Sustainability Review by AEC, Council has resolved to increase expenditure in renewal to achieve at least 80% of depreciation expense. Future levels of expenditure will be driven by the Asset Renewal Funding Ratio and growth as the Shoalhaven Region continues to grow.

'Other' expenditure includes chargeable private works and other asset capital expenditure.

The supporting expenditure table is shown below.

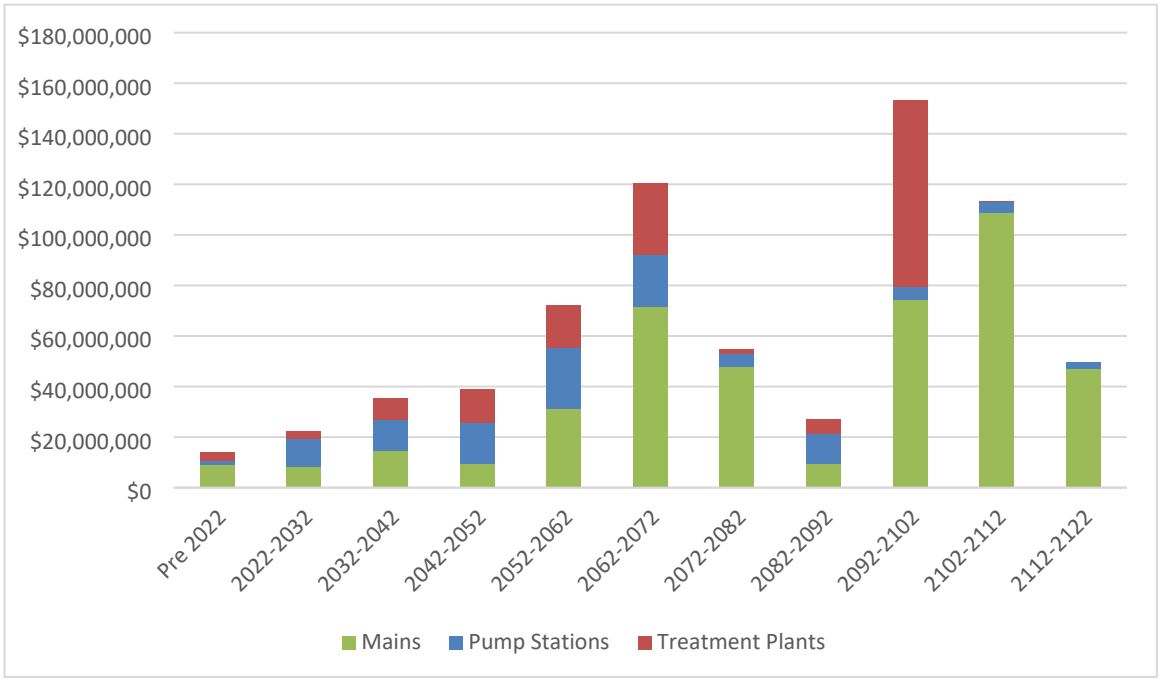
Table 10-2 Capital Works Expenditure Forecast) (June 2023)

Category	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Chargeable Private Works	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000				
Asset Enhancement	$6,711,000	$12,775,000	$12,390,000	$12,190,000	$13,090,000	$15,090,000	$15,000,000	$15,000,000	$15,000,000	$5,000,000
New Works Growth	$10,568,166	$2,350,000	$5,540,000	$3,600,000	$9,150,000	$5,000,000	$4,100,000	$5,320,000	$8,770,000	$10,300,000
Other Assets	$1,020,000	$3,384,000	$1,020,000	$1,020,000	$1,020,000	$900,000	$900,000	$900,000	$900,000	$900,000
Renewal / Replacement	$6,699,631	$11,000,000	$8,085,000	$10,400,000	$8,650,000	$10,650,000	$9,000,000	$10,000,000	$9,000,000	$9,000,000
Total Capital Expenditure	**$25,108,797**	**$29,539,000**	**$27,085,000**	**$27,260,000**	**$31,960,000**	**$31,640,000**	**$29,000,000**	**$31,200,000**	**$33,670,000**	**$25,200,000**

10.4.1.3 Renewals Forecast

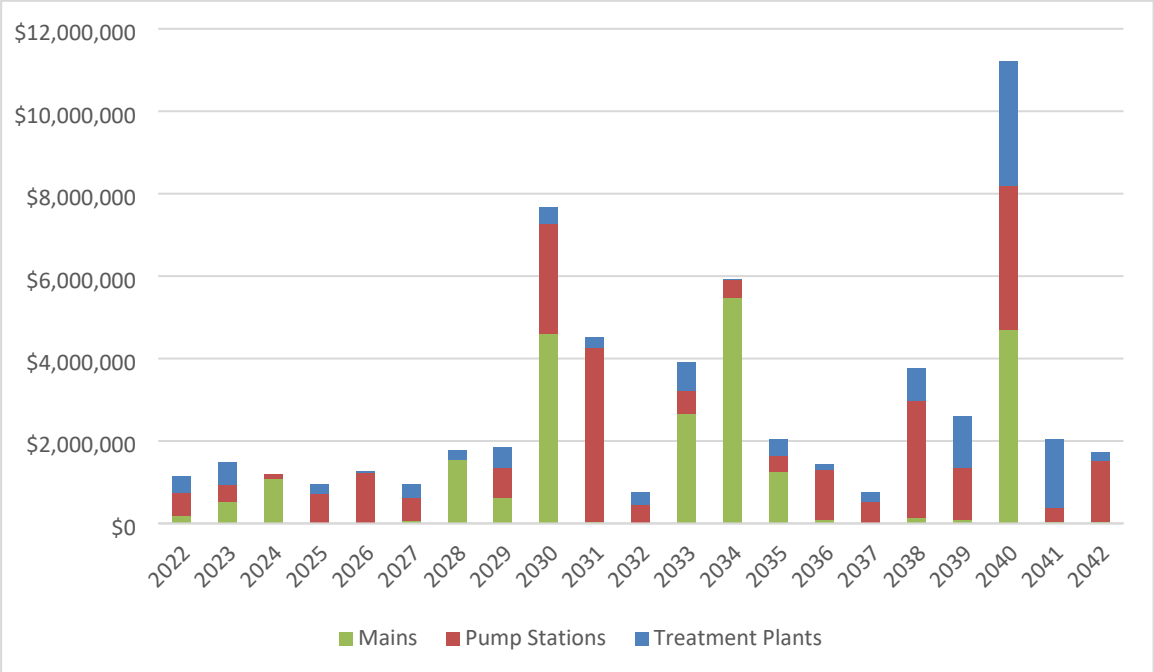
The following graph provides a snapshot of future wastewater replacement requirements, based on design asset life only. The timeline has been grouped into decades for simplicity. This shows significant renewals expenditure required in the 2045-2064 time period and again in 2065 to 2074. The renewals in 2065 to 74 are mainly due to the renewal of the recently completed Nowra and Bomaderry STP's which combined cost in excess of $100M.

Figure 10-6 Replacement Cost by Decade to be Replaced (based on End-of-Design Life)



The financial planning period for the capital works program is 20 years, and the 20-year period expanded from the above graph is given below.

Figure 10-7 20 Year Replacement Cost by End-of-Life (Design Life)

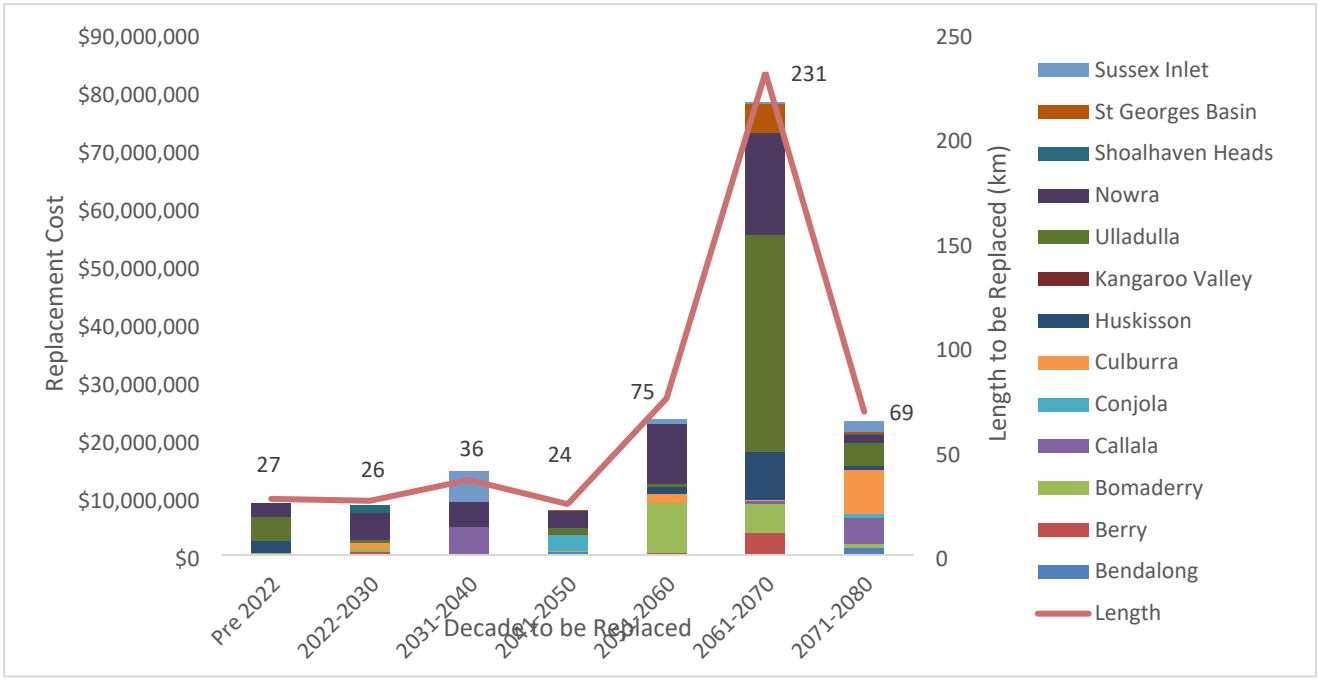


The “backlog” of over $13M suggested by the above graph is primarily related to pipes and is based on the data contained in the Tech One Asset Register.

Most of the backlog shown in the above graph is in wastewater pipes. A breakdown of these older pipes is given in the graph below, which shows the lengths of pipe in each system. The data indicates that, based on the age of the pipes the Nowra system should have undergone major replacement. Due to other risk factors, the Culburra system has been the subject of the relining program to date, with 30km of main effectively replaced. The next stage of the relining/replacement program will be reviewed based on the critical assets list.

A total of 20.813 kilometres of relining at Nowra has taken place between 2002 to 2014. 10 km of gravity mains were relined between 2012 and 2013 at a cost of $3,831,065.04. This was uploaded into the Conquest database and transferred across to TechOne in 2020. The remaining 10.8km of completed relining remains is in the GIS was entered into the Conquest database in 2015.

Figure 10-8 Wastewater Pipes – Replacement Cost by Decade



10.5 Operations and Maintenance Expenditure

10.5.1.1 Operations and Maintenance Expenditure History

Wastewater historical maintenance expenses are shown in the graph below.

Figure 10-9 Operations and maintenance Expenditure History

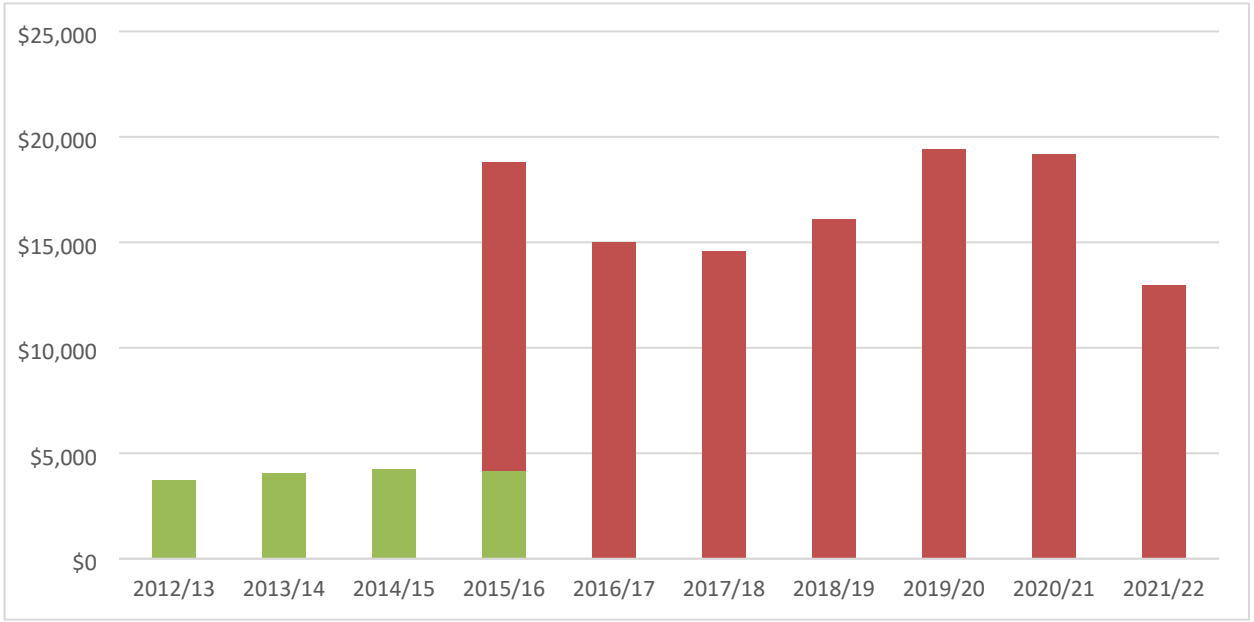


Figure 10-10 Operations and Maintenance Expenditure Forecast (June 2022)

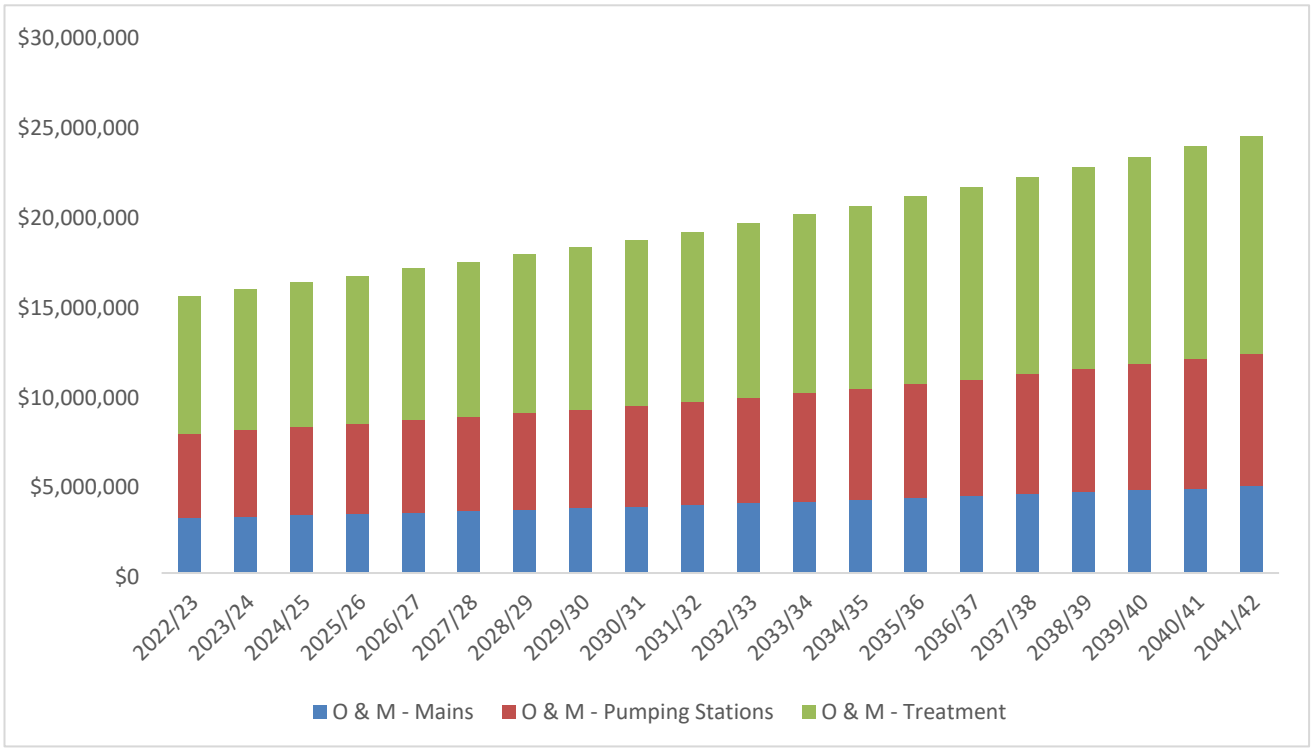


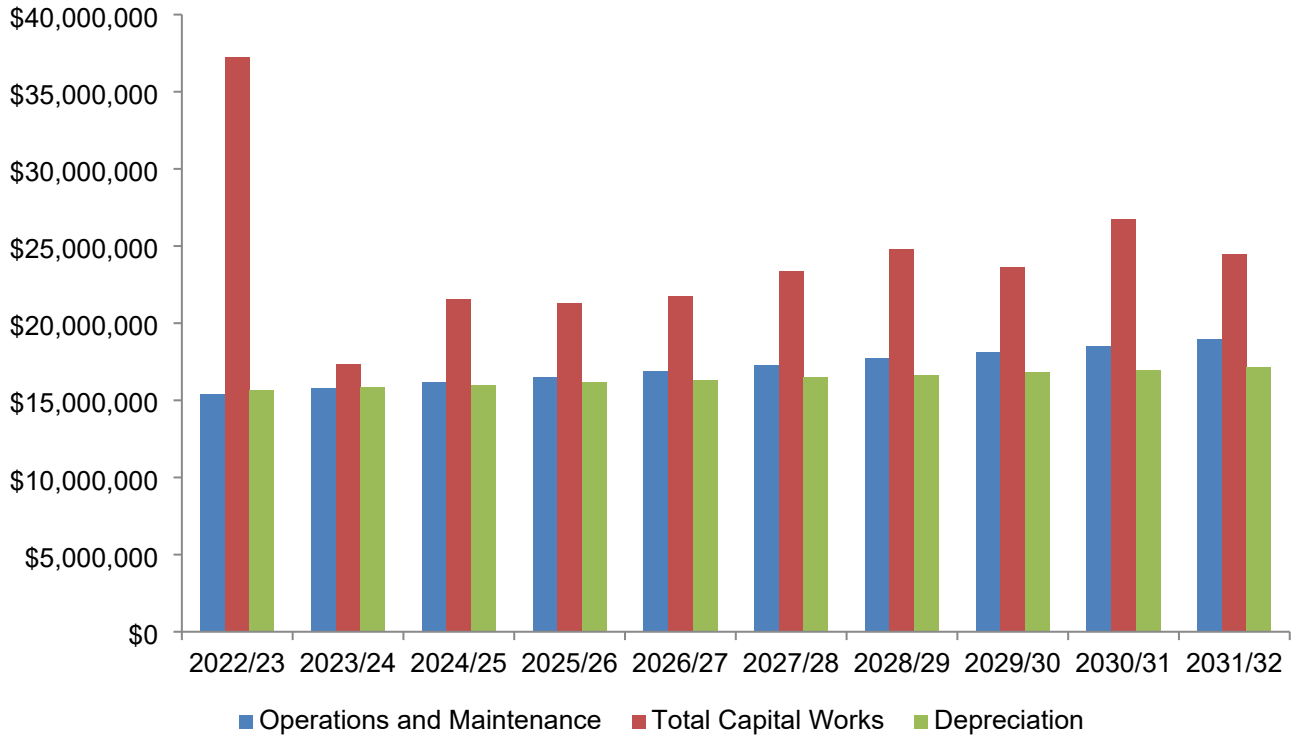
Table 10-3 Operations and Maintenance Expenditure Forecast (June 2022) $M

Category	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36	2036/37	2037/38	2038/39	2039/40	2040/41	2041/42
Management Expenses (Incl Admin charge to General Fund)	11.61	11.90	12.19	12.47	12.76	13.06	13.36	13.67	13.99	14.31	14.67	15.03	15.41	15.79	16.19	16.59	17.01	17.43	17.87	18.32
O & M - Mains	3.07	3.15	3.22	3.30	3.37	3.45	3.53	3.61	3.70	3.78	3.88	3.97	4.07	4.17	4.28	4.38	4.49	4.61	4.72	4.84
O & M - Pumping Stations	4.67	4.79	4.90	5.02	5.13	5.25	5.37	5.49	5.62	5.75	5.89	6.04	6.19	6.34	6.50	6.66	6.83	7.00	7.18	7.36
O & M - Treatment	7.64	7.83	8.02	8.21	8.40	8.60	8.80	9.01	9.22	9.44	9.67	9.91	10.16	10.42	10.68	10.94	11.22	11.50	11.78	12.08
O & M - Other	1.18	1.21	1.24	1.27	1.30	1.33	1.37	1.40	1.43	1.47	1.51	1.54	1.58	1.62	1.66	1.71	1.75	1.79	1.84	1.88
Sanitary Services	1.20	1.23	1.27	1.30	1.33	1.36	1.40	1.43	1.47	1.51	1.54	1.58	1.62	1.66	1.70	1.75	1.79	1.83	1.88	1.93
Total Operations and Maintenance Expenditure	29.37	30.10	30.85	31.57	32.30	33.06	33.83	34.62	35.42	36.25	37.16	38.08	39.04	40.01	41.01	42.04	43.09	44.17	45.27	46.40

10.5.2 Expenditure Summary

The 10-year financial projections for planned operating expenditure (operations and maintenance), total capital works and depreciation are given in the graph below.

Figure 10-11 20-Year Financial Forecast (June 2022)



Note – Management expenses excluded from graph above as these are expenses which are not directly attributed to individual asset or asset classes.

The current program allows for a “smoothing” of the replacement peaks. With little data to validate or dispute the assumed asset lives at this stage, the model will be refined through “what if” scenarios.

Table 10-4 Total Expenditure Forecast (June 2022) $M

Category	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36	2036/37	2037/38	2038/39	2039/40	2040/41	2041/42
Total Operations and Maintenance	15.4	15.8	16.2	16.5	17.0	17.3	17.7	18.1	18.5	19.0	19.4	19.9	20.4	20.9	21.4	22.0	22.5	23.1	23.7	24.3
Total Capital Expenditure	37.2	17.3	21.5	21.3	21.7	23.3	24.8	23.6	26.7	24.5										
Depreciation	15.7	15.8	16.0	16.2	16.3	16.5	16.6	16.8	17.0	17.1										

10.6 Key Projects, Costs and Timing

The following table provides a summary of the key projects, cost and timing for the first five (5) years. Detailed explanations of the projects are included within each of the asset descriptions in Section 4. The full list of capital projects is available in Appendix 2.

Table 10-5 Key Projects, Costs and Timing

Project	Expenditure Category	Approximate Project Cost and Timing ($M)					
		2023/24	2024/25	2025/26	2026/27	2027/28	2028/29
Sewer Electrical Cabinet Upgrades	Renewal		0.75	.3	.3		
St Georges Basin STP Upgrades	Renewal				1	1.9	
Ulladulla STP Upgrades	Renewal			1	4	10	10
Mundamia SPS N-F4 - RM and GM	Growth			4.5			
Nowra Lyrebird SPS2 GM Upgrade	Growth	0.2		1.8			
Sussex Inlet STP Augmentation	Growth				1.5	2.0	
South Nowra Surcharge Main Upgrades	Renewal	5.1	5.6	5.2			
Moss Vale Rd expansion area - WWtr	Growth	3.0					
Huskisson SPS 7 & Rising Main Upgrade	Renewal	2.9	3.2				
Culburra STP Upgrades	Growth			3	5	5	5
Erowal Bay Sewer Protection	Enhancement	1.7					

11 SERVICE DELIVERY MODEL

The operations and majority of routine maintenance activities for water assets are currently undertaken by council workforce. Some specialized maintenance tasks are carried out by external contract as Council does not have the resources and/or equipment to economically undertake the activity.

Mechanical and electrical maintenance is currently carried out by Shoalhaven Water's electrical mechanical services sections that operate under Shoalhaven Water's, Water Operations and Maintenance sections.

Some minor construction activities are undertaken by Council staff, but the majority of construction projects are undertaken by contract. This model places more emphasis on internal project management resources and further assessment of technical resources will be required to determine future requirements.

To improve the service delivery and asset data management Shoalhaven Water will focus on development of a comprehensive scheduled maintenance program utilising the TechOne One Council Solution to develop and implement the Scheduled maintenance program. Resourcing for this system will be a key constraint and recruitment of these roles has commenced in 2022.

12 PLAN IMPROVEMENT AND MONITORING

12.1 AMP Performance Measurement

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

The degree to which the required cash flows identified in this asset management plan are incorporated into council's long term financial plan and Strategic Management Plan;

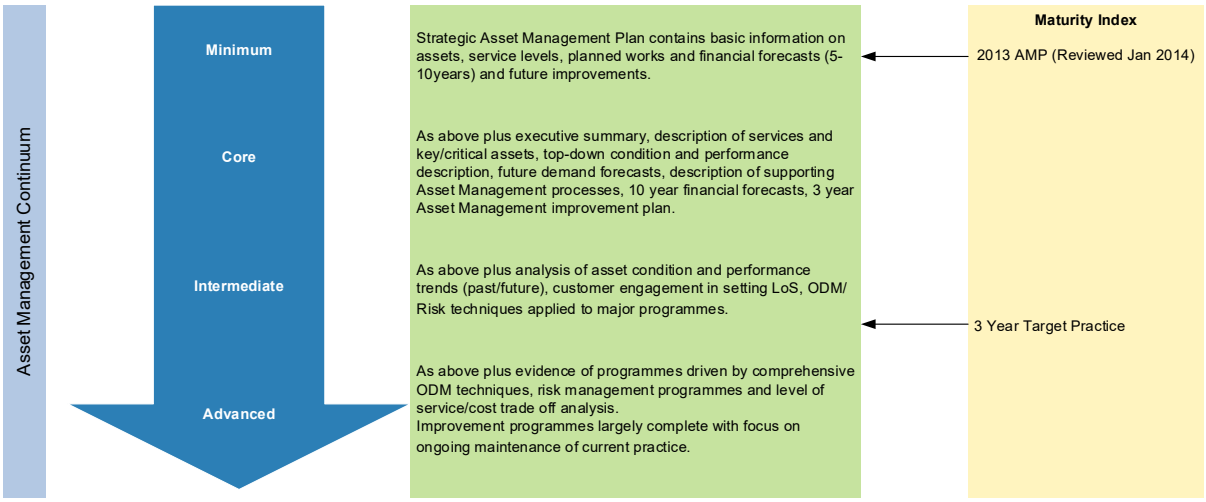
The degree to which 1-5 year detailed works programs, budgets, business plans and organisational structures take into account the 'global' works program trends provided by the asset management plan;

External or internal assessment against best practice guidelines.

12.2 Core and Advanced Asset Management

The development of an Asset Management Plan (AMP) is undertaken over a number of years. Its evolution is dependent on the commitment by Shoalhaven Water and the organisation as a whole to continuous improvement and to provide ongoing investment in its asset management capability. The maturity index provides an indication of where the AMP sits in the asset management continuum, based on the International Infrastructure Management Manual (IIMM 2011).

Figure 12-1 The Asset Management Maturity Index



12.2.1 Shoalhaven Wastewater AMP

In January 2014, Shoalhaven Water engaged an external consultant to undertake a review of the 2013 AMP. The AMP was reviewed against a range of criteria under ten aspects of the asset management framework. The purpose of the review was to identify and prioritise any gaps in the AMP documents and focus improvements to provide the greatest benefit towards achieving Intermediate to Advanced AMP status (based on the International Infrastructure Management Manual AMP Maturity Index).

Overall, the 2013 AMP was found to present a preliminary summary of the asset information available to Shoalhaven Water, however significant improvements were required to both structure and content to improve the AMP. The AMP was found to be at the minimum level of AMP development.

Shoalhaven Water aims to improve the AMP to an intermediate level, with a score of above 0.70. A prioritised list of improvement tasks was provided as part of the AMP review and was used to inform this update to the AMP. Due to time constraints this AMP update incorporates some, but not all of the recommended AMP improvements. Further improvements are required to advance the asset management activity to the upper intermediate level of development and these improvements are outlined in the improvement plan section of this AMP.

The AMP status and programme for improvements is explained below:

- The 2013 AMP Review showed the AMP at core level of development.
- Since the 2013 AMP Shoalhaven Water has continued to make significant improvements in asset management planning and practices and these are recorded in this AMP update.
- Shoalhaven Water aim to improve the AMP to an intermediate level and an AMP framework has been developed (not yet populated) to achieve this.
- The new AMP framework will be progressively updated by June 2016.

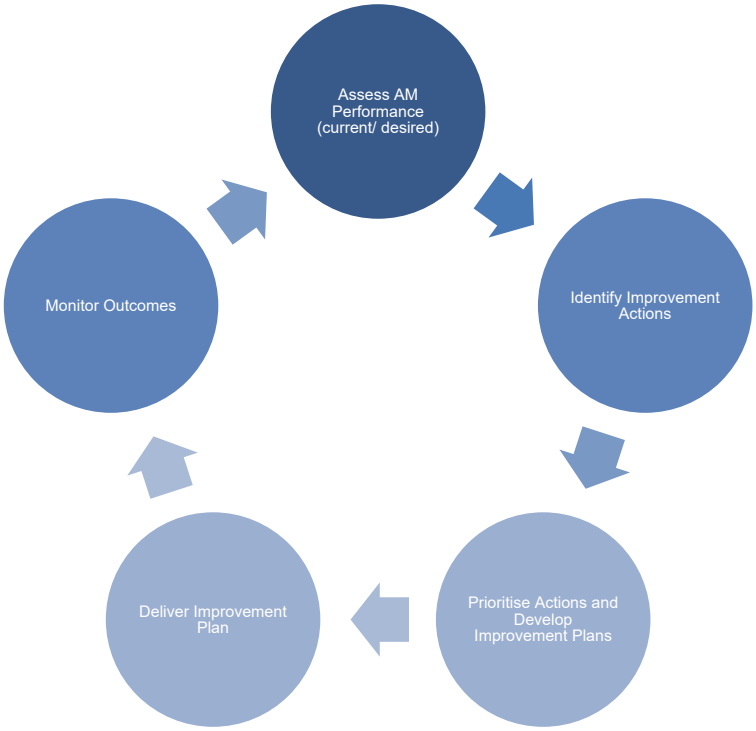
12.3 Continuous Improvement

Shoalhaven Water is adopting a strategic management approach to improvement planning and implementing improvement processes and practices. This Improvement Plan is integral to that approach, quantifying current business practice and measuring progress toward an identified future position.

12.3.1 Improvement Cycle

The purpose of the Improvement Plan is to identify, prioritise and implement specific projects and tasks which will increase the level of maturity over time.

Figure 12-2 Continuous Improvement Cycle



12.3.2 Current Practice Assessment

The first step of asset management improvement planning is to understand the current and future ***"appropriate practices"***. To do this in a systematic way the following elements will be assessed:

- Asset Management Policy Development
- Levels of Service and Performance Management
- Demand Forecasting
- Asset Register Data
- Asset Condition
- Risk Management
- Decision Making
- Operational Planning
- Maintenance Planning
- Capital Works Planning
- Financial and Funding Strategies
- Asset Management Teams
- Asset Management Plans
- Information Systems
- Service Delivery Mechanisms
- Quality Management
- Improvement Planning

These key elements are critical to achieving sustained performance of the organisation at the lowest life cycle cost and to form a clear picture of how well it is performing in each of these elements and where the weaknesses lie. Each of the elements "adds value" to the raw business processes which leads to good asset management practice.

12.3.3 Identify Improvement Actions

A clear understanding of the gap between current and appropriate practice will help drive identification of improvement actions. However, identifying improvements should also be an on-going activity, not just a "one-off" gap assessment process.

Improvement actions need to be clearly scoped and defined. Failure to recognise the full costs associated with improvements may see the projects inadequately resourced and potentially not meeting the desired outcomes.

12.3.4 Develop Improvement Plan & Prioritise Actions

The Improvement Plan will be developed to identify the high priorities requiring action to focus the organisation on the most important areas. Utilising a simple improvement framework that has a clear relationship to the assessment elements will help people understand how the actions relate to the appropriate level of asset management required.

12.3.5 Monitor the Outcomes

Organisations are under pressure to show the quantifiable benefits from improving asset management outcomes and this is a real challenge across local government. Regular asset management assessments using the frameworks in this section are currently the best way to demonstrate on-going improvement to asset management practices. Assessments should be undertaken over a number of years to track progress.

12.3.6 Current Asset Management Practice Assessment

In September 2012 Shoalhaven Water, as part of its commitment to improving asset management practices over time, commissioned GHD to undertake an Asset Management Capability review. Following the recommendations made in this review, Shoalhaven embarked on a number of improvements across the business and in September 2014 commissioned GHD to review progress against the initial set of recommendations.

The maturity of the wastewater activity across the 9 assessment areas and 17 key asset management elements are shown in Figure 12-3 and Figure 12-4 below. The blue bar in Figure 12-3 represents the baseline maturity determined in September 2012. Green is the recommended target to be achieved by 2016/17. Orange depicts the progress to September 2014 confirming the maturity advancements over the last 2 years. The framework used to assess the maturity levels of each AM element is from the International Infrastructure Management Manual (IIMM). These elements have also been utilised to develop strategies for improving asset management practices over the next three years later in the section.

As depicted in Figure 12-3 below, progress to September 2014 shows consistent and steady improvements in asset management with the largest increases are in programming, data, and information. An updated list of business enhancement projects and priorities was produced to enable Shoalhaven Water to achieve an intermediate (competent 60 status) level of Asset Management Practice by June 2017.

Following on from previous assessments an Asset Management Maturity Assessment was completed utilising the Shoalhaven Water Asset Management Strategy as the foundation for the assessment. The outcomes of that assessment identified significant improvement over the past 5 years however further work is still needed.

Figure 12-3 Asset Management Maturity Assessment and Improvements as at September 2014

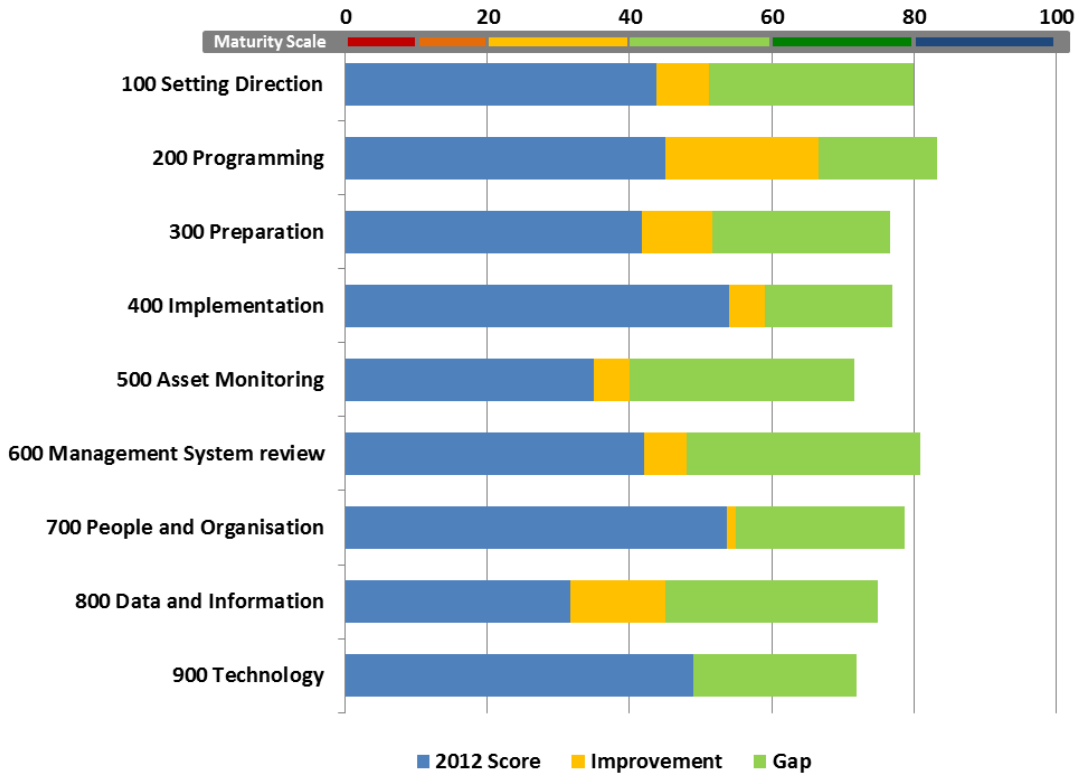
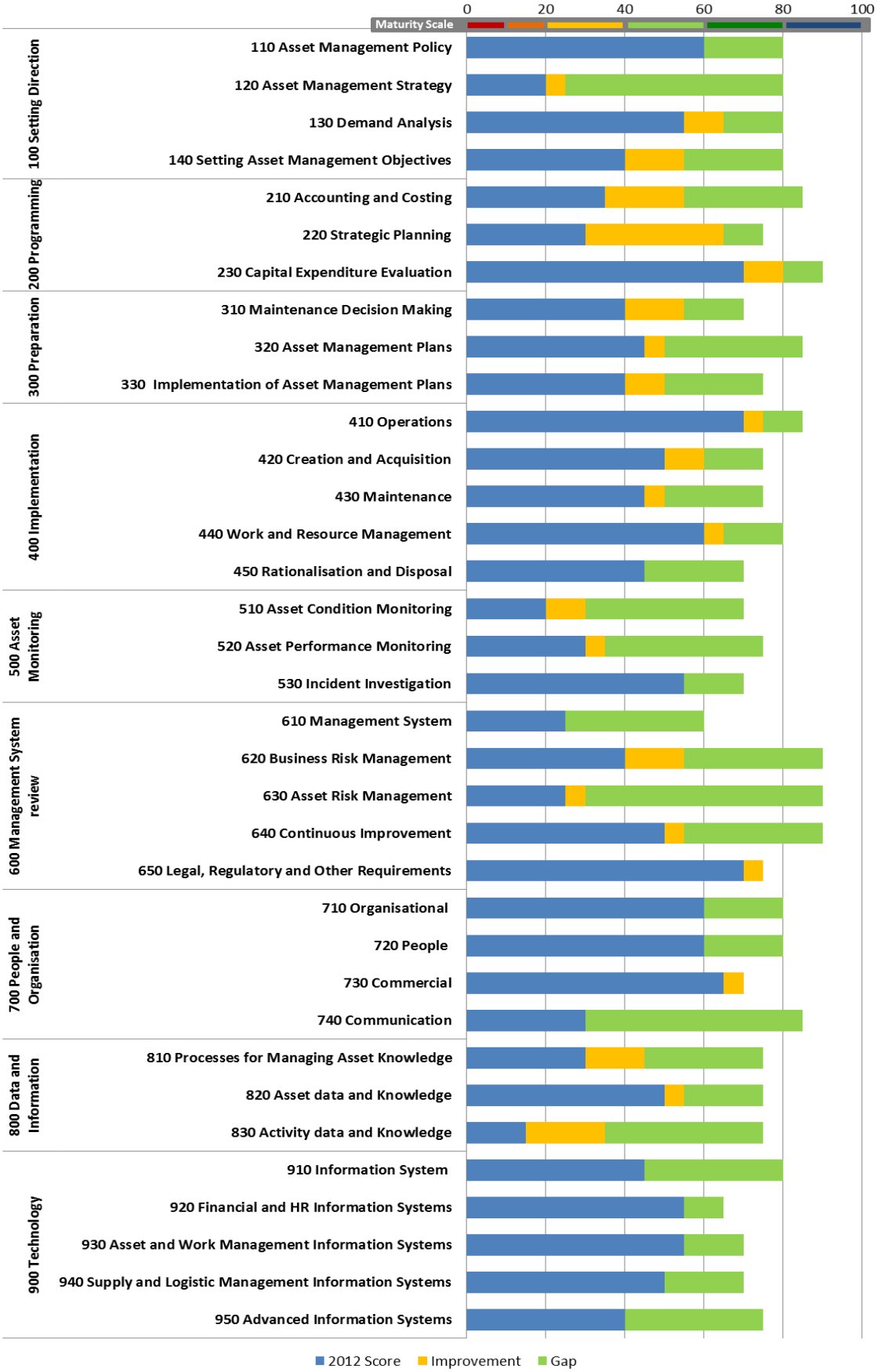


Figure 12-4 Assessment Element Results



12.4 Achievements

The improvements achieved over the past 6 years are summarised briefly below:

- Implementation of ArcGIS Collector App for mobile condition assessment of water hydrants, valves and mains.
- Development of Survey 123 for complex asset condition assessment.
- Development of GIS Officer Procedures documentation.
- Componentisation of Asset Register to component level
- Development of a Shoalhaven Water Asset Management Policy
- Review of Shoalhaven City Council Asset Management Strategy
- Adoption of a Community Engagement Policy, customer surveys and reporting
- Critical and Trade Waste customers being mapped into GIS
- Development of an Asset Information Framework
- Development of a Capital Investment Framework and Prioritisation Methodology and documentation of the business processes and policy
- Water and Wastewater servicing strategies to provide a program for system augmentation and capital works
- Asset Criticality Framework and Management strategies, Criticality Framework Implementation and Critical Assets Management Strategies
- Development of a Framework for the Water and Sewer Asset Management Plans
- Asset Management Plan Review
- Established a Shoalhaven Water Asset Management Steering Group and a Terms of Reference.
- Collector and other Asset Data Collections
- Asset Data Hierarchy Review.
- Asset Information Confidence Rating.
- Development of Customer Service Plan
- Update AMP's

12.5 Improvement Plan

12.5.1 Setting Priorities

A thorough asset management review process will often identify more improvements that an organisation is able to realistically deliver within a short timeframe. Therefore, there is a need to prioritise these actions so they are realistic and affordable.

The projects/tasks are prioritised based on the gap between the current maturity and what is the appropriate target for the business unit, versus the cost.

Table 12-1 below provides a general meaning ranging from Priority A (very high priority) to Priority E (very low priority).

Table 12-1 Prioritisation General Meaning

Priority		**Explanation**
A	Very High priority	These improvement tasks provide very high value for money and should be implemented in the short term (ie in the next year). The improvement tasks identified will provide the most benefit (eg overall improvement towards the appropriate target) for the least cost (less than $10,000) Typically, the higher benefit ones improve legislative compliance, greatly enhance operational efficiency, provide significant cost savings or mitigate major risk
B	High Priority	These improvement tasks provide high value for money and should be implemented in the short to medium term
C	Medium Priority	These improvement tasks provide a medium level of value for money and should be considered for implementation in the longer term
D	Low Priority	These improvements provide relatively low value for money, and should only be implemented after higher priority improvement tasks
E	Very Low Priority	These improvement tasks provide the least benefit for the highest cost and should only be implemented if they are a pre-requisite for another task, or there are no other higher priority tasks.

12.5.2 Three-Year Improvements

The tables that follow contain the improvement projects/tasks to be undertaken over the next 3 years across the organisation and specific improvements to be undertaken for the wastewater activity. The table includes levels of resources, funding and priorities (based on the above matrix) for each identified improvement task.

Table 12-2 Improvement Plan

	Policy Statements	Findings	Recommendations
Asset Management Strategy / Asset Management Plan			
	The Asset Management Plans (AMPs) will document the plan to manage Shoalhaven Water's assets to support the delivery of our strategic direction and our contribution to the Governments priorities and outcomes,	Asset management plans exist for the water, wastewater and telecommunications systems, and contain comprehensive information about the infrastructure and forecast expenditure needs. It is unclear how the AMPs are used in the management of the infrastructure systems. However, we note the improvements made to the sections on management strategies as compared to earlier versions of the AMPs, with information on current practice and what needs to be done to improve performance. These sections are core to the management of the assets and could be improved with timelines and dollars; i.e. what will be done by when, and how much is that going to cost (both capital and recurrent). Timelines and dollars should form the basis for budgeted investment in the infrastructure.	The asset management plans may be streamlined by removing the asset management theory-style text. It is recommended that text be placed into a separate policy document for guidance on developing and updating asset management plans at Shoalhaven Water. Noting that asset management plans are the core output from an asset management program, it is recommended the plans be updated annually as input to the budgeting process. The asset management plans may be improved by augmenting their performance-based aspects, by stating long term goals (numerically), with short term/next year targets and comment on how performance will be improved over an appropriate planning horizon.

	The Asset Management Strategy (AM Strategy) will guide the development and review of AMPs and specify appropriate LoS with community consultation,	The Asset Management Strategy is a comprehensive document. Aspects of the information may be repeated in the AMPs (e.g. life cycle costs) to augment the financial content of the AMPs. Figure 2-1 illustrates the relationship between organisational objectives and the asset management program. We find that it is not clear how each aspect of the asset management planning process connects and aligns with each other.	The asset management strategy may be streamlined by removing the asset management theory-style text. It is recommended the order of the content in the Asset Management Strategy is changed to reflect the flow from organisational objectives to policy statements to strategies in the asset management strategy that align with asset management policy objectives. It is recommended that key customer-centric levels of service be included in the asset management strategy. The asset management planning strategies referred to in the previous paragraph should be cross-referenced to the Customer Levels of Service to illustrate how they are expected to sustain or improve customer service performance. Similarly, the introduction of key Technical Levels of Service that are aligned to the Customer Levels of Service and corelated to the asset management planning strategies will assist in demonstrating how investment in the asset management program is contributing to Shoalhaven Water's overall objectives.
	The AM Strategy and AMPs will be developed and updated to meet the requirements of the IPR Guidelines and Best Practice Management,	The reference to regulatory requirements or guidelines and other forms of best practice frameworks and concepts is an important part of developing a mature asset management program. We find that there are (more than) sufficient, defined activities to progress towards achieving excellence with the Shoalhaven Water asset management program.	It is recommended to continue development of the asset management program to align with regulatory requirements and guidelines. It is recommended that reference to best practice frameworks be constrained to the GFMAM Landscape, which is a collaborative, international effort to define a shared set of agreed, core asset management practices. This very practical framework has been briefly reviewed in light of the Shoalhaven Water asset management program.

	AMPs will be developed for all infrastructure assets,	We find there are relatively current asset management plans for the three major infrastructure systems: water, wastewater and communications facilities. It is noted in the Asset Management Strategy that the asset management plans are to be updated annually. Incorporating updates of the asset management plans as a required activity in the budget development process is best practice with keeping the plans relevant, used and focused.	As referenced above, it is recommended the asset management plans are updated on an annual basis.
	The AM Strategy and AMPs will be for a minimum time period of 20 years,	The Asset Management Strategy and asset management plans report to the 20 year planning horizon. However, we find that confidence in the quality, completeness and currency of the data is inconsistent and tending towards questioning whether the data may be relied upon. Data around levels and costs of service is considered to be an area for improvement in the strategy and plans.	It is recommended the asset management plans include a separate, simpler and formal tabulation of the extent (i.e. percentage) to which key sets of data (e.g. costs, condition, age, asset register, values) may be relied upon, what is being done to sustain and improve the data (with forecast expenditure dollars and timelines).

	AMPs will include 20 year financial projections of capital expenditure (separated into renewals and replacements, asset enhancements and growth) and operational expenditure (separated into asset maintenance and operations),	We find that the detail associated with recurrent expenditure - operations costs, maintenance costs, administration/overhead costs - is not yet maturely developed in the asset management plans. There appears to be an underlying assumption that recurrent expenditure will increase, progressively, which may reflect CPI or the growth in an infrastructure system. Discussions in the interviews indicated the challenges in capturing cost data, particularly with the introduction of new software in which the data will ultimately be captured, stored and managed.	It is recommended that the next three years include a concerted effort to begin building a reliable data set for recurrent expenditure, with trend analysis and life cycle cost analysis techniques used to identify where costs can be constrained or reduced. It is recommended that unit costs of service are developed for all services, structured so as to enable comparison across zones within the infrastructure systems and to enable comparison across asset classes (e.g. pump stations - unit cost per unit of water).
	Shoalhaven Water will establish and maintain an Asset Management Steering Group to guide the development, review and improvement of AM Strategy and AMPs.	We find that the Asset Management Steering Group is well established and actively involved in governing and directing the asset management program. It is acknowledged that the AMSG was actively engaged in this study.	It is recommended the AMSG continue functioning as it has been with the added dimension of adjusting to directing and tracking performance in delivering against policy objectives, strategies and asset management planning activities. It is recommended the AMSG begin each meeting with a review of the metrics for Customer Levels of Service,

			prime Technical Levels of Service, and key Costs of Service.

Levels of Service			
	Levels of Service (LoS) will be aligned with strategic and legal/regulatory requirements and customers/stakeholders will have an opportunity to contribute towards the development of the LoS,	Levels of Service appears to be an area with opportunity for improvement as asset management maturity continues to develop within Shoalhaven Water, certainly with respect to embedding customer service performance within asset management planning processes and the asset management plans.	It is recommended that metrics for customer-centric levels of service be developed; and, key technical levels of service developed to enable correlating investment in the assets and expenditure on the assets with sustaining and improving customer levels of service performance.
	The LoS statements will be supported by performance measures and targets that are specific, measurable and appropriate,	A range of levels of service-related performance measures and targets were observed. Generally, these were considered to be useful and to be retained; with improvements focused on increasingly numeric or statistical measures and timelines for performance targets. Alignment between measuring the customers' levels of service and spending on the assets is not clearly developed and/or reported on.	It is recommended that metrics for customer-centric levels of service be developed; and, key technical levels of service developed to enable correlating investment in the assets and expenditure on the assets with sustaining and improving customer levels of service performance.

	The AM Strategy will guide the development and review of the LoS and performance measures and targets,	In its current form the Asset Management Strategy relies heavily on reference to the Customer Service Plan, which does contain levels of service type metrics and data. However, the purpose of the Strategy is to define how organisational objectives (i.e. Customer Levels of Service) are to be realised via the asset management program, through policy objectives, strategies and asset management planning activities. This alignment is not apparent.	It is recommended the content in the Asset Management Strategy is changed to enable alignment of organisational objectives with policy statements and strategies.
	The AMP(s) will set out how the assets will be managed to deliver the LoS.	Asset management plans typically explain how, technically, customer levels of service goals and targets will be sustained and achieved over the 20 year planning horizon. This is usually by aligning technical levels of service with customer levels of service and developing asset management program activities designed to deliver technical levels of service targets and, therefore, customer levels of service targets. We find that in their current form the asset management plans reflect planning processes that are not yet mature with respect to performance alignment and, therefore, are not yet structured to clearly demonstrate how the activities described in them are resulting in the delivery of customer levels of service.	It is recommended the content in the asset management plans is changed to enable alignment of customer levels of service with asset management planning processes and activities.

Risk Assessment and Management			
	All sections within Shoalhaven Water will be responsible for undertaking risk assessments and developing risk management plans for their areas of responsibility,	We note from the briefings received at the beginning of this study that a formal risk framework is a high priority for Shoalhaven Water's asset management program. Reference was made to the WSAA Asset Risk Management Framework (PP3-027). It was found that risk is formally used with respect to business risks such as those associated with natural hazards (e.g. bushfires and storms). A criticality assessment has also been completed which correlates to risk management as critical assets (group or sub-group) inform the determination of the consequences associated with asset failure. The discussions during the interviews made reference to informal or ad hoc applications of risk management techniques, with a general willingness to apply practical risk tools when they become available. Risk, conceptually, was evident in asset management planning process. For example, age and condition criteria reflected the increasing likelihood of asset failure as assets aged and their condition deteriorated.	It is recommended Shoalhaven Water adopt PP3-027 as its risk management framework. Basic risk tools such as assessment and evaluation tables, and a risk register spreadsheet template, will need to be developed to enable the application of the framework. Current risk management activity such as business risk assessments will need to be upgraded to align with the new tools. Criticality framework criteria will need to be used to inform augmentation of the consequences table to enable correlation between risk and criticality assessments.

	Risk management plans will be reviewed annually,	Risk management plans is, conceptually, a broad subject. A risk management plan could be developed for a critical pump station, or one could be developed for the entire water system, with a correlation between the two. On the basis that a risk management plan, as defined in the policy document, represents a summary document of all significant business risks in the asset management program, we find that such a plan does not yet exist.	It is recommended that, following the adoption of PP3-027, Shoalhaven Water extract detail on its significant risks from current documentation and develop a first edition of a Shoalhaven Water Asset Risk Management Plan, detailing the current plan for treating those business risks and explaining the expansion of the risk management program over the next planning horizon (e.g. the next three years).
	Training will be provided to an appropriate level to ensure that risk management is practiced throughout Shoalhaven Water's activities,	It is noted that, in the absence of a formal risk management business function, training in risk management is yet to be formally commenced across Shoalhaven Water.	It is recommended that basic risk management training accompany the adoption of PP3-027. This should be in the form of an introduction to risk management as defined in ISO 31000 and its application as defined in the PP3-027 framework.
	The AM Strategy will identify critical assets and outline risk management strategies for these assets,	Critical assets were determined and tabulated in a report, dated 2013. While critical assets don't necessarily change all that frequently, the nature of critical assets is such that updated versions of the critical assets report ought to be routinely kept up to date and readily available. The report also makes reference to "critical customers". It is noted that the policy document does not refer to this aspect of criticality. Critical assets are referred to in the Asset Management Strategy and the asset management plans.	It is recommended the Asset Management Policy is edited to include "critical customers" along with "critical assets". It is recommended the significant risks associated with critical assets be determined and the results tabulated in the Shoalhaven Water Asset Risk Management Plan.

	Shoalhaven Water's Emergency Response Plans will provide clear guidelines to assist Shoalhaven Water staff involved in responding to and recovering effectively from emergency situations,	A review of the Emergency Response Plan is outside the scope of this study. We note that the document appears to be comprehensive but, as an August 2019 version, is beyond its annual review date. The Plan contains information that may be used to inform business processes in the asset management program. For example: Level of Alert factors, Potential Effects of asset failures, and flowcharts that form the basis of standard operating procedures for, say, wastewater overflows.	It is recommended checking the status of the review of the Emergency Response Plan against the requirements stated in the Plan.
	Shoalhaven Council's Business Continuity Plan will ensure critical business functions can be maintained and/or restored in a timely fashion in the event of a material disruption to the organisation arising from internal or external events,	In the absence of available documentation no findings or recommendations are provided for this Policy Statement at this point in the study.	No recommendation has been made.
	Shoalhaven Water's Drought Management Plan (DMP) is to ensure the water utility business of Shoalhaven Water, has an appropriate mechanism in place to allow it to carry out its responsibility to soundly manage water use during droughts and to minimise the risk of system failure in times of drought,	A review of the Drought Management Plan is outside the scope of this study. We note that the document appears to be comprehensive and published in 2013 (not confirmed). The Plan contains information that may be used to inform business processes in the asset management program. For example: Section 2.11 Water Supply Customers references average yearly usage by major customer type and reference to minimum water volume requirements. The Plan is, essentially,	It is recommended that drought management strategies - as defined in the Drought Management Plan - are used to inform the development of Customer Levels of Service.

		a basis for reducing Customer Levels of Service during low water availability periods and, as such, can be used to inform the development of Customer Levels of Service for abnormal operating periods.	
	The Operational Environment Management Plan (OEMP) will set out how the treatment plants are to be operated and will be updated as required.	In the absence of available documentation no findings or recommendations are provided for this Policy Statement at this point in the study.	No recommendation has been made.
	Develop climate change resilience as in integrated part of the asset life cycle.	It is noted that climate change resilience is a current area of activity with Shoalhaven Water, starting before the 2019/2020 bushfire season with coastal assets with respect to sea level rise, but with increasing importance and attention following that season.	It is recommended the risks of asset failure associated with climate change be included in future risk assessments, determining the changes - if any - to the likelihood of failure as a result of changes in the climate. In evaluating those risks, consideration is to be given to the sensitivity of the inherent risks and existing/proposed controls to forecast changes in the climate over an acceptable - e.g. 20 year - planning horizon.

	Capital works will be prioritised based on an assessment of project benefits and available budgets for both asset acquisitions and renewals,	The asset management plans describe a capital works prioritisation process and discussions in the interviews indicated that this was generally the process followed. Asset management program documentation also references prioritisation criteria. It was noted, however, that a life cycle process view was not available. This correlates with interview discussions around project initiation and the (limited) data available at that time that supports the project need.	It is recommended an asset life cycle workflow be developed that illustrates the capital planning and delivery process, including the transition of the assets into operation. It is further recommended that the workflow include an information stream, or swim lane, for information flows across the life cycle with an emphasis on enabling effective asset handover.
	Asset acquisition decisions are to be based on the evaluation of alternatives that take into account full life cycle costs, environmental, social and economic benefits and risks,	It is not clear from the available documentation the extent to which full life cycle costs are considered in asset acquisition decisions. It is considered that this is likely constrained to assumptions and typical percentages rather than being based on historical asset cost data. Triple bottom line benefits and risks are alluded to but are not clearly evident in the absence of an overarching workflow process that defines the analysis and reporting requirements for each step in the asset life cycle.	It is recommended triple bottom line concepts be introduced into the adoption of PP3-027 and the capital planning and delivery workflow.
	Minimum utilisation measures shall be determined for all assets to determine surplus assets,	Utilisation is conceptually referred to in the Asset Management Strategy and the asset management plans. It is not evident that utilisation measures have been developed.	It is recommended that work on developing utilisation measures be undertaken on an opportunistic basis until other recommendations have progressed. In the process, an interim methodology for determining and evaluating utilisation will need to be developed.

	All construction, whether it is asset replacement, renewal, upgrade or new, must consider ecological sustainable development,	In the absence of available documentation no findings or recommendations are provided for this Policy Statement at this point in the study.	No recommendation has been made.
	Water and sewerage infrastructure will be provided to service planned development areas in accordance with the Development Servicing Plans (DSP) that will be maintained in accordance with the Best Practice guidelines.	A review of the Development Service Plans is outside the scope of the study. However, they have been made available and will be reviewed with a view to provide comment here.	No recommendation has been made.
	A 20-year capital works plan will be developed to meet IPR and Best Practice guidelines.	The development of 20-year capital works plans appears to be relatively robust, albeit subject to the potential for improvement as alluded to in this study's findings and recommendations.	It is recommended that improvement in asset management planning processes focus on recommendations provided elsewhere in this table, noting that those improvements will result in improvements to the confidence vested in each subsequent version of the 20-year capital works plan.

Asset Operations and Maintenance			
	The water and wastewater assets will be operated and maintained to ensure that the Levels of Service are delivered at the most efficient long term cost,	As mentioned elsewhere we find the correlation between customer levels of service and asset management activities is limited. We note from interviews with operations staff and the staff maintaining the assets that data on their costs is fragmented, not readily captured in new information solutions, and generally low in confidence with respect to accuracy or relevance. As such, we find that demonstrating cost efficiency with respect to levels of service is unlikely to be determined to appropriate levels of detail.	It is recommended that the next three years include a concerted effort to begin building a reliable data set for recurrent expenditure.
	Update the maintenance plans using reliability centred maintenance analysis techniques and cost benefits to determine the most appropriate economic practices to suit the assets and Shoalhaven Water,	We note from interviews with the staff maintaining the assets that data on their costs is fragmented, not readily captured in new information solutions, and generally low in confidence with respect to accuracy or relevance. We further note that staff indicate that the majority of their time is spent on reactive maintenance, with a corresponding lack of available resources to shift the effort to a better balance between reactive and planned maintenance activities. The latter appears to be constrained, in the short term, by the ongoing implementation and configuration of the new information solution.	It is recommended that Shoalhaven Water review the current plan for implementation and configuration of the new information solution with respect to the functionality that will enable improvements to core data aspects of its asset management program. In light of that review, adjustments to the timing of asset management planning improvements will need to be made to set realistic and achievable improvement goals.

	Undertake benchmarking of asset maintenance and lifecycle management techniques to ensure that Shoalhaven Water is adopting best appropriate practices in all areas,	It is noted that benchmarking comes in many forms. Benchmarking that Shoalhaven Water has previously participated in provided an opportunity to identify new practices - now incorporated into the Asset Management Policy document as Policy Statements - and to compare industry 'standard' metrics. The latter provide a degree of reassurance that asset management program outputs are generally in line with industry expectations.	In addition to continuing with mandatory reporting and benchmarking activities, it is recommended Shoalhaven Water continue with repeating previous benchmarking activities that compare asset management program outputs across the sector. However, it is further recommended that where the latter require significant effort, the timing of the next benchmarking exercise ought to be no more than once every three to five years. In the interim, it is recommended Shoalhaven Water focus its efforts on internal benchmarking that informs comparison of the performance of assets within an asset class, including aspects such as operations costs, actual useful lives (AUL), maintenance costs and reliability metrics (e.g. MTBF, MTTR), and asset acquisition unit costs. It is further recommended that this approach be piloted on an asset class such as wastewater pump stations.
	Shoalhaven Water recognises the need to maintain its asset base and will target a long term asset sustainability index (actual replacement/renewal budget versus required funding as per AMPs) averaging 90-95% for each of the asset types,	While reference to a sustainability index, as defined in the Policy Statement, was not observed in the documentation made available for this study, we note in general that asset management planning activities are directed towards realising the long term asset sustainability index target (i.e. goal).	It is recommended that the asset sustainability index is developed as part of introducing a range of technical levels of service, as discussed elsewhere in this table.

	20-year operation and maintenance budgets will be developed and included in the AMP and shall include an allowance for additional costs arising from addition of new assets through development, acquisition, dedication or leasing and/or licensing as well as an allowance to cover cost increases in line with indices relevant to each asset class,	It is noted that 20-year budgets for operations and maintenance activities are included in the asset management plans. It is not known how those costs are arrived at, but appear to be predominantly indexed from one year to the next.	It is recommended the policy statement be edited to reflect a change in emphasis from indexed cost increases to forecast costs based on historical cost analysis. It is recommended that further breakdown of cost forecasts be undertaken to differentiate between cost increases associated with new assets and indexed cost increases for forecasting costs for existing assets.
	Adequate resources shall be provided to undertake regular agreed levels of inspections for risk, identifying programmed works, asset condition and renewal priorities,	In interviews with staff undertaking operations or maintenance activities it was determined that data on the volumes of work undertaken was not available and data from inspections was considered likely to be incomplete or unreliable. It was noted that improvements in this area are constrained until the implementation and configuration of the new information solution is complete.	It is recommended that establishing new processes for capturing inspection activity and volumes of work be incorporated in the implementation and configuration of the new information solution.
	Appropriately audited preventative maintenance programs will be undertaken on all infrastructure and other assets to ensure that the lowest life cycle cost is achieved, and asset values are maintained,	In interviews with staff undertaking maintenance activities it was noted that the majority of the maintenance is, at the moment, deemed to be reactive. Additional notes on this have been made previously. We find that the preventative maintenance program requires the injection of additional resources to support staff in shifting from mostly reactive to more appropriate levels of preventative maintenance, subject to the availability	It is recommended that developing and auditing the preventative maintenance program be incorporated in the implementation and configuration of the new information solution, and subject to short term additional resources being made available during the transition from mostly reactive to preventative.

		of suitable functionality in the new information solution.	
	Monitor and improve the planned (scheduled) maintenance regime for all infrastructure and other assets to ensure that the assets meet their design life in the most cost-effective way.	Based on previously documented findings in this table we find that, currently, it will be difficult to clearly link maintenance to actual asset useful life outcomes.	It is recommended that developing and evaluating the preventative maintenance program be incorporated in the implementation and configuration of the new information solution.

Asset Accounting, Costing and Budgeting			
	• Assets will be valued at intervals of no greater than 5 years using modern engineering equivalent replacement asset (MEERA) costs,	Based on the available documentation is not known when the most recent, complete MEERA-based valuation took place. Based on the interviews we understand that there is an ongoing effort to restructure asset registers - partly in response to the implementation of the new information solution, partly to address past errors and inconsistencies - but we are not certain on the current status of MEERA-based valuations.	No recommendation has been made.
	Effective economic lives will be given to each asset with the written down value and depreciation value determined in accordance with accounting regulations,	We understand from the interviews that updated effective economic lives are being developed as a result of other improvements to the asset registers. Based on the documentation provided we understand that asset depreciation is stated to be in line with accounting regulations; noting that this is typically the case given the regularity of formal, mandated, routine financial audits.	No recommendation has been made.

	In no case will the depreciation be less than the average annual annuity of the renewal cashflow necessary to sustain the existing assets group in a condition capable of delivering the level of service required by Shoalhaven Water's customers,	It is not observed in the documentation made available for this study how the average annual annuity aligns with depreciation, renewal cashflow requirements, maintaining appropriate asset condition and, ultimately, sustaining customer levels of service. It is noted that investment forecasts are intended to realise the outcome implicit in the policy statement, and we note from the interviews that there is a structured approach to calculating the annuity figures.	It is recommended that the calculation of the average annual annuity amount be incorporated into other workflow improvements referred to elsewhere in this table, and continued to be a prime feature of the asset management plans.
	Shoalhaven Water will determine the cost of asset service delivery on a full cost recovery basis which includes appropriate distribution of costs and overheads to: – Administration including any finance charges, – Operation, – Maintenance, – Depreciation expressed as either straight line or average annual annuity of the renewal cash flow. Where appropriate a capital use charge will be included at an appropriate opportunity cost of capital applied to the written down value of the assets to provide Shoalhaven Water with a return on assets invested and enable users to better understand the true cost of service delivery.	Elsewhere in this table we have found that the cost data that would enable the realisation of this policy statement is considered to be incomplete or otherwise unavailable.	Previous recommendations have been made with respect to developing a better set of historical cost data, following which it is recommended that a methodology for full cost recovery be developed and subsequently applied.

	That all costs will be determined on an accurate accrual basis and that any cost subsidies or community service obligations will be clearly defined and transparent to all stakeholders and customers,	We have noted previously that the limited granularity and low confidence in cost data is likely to impact on decision making based on that data. We find that likely to be the case here as well. However, we note that cost subsidies and community service obligations are important financial aspects that are likely to be appropriately tracked in Shoalhaven Water accounts.	Previous recommendations have been made with respect to developing a better set of historical cost data, following which it is recommended that the policy and methodology for cost accrual is revisited to ensure it remains valid and appropriate.
	That joint use facilities will be costed as stated above and full costs transferred to the relevant operating business units based on usage of assets,	It is not clear to what extent the costs associated with joint use facilities are subject to an equivalent degree of scrutiny that would allow Shoalhaven Water to confidently report on those costs, use those costs in life cycle and other analyses, and project future costs for those services.	It is recommended that, as Shoalhaven Water develops better historical cost data, a similar methodology be applied to the scrutiny of costs associated with joint use facilities with an objective to find opportunities to reduce and appropriately charge those costs in the future.
	Shoalhaven Water will keep detailed asset registers on all assets owned or under the control of Shoalhaven Water.	We understand that the implementation of a new information solution has provided the opportunity to update Shoalhaven Water's asset registers, with follow on opportunities to make other asset management planning improvements. At this time is not possible to form an opinion on the extent to which asset registers have been maintained, noting the references elsewhere in this table to challenges in maintaining comprehensive, accurate historical data sets.	It is recommended that the implementation and configuration of the new information solution include for the development of business processes for primary, or core, asset management activities, such as keeping asset registers up to date as new assets come online, old assets are replaced, and components of assets are replaced.

		It is presumed that, as the new information solution is rolled out, new workflows will be developed such that newly updated asset registers will be kept up to date, routinely, in the future.	

Asset Reporting			
	Annual reports will meet the requirements of the Local Government Code of Accounting Practice and Financial Reporting, Best Practice Guidelines and the National Water Imitative.	An audit of asset management documentation against the specific requirements of legislative and regulatory instruments is outside the scope of this study.	No recommendation has been made.

13 APPENDIX 1 - CRITICAL WASTEWATER PUMP STATIONS

Table 13-1 Critical Wastewater Pump Stations – Figures will be up-dated upon delivery of the 2024 Servicing Strategy

Object ID (GIS)	Scheme	Pump station name	Pump station number	Reason for criticality	Storage available (kL) *	2011 Storage requirement (kL) at 4xADWF *	ADWF (kL/hour)	Hours of storage available (Hours)
656	Bendalong	Nth Bendalong Rd	BE1		31	14	3.5	8.9
655	Bendalong	Boronia St	BE2		10	6	1.5	6.7
658	Bendalong	Nth Sunset Strip	MA1	Spills onto beach	47	25	6.3	7.5
1055	Bendalong	Sth Sunset Strip	MA2	Spills onto beach	71	96	24	3
1048	Bendalong	Ottawa St	MA4	Spills onto beach	15	16	4	3.8
47	Berry	Prince Alfred St	8	Size and main collector	88	57	14.3	6.2
199	Bomaderry	STW #1 (big)	1	Part of treatment plant	137	27	6.8	20.3
200	Bomaderry	STW #2 (small)	2	Part of treatment plant	13	0	0	N/A
64	Bomaderry	Bolong Rd (Hanlon's)	4	Difficult to manage. Two pump stations feeding.	100	67	16.8	6
196	Bomaderry	Bolong Rd (Moorehouse)	7	Collects from Manildra	23	16	4	5.8
54	Bomaderry	Edwards Ave	8	Large, overflows to paddock	24	TBD	TBD	TBD
8	Bomaderry	Concord Way	9	Large catchment	57	TBD	TBD	TBD
649	Bomaderry	Main Rd (Good Dog Crk)	23	Size and adjacent to creek	41	33	8.3	5
TBD	Bomaderry	Far North Collector Rd	21	Size,	TBD	TBD	TBD	TBD

TBD	Bomaderry	Far North Collector Rd	30	Size, Main Collector & Within waterway buffer zone	TBD	TBD	TBD	TBD
TBD	Bomaderry	Abernathys Lane	31	Size & Main Collector	TBD	TBD	TBD	TBD
112	Callala	The Corso (off Emmett St)	1	Size	58	54	13.5	4.3
113	Callala	Boorawine Tce	2	Size	61	45	11.3	5.4
114	Callala	Lackersteen St	3	Size	122	28	7	17.4
192	Callala	Callala Beach Rd	4	Main collector	206	6	1.5	137.3
2674	Callala	WWPS12	12	Size	56	10	2.5	22.4
4274	Callala	WWPS12A	13	Booster	Booster pump only – no storage			
4275	Callala	WWPS11	11	Within waterway buffer zone	28	24	6	4.7
1061	Conjola	Hoylake Gr	C1	Within waterway buffer zone	67	29	7.3	9.2
1062	Conjola	Haviland Str (C1 Booster)	C1B	Within waterway buffer zone	Booster pump only – no storage			
1064	Conjola	Prior St (Killarney)	C2	Within waterway buffer zone	13	3	0.8	17.3
1063	Conjola	Spinks Ave	C3	Within waterway buffer zone	61	19	4.8	12.8
1060	Conjola	Sth Anglers Pde	F1	Size and buffer	25	9	2.3	11.1
1058	Conjola	Alma Ave	F2	Within waterway buffer zone	10	12	3	3.3

1057	Conjola	Nth Anglers Pde	F3	Within waterway buffer zone	17	11	2.8	6.2
96	Culburra-Greenwell Pt	Orient Ave	1	Proximity to Oyster Farms	135	44	11	12.3
190	Culburra-Greenwell Pt	Orama Cr	2	Proximity to Oyster Farms	35	19	4.8	7.4
101	Culburra-Greenwell Pt	Raglan St	3	Proximity to Oyster Farms	65	42	10.5	6.2
105	Culburra-Greenwell Pt	The Strand	5	Proximity to Oyster Farms	57	TBD	TBD	TBD
106	Culburra-Greenwell Pt	Bowery Rd	6	Proximity to Oyster Farms	93	TBD	TBD	TBD
108	Culburra-Greenwell Pt	Penguin Head Rd	7	Within waterway buffer zone	54	6	1.5	36
109	Culburra-Greenwell Pt	Farrant Ave (Surf Club)	8	Within waterway buffer zone	12	5	1.3	9.6
111	Culburra-Greenwell Pt	Lee St	9	Within waterway buffer zone	48	TBD	TBD	TBD
19	Culburra-Greenwell Pt	West St East	10	Within waterway buffer zone	46	TBD	TBD	TBD
110	Culburra-Greenwell Pt	Cross St (West Cres)	11	Within waterway buffer zone	10	3	0.8	13.3
20	Culburra-Greenwell Pt	Canal St	12	Size, main collector, oyster	77	36	9	8.6
91	Culburra-Greenwell Pt	Adelaide St (Near Caravan Pk)	13	Buffer, oyster	25	24	6	4.2
17	Culburra-Greenwell Pt	Church St	14	Buffer, oyster	17	31	7.8	2.2
98	Culburra-Greenwell Pt	Keith Ave	16	Buffer, oyster	98	32	8	12.3
102	Culburra-Greenwell Pt	Greens Rd	17	Size, main	81	23	5.8	14.1

				collector, oyster				
21	Huskisson-Vincentia	Wood Cres	1	Within waterway buffer zone	18	6	1.5	12
118	Huskisson-Vincentia	Currambene St	2	Within waterway buffer zone	9	19	4.8	1.9
119	Huskisson-Vincentia	Moona Moona Cres	5	Size, buffer, main collector	83	60	15	5.5
24	Huskisson-Vincentia	Montague St	7	Main collector	111	148	37	3
123	Huskisson-Vincentia	Church St	9	Within waterway buffer zone	14	17	4.3	3.3
124	Huskisson-Vincentia	Holden St	10	Large, buffer, collector	123	49	12.3	10
25	Huskisson-Vincentia	Plantation Pt	11	Within waterway buffer zone	28	112	28	1
125	Huskisson-Vincentia	Elizabeth Dr (Blenheim Bch)	12	Within waterway buffer zone	15	27	6.8	2.2
128	Huskisson-Vincentia	Sutton St	13	Within waterway buffer zone	4	7	1.8	2.3
135	Huskisson-Vincentia	Aster St	14	Within waterway buffer zone	22	7	1.8	12.6
139	Huskisson-Vincentia	Hyam Rd	15	Within waterway buffer zone	10	15	3.8	2.7
141	Huskisson-Vincentia	Cyrus St (Car Park)	16	Within waterway buffer zone	12	18	4.5	2.7
5475	Milton-Ulladulla	Dolphin Pt Rd (Opp. Lions Park)	B4	Size, buffer	61	31	7.8	7.9
181	Milton-Ulladulla	Moore St	B6	Within waterway buffer zone	20	2	0.5	40

179	Milton-Ulladulla	Ireland St	B7	Within waterway buffer zone	35	4	1	35
183	Milton-Ulladulla	Wallaroy Dr	B8	Within waterway buffer zone	11	11	2.8	4
42	Milton-Ulladulla	End of James Cr	K1	Within waterway buffer zone	14	5	1.3	11.2
177	Milton-Ulladulla	Park Land Dr (Kings Point Res)	K2	Size, Buffer	29	26	6.5	4.5
5476	Milton-Ulladulla	Croobyar Rd	M3	Medium	29	17	4.3	6.8
171	Milton-Ulladulla	Garrads Lane	M4	Medium, Collector	15	6	1.5	10
165	Milton-Ulladulla	Matron Porter Dr (nr Bangalow)	N1	Collector	58	52	13	4.5
160	Milton-Ulladulla	Normandy St	N4	Within waterway buffer zone	13	4	1	13
1051	Milton-Ulladulla	Princes Hwy (Wairo Beach)	T1	Size	7	38	9.5	0.7
175	Milton-Ulladulla	St Vincent St (Bowling Club)	U1	Main collector	162	226	56.5	2.9
5874	Milton-Ulladulla	Wason St (Fish Co-Op)	U3	Within waterway buffer zone	25	33	8.3	3
41	Milton-Ulladulla	Rennies Beach Cl	U5	Within waterway buffer zone	7	25	6.3	1.1
650	Milton-Ulladulla	Princes Hwy (U6)	U6	Size, main collector, buffer	60	62	15.5	3.9
176	Milton-Ulladulla	Rennies Beach Cl	U7	Within waterway buffer zone	4	1	0.3	16
5075	Milton-Ulladulla	Princes Hwy (Swamp)	WWPSB 1	Size	35	13	3.3	10.8
5074	Milton-Ulladulla	Queanbeyan Ave (Reserve)	WWPSB 3	Size	126	12	3	42

37	Milton-Ulladulla	Riversdale Av (Golf Club)	X1	Main collector, Buffer	149	27	6.8	22.1
38	Milton-Ulladulla	Shipton Cr, Riversdale Ave	X3	Main collector, Buffer	132	23	5.8	23
5875	Milton-Ulladulla	Surfers Ave	Z1	Within waterway buffer zone	12	12	3	4
170	Milton-Ulladulla	Mitchell Pde	Z2	Main collector, Buffer	57	86	21.5	2.7
169	Milton-Ulladulla	Beach Rd	Z3	Within waterway buffer zone	14	3	0.8	18.7
36	Milton-Ulladulla	Cliff Ave	Z4	Within waterway buffer zone	5	4	1	5
5876	Milton-Ulladulla	Bannister Head Rd	Z5	Within waterway buffer zone	11	9	2.3	4.9
172	Milton-Ulladulla	Mitchell Pde	Z6	Within waterway buffer zone	0	2	0.5	0
173	Milton-Ulladulla	Blackwater Ck (Mitchell Pde)	Z7	Main collector, Buffer	72	34	8.5	8.5
68	North Nowra	Yurunga Dr #1 (Nth East)	15	Size, main collector	20	5	1.3	16
79	Nowra	North St	1	Main collector	84	131	32.8	2.6
80	Nowra	Lyrebird Park (off St Anns St)	2	Main collector	28	TBD	TBD	TBD
81	Nowra	St Anns St	3	Main collector, buffer	66	TBD	TBD	TBD
83	Nowra	Depot Rd	21	Within waterway buffer zone	18	0	0	N/A
88	Nowra	Worrigee Rd (Sth of Regelia Pde)	24	Size	68	93	23.3	2.9
13	Shoalhaven heads	Hay Ave	1	Within waterway buffer zone	34	5	1.3	27.2

15	Shoalhaven heads	Jerry Bailey Rd	2	Within waterway buffer zone	38	29	7.3	5.2
12	Shoalhaven heads	Shoalhaven Heads Rd	3	Within waterway buffer zone	13	37	9.3	1.4
61	Shoalhaven heads	McIntosh St	5	Size, Buffer	23	27	6.8	3.4
56	Shoalhaven heads	End of Scott St (adjacent DE)	7	Main collector, buffer	140	28	7	20
16	Shoalhaven heads	Mathew St	8	Within waterway buffer zone	43	3	0.8	57.3
58	Shoalhaven heads	Scott St (near Albert St)	10	Within waterway buffer zone	13	11	2.8	4.7
26	St Georges Basin	South East Mathie St	1	Within waterway buffer zone	25	27	6.8	3.7
194	St Georges Basin	North East Mathie St	2	Within waterway buffer zone	22	13	3.3	6.8
133	St Georges Basin	Harris Ave	3	Within waterway buffer zone	56	TBD	TBD	TBD
129	St Georges Basin	Waterpark Rd, Panorama Rd	4	Within waterway buffer zone	131	36	9	14.6
127	St Georges Basin	The Wool Rd (Opposite School)	5	Within waterway buffer zone	13	13	3.3	4
130	St Georges Basin	Deane St	6	Within waterway buffer zone	12	5	1.3	9.6
195	St Georges Basin	Collett Pl	7	Within waterway buffer zone	114	48	12	9.5
137	St Georges Basin	Loralyn Ave (Near Meriton St)	8	Main collector, buffer	265	93	23.3	11.4
138	St Georges Basin	Loralyn Ave (Near Anson St)	10	Within waterway	49	TBD	TBD	TBD

				buffer zone				
142	St Georges Basin	Walmer Ave (Opp. Cross St)	11	Within waterway buffer zone	3	1	0.3	12
145	St Georges Basin	Walmer Ave (Near Frederick St)	12	Within waterway buffer zone	120	TBD	TBD	TBD
147	St Georges Basin	Irene St	13	Within waterway buffer zone	17	TBD	TBD	TBD
144	St Georges Basin	Sanctuary Pt Rd (Opp. Leumeah)	14	Within waterway buffer zone	76	77	19.3	3.9
134	St Georges Basin	The Park Dr	15	Within waterway buffer zone	56	12	3	18.7
140	St Georges Basin	Sanctuary Pt Rd (Opp. Cessna)	16	Within waterway buffer zone	111	44	11	10.1
132	St Georges Basin	The Wool Rd (Near Shoreville)	17	Main collector, buffer	541	116	29	18.7
131	St Georges Basin	Prentice Ave	18	Within waterway buffer zone	136	49	12.3	11.1
126	St Georges Basin	Macgibbon Pde	19	Within waterway buffer zone	22	18	4.5	4.9
136	St Georges Basin	Naval Pde (Near Kallaroo Rd)	20	Within waterway buffer zone	101	32	8	12.6
143	St Georges Basin	Naval Pde (Near Wharf Rd)	21	Within waterway buffer zone	50	18	4.5	11.1
146	St Georges Basin	Fisher St	22	Within waterway buffer zone	28	9	2.3	12.4
27	Sussex Inlet	River Rd (Nth)	1	Within waterway buffer zone	19	17	4.3	4.5

28	Sussex Inlet	River Rd (Badgee Bridge)	2	Within waterway buffer zone	41	20	5	8.2
148	Sussex Inlet	Fairview Cr	3	Within waterway buffer zone	27	15	3.8	7.2
149	Sussex Inlet	Nelson L	4	Within waterway buffer zone	70	30	7.5	9.3
150	Sussex Inlet	Jacobs Dr	5	Within waterway buffer zone	23	18	4.5	5.1
29	Sussex Inlet	Sandpiper Way	6	Within waterway buffer zone	67	26	6.5	10.3
151	Sussex Inlet	River Rd (Near Thora St)	7	Buffer, main collector	131	38	9.5	13.8
153	Sussex Inlet	Cater Cr (Nr Sussex Inlet Rd)	8	Within waterway buffer zone	10	11	2.8	3.6
31	Sussex Inlet	Cater Cr (Near Corang Cr)	9	Within waterway buffer zone	35	25	6.3	5.6
155	Sussex Inlet	Edgewater Av	11	Buffer, main collector	249	92	23	10.8
156	Sussex Inlet	Hoffman Dr	12	Within waterway buffer zone	15	3	0.8	20
32	Sussex Inlet	Lake Dr	13	Within waterway buffer zone	9	9	2.3	4
157	Sussex Inlet	Goonawarra Dr	14	Within waterway buffer zone	57	35	8.8	6.5
158	Sussex Inlet	Collier Dr	15	Within waterway buffer zone	27	10	2.5	10.8
33	Sussex Inlet	Lakeland Av	16	Within waterway buffer zone	25	33	8.3	3

30	Sussex Inlet	Cormorant Av	10A	Within waterway buffer zone	5	7	1.8	2.9
152	Sussex Inlet	Dotterel Pl	10B	Within waterway buffer zone	4	7	1.8	2.3
21090	Sussex Inlet	Golf Course Way	21	EEC Zone	TBD	TBD	TBD	TBD

14 APPENDIX 2 – 5 YR CAPITAL EXPENDITURE (21/22 - 26/27)

Existing Proposed	Existing Project Code	Existing Project Name	Proposed Project Name	Review Status	Year 1 Amount	Year 2 Amount	Year 3 Amount	Year 4 Amount	Year 5 Amount
Current	104079	Communication Towers Capital -GF		Draft	0	0	1,000,000	0	0
Current	104080	Communications Section		Draft	8,800	9,000	9,200	9,400	9,600
Current	104198	Water New services instal & relocate		Draft	600,000	600,000	600,000	600,000	600,000
Current	104199	Water Meter New Services/Replacements		Draft	0	0	0	0	0
Current	104202	Water Office furniture & equipment		Draft	120,000	120,000	120,000	120,000	120,000
Current	105218	Sewer Office furniture & equipment		Draft	120,000	120,000	120,000	120,000	120,000
Current	104201	Water Land Purchases		Draft	100,000	100,000	100,000	100,000	100,000
Current	104275	Sewer Land Purchases		Draft	200,000	200,000	200,000	200,000	200,000
Current	104147	Water A&W minor works program		Draft	250,000	250,000	250,000	250,000	250,000
Current	104262	A&W minor works program - Sewer		Draft	60,000	60,000	60,000	60,000	60,000
Current	104210	Nth-Sth transfer system improvements		Draft	10,000,000	10,000,000	5,000,000	0	0
Current	105165	Sewer Coastal Zone Management-Concept Options Report-South		Draft	950,000	1,000,000	1,000,000	1,000,000	1,000,000
Current	104231	Water Minor main extension		Draft	50,000	50,000	50,000	50,000	50,000
Current	104248	Sewer Various new electrical cabinets		Draft	550,000	550,000	550,000	0	0

Current	104235	Yalwal tourist upgrade		Draft	50,000	2,000,000	0	0	0
Proposed	999960	10YR Capital Plan - Proposed Project A60	Berry STP storm pond	Draft	0	100,000	800,000	0	0
Proposed	999960	10YR Capital Plan - Proposed Project A60	Bom Crams Rd New SPS 28 + RM + GM	Draft	0	0	0	0	0
Proposed	999960	10YR Capital Plan - Proposed Project A60	Cabbage Tree Lane TM (200mm x 1.2km)	Draft	0	360,000	0	0	0
Proposed	999960	10YR Capital Plan - Proposed Project A60	Callala STP New 8000 Eat Tank	Draft	0	0	0	0	0
Proposed	999960	10YR Capital Plan - Proposed Project A60	Culburra STP Upgrade tertiary filters	Draft	0	0	0	0	0
Proposed	999960	10YR Capital Plan - Proposed Project A60	Culburra West New SPS - 1 +RM	Draft	0	0	0	526,000	0
Proposed	999960	10YR Capital Plan - Proposed Project A60	Culburra West New SPS - 2 + RM	Draft	0	0	0	420,000	0
Proposed	999960	10YR Capital Plan - Proposed Project A60	Culburra West New SPS - 4 +RM	Draft	0	0	0	0	0
Proposed	999960	10YR Capital Plan - Proposed Project A60	Danjera Dam Bridge	Draft	600,000	0	0	0	0

Existing Proposed	Existing Project Code	Existing Project Name	Proposed Project Name	Review Status	Year 1 Amount	Year 2 Amount	Year 3 Amount	Year 4 Amount	Year 5 Amount
Proposed	999960	10YR Capital Plan -	Edwards Ave Bomaderry, SPS 8 Inlet GM	Draft	235,000	0	0	0	0

		Proposed Project A60							
Proposed	999960	10YR Capital Plan - Proposed Project A60	Erowal Bay Sewer Protection	Draft	0	1,500,000	0	0	0
Proposed	999960	10YR Capital Plan - Proposed Project A60	Manildra Raw Water main relocation ? Princess Highway Nowra	Draft	0	0	0	1,000,000	0
Proposed	999960	10YR Capital Plan - Proposed Project A60	Manyana (Kylor Development) SPS + RM	Draft	0	0	0	0	540,000
Proposed	999960	10YR Capital Plan - Proposed Project A60	Milt/Ull Downstream SPS U5 GM upgrade	Draft	0	0	170,000	0	0
Proposed	999960	10YR Capital Plan - Proposed Project A60	Milt/Ull GM between SPS M2 & SPS M3	Draft	0	0	120,000	0	0
Proposed	999960	10YR Capital Plan - Proposed Project A60	Milt/Ull M2 RM	Draft	0	0	0	150,000	0
Proposed	999960	10YR Capital Plan - Proposed Project A60	Milt/Ull SPS B4 GM	Draft	0	0	0	0	0
Proposed	999960	10YR Capital Plan - Proposed Project A60	Milt/Ull SPS M3 GM upgrade	Draft	0	0	100,000	0	0
Proposed	999960	10YR Capital Plan -	Milt/Ull SPS N1 RM upgrade + GM	Draft	0	715,000	0	0	0

		Proposed Project A60							
Proposed	999960	10YR Capital Plan - Proposed Project A60	Milt/Ull SPS SPS Z7 New RM	Draft	0	2,250,000	0	0	0
Proposed	999960	10YR Capital Plan - Proposed Project A60	Milt/Ull SPS U5 RM upgrade	Draft	0	100,000	0	0	0
Proposed	999960	10YR Capital Plan - Proposed Project A60	Milt/Ull SPS Z2 RM upgrade	Draft	0	420,000	0	0	0
Proposed	999960	10YR Capital Plan - Proposed Project A60	Milton Elevated Reservoir	Draft	0	575,000	0	0	0
Proposed	999960	10YR Capital Plan - Proposed Project A60	Milton WTP Augumentation	Draft	0	0	0	2,000,000	0
Proposed	999960	10YR Capital Plan - Proposed Project A60	Mundamia - 200mm Feeder Main	Draft	4,320	85,680	0	0	0
Proposed	999960	10YR Capital Plan - Proposed Project A60	Mundamia SPS N-F4 - RM and GM	Draft	850,000	0	0	0	0
Proposed	999960	10YR Capital Plan - Proposed Project A60	New Asset Enhancement Works to be determined	Draft	0	0	350,000	3,000,000	2,000,000

Proposed	999960	10YR Capital Plan - Proposed Project A60	New Asset Enhancement Works to be determined	Draft	0	0	2,000,000	0	2,500,000
Proposed	999960	10YR Capital Plan - Proposed Project A60	New Growth Works to be determined	Draft	0	0	0	0	1,000,000
Proposed	999960	10YR Capital Plan - Proposed Project A60	New Growth Works to be determined	Draft	0	0	0	1,000,000	2,000,000
Proposed	999960	10YR Capital Plan - Proposed Project A60	New Renewals Works to be determined	Draft	0	0	2,500,000	1,500,000	2,500,000
Proposed	999960	10YR Capital Plan - Proposed Project A60	New Renewals Works to be determined	Draft	0	0	0	3,000,000	2,000,000
Proposed	999960	10YR Capital Plan - Proposed Project A60	Nowra GM upstream SPS 3 StAnnes St	Draft	0	0	0	0	0
Proposed	999960	10YR Capital Plan - Proposed Project A60	Nowra GM Upstream SPS 4	Draft	0	0	0	0	0
Proposed	999960	10YR Capital Plan - Proposed Project A60	Nowra Golf Club WM Renewal	Draft	0	250,000	0	0	0
Existing Proposed	**Existing Project Code**	**Existing Project Name**	**Proposed Project Name**	**Review Status**	**Year 1 Amount**	**Year 2 Amount**	**Year 3 Amount**	**Year 4 Amount**	**Year 5 Amount**

Proposed	999960	10YR Capital Plan - Proposed Project A60	Nowra Lyrebird SPS2 GM Upgrade	Draft	2,000,000	0	0	0	0
Proposed	999960	10YR Capital Plan - Proposed Project A60	Nowra Nth Illaroo Rd East GM Replacement	Draft	0	212,000	0	0	0
Proposed	999960	10YR Capital Plan - Proposed Project A60	Nowra Sewer Main Upgrade Program	Draft	0	700,000	0	0	0
Proposed	999960	10YR Capital Plan - Proposed Project A60	Nowra Sth Residential SPS D (179D)	Draft	0	430,000	0	0	0
Proposed	999960	10YR Capital Plan - Proposed Project A60	Nowra SthSPS 20 Surcharge main	Draft	140,000	0	0	0	0
Proposed	999960	10YR Capital Plan - Proposed Project A60	Nowra SthWest Gaol Construct 225dia.Sew Main Fut Indust Land	Draft	0	0	0	0	0
Proposed	999960	10YR Capital Plan - Proposed Project A60	Nowra West Cabbage Tree Gravity Trunk Mainupstream of SPS3	Draft	0	0	0	1,000,000	1,000,000
Proposed	999960	10YR Capital Plan - Proposed Project A60	Nowra West Cabbage Tree-Service Expan,SPS+RM+upstream GM	Draft	0	0	0	1,162,000	250,000
Proposed	999960	10YR Capital Plan - Proposed Project A60	Nowra West SPS 21 Decommission	Draft	0	100,000	0	0	0

Proposed	999960	10YR Capital Plan - Proposed Project A60	Nowra West SPS 26 (Uni) RM	Draft	0	0	588,000	0	0
Proposed	999960	10YR Capital Plan - Proposed Project A60	SGB STP New 8000EP tank x 2	Draft	0	0	0	2,963,000	0
Proposed	999960	10YR Capital Plan - Proposed Project A60	Sussex Badgee Lag TM Ext.Suncrest Ave&Expansion(220mmx1.8km)	Draft	0	285,000	0	0	0
Proposed	999960	10YR Capital Plan - Proposed Project A60	Sussex Inlet STP Augumentation	Draft	0	1,555,000	2,000,000	0	0
Proposed	999960	10YR Capital Plan - Proposed Project A60	Ulladulla STP Filters & Storm pond	Draft	0	0	0	300,000	4,000,000
Proposed	999960	10YR Capital Plan - Proposed Project A60	UV Upgrade - Sussex Inlet Treatment Plant	Draft	0	1,000,000	0	0	0
Proposed	999960	10YR Capital Plan - Proposed Project A60	Various Emergency Storage	Draft	50,000	2,000,000	0	50,000	2,000,000
Proposed	999960	10YR Capital Plan - Proposed Project A60	Various Sewerage DSP	Draft	0	100,000	0	0	0
Proposed	999960	10YR Capital Plan - Proposed Project A60	Various Sewerage Strategy	Draft	0	100,000	0	0	0

Proposed	999960	10YR Capital Plan - Proposed Project A60	Various Water Supply DSP	Draft	0	100,000	0	0	0
Proposed	999960	10YR Capital Plan - Proposed Project A60	Various Water Supply Strategy	Draft	0	100,000	0	0	0