Appendix O

30-year asset planning

Asset management

In managing our assets, we aim to deliver the services our customers and regulators expect while managing risks and ensuring the cost to deliver is as low as possible over the lifetime of each asset.

The key principles that guide our asset management are:

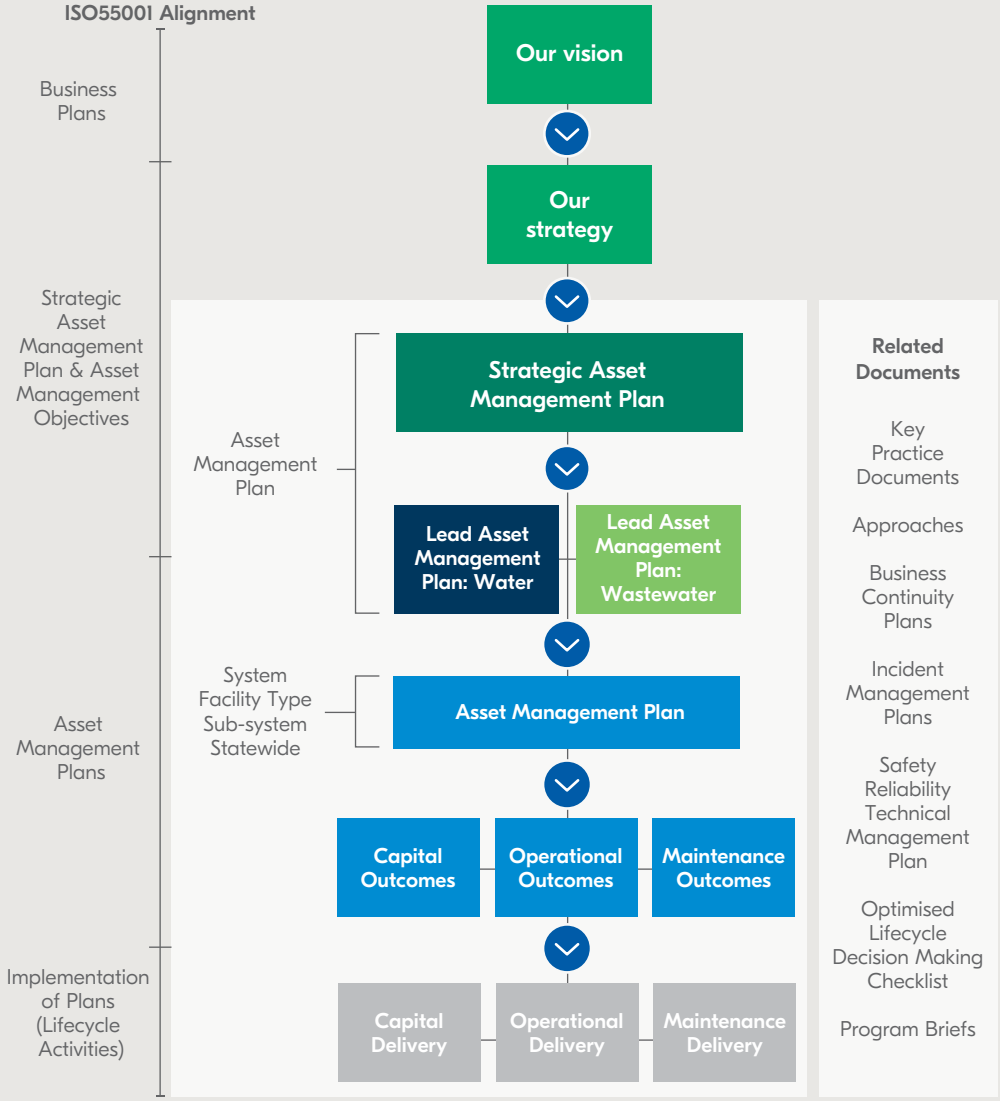
- Infrastructure assets exist to provide our customers with safe, sustainable and affordable water and sewerage services.
- Asset management decisions follow the corporate principles for decision making.
- Across the business, people have the knowledge, accountability and behaviours to influence levels of service experienced by our customers through smart, innovative asset management and a total expenditure approach.
- Our Asset Management System aligns with industry best practice and we are committed to continual improvement.
- Asset Management objectives are designed to deliver the corporate performance measures.

The Asset Management System sets out how we need to manage every asset across the state for a 30-year period based on its condition, age and current performance.

Decisions are based on customer expectations as well as our legal and regulatory responsibilities, mindful we respond as these expectations and responsibilities evolve. In addition, these aspects are balanced with the optimised life cycle cost to keep prices as low and stable as possible for our customers.

Our Asset Management System is shown in Figure O.1.

Figure O.1: Asset Management System



Our **Strategic Asset Management Plan** sets out how the Asset Management System supports the delivery of our asset management objective and aligns with our customer-focused strategy.

Lead Asset Management Plans explain the levels of service, costs and risks we need to balance to maintain and manage our water and sewerage assets over 30 years. These documents inform our more detailed system and facility level plans which ensure all assets are managed so we deliver customer outcomes, meet regulatory responsibilities and manage risk.

System Asset Management Plans explain external responsibilities and system-level improvements. With 71 water supply systems and 25 sewerage systems across the state, we understand the age and performance of critical assets in these systems, the operating requirements, and how we need to plan to meet the requirements over 30 years.

Facility Type Asset Management Plans set out the optimised lifecycle costs required to balance levels of service with risk through asset replacement and renewals.

Our **approach and key practice documents** detail the processes used to support asset management and investment decisions for specific situations and asset types.

Together, these documents bring the varying levels of detail needed to inform and document our investment decisions.

Asset management approach

Optimised life cycle decision making is a process used in asset planning that comprises long-, medium- and short-term planning. These stages produce outputs for delivery including operations, maintenance and capital.

Through the process, asset planners facilitate and lead decisions about how we use our infrastructure assets to deliver services to customers.

The following outlines the optimised life cycle decision making approach we use to manage our infrastructure assets:

- Critical assets will be managed proactively to minimise their likelihood of failure.
- All relevant legislative requirements will be complied with, along with the social and economic environment in which we operate.
- Asset management decisions will be based on optimising the three critical elements of risk, levels of service and whole of life costs. This means:
  - Assets will be maintained so the risk to delivering services is within the boundaries of the corporate risk appetite and the asset is managed at the optimal whole of life cost.
  - Where maintenance cannot manage the risk to an acceptable level or it would result in sub-optimal whole of life costs, the asset will be considered for refurbishment or renewal.
  - Before asset refurbishment or renewal, all viable options and opportunities will be considered including meeting requirements through changes to other assets in the system.
- Information is collected and made readily available to provide the certainty necessary to make good decisions.

Levels of service

To support the connection between planning activities and our strategy and customer outcomes, there are agreed levels of service covering customer performance measures and technical performance measures. Fundamental to our asset management plans are operational performance measures and how we operate assets to meet these requirements, and apply best practice. An example of this cascade, as detailed in Figure O.2, is:

1. Business objective
2. Level of service:
   a. Customer performance measure
   b. Technical or infrastructure measure
3. Operational performance measure.

Performance against each measure is monitored and reported, and action is taken to investigate and remedy issues. Our measures include all statutory and technical requirements for health, safety, security and reliability, as well as sustaining levels of physical, functional and financial performance.

Figure O.2: Line of sight model — organisational objectives through to operational performance measures

*Key Performance Indicators

Levels of service encompass the commitments we make to our customers. At a strategic level, this is captured in our goal to get the basics right every time regarding the quality and the reliability of the services we provide.

Meeting quality and reliability expectations benefits the South Australian community through support for state growth, keeping our people and the community safe and ensuring we meet our regulatory responsibilities.

Levels of service have been developed based on:

- our customers' expectations and feedback gathered through the extensive customer engagement program that informed our business planning
- legislation, including acts, regulations, standards and codes of practice
- business requirements, including corporate strategies, policies and approaches.

There are different types of service levels:

- **Customer levels of service:** customer performance measures or levels of service are used to measure how a customer receives or experiences the service provided. For example, the customer or the regulator representing the customer is concerned about:
  - the frequency of an incident occurring and impacting them
  - how quickly the incident is attended to
  - how quickly service is restored
  - the quality of the service our customer receives.
- **Technical levels of service:** these specific performance measures underpin our investment planning and support customer levels of service. They are based on:
  - minimising the loss or reduction of product or service reliability due to underperforming assets in terms of reliability or capacity, or
  - minimising the loss of product or service quality.
- **Operational performance measures:** summarise the operational objectives to support delivery of the technical or infrastructure performance measures.

Our ongoing customer research, together with the engagement program undertaken to inform *Our Plan 2020-24* (Our Plan) informs our investment analysis and asset management philosophy.

From the customer engagement undertaken for Our Plan, we know our customers value:

- low and stable prices over time
- safe, clean drinking water
- minimal interruptions
- support, fairness and great customer service
- protecting the environment
- supporting the South Australian community and economy.

These customer priorities have been built into our strategy, plans and performance measures, to ensure they are directly reflected in our short-, medium- and long-term plans, and considered in our asset planning tools and decisions.

Asset planning tools

The Asset Management System enables best use of our asset management expertise so we can deliver the services our customers value while meeting our legal and regulatory responsibilities. Our investments are prioritised and challenged based on a balance of risk and cost, ensuring investments are customer-focused, prudent and efficient. We continually seek ways to smooth our expenditure profile, preventing spikes in investment that impact customer bills.

Planning tools that support decision making include sophisticated growth projections, data collection, and analysis to strengthen our knowledge of our assets. This enables us to make confident predictions about future asset performance and investment requirements.

- **Population growth:** we monitor growth in our water and sewerage catchments, using population forecast data from the *30 Year Greater Adelaide Plan*. In addition, we work closely with developers and major customers to understand emerging trends in state growth and commercial enterprises that rely on our existing assets, and/or require us to build new infrastructure to provide new services. Our growth planning activities are supported by a comprehensive suite of system planning tools, including network hydraulic models, treatment plant monitoring equipment and performance data, and strategic masterplans, to enable us to understand and predict future asset performance and identify capacity constraints brought about by growth in the catchment.
- **Asset performance:** the performance of our assets is continually monitored using water, sewage and recycled water treatment and network monitoring equipment. This informs the application of sophisticated asset management and data analysis tools that are tailored to the different asset types we manage across South Australia. Current and forecast performance of our assets is assessed against a range of internal and external specifications including, for example, drinking water guidelines, environmental discharge licences, work health and safety legislation and regulations, recycled water supply approvals, and customer commitments. Any changes to these levels of service are incorporated into our planning and we regularly review the levels of service to facilitate continual improvement.
- **Asset age and condition:** to ensure service continuity, we have developed and will continue to manage a 30-year capital renewals plan for all asset types. An extensive database capturing asset age and condition intelligence informs the plan, supported by a strong understanding of current asset performance, and the levels of risk attributed to deterioration in condition and performance.

Our people have extensive technical expertise and are skilled in using these tools for asset management decision making, while always looking for and applying innovative solutions to better meet evolving customer needs in the most efficient way. More details about our efficient capital delivery approach are in Appendix N.

Risk management

Risk management is fundamental to good governance and best practice. In pursuing our strategic objectives, we acknowledge that measured risk-taking is both acceptable and appropriate.

Our Risk Management Framework articulates a consistent and systematic approach to ensure risks are appropriately considered in all decision making. The framework outlines the management principles and approach we apply and provides a structured and consistent approach. It includes the governance structure, process, systems and tools we use to support good risk management practice.

We are committed to effective and efficient planning, critical thinking and evidence-based decision making. Operating in a dynamic environment (market, climate, political, technological, and so on), we manage uncertainties that may affect the sustainable delivery of services for our customers. What may be considered true at one point in time might not be true in the future. Ongoing monitoring, reviews, planning and detection of change are integrated throughout our risk management process.

30-year capital plan

We plan for a 30-year horizon. This enables us to make prudent decisions that consider the impact on future customers, avoiding or reducing the impact of investment spikes that may result from a short-term approach. With a sound understanding of forecast population growth and the impact on our assets, we use sophisticated technical expertise and planning tools to predict the future condition and performance, and work with our regulators and stakeholders to understand longer term regulatory responsibilities.

Our 30-year investment profiles for water and sewerage infrastructure are presented below, reflecting our latest thinking based on the information available today. These profiles will be regularly reviewed and updated to ensure an appropriate balance is achieved between cost, service provision and risk. Detailed information is available for the shorter term and data in later years relies more on assumptions, which is why our system is designed to be robust and agile. It is a strong foundation from which we can adapt to priorities as they emerge, including changes to customer expectations and our regulatory context.

Long-term expenditure drivers generally fall into three categories:

1. **Meeting growth:** as the population across South Australia increases, we continue to support this growth and expand our services to new and existing customers through the expansion of our water and sewerage networks and treatment facilities. The population grows at different rates in each of the systems we operate. The current and predicted future capacity and performance of our assets is regularly reviewed and assessed, to ensure we can continue to sustainably meet demand.
2. **Meeting external responsibilities and customer expectations:** with a sound understanding of our legal and regulatory responsibilities and healthy working relationships with our regulators, we plan for and implement improvements that are prudent and efficient. This category also includes customer-driven expenditure to improve services in the next regulatory period and, where appropriate, longer term plans like increasing water recycling. Generally expenditure to meet customer expectations is not embedded in longer term plans mindful these change over time and are informed by ongoing research which feeds into our capital plans as we remain agile to these needs.
3. **Maintaining service as assets age (asset renewal):** forecast trends in investment requirements for asset renewals and replacement are based on the condition and performance assessment profile of our asset base. Assets are regularly inspected or tested and allocated condition grades, which relate to the integrity and quality of the asset and is considered against the expected remaining asset life. The gradings are categorised from one to five. Condition grade one assets are in the best condition. That is, they are 'as new' and have more than 90 per cent of their life left. For some assets this may be more than 30 years, and others, such as electronics, have a shorter expected life. Condition grade five assets have a remaining asset life of less than 12 months. The review also considers if the asset is still required, sized appropriately for its application and if there are other more appropriate solutions available to improve growth or compliance requirements.

Water

An extract of our 30-year capital investment profile for our water infrastructure portfolio (valued at approximately $8,802 million) is presented in Figure O.3. For the regulatory period 2020-24, we have allocated $1,220 million in capital expenditure to:

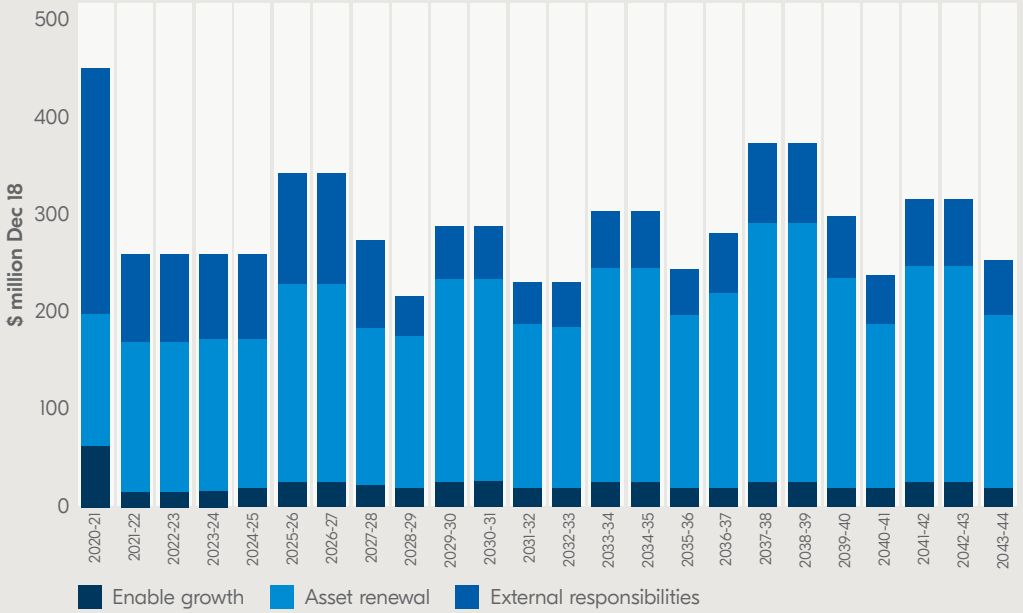
- renew existing water assets — $593 million
- expand the water system to meet future growth demand — $111 million
- improve our network to ensure we continue to meet existing and new external responsibilities and improvement to customer service — $516 million.

Over the 20 years 2024-44, we are forecasting to invest $5,759 million in capital to:

- renew existing water assets — $3,977 million
- expand the water system to meet future growth — $441 million
- continue to meet existing and new external responsibilities and improvement to customer service — $1,341 million.

Peaks in 2020 and 2021 are driven by the need to invest in water sources in areas of the state where current sources need to be protected and/or are not able to meet the current or future demand of the region. Other patterns visible in our expenditure profile demonstrate the impact of ramping up and down between regulatory periods as our capital plan goes through an external determination process and we align our business to deliver what has been allowed in each determination.

Figure O.3: Capital financial projections scenario, regulated only (includes annual averages in *Our Plan 2020-24* and beyond)



Drivers of expenditure over the next 30 years (water)

Growth

Water demand across South Australia continues to steadily increase. Trends indicate significant growth and densification in urban areas, while people are also moving to 'sea and tree change' areas. During 2020-24, key projects will include $16 million for upgrades in Northern Adelaide, $12 million in upgrades to increase supply to Murray Bridge and the surrounding area, and $5.8 million to increase capacity in the Yankalilla system.

Capital investments proposed in Our Plan will support growth in our distribution network, as well as comprehensive studies and investigations to inform our capital investment needs in response to growth beyond 2024. Key growth areas over the coming 10 years are:

- Mount Barker
- Strathalbyn
- Murray Bridge and Monarto
- Northern Adelaide
- South Coast.

Some growth projects rely on customer contracts being in place and so we remain responsive as they arise, for example the Upper Spencer Gulf expansion and the Kangaroo Island desalination plant.

Meeting external responsibilities and customer expectations

Our key external responsibilities include:

- providing safe clean drinking water as per the *Safe Drinking Water Act 2011*
- protecting environmental and heritage values in accordance with the *Environment Protection Act 1993, Heritage Places Act 1993* and *Aboriginal Heritage Act 1988*
- ensuring a safe environment for our people and the community as required by the *Work Health and Safety Act 2012*
- maintaining public safety by managing our dams in accordance with the Australian and New Zealand Committee for Large Dams guidelines.

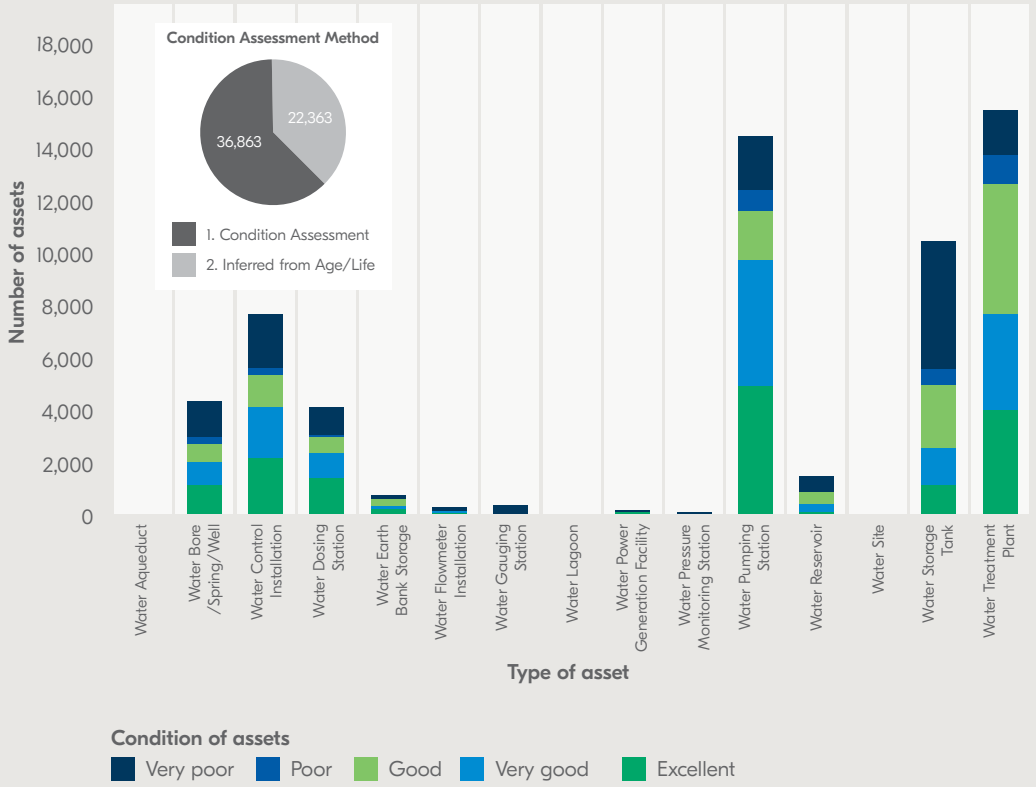
Currently our 30-year plan includes $482 million for upgrading dams to ensure public safety. We have spread this expenditure over multiple regulatory periods in order to soften the price impact for customers. We do this using a risk-based approach to ensure the risks to public safety are tolerable. During 2020-24 we will begin the wall upgrade for Mount Bold Reservoir, our largest dam.

Maintaining service as assets age (asset renewals)

Condition inspections have been undertaken on 38 per cent of our water assets across the state. The remaining assets have been assigned a condition grade based on their remaining life. Those identified in poor or very poor condition have been flagged for capital and maintenance work to improve their condition profile, with a specific focus on improving the asset condition at water treatment plants, storage tanks and pump stations. Figure O.4 shows our assessment over different assets.

To deliver a value for money service for our customers, we need to invest in new technologies to transform our services and maintenance of our assets. Smart water networks collect information in real time about the flow, pressure, water quality and leakage in water networks to optimise asset life and deliver improved service reliability to our customers. By adopting this technology, we can detect small leaks before they become breaks, enabling planned repairs and reducing temporary service interruptions for customers and traffic disruptions for commuters.

Figure O.4: Condition of water assets (excluding pipes)



There were 1,693 water main breaks and leaks in the metropolitan area in 2017-18, equating to a rate of 18.2 breaks per 100 kilometres for the year. There were 2,168 water main breaks and leaks in country South Australia during the same period. This equates to a rate of 12.2 breaks per 100 kilometres for the year. In comparison to other Australian water utilities, we currently have the fifth lowest failure rate, according to the Bureau of Meteorology's *National performance report 2017-18: urban water utilities*, released in February 2019 (Table O.1).

While we are performing well nationally, we understand the impact water main breaks have on our customers and the community. To ensure we minimise these we will continue to improve our performance and target water main renewals in priority areas.

Table O.1: Main breaks per 100km of main for major Australian utilities

Utility	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	Change from 2016-17 %
Yarra Valley Water	52.3	50.5	39.3	48.5	47.4	46.3	-1.1
City West Water	52.2	39.9	37.1	40.1	42.1	42.8	0.7
Tasmanian Water and Sewer						38.9	38.9
South East Water	31.3	30.8	32.2	33.5	32.7	37.1	5.6
Sydney Water	29.0	30.0	26.0	26.0	23.9	32.8	8.9
Hunter Water	31.9	30.2	28.9	26.8	24.8	30.0	5.2
Barwon Water	44.0	31.0	29.0	33.5	31.0	29.4	-0.6
QLD Urban Utilities	26.6	29.0	28.0	25.7	23.1	22.5	-0.6
Icon Water	20.0	11.5	14.2	13.8	14.3	16.3	2.0
Central Coast				17.0	16.0	14.4	-1.6
SA Water		**11.4**	**13.9**	**14.9**	**13.5**	**13.6**	**0.1**
Water Corporation (Perth)	13.3	13.4	15.0	12.0	13.1	11.1	-2.0
Gold Coast	10.5	12.0	7.1	7.4	5.1	6.4	1.3
Logan	10.8	6.6	6.5	4.7	4.0	5.1	1.1
Unity Water		5.6	3.3	3.7	4.8	4.1	-0.7
Median	**29.0**	**29.0**	**26.0**	**21.4**	**19.6**	**19.4**	
Mean	**29.3**	**23.2**	**21.6**	**22.0**	**21.1**	**22.3**	

Source: *National performance report 2017-18: urban water utilities.*

Sewerage

An extract of our 30-year capital investment profile for our sewerage infrastructure portfolio (valued at approximately $4,190 million) is presented in Figure O.5. For the regulatory period 2020-24, we have allocated $534 million in capital expenditure to:

- renew existing sewerage assets — $221 million
- expand the sewerage system to meet future growth demand — $108 million
- improve our network to ensure we continue to meet existing and new external responsibilities and improve customer service — $205 million

Over the 20 years 2024-44, we are forecasting to invest $2,561 million in capital to:

- renew existing sewerage assets — $1,660 million
- expand the sewerage system to meet future growth — $480 million
- continue to meet existing and new external responsibilities — $421 million.

Drivers of expenditure over the next 30 years (sewerage)

Staging investment keeps customer prices as low and stable as possible over time, while maintaining an appropriate balance between cost, service provision and risk. Fluctuations within each regulatory period are the result of impacts from population growth, changes in the age and condition of infrastructure, and maturing environmental requirements in different systems. The cyclical nature of investment trends sees the first year of each regulatory business period focused on planning activities, followed by a steady increase in capital investment during the remaining three years.

Growth

The population and demand for sewerage services grow at different rates in each of the 25 sewerage systems we operate. As with water asset planning, trends indicate significant growth and densification in urban areas, while people are also moving to 'sea and tree change' areas. The current and predicted future capacity and performance of our assets are regularly reviewed and assessed to ensure we continue to sustainably collect, transfer, treat and reuse or dispose of increased sewage flows.

Capital investments in Our Plan are proposed to support growth, as well as comprehensive studies and investigations that inform our capital investment needs in response to growth beyond 2024. Key growth areas over the coming 10 years are:

- Northern Adelaide
- Glenelg
- South Coast
- Victor Harbor
- Port Lincoln
- Murray Bridge.

To meet expected growth in 2020-24, the Bolivar Sewage Treatment Plant requires a capacity upgrade. Figure O.6 shows the predicted total sewage inflows as a result of population growth, and the likely timeframe for when the capacity of the treatment plant will be exceeded. A detailed study was completed using this data to assess the performance of different stages of the treatment process. Our analysis demonstrates the size of some of these treatment units will need to be increased in 2020-24, while our others will be adequate until the 2024-28 regulatory period.

Figure O.5: 30-year capital plan for sewerage

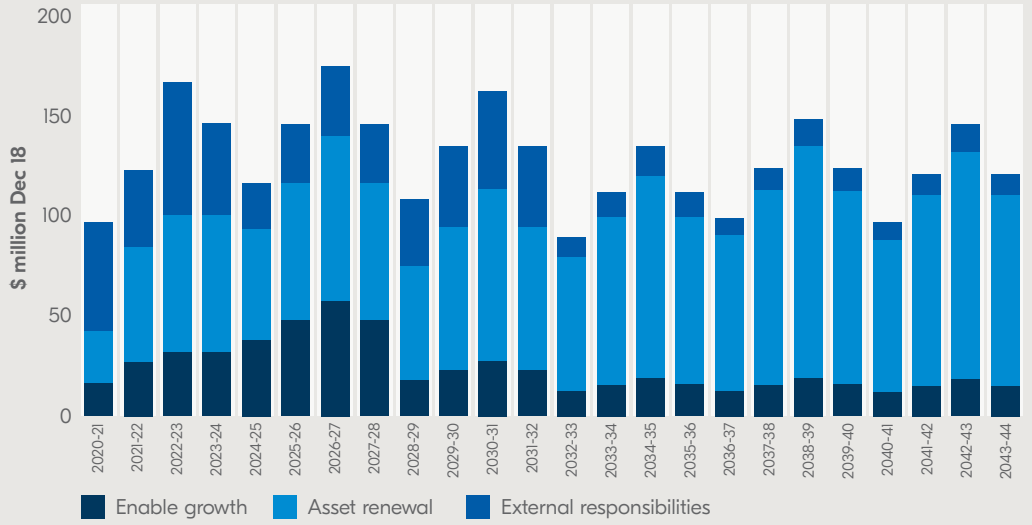
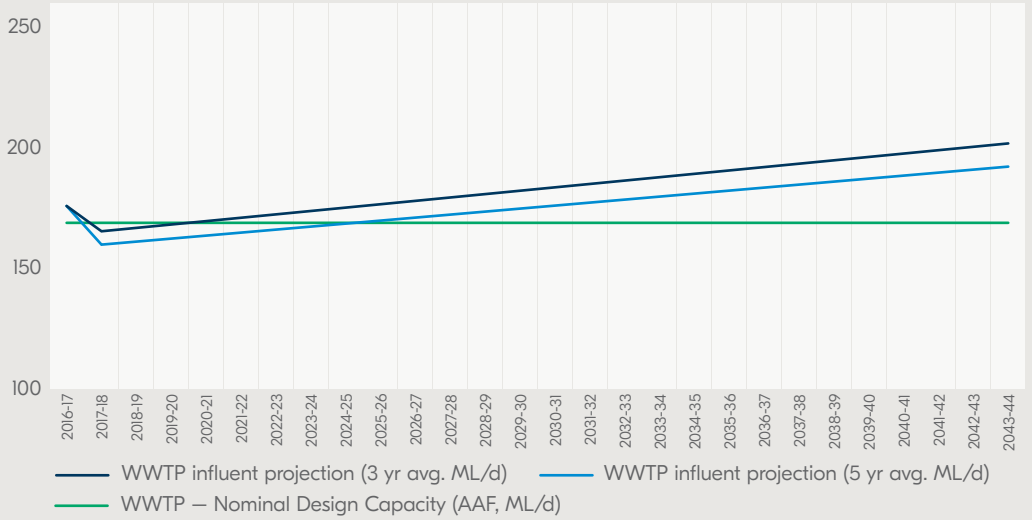


Figure O.6 Bolivar Sewage Treatment Plant forecast growth in sewage inflows to 2040



Meeting external responsibilities and customer expectations

Our key external responsibilities include:

- protecting the environment as outlined in the *Environment Protection Act 1993* and *Heritage Places Act 1993*
- ensuring a safe environment for our people and the community as per the *Work Health and Safety Act 2012*.

Protecting the environment remains a key priority for us and our customers. While there is more information available on environmental compliance requirements in the coming five to 10 years than the subsequent 20 years, we continue to look towards the future, and ensure our actions and investments support a sustainable sewerage system in the long-term.

Our customers value recycling water and preventing sewage overflows to reduce our impact on the environment, this has been incorporated into our 2020-24 expenditure proposals.

Investigation of water recycling scheme expansion is proposed between 2020-30 as part of our investment in environmental protection. During the next 10 years we will also investigate and deliver new and innovative ways to improve our sewerage network management, to reduce overflows. This will include smart network technology which we are already trialling. Our environmental improvement and protection program include a number of capital investments in Our Plan, as well as comprehensive studies and investigations to inform our investment needs beyond 2024.

Our planned expenditure for improving the environmental performance of our sewerage assets is shown in Figure O.7.

The increase in expenditure forecast for 2028-29 and 2029-30 is aligned to expected increases in environmental regulatory requirements. In order to be compliant with changing environment licence conditions it may be necessary to invest in upgrades at our sewage treatment plants to achieve improved effluent discharge quality or increase recycled water opportunities to decrease our environmental impact.

Maintaining service as assets age (asset renewals)

Most of our investment to ensure reliable services is in ongoing renewals. Decisions are informed by condition assessments, risk and required levels of service. Some investment is based on asset age rather than condition, and as we conduct more condition assessments, we are refining these assumptions, and potentially the expenditure linked to them. Figure O.8 is an example of the condition data for sewage treatment facilities on which we base our planning for assets.

Figure O.7: 10-year investment profile for improving the environmental performance of our sewerage assets

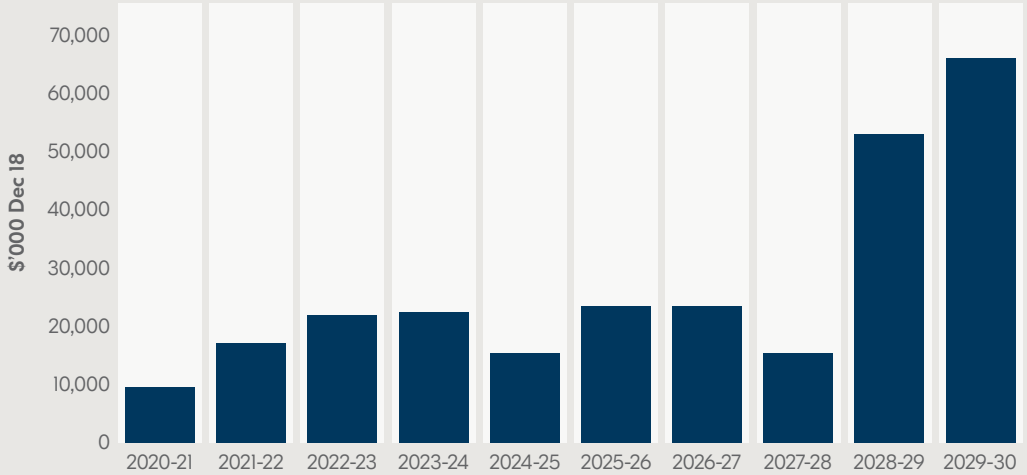


Figure O.8: Condition of sewage treatment facilities