South Gippsland Water

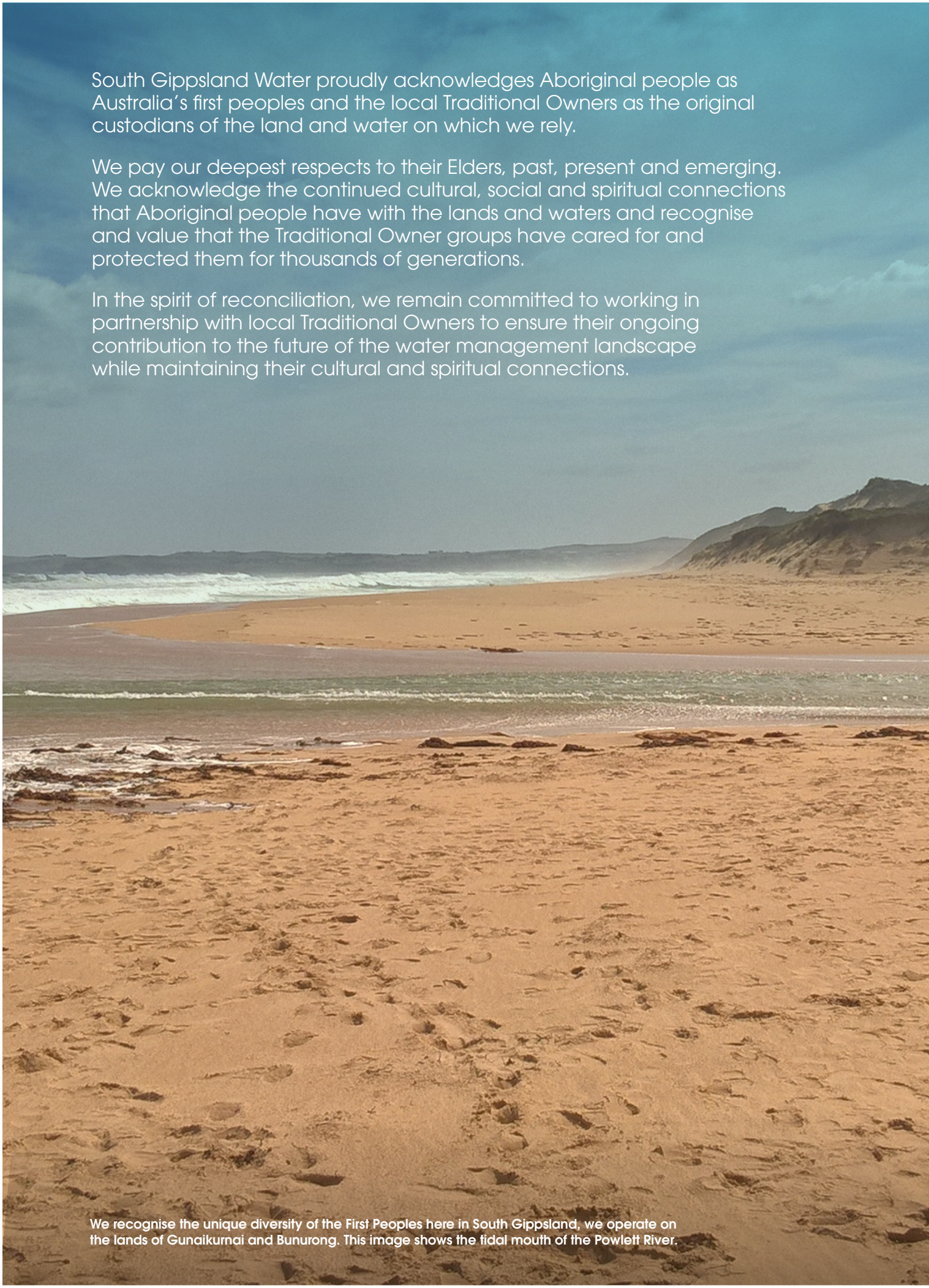
2022 | Urban Water Strategy

Our long term plan for water and wastewater services

South Gippsland Water proudly acknowledges Aboriginal people as Australia's first peoples and the local Traditional Owners as the original custodians of the land and water on which we rely.

We pay our deepest respects to their Elders, past, present and emerging. We acknowledge the continued cultural, social and spiritual connections that Aboriginal people have with the lands and waters and recognise and value that the Traditional Owner groups have cared for and protected them for thousands of generations.

In the spirit of reconciliation, we remain committed to working in partnership with local Traditional Owners to ensure their ongoing contribution to the future of the water management landscape while maintaining their cultural and spiritual connections.



We recognise the unique diversity of the First Peoples here in South Gippsland, we operate on the lands of Gunaikurnai and Bunurong. This image shows the tidal mouth of the Powlett River.

Chair and MD Statement

We are pleased to present our draft Urban Water Strategy. This strategy is our 50-year plan to continue delivery of the water and wastewater services that are essential for a productive, liveable and sustainable region into the future.

South Gippsland Water is responsible for a vast area, and our services play a significant role in the prosperity and wellbeing of our region. This long term strategy has sought to deliver plans based on a shared understanding of the aspirations and values of others and has been developed in partnership with our customers, Traditional Owners, wider communities, and government.

When thinking about the uncertainties of the future, there are a number of unknown challenges, particularly as COVID-19 (coronavirus) evolves and continues to impact our region. In responding to these, an adaptive approach has been taken providing the flexibility for projects to be implemented if and when required. This approach enables us to continue to deliver affordable, fit for purpose solutions. We will continue to make these decisions in partnership with others.

Our Strategy is supported by a robust process of modelling and analysis. The planning has carefully considered the balance of water and wastewater needs, sources, uses and treatment for the long term. Our ongoing focus on the environment and technology is prominent in identifying a diversity of water sources and finding more efficient ways to use the water we already have.

As we continue to deliver on the commitments and services we provide today and responding to the challenges we face in future. This strategy provides flexibility and a balance in service delivery and affordability. We are grateful for our community input and will continue to work with our Customer Advisory Committee to make sure our investments are timely, appropriate and deliver a secure and sustainable water supply future for our region.

Philip Clark
Chair

Philippe du Plessis
Managing Director

Our strategy in brief

Our challenges

Our future weather will be more extreme

Our climate is warming, and there will be less water available from rivers, creeks and our dams.We have to plan for more wet weather downpours that will impact our wastewater systems.

A serviced population from 37,000 to 60,000 or more over 50 years

Planning for our changing 4,000 square kilometre region and industry.

Finding the balance

Of being prepared to adapt and respond if and when needed to meet our customer expectations, protect our environment and keep our prices affordable.

Our approach

We will continually monitor the changes in our region and environments to make sure decisions are based on the most up to date information.

We have an adaptable approach to planning providing flexibility for projects to be completed if and when needed.

Determing our position

We have to make decisions that will impact our customers, the efficiency of systems in years to come and our customer bills.

How robust should our services be during times of drought and extreme weather events?

Our plan

We spoke to our customers, and they said:

- Plan for moderate restrictions every now and then, try to avoid severe restrictions that will impact the region
- Be prepared! Plan upgrades for a moderate level of climate change – be prepared for more severe impacts and adapt and respond if needed.

Our systems

Water

Of our eight water systems servicing the region, one needs short term upgrades to address water security issues, Ruby Creek, Leongatha.

Our largest system Lance Creek, which provides water for 63% of our customer base will continue to be a focus of our adaptable approach to ensure long term water security. The remaining systems have planned works to address system vulnerabilities and accommodate future growth.

Key actions

Core ongoing programs

We are focusing on water use and efficiency for all systems:

- Water awareness and efficiency programs
- Leak reduction
- Reuse - for our customers, and within our own systems.

Ruby Creek Water Supply

Immediate options investigation and action required to secure Leongatha and surrounds. This may include diverse water sources or interconnection between our systems or other regional systems.

Lance Creek Water Supply

Our biggest water supply system is secure today, however, we are planning for tomorrow using the security of the state water grid.

Wastewater

Of our 12 sewerage systems servicing the region, one needs significant, short term upgrades, Wonthaggi Wastewater Treatment Plant.

Foster Wastewater Treatment Plant requires upgrading to protect our environment and to improve reuse opportunities.

Beneficial Reuse

Of our wastewater systems, 9 have the ability to reuse water. In South Gippsland, as a high rainfall area, identifying viable opportunities to reuse water has proven challenging.

Key actions

Wonthaggi wastewater

Upgrade works commenced two years ago and are continuing to be completed in a staged manner as part of our adaptive strategy.

Foster Wastewater Treatment Plant

Minor works and monitoring will be completed in the short term. Upgrade works, currently being designed, will maximise reuse opportunities and protect Corner Inlet.

We recognise our climate is getting dryer. Identifying reuse opportunities and continuing to improve our treatment processes are a key focus of this plan.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1 Planning for our region

1.1 Our region

South Gippsland is located approximately 150 km from Melbourne in the south east of Victoria. The region has a focus on the natural environment with two internationally recognised National Parks, Wilsons Promontory and Tarra Bulga, north east of Yarram. South Gippsland is a popular tourist destination, well known for the coastal towns of Inverloch, Cape Paterson, Waratah Bay, Sandy Point and Port Albert.

Dairy farming is the major industry, alongside a range of other important agricultural and horticultural enterprises including beef, sheep, wine, vegetable production, and a commercial fishing industry.

1.2 Supporting economic development

As a regional service provider, we are proactive in providing environmentally sustainable water and wastewater services to benefit our customers and support strong communities. Our service area covers 4,000 square kilometres. Servicing a residential population of about 37,000 people that can swell to almost double in some towns over summer.

Our Purpose

We provide sustainable water services that are essential to the prosperity and wellbeing of our communities and natural environments.

Our Vision

Our customers value the services and outstanding experiences proudly delivered by our capable and committed teams.

HOW WE WANT TO WORK

Value our customers & community

Our customers are our priority

We will use a strong understanding of our customer needs to provide resilient services and greater value

Community collaboration to develop integrated services

Engaging communities in co-design

Partnerships for value creation

We will actively seek and leverage partnerships for co-investment, capability generation and value creation

Clear, efficient practices

Improve the core

System improvements to clarify responsibilities and improve process flow

Remove the noise

Focus employee effort on value-add activities

Get future fit

Invest in building capability to meet future needs

With the future in mind

Embracing the Circular Economy

Enable the Circular Economy in everything we do

Developing fit for purpose integrated infrastructure solutions

Integrated assets that are adaptable, productive and provide high value

Transitioning to a digitally enabled business

To efficient, effective integrated practices

Projects are designed to deliver our goals

Developing strategies to protect our environment:

- 2050 Carbon Strategy
- Circular Economy Strategy
- Lance Creek Reservoir Health Study
- Leongatha Water Supply
- Venus Bay Ocean Outfall Upgrade
- Customer Experience Strategy
- Best sourced Billing/ CRM capability
- Intelligent Metering Systems
- Digital Strategy

1.3 Our customers are our priority

As part of our planning processes, we work with our customers to understand what they value most and plan our projects to deliver these key customer outcomes:

1. **Reliability**: We will plan for the future, be reliable and minimise unplanned interruptions to services
2. **Customer integrity**: We will act with honesty, respect and strive to, balance affordability, value for money and fairness
3. **Environment**: Be environmentally sustainable and adapt to a future impacted by climate variability
4. **Water**: Provide safe, clean, good tasting drinking water
5. **Wastewater**: Provide a safe wastewater service that contributes to the liveability of our communities.

1.4 Meeting our future needs

To meet our customers future needs, and to address key challenges such as climate change and population growth, we have identified key principles for planning and delivering our services:

1. Our approach to working together is:

- Our customers are our priority
- We seek community collaboration in developing our services
- Identification of partnerships to create value

2. Our planning and delivery processes aim to:

- Embrace the circular economy to reduce waste and pollution, circulate products and materials and regenerate nature
- Develop fit for purpose infrastructure solutions
- Transition to a digitally enabled business

1.5 Servicing our region

To deliver water and wastewater services to 21 communities across our region we operate:

- 8 water treatment plants
- 750 kilometres of water mains
- 13 reservoirs and 18 service storages
- 520 kilometres of wastewater mains
- 2 pressure sewer systems
- 1 vacuum wastewater system
- 11 sewage treatment plants
- 5 marine environment outfalls
- 3 inland water discharge points.

1.6 Why do we need an Urban Water Strategy?

Our Urban Water Strategy outlines our plan to deliver water and wastewater services over the next 50 years. The Strategy incorporates the key challenges of climate change and population growth while considering the environment and the role water plays in economic development.

The Urban Water Strategy helps us to support the development of resilient and liveable communities while balancing social, environmental and economic costs and benefits.

The strategy is developed every five years and actions arising from the Urban Water Strategy are included in our Price Submission to the Essential Services Commission, and Corporate Planning processes.

1.7 Our challenges

An important part of planning water and wastewater services into the future is understanding and responding to key challenges. The challenges below have been considered while developing our Urban Water Strategy, and an adaptive strategy adopted to respond and contribute to shaping our communities, landscape and our direction for the future.

1.7.1 Climate

Both water and wastewater system operations and planning are highly dependent upon and impacted by climate. While Australia's climate naturally exhibits a degree of variability, this variability will be exacerbated by the impacts of climate change. Climate change is expected to result in more extreme events, such as flood, drought and bushfires. Our Strategy considers a range of plausible climate futures to assess potential impacts on water supply, customer demand and wastewater treatment.

The Urban Water Strategy also incorporates our Drought Preparedness Plan which provides further detail on how we will respond in years of drought.

1.7.2 Population

The growing population within our region, particularly in larger towns such as Wonthaggi, increases the demand on water resources and infrastructure required to meet customer needs. We have assessed a range of growth projections to accommodate for population growth and changing industry demand.

1.7.3 Our vast service area

South Gippsland Water's service area covers 21 towns spread over 4,000 square kilometres and encompasses three Shire Councils. The number and size of the towns creates significant physical and financial challenges for a small water corporation in how we provide water and manage wastewater, including treatment, transfer and storage.

Our service area includes eight separate water supply systems and 11 wastewater systems. These range in size from Lance Creek water supply system which has14,000 customers to Dumbalk which has 109 water customers. Each system receives the same standards of service and come with a range of challenges.

1.7.4 Meeting customer and community expectations

Our customers are at the core of everything we do. Working closely with our customers and communities, we are continually testing our understanding of what customers value in our services. Our planning includes a focus on how the services we provide support sustainable and liveable communities.

Part of our conversation with customers includes annual updates on our water security status and scenarios from which we adapt our programs to meet customer and community expectations.

1.7.5 Healthy waterways

Water resource management balances the needs of people and the environment in which we live. Some waterways may benefit from additional environmental flows, particularly as one projected impact of climate change is a reduction in streamflows across the region.

1.7.6 Rules and regulations

We are governed by a range of rules and regulations on how we manage our water and wastewater systems. Our Urban Water Strategy incorporates the quality standards and adaptative plans to provide flexibility to deal with any future change.

1.7.7 Affordability

When planning for the future, we seek to find a balance between price, service and a sustainable future. Our customers are our focus when we find a balance between price and service. This balance is a key consideration in our customer engagement process and incorporated into this strategy.

2 Our customers and communities

2.1 Our customers and communities

Our customers use our services for a wide variety of purposes such as residential and holiday properties, small and large businesses and farms:

- 22,400 water customers and 20,000 sewerage customers, servicing a total population of 37,000
- About 4,000 of our customers are classified non-residential
- Business and industry use 43% of our water supply
- Some of our towns, such as Inverloch and Cape Paterson, have many vacation homes and the population swells during holidays
- Our 2019 Vulnerability study indicated that South Gippsland Water customers are less affluent than other Victorians, therefore making services available and affordable to vulnerable customers is important
- Customer engagement for our 2020 Price Review by the Essential Services Commission told us that customers value reliable services, safe, clean drinking water, safe wastewater services and environmental responsibility.

2.2 Engaging with Bunurong and Gunaikurnai

We recognise the unique diversity of the First Peoples here in South Gippsland. We are committed to an ongoing process of reconciliation and community strengthening through building strong organisational and community relationships between Indigenous and non-Indigenous communities.

Gunaikurnai have provided their principles following a workshop on the Urban Water Strategy:

- Does it return water to Gunaikurnai?
- Does it take water from Gunaikurnai?
- Is there a step change benefit?

Then check against the quadruple bottom line:

- Social benefit to Gunaikurnai
- Economic benefit to Gunaikurnai
- Caring for country
- Cultural heritage.

Gunaikurnai have expressed an interest in the Agnes Falls area, as it is of cultural significance. We will ensure we engage Gunaikurnai specifically on anything to do with this site as part of our regular project management.

We're working with other water corporations to engage Bunurong. We welcome all forms of participation in the Bass Coast Reconciliation Network.

2.3 Engaging our customers

We have completed a thorough engagement process across our communities through a range of methods and conversations while navigating the challenges of COVID-19 (coronavirus). Our Community Advisory Committee has been pivotal to help us make decisions about the range of challenges and options available to us.

Review

- Review existing plans, engagement outcomes, and conduct stakeholder analysis
- Identify opportunities to utilise existing partnerships/forums
- Establish terms of reference for and recruit a SGW community advisory committee

Deep dive

- Revise and review community and stakeholder feedback
- Identify and analyse specific issues raised in the 'Go Broad' phase
- Conduct forums/meetings on key themes and topics
- Options presented and analysed including customer price and service expectations

Publish

- Final report and position incorporated into Urban Water Strategy

Go broad

- Build 'Have Your Say' website and online survey to commence wider community engagement
- Establish community advisory committee, review survey results
- Incorporate survey outcomes in next stage of consultation
- Commence specific consultation on key project areas

Test

- Options further developed and draft UWS available for comment
- Seek public comment on draft UWS via online survey and feedback
- Revise and review final engagement report for addition to UWS and publication online

2.3.1 Go Broad

Since 2014 we have engaged consultant InSync to provide a community-wide view of what our customers want and expect from us. The survey consists of a call centre direct calling our customers to seek their views.

This survey of 400 people found that the top three expectations of us are the provision of clean water and wastewater services, reliability and affordability of our services.

For the Urban Water Strategy we designed a specific customer survey. To promote the survey we completed a broad range of activities:

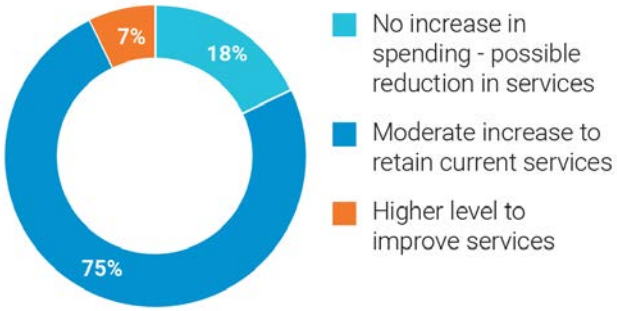
- We emailed our customer base with a link to a survey and individually spoke to more than 50 business owners and staff across the region
- We printed and distributed 700 flyers via letter-box drop and in person to residents, with a focus on the key town of Leongatha. One hundred posters were printed for display in local business windows, complete with a QR code to enable people to connect with us easily
- We performed a "supermarket blitz" – talking to residents about the survey while they were out shopping, resulting in a significant number of responses (approximately 65)
- On social media we posted seven times throughout the survey period, boosting them via Facebook advertising. Our last post reached 2,300 people.
- The survey was also promoted on our website, and we created a new "have your say" section and included a banner on the homepage
- Our survey was also promoted existing networks and relationships such as West Gippsland Catchment Management Authority and councils.

Our online survey launched on 21 May 2021 and closed on 11 July 2021. We designed the survey to take between five and eight minutes, in line with the International Journal of Market Relations recommendations for survey length. We asked 15 questions of respondents. 114 people fully participated in the survey.

2.4 What our customers told us they want

A clear majority of our customers (75%) said they would accept a moderate increase in customer prices, $20 to $50 per year per customer, over the next three years to maintain service standards as they currently are.

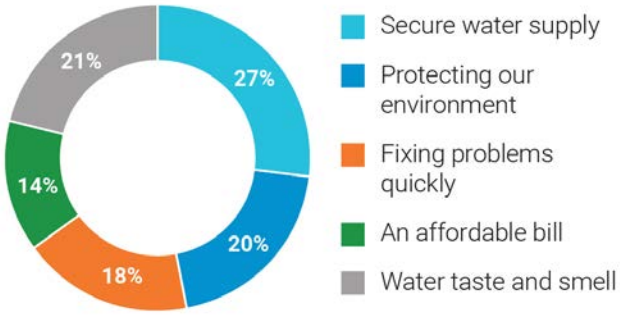
What level of tarrif increase would you be willing to accept over the next three years?



"Your service and attendance to problems, advertising, knowledge given to the public, fresh, clean, safe water – we are very privileged to have this service." Customer quote from the Go Broad survey.

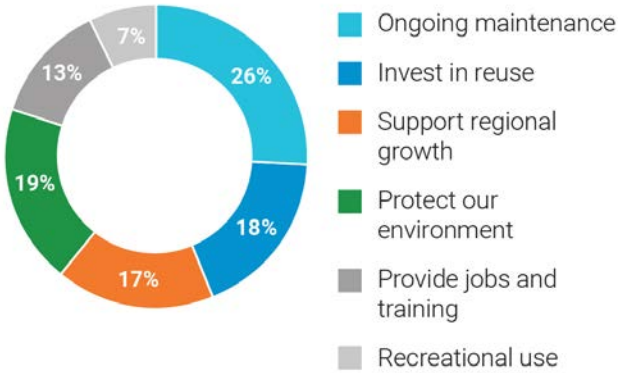
Our customers said that a secure water supply is the most important service to plan for, followed by protecting the environment and fixing problems quickly.

Tell us what you prefer



To clarify, we asked our customers to rank our most important services and ongoing maintenance was a clear winner.

Tell us what's important to you



We regularly engage customers about water security and what frequency of water restrictions we should plan for. Our water system planning aims for moderate water restrictions no more often than one year in ten and severe restrictions no more often than one year in fifteen.

Customers responding to the Go Broad survey expressed acceptance for moderate restrictions as often as one year in five or one year in ten.

Our Community Advisory Committee, formed to help us with the Urban Water Strategy, also expressed acceptance of moderate restrictions, however, little acceptance of severe restrictions.

Moderate restrictions (stage 1 and stage 2) place limits on activities such as water use for private gardens, while severe restrictions (stage 3 and 4) place significant restrictions on water use outside of homes and can impact business. Descriptions of restrictions can be found on our website **here**.

Our planning for the Urban Water Strategy aims to limit moderate restrictions to once every ten years and aims to avoid severe restrictions.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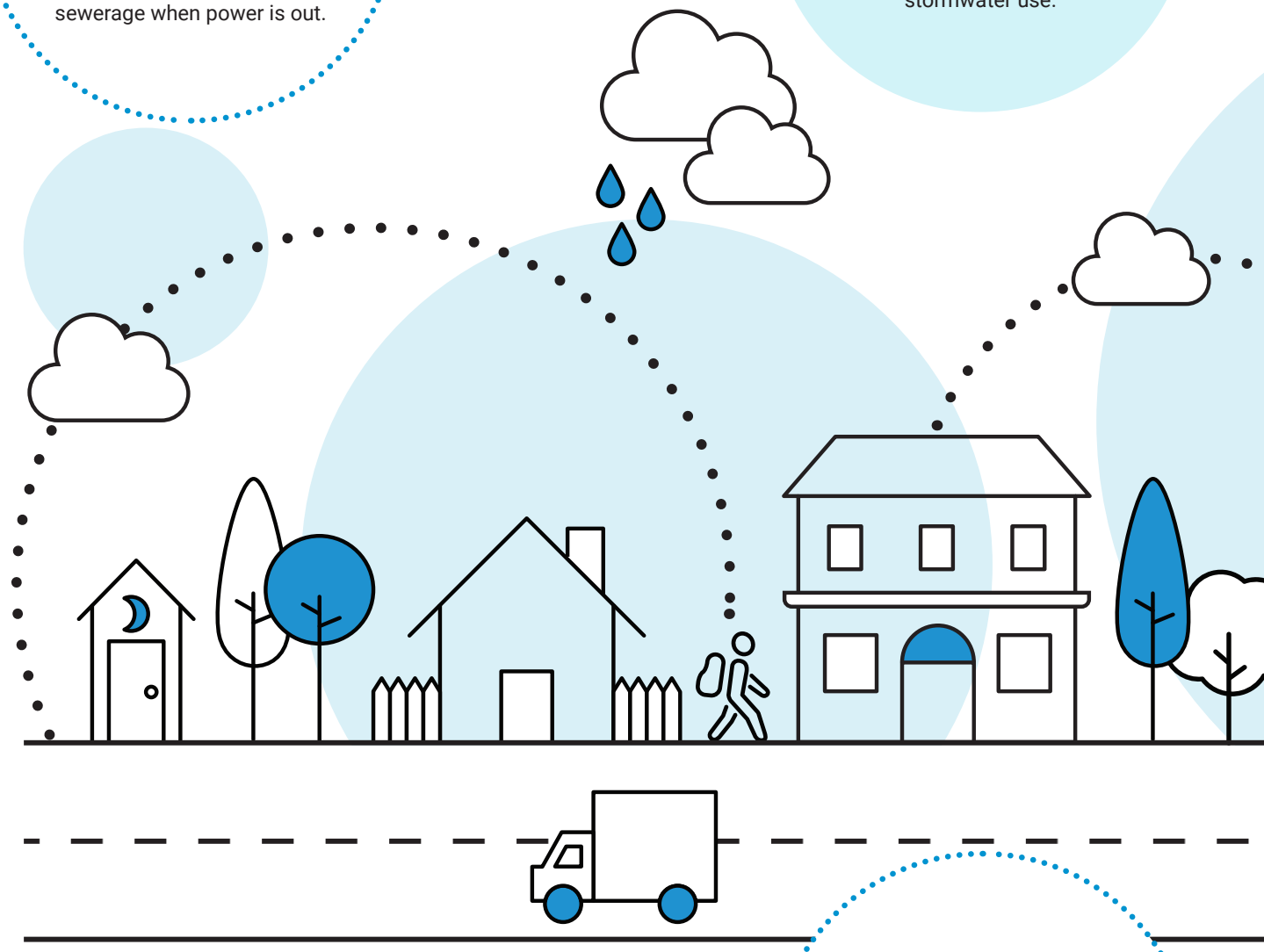
2.5 What our customers want

Wastewater services

Increase reach of services to all residential blocks | Connect Stony Creek to the sewerage system next door | Provide wastewater services to Fish Creek | Notify people of what they need to do with their sewerage when power is out.

Our environment

Planning for future water storages/ climate change, looking after the environment | Invest in waterway restoration projects | New focus on carbon neutral future | Look at more natural solutions | Look at stormwater use.



Comments above have been drawn from our customer sessions and represent their voice in developing the Urban Water Strategy.

Embrace changing technology

More online capabilities for customers | More website interactive forms, self-access for customers | Provide SMS of planned works or incidents in my area.

More community benefits

Update the outdated trade waste charge particularly for small community organisations | Try to keep the costs $ to customers as low as possible | Water is cheaper in Melbourne | Teach us about where our water comes from | Public access or open days | Have a service centre in Leongatha.

Water services

Create more water storage | Water quality is so important | Improve taste of water in Korumburra, Wonthaggi and Dumbalk | Water for towns who don't currently have services | Improve taste through reducing added chemicals | Take a more proactive approach in the assessment and maintenance of water and wastewater assets.

2.6 Our Community Advisory Committee

Our Community Advisory Committee was established in July 2021 and has met four times over the period to deliberate on the options to augment our systems for a period of 25 hours. The Committee were asked to deliberate on strategic topics such as their preferred frequency of restrictions, what water supply options we should consider and how options should be evaluated. The Committee were asked to help evaluate upgrade options for our systems and, as such, had a significant influence on our strategy.

The Community Advisory Committee has indicated its support for the following actions:

- Reconnect existing, unused reservoirs to Ruby Creek (Leongatha) to secure the town's water supply. This is in preference to connecting the town to the Lance Creek system
- Investigate stormwater as a potential water resource for Leongatha
- Undertake a water leakage reduction program at Fish Creek
- Look at water treatment plant wash water reuse for all systems, where relevant
- Purchase an additional 2GL entitlement for Lance Creek system to ensure security for future growth
- More emphasis on community education and awareness of Permanent Water Saving Rules
- Investigate use of digital meters to reduce leakage in our systems
- Investigate a new off-stream storage at Agnes River
- Investigate the introduction of modest water restrictions as part of our Drought Response Strategy

It decided against the following potential actions:

- Water carting (unless absolutely necessary) due to high cost

2.7 Engaging others

2.7.1 Our major customers

South Gippsland is principally an agricultural region known for dairy and beef. Our major customers are associated with dairy production. We have been working with them closely to ensure their future needs will be met, particularly in relation to trade waste services, and reuse or different treatment options.

2.7.2 Community, business and industry forums

As an active member of our community, South Gippsland Water works in partnership with many local and industry groups, giving us the opportunity to hear from people with a diverse range of interests. These include, but are not limited to:

- GEA GLAWAC; South Coast Water Partnership (health) Choose Tap alliance; South Gippsland Shire Council
- Bass Coast Shire Council, Wellington Shire Council, Water Alliance, WSAA
- Smart Watermark, Bass Coast Landcare Network, West Gippsland CMA
- Parks Victoria, Schools Water Efficiency Partnership, Kids Teaching Kids
- Earthwatch, Meeniyan Progress Association, Poowong and District
- Landcare Group, Gippsland Regional Water Alliance, Vic Water, and the Intelligent Water Networks group.

2.7.3 Noting the Sustainable Water Strategy

The Victorian Government is renewing it's Central and Gippsland Region Sustainable Water Strategy, setting the directions and policies that secure the region's future water resources over the next 50 years. This process is being completed in tandem with water corporations developing their 50-year Urban Water Strategies. South Gippsland Water has attended a local forum as a guest to assist our understanding of community wishes and incorporate key lessons in the Urban Water Strategy.

3 Planning for our changing future: water

3.1 Water supply and demand

In planning for the future we have considered:

- The changing climate
- Industry and population growth
- Projected water use (demand)
- The balance in water supply and demand
- Frequency of water restrictions
- New service areas including un-serviced towns.

3.1.1 Our climate is changing

Most of our water resources rely on annual rainfall and respond to the changes in weather patterns. In the future, the impacts of climate change are expected to result in a drier, hotter climate that will reduce the water available from our existing resources. Evolving climate science informs our planning, however, there is considerable uncertainty about the climate future we face over the next 50 years and beyond.

We have used detailed scenario modelling of water availability to prepare for a range of plausible climate futures.

Our climate scenarios have been informed by the Department of Environment Land Water and Planning Guidelines for Assessing the Impact of Climate Change on Water Availability in Victoria.

These guidelines show the projected changes to our climate (runoff, temperature, potential evapotranspiration and rainfall) under scenarios of low, medium and high climate change, relative to the 1995 average. These plausible futures have been considered as part of our 50-year planning.

3.1.2 Future water demand projections

We are also expecting growth in demand for water from residential population growth and industrial expansion.

To account for uncertainty in future demand, we have considered three demand scenarios: low, baseline and high.

In the face of population growth, climate change and an inherently uncertain future, our challenge over the next 50 years is how we continue to effectively manage our increasing demand for water while delivering value to our customers.

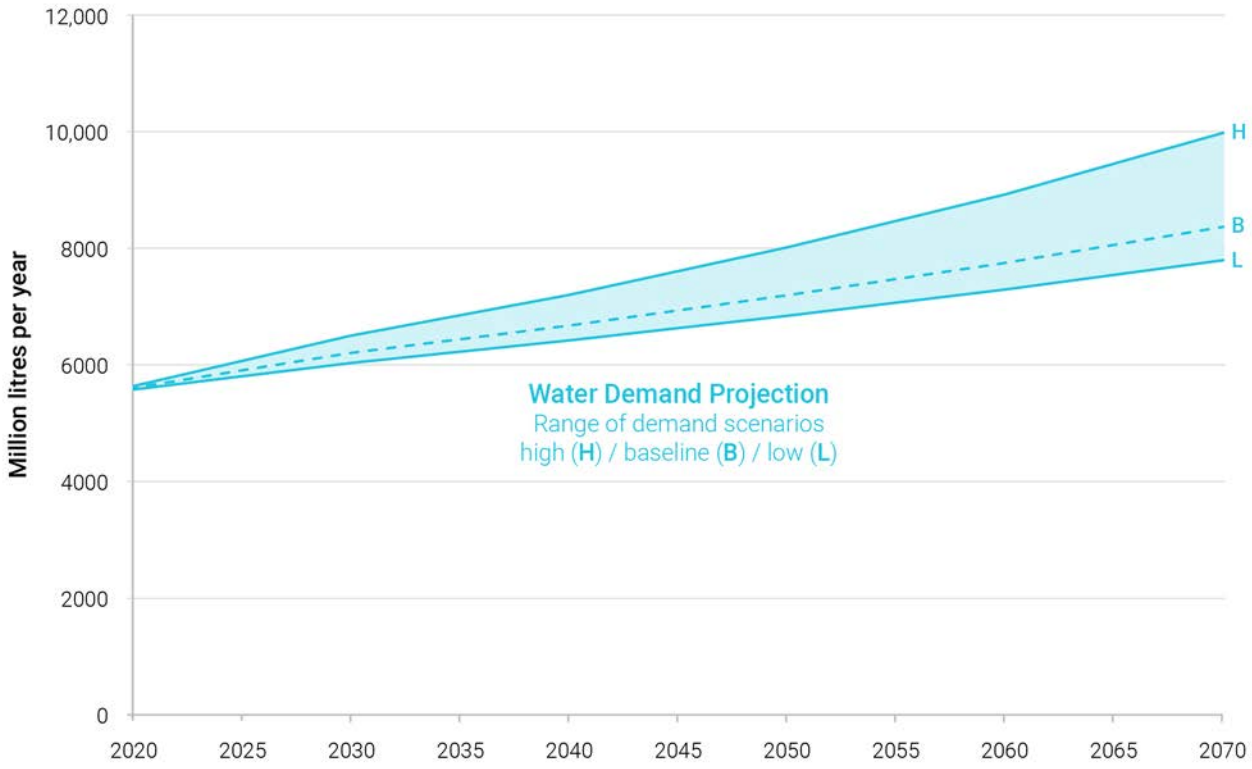


Figure 3-1: Our future water demand projection

We currently extract over 5,700 ML/year of raw water, of which 37% is used to supply residential customers, 43% supplies industrial and commercial customers, and about 20% is utilised across our water treatment plants and lost through leakage.

3.1.3 Frequency of water restrictions

3.1.3.1 Agreed level of service

In planning our strategy, we have worked with customers to understand what frequency of water restrictions, or 'level of service' is acceptable.

Customers indicated moderate restrictions (Stages one and two) would be acceptable every five to ten years. There was little appetite for severe restrictions of stage 3 or worse.

We have used this information and in normal rainfall years, our Strategy aims for restrictions no more than once every 10 years on average.

3.1.3.2 Water Restriction levels

- Stage 1: 'Alert'; Be 'ALERT' that weather conditions require water efficient practices be activated
- Stage 2: 'Save'; Seek to ensure customers 'SAVE' water due to dry weather conditions
- Stage 3: 'Just Enough' Water storage levels are 'JUST ENOUGH' given the current climatic conditions. Customers should limit their use of water
- Stage 4: 'Critical' Water storage levels are at 'CRITICAL' low levels. Restrictions limit the use of water.

3.1.3.3 Drought conditions - minimum level of service

During drought, we will continue to supply water to meet essential human needs. For residential homes and businesses, this is the amount of water that is required when Stage Four, critical water restrictions, are in place.

3.1.4 Supply

Water resource modelling of each system over a long climatic period (50+ years) was used to determine the average annual amount of water that could be supplied to a given system at the agreed level of service (restrictions no more frequent than 1 in 10 years) under a given set of climatic conditions. This assessment was done under current and future climate conditions.

3.1.5 The water balance - supply and demand

To meet our agreed level of service, we look at both water demand and supply over time. We plan for water system improvements before the forecast date when we predict the available water supply, to meet our agreed level of service, is less than demand.

The planning process uses supply and demand curves. The curves show the volume of water that can be provided as a long term average relative to the water demand, without restrictions in place. When the curves show demand exceeding supply, restrictions will be required or the system will need upgrading.

The challenge for long term planning is to estimate when the frequency of restrictions will be greater than once every ten years in the context of uncertainty about future growth in demand, natural climate variability and the impacts of climate change.

We plan for system improvements to give a water supply level that is greater than projected demand. The calculations are based on water resource modelling over 50+ years of varying climate conditions. We also regularly assess short term modelling separately which estimates the likelihood of restrictions over the next year or so given the current volume in storage. These short-term outlooks are heavily influenced by start storage volumes.

For example, long term modelling of the Ruby Creek system shows that demand for Leongatha and Koonwarra currently exceeds supply. This means that restrictions are likely to be more frequent than 1 year in 10, on average over the long-term. However, short term modelling for the Leongatha Water Security Outlook (Section 4.1.2) shows that Leongatha is unlikely to experience restrictions over the next 12 months. This is because 2021 happened to be relatively wet, and storages leading into the 2021/22 summer were quite full.

Planning for agreed service levels doesn't mean that restrictions won't be needed. Water systems with storage capacity will have some resilience following wetter years. Water system augmentation plans will be timed so that, on average over the long term, water restrictions will not be required more than one year in ten.

Figure 3-2 shows an example of our water supply and demand projections. The intersection of a township water demand and the annual water volume available is typically used to describe the point at which a system should be upgraded to ensure that agreed service levels can continue to be delivered. The balance is further complicated by the challenges of predicting our future population and our changing climate. Modelling shows a range of climate and demand scenarios. Planning for the next 50 years uses a best estimate, or baseline, estimated demand along with the medium climate change scenario. Different climate change and growth scenarios are used to estimate the earliest time when upgrades may be needed so plans can be developed to accommodate higher demand growth or greater climate change impacts, if they were to eventuate.

3.1.6 Cost of restrictions versus cost of augmentation

Water restrictions save water during drought by temporarily limiting the ways in which water can be used. These water savings can help to avoid or defer costly supply system augmentations, but come with their own costs to customers, the broader community and South Gippsland Water. Severe water restrictions can result in the loss of public and private lawns and gardens vegetation including sports fields. For South Gippsland Water advertising and management costs increase.

Any water restrictions are an inconvenience and impact our customers and the region. When reviewing actions to maintain level of service we consider the cost of restrictions based on a common understanding of the impacts of those restrictions. Further details are provided in our supporting document – Water Resource Modelling – Technical Report.

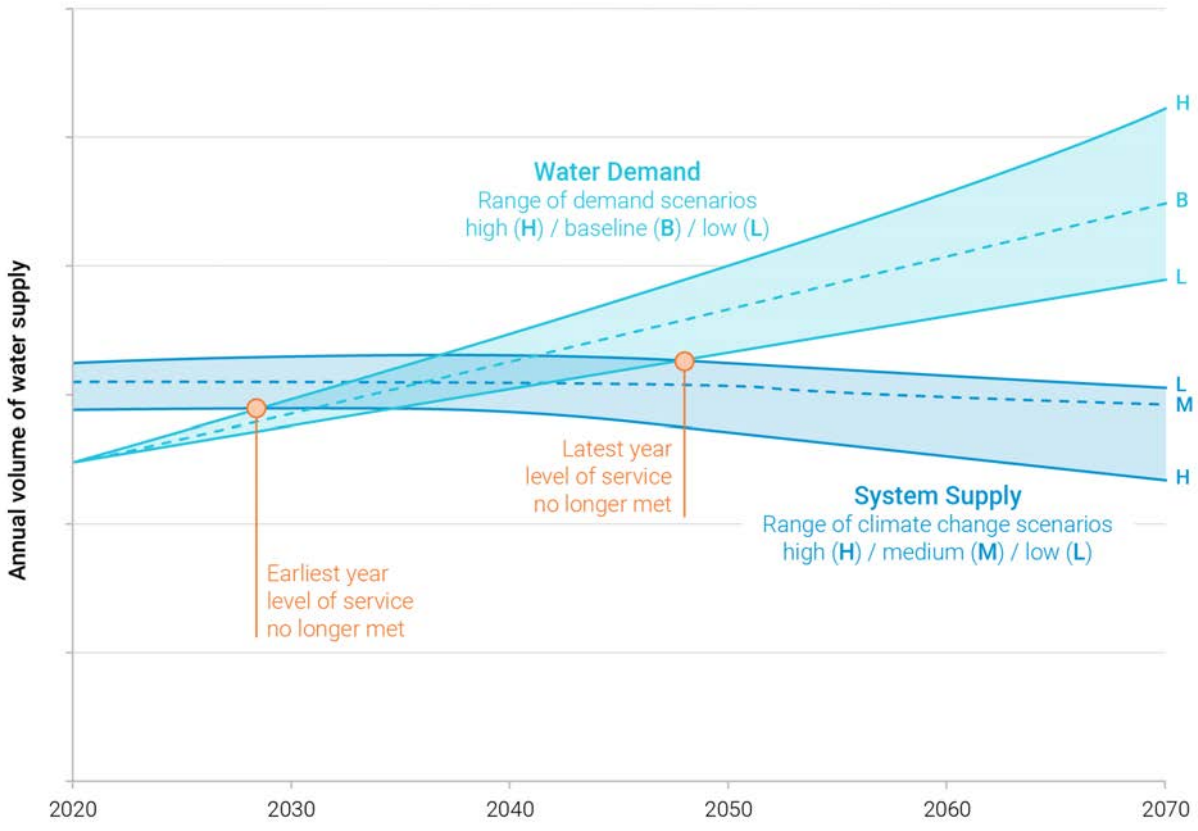


Figure 3-2: Example Water Supply Demand Curves

3.2 Options to Upgrade

We have adopted an adaptive approach to planning and managing our future water supplies that considers a broad range of possible upgrade options:

- Creation of plans that can be adapted to changing circumstances
- Securing supply in a variable climate
- Improving system resilience and water supply security.

To achieve this, three broad categories of initiatives support the development of our Urban Water Strategy.

3.2.1 Water efficiency

Water conservation and efficiency is an ongoing program and refers to programs and practices that prevent wasteful uses of water. Using water responsibly is everyone's opportunity to help the environment. We are committed to being a water efficient organisation and helping our community save water. We do this by:

- Water saving campaigns and community grants to reduce regional water use
- Programs to identify and fix system leakage and unmetered tappings
- Understanding where and when water is used.

South Gippsland average water consumption has been steadily declining over the past 10 years and is amongst the lowest in Victoria. Water efficiency is an important element when managing water supplies and is considered for all our water supply systems alongside other initiatives.

3.2.2 Diverse sources of water

Diverse water sources include capturing the rainwater from building rooftops and harvesting the stormwater, treated wastewater recycling or greywater. Water from diverse sources requires treatment to make it fit for purpose to reduce reliance on potable water. Stormwater harvesting involves collecting, storing, and treating stormwater from urban areas.

The use of diverse water sources provide a range of benefits to our community, including:

- Saves drinking water
- Reduces impacts on the environment by reducing the amount of stormwater or treated wastewater that ends up in waterways and the ocean; and
- Provides an opportunity to create greener, more liveable urban landscapes, especially in periods of drought.

3.2.3 Supply System Upgrades

We have considered a range of plausible future scenarios to help us understand when we might need to upgrade our systems. From this, where needed, we have identified a range of improvement options, such as:

- Optimise use of existing assets (pipelines, tanks, reservoirs, and water treatment plants)
- Refurbish or replace existing assets
- Construct new assets
- Reinstate groundwater extraction
- Increase supply from Melbourne Water Supply System
- Investigate supply options from other sources.

3.3 Approach to options identification and assessment

A key part of our strategy includes establishing an approach to identify and short list system enhancements that provide safe and secure water supply in the future. Our decision-making process included a multi-criteria analysis that considers and compares options based on how easy they are to implement, how much water it provides, community preferences, impacts on the environment, how resilient the option is to uncertainty such as climate change and cost.

IDENTIFY LONG LIST OF OPTIONS

- Broad scan and consultation to identify all possible options

IDENTIFY AND APPLY CRITERIA

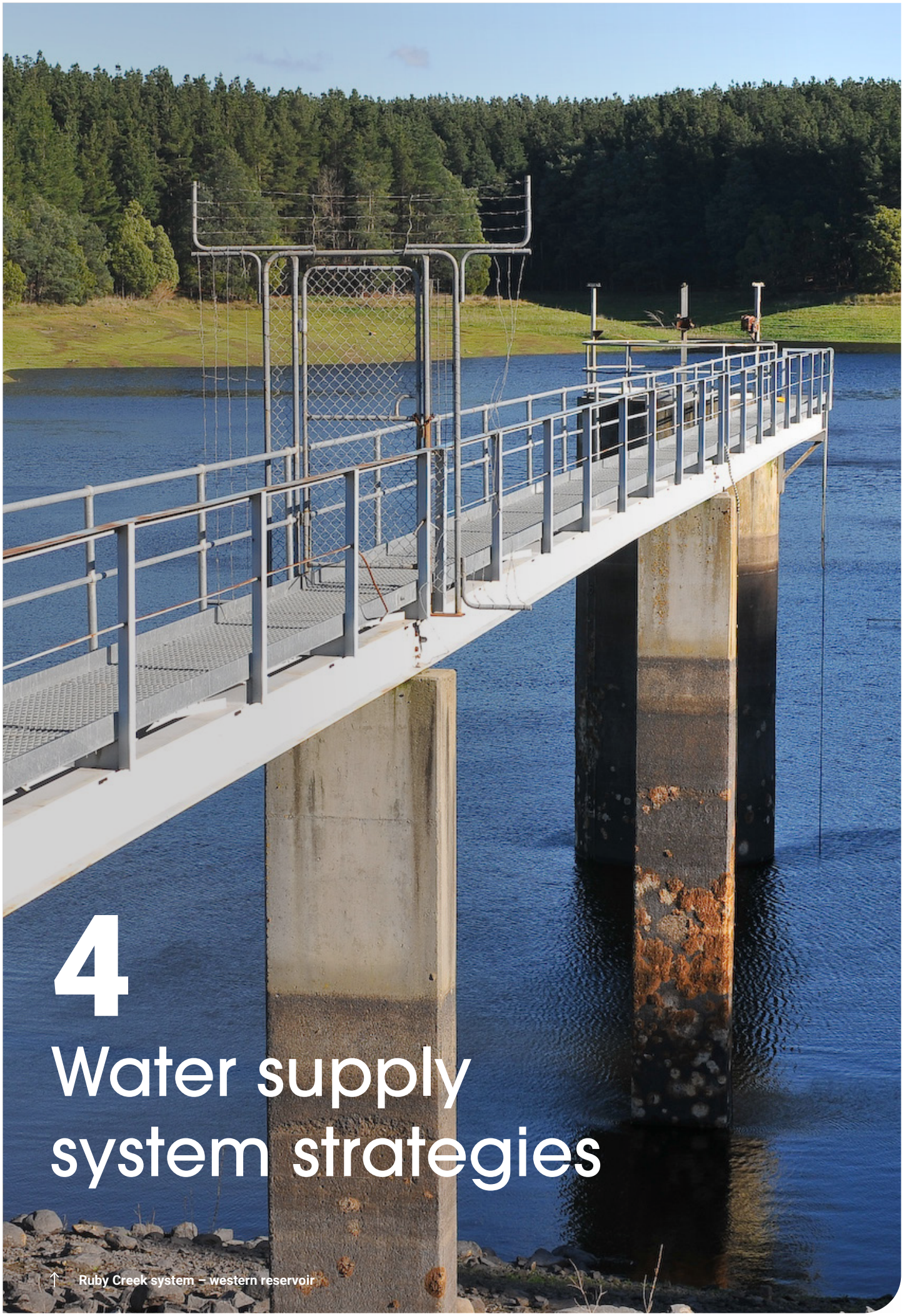
- Establish initial criteria that must be met for an option to be short-listed
- Consider cost, community input, environment, legislative, reliability and flexibility aspects
- Review all options against initial criteria, eliminating those that are considered infeasible with the remainder short-listed for further investigation

DEVELOP SHORT LISTED OPTIONS

- Further develop the concept for each short-listed option, expected available water volume, total cost
- Classify options as supply augmentations, alternative supply sources or water conservation measures

MULTI CRITERIA ANALYSIS (MCA) AND PORTFOLIO DEVELOPMENT

- Score and rank each option and build portfolio of actions for each water system
- Stage system specific action plan

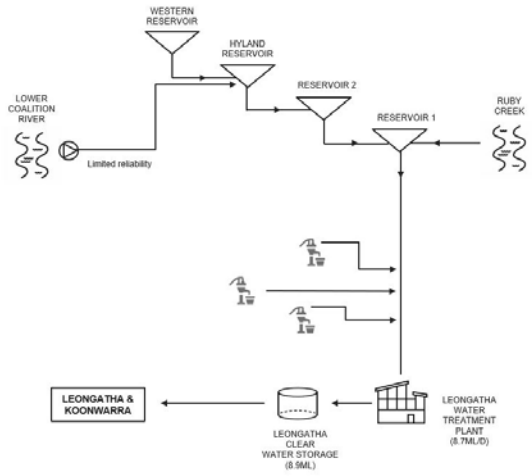


4 Water supply system strategies

↑ Ruby Creek system – western reservoir

4.1 Ruby Creek system

The Ruby Creek water system supplies treated non-fluoridated water to residents of Leongatha and Koonwarra.The water supply is the sole source for a major milk processing factory located in Leongatha.



4.1.1 Ruby Creek system snapshot

- Water is sourced from reservoirs and may be sourced from groundwater extraction in dry times;
- Treated at the Leongatha Water Treatment Plant, current capacity of 8.7ML/day
- Four reservoirs are located to the north west of Leongatha with a total capacity of 1,911ML
- Reservoir connection is gravity fed from Western Reservoir through to Reservoir No. 1
- Bulk Water Entitlement to extract up to 2,476 ML/year from Ruby Creek
- Currently three groundwater bores are accessible under specific licencing restrictions, with a combined annual extraction limit of 441.5 ML/year. In practise the groundwater available is approximately 120ML/year. A fourth bore is also accessible but currently unused.

The groundwater bores are not in service and have not been used since 2007, during the Millennium Drought. When used, the groundwater is pumped to the water treatment plant, mixed with water from the reservoirs, is treated and transferred into the distribution system.

Additionally, there is a water supply offtake from Coalition Creek with a Bulk Water Entitlement to extract up to 800ML/year between the months of May to November. In the past this water source has been used as an emergency response during drought periods.
The Coalition Creek offtake has very limited reliability and availability due to the Bulk Water Entitlement conditions for withdrawal.

4.1.2 Ruby Creek system long-term outlook

- Current water demand approximately 1,620ML/year
- Projected water demand in 2070 is 30% higher than today at 2,100ML/year
- System available water (all climate scenarios) is insufficient to meet one in ten-year level of service target, meaning restrictions are likely to occur more frequently
- Despite demand currently exceeding long term average supply, recent wet conditions have filled the Ruby Creek storages which means that there is no immediate risk of restrictions (refer Section 3.1.5).

Population growth and the impacts of climate change mean that further supply augmentation is required in the short term for the Ruby Creek system to keep the frequency of restrictions less than one year in ten.

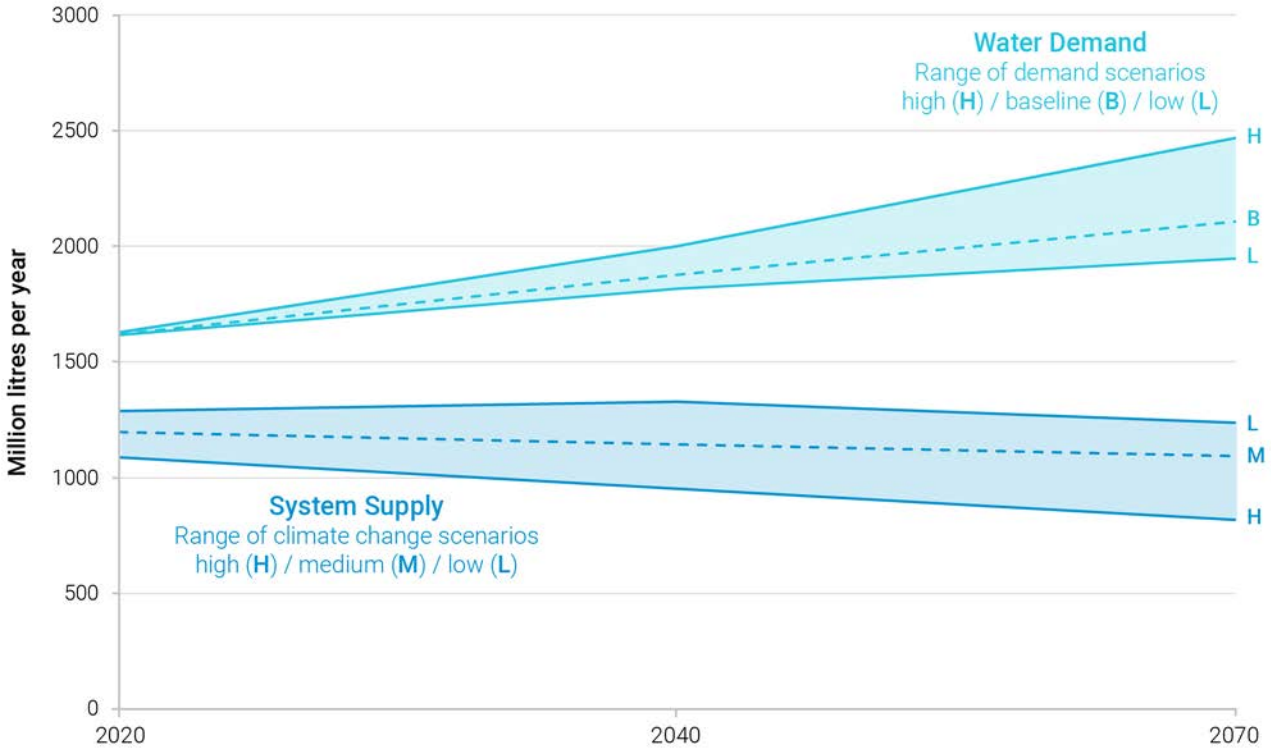


Figure 4-1: Ruby Creek system – water supply and demand

4.1.3 Ruby Creek system options

We have identified a range of options, as provided in Table 4-1, to secure water supply for the Ruby Creek system. These options range from optimising existing assets and water sources to new and diverse water sources.

Water efficiency programs have been successful in reducing water use. However, these alone are not sufficient to achieve our agreed level of service at present.

Over time, community awareness programs have resulted in a reduction in how much water we use. Residential water use in Leongatha has dropped from approximately 218 L per person in 2006, to 160 L per person per day. The local milk processing factory which accounts for approximately 60% of the Leongatha supply has implemented a range of water efficiency measures and these have been considered in demand scenarios.

An additional consideration is the capacity of the Leongatha Water Treatment Plant which will require upgrading beyond 2040 to address the increased demand over the 50-year planning period.

Table 4-1: Ruby Creek system – options to improve our water availability

• Community awareness • Digital meter rollout • Target leakage reduction	• Reuse Leongatha Water Treatment Plant wash water • Rainwater tanks for non-potable water use • Stormwater harvesting in Leongatha	• System renewals for continued use of groundwater • Re-instate Racecourse Road bore • Connect Bellview Creek, Coalition Creek and Little Bass Reservoirs • Connect to Lance Creek supply network

4.1.3.1 Expanded use of groundwater bores

The Leongatha groundwater licence is renewed annually from Southern Rural Water. This licence encompasses four operational bores, however one of the groundwater bores (Racecourse Groundwater Bore) is not connected to the Water Treatment Plant at the moment. The Leongatha Groundwater Licence requires an extensive program of groundwater monitoring. Reinstating Racecourse Road groundwater bore would provide the system with an additional 74ML/year.

4.1.3.2 Connect to disused reservoirs

As part of our focus on the circular economy, we seek to maximise the use of our existing water sources and infrastructure before we invest in new sources. Our extensive infrastructure and diverse water sources across the entire South Gippsland Water region provides this opportunity.

The Lance Creek water connection to Korumburra, Poowong, Loch and Nyora, with the backup of the Melbourne Water Supply System, has resulted in four reservoirs no longer required for their original drinking water purposes. These reservoirs and the associated catchments are too small to service Korumburra, Poowong, Loch and Nyora. However, three of the existing reservoirs, Bellview, Coalition Creek and Little Bass, could be used to supplement the Ruby Creek system.

Due to their proximity, there is potential for these reservoirs to be connected to Ruby Creek's Reservoir No. 4 (Western) which is located only 6km from Bellview reservoir. A high-level assessment has been completed including the potential water available, costs associated with upgrades and stringent dam safety requirements.

This option is subject to further understanding of regulatory requirements. However, our modelling results show that the reliability of the Ruby Creek system significantly improves with the connection of these additional sources. An additional 975-1,170ML/year of water volume is potentially available to the system, over the 50-year planning period, depending on how we operate these three reservoirs.

4.1.3.3 Lance Creek connection

The Lance Creek System connection to the Melbourne Water Supply System has made a significant contribution to diversifying and enhancing water availability for the connected towns of Korumburra, Loch, Poowong and Nyora.

In future, connection of Leongatha to the Lance Creek system may be an efficient means of securing additional water supply for the Ruby Creek system. An annual volume between 550ML to 1,000ML over the 50-year planning period needs to be secured through this connection to maintain our level of service.

The option would require construction of a new pipeline from the Lance Creek system. This option can be a substitution for connecting to Bellview Creek, Coalition Creek and Little Bass reservoirs.

The major industry located in Leongatha requires a non-fluoridated water supply as part of their current manufacturing processes. The Lance Creek system is a fluoridated supply meaning we would need to supply both fluoridated and non-fluoridated water to the town.

In the long-term, upgrade of the Ruby Creek system using either the disused dams or a Lance Creek connection could also facilitate a future connection from Koonwarra to Meeniyan and Dumbalk. This strategy is further discussed under the Tarwin River system section.

Of the options assessed, the Lance Creek connection is the only stand-alone solution, which offers the flexibility to service demands under higher growth projections and higher climate change conditions. However, if a drier climate ensues, then the purchase cost of additional Bulk Water Entitlement, from Melbourne Water Supply System is likely to return a higher marginal cost relative to the other water supply upgrade options considered.

4.1.3.4 Reuse water treatment plant wash water

A by-product of our water treatment process is called wash water. This is clear water, which has had most of the particles removed.

At present wash water from Leongatha Water Treatment Plant process is treated in sedimentation basins and returned to the creek. An option is to reuse this clear water to increase water supply, by cleaning it through disinfection and other processes, and blending it with inflow from the Ruby Creek reservoirs. We estimate a potential recovery of about 4% of the water treatment plant production volume, or an additional average annual water volume of 70-95ML.

4.1.3.5 Stormwater harvesting in Leongatha

Making the most of existing water resources extends beyond conservation and efficiency. Using diverse sources of waters, such as stormwater and rainwater is an important consideration to augmenting drinking water supplies.

The South Gippsland Shire Council investigated the feasibility of building a stormwater flow attenuation and treatment basins in 2013. This feasibility study considered capture of stormwater runoff from council drains at three locations within the town of Leongatha. Stormwater harvesting could be used to supplement water supplies in Leongatha. Stormwater can be used for non-drinking purposes to reduce reliance on drinking water.

Further investigation of this option is essential before it can be included in the future strategy. Our understanding is that demand for non-potable water in Leongatha is limited, making the potential benefit of stormwater use limited too.

4.1.3.6 Demand Management

Non-Revenue Water (NRW) in the Ruby Creek system represents approximately 12% of water supplied. There have been extensive demand reduction initiatives implemented in Leongatha in the past. South Gippsland Water will continue to invest in initiatives to reduce this volume of unaccounted for water within the Ruby Creek system through schemes such as digital meters to help detect leakage and water main renewals. It has been assumed that a reduction of approximately 5% in demand could be achieved over the next 50 years through these initiatives.

Residential rainwater tanks also have the potential to save drinking water each year. However, they are not reliable source during drought times as there is no rainfall to fill the tanks. We will continue to investigate conventional and contemporary alternate water supplies.

4.1.4 Ruby Creek system – short list options ranking

We completed a process to rank all options in order of preference. Customer feedback on water efficiency measures and diverse sources of water supplies has been incorporated into our long-term adaptive plan for Leongatha and surrounds.

Table 4-2: Ruby Creek system – short list options ranking

MCA Rank	Option	$/ML	Estimated Water Volume (ML/Year)
1	Water efficiency measures	varies	80 – 120
	Recover and reuse water treatment plant wash water	540	60 – 80
2	Connect Bellview Creek, Coalition Creek and Little Bass Reservoirs at low operating levels	405	975 – 1,110
3	Connection to Lance Creek system	675	550 – 1,170
4	Connect Bellview Creek, Coalition Creek and Little Bass Reservoirs at high operating levels	555	1,050 – 1,170
5	Renewal for continued use of groundwater	165	120
6	Stormwater Harvesting	770	To be confirmed
7	Reinstate Racecourse Road bore	1,160	74

Figure 4-1 shows there is considerable uncertainty about future growth rates and the climate change impacts on water supply. We are aiming to produce a plan that can adapt as the future becomes clearer and allows:

- System upgrades to be planned and delivered so the planned frequency of restrictions is met
- Triggers upgrades only when needed to avoid unnecessary expenditure or early expenditure that impacts customer bills
- Includes sequencing and staging of actions to best match water supply with demand over time

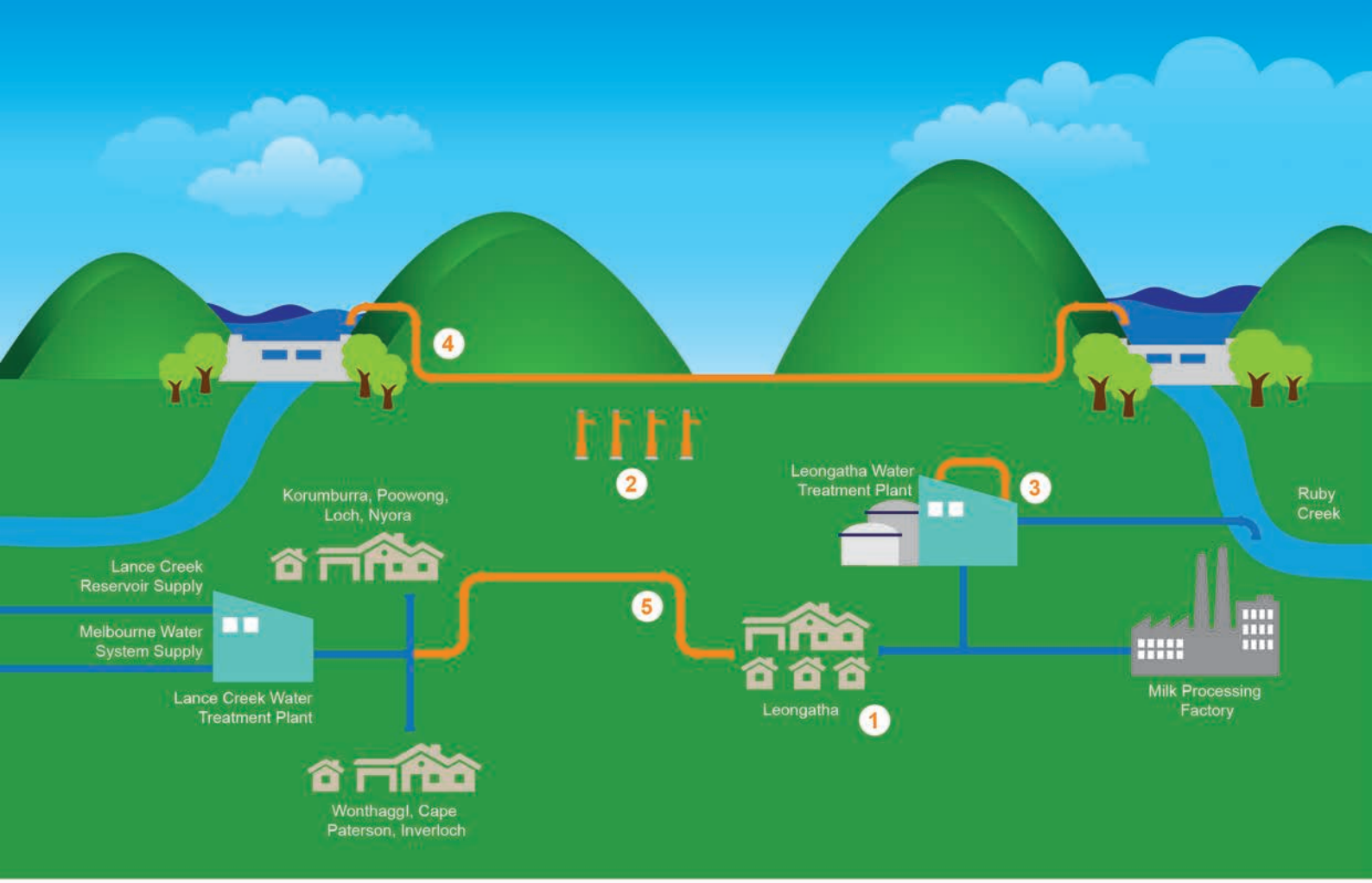
To create an adaptive plan for Leongatha we have considered the ranking of the options, volume of water that can be delivered and factors such as the length of time required to complete planning and design work to implement the options. Water efficiency measures such as on-going community education programs and leakage investigation and reduction will be the first actions implemented

These will be followed by implementing water treatment plant reuse of wash water and reinstating existing assets used for extraction of groundwater. These actions are in line with our circular economy focus, and will diversify our water sources, and optimise the operation of our current assets.

A staged approach will be followed to implement options over the long term which allows us to be flexible and adapt to future uncertainties, while being prudent with our financial investment.

Actions required are listed in the table below. These may adjust due to changing conditions, however, the fundamental requirements of the options are generally consistent:

- Connecting Bellview Creek, Coalition and/or Little Bass reservoirs to the Ruby Creek system, would be completed with the expectation that connection of the Lance Creek system will be required at some stage in the future
- Additional Bulk Water Entitlement from the Melbourne Water Supply System may be needed in the long term to service the full demands of an interconnected system.



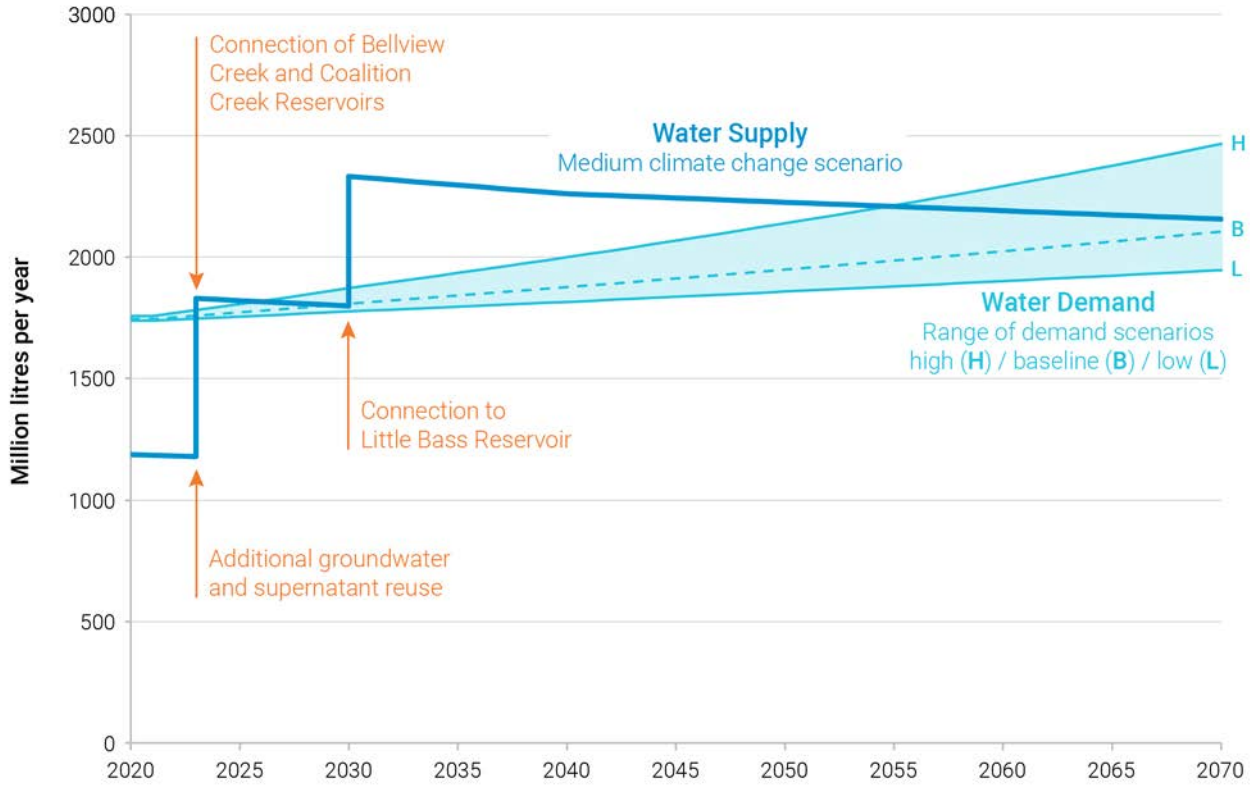


Figure 4-2: Ruby Creek system – details our preferred pathway, quantity and timing for the major water supply upgrades

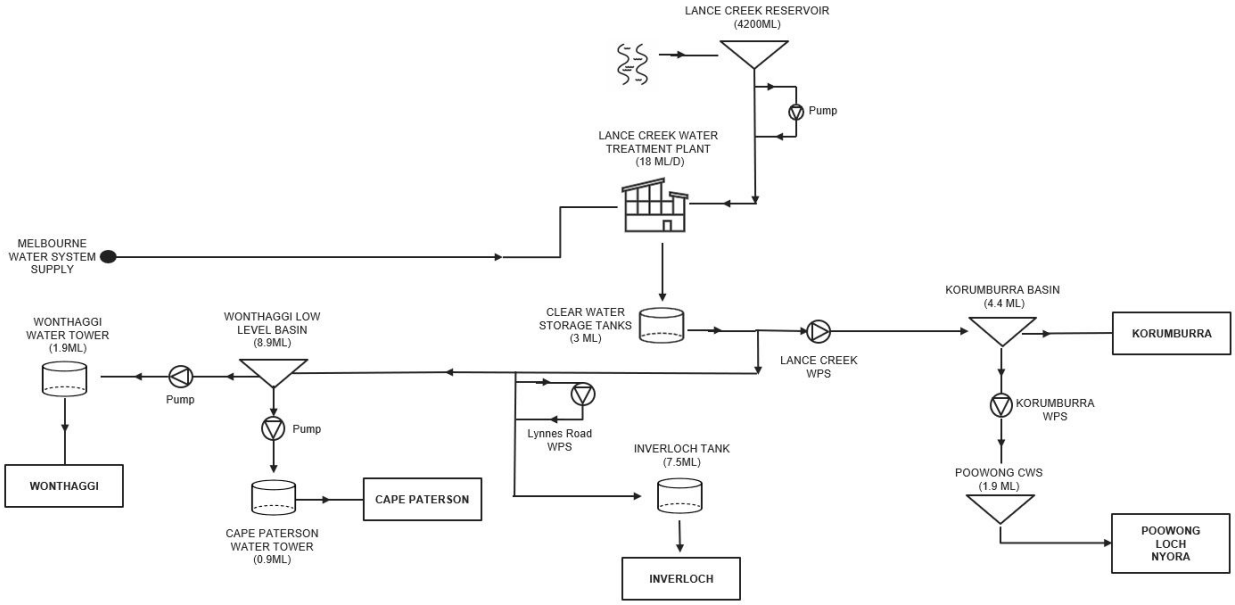
Table 4-3: Ruby Creek system actions

No.	Actions		Approximate Timing
4.1	Confirm water demand estimates	Review and compare consumption data for accuracy and trends	Ongoing
	Review future water demand	i. Review long-term trends in water use independent of climate variability	Ongoing
		ii. Monitor major industry demand, keep informed of usage including water efficiency programs	Ongoing
	Encourage water efficiency	i. Water efficiency via community programs, grants and education	Ongoing
		ii. Support larger residential and commercial properties assess rainwater and reuse systems	Ongoing
		iii. Investigate feasibility of digital meters with a target of transfer main leak detection and understanding larger water consumption customers	Next 5 years
	Expand groundwater use	i. Renew infrastructure to continue use of Condolucci, Wild Dog and Van Ecks groundwater bores	Next 5 years
		ii. Investigate connection to reinstate usage of Racecourse Road groundwater bore	Next 5 years
4.2	Water treatment plant wash water reuse	Complete program to reuse wash water at Leongatha Water Treatment Plant	Next 5 years
4.3	Interconnection of disused reservoirs	i. Investigate feasibility of interconnection of disused dams to the Ruby Creek system	Next 5 years
		ii. Implement connection to Bellview Creek and Coalition Creek Reservoirs	Next 5 years
		iii. Implement connection to Little Bass Reservoir	Next 10 years
4.4	Connecting to the grid - Lance Creek system connection	i. Continue to determine Lance Creek Connection position including the strategy and purchase of additional Bulk Water Entitlement from Melbourne Water	Next 5 years
		ii. Implement connection to Lance Creek system and sustain Ruby Creek System for non-fluoridated supply for major industry	Long-term

↑ Lance Creek Water Treatment Plant

4.2 Lance Creek system

The Lance Creek water system supplies potable water to customers in both the Bass Coast and South Gippsland Shire Councils, and is approximately 130km south-east of Melbourne. The system supplies the towns of Inverloch, Wonthaggi, Cape Patterson, Korumburra, Poowong, Loch and Nyora.



4.2.1 Lance Creek system snapshot

- Raw water is sourced from the 4,200ML Lance Creek Reservoir and from the Melbourne Water Supply System via a connection near Wonthaggi
- Water is treated at the Lance Creek Water Treatment Plant that can produce 19ML/day. Three Bulk Water Entitlements for the Lance Creek System:
  - Lance Creek: Maximum extraction volume of 3,800ML/year with a maximum rate of 35ML/day
  - Powlett River: Maximum extraction volume of 1,800ML/year with a maximum rate of 10ML/day
  - Melbourne Water Supply System: Currently 1,000ML/year (1GL/year) with an option to purchase and secure up to an additional 4,000ML/year (4GL/year) by 2024.

4.2.2 Lance Creek system long-term outlook

- The current demand is approximately 2,700ML/year
- Projected water demand for 2070 is approximately 4,800ML/year under medium climate change
- Medium climate change scenario modelling indicates available water supply is currently greater than demand and sufficient until about 2035
- Under high climate conditions demand may exceed available supply during the 2020s.

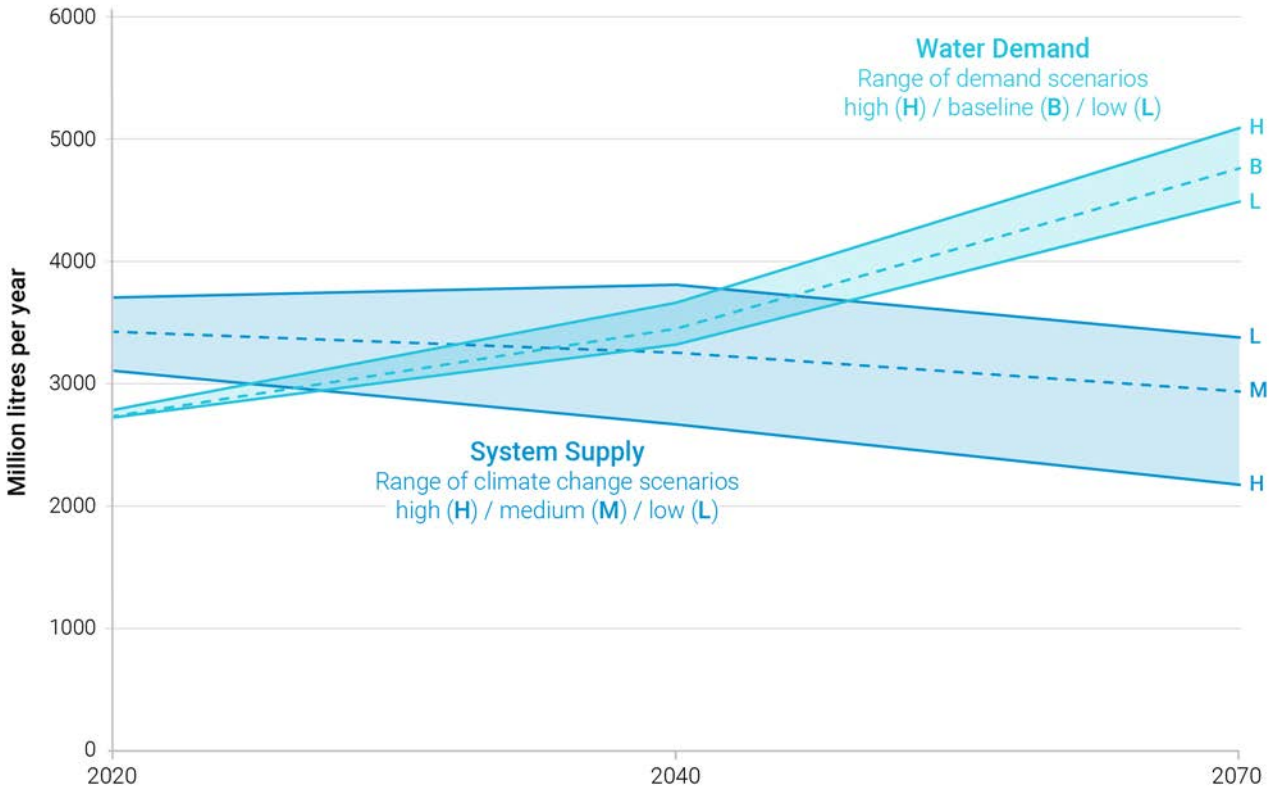


Figure 4-3: Lance Creek system – water supply and demand

4.2.3 Lance Creek system options

We have identified a range of options to secure water supply for the Lance Creek system. These options range from optimising and securing existing water resources to exploring all sources of water.

Community awareness and advice programs have resulted in a reduction or water use for each person over the past twenty years. Residential water use in the Lance Creek system, at approximately 160 L per person per day, is low compared to other areas across the state.

Further efforts to reduce water consumption may result in further incremental benefits. These will not be sufficient to address the supply shortfall and achieve our target restriction frequency rate over the next 50 years.

The capacity of the Lance Creek Water Treatment Plant will require upgrading in the late 2030's to manage increased system demand estimates.

Table 4-4: Lance Creek system – options to improve our water availability

		
• Community awareness • Possible rollout of digital meters • Target leakage reduction	• Upgrade system supply by making increased use of recycled water • Stormwater harvesting scheme	• Increase supply (and Bulk Entitlement) from the Melbourne Water Supply System

4.2.3.1 Increase supply from Melbourne Water Supply System

Our connection to the Melbourne Water Supply System provides an opportunity to diversify and improve water supply resilience. An efficient option to increase this supply is via purchase of additional Bulk Water Entitlement using a pre-existing agreement dating from 2014 when Bulk Water Entitlement arrangements were last reviewed.

We have spoken to our customers and investigated the technical and financial implications of purchasing an additional 2GL or 4GL/year Bulk Water Entitlement. To access this additional water in the long-term we will need to duplicate the pipeline between the Melbourne Water Supply System and the Lance Creek system.

4.2.3.2 Recycled Water

Our adaptive approach to future water supplies has included consideration of all options to secure additional water. Diverse water sources such as rainwater and storm water for non-drinking uses saves drinking water and have been considered as future supplies. Treated wastewater to substitute drinking water use for non-drinking purposes has also been considered.

Our strategy includes a commitment to increase the use of recycled water for irrigation, and potentially production of recycled water suitable for non-drinking use at individual homes and businesses (called Class A recycled water). Known challenges in these options are:

- South Gippsland's relatively high rainfall and limited large-scale agriculture irrigation opportunities mean that recycling water for irrigation will not reduce drinking water demand from the Lance Creek system
- Similarly, the use of Class A recycled water for non-drinking applications such as watering gardens and flushing toilets, while having the additional benefit of reducing discharge of treated wastewater to the ocean, has limited impact on water demand
- Both of these approaches need to be part of a multifaceted approach to securing future water resources.

4.2.3.3 Stormwater harvesting scheme

As described previously, making the most of existing water resources extends beyond conservation and efficiency. Using diverse sources of water, such as stormwater and rainwater is an important consideration to augmenting drinking water supplies.

There is the potential to capture stormwater from council drains at several specific locations, treat the water to be used to supplement water supplies for non-drinking purposes.

The Bass Coast Shire Council have considered such a scheme to substitute potable water for stormwater to irrigate sports grounds in Wonthaggi.

A number of development areas have been identified as potential stormwater opportunities. Further partnerships to be explored with Bass Coast Shire Council include the feasibility of implementing a stormwater harvesting scheme in these new development areas. The option is complex from an engineering and regulatory perspective, high cost, and the water available from this source is rainfall dependent, which creates uncertainty in the quality how reliable it is.

An average water volume of 160ML/year is estimated to be available with this option as it considers small-scale contributory catchments.

The estimated demand for non-potable water in Lance Creek is limited due to existing widespread use of rainwater tanks, along with 'limited demand for non-drinking water. Further investigation of this option is essential before it can be included in the future strategy.

4.2.3.4 Demand management

We have implemented extensive demand reduction initiatives in the Lance Creek system in the past. However, the current water losses represent approximately 19% of the system's water supply. South Gippsland Water will invest in the following management initiatives to reduce this volume of unaccounted for water within the Lance Creek system:

- Possible rollout of digital meters
  - to target distribution main leak detection
  - to target leakage detection and water usage monitoring and analysis for industrial and high-water consumers
- On-going program of water distribution and reticulation main upgrades and renewals.

Residential rainwater tanks also have the potential to save a volume of potable water each year. Although, the cost of retrofitting tanks can be high, their contribution to improving supply at critical times of water shortage can be valuable.

4.2.4 Lance Creek system water supply strategy

We ranked the above options in order of preference, using our multi-criteria analysis. Through our customer consultation activities, our customers expressed their preference for a solution that offers improved water security over the long-term planning horizon. This customer feedback has been incorporated into our long-term adaptive plan for the Lance Creek system.

Table 4-5: Lance Creek system – short list options ranking

MCA Rank	Option	$/ML	Estimated Annual Volume (ML/Year)
1	Water efficiency measures	varies	130 - 230
2	Additional 2GL from Melbourne Water Supply System	$275	up to 2,000
3	Additional 4GL from Melbourne Water Supply System	$235	up to 4,000
4	Stormwater harvesting scheme	$2,390	160
5	Upgrade system supply using recycled water	$1,650	1,700

Our medium climate change scenario analysis indicates that an additional 2GL of Bulk Water Entitlement is required by around 2036. Our planning processes has recognised that the annual water allocation we receive may vary from year to year, and a further 2GL in 2053 may be required to maintain our level of service for the long term.

Our existing commitment with the State Government, requires purchase of additional Bulk Water Entitlement by 2024. However, early purchase of 4GL of additional water will add to customer bills. Balancing the short-term price impact of using additional water from Melbourne against long term water security is a critical decision. Customer engagement ahead of our 2020 Price Review showed customers thought purchase of 2GL represented the best balance between customer bills and long-term water security.

To handle the increased volumes supplied from the Melbourne Water Supply System, we will need to duplicate the transfer pipeline to the Lance Creek system by 2063. The availability of an additional 2GL of water from the Melbourne Water Supply System by 2024 will also support our long-term plan to connect the Ruby Creek system to the Lance Creek system.

High climate change and growth scenario modelling shows the purchase of additional Melbourne water supply system Bulk Water Entitlement could be needed before 2053. We will continue to review and adapt our long-term plan should earlier works be required.

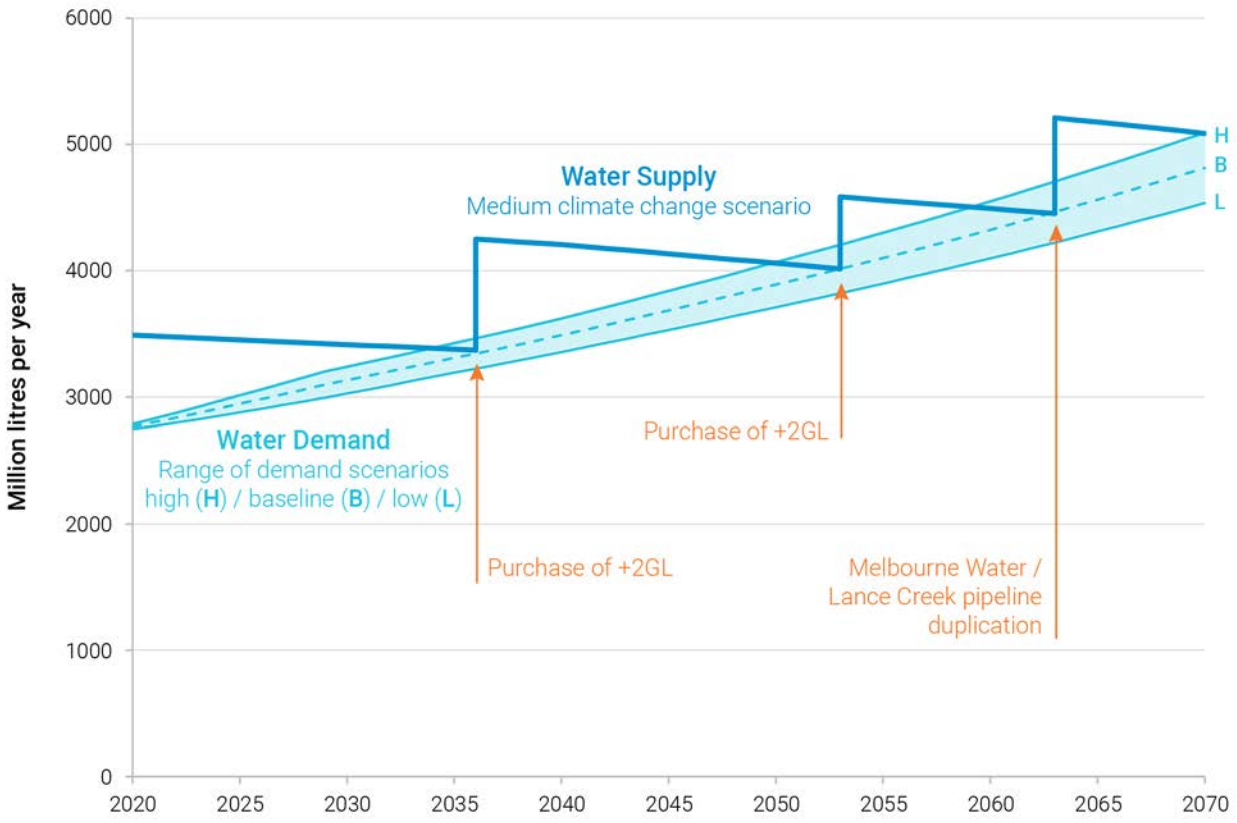


Figure 4-4: Lance Creek system - Our preferred pathway for major water supply augmentation

Table 4-6: Lance Creek system actions

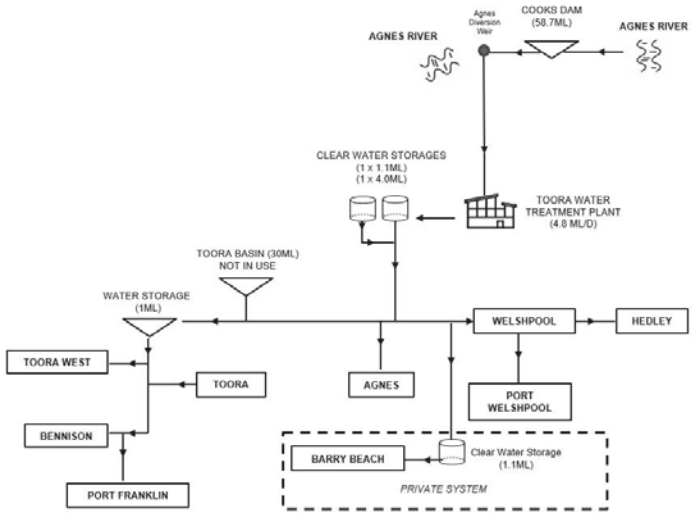
No.	Actions		Approximate Timing
4.5	Confirm water demand estimates	Review and compare consumption data for accuracy and trends	Ongoing
	Review future water demand estimates	Review long-term trends in water use independent of climate variability	Ongoing
	Encourage water efficiency	Water efficiency via community programs, grants and education	Ongoing
		Support larger residential and commercial properties assess rainwater and reuse systems	Ongoing
		Continue system leakage reduction and unmetered connection programs	Ongoing
4.6	Increase use of Melbourne Water Supply System	i. Confirm strategy for purchase of additional Bulk Water Entitlement from Melbourne Water	Immediate
		ii. Purchase additional Bulk Water Entitlement from Melbourne water supply system	By 2024
		iii. Plan strategy for additional Bulk Water Entitlement purchase from Melbourne water supply system	From 2040
4.7	Increase transfer capacity	Duplication of Melbourne Water – Lance Creek pipeline	Long-term
4.8	Recycled water	Investigate feasibility and implement fit for purpose reuse programs	Long-term

↑ **Agnes River system – Agnes Falls where the raw water for the Agnes River System is diverted to our Water Treatment Plant**

Gunaikurnai have told us the Agnes River and the Agnes Falls are culturally significant. We are committed to working closely with the Gunaikurnai on any work we do on this system

4.3 Agnes River system

The Agnes River system is located in the South Gippsland Shire, approximately 190km south-east of Melbourne and supplies the townships of Toora, Agnes, Barry Beach, Welshpool, Port Welshpool and Hedley.



4.3.1 Agnes River snapshot

- Raw water is sourced from the Agnes River
- A 58.7ML storage at Cooks Dam on the Agnes River. Downstream of Cooks Dam diversion to Toora Water Treatment Plant
- Water treatment plant has a capacity of 3.6ML/day
- We have a Bulk Water Entitlement of 1,617ML/year from Agnes River with a maximum extraction rate of 4.8ML/day; and a passing flow requirement of 1ML/day, to maintain health of the river.

4.3.2 Agnes River system long-term outlook

- Current demand for the Agnes River system is approximately 460ML/year
- Projected water demand by 2070 is 700ML/year under medium climate change
- Water demand projections include possible expansion for a major customer
- Available water under the medium climate change scenario is sufficient to meet the minimum level of service
- Level of service becomes a challenge beyond 2055 under high climate change scenario.

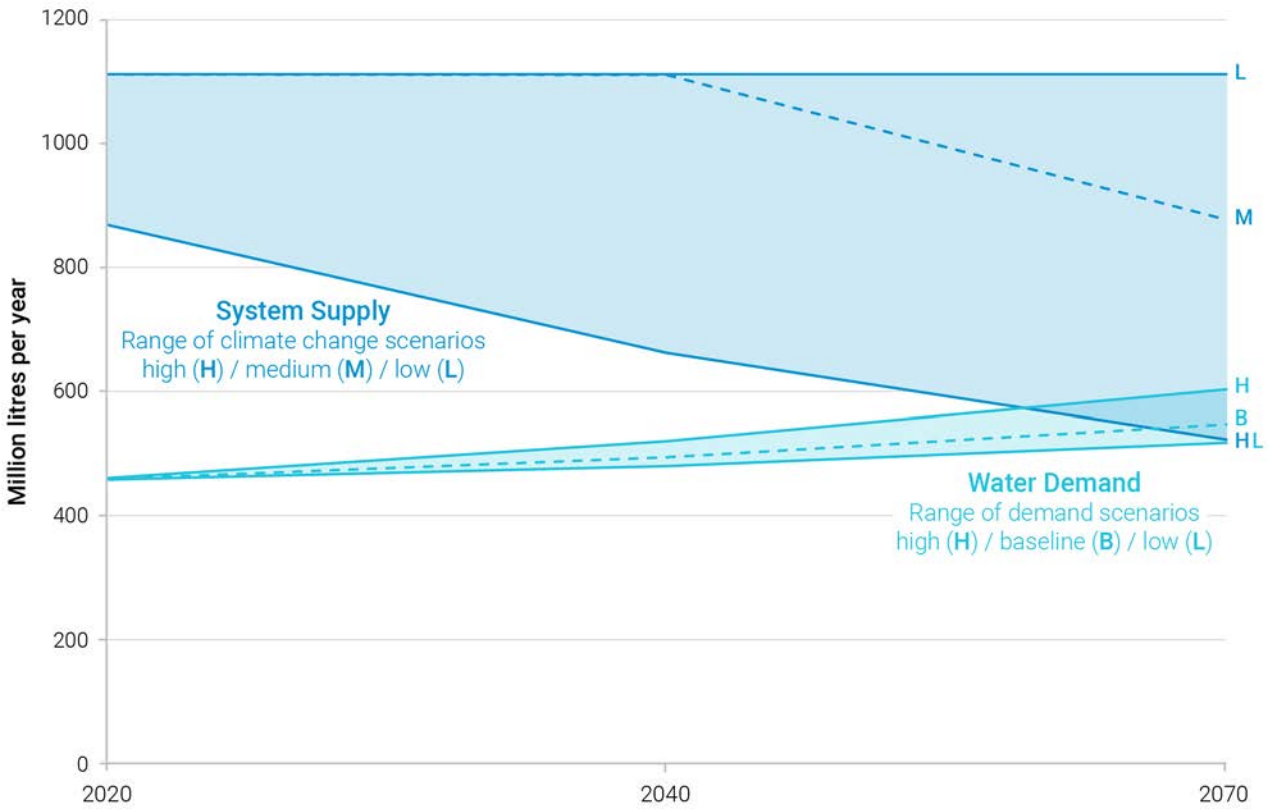


Figure 4-5: Agnes River system – water supply and demand

4.3.3 Agnes River system options

The water supply available from the Agnes River system is projected to meet water demand needs of our customers over the next 50 years. Dry periods after 2040 represent some risk to service under a high climate change scenario.

A further consideration is that the Agnes River system is vulnerable to the condition and location of the transfer pipeline from the offtake on the Agnes River to the Toora Water Treatment Plant. The current pipeline, located along the Agnes Falls cliff face, is a challenge to maintain. As such, implementing our long-term adaptive plan will help improve the reliability of this system.

As an adaptable approach to planning, we have identified additional storage options to provide flexibility when river flows are low in dry periods.

The capacity of the Toora Water Treatment Plant is adequate through 2070 with the exception of routine water treatment plant renewals and planned maintenance.

Table 4-7: Agnes River system – options to improve our water availability

• Community awareness • Possible rollout of digital meters • Target leakage reduction	• Reuse Toora Water Treatment Plant wash water	• Reinstate Toora Basin • Construct new off-stream storage basin

4.3.3.1 Additional system storage

The Agnes River water supply system has very limited in-stream storage in Cooks Dam, leaving the supply system vulnerable in low flow periods. A dry summer and autumn period can place the system under stress, this occurred in 2007 when water restrictions were required. To help balance supply and demand through the year and make full use of the water available from our Bulk Water Entitlement there is benefit in having an off-stream storage.

Two plausible configurations to improve system storage include:

1. Reinstating the Toora Basin. This will require a new off-take from Agnes River to an the existing unused 30ML Toora basin.
2. Construct a new off-stream storage basin. This will require a new off-stream storage. Based on a range of scenarios considered, a volume of 110ML is required.

4.3.3.2 Reuse water treatment plant wash water

Clear water remaining from the treatment process maybe recovered and reused by cleaning it through disinfection and other processes and blending with inflow from Agnes River. An estimated average annual volume of 60-70ML could be recovered from this option.

4.3.3.3 Demand management

Current water losses still represent approximately 26% of the system's water supply. A number of demand reduction programs have been completed and South Gippsland Water will continue to invest in the following initiatives to achieve a reduction in demand over the next 50 years through these initiatives;

- Possible digital meter rollout
- Leakage reduction
- Ongoing water main renewals.

Residential rainwater tanks also have the potential to save a volume of potable water each year. Although, the cost of retrofitting tanks can be high, their contribution to improving supply at critical times of water shortage can be valuable.

4.3.4 Agnes River system water supply strategy

The above options were ranked in order of preference, using our multi-criteria analysis in partnership with our Community Advisory Committee.

Table 4-8: Agnes River system – short list options ranking

MCA Rank	Option	$/ML	Estimated Annual Volume (ML/Year)
1	Water efficiency measures	varies	60 - 70
2	Recover and reuse water treatment plant wash water	354	60 - 70
3	New off-stream storage	729	110
4	Reinstate Toora Basin	1,212	30

The volume of water available from the reuse of wash water is small, however we are committed to implementing this option, due to the improved outcomes for the environment.

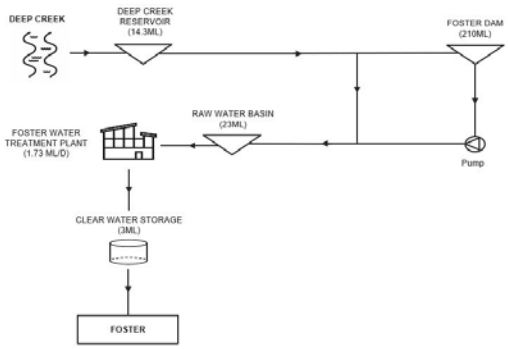
Table 4-9: Agnes River system actions

No.	Actions		Approximate Timing
4.9	Encourage water efficiency	i. Water efficiency via community programs, grants and education	Ongoing
		ii. Support larger residential and commercial properties assess rainwater and reuse systems	Ongoing
		iii. Continue system leakage reduction and unmetered connection programs	Ongoing
4.10	Water treatment plant wash water reuse	Implement infrastructure to reuse wash water at Toora Water Treatment Plant	By 2028
4.11	Additional storage	Address supply security during dry periods via an off-stream storage	By 2033

↑ Foster Reservior

4.4 Deep Creek system

The Deep Creek system is located in the South Gippsland Shire, approximately 173km south-east of Melbourne and supplies customers in the town of Foster.



4.4.1 Deep Creek snapshot

- The Deep Creek water supply system consists of Deep Creek on-stream storage with a capacity of 14.3ML
- Foster Dam, an off-stream storage with a capacity of 233ML
- A raw water basin with a capacity of 23ML upstream of the Foster Water Treatment Plant
- Foster Water Treatment Plant that operates at up to 1.3ML/day
- Bulk Water Entitlement of 326ML/year for Deep Creek with a maximum extraction rate of 3.5 ML/day
- A passing flow requirement of 0.2ML/day, to protect the health of the creek.

4.4.2 Deep Creek system long-term outlook

- Current demand for the Deep Creek system is approximately 170ML/year
- The water demand projection for 2070 is approximately 220 ML/year under medium climate change
- Modelling results indicate that the available water supply is higher than demand for entire 50-year planning horizon, for all climate change and demand scenarios assessed.

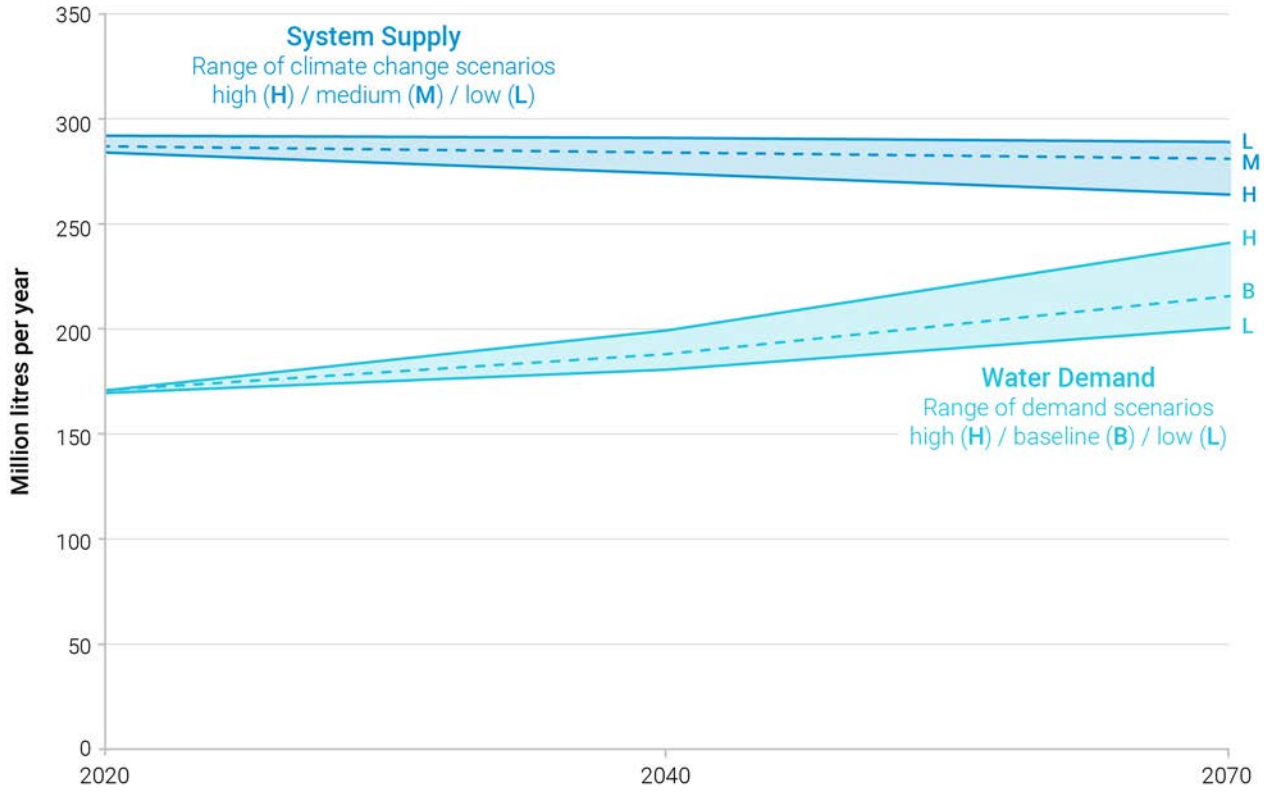


Figure 4-6: Deep Creek system – water supply and demand

4.4.3 Deep Creek system water supply strategy

The water available in the Deep Creek system is projected to be greater than demand and therefore, we do not anticipate the need to secure additional water over the 50-year planning horizon. To maintain a reliable supply to customers, we will continue with our routine renewals and maintenance activities for the Foster Dam and Foster Water Treatment Plant.

When planning for the future, we consider how we could improve the operation of all our systems, focusing on maximising use of existing assets while providing affordability to our customers. As such, the Deep Creek water supply system could potentially be used in future to supply Dumbalk and Meeniyan and/or to supplement supply to the neighbouring Battery Creek water supply system. Over time, we will take steps to understand the need and feasibility of making connection to neighbouring water supply systems.

Our long-term strategy for Deep Creek system needs to remain adaptable, and the actions in Table 4-10 have been identified as part of that plan.

Table 4-10: Deep Creek system actions*

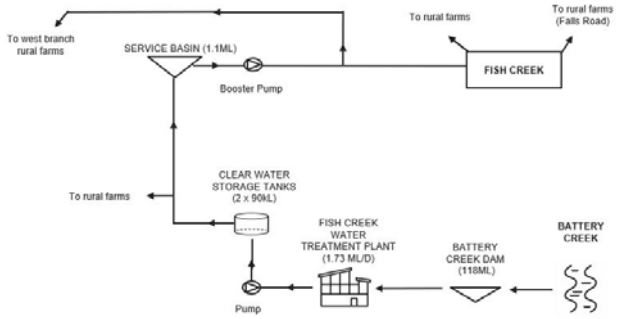
No.	Actions		Approximate Timing
4.12	Confirm water demand estimates	Review and compare consumption data for accuracy and trends	Ongoing
	Review future water demand estimates	Review long-term trends in water use independent of climate variability	Ongoing
	Encourage water efficiency	i. Water efficiency via community programs, grants and education	Ongoing
		ii. Support larger residential and commercial properties assess benefits rainwater and reuse systems	Ongoing
		iii. Continue system leakage reduction and unmetered connection programs	Ongoing
4.13	Consider additional supply for Fish Creek	Implement connection to Fish Creek service basin	Beyond 2050

*further options and $/ML analysis not required for this system

↑ Battery Creek Reservoir

4.5 Battery Creek system

The Battery Creek water supply system is located in the South Gippsland Shire, approximately 171km south-east of Melbourne and supplies the township of Fish Creek and surrounding rural customers.



4.5.1 Battery Creek snapshot

- Supplied by the Battery Creek Dam with a storage capacity of 118ML
- Water is transferred to Fish Creek Water Treatment Plant
- Water treatment plant has a capacity of 1.7 ML/day
- We have a Bulk Water Entitlement of 251ML/year from Battery Creek with a maximum extraction rate of 1ML/day.

4.5.2 Battery Creek system long-term outlook

- The current demand for Battery Creek is approximately 110ML/year
- Projected water demand by 2070 is 120ML/year under medium climate change
- The available water supply is projected to be higher than demand over the 50-year planning period
- Except after 2050 under high climate case scenario conditions.

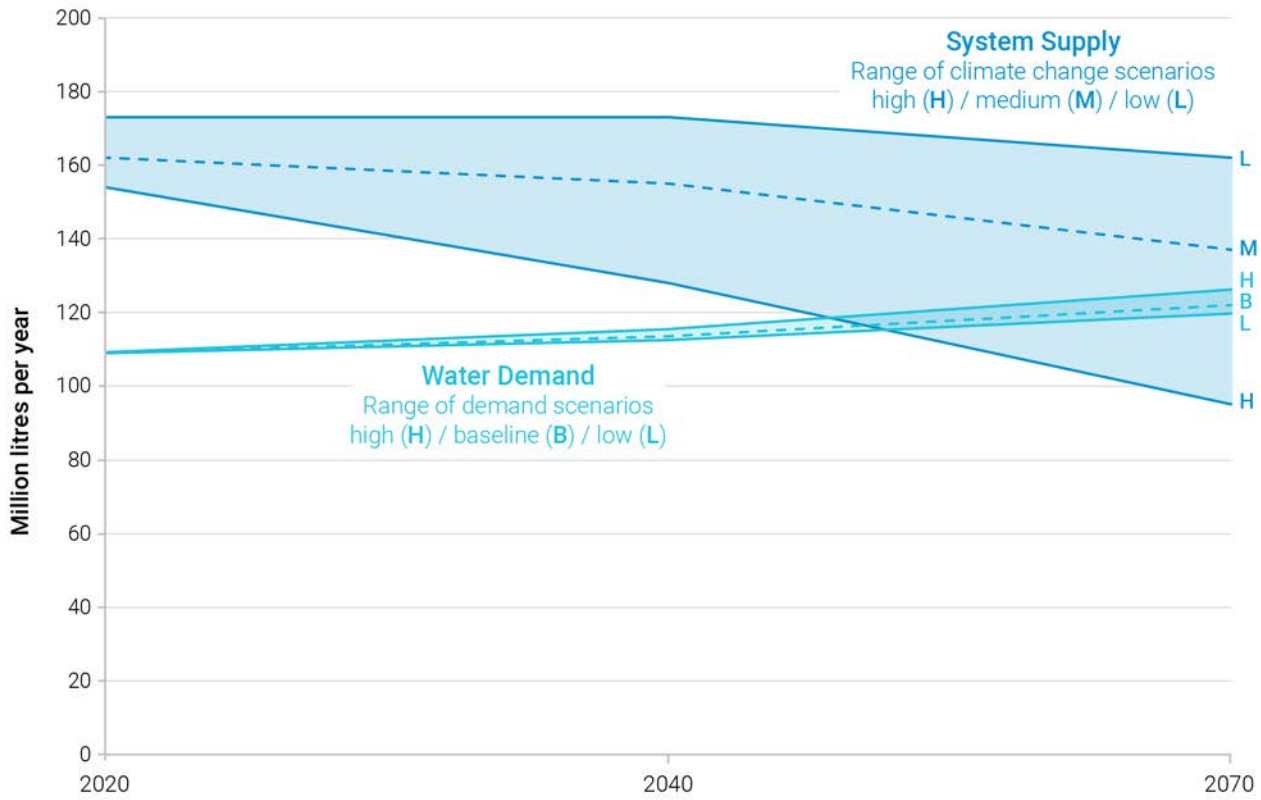


Figure 4-7: Battery Creek system – water supply and demand

The water available in the Battery Creek system and the capacity of the Fish Creek Water Treatment Plant is projected to meet the water demand needs of our customers over the next 50 years. Battery Creek Reservoir does require short term system operation and safety improvements to maintain a reliable system for our customers as follows:

1. Battery Creek Reservoir was built in 1960 and has a capacity of 118 ML. The structure requires upgrade to be compliant with contemporary design standards in accordance with, ANCOLD (Australian National Committee on Large Dams) guidelines.
2. Investigation of non-revenue water. This may be leakage, water losses through unmetered connections or via flow meter error. For the Battery Creek system this is very high and estimated to be over 40% of water supplied. We will investigate the cause further and by addressing areas such as leakage, potentially defer future water supply improvements which may arise due to climate change variability.

Table 4-11: Battery Creek system actions*

No.	Actions		Approximate Timing
4.14	Digital Water Metering Project/ Leakage Reduction	Investigate feasibility of digital meters to customers in Fish Creek to understand leakage and non-revenue water losses: • Estimated 20% reduction in water losses.	Immediate
	Review future water demand estimates	Review long-term trends in water use independent of climate variability	By 2028
	Encourage water efficiency	Water efficiency via community programs, grants and education	Ongoing
		Support larger residential and commercial properties assess benefits rainwater and reuse systems	Ongoing
4.15	Dam upgrade	Upgrade to the spillway and embankment to contemporary design standards in accordance with ANCOLD guidelines.	Estimated before 2027

*further options and $/ML analysis not required for this system

4.6 Tarwin River system

The Dumbalk and Meeniyan water supply systems source water from the Tarwin River.

Dumbalk

Water is pumped directly from the East Branch of the Tarwin River to the Dumbalk Water Treatment Plant, where it is treated and supplied to customers.

The Bulk Water Entitlement for Dumbalk allows South Gippsland Water to divert up to a maximum of 100 ML/year from the Tarwin River East Branch. There is no minimum passing flow requirements.

Meeniyan

Meeniyan's water supply is taken directly from the Tarwin River at Meeniyan. Water is pumped to a small water storage basin (5.5 ML) located south of the town centre. After treatment, water is supplied to customers.

The Bulk Water Entitlement for Meeniyan allows South Gippsland Water to divert up to a maximum of 200 ML/year from the Tarwin River. There is no minimum passing flow requirement.

4.6.1 Tarwin River systems long-term outlook

As Dumbalk and Meeniyan are essentially supplied directly from the Tarwin River the level of service for these towns is based on daily river flows.

4.6.1.1 Dumbalk

The projected frequency of restrictions exceeds 1 year in 10 by 2040 under a medium climate change scenario and sooner under a high climate change scenario. The minimum level of service is maintained for all climate change scenarios.

4.6.1.2 Meeniyan

Target reliability is not met under the 2040 and 2070 high climate change scenarios; however, minimum level of service is met for all scenarios.

4.6.2 Dumbalk and Meeniyan options

Water supply availability is not the key driver for improvement as the existing Dumbalk and Meeniyan systems are anticipated to meet our target frequency for water restrictions, for the medium term.

The key drivers are the condition of the existing water treatment plants, increasing stringency of water quality requirements, and planning objectives within the Tarwin River Water Supply Catchment which influences how South Gippsland Water have developed our long-term plan for these towns.

Options to address these challenges include the connection of Dumbalk and Meeniyan to the Deep Creek system or the Ruby Creek system.

4.6.2.1 Connection to the Deep Creek system

The Deep Creek water supply system has sufficient water supply available to meet demand in Foster over the next 50-years (Section 4.3). Excess water supply available from the Deep Creek System could potentially be used to supply the future demand of both Dumbalk and Meeniyan.

In this option, sole treatment and supply to the towns is from Foster. This would require us to build a new pipeline to the Dumbalk and Meeniyan systems and to upgrade the Foster Water Treatment Plant.

4.6.2.2 Connect Dumbalk and Meeniyan to the Ruby Creek system

As a second water supply planning option, Dumbalk and Meeniyan could be connected to the Ruby Creek system, downstream of Koonwarra. In this option, sole treatment and supply to the towns is from the Leongatha Water Treatment Plant.

This would influence the timing of the Ruby Creek upgrade and require us to build a new pipeline to the Dumbalk and Meeniyan systems.

4.6.3 Dumbalk and Meeniyan water supply strategy

If operated as standalone supply systems, no water supply options are required for these systems in the short to medium term. However, system upgrade analysis is included in this strategy in preparation should these systems required additional water supply.

The adaptive planning approach resulted in potential options being ranked in order of preference should they be required. This was completed in partnership with the South Gippsland Water Community Advisory Committee. The options that were considered for Dumbalk and Meeniyan outlined previously both involve connection of the towns to an adjacent water supply system.

Benefits in this approach include the water supply to the towns will be secured and overall system operating costs reduced by a shared system. Finally, there would be no further need for the Tarwin River Water Supply Catchment Area to be a Declared Open Water Catchment, which has impacts on future development of the area due to planning scheme constraints.

Table 4-12: Tarwin River system – options ranking

Rank	Option	$/ML
1	Connect Dumbalk and Meeniyan to the Ruby Creek system	4,430
2	Connect Dumbalk and Meeniyan to the Deep Creek system	5,810

Should connection to the Ruby Creek system be adopted. There are impacts on our long-term plans for that system by bringing forward the Ruby Creek system upgrade options for the increased demand as outlined in Section 4.1 - Ruby Creek system. This is shown in figure 4.8 below.

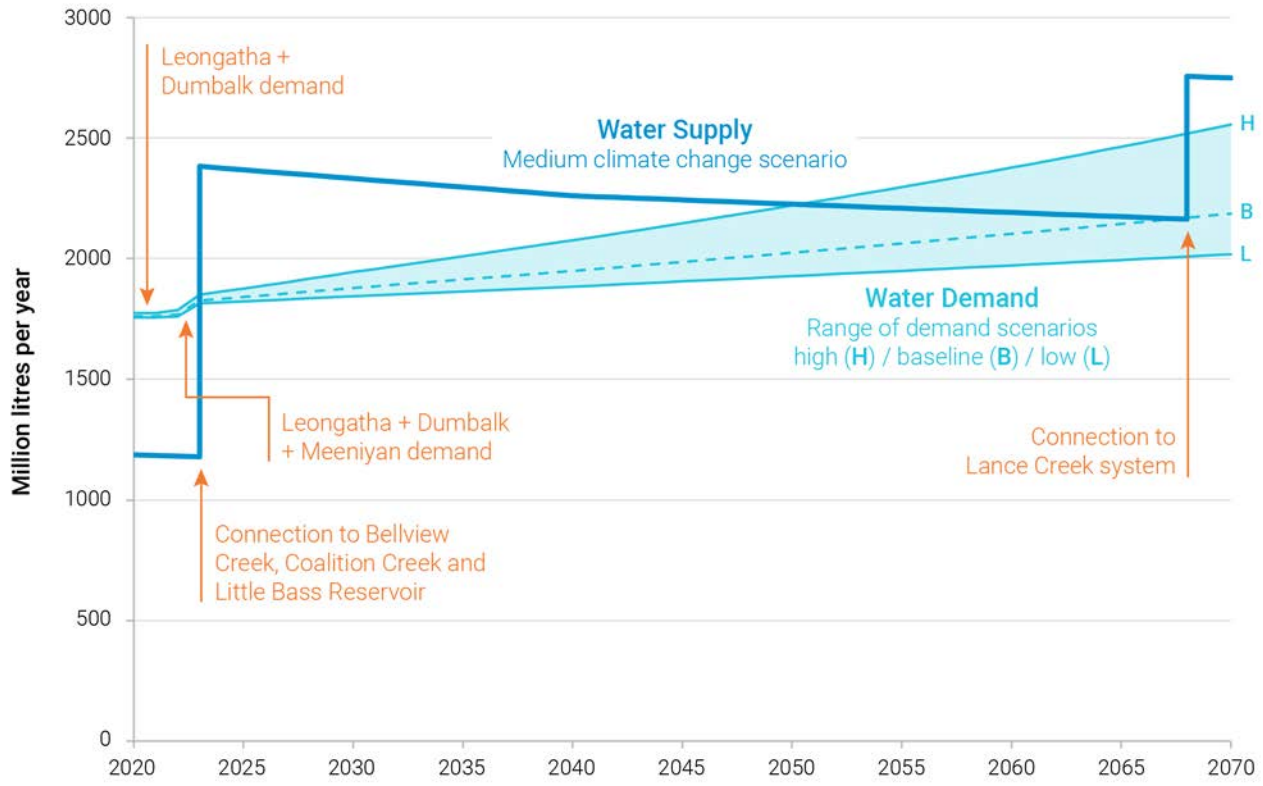


Figure 4-8: Ruby Creek system – impacts of preferred implementation pathway with connection of the Tarwin River system

The connection of Meeniyan and Dumbalk to the Deep Creek system is more straightforward, as the Deep Creek system has sufficient water available to supply both Meeniyan and Dumbalk as shown in Figure 4.9 below.

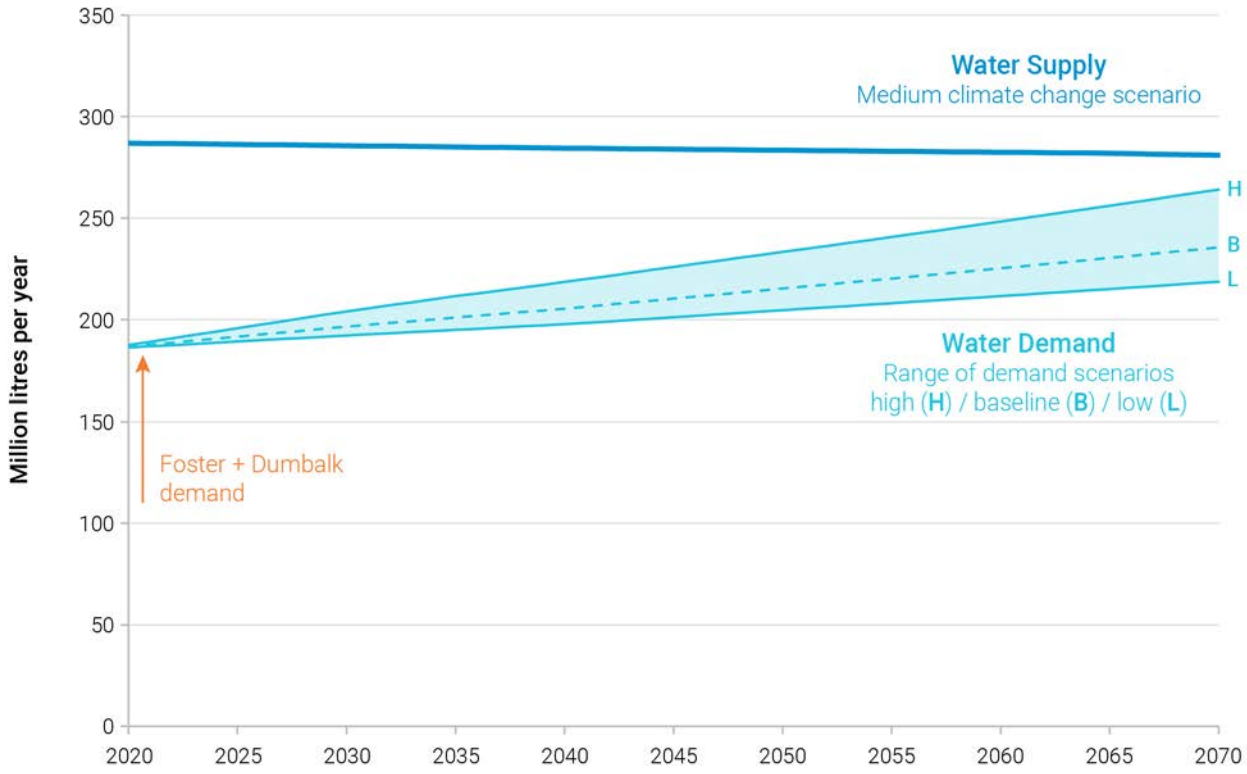


Figure 4-9: Impact of Dumbalk and Fish Creek connection on Deep Creek system supply demand curve under medium climate change

Currently we do not have a timeline for changing the water supply arrangement for Dumbalk and Meeniyan, we will continue to explore these options.

Table 4-13: Tarwin River system actions

No.	Actions		Approximate Timing
4.16	Confirm water demand estimates	Review and compare consumption data for accuracy and trends	Ongoing
	Review future water demand estimates	Review long-term trends in water use independent of climate variability	Ongoing
	Encourage water efficiency	Water efficiency via community programs, grants and education	Ongoing
		Pursue additional demand reduction options such as system leak reduction and inspections for unmetered tapings	Ongoing

4.7 Tarra River system

4.7.1 Tarra River system snapshot

The Tarra River water supply system supplies water to the townships and localities of Yarram, Alberton, Port Albert and Devon North. The entitlement for the Tarra River system is 853 ML/year and has an environmental passing flow requirement of 3ML/day.

From the offtake weir on the Tarra River, water gravitates to a 30ML raw water storage basin, before being treated at the Devon North Water Treatment Plant and supplied to customers.

The Tarra River system is supplemented using a groundwater bore at Devon North. The groundwater allocation allows South Gippsland Water to extract up to 214 ML/year (at up to 4ML/d).

4.7.2 Tarra River system long-term outlook

- The current demand for the Tarra River system is approximately 445ML/year
- Projected water demand by 2070 is 530ML/year under medium climate change
- The available water supply is projected to be higher than demand until 2036 under medium climate change scenario conditions (refer to figure 4-10).

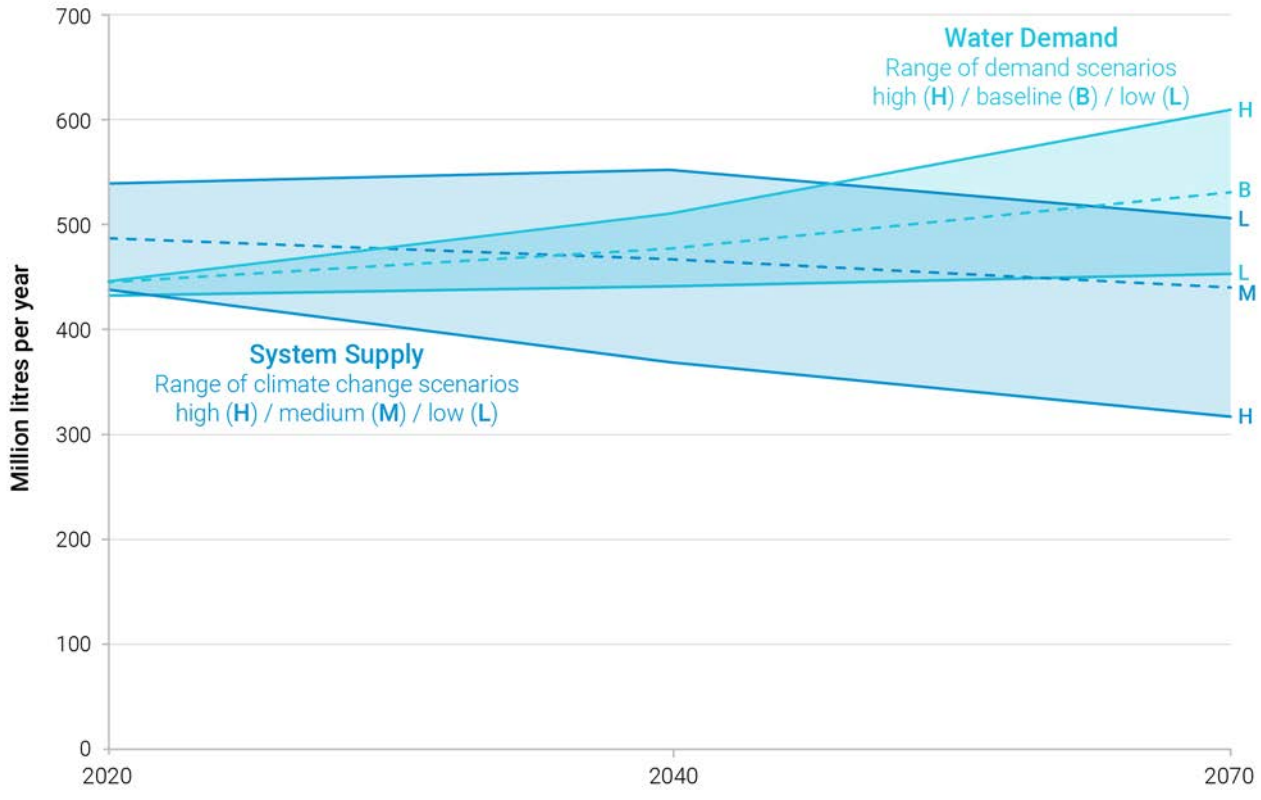


Figure 4-10: Tarra River system – water supply and demand

4.7.3 Tarra River system supply strategy

The long-term plan to secure water supply beyond 2036 is to increase the licenced groundwater volume from 212ML/year to 412ML/year (refer to figure 4-11). South Gippsland Water has made initial inquiries about access to additional groundwater and will work with our partners Southern Rural Water should an amendment to groundwater licences be required.

The treatment process for groundwater is complex compared to river water. However, with the proposed additional groundwater licence, annual water volumes available will be higher than estimated demand over the entire 50-year planning horizon. There is an exception under a high climate change and high growth scenarios when upgrade is required at about 2060.

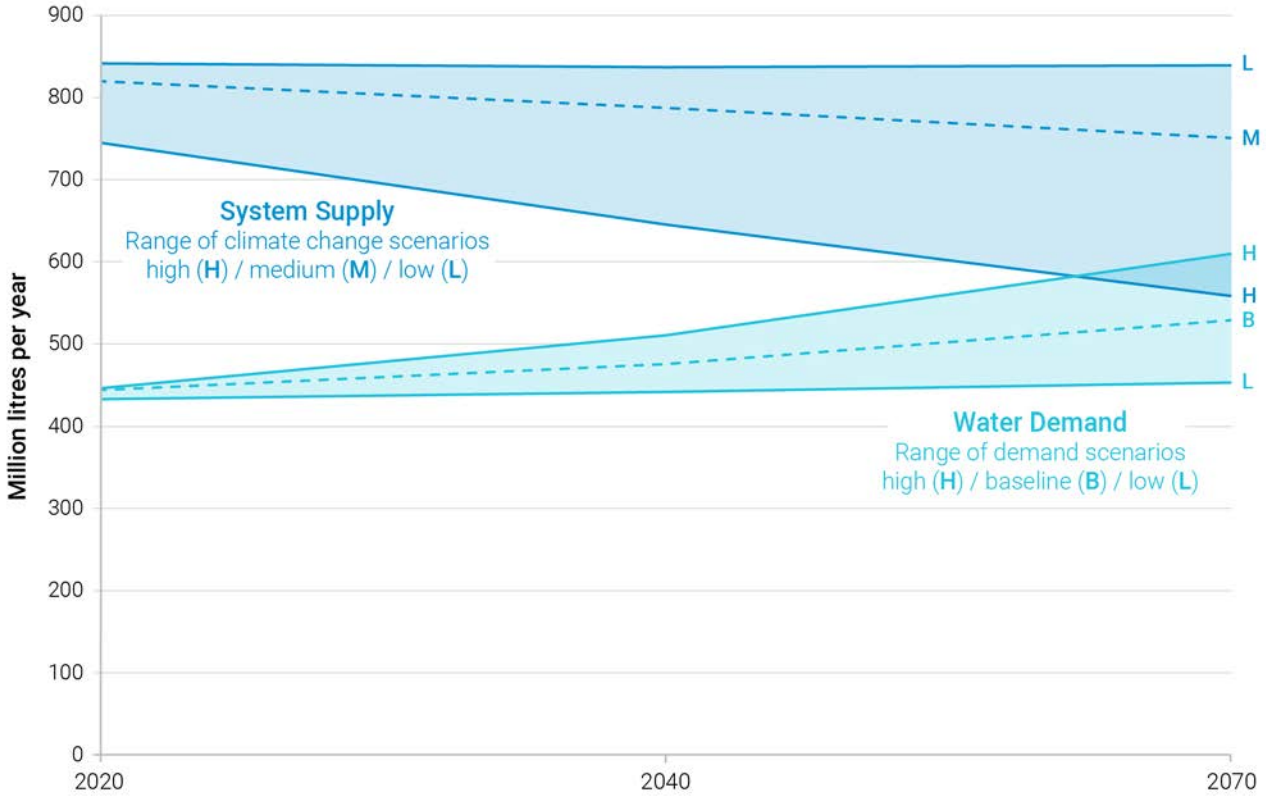


Figure 4-11: Tarra River system – water supply and demand balance with increased groundwater

4.8 Unserviced Towns

Our long-term plan includes an understanding of unserviced towns and opportunities to extend drinking water supply services. For South Gippsland Water, connection of an unserviced town is completed on a user-pays basis and with majority support of the town.

Providing new services is considered by the Urban Water Strategy, however, new services are complex and must be technically and economically feasible and be supported by all users and stakeholders before they progress.

Our approach to planning for unserviced towns involved:

- Identify towns that are considered too small and/or too far-removed to feasibly connect to our existing supply systems
- Cluster unserviced towns based on geographical location and identify probable connection points to existing networks
- Investigate local diverse water supply options;
- Investigate whether existing water supply systems can meet the demand of unserviced towns and consider if this is technically and economically feasible.

A summary of key considerations is below:

Venus Bay and Tarwin Lower are located near Inverloch. Venus Bay is approximately 10 km from Inverloch, which would be the most likely source of water supply, however, the settlements are separated by the Tarwin River estuary. Tarwin Lower is a small town located on the banks of the Tarwin River, adjacent to Venus Bay. A large number of tourists are in these towns in the summer months. These towns are expected to have sufficient demand for water within close proximity of the existing Lance Creek water supply system. The ability of the Lance Creek water supply system to meet the demands of these unserviced towns will be dependent on the Bulk Water Entitlement volumes secured from Melbourne Water.

Bena is a small town of around 54 properties located between Korumburra and Loch. The location and size of Bena result in connection the Lance Creek system challenging.

Tarwin is a hamlet of around 12 properties between Koonwarra and Meeniyan. At this time, Tarwin is also considered too small to make connection to an existing system, such as Ruby Creek System or the Meeniyan system, viable. However, if the Ruby Creek system is extended via Koonwarra to supply both Meeniyan and Dumbalk, then the viability of a connection to Tarwin can be investigated at that time.

Harmers Haven is small town located in the Bass Coast Shire. Existing supply consists of privately owned rainwater tanks. Although small, the reliability of supply could be improved through a connection to the Lance Creek system which already supplies the nearby towns of Cape Paterson and Wonthaggi.

Walkerville, Waratah Bay, Sandy Point and Yanakie are coastal towns located in the South Gippsland Shire. Large numbers of tourists visit these towns in the summer months, increasing water demands during these periods. Sandy Point, which is the largest of these four towns, is approximately 20 km south of Fish Creek. Existing water supply consists of privately owned rainwater tanks, groundwater bores and, at Waratah Bay, a small untreated council dam. Since water availability for Battery Creek supply system is limited, it is not currently feasible to connect these unserviced towns to the Battery Creek supply system, particularly given the potential for Fish Creek rural demands to increase in severe drought years. Sandy Point, Waratah Bay, Yanakie and Walkerville could be serviced from the Deep Creek system and the Foster Water Treatment Plant. Deep Creek has sufficient yield to meet some of the demand from these unserviced towns, but additional supplies would be needed.

Stony Creek is a small township located between Foster and Meeniyan. Existing supply consists of privately owned rainwater tanks. If the Deep Creek system is extended to supply Meeniyan and Dumbalk, the potential to connect Stony Creek will be investigated for feasibility and customer acceptance.

Greenmount, Won Wron, Woodside, Woodside Beach, Robertson's Beach, Manns Beach and McLoughlins Beach are towns east of Yarram located in the Wellington Shire. All these town have less than 50 properties each. Given that there is currently no demand for a reticulated supply in these towns and given the likely high cost of supplying water to these small towns, we are not pursuing servicing these unserviced towns at this current time. Supply from groundwater or a local desalination package plant may be alternative water supply options for these towns.

Table 4-14: Unserviced towns - actions

Actions		Timing
4.17	Work with local communities, business, councils and other stakeholders to understand the technical and economic feasibility of new services	Ongoing

5 Preparing for Drought

Drought is a natural feature of South Gippsland's climate. It has occurred in the past and will occur again in the future. Each drought is unique, which requires South Gippsland Water to put in place a clear, robust plan that can be adapted as needed when individual droughts unfold.

For this Urban Water Strategy, we have updated our Drought Preparedness Plan, which is contained in Appendix A.

The Drought Preparedness Plan outlines a process for preparing and responding to drought:

- Monitoring weather conditions and how our systems are performing
- Activities to prepare our systems should periods of low rainfall be predicted
- System by system activities in response to drought conditions should they occur.

Specifically, it includes:

- **Monitoring for drought** by tracking how much water is available in each supply system, how much water customers are using, recent climate and streamflow conditions, and predicted climate and streamflow conditions
- **An annual Water Outlook** of the likelihood of drought and our likely need to respond to potential water shortages. The process includes a progress review of the actions contained in this Strategy. The Annual Water Outlook is published to www.sgwater.com.au in November each year
- **Pre-drought actions** to make sure we are in a strong position to manage future droughts. This includes the community preferences for levels of service, improving the readiness of drought response actions, and the identification of customers and community areas that could require water during droughts.

South Gippsland Water has developed and implemented plans to provide recycled water to community assets in several towns, effectively making those assets resilient to drought;

- **A plan to respond to drought**, including clearly defined triggers for implementing actions including water restrictions across a system
- **A process to review the plan** after each drought, or every five years, whichever occurs sooner.

The planning cycle to prepare for drought over the five year Drought Preparedness Plan is shown below.

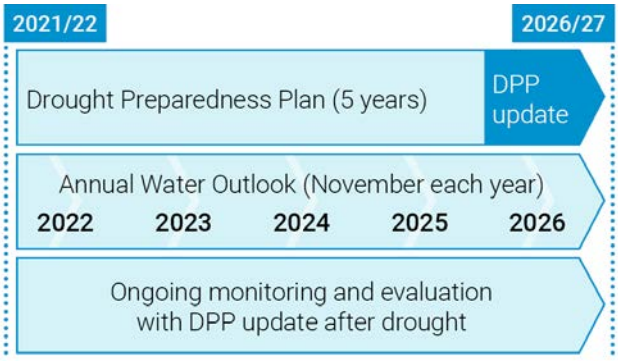


Figure 5-1: South Gippsland Water's Drought Planning Timeline

6 Planning for our changing future: Wastewater

↑ Waratah Bay Wastewater Treatment Plant Lagoons

6.1 Our wastewater plan

South Gippsland Water has 12 separate wastewater systems across our region servicing 20,000 customers.

Planning for our future wastewater systems is important to protect the environment from spills and to identify opportunities for beneficial reuse.

Planning for future wastewater services involves estimating both the volume and the quality of the effluent. This is then contrasted with the capacity of existing networks, treatment plants, reuse and discharge systems as detailed below:

- Network systems: the pipes and pumps that collect wastewater from residential homes or commercial properties and transfer wastewater to our wastewater treatment plants
- Treatment: completed through mechanical, biological and chemical processes, contaminants are removed to allow for safe reuse or discharge
- Discharge and Reuse: should discharge from treatments plants be required it is to inland waterways or marine environments. Where possible water is put to reuse, in South Gippsland, typically it is used to irrigate agricultural land or recreational facilities
- Opportunities for reuse are dependent on the location of the treatment plant, climate and quality of the effluent.

The Urban Water Strategy provides an over-arching plan for the next 50 years. From this, detailed master plans are developed to provide the planning, design and delivery of specific infrastructure upgrades.

Table 6-1: Wastewater systems overview

System	Customers	Treatment	Outfall
Wonthaggi	4,893	Lagoon	Baxter's Beach
Cape Paterson	1,262	Lagoon	
Inverloch	4,875	Lagoon	
Foster	866	Lagoon	Corner Inlet
Korumburra	2,049	Mechanical	Foster Creek
Leongatha	3,169	Mechanical	Little Ruby Creek
Waratah Bay	115	Lagoon	Irrigation
Toora	289	Lagoon	Corner Inlet
Welshpool	124	Lagoon	Lewis Channel
Tarraville/Yarram	1,534	Lagoon	Private Irrigation
Meeniyan	246	Lagoon	Stony Creek / Irrigation
Poowong, Loch, Nyora	471	Lang Lang WRP (South East Water)	Private Irrigation

6.2 Assessment overview

6.2.1 Demand projections

Planning for future demand in our wastewater systems includes assessment of our collection, treatment and discharge trends while taking into consideration the uncertainties of population growth and our changing climate, including increased storm events.

Wastewater systems are a key in protecting and improving our natural environment and have regulatory oversight of the Environment Protection Authority.

6.2.2 Level of service

The planning criteria is guided by a set of key areas to deliver an acceptable level of service:

- Full containment of wastewater flows in storm events. The target being at least an 18.1% Annual Exceedance Probability (AEP) storm event
- Wastewater treatment plant uncontrolled spills to occur no more than one year in ten
- No odour beyond the Treatment Plant boundary
- Discharge quality and volume, of treated wastewater to be within Environment Protection Authority (EPA) licence requirements
- Reuse scheme to comply with EPA publication 464.2 Use of Reclaimed Water and other relevant regulations.

Note the outcomes of the capacity assessments for each system detailed in Section 7 are summarised using 'traffic lights':

	Major upgrades required
	Minor upgrades required
	No upgrades required

6.2.3 Network capacity

We use hydraulic models to identify whether our wastewater systems have enough capacity for wastewater volume projections. Hydraulic models represent our network assets such as pipes, pumps and storages, and simulate the collection and transfer of wastewater flows. This helps us understand where and when an upgrade is required.

6.2.4 Effective treatment

Treatment plant performance is primarily measured by looking at the level of organic material, nutrients and pathogens in the effluent. This means we can understand both the existing and potential future loading that may come into the plant for treatment against the existing treatment plant capacity.

6.2.5 Discharge and reuse

Currently, our wastewater systems discharge wastewater in one or more of the following ways:

- Ocean outfalls
- Inland waterways
- Reuse for agricultural irrigation
- Reuse to irrigate recreational facilities
- Reuse in partnership with others.

All forms of discharge and water reuse are subject to Environment Protection Authority Regulation.

This Strategy has a focus on wastewater reuse opportunities and has included a process to identify systems that may require new or expanded recycled water systems.

6.2.6 Adaptive planning

Challenges in future planning such as our changing climate, population and industrial growth require flexibility in our planning processes. The adaptive planning approach for our water systems has also been adopted to determine future wastewater outcomes.

Key decision points are informed by a range of potential future events as shown in the table below. This approach aims to address uncertainty in the timing and extent of works required for each system to maintain levels of service.

6.2.7 Options assessment

Potential future events that may influence the timing of upgrades include:

Table 6-2: Options evaluation assessment criteria

Event
Climate change
Uncertainty of major customer discharge volumes and WWTP inflow quality
Uncertainty of population growth
EPA licence change
Poor or failed sewer network infrastructure
Wastewater treatment failure
Unreliable/lack of reuse opportunity
Unexpected policy changes
Emerging contaminants
Urban development encroaching on WWTP sites

Upgrade option assessment is complex and must progress through a multi layered assessment process, as shown below.

1. A high-level acceptability of the upgrade options:
- Customer acceptance
- Reliability, resilience and robustness
- Flexibility of the option
- Legislative acceptability
- Environmental impacts
- Total cost.

2. Each option must show some future improvement to our environmental footprint and deliver improved environmental impact:

- Reduce wastewater production
- Reduce nutrient load to the receiving environment
- Increase beneficial reuse of treated wastewater
- Increase beneficial reuse of biosolids
- Reduce greenhouse gas emissions.

3. Each option must be further tested with a combination of decision points to inform our adaptive planning approach for each system:

- Is the existing wastewater treatment plant capacity acceptable?
- Is the treated wastewater discharge quality acceptable?
- Do the treated wastewater discharge volumes meet our EPA licence requirements?
- Is urban development encroaching on the wastewater treatment plant site?
- Are there opportunities to increase reuse opportunities?

Our initial 'long' list of options considered across all systems is shown in the table below.

Table 6-3: Long list options identified to address long-term wastewater management challenges

Challenge	
Reduce wastewater production	Ongoing program improvements identified in section 6.2.8 below will be implemented as appropriate for each system.
Reduce nutrient load to the receiving environment	Expansion of existing lagoon systems
	Wet weather only treatment trains
	Pond enhanced treatment systems
	Mechanical / biological treatment
Increase beneficial reuse of treated wastewater	Full effluent reuse and comply with EPA 1 in 10 year wet year containment standard
	Partial effluent reuse with an allowable discharge to the environment.
	Third pipe Class A recycled water
	Industrial reuse
	Aquifer storage and reuse
	Discharge to wetlands prior to waterway/groundwater
	Indirect potable reuse
Increase beneficial reuse of biosolids	Agricultural reuse on land
	Composting via third party agreements
	Topsoil for landfill cap seeding
	Waste to energy/co-digestion facility
	Incineration to generate electricity via burning municipal waste
	Clay brick manufacturing
	Biochar production
Reduce greenhouse gas emissions	Shallow wetland algae treatment
	Increase length of ocean outfall

6.2.8 Ongoing programs

A range of opportunities to reduce the production of wastewater are in place as ongoing programs across South Gippsland. Each of these general initiatives will not be implemented in lieu of preferred infrastructure upgrades, however, may delay the timing or reduce the extent of upgrades required.

6.2.8.1 Infiltration reduction

During wet weather, stormwater finds its way into our systems. Our asset management program reduces the volumes of inflow and infiltration entering our networks through an ongoing program of relining or replacements of ageing assets.

6.2.8.2 Increased onsite treatment quality for trade waste customers

We maintain positive relationships with commercial and industrial customers across our service area. Many of these include agreements regarding acceptable wastewater volumes and quality, or Trade Waste Agreements. We will actively engage with these trade waste customers to understand and improve the quality of wastewater entering our treatment plants, as well as decrease the volume where possible.

6.2.8.3 Water efficient appliances

The less water a household uses, the less wastewater to treat. A large portion of the wastewater from households comes from washing machines, showers, taps and toilets.

6.2.8.4 Reuse for new developments

We will continue to work collaboratively with developers to identify initiatives to incorporate beneficial reuse where possible. Opportunity may include areas such as decentralised reuse systems in future developments.

6.2.8.5 Community conversations

We play an important role in educating our customers and communities in water efficiency and the role of treated wastewater in the development of sustainable systems.

6.2.8.6 Forward planning

Our forward planning is an ongoing process of systems analysis, growth and wastewater volume projections, and regular renewals programs. For each system we regularly:

- Monitor growth to ensure upgrades appropriately service existing and future customers
- Ongoing communication with developers and council to understand location and timing of growth
- Continue to review and improve our wastewater system monitoring and planning practices for timely opportunities to defer or reduce upgrades
- Continue to consider the key decision points in our adaptive planning approach during the development of each planning cycle. This will inform variations to the Strategy due to unforeseen events.

7 Wastewater systems strategies

7.1 Wonthaggi, Inverloch and Cape Paterson – Baxters Beach system

7.1.1 Baxters Beach system snapshot

The townships of Wonthaggi, Cape Paterson and Inverloch are approximately 130km from Melbourne.

Baxters Beach has a total serviced population of over 16,400 and a projected population of over 45,000 customers by 2070.

This area has experienced significant growth and, as a major holiday/weekend destination, it is prone to seasonal fluctuation in demand.

The three towns linked to the system have separate transfer networks and individual lagoon-based treatment systems.

The three systems discharge to one central point, the Baxter's Beach Outfall.

After treatment, Class C treated wastewater is transferred via a shared outfall and an annual mean of 5ML/day is discharged via the ocean outfall.

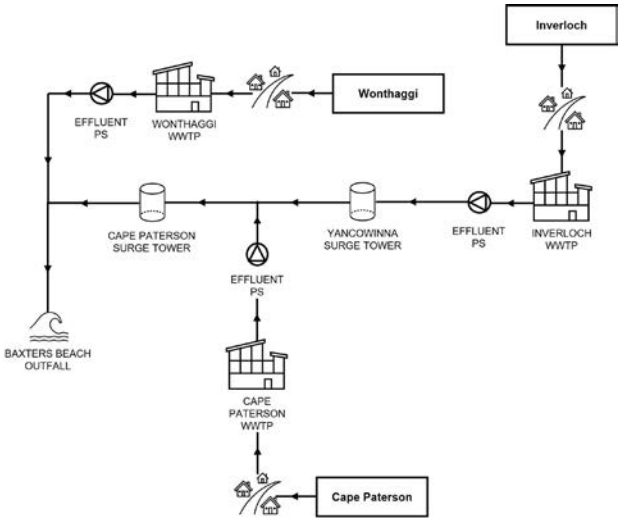


Figure 7-1: Baxters Beach system overview

As our largest and fastest growing system. The Baxters Beach wastewater system is a key focus area for our 50-year strategy. The following information provides a summary of the existing and projected capacity limitations.

Table 7-1: Baxter's Beach system - existing and 50-year capacity assessment summary

		Wonthaggi	Cape Paterson	Inverloch
Existing System	Network capacity			
	Treatment capacity			
	Discharge capacity			
2070 Planning Horizon	Network capacity	2020-2023	2028-2038	2020-2023
	Earliest Augmentation			
	Treatment Capacity	Before 2023	After 2048	2023 – 2033
	Earliest Augmentation			
	Discharge Capacity	2020-2023	2020-2023	2020-2023
	Earliest Augmentation			

7.1.2 Wonthaggi

The projected increase in wastewater inflows to the treatment plant means significant upgrades are required to maintain our levels of service over time.

Future upgrades will be required. Figure 7-2 provides a summary of the existing treatment plant capacity and future upgrades.

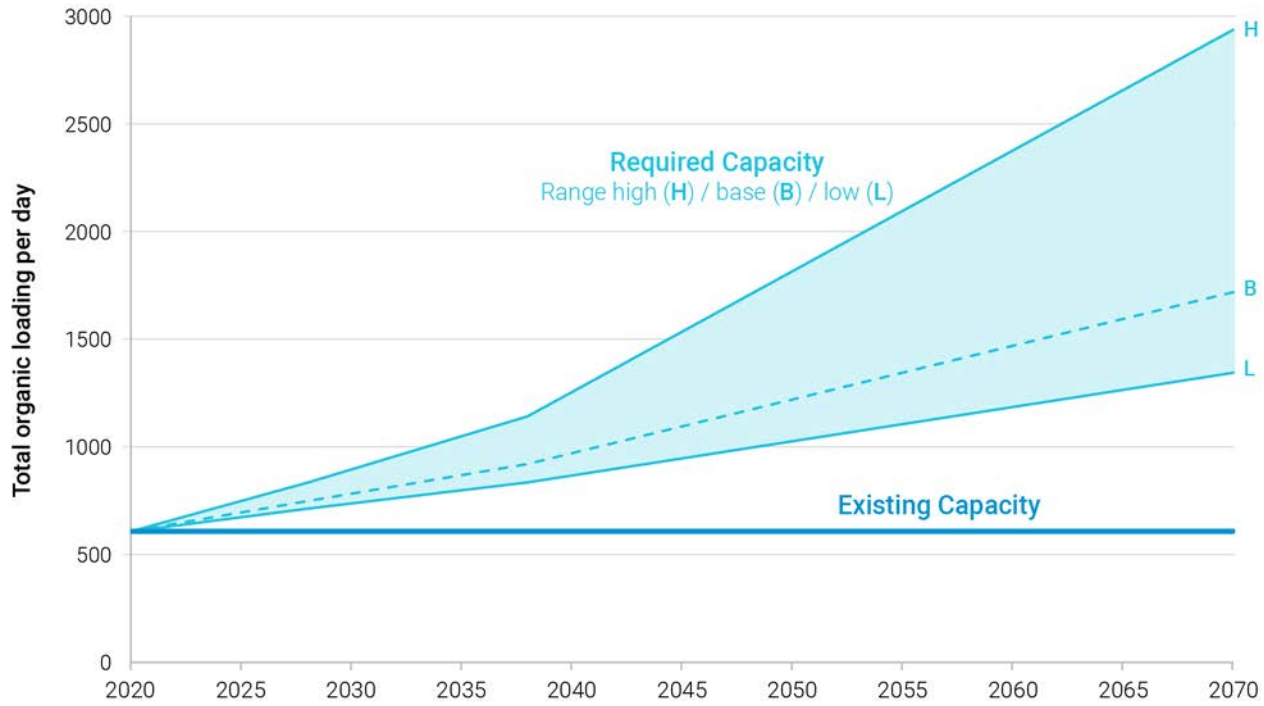


Figure 7-2: Wonthaggi WWTP capacity assessment

7.1.3 Cape Paterson

The Cape Paterson Wastewater Treatment Plant is currently achieving full compliance with all EPA licence limits with a good margin.

It is expected that only minor upgrades will be required, with no major capacity restrictions expected over the medium to long term.

We will monitor growth within Cape Paterson and, should higher than expected growth occur, modify our plans accordingly.

7.1.4 Inverloch

Inverloch Wastewater Treatment Plant currently meets all EPA licence limits and does not require any immediate major upgrades.

Minor upgrades will be required to ensure operation of this plant continues to meet levels of service requirements over the medium and potentially to service long term projected growth.

We'll monitor growth as part of our adaptive planning approach to determine the appropriate timing and magnitude of upgrades over time.

7.1.5 Baxters Beach Outfall

Our current EPA licence limits discharge of treated wastewater to 5ML/day. This daily discharge volume currently services all three townships adequately.

However, increasing wastewater treatment requirements over the long term will result in existing discharge limit potentially being inadequate in about ten years.

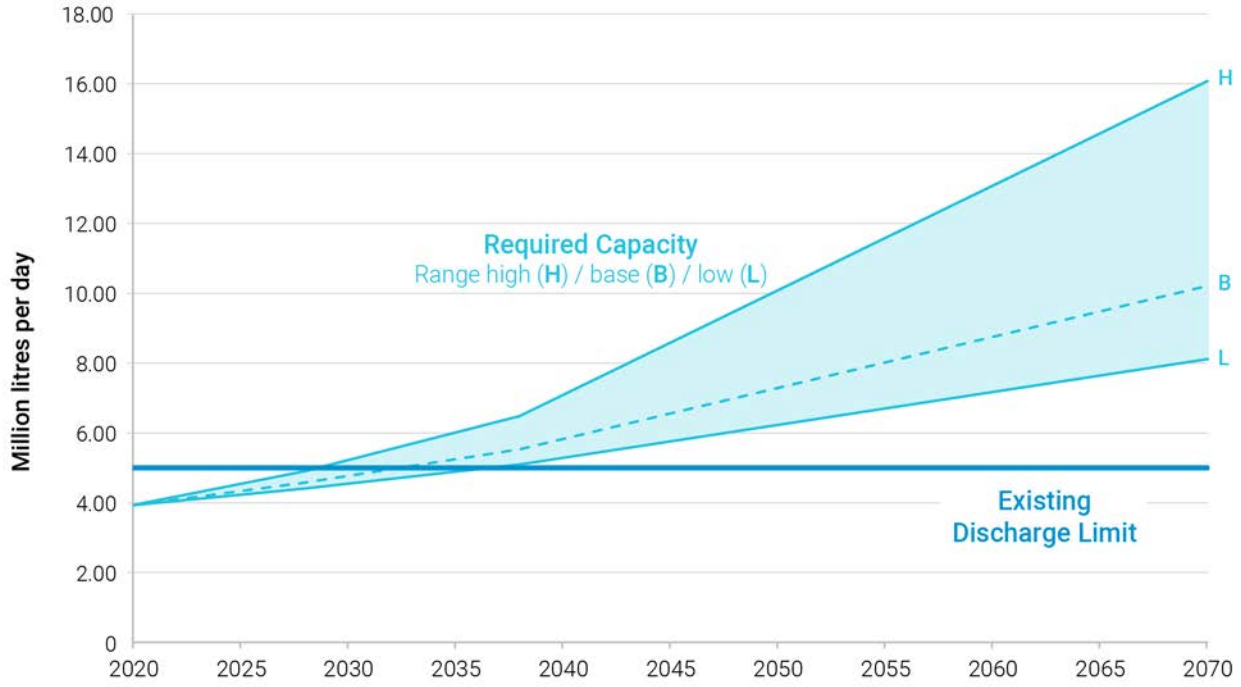


Figure 7-3: Baxters Beach discharge capacity assessment

7.1.6 System Upgrade options

7.1.6.1 Wastewater networks

To maintain levels of service, Wonthaggi, Cape Paterson and Inverloch wastewater collection networks will be progressively upgraded.

We will build new pipelines to service the Wonthaggi north-east growth area and upgrade sewer pipelines and pump stations in our existing network to increase capacity as the towns grow over time. Changing climate conditions, including the potential for wet weather events have been taken into consideration. For these events, we have planned additional storage at pump stations to ensure we don't spill wastewater to the environment during emergencies.

7.1.6.2 Wastewater treatment plants

As both Inverloch and Cape Paterson currently meet all EPA licence limits no immediate major upgrades are required. Minor upgrades and routine planned works will continue for these plants.

The Wonthaggi Wastewater Treatment Plant has existing capacity and licence compliance risks include odour, containment of wet weather flows and treated effluent quality. Wonthaggi requires major upgrades in the short-term.

Initial planning is underway to build a new mechanical / biological wastewater treatment plant. This will reduce the footprint of our treatment operations, and address buffer zone concerns.

A shift to a mechanical / biological plant will increase the quality of treated wastewater discharged to Baxter's Beach and allow us to explore reuse opportunities in addition to irrigation.

7.1.6.3 Recycled wastewater

Investigations are ongoing for potential opportunities to implement reuse within the Baxter's Beach system.

The relatively wet South Gippsland climate limits demand for irrigation water, making recycling of all available treated wastewater challenging. Therefore, discharge to Bass Strait via the Baxter's Beach Outfall remains a key part of the long-term strategy for this system.

We have identified some opportunities for smaller volumes of beneficial reuse that we will explore in the short term. These opportunities include providing recycled wastewater for irrigation of farmland and recreational areas.

Initial studies have identified areas to the south of Wonthaggi and north of Cape Paterson that may have potential opportunity for a large-scale irrigation of farmland. We will continue to investigate these opportunities for reuse.

7.1.6.4 Baxter's Beach Outfall

We will continue to discharge treated wastewater via the Baxter's Beach Outfall.

As part of our focus on the circular economy, and our adaptive planning approach, we will continue to explore opportunities for reuse in the Baxter's Beach system.

It is expected that our existing discharge licence flow limit will be inadequate within the next ten years. Therefore, the timing and extent of initial upgrades to the outfall pipeline will be depended on the volume of treated wastewater produced and reuse opportunities. Compliance monitoring will continue, and we will upgrade the Baxter's Beach Outfall if and when required.

7.1.7 Our Strategy

The Baxter's Beach system is the largest and most complex of our wastewater systems for planning.

Our climate and demand on the system is changing. We have developed the long-term plan using our modelling to determine projected growth rates . Figure 7-4 presents a schematic overview of this 50-year strategy.

A preferred pathway for Baxter's Beach has been identified, however, our long-term plan needs to remain adaptable to changing conditions in the future. As such, our plan includes a staged implementation plan, that allows us to adjust as more information becomes available in future.

This is an important step to ensure we don't over-invest in infrastructure that is ultimately not required. We have identified the following key decisions points that we will use to inform the specific timing and extent of works overtime:

- Is the existing wastewater treatment plant capacity acceptable?
- Is the treated wastewater discharge quality acceptable?
- Do the treated wastewater discharge volumes meet our EPA licence requirements?
- Is urban development encroaching on the wastewater treatment plant site?
- Are there opportunities to increase discharge via reuse pathways?

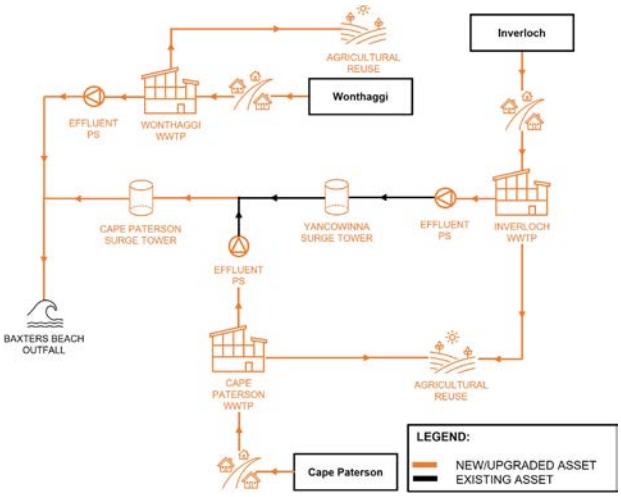
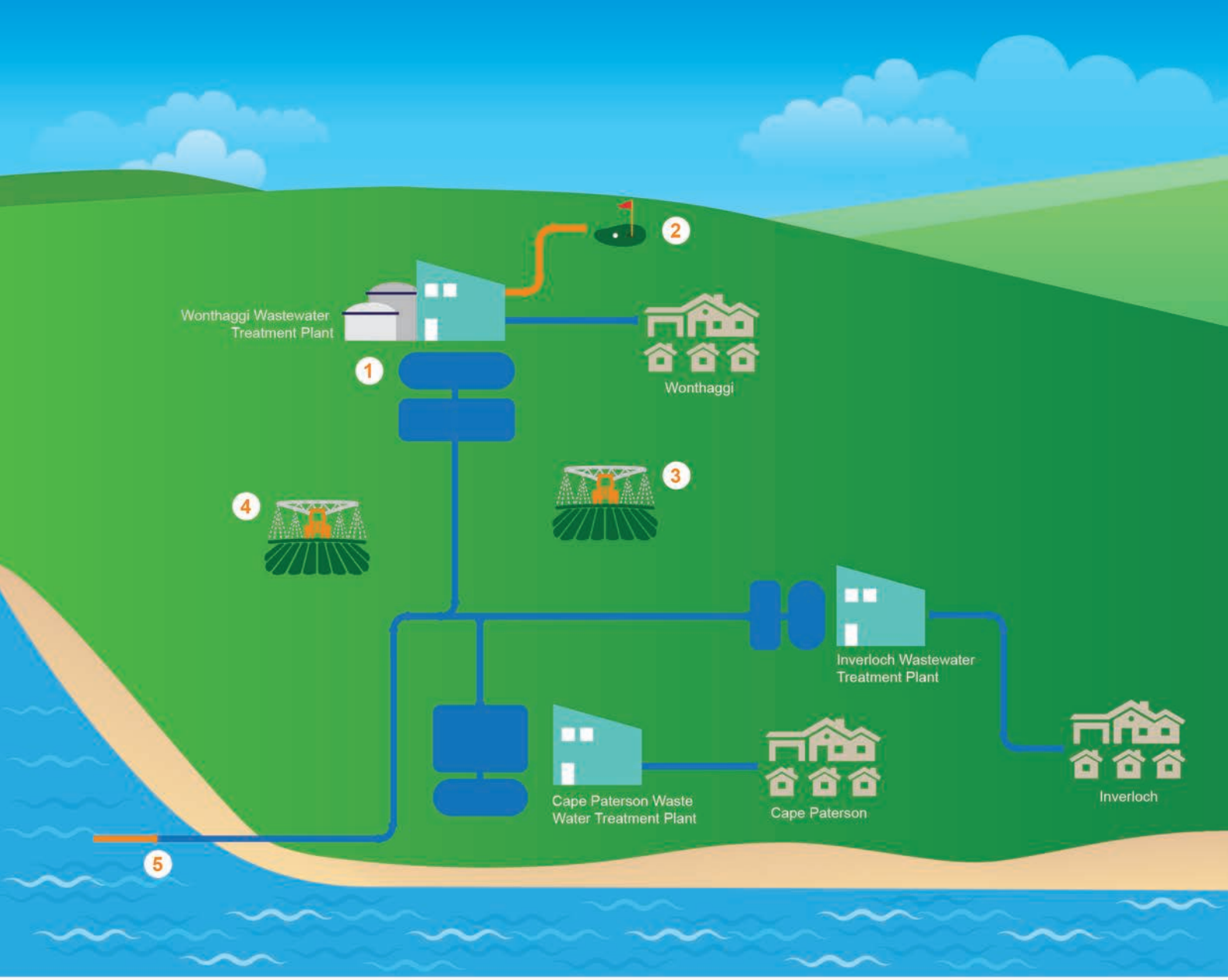


Figure 7-4: Baxters Beach wastewater strategy – infrastructure upgrades overview



1. IMPLEMENT TREATMENT PLANT UPGRADE

2. MAXIMISE RECYCLED WATER FOR LOCAL RECREATIONAL FACILITIES

3. MAXIMISE RECYCLED WATER FOR AGRICULTURAL IRRIGATION - STAGE 1

4. MAXIMISE RECYCLED WATER FOR AGRICULTURAL IRRIGATION - STAGE 2

5. UPGRADE OCEAN OUTFALL IF REQUIRED

Figure 7-5: Baxters Beach system – details our preferred pathway, quantity and timing for the major water supply upgrades

Table 7-2: Baxters Beach system – actions

Actions		Timing
7.1	Continue de-sludging of lagoons at Wonthaggi, Cape Paterson and Inverloch Wastewater Treatment Plants.	Before 2023
7.2	Commence early design works for the mechanical upgrade of Wonthaggi Wastewater Treatment Plant, to be delivered by 2028.	Before 2023
7.3	Continue to investigate existing reuse opportunities such as farmland, vegetation plantations and recreation.	Before 2023
7.4	Investigate a winter storage at Wonthaggi WWTP to enable the servicing of reuse demand.	Before 2023
7.5	Investigate opportunity and engagement for farmland north of Cape Paterson identified as high potential for future large-scale treated wastewater reuse.	By 2028
7.6	Monitor growth within the region and availability of reuse opportunities to determine the timing and extent of any upgrades to the ocean outfall in the short to medium-term.	By 2028

7.2 Foster system

Foster is an inland town located approximately 170km from Melbourne.

7.2.1 Snapshot

- Servicing approximately 900 customers
- Foster is expected to experience only moderate growth
- Lagoon-based system
- Treats water to Class C standard
- Reuse system in place for recreational purposes
- Discharged via an ocean outfall at Corner Inlet.

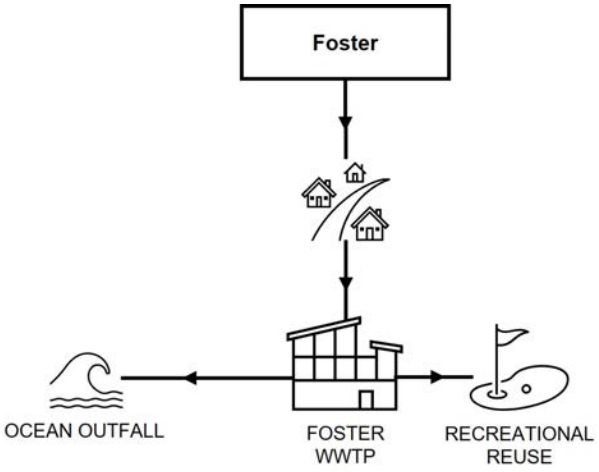


Figure 7-6: Foster system overview

Modelling results and analysis show that the Foster wastewater system requires upgrades to its network, treatment and discharge components.

7.2.2 Future works

Table 7-3: Foster capacity assessment summary

		Foster
Existing System	Network capacity	
	Treatment capacity	
	Discharge capacity	
2070 Planning Horizon	Network capacity	Before 2023
	Earliest Augmentation	
	Treatment Capacity	Before 2023
	Earliest Augmentation	
	Discharge Capacity	Before 2023
	Earliest Augmentation	

Recycled water produced at the Foster Wastewater Treatment Plant often contains a lot of algae in the summer months. Algae makes it more complex to reuse effluent and a minor upgrade to the treatment plant is needed to solve this challenge. Figure 7-7 provides a summary of the existing treatment capacity, projected wastewater treatment requirements and the timing/extent of future upgrades required.

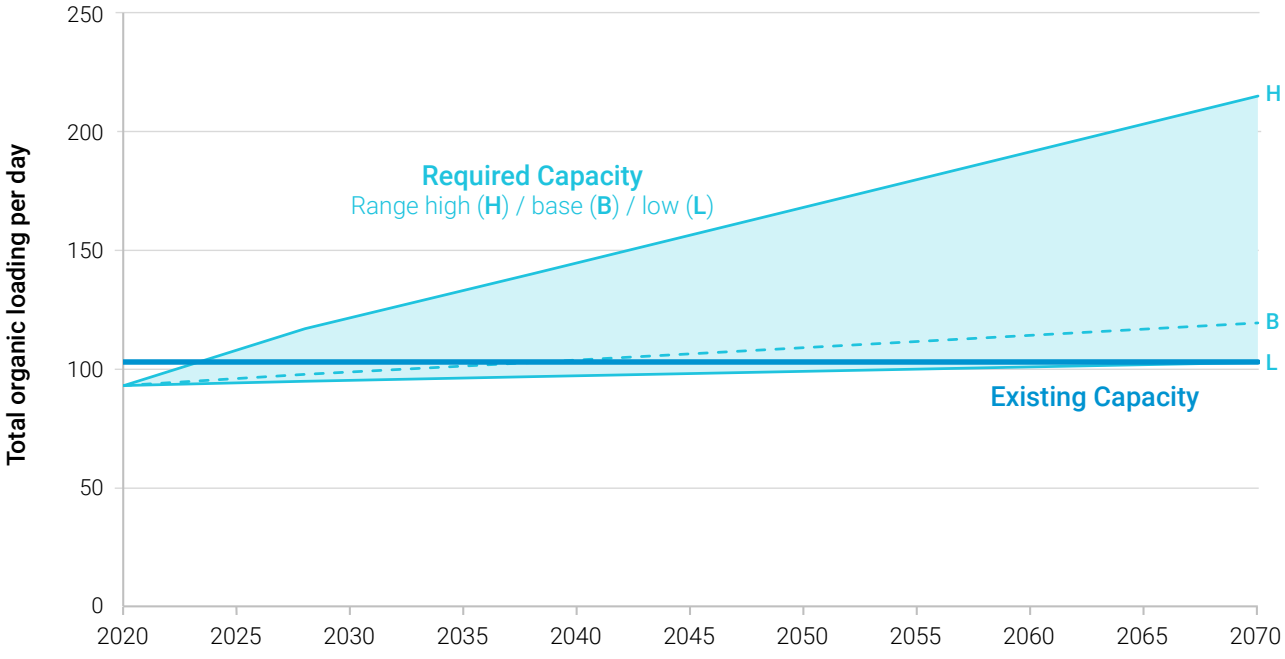


Figure 7-7: Foster WWTP capacity assessment

Our current Corner Inlet discharge limit of 0.4 ML/d will be adequate in the short to medium term if water can be reused at the local recreational reserve and golf course. In the medium to long term the discharge limit of 0.4 ML/d will be inadequate.

We have potential to provide some recycled water to Foster Golf Course and Foster Recreational Reserve and will continue to explore further opportunities for reuse as a strategy to defer the need to increase our discharge licence.

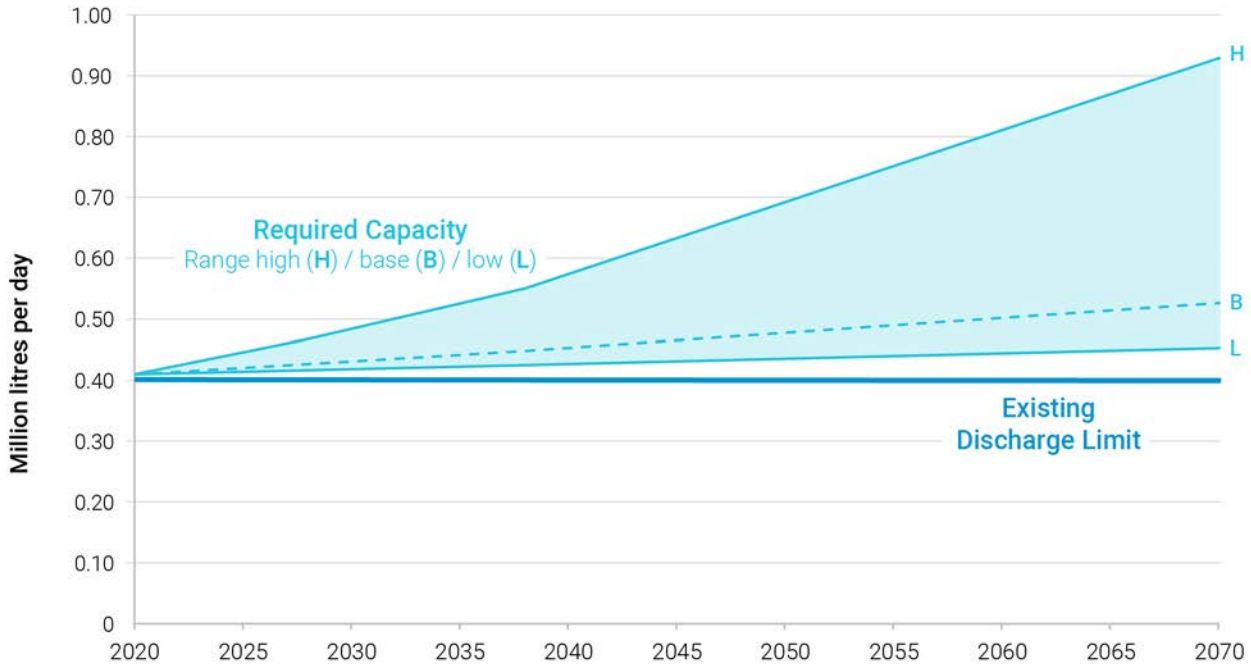


Figure 7-8: Foster WWTP discharge capacity assessment

7.2.3 Wastewater system actions

7.2.3.1 Networks

We will upgrade sewer pipelines and pump stations in our existing network to increase capacity as Foster grows to ensure we don't spill wastewater to the environment during extreme wet weather events.

7.2.3.2 Wastewater Treatment Plant

Foster Wastewater Treatment Plant currently does not have sufficient hydraulic capacity, the plant has:

- Poor treated wastewater quality resulting from high levels of sludge accumulation
- Limited disinfection in the maturation lagoons
- Algal blooms during summer months.

Our long term plan is to upgrade the plant by retaining the existing treatment lagoons and constructing a new mechanical / biological treatment process at the site.

The first stage of works are planned for completion by 2024. These upgrades will reduce the flow and improve the quality of effluent traveling through the existing lagoon system.

Additionally, treated wastewater from the new treatment system would be Class B standard, providing increased opportunity to recycle water. The increased use of recycled water is a key strategy to remain compliant with the Corner Inlet discharge licence limit.

7.2.3.3 Reuse

Investigations are ongoing for potential opportunities to implement a reuse program within the Foster system.

Demand from the Foster Golf Course and Foster Recreational Reserve may be about 50ML/year in the foreseeable future.

In the longer term, an additional option is to implement a recycled water irrigation scheme on 79 hectares of land we own. This provides an irrigation area that exceeds the required 65 hectares to maintain our existing discharge volumes at Corner Inlet with further opportunities identified to expand further. To do this we will need to build new pipelines.

Foster reuse schemes provide opportunity to reduce treated wastewater volumes discharged to Corner Inlet, while saving potable water.

7.2.3.4 Corner Inlet Outfall

Continued operation of the ocean outfall will be required at least for the medium term. To ensure the continued operation is safe for the environment, refurbishment of various sections of the outfall pipeline will be required.

7.2.4 Our Strategy

Our adaptive long-term plan takes into account the higher projected growth rate for this region. Upgrade works will be required on all areas of the system.

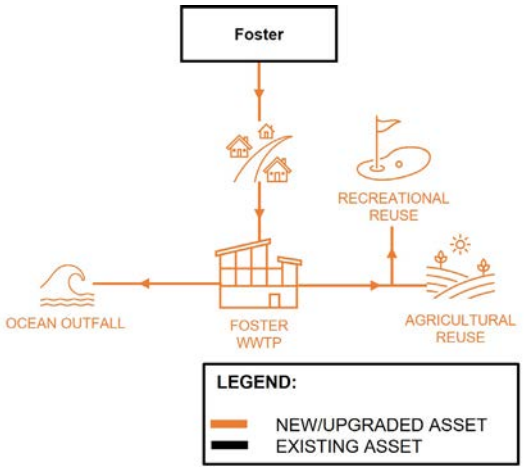


Figure 7-9: Foster wastewater strategy – infrastructure upgrades overview

Table 7-4: Foster system - actions

Actions		Timing
7.7	Update the Foster wastewater network master plan to identify the timing and extent of upgrades required.	Before 2023
7.8	Continue discussions with Foster Golf Course and Foster Recreational Reserve recreational recycled water demand.	Before 2023
7.9	Complete lagoon de-sludging in the short term to increase treatment quality.	Before 2024
7.10	Construct a mechanical / biological upgrade at the plant.	Before 2024
7.11	Monitor the performance of existing lagoons to confirm the need for new baffle curtains in the medium-term.	By 2028
7.12	Commence planning for the implementation of a partial reuse scheme at a 79 ha site owned by South Gippsland Water.	By 2038
7.13	Continue engagement with the EPA regarding our discharge licence at Corner Inlet and inform expansion of the reuse scheme in the medium to long term.	By 2048
7.14	Assess the condition of this ocean outfall over time and complete upgrades as required.	Ongoing

↑ Korumburra Wastewater Treatment Plant Bioreactor

7.3 Korumburra system

Korumburra is an inland town located approximately 120km from Melbourne.

7.3.1 Snapshot

- Servicing approximately 2,400 customers
- The Korumburra Wastewater Treatment Plant is a mechanical / biological system
- Treats water to Class B standard
- Treated wastewater is subsequently discharged to Foster Creek
- Our existing EPA licence allows an annual mean discharge volume of 3ML/day.
- Trade waste flows from several industries are managed within this system.

Growth in Korumburra is being monitored closely, with the higher growth scenario projecting over 5,300 customers by 2070, which if realised would put significantly more strain on the wastewater system.

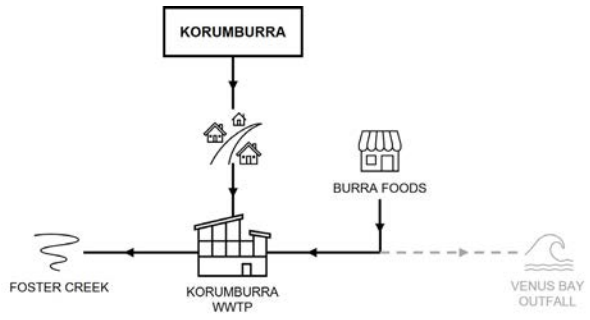


Figure 7-10: Korumburra system overview

7.3.2 Future Works

Our modelling results and analysis show that the Korumburra wastewater system requires upgrade to its network system and treatment process.

Table 7-5: Korumburra capacity assessment summary

		Korumburra
Existing System	Network capacity	
	Treatment capacity	
	Discharge capacity	
2070 Planning Horizon	Network capacity	Before 2023
	Earliest Augmentation	
	Treatment Capacity	Before 2023
	Earliest Augmentation	
	Discharge Capacity	Before 2033
	Earliest Augmentation	

7.3.3 Network

Upgrade works will be required to provide additional emergency storage and increase network capacity prior to 2023.

Periodic upgrades of the wastewater collection and transfer system will be required over time. This may include upgrades to sewer pipelines, pump stations and emergency storage.

7.3.4 Treatment

Since construction in 2005 Korumburra Wastewater Treatment Plant has consistently and reliably produced treated wastewater which complies with its discharge licence limits.

In recent years the quality of wastewater from industry entering the plant has impacted the treatment process. A program to review agreements with trade waste customers is underway.

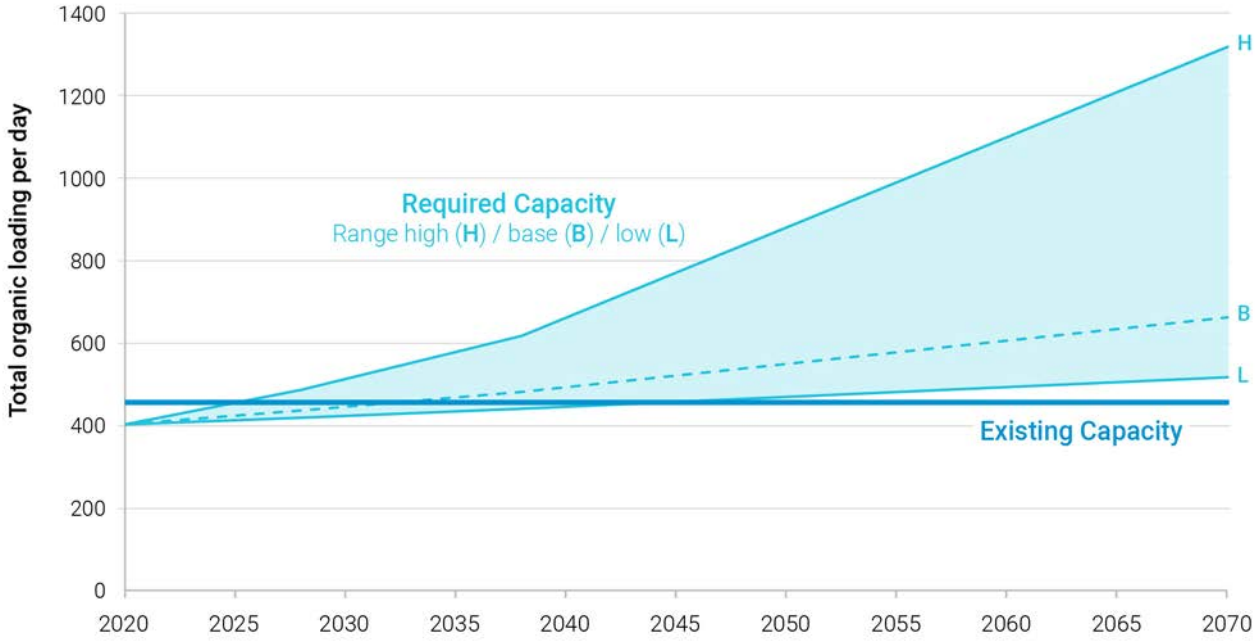


Figure 7-11: Korumburra WWTP capacity assessment

Korumburra Wastewater Treatment Plant currently has adequate capacity under most circumstances with the exception of periods of significant trade waste flows.

By 2030, it is expected that additional capacity may be required. However, this is contingent on the quality / presence of inflows from trade waste customers.

Consideration is underway for some trade waste flow being further treated at source and re-directed to the Venus Bay Outfall which will impact the timing of plant upgrades. However, this option has not been fully developed for consideration.

The current EPA licence limits discharge of treated wastewater at Foster Creek, 3ML/day is expected to remain adequate for future years. This will be re-assessed should growth exceed the predicted levels.

7.3.4.1 Reuse

Apart from the minor volumes of reuse already being delivered from an existing standpipe at the WWTP, limited opportunities have been identified for additional reuse from the Korumburra system at this stage.

7.3.4.2 Discharge

The existing Korumburra Wastewater Treatment Plant discharge licence limits are expected to remain sufficient over the long term. Minor upgrades will be completed to the outfall pipeline as part of our routine maintenance and asset management practices.

7.3.5 Our Strategy

Upgrade works will be required on the network and treatment process of the system. We will continue to work with our trade waste customers and implement our adaptive planning approach should there be significant change in growth or quality predictions.

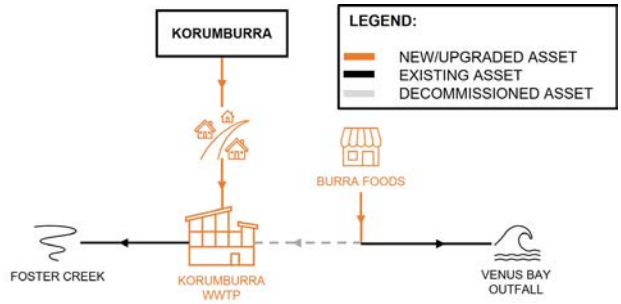


Figure 7-12: Korumburra wastewater strategy – infrastructure upgrades overview

Table 7-6: Korumburra system - actions

Actions		Timing
7.15	Complete emergency storage and capacity upgrades to the WWTP inlet pipeline.	Before 2023
7.16	Investigate existing trade waste agreements for opportunities to reduce load on the wastewater treatment plant in the short term.	Before 2023
7.17	Confirm Venus Bay Outfall design.	Before 2023
7.18	Monitor the performance of the treatment system to inform short to medium-term upgrades.	By 2028
7.19	Continue liaising with local industry for Class B recycled water opportunity.	Ongoing

Leongatha Wastewater Treatment Plant Clarifier

7.4 Leongatha system

Leongatha is one of our largest townships and is located approximately 135km from Melbourne.

7.4.1 Snapshot

- Servicing approximately 3,000 customers
- Expected growth within Leongatha consists of mainly residential customers
- Leongatha Wastewater Treatment Plant is a mechanical system
- Treats water to Class B standard
- Treated wastewater is discharged to Little Ruby Creek
- Our existing EPA licence allows annual mean discharge volume of 2.5ML/day.

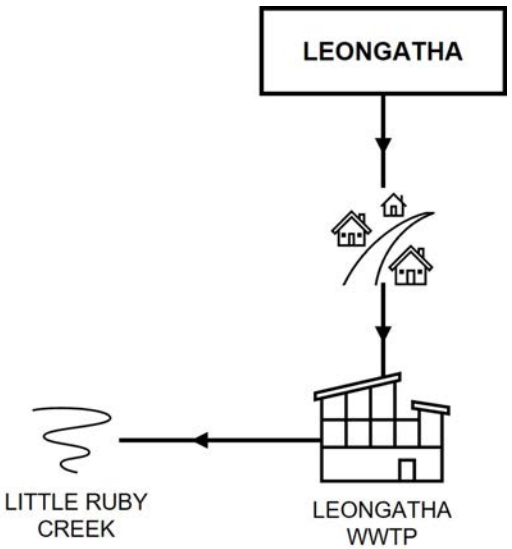


Figure 7-13: Leongatha system overview

7.4.2 Future works

Our modelling results and analysis show that the Leongatha wastewater system requires upgrades to its network, treatment and discharge components.

Table 7-7: Leongatha capacity assessment summary

		Leongatha
Existing System	Network capacity	
	Treatment capacity	
	Discharge capacity	
2070 Planning Horizon	Network capacity	Before 2023
	Earliest Augmentation	
	Treatment Capacity	Before 2023
	Earliest Augmentation	
	Discharge Capacity	2038 - 2048
	Earliest Augmentation	

7.4.3 Treatment Plant

The Leongatha Wastewater Treatment Plant currently does not fully comply with all EPA licence limits.

The plant currently has adequate capacity under most circumstances. However, during periods of significant trade waste flows or heavy rainfall events, overloading of the plant has been observed.

Minor works are required over the short term to maintain compliance under these varied conditions. Additionally, by 2028 we expect that additional capacity will be required.

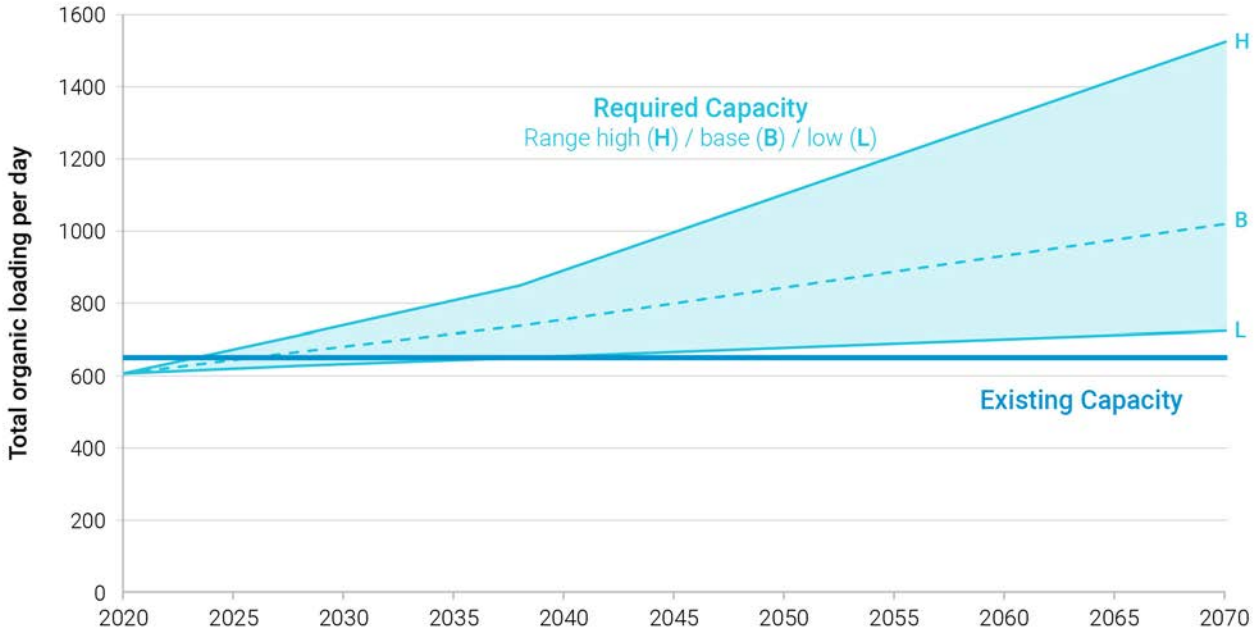


Figure 7-14: Leongatha WWTP capacity assessment

7.4.3.1 Discharge

Our current EPA licence limits discharge of treated wastewater at Little Ruby Creek to 2.5ML/day. This daily discharge volume is adequate until after 2048.

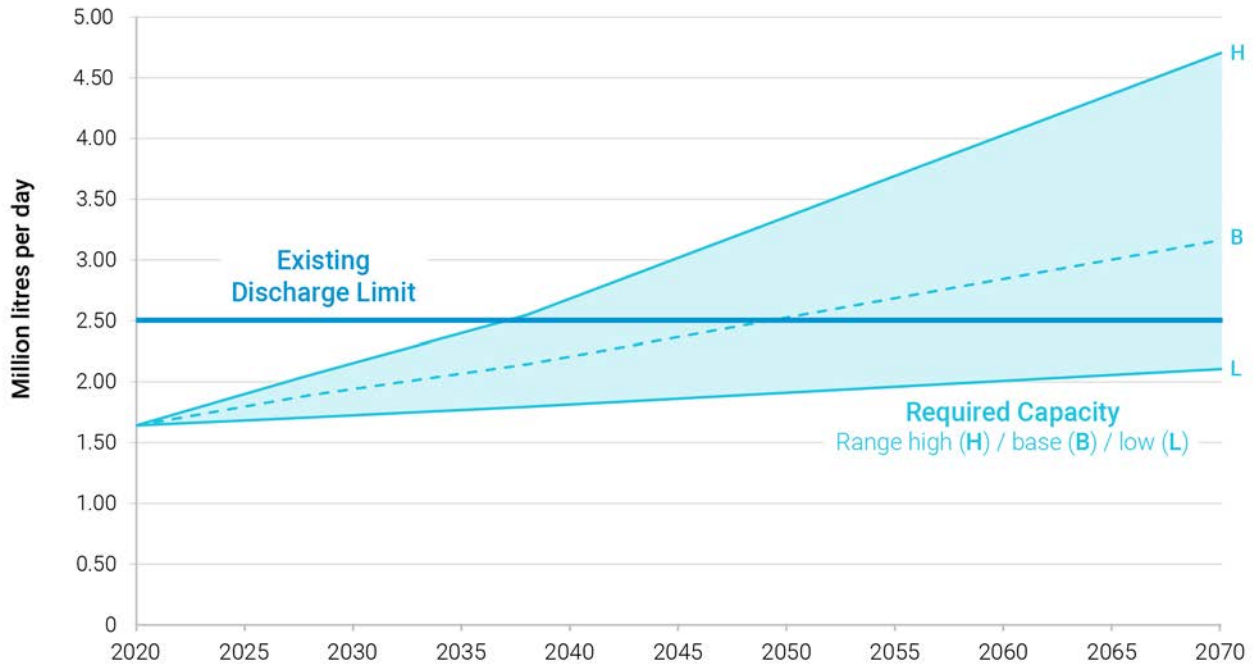


Figure 7-15: Leongatha discharge capacity assessment

7.4.3.2 Wastewater network

We will need to implement significant wastewater network upgrades before 2023.

Over time, additional upgrades will be required to service projected growth. These may include upgrades to sewer pipelines, pump stations and additional emergency storage.

7.4.3.3 Reuse

Currently, reuse opportunities are limited with only small volumes being provided from an existing standpipe at the wastewater treatment plant. We have identified potential opportunities to implement a rural irrigation reuse scheme in the Leongatha surrounding area.

Work will continue to progress this option pending the requirement to review the discharge licence by 2048, or by 2038 if our higher growth projection is realised.

We'll also continue to liaise with local industry and determine whether Class B recycled water demand becomes available over time.

7.4.3.4 Discharge

Two options are under investigation as opposed to an upgrade of the existing outfall pipeline or amendment of our existing discharge licence.

- Reuse opportunities to gradually reduce the volumes of water discharged to Little Ruby Creek is a preferred option
- Connection to the existing Venus Bay Ocean Outfall (pending upgrade) may also be a consideration.

However, the practicality of these are yet to be confirmed and will be evaluated in our adaptive planning approach.

Venus Bay Outfall System

We own and operate a treated wastewater disposal system that connects milk process factories in Korumburra and Leongatha to an ocean outfall near Venus Bay. The system is currently only used to transfer fully treated wastewater from the Leongatha factory to the ocean. Treated wastewater from milk processing is saline. We are working with our customers on a strategy to renew and upgrade the system to protect the environment and ensure continued, uninterrupted, operation for the factories.

7.4.4 Our Strategy

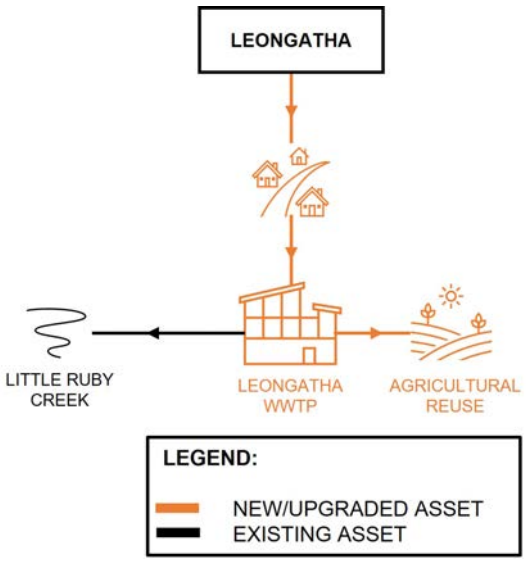


Figure 7-16: Leongatha wastewater strategy – infrastructure upgrades overview

Upgrade works will be required on the network and treatment process of the system. We will continue to investigate reuse options and redirect discharge to the environment.

Table 7-8: Leongatha system - actions

Actions		Timing
7.20	Upgrade network to maintain levels of service in the short term.	Before 2023
7.21	Deliver the minor upgrades required to maintain levels of service in the short term.	Before 2023
7.22	Monitor the performance of the existing treatment system to confirm the need for upgrades in the short to medium-term.	By 2028
7.23	Commence engagement in the local region for agriculture reuse opportunity.	By 2028

↑ Toora Wastewater Treatment Plant

7.5 Toora system

Toora is a small coastal town located approximately 180km from Melbourne.

7.5.1 Snapshot

- Servicing up to 300 customers
- Minimal growth over the 50-year planning horizon
- One large commercial business located in Toora
- The Toora Wastewater Treatment Plant is a lagoon-based system
- Treats water to Class C standard
- Treated wastewater is subsequently discharged via an ocean outfall at Corner Inlet
- Our existing EPA licence allows an annual mean discharge volume of 1.2ML/day
- There is also some limited Class C recreational recycled water demand (5ML/year).

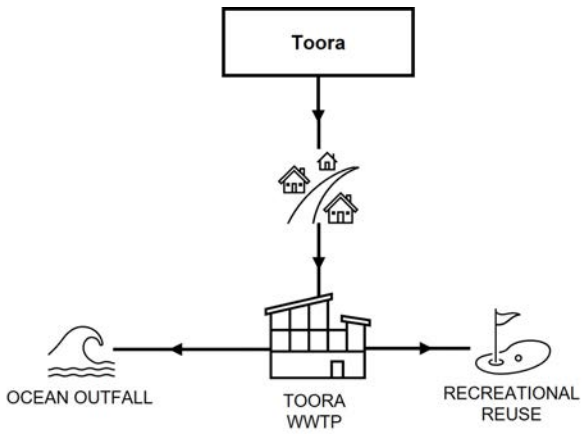


Figure 7-17: Toora system overview

7.5.2 Future works

Toora wastewater system components are all adequately servicing current and projected growth, as shown in the table below.

Due to the limited growth expected in Toora, no upgrades to the existing system are planned.

Table 7-9: Toora capacity assessment summary

		Toora
Existing System	Network capacity	
	Treatment capacity	
	Discharge capacity	
2070 Planning Horizon	Network capacity	After 2070
	Earliest Augmentation	
	Treatment Capacity	After 2070
	Earliest Augmentation	
	Discharge Capacity	After 2070
	Earliest Augmentation	

7.5.3 Our Strategy

Table 7-10: Toora system actions

Actions		Timing
7.24	Consider key decision points periodically to inform any upgrades that may be required over time.	Ongoing

7.6 Waratah Bay system

Waratah Bay is a small coastal town located approximately 180km from Melbourne.

7.6.1 Snapshot

- Servicing approximately 100 customers
- Minimal growth expected
- The Waratah Bay Wastewater Treatment Plant is a lagoon-based system
- Treats water to Class C standard
- Recycled water is used for agricultural irrigation via an existing reuse scheme
- Providing approximately 10-ML per year of recycled water to irrigation.

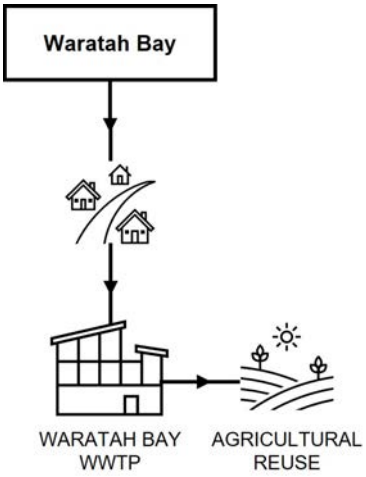


Figure 7-18: Waratah Bay system overview

7.6.2 Future Works

7.6.2.1 network

Due to the limited growth expected in Waratah Bay, no major upgrades to the existing network are expected. Routine maintenance to replace assets as part of our asset management strategy will continue.

7.6.2.2 Treatment Plant

The Treatment Plant has significant spare capacity and no major upgrades are planned as part of our strategy.

7.6.2.3 Reuse

Minor expansion of the existing Class C irrigation reuse scheme is required to ensure we're meeting our 1 in 10 year containment standard spill frequency requirement at the wastewater treatment plant during high rainfall years.

Table 7-11: Waratah Bay capacity assessment summary

		Waratah Bay
Existing System	Network capacity	
	Treatment capacity	
	Discharge capacity	
2070 Planning Horizon	Network capacity	After 2070
	Earliest Augmentation	
	Treatment Capacity	After 2070
	Earliest Augmentation	
	Discharge Capacity	Before 2023
	Earliest Augmentation	

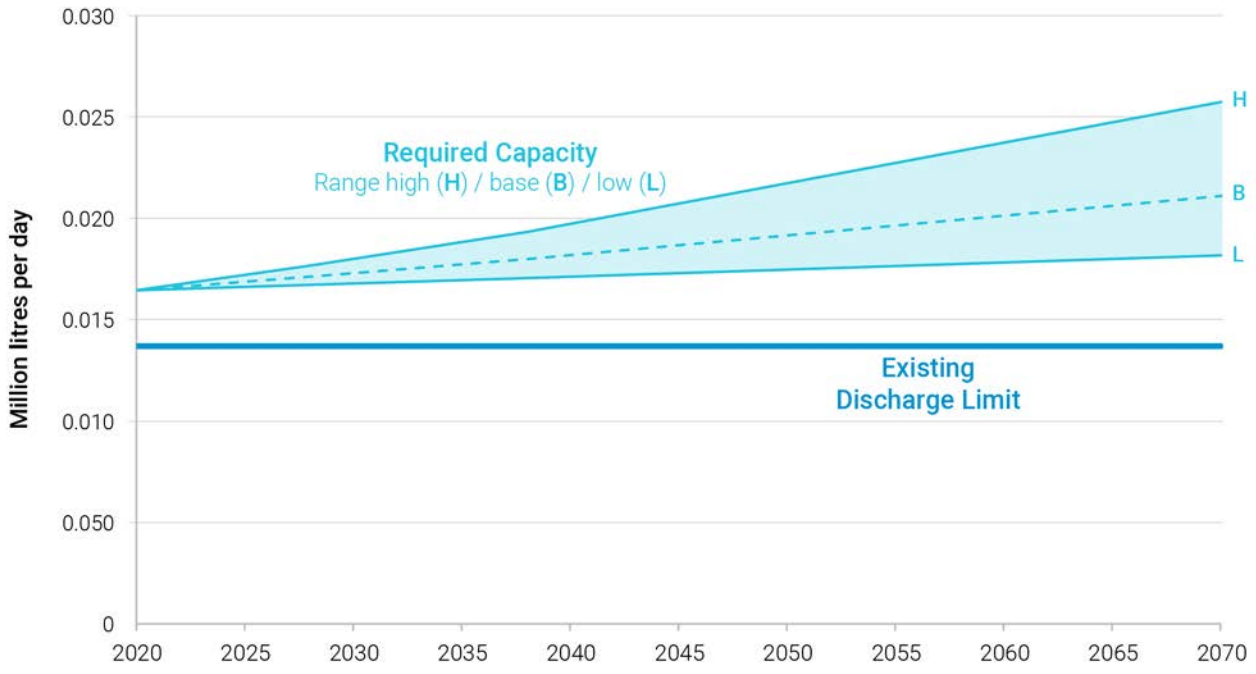


Figure 7-19: Waratah Bay discharge capacity assessment

7.6.3 Our strategy

To accommodate the minor growth expected in this region, as well as climate variability, we will commence plans to expand our existing irrigation scheme.

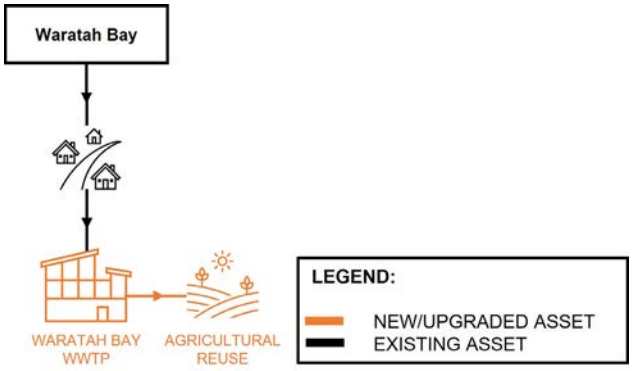


Figure 7-20: Waratah Bay wastewater strategy infrastructure upgrades overview

Table 7-12: Waratah Bay system - actions

Actions		Timing
7.25	Commence planning to expand our existing irrigation scheme to cater for growth and varied climate conditions.	Before 2023

7.7 Welshpool system

Welshpool is a small coastal town located approximately 190km from Melbourne.

7.7.1 Snapshot

- Servicing approximately 124 customers
- No major trade waste customers
- Minimal expected growth to 2070
- The Welshpool Wastewater Treatment Plant is a lagoon-based system
- Treats water to Class C standard
- Treated wastewater is subsequently discharged via an ocean outfall at Lewis Channel
- There is also limited volumes of recycled water available from the treatment plant for pasture irrigation.

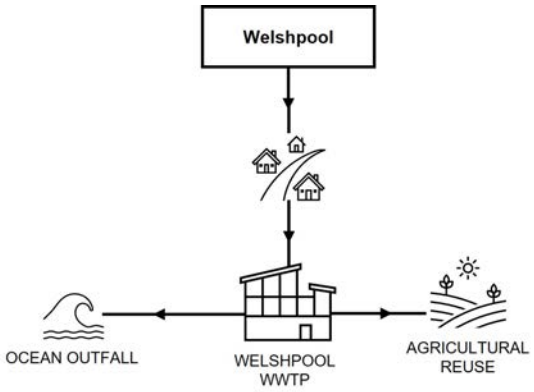


Figure 7-21: Welshpool system overview

7.7.2 Future works

The existing Welshpool wastewater system components are all adequately servicing current and projected growth, as shown in Table 7-13.

Due to the limited growth expected in Welshpool, no upgrades to the existing system are planned.

Table 7-13: Welshpool capacity assessment summary

		Welshpool
Existing System	Network capacity	
	Treatment capacity	
	Discharge capacity	
2070 Planning Horizon	Network capacity	After 2070
	Earliest Augmentation	
	Treatment Capacity	After 2070
	Earliest Augmentation	
	Discharge Capacity	After 2070
	Earliest Augmentation	

Table 7-14: Welshpool system actions

Actions		Timing
7.26	Consider key decision points periodically to inform any upgrades that may be required over time.	Ongoing

7.8 Tarraville/Yarram system

The Tarraville wastewater system services three small towns of Yarram, Alberton and Port Albert, and is located approximately 220km from Melbourne.

7.8.1 Snap shot

- Servicing approximately 1,534 customers
- Minimal growth over the 50-year planning horizon
- The Tarraville Wastewater Treatment Plant is a lagoon-based system
- Treats water to Class C standard; and can achieve Class B quality for periods of the year
- 100% of treated wastewater is discharged to local farmland via an existing reuse scheme
- Providing approximately 140 ML per year of Class C recycled water for irrigation
- Yarram is served by a conventional gravity sewer system while Alberton is served by a pressure sewer network and Port Albert has a vacuum sewer system.

7.8.2 Future Works

7.8.2.1 Network

Although limited growth is expected in Yarram, Alberton and Port Albert, the existing network is reaching capacity. Future minor upgrades will include additional emergency storage and increase capacity of the existing wastewater network. We are planning to deliver these works before 2023. Minor upgrades will include improvements to the Port Albert vacuum sewer system to improve reliability and make maintenance easier.

Our capacity assessment identified significant spare capacity at Tarraville Wastewater Treatment Plant.

Table 7-15: Tarraville capacity assessment summary

		Tarraville
Existing System	Network capacity	
	Treatment capacity	
	Discharge capacity	
2070 Planning Horizon	Network capacity	Before 2023
	Earliest Augmentation	
	Treatment Capacity	After 2070
	Earliest Augmentation	
	Discharge Capacity	After 2070
	Earliest Augmentation	

7.8.3 Our Strategy

To accommodate the minor growth expected in this region, as well as climate variability, we will upgrade components of the network system.

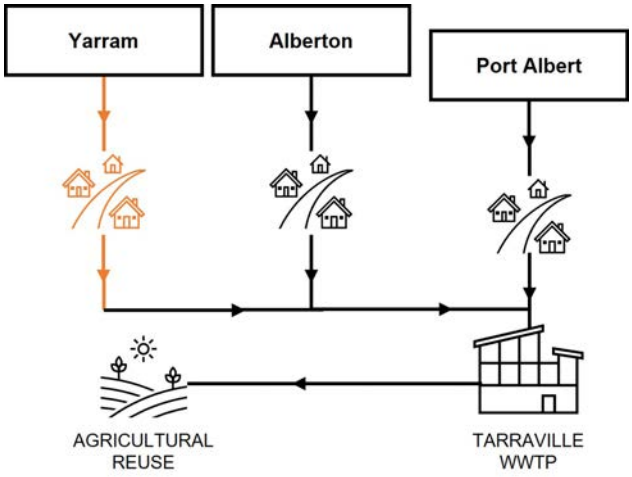


Figure 7-22: Tarraville wastewater strategy infrastructure upgrades overview

Table 7-16: Tarraville system - actions

Actions		Timing
7.27	Minor upgrades including additional emergency storage and increase capacity of the existing wastewater network	2023

7.9 Meeniyan system

Meeniyan is a town located between Leongatha and Foster, approximately 150km from Melbourne.

7.9.1 Snapshot

- Servicing approximately 250 customers
- Minimal growth expected
- The Meeniyan Wastewater Treatment Plant is a lagoon-based system
- Treats water to Class B standard
- Discharge via an existing beneficial reuse scheme providing approximately 16 ML per year of Class C recycled water for recreational and farmland irrigation
- Winter/spring discharge via Stony Creek during periods of higher rainfall and lower recycled water demand.

The Meeniyan wastewater system is adequately sized in most part to service the township for the long term.

7.9.2 Reuse

We currently reuse our recycled water from Meeniyan Wastewater Treatment Plant during summer months. During winter/spring, when rainfall events are more frequent and recycled water demand is consequently lower, we discharge to Stony Creek. In recent years, we've had to manage this system during more frequent rainfall events, and additional capacity is required to ensure we're meeting our 1 in 10-year containment standard during wet weather events.

Our capacity assessment identified significant spare capacity at Meeniyan Wastewater Treatment Plant.

Table 7-17: Meeniyan capacity assessment summary

		Meeniyan
Existing System	Network capacity	
	Treatment capacity	
	Discharge capacity	
2070 Planning Horizon	Network capacity	After 2070
	Earliest Augmentation	
	Treatment Capacity	After 2070
	Earliest Augmentation	
	Discharge Capacity	Before 2023
	Earliest Augmentation	

7.9.3 Our Strategy

Due to limited growth in the area, no major upgrades are planned over the 50-year planning horizon, except expansion of the existing irrigation scheme. However, our long-term plan needs to remain adaptable to changing conditions in the future. As such, our strategy includes a staged implementation plan, that allows us to adjust our planned works as more information becomes available.

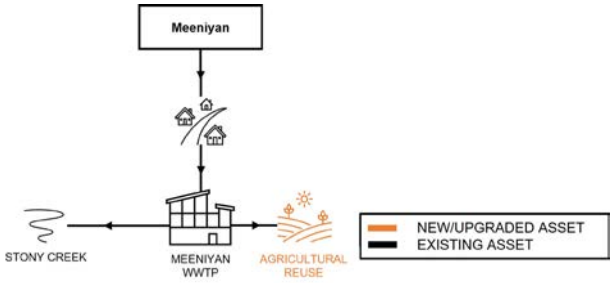


Figure 7-23: Meeniyan wastewater strategy infrastructure upgrades overview

Table 7-18: Meeniyan system - actions

Actions		Timing
7.28	Commence planning to expand our existing recycled water scheme to cater for growth and varied climate conditions.	Before 2023

7.10 Poowong, Loch & Nyora system

Poowong, Loch and Nyora are small inland towns located north of Korumburra, approximately 110km from Melbourne.

7.10.1 Snapshot

- Servicing approximately 460 customers
- Serviced by a pressure sewer system
- SGW operates and maintains the pressure network system including individual pump stations
- Wastewater is transferred to South East Water's Lang Lang wastewater treatment, which delivers 100% beneficial reuse.

The original wastewater network was designed to service over 680 customers with conservative sewage loading estimates for each property.

A range of growth and loading scenarios have been considered, up to 1,100 customers. Results have shown the network is adequately sized to cater for growth over the 50-year planning horizon, for which a total population of 580 lots is expected.

We will continue to inform South East Water of our predicted volumes of wastewater delivered to the Lang Lang wastewater treatment plant.

We have applied our adaptive long-term planning approach and will review this outcome periodically.

Table 7-19: Poowong, Loch, Nyora system - actions

Actions		Timing
7.29	Monitor growth to ensure infrastructure upgrades appropriately service existing and future customers.	Ongoing

7.11 Beneficial reuse of biosolids – all systems

Biosolids are a soil-like residual produced from wastewater treatment. Biosolids can be beneficially reused in accordance with EPA regulations. We have a long term biosolids strategy that aims to reuse 100% of biosolids produced by our treatment operations.

The economics of biosolids reuse opportunities are dynamic and market competition is increasing over time. After exploring the costs and benefits of various end-use possibilities, we plan to continue sending fresh biosolids for composting to PineGro and Gippsland Water's Soil & Organic Recycling Facility (Dutson Downs) over the medium to long term. These end-use pathways offer good environmental outcomes and the best value for money when up-front capital and ongoing operational costs are considered. Some direct application to land will be implemented in areas such as Agnes, where appropriate.

Table 7-20: Biosolids management actions

Actions		Timing
7.30	Confirm the long term acceptance of biosolids and establish long term contracts with regional providers.	Before 2023
7.31	Issue public tender of aged biosolids as additive/ fertiliser to establish farming community awareness and acceptance.	Before 2023
7.32	Commence a detailed study and ultimately replace the Leongatha biosolids ageing site.	Before 2023

7.12 Reducing greenhouse gas emissions – all systems

Our long-term strategy aims to maintain levels of service over time by using a staged implementation plan, so that we deliver value to the community and environment and are adaptable to meeting changing conditions. To reduce greenhouse gases, we identified an opportunity to construct Shallow Wetland Algae Treatment ponds at each of our wastewater treatment plants. These ponds do not require significant earthworks or mechanical infrastructure and therefore have a relatively low embedded carbon footprint. These ponds offer a simple way to capture carbon via algae, which can ultimately be harvested and disposed of in a safe manner. Treated wastewater delivered from this process also comprises valuable nutrients for irrigation, which will support our efforts to increase beneficial reuse volumes over time.

Table 7-21: Emissions reduction actions

Actions		Timing
7.33	Undertake a feasibility assessment to determine where construction of Shallow Wetland Algae Treatment ponds at our wastewater treatment plants is feasible.	By 2028

8 Summary of Actions

No.	Actions		Approximate Timing
Ruby Creek water system			
4.1	Confirm water demand estimates	Review and compare consumption data for accuracy and trends	Ongoing
	Review future water demand	i. Review long-term trends in water use independent of climate variability	Ongoing
		ii. Monitor major industry demand, keep informed of usage including water efficiency programs	Ongoing
	Encourage water efficiency	i. Water efficiency via community programs, grants and education	Ongoing
		ii. Support larger residential and commercial properties assess rainwater and reuse systems	Ongoing
		Investigate feasibility of digital meters with a target of transfer main leak detection and understanding larger water consumption customers	Next 5 years
	Expand groundwater use	i. Renew infrastructure to continue use of Condolucci, Wild Dog and Van Ecks groundwater bores	Next 5 years
		ii. Investigate connection to reinstate usage of Racecourse Road groundwater bore	Next 5 years
4.2	Water treatment plant wash water reuse	Complete program to reuse wash water at Leongatha Water Treatment Plant	Next 5 years
4.3	Interconnection of disused reservoirs	i. Investigate feasibility of interconnection of disused dams to the Ruby Creek system	Next 5 years
		ii. Implement connection to Bellview Creek and Coalition Creek Reservoirs	Next 5 years
		iii. Implement connection to Little Bass Reservoir	Next 10 years
4.4	Connecting to the grid - Lance Creek system connection	Continue to determine Lance Creek Connection position including the strategy and purchase of additional Bulk Water Entitlement from Melbourne Water	Next 5 years
		i. Implement connection to Lance Creek system and sustain Ruby Creek System for non-fluoridated supply for major industry	Long-term
Lance Creek water system			
4.5	Confirm water demand estimates	Review and compare consumption data for accuracy and trends	Ongoing
	Review future water demand estimates	Review long-term trends in water use independent of climate variability	Ongoing
	Encourage water efficiency	Water efficiency via community programs, grants and education	Ongoing
		Support larger residential and commercial properties assess rainwater and reuse systems	Ongoing
		Continue system leakage reduction and unmetered connection programs	Ongoing

4.6	Increase use of Melbourne Water Supply System	Confirm strategy for purchase of additional Bulk Water Entitlement from Melbourne Water	Immediate
		Purchase additional Bulk Water Entitlement from Melbourne water supply system	By 2024
		Plan strategy for additional Bulk Water Entitlement purchase from Melbourne water supply system	From 2040
4.7	Increase transfer capacity	Duplication of Melbourne Water – Lance Creek pipeline	Long-term
4.8	Recycled water	Investigate feasibility and implement fit for purpose reuse programs	Long-term
Agnes River water system			
4.9	Encourage water efficiency	Water efficiency via community programs, grants and education	Ongoing
		Support larger residential and commercial properties assess rainwater and reuse systems	Ongoing
		Continue system leakage reduction and unmetered connection programs	Ongoing
4.10	Water treatment plant wash water reuse	Implement infrastructure to reuse wash water at Toora Water Treatment Plant	By 2028
4.11	Additional storage	Address supply security during dry periods via an off-stream storage.	By 2033
Deep Creek water system			
4.12	Confirm water demand estimates	Review and compare consumption data for accuracy and trends	Ongoing
	Review future water demand estimates	Review long-term trends in water use independent of climate variability	Ongoing
	Encourage water efficiency	Water efficiency via community programs, grants and education	Ongoing
		Support larger residential and commercial properties assess benefits rainwater and reuse systems	Ongoing
		Continue system leakage reduction and unmetered connection programs	Ongoing
4.13	Consider additional supply for Fish Creek	Implement connection to Fish Creek service basin	Beyond 2050
Battery Creek water system			
4.14	Digital Water Metering Project/ Leakage Reduction	Investigate feasibility of digital meters to customers in Fish Creek to understand leakage and non-revenue water losses: • Estimated 20% reduction in water losses.	Immediate
		Review success of loss reduction works	By 2028
	Review future water demand estimates	Review long-term trends in water use independent of climate variability	Ongoing
	Encourage water efficiency	Water efficiency via community programs, grants and education	Ongoing
		Support larger residential and commercial properties assess benefits rainwater and reuse systems	Ongoing
4.15	Dam upgrade	Upgrade to the spillway and embankment to contemporary design standards in accordance with ANCOLD guidelines	Estimated before 2027

Tarwin River water system			
4.16	Confirm water demand estimates	Review and compare consumption data for accuracy and trends	Ongoing
	Review future water demand estimates	Review long-term trends in water use independent of climate variability	Ongoing
	Encourage water efficiency	Water efficiency via community programs, grants and education	Ongoing
		Support larger residential and commercial properties assess benefits rainwater and reuse systems	Ongoing
		Pursue additional demand reduction options such as system leak reduction and inspections for unmetered tapings	Ongoing
Unserviced towns			
4.17		Work with local communities, business, councils and other stakeholders to understand the technical and economic feasibility of new services	Ongoing

Wastewater

Forward planning for wastewater includes and an ongoing process of systems analysis, growth and demand forecasting and regular renewals programs. For each system we regularly:

- Monitor growth to ensure upgrades appropriately service existing and future customers.
- Ongoing communication with developers and council to understand location and timing of growth.
- Continue to review and improve our wastewater monitoring and planning practices for timely opportunities to defer or reduce upgrades.
- Continue to consider the key decision points in our adaptive planning approach during the development of each planning cycle. This will inform variations to the Strategy due to unforeseen events.

No.	Actions	Approximate Timing
Baxters Beach wastewater system		
7.1	Continue de-sludging of lagoons at Wonthaggi, Cape Paterson and Inverloch Wastewater Treatment Plants.	Before 2023
7.2	Commence early design works for the mechanical upgrade of Wonthaggi Wastewater Treatment Plant, to be delivered by 2028.	Before 2023
7.3	Continue to investigate existing reuse opportunities such as farmland, vegetation plantations and recreation.	Before 2023
7.4	Investigate a winter storage at Wonthaggi WWTP to enable the servicing of reuse demand.	Before 2023
7.5	Investigate opportunity and engagement for farmland north of Cape Paterson identified as high potential for future large-scale treated wastewater reuse.	By 2028
7.6	Monitor growth within the region and availability of reuse opportunities to determine the timing and extent of any upgrades to the ocean outfall in the short to medium-term.	By 2028
Foster wastewater system		
7.7	Update the Foster wastewater network master plan to identify the timing and extent of upgrades required.	Before 2023
7.8	Continue discussions with Foster Golf Course and Foster Recreational Reserve regarding recycled water demand.	Before 2023
7.9	Complete lagoon de-sludging in the short term to increase treatment quality.	Before 2024
7.10	Construct a mechanical / biological upgrade at the plant.	Before 2024
7.11	Monitor the performance of existing lagoons to confirm the need for new baffle curtains in the medium-term.	By 2028

7.12	Commence planning for the implementation of a partial reuse scheme at a 79 ha site owned by South Gippsland Water.	By 2038
7.13	Continue engagement with the EPA regarding our discharge licence at Corner Inlet and inform expansion of the reuse scheme in the medium to long term.	By 2048
7.14	Assess the condition of this ocean outfall over time and complete upgrades as required.	Ongoing
Korumburra wastewater system		
7.15	Complete emergency storage and capacity upgrades to the WWTP inlet pipeline.	Before 2023
7.16	Investigate existing trade waste agreements for opportunities to reduce load on the wastewater treatment plant in the short term.	Before 2023
7.17	Confirm Venus Bay Outfall design.	Before 2023
7.18	Monitor the performance of the treatment system to inform short to medium-term upgrades.	By 2028
7.19	Continue liaising with local industry for Class B recycled water opportunities.	Ongoing
Leongatha wastewater system		
7.20	Upgrade network to maintain levels of service in the short term.	Before 2023
7.21	Deliver the minor upgrades required to maintain levels of service in the short term.	Before 2023
7.22	Monitor the performance of the existing treatment system to confirm the need for upgrades in the short to medium-term.	By 2028
7.23	Commence engagement in the local region for agriculture reuse opportunities.	By 2028
Toora wastewater system		
7.24	Consider key decision points periodically to inform any upgrades that may be required over time.	Ongoing
Waratah Bay wastewater system		
7.25	Commence planning to expand our existing irrigation scheme to cater for growth and varied climate conditions.	Before 2023
Welshpool wastewater system		
7.26	Consider key decision points periodically to inform any upgrades that may be required over time.	Ongoing
Tarraville/Yarram wastewater system		
7.27	Minor upgrades including additional emergency storage and increase capacity of the existing wastewater network	2023
Meeniyan wastewater system		
7.28	Commence planning to expand our existing recycled water scheme to cater for growth and varied climate conditions.	Before 2023
Poowong, Loch & Nyora wastewater system		
7.29	Monitor growth to ensure infrastructure upgrades appropriately service existing and future customers.	Ongoing
All wastewater systems		
7.30	Confirm the long term acceptance of biosolids and establish long term contracts with PineGro and Gippsland Regional Organics.	Before 2023
7.31	Commence EOI process of aged biosolids as additive/fertiliser to establish farming community awareness and acceptable.	Before 2023
7.32	Undertake a detailed study of potential biosolids ageing sites.	Before 2023
7.33	Undertake a feasibility assessment to determine where construction of Shallow Wetland Algae Treatment ponds at our wastewater treatment plants is feasible.	By 2028

9 Supporting Documents

DELWP (2021) Guidelines for the development of Urban Water Strategies – Final

State Government guidance document, issued to the urban water corporations, providing requirements and guidance for development of the 2022 Urban Water Strategy.

Hydrology and Risk Consulting Pty Ltd (HARC) (2021): Water Resources Modelling – Technical Report

A report describing drinking water demand and water system yield projections for the eight South Gippsland Water supply systems. The report also describes modelling of various water system upgrade options to support development of the overall Urban Water Strategy.

The water supply and demand projections were completed in accordance with DELWP guidelines.

Hydrology and Risk Consulting Pty Ltd (HARC) (2021): Drought Preparedness Plan

The Drought Preparedness Plan describes a set of measures designed to plan for and respond to drought situations that may impact South Gippsland Water supply systems.

Jacobs Group Australia Pty Ltd (2017): South Gippsland Water Urban Water Strategy

The report describes the 2017 Urban Water Strategy which is being superseded by this 2022 Urban Water Strategy.

South Gippsland Water (2021): South Gippsland Talks Water – Urban Water Strategy 2022 Final Engagement Report

A report describing results from broad regional, community and customer engagement to support development of the 2022 Urban Water Strategy.

Stantec Australia Pty Ltd (2021): Water Strategy Review and Update

The report reviews South Gippsland Water supply upgrade initiatives described in the 2017 Urban Water Strategy. Potential system upgrade options for the 2022 Urban Water Strategy are described in the report, along with an assessment of alternative strategies. Adaptive plans for each system are presented.

The strategy report includes a review of South Gippsland Water supply system risk and resilience and describes how risk will be mitigated.

Stantec Australia Pty Ltd (2021): Wastewater Strategy

The report describes demands for wastewater services and compares future estimated demands with the capacity of South Gippsland Water systems. Where upgrades are required, the report describes options available and an assessment of the options. Adaptive plans for each system are presented.

Other supporting documents

Numerous other supporting documents provided the detailed background information necessary to develop the 2022 Urban Water Strategy. Each of the supporting documents listed provides detail of additional material used to develop this document.

Appendix A: Drought Preparedness Plan

The Drought Preparedness Plan outlined in section five of this report is a process for preparing and responding to drought:

- Monitoring weather conditions and how our systems are performing
- Activities to prepare our systems should periods of low rainfall be predicted
- System by system activities in response to drought conditions should they occur.

The Drought Preparedness Plan can be located on the Corporations website **www.sgwater.com.au**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