Water Security Plan for Greater Melbourne, Geelong and connected towns

Technical document

VICTORIA State Government | Energy, Environment and Climate Action

Acknowledgement

We acknowledge and respect Victorian Traditional Owners as the original custodians of Victoria's land and waters, their unique ability to care for Country and deep spiritual connection to it. We honour Elders past and present whose knowledge and wisdom has ensured the continuation of culture and traditional practices.

We are committed to genuinely partner, and meaningfully engage, with Victoria's Traditional Owners and Aboriginal communities to support the protection of Country, the maintenance of spiritual and cultural practices and their broader aspirations in the 21st century and beyond.

DEECA is grateful for the input and the provision of data of Melbourne Water, South East Water, Yarra Valley Water, Greater Western Water, Barwon Water, Gippsland Water, South Gippsland Water and Westernport Water.

Cover photograph: Merrimu Reservoir near Bacchus Marsh
Credit: Darryl Whitaker

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1. Introduction – planning for water security

Safe, reliable and affordable water is essential for the health, wellbeing and the economic prosperity of Victoria. However, climate change, declining rainfall, and population growth are increasing pressure on water supplies. To meet future water needs and ensure water for the environment and Traditional Owners, the Victorian Government is developing options to sustainably grow water supplies and build resilience to drought and climate change scenarios.

To offset declining inflows into our dams, we will continue to support gains in water efficiency in homes and businesses and make better use of all water sources. We also need to investigate options for additional supply that do not rely on rainfall, such as use of purified recycled water and stormwater to replenish our rivers, groundwater or reservoirs; and expansion of our seawater desalination capability.

The Water Security Plan is a new process established through the Central and Gippsland Region Sustainable Water Strategy (CGRSWS) (2022), to track and report on the progress of regionally-significant water supply projects for Melbourne, Geelong and connected towns (**Figure 1**). The Water Security Plan focuses on water supply projects that span multiple water corporations, and have the potential to enable the return of water to Traditional Owners and the environment. The annual document will build on the CGRSWS and the Greater Melbourne Urban Water and System Strategy (GMUWSS) (2023) to transparently communicate:

- **How much additional water security is required:** water security position, including urban supply and demand forecasts, and the process in place for returning surface water to Traditional Owners and the environment
- **Where additional water security comes from:** options for additional water supplies and water efficiency, how they have been assessed, which options are being progressed and their status
- **When additional water security will be delivered:** Decision Points, which are agreed indicators for progressive decision-making through the different phases of the readiness framework, to support future augmentations being 'ready', and able to be completed at the right time – not too early or too late
- **Next steps to progress options:** no-regrets actions the Victorian Government is taking to prepare preferred supply augmentation options

This document sets out a plan for the water sector to maintain urban water security for the connected South-Central region[1], which includes approximately 80% of Victoria's population, and protect the community's prosperity and liveability amid climate change and population growth uncertainty

1 South-Central region refers to Melbourne and other connected cities and towns – Melbourne is connected to some neighbouring cities and towns, such as Geelong, Westernport and some parts of Gippsland, through pipelines and proximity to storages.

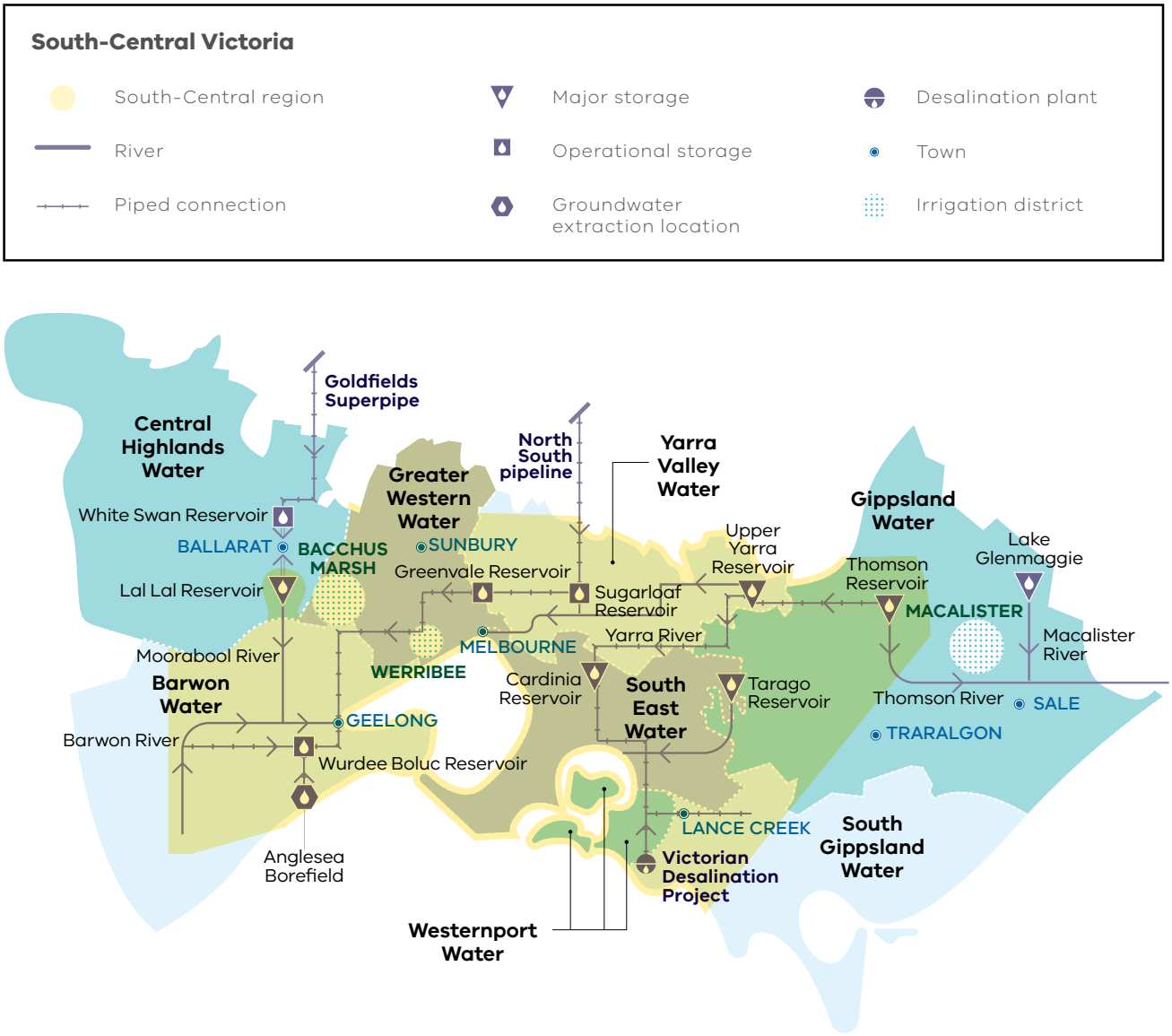

Figure 1. Map of the connected South-Central Water Grid

Bacchus Marsh Weir

2. Water security outlook

Why urban water security is important

Urban water security refers to ensuring that cities and towns have enough safe and reliable water supplies to meet customer expectations, in the face of uncertainty about future supply availability and demand. This means that people have access to clean and safe water to support public health, green parks and gardens for community wellbeing, healthy environment and waterways, and a prosperous economy.

Streamflow into dams is declining, while population and water demand is growing

The South-Central region (**Figure 1**) is expected to grow by 70% to approximately 9 million people by 2060. Current water supplies will not be enough to meet our long-term needs and as the population increases and the climate dries, the risk of extended severe water restrictions grows.

Streamflow into dams between 1997 and 2024 was 17% lower than long-term average inflows before 1996, and is expected to decrease further due to changes in Victoria's climate. Despite water-efficient behaviours, population growth is increasing overall water demands. In addition, regional cities and towns, such as Geelong and parts of Gippsland, are increasingly connecting to the Melbourne system and creating further demand on the centralised network.

As part of the Victorian Government's approach to managing future demand risks in water planning, all water corporations are required to create a low, medium, and high forecast for demand and water availability under climate change. The water sector also monitors actual supply and demand data to identify trends and compares these to planning forecasts.

Current data indicates that despite the recent wet years, climate change impacts and demand are tracking at 'medium scenario', or worse, in relation to projections currently being used for augmentation planning (refer to **Figure 2** and **Figure 3**).

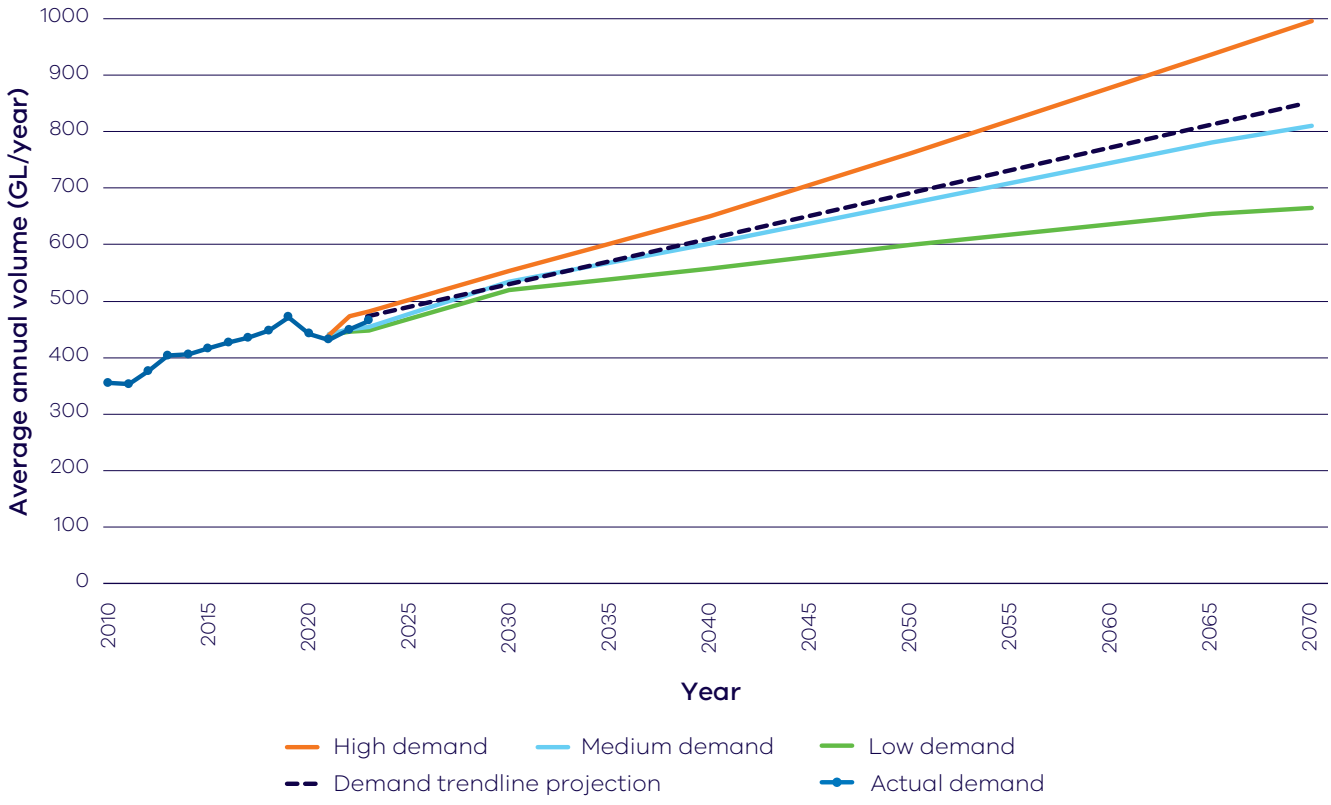

Figure 2. Comparing actual demand figures to updated VIF2023 forecasts – showing that water demand is tracking between 'high' and 'medium'.

As major augmentation options have a long lead-time, it is impractical to adopt a 'wait and see' approach and begin augmentation planning once a shortfall emerges during a drought event. Therefore, a 'high-demand high-climate scenario' has been adopted as the **baseline scenario** for future planning (see **Figure 4**).

Additional water on top of these figures is needed to return water to Traditional Owners and the environment. An adaptive decision-making process means we plan and investigate options early so we are ready to make the right decisions and implement the right options at the right time.

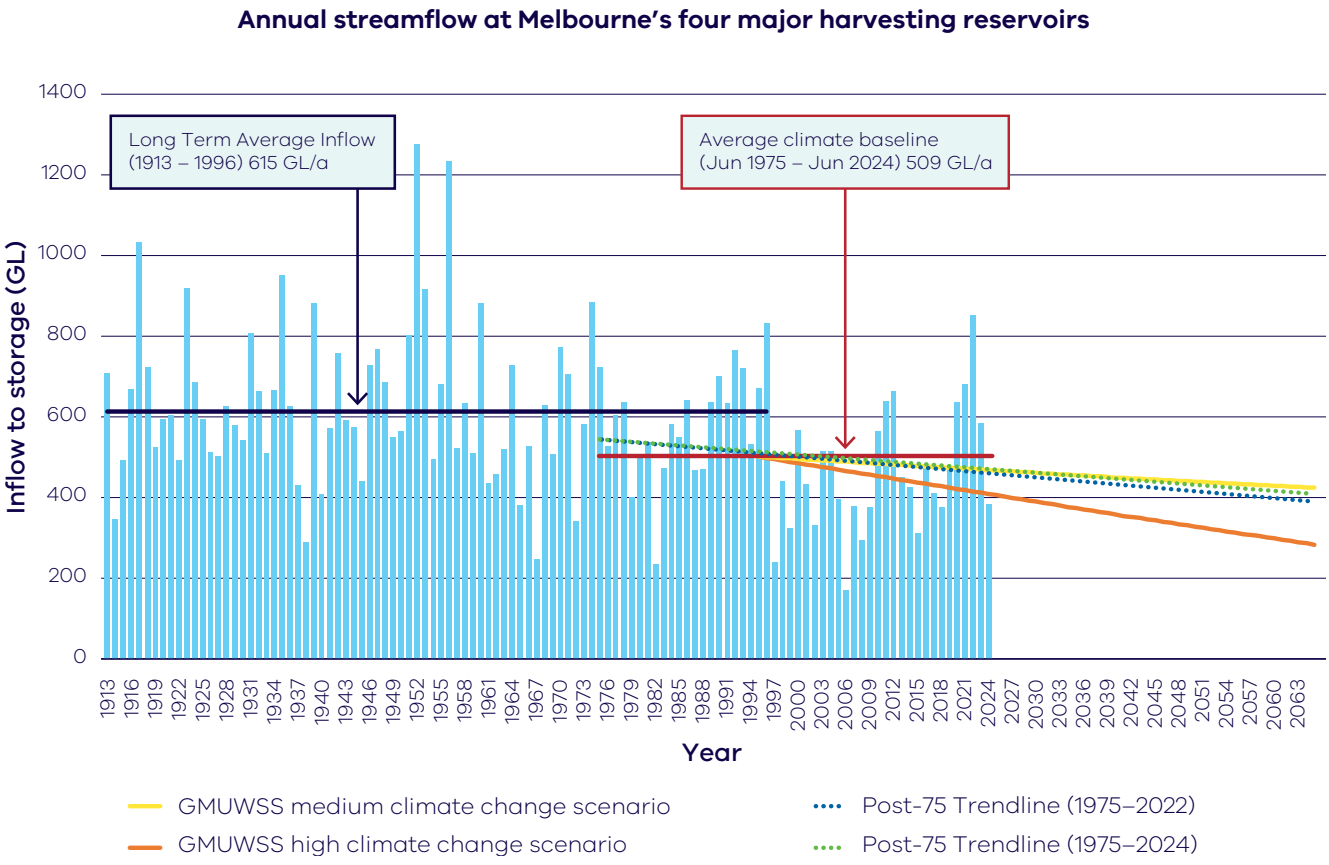

Figure 3. Comparing actual supply figures to forecasts – showing the climate change scenario is tracking between 'high' and 'medium'.

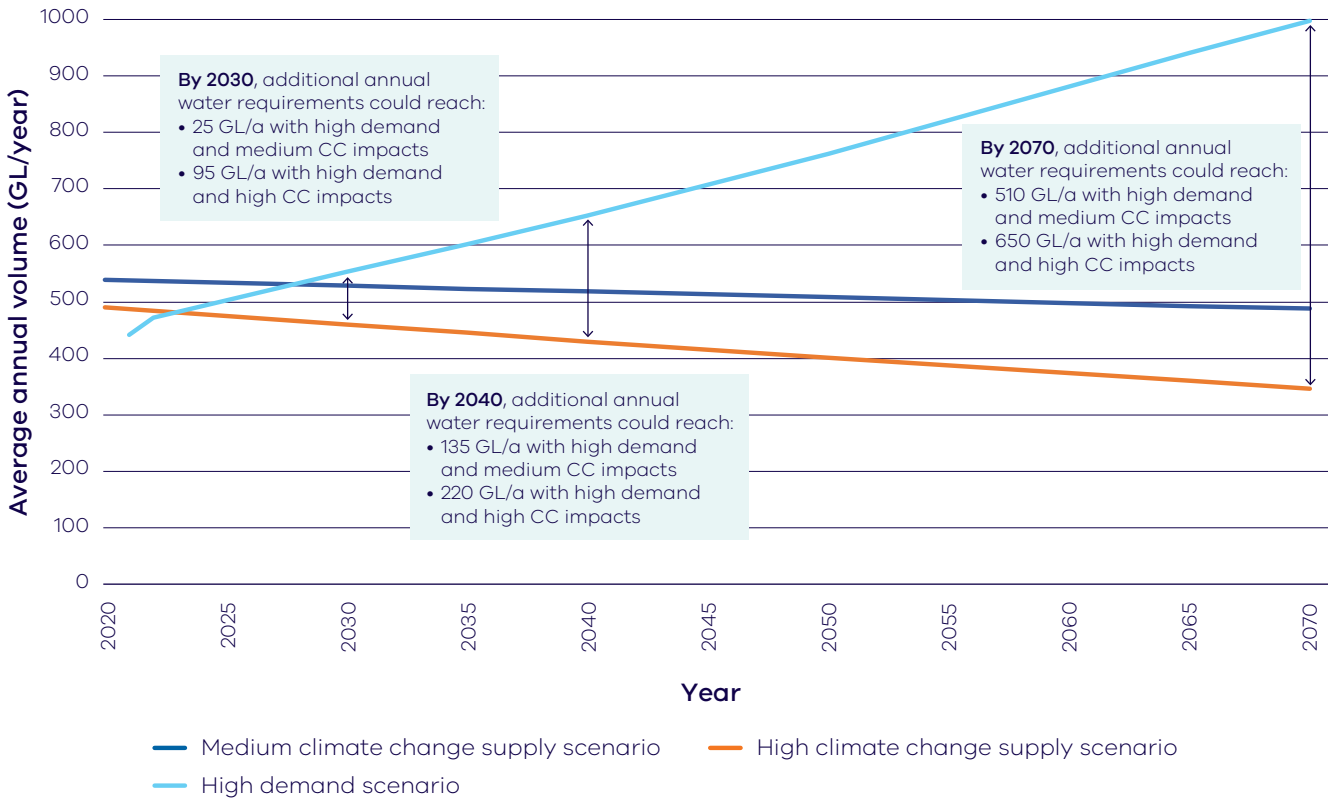

Figure 4. Forecast of supply and demand (under a 'high climate, medium climate, and high demand' scenarios) showing how much additional water security needs to be 'ready' prior to a severe drought event, noting that these scenarios do not include water to be returned to Traditional Owners and the environment.

Storage levels drop quickly in drought, even with desalinated water sources

Rainfall in the South-Central region is highly variable and climate change is expected to make droughts more frequent, severe, and longer-lasting. The Millennium Drought (1997 – 2009) and the resulting extended severe water restrictions enforced caused significant negative outcomes for communities and the economy[2]. Restrictions caused damage to parks and gardens, harmed the health of communities and ecosystems, and severely disrupted industries and tourism.

Melbourne has large, inter-connected water storages, allowing for secure supplies even during multi-year dry conditions and droughts. Water resource planning for Melbourne forecasts the urban demand that can be provided for, while remaining resilient to 'shocks' and 'stresses'. This means the system needs to be able to handle 'shocks', such as extended dry conditions (including drought), floods and bushfires that may create short term system disruptions. The system also needs to be able to handle 'stresses', such as long-term changes to average rainfall, population growth, and changes to how the community uses and values water.

The Victorian Desalination Project, located in the Wonthaggi region, was initiated in response to the Millennium Drought, and achieved final commissioning completion in December 2012 and is fully operational. The plant is capable of supplying up to 150 GL of water a year to Melbourne, Geelong, South Gippsland and Western Port towns.

The region's population has grown from approximately 3 million (when the Millennium Drought began) to over 5 million. The increase in annual demand between 2010 and 2025 is approaching 150 GL per year which is equivalent to the capacity of the Victorian Desalination Project.

Even with full storages, a repeat of the Millennium Drought with full use of the existing desalination plant, would decrease storages from 90% full; to requiring severe restrictions in under three years (refer to **Figure 5**).

2 Productivity Commission 2011 Australia's urban water sector, Report No. 55, Final inquiry report, Canberra, https://www.pc.gov.au/ inquiries/completed/urban-water/report/urban-wateroverview.pdf.

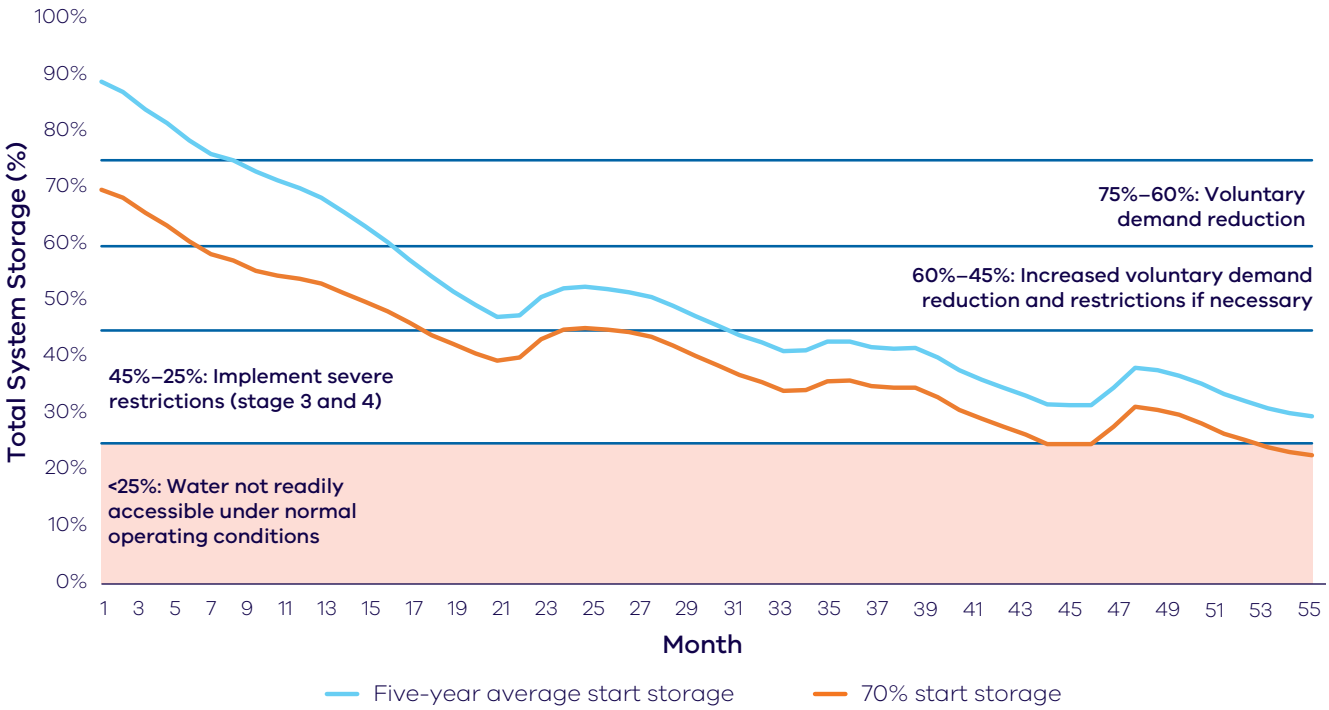

Figure 5. How rapidly storages can deplete under a repeat of Millennium Drought 2006-09 inflows, showing a scenario starting at 90%, and another starting at 70% (factors in use of existing desalination plant, and data is factored for high demand and high climate change scenarios).

Many of the water-saving habits adopted by the community during the Millennium Drought have been maintained[3]. Unlike in the past, traditional (mostly outdoor) water restrictions will not be as effective at reducing demand in future droughts. Even severe water restrictions targeting mainly outdoor usage won't save enough water to fill the gap, as homes and gardens are becoming smaller and more water efficient. Outdoor water usage, now only accounts for 11% of household water use today, compared with 35% in the early 2000s. This means during times of water shortage there is less discretionary water use to restrict, and therefore less reduction in overall demands.

Significant consequences are associated with extended severe water restrictions on households, industries, communities and the broader economy (refer to the section: **Consequences of running out of water (social, environmental, economic and cultural)**. Planned additions to Victoria's water security will reduce this risk.

What are severe water restrictions?

The restrictions framework ranges from Stage 1 to Stage 4 and specifies restrictions across private gardens, public parks, fountains, washing of vehicles/hard surfaces, and operation of pools/spas. Stage 1 represents mild restrictions on these water uses, while Stage 4 involves a blanket ban on most outdoor uses.

Stage 3 and 4 restrictions may cause major damage to private gardens and public parks.

Severe water restrictions refers to restrictions at Stage 4, or potentially beyond in future if Stage 4 restrictions are not enough to fill the gap between available water and demand. The proportion of the region's outdoor use has dropped significantly since the Millennium Drought (from 35% to 11%t), which means Stage 3 or 4 restrictions alone will no longer be effective for drought response.

3 Latest numbers from water corporations in 2023/24 indicate approximately 163 litres per person per day.

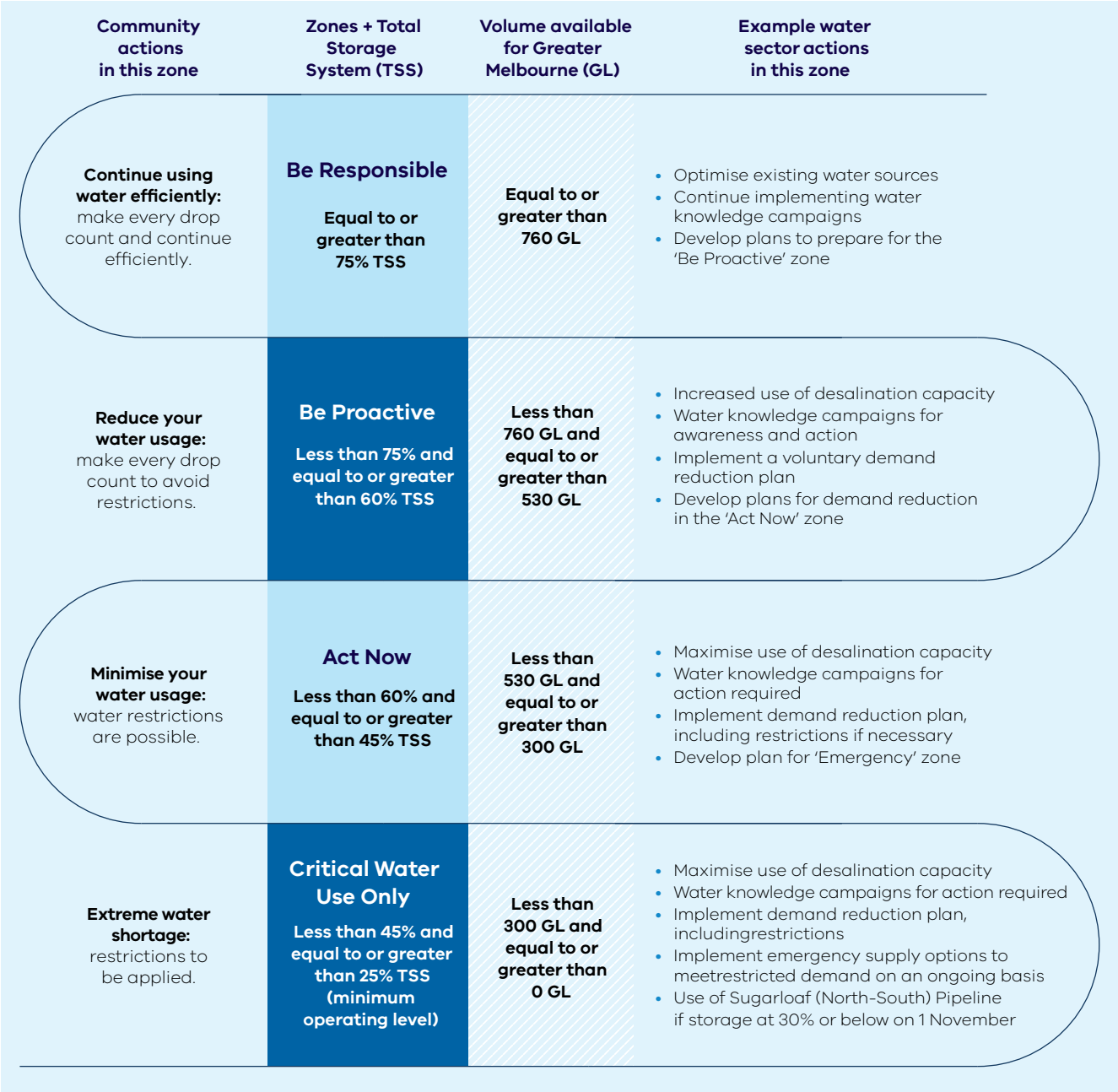

Figure 6. Water outlook zones from Greater Melbourne Urban Water & System Strategy: Water for Life. The water outlook zones are aligned to the amount of water held in storage in the reservoirs of the Greater Melbourne water supply system at 30 November of any given year. (note that Critical Water Use Only starts below 45% and the normal Minimum Operating Level starts from 25% Total System Storage)

Supply projections and evidence for additional water security

Melbourne Water leads the modelling of supply projections for the South-Central supply system. The metropolitan water corporations and Barwon Water collectively model demand projections for Melbourne and Geelong, and other regional water corporations provide their projected demands from the South-Central system for other connected towns. This modelling of supplies and demands was included in the GMUWSS[4] and determined the additional water likely required in the future to meet agreed customer Levels of Service[5]. The modelling also helps to understand possible future water requirements due to climate change impacts and demand growth.

Filling the gap between supply and demand

The forecast gap between supply and demand in future indicates that urban water security will be increasingly at risk if no action is taken. In the event of a severe drought, we will be reliant on water restrictions to ensure water supplies are conserved until additional supply comes online. According to the adopted planning baseline[6], 95 GL per year of 'additional security[7]' will adequately meet urban water needs until 2030, and 220 GL per year of additional water security will adequately meet urban water needs until 2040. Additionally, further water is required to return water to Traditional Owners and the environment (refer to **Returning water and reducing reliance on rivers**).

The Millennium Drought showed that future rainfall, streamflow and climate change impacts on Victoria's catchments cannot be reliably predicted by historical experience. However, we can plan for plausible scenarios by tracking year-to-year variations in water demand and surface water inflows and updating the adopted planning baseline as required. If weather conditions are wetter than predicted or population growth is lower than expected, the Victorian Government can delay implementing additional water security.

Major augmentation projects have a long-lead time, and action is required well in advance of water needed to ensure an adaptive planning approach for the future. For more information, refer to **Readiness and triggers**.

Consequences of running out of water (social, environmental, economic and cultural)

There are significant economic, social, cultural and environmental risks associated with a lack of readiness. Reaching the Critical Water Use Only Zone[8], would have severe consequences[9], including:

- many businesses will be severely impacted, which is likely to result in a loss of confidence in investment economic development in Victoria
- stopping almost all outdoor water use, resulting in damage to parks, private gardens and trees, significant loss of urban flora and fauna, damage to community mental and physical health
- damage to global reputation and tourism

Preliminary economic modelling from Melbourne Water shows that a very extreme water shortage event (for example if augmentation has not been completed by 2040) that required households and businesses to cut their water use by 50% could cost the Victorian economy tens of billions of dollars in just 12 months.

Community feedback

Regular consultation with the community, led by water corporations, has shown that water customers value access to safe and reliable water and sewerage services above everything else, and want water bills to be kept as low as possible.

The community expects the water sector and the Victorian Government to proactively manage the impacts of climate change and population growth, including the risk of flooding and the environmental health of rivers, creeks and bays. The community supports a common-sense approach to the everyday use of drinking water and the use of low-level water restrictions when necessary, however, the use of severe restrictions outside of extreme events is considered unacceptable.

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4 The Greater Melbourne Urban Water and Systems Strategy was developed as a collaboration between Melbourne Water, Greater Western Water, Yarra Valley Water and South East Water. However it also incorporated forecasts for future demands on the Melbourne system, from Geelong and Gippsland.

5 The water security standard that the supply system is designed to achieve, less than 1% chance of severe restrictions each year, for Greater Melbourne.

6 As major augmentation options have a long lead-time, it is not possible to 'wait and see' and begin augmentation planning after a shortfall emerges, and thus the 'high-demand high-climate scenario', has been adopted as the baseline scenario for future planning.

7 Term used as a short-form for "additional water supply or reduced water demand"

8 The zone between 45% and 25% Total System Storage.

9 It is "estimated that the impact of severe water restrictions cost Melbourne between $420 million to $1,500 million over a 10-year period during the Millennium Drought in the mid-1990s and early 2000s (Productivity Commission 2011)" – Central and Gippsland Region Sustainable Water Strategy (2022).

3. Returning water and reducing reliance on rivers

Increasing the supply of manufactured water sources will allow Victoria to reduce the reliance on river water for urban supplies across the connected South-Central region. Using manufactured water also provides an opportunity for [10] river water to be re-purposed from urban supply to improve the health of the rivers or be returned to Traditional Owners within the region, without compromising overall water supply security.

Returning water to Traditional Owners

The Victorian Government is committed to redressing historical and continuing exclusion of Traditional Owners from water management through a restorative justice approach, in line with Yoorrook Justice Commission, Treaty, and Closing the Gap commitments. This includes identifying opportunities to return some river water entitlements (held by water corporations for urban supply) to relevant Traditional Owners[11].

The Cultural Benefits Framework[12] developed together with the CGRSWS provides a tool to describe and quantify the cultural benefits of projects for a quadruple-bottom-line assessment[13]. Future business cases will outline the benefits of returning water to Traditional Owners by applying the Cultural Benefits Framework.

The Traditional Owner Partnership was involved in the development of the CGRSWS, including the Water Security Plan policy. Subsequently, Traditional Owners have been consulted in the development of this Water Security Plan, and will continue to be engaged as partners in future updates, including outcomes of feasibility studies and detailed investigations of supply options for inclusion in future business cases.

Returning water to the environment

Healthy rivers, creeks, lakes and bays are vital for the region's health, economy and liveability. They support agriculture, industry and jobs and ensure we have water for communities, Traditional Owners and the environment. However, almost every waterway in the region is under stress due to water extraction, land-use changes, population growth and climate change[14].

The Victorian Government has set targets for returning water to the environment across the connected South-Central region, where failing to do so may result in irreversible damage to ecosystems[15]. Any water returned to the environment via investment in regionally-significant options would be held as new entitlements issued to the Victorian Environmental Water Holder.

Catchment Management Authorities will be involved in developing recommendations and supporting analysis for inclusion in future business cases and updates to the Water Security Plan.

Quadruple-Bottom-Line assessment for augmentation business cases

Decisions on future supply options, volumes to be returned, and public co-investment for returning water will be made through future business cases, and will take into account benefits for Traditional Owners, the environment and communities by applying a quadruple-bottom-line assessment. All options within the Water Security Plan have the potential to enable water to be returned to rivers across the region by substituting a portion of the new supply with existing river water entitlements held for urban supply purposes.

10 Decisions around the volume of water to be returned, and the reliability of these entitlements, will be made at a later date through the business case process. If entitlements for returning water are to have a high reliability (i.e. be available in dry years as well as average years), then the major augmentations for the region will need to be increased in volume over and above what is needed for urban demands.

11 Refer to Central and Gippsland Region Sustainable Water Strategy Actions including Action 4-1 Investigate options to return water to the environment and Traditional Owners as regional-scale manufactured water sources are planned for Greater Melbourne and Geelong.

12 Traditional Owner Partnership and Alluvium 2022, Framework: Multiple benefits of ownership and management of water by Traditional Owners. Report produced for Traditional Owner Partnership, Central and Gippsland Region Sustainable Water Strategy.

13 The quadruple-bottom-line approach takes into account not only economic or financial results or benefits, but also social, environmental, and cultural factors and outcomes.

14 Refer to chapter 8 of Central and Gippsland Region Sustainable Water Strategy for details about flow-stressed rivers.

15 Refer to chapter 8 of Central and Gippsland Region Sustainable Water Strategy for details about environmental water returns.

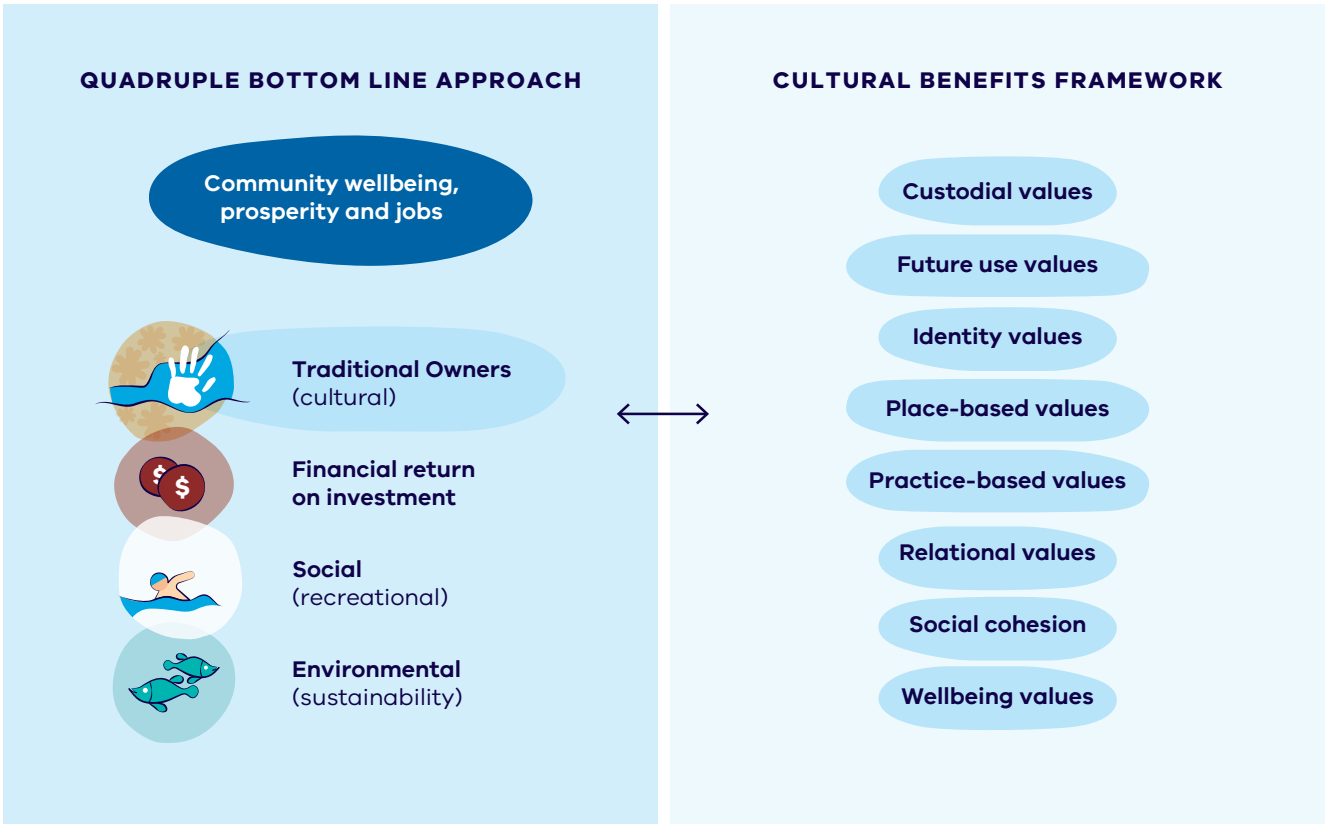

Figure 7. Quadruple Bottom Line and Cultural Benefits Framework developed with the Traditional Owner Partnership through the Central and Gippsland Region Sustainable Water Strategy.

4. Options for additional water security

Additional water security projects are needed to meet water demand under the baseline scenario[16]

As shown in **Figure 4**, there is a growing gap (shortfall) emerging between supply (projected to decline) and demand (projected to grow). A modelled shortfall means that in the event of a major drought we would be more reliant on water restrictions to ensure water supplies are conserved until additional supply comes online. This modelled gap could reach 95 GL per year by 2030 and 220 GL by 2040 to meet urban needs alone under a high demand and high climate change scenario. Additional water will also be required to allow for water to be returned to Traditional Owners and the environment. As the gap grows, resilience to drought drops and the risk of severe restrictions grows. The Water Security Plan and associated actions, aim to be ready to fill this projected gap.

Option assessment results

We have identified, assessed and ranked the water supply and demand options available for the South- Central system, with demand inputs for towns connected to the South-Central Water Grid from the Urban Water Strategies[17] for Barwon Water, Gippsland Water, South Gippsland Water and Westernport Water.

There is no single solution that can meet all needs of the connected South-Central region's customers and communities. A diverse portfolio of options is required to increase system resilience and address the emerging supply shortfall.

The analysis found that the preferred options for investment in additional water security in the near-term are:

- expanding our use of seawater desalination, powered by renewable energy.
- water efficiency activities and behaviour change
- integrated water management programs (capturing and using fit-for-purpose stormwater, rainwater and recycled water)

The analysis found that further investigation of purified recycled water** and stormwater is urgently needed to address significant gaps in our knowledge of community views, expertise, technology and regulation in order for it to be considered as a near-term option.

A rigorous options assessment found that other options such as new dams for water supply purposes, are unsuitable both in the near and long-term (see **Table 1** and **Table 2** for more details). Suitable dam sites have been exhausted and a predicted decrease in rainfall due to climate change means less reliable streamflow to refill dams will be available. In addition, as dams do not create water, any new dams would reduce water availability elsewhere, either from the environment or other users.

The option assessment found that indirectly sourcing drinking water from purified recycled water and stormwater** may offer a comparable option to desalination, in terms of cost and energy use. Additional technological investigation (including cost of treatment and distribution), regulatory review, and community engagement and acceptance is still required.

Early investigations suggest an estimated timeframe for potential implementation of approximately 10–15 years. Therefore, work needs to begin now to design and test the feasibility of drinking water options sourced from purified recycled water and stormwater, so that they can be accurately compared against other suitable options for our water security in a future business case.

Using purified stormwater as a source of drinking water in some select areas could be a feasible strategy for supplementing supplies and mitigating degradation of high value waterways due to urbanisation. More work is needed to understand the technical feasibility of stormwater to drinking water as a supply option for the medium-term, as well as community acceptability.

The Victorian Government will continue to consult the community on future water sources, how to best use stormwater and recycled water, and advance our understanding of the technologies, regulation and community acceptance as a source of drinking water. Victoria will continue to implement its integrated water management program to promote the use of stormwater and recycled water for non-drinking uses, which help reduce demand on urban water supplies.

** *This refers to supplementing rivers, groundwater or reservoirs with water treated to comply with Safe Drinking Water Regulations 2015, and the latest Australian Drinking Water Guidelines. The Victorian Government is not contemplating any options that involve direct injection of this purified water into town water supply pipes.*

16 As major augmentation options have a long lead-time, it is not possible to 'wait and see' and begin augmentation planning after a shortfall emerges, and thus the 'high-demand high-climate scenario', has been adopted as the baseline scenario for future planning.

17 Urban Water Strategies are the main planning tools for ensuring water security for cities and towns. They identify the best mix of actions to provide secure water and sewer services over the next 50 years. Urban Water Strategies are developed for each urban water corporation, other than the metropolitan water corporations in Melbourne and Melbourne Water, who have done a joint strategy, Greater Melbourne Urban Water Strategy.

Table 1. Assessment criteria and scoring metrics for regional-scale augmentation

Criteria	Description	✓ Yes / full benefit	? Maybe / partial benefit	× No / negligible benefit
Significant volume	Can the option provide a substantial volume of water (i.e. 50 GL per year by 2040)?	Greater than 50 GL of additional water is considered possible by 2040	Greater than 10 GL of additional water is considered possible by 2040	Less than 10 GL of additional water is considered possible by 2040
Reliability of supply	Can the option provide a reliable climate independent yield (i.e. will still be available when it is not raining)?	50–100% of the security provided is climate independent	0–50% of the security provided is climate independent	Security benefits in a drying climate are considered likely to be negligible
Confidence in delivering concept at scale	Is there confidence the option is technically feasible and can be implemented to deliver the estimated yield?	Option has already been done at-scale in the South-Central region and/or there is great confidence that the concept can work as intended	Option has been implemented before at a smaller scale in the South-Central region and/or concept/functional level engineering provides some confidence that the option will work as intended.	Option is considered unlikely to be implemented and/or work as intended
Consistency with current government policies and regulations	Does the option align with current government policy and/or is permitted under relevant guidelines and regulations?	Source/end-us combination is permitted by government policy AND supports key objectives of climate independence and does not place further stress on waterways	Source/end-use combination is not explicitly permitted by current government policy BUT supports key objectives of climate independence and does not place further stress on waterways	Option is either explicitly prohibited by current government policy OR would take water away from rivers, making it harder to achieve CGRSWS objectives

Table 2. Options assessment for regional-scale augmentation – consolidating findings from Greater Melbourne Urban Water Systems Strategy, and Urban Water Strategies for Barwon Water, Gippsland Water, South Gippsland Water and Westernport.

Option	Description	Significant Volume	Reliability of supply	Confidence in concept	Consistency with current government policy and regulations	Assessment criteria 5 Cost: What is the estimated cost per Megalitre of the water? ($ / $$ /$$$)	Assessment criteria 6 Lead-times: What is the timeframe for the option to be implemented based on the current status?	Score and conclusion (Note: option filtering is based on first four criteria only, cost and timing will be considered in detailed investigations stage and business case)	Reference
Existing Desalination – VDP Expansion	This option expands the existing VDP by 50 GL/year capacity and supplies this volume into the system via the existing integration of the VDP via Cardinia Reservoir.	Yes, 50 GL/year of reliable seawater desalination could be provided.	Yes, this option provides a climate independent source of water.	Yes, this concept is an expansion of the existing plant, which was constructed to allow for a 50 GL upgrade.	Yes, desalination provides more manufactured, climate independent water	$$	Approximately 8–10 years after a decision has been made to proceed	100% Suitable option for near-term portfolio and recommended for detailed investigations.	Greater Melbourne Urban Water and System Strategy: Water for Life, p.179
New Desalination (location TBC)	This option describes the option to build new additional desalination capacity either to the West or East of Melbourne.	Yes, 150 GL/year or more could be provided.	Yes, this option provides a climate independent source of water.	Yes, there is confidence that an appropriate site exists.	Yes, desalination provides more manufactured, climate independent water.	$$$	Approximately 8–10 years after a decision has been made to proceed.	100% Suitable option for near-term portfolio and recommended for detailed investigations.	Greater Melbourne Urban Water and System Strategy: Water for Life, p.179
Integrated Water Management	Options inter-connecting parts of the water cycle, such as rainwater tanks, stormwater harvesting or recycled water reuse (non potable).	Maybe/partial, approximately 7 to 22 GL additional above the base case could be achieved by 2040, excluding projects with a systemic barrier (according to DEECA portfolio analysis).	Yes, IWM volumes are more than 50% made up of recycled water, making the greater part of the portfolio rainfall independent.	Maybe/partial, IWM is made up of many smaller projects, and each project has a varying degree of progress. Some projects are reliant on urban development and major transport infrastructure projects proceeding which cannot always be predicted or controlled.	Yes, provides many social and environmental benefits as well as water security benefits.	$$$	Made up of many smaller projects that build up volumes over time. A significant volume could be contributed sometime between 2040 and 2050	85% Suitable option for near-term portfolio and recommended for detailed investigations.	Greater Melbourne Urban Water and System Strategy: Water for Life, p.179

Option	Description	Significant Volume	Reliability of supply	Confidence in concept	Consistency with current government policy and regulations	Assessment criteria 5 Cost: What is the estimated cost per Megalitre of the water? ($ / $$ /$$$)	Assessment criteria 6 Lead-times: What is the timeframe for the option to be implemented based on the current status?	Score and conclusion (Note: option filtering is based on first four criteria only, cost and timing will be considered in detailed investigations stage and business case)	Reference
Water efficiency	Audits and replacement of showerheads, rebates for toilets and washing machines, behaviour change campaigns, non-residential programs	Maybe/partial , water efficiency is able to provide significant savings, up to 18 GL per year by 2040 (based on water corporation analysis in 2023).	Yes, the initiatives included in the portfolios are for indoor / climate independent uses, and thus the savings are climate independent.	Maybe/partial, this option is dependent on customers engaging with audits, rebates and changed behaviours.	Yes, frees up water for other uses.	$	Significant volume could be achieved in the 2040s depending on a significant investment uplift.	85% Suitable option for near-term portfolio and recommended for detailed investigations. .	Greater Melbourne Urban Water and System Strategy: Water for Life, p.179
Purified recycled water into rivers, groundwater or reservoirs	Advanced treatment of recycled water to drinking water standards and then injection to an existing dam or other water storage, as part of the drinking water network (Sugarloaf Reservoir or Cowies Hill)	Yes, up to 110 GL per year could be achieved by 2040 if feasibility studies begin now.	Yes, this option provides a climate independent source of water.	Complex technical and feasibility investigations and community engagement needs to be undertaken before these can be confirmed as a potential drinking water source. Need to fully understand the costs, benefits and risks. Must embed the capture and use of stormwater into land use planning and urban form. Community engagement around risks to human health and the environment will also need to occur.	Can provide a source of manufactured, climate independent water. However, work is needed to understand technical feasibility and community acceptance.	$$	Subject to further work and engagement, may be an option in the medium term. Current estimate is 10–15 years. Difficult to assess the lead-time for these projects, as they would involve regulatory change and we don't have sufficient information on community views, hence timeframes are also very uncertain.	70% Not viable in the near-term, but potentially suitable in the medium-term. Recommended for pre-feasibility studies.	Greater Melbourne Urban Water and System Strategy: Water for Life, p.179
Purified stormwater into rivers, ground water or reservoirs	Collection of stormwater from urban areas/road network, appropriate treatment, and then injection to drinking water network.	Maybe/partial, between 0 and 22 GL/year of projects under consideration by 2040.	Maybe/partial, stormwater is more reliable than dams (due to impervious surfaces), but it is still dependent on rainfall.		Yes, provides many social and environmental benefits as well as water security benefits. However, work is needed to better understand technical feasibility and community acceptance.	$$$		55% Not viable in the near-term, but potentially suitable in the medium-term. Recommended for pre-feasibility studies.	Barwon Water – Urban Water Strategy 2022, Water-for-our-Future-Strategy_updated-as-of-Feb-2023-Final.pdf (barwonwater.vic.gov.au)

Option	Description	Significant Volume	Reliability of supply	Confidence in concept	Consistency with current government policy and regulations	Assessment criteria 5 Cost: What is the estimated cost per Megalitre of the water? ($ / $$ /$$$)	Assessment criteria 6 Lead-times: What is the timeframe for the option to be implemented based on the current status?	Score and conclusion (Note: option filtering is based on first four criteria only, cost and timing will be considered in detailed investigations stage and business case)	Reference
North-South Pipeline – change operating rules	Change system operating rules to allow use outside extreme drought response. Existing 70 km inter-basin pipeline that transfers raw water from the Goulburn River system at Lake Eildon, to Sugarloaf Reservoir in Melbourne and treated through Winneke water treatment plant.	Yes, allows 75 GL per year in some years, dependent on seasonal allocations. Current operational rules mean this volume can only be accessed when Melbourne's reservoir levels are less than 30% full.	Maybe/partial, sources surface water from Eildon Reservoir and is climate dependent.	Maybe/partial, existing asset however integration to the existing system in an ongoing basis, rather than emergency supply, needs to be considered, including limitations in Sugarloaf if other supply options are using Sugarloaf Reservoir.	No, the use of the North-South pipeline is supported as an emergency response only.	$	Recommissioning could be implemented quickly in an emergency response. Pipeline remains charged to ensure it is available for firefighting if required.	45% Viable as an emergency response. As option is already available, no further investigations required.	See the Statement of Obligation – System management for details: https://www.water.vic.gov.au/about-us/how-we-work-with-water-corporations/governance-and-planning
River dependent sources: new dams	Mitchell River dam.	Yes, could meet significant volume threshold in theory.	Maybe/partial, climate dependent.	Maybe/partial, large amount of negative impacts that would need to be managed.	No, the CGR-SWS aims to return water to Traditional Owners and the environment. The Mitchell River has a special listing under the Heritage Rivers Act 1992 due to its ecological, cultural and social heritage and value. This prevents any new water diversions that would significantly impair the attributes of the area.	Not assessed as part of Water Security Plan	Not assessed as part of Water Security Plan	45% All surface water augmentations are considered unlikely to be preferred ever, because all take water from flow-stressed rivers. No further investigations.	Greater Melbourne Urban Water and System Strategy: Water for Life, p.179

Option	Description	Significant Volume	Reliability of supply	Confidence in concept	Consistency with current government policy and regulations	Assessment criteria 5 Cost: What is the estimated cost per Megalitre of the water? ($ / $$ /$$$)	Assessment criteria 6 Lead-times: What is the timeframe for the option to be implemented based on the current status?	Score and conclusion (Note: option filtering is based on first four criteria only, cost and timing will be considered in detailed investigations stage and business case)	Reference
Evaporation reduction	This concept reduces the losses from reservoirs, rather than an additional supply source. This option has been implemented before in Australia, with possible methods including floating items, roofs, or solar panels, providing additional broader benefits.	No, for both volume and reliability, generally considered to contribute only small volumes due to being applicable to smaller reservoirs only (GMUWSS notes < 5 GL/year yields assumed).		Maybe/partial, there are issues around water quality that would need to be managed.	Yes, frees up water for other uses.	Not assessed as part of Water Security Plan	Not assessed as part of Water Security Plan	35% Not preferred at any time horizon. No further investigations.	Greater Melbourne Urban Water and System Strategy: Water for Life, p.179
Surface water upgrades	Transfer network upgrades and local system diversions	Maybe/partial, likely 20 GL/year or less under high climate change.	No , dependent on climate, and under high climate change yield may be insignificant.	Yes, relatively high confidence in infrastructure concepts.	No, the CGRSWS aims to return water to Traditional Owners and the environment, not take more.	$	Could be done relatively quickly.	35% All surface water augmentations are considered unlikely to be preferred ever, due to the fact that all take water away from flow-stressed rivers. No further investigations.	Greater Melbourne Urban Water and System Strategy: Water for Life, p.179
Environmental flow substitution	Using recycled water from ETP to support environmental water flow requirements, rather than releases from Upper Yarra reservoir.	Maybe/partial 31 GL/year.	No, traded volume now used for potable supply is a surface water source that is climate independent, and if there were environmental issues revealed at a later date scheme could be interrupted.	Maybe/partial, to provide a suitable concept for the environment, there is significant complexity in delivering the appropriate flow regime.	Maybe/partial, supporting environmental flows is aligned with government policy, however there could be issues with water quality & flow, and the source of water for urban uses is climate dependent.	$$$	Approximately 2033 if there were no environmental regulatory objections.	30% Unlikely to be preferred ever in the South Central area. No further investigations.	Greater Melbourne Urban Water and System Strategy: Water for Life, p.179
Groundwater	In the proximity of Melbourne, there are 5 concepts noted in the GMUWSS, using water from aquifers near Lang Lang, Werribee, Boneo, Powelltown/ Baw Baw Region and Romsey.	No, each scheme is likely less than 5 GL.	Maybe/partial more work would be needed to confirm reliability.	No, long-term investigations required to understand the water quality and yields of the sources.	No takes water from the environment.	Not assessed as part of Water Security Plan	Not assessed as part of Water Security Plan	30% Unlikely to be preferred ever in the South Central area. No further investigations.	Greater Melbourne Urban Water and System Strategy: Water for Life, p.179

For further information and discussion see the relevant urban water security plans:

- Greater Melbourne Urban Water and System Strategy: Water for Life
- Barwon Water – Urban Water Strategy 2022: Water for our Future
- Gippsland Water – Urban Water Strategy 2022
- South Gippsland Water – 2022 Urban Water Strategy
- Westernport Water – Urban Water Strategy 2022

Water efficiency and integrated water management projects that are already planned and approved by water corporations (estimated at 33 GL savings by 2030 and 41 GL savings by 2040) are already factored into the demand projections shown in **Figure 4**.

Investments to step up water efficiency may include water audits, showerhead replacement, behaviour change programs, digital metering, toilet and washing machine rebates, and working with industries and businesses. Over 100 additional potential opportunities have been identified for reuse of recycled water, stormwater and rainwater on a small scale.

However, water efficiency and integrated water management measures, even above and beyond what is already included in the base case, are not on their own capable of producing the volumes of additional security needed to service the region's growing communities (refer to **Table 3**).

Following feasibility studies and detailed investigations, a future business case will assess and compare additional water efficiency and integrated water management opportunities against increased use of desalination, and options that source drinking water from purified recycled water and stormwater to recommend an optimised investment portfolio.

Table 3. Potential contributions of integrated water management, water efficiency and drinking water sourced from purified recycled water and stormwater towards projected shortfalls, which are over and above the estimated water savings (33 GL by 2030 and 41 GL by 2040) already assumed within the supply and demand modelling base case.

Timeframe	2030 potential contribution	2040 potential contribution
Integrated water management beyond current base case	5 – 11 GL	7 – 22 GL
Water efficiency beyond current base case	7 – 14 GL	10 – 18 GL
Drinking water sourced from purified recycled water	0 GL	0 – 110 GL
Drinking water sourced from purified stormwater	0 GL	0 – 22 GL
Total potential contribution to addressing projected shortfall	12 – 25 GL	17 – 172GL

Network transfer investments

Much of Melbourne's water supply is sourced from the east, including from dams in the Yarra and Thomson River basins, and the existing desalination plant in the Wonthaggi region. Planning and investment to improve water security needs to consider the infrastructure required to move water from where it is sourced, to where it is needed.

This means, in addition to considering new supplies, we also need to consider additional transfer infrastructure within the South-Central Water Grid such as additional or larger pipelines to connect those new or larger supplies to where the demands are. Given much of the urban growth is occurring to the west and north of Melbourne and in Geelong, network transfer investments will be required to meet future needs.

Two transfer network initiatives are currently underway to ensure water can be moved where it is most needed via the South-Central Water Grid. The most urgent is the Melbourne-Geelong pipeline upgrade identified through the CGRSWS to secure urban supplies for Geelong. This project is also being designed to enable the return of some water to Traditional Owners and the environment in the Moorabool River. The second is to start early transfer planning for additional desalination capacity or increased purified recycled water and stormwater volumes, to connect future supplies of drinking water from the east or the west, to where it is needed across the South-Central region.

Preferred pathway for additional water security by 2040

An integrated mix of solutions is required to meet the 220 GL of additional water security by 2040 for the South-Central region under the 'high-demand high-climate scenario' baseline scenario for future planning. The Victorian Government is working with communities to find genuine opportunities to use water more efficiently, expand integrated water management programs , investigate options that source drinking water from purified recycled water and stormwater, and plan for new drinking water sources that don't rely on rainfall – like seawater desalination. For more information on preferred options and projects see **Table 4**. A future business case will assess all potential options for our future water security and select the optimised portfolio for implementation.

Table 4. Preferred options for meeting future water demand

Preferred water security options	Description
Water efficiency	Toilet rebates, washing machine rebates, water audits, showerhead replacement, behaviour change programs, digital metering, and working with industries and businesses – with detailed investigations identifying opportunities to go beyond what is already planned, approved and assumed in supply and demand modelling.
Integrated water management	Stormwater, rainwater and recycled water for non-drinking purposes – with detailed investigations assessing opportunities to go beyond what is already planned, approved and assumed in supply and demand modelling.
Purified recycled water into rivers, groundwater or reservoirs	Advanced treatment of recycled water to drinking water standards and then transferring it to an existing dam or other water storage – with feasibility studies and detailed investigations needed to understand how this could work in the South-Central region.
Purified stormwater into rivers, groundwater or reservoirs	Collection of stormwater from urban areas/road network, followed by appropriate treatment, and then transfer into the drinking water network – with feasibility studies and detailed investigations needed to understand how this could work in the South-Central region.
Seawater desalination (powered by renewable energy)	Potential for a 50GL expansion of the Victorian Desalination Project and options for a new desalination plant.
Transfer network upgrades	Melbourne-Geelong Pipeline upgrade, and investigations into East-West transfer network.

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5. Readiness and triggers

Now that options for additional water security have been shortlisted for feasibility studies and detailed investigations (water efficiency, integrated water management, purified recycled water and stormwater to supplement rivers and reservoirs, and desalination) and expected future volumes of required water are understood (95 GL per year by 2030 and 220 GL by 2040), the timing of investments must now be addressed.

This section outlines the Victorian Government's plan for the timing of investment in regionally significant additional water security. Major water infrastructure options require significant project investments and multiple decision points before a final decision is made.

Smaller scale, local projects will be progressed and implemented by water corporations directly (i.e. are not subject to the below Decision Points framework).

Long-lead times and staged decision-making

Regionally significant water security options, such as desalination and purified recycled water, have a long-lead time, estimated at ~10–15 years in total from concept to operation. The CGRSWS shared a framework for progressing these major augmentations through three decision points (refer **Figure 8**). These decision points can be used to assess option progress against supply and demand data to determine whether options should be progressed, delayed or fast-tracked.

The water planning framework has four key stages for regionally significant initiatives:

1. **Adaptive planning** – identification of conceptual options for water supplies
2. **Readiness** – development of pre-feasibility studies of all potentially viable options for additional water supplies
3. **Detailed investigations** – development of functional or detailed designs, and associated costs and benefits, for all preferred options, including assessing sites
4. **Implementation** – business case, procurement, construction and operation of new water supply infrastructure

Planning for uncertainty and plausible future water scenarios is vital to ensure the timely investment in readiness activities, such as feasibility studies and detailed investigations, for any largescale infrastructure projects the region requires in the next decade.

Benefits of a readiness approach

Readiness means completing option development and analysis in advance, rather than waiting for a crisis, such as a drought or emergency, to start planning. This approach reduces the lead-time on the next major augmentation allowing quicker construction after a decision to build. It also reduces the risk of severe and chronic water restrictions that can have significant and lasting impacts on the economy, environment and liveability of cities and towns. Starting planning early, rather than waiting for a crisis, can save money and lead to better whole of community outcomes because:

- Severe water restrictions will be less likely (and all the benefits this provides, including maintaining economy and supporting parks and gardens)
- the best options can be progressed at the most efficient cost to the community[18]
- no-regrets investments avoid decisions being taken in a crisis which often incur higher costs from fast-tracking tenders and construction[19]
- avoids sudden increases in household water bills[20]
- allows time for the community to participate in decisions about future water supplies[21]
- enables opportunities to return water to the environment and Traditional Owners

Investment options will be informed by evidence-based Decision Points for the different stages of planning and implementation. An annual assessment of the water resource position against the Decision Points reduces the risk of investing too early (earlier increase to bills) or too late (risk of water shortage and associated severe negative consequences). All major investment decisions will be made by the Victorian Government under advice from water corporations and based on the latest data and Decision Points.

18 In contrast if no readiness was undertaken until after a water supply crisis begins, then government could be forced to implement the fastest.

19 No-regrets investments include cost-effective early engineering, planning and environmental studies. These are considered no-regrets investment, because the projects in question will eventually be built, it is only the timing of final construction that is uncertain. Therefore, no investment will be wasted.

20 When large projects are undertaken that are not in accordance with long-term planning, there is a risk of a sudden 'price shock' being felt by water customers

21 Proactive readiness allows time for community members to be consulted on which water security options are pursued and how.

Figure 8. Readiness framework articulated in the Central and Gippsland Region Sustainable Water Strategy

Water security investment governance

Future water security augmentations will be planned and tracked through the Water Security Plan. Options will be progressed according to clearly defined Decision Points for the different stages of planning and implementation. All major investment decisions will be made by the Victorian Government under advice from water corporations based on data and Decision Points (refer to **Figure 9**).

To support collaboration between government and the water industry, an Executive Advisory Committee (EAC), consisting of senior representatives from Department of Energy, Environment and Climate Action and Managing Directors from urban water corporations has been established as per the CGRSWS. The EAC, will make recommendations to government on:

- the regionally significant water supply options included in the Water Security Plan
- Decision Point assessments;
- allocating an appropriate delivery lead for each potential supply option in the Water Security Plan portfolio; and
- when to progress options to the next stage of development.

Environment and Traditional Owner working groups will be established to provide iterative and ongoing advice to support decisions around projects that have the potential to return water to the environment and/or Traditional Owners, or where there is expected to be an impact on the environment or Traditional Owners.

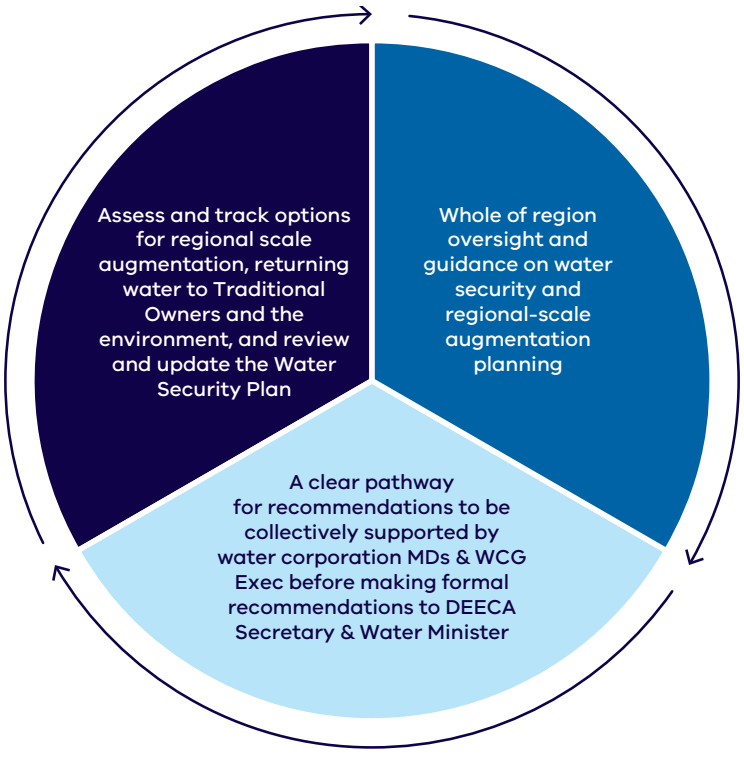

Figure 9. Purpose of the Executive Advisory Committee

Decision Points to balance timing

Three Decision Points have been designed to indicate when a decision may need to be made to progress a water supply option(s) (see **Figure 10**). Decision Point #1 indicates that a decision should be made to move into readiness planning. Decision Point #2 indicates an option(s) should be considered to move into the detailed investigation phase. And finally, after the completion of detailed investigations, and Decision Point #2 is still met, consideration should be given to move the option(s) into selection and implementation.

As work on supply options progresses and water corporations undertake engagement with their customers through their next round of Urban Water Strategies we will continue to review and update the Decision Points to reflect the community's expectations and risk tolerance for water restrictions. Any updates to the Decision Points will be included in the next Water Security Plan.

Indication to proceed with '**readiness**':

- **Decision Point #1:** This applies when future water demand is anticipated to exceed forecast available supplies, at the point in time when new water supplies could be delivered (based on current levels of readiness).

Indication to proceed with '**detailed investigations**':

- **Decision Point #2:** This applies when a 'projected level of service failure' is expected, equivalent to a greater than 1% chance of severe restrictions each year, at the point in time when new water supplies could be delivered (based on current levels of readiness)

  and

- when the time needed for new water supply infrastructure to come online (based on current levels of readiness) is greater than the time it would take for water storages to deplete to critical levels under a repeat of Millennium Drought climate conditions.

Indication to proceed with '**implementation**':

- **Decision Point #3:** After the completion of detailed investigations, a business case would be required to (a) test if Decision Point #1 and #2 are all still active and conduct an analysis to determine whether the cost of inaction is greater than the cost of action, and (b) select the preferred mix of actions.

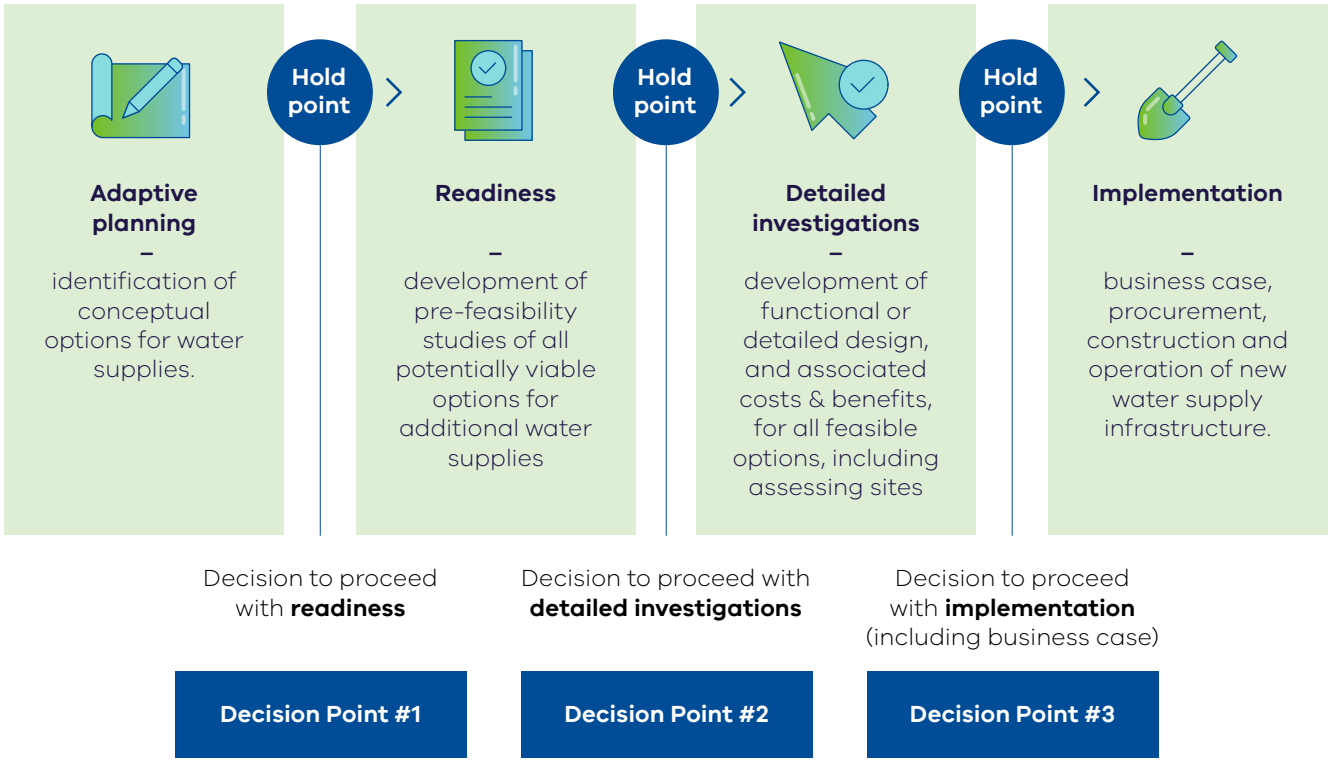

Figure 10. New Decision Point framework for regionally significant water security investment in the connected South-Central region

Current assessment against new Decision Points

The 2025 assessment against Decision Points has revealed the near-term augmentation options require further preparation to reduce their implementation lead- time (~10 years).

Based on the current level of readiness, it is possible under some climate and demand scenarios that a supply shortfall (where annual demand exceeds average annual supply) could emerge before a supply augmentation could be completed (Decision Point #1, see **Figure 4**). This doesn't mean we run out of water as we will have a 'buffer' from water already in dams at that time, however it does mean that if a severe drought were to occur then we would be more reliant on water restrictions to ensure water supplies are conserved until additional supply comes online. The chance of severe restrictions is projected to increase to 27%annually (31% cumulative) if no augmentation is completed within the next 10 years (Decision Point #2, see **Figure 11**).

We also know a repeat of the most severe sequence from the Millennium Drought, under a high climate change and high demand scenario, would deplete storage levels faster than a new augmentation could come online (Decision Point #2, see **Figure 5**) and if that occurred within this timeframe we would need to rely on severe water restrictions for an extended period.

Given the 2025 assessment against the Decision Points, the Victorian Government will progress adaptive planning and readiness activities of potential supply options into detailed investigations, in order to reduce lead-times, and ensure our water supplies can be increased when the time is right. No-regrets investments in feasibility studies and detailed design will avoid decisions being taken in a crisis, which often results in higher costs from fast-tracking projects, and limited ability for community to have a say.

This short-term action will not lock the Victorian Government into any specific future investment, but it will provide more information on preferred options, including all costs and benefits to enable well informed future decisions.

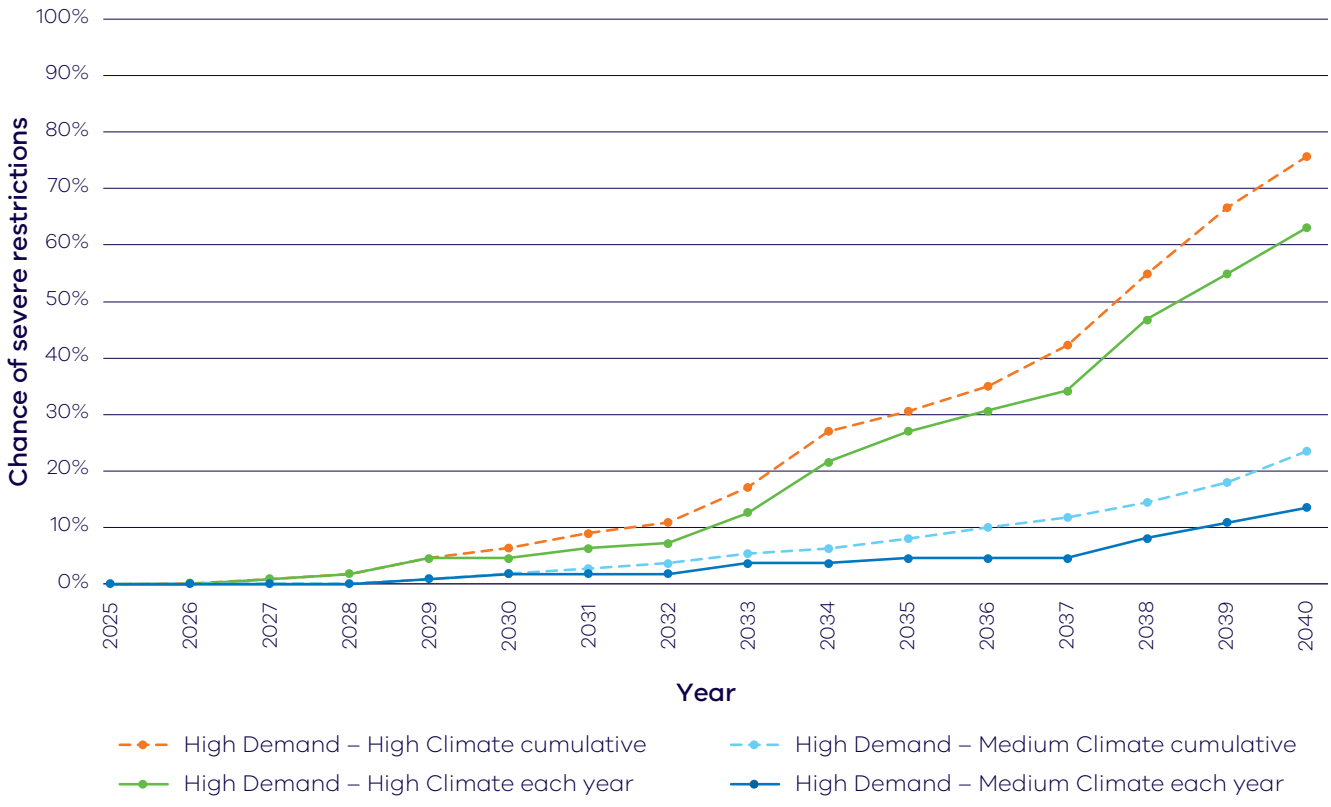

Figure 11. Probability of storages reaching Critical Water Only Zone (where severe restrictions begin), according to the high climate, medium climate, and high demand scenarios. Each year refers to the chance of severe restrictions occurring in that particular year. Cumulative chance of restrictions refers to the chance that severe restrictions will have occurred at least once between the present and the year in question.

Decision Points framework to progress planning on options

A step sits between each planning stage to allow the Victorian Government to proceed based on a status assessment against the Decision Points framework. **Figure 12** shows the progress of regionally significant options against the Decision Points framework, and where the project must continue to meet Levels of Service.

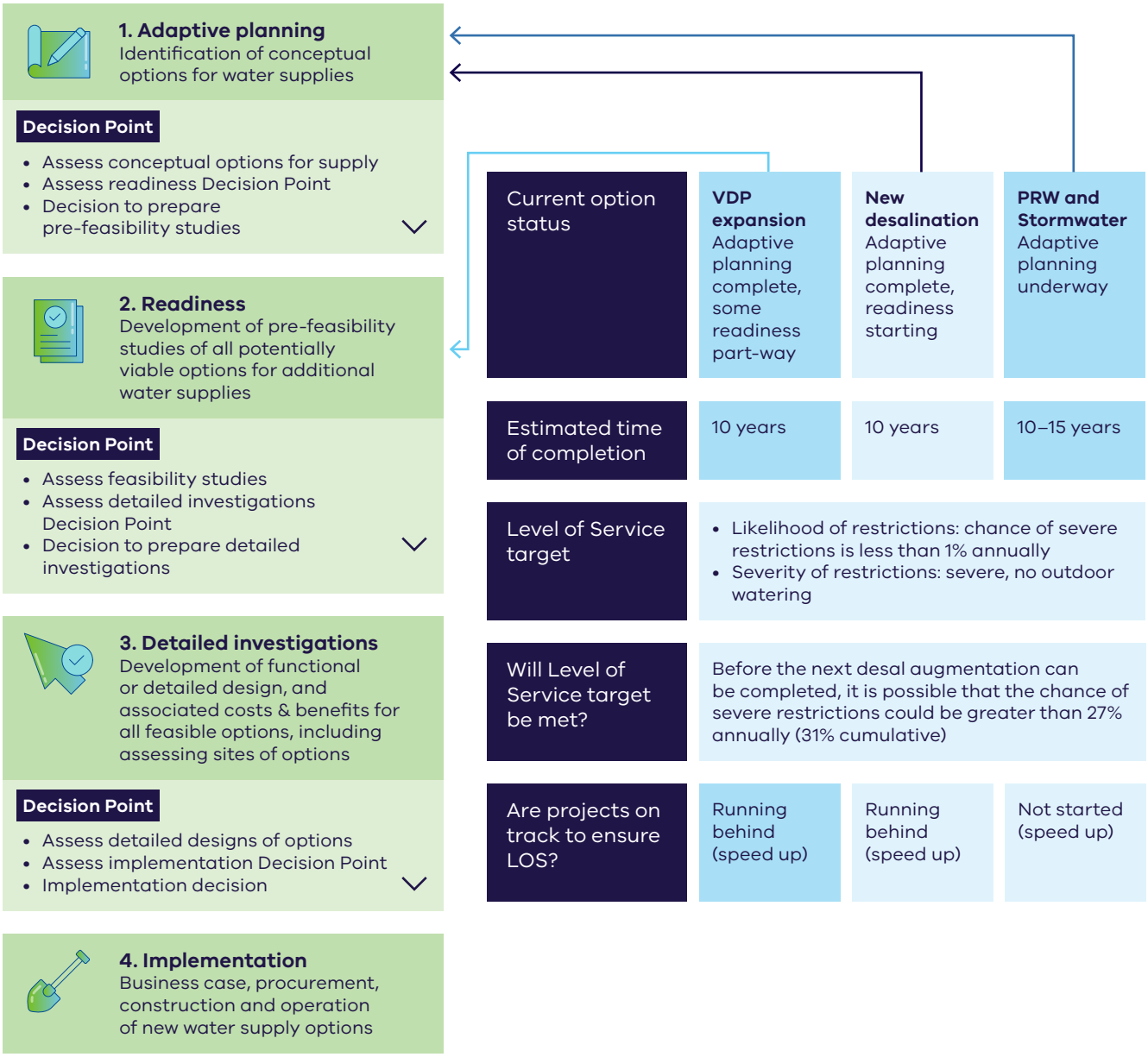

Figure 12. Decision Points framework for progressing options through planning

6. Next steps

Where to now?

DEECA's 2025 assessment has revealed that the Decision Points for both readiness and detailed investigations have been met and therefore that the near-term augmentation options require further preparation to reduce their implementation lead-time (currently up to 10-15 years).

We are now exploring the optimised combination of near-term water supply options and are progressing towards the detailed investigation phase of the framework (see Figure 3).

Detailed investigations will develop the best mix of options including water efficiency initiatives, integrated water management, replenishing water sources with purified recycled water and stormwater; and expanding desalination water capacity, to meet the forecast gap between supply and demand. There is no commitment to a particular outcome or mix of options at this stage.

The Minister for Water will establish a Water Security Taskforce to consider the findings of the detailed investigation and report to the Minister for Water before March 2027. The Terms of Reference for this work will progress the investigation of all water security options (including Purified Recycled Water, desalination, integrated water management and water efficiency) that could viably address Greater Melbourne and Geelong's water security.

To complement water supply option development, work will be done to understand if changes to the water supply network (how water moves around) are needed so that water can be delivered efficiently and meet demand where it is needed now and into the future.

This work will include options around mix and sequencing implementation, site investigations, initial environmental surveys and design development. This will reduce the lead times for bringing on new supplies, enabling a business case to be deferred to the implementation phase of the framework and closer to when water will be needed.

The Water Security Plan will be updated annually and published alongside the Annual Water Outlook each December. A summary on progress of detailed investigations will be reported in these updates.

Complementary Actions

Ongoing focus on maximising the use of existing sources and reducing demands, including:

- Public awareness campaigns on using water wisely (voluntary changes in community behaviour).
- Continuing water efficiency and conservation initiatives (such as audits and rebates).
- Continuing integrated water management projects (including where existing drinking water use can be substituted with other sources), including stormwater and recycled water.
- Continued use of the Victorian Desalination Plant to keep our storages at a healthy level.
- Water Security Taskforce to consider detailed investigations work and provide advice to the Minister for Water.

7. Glossary

Word or phrase	Meaning
Baseline	Conditions regarded as a reference point for the purpose of comparison.
Critical water use only zone	The zone between 45% and 25% Total System Storage.
Environmental entitlement	A continuing legal right to take and use water allocated under Part 4, Division 1A of the Water Act to maintain the Environmental Water Reserve and to preserve or improve the **environmental values** and health of water **ecosystems**.
Environmental outcomes	Changes to the riverine, wetland or floodplain environment that occur as a result of waterway management practices, including the management of water for the environment. Beneficial environmental outcomes match the ecological objectives stated in FLOWS studies, environmental water management plans and seasonal watering plans. Examples include (i) improved water quality from flows that flush refuge pools and (ii) improvements to the structure of native fish populations due to environmental flows that benefit native fish breeding and migration.
Environmental water deficit (shortfall)	The shortfall between the volume of water required to sustain a **waterway's** ecological values under current and/or future climate scenarios, and the volume of water that is actually supplied to the waterway.
Environmental Water Reserve	Water set aside for the environment under Part 4A of the Water Act as an **environmental entitlement**, and through the operating conditions on any **bulk entitlement**, licence, permit, authority or management plan or via other provisions in the Water Act. The Environmental Water Reserve helps to preserve the **environmental values** and health of water **ecosystems**, including their biodiversity, ecological function and **water quality**, and other uses that depend on environmental conditions.
Fit-for-purpose water	Water of a quality that is appropriate for its intended use.
Gigalitre (GL)	One billion (1,000,000,000) litres.
Groundwater	Water stored in an **aquifer**.
Inflow	Water flowing into a storage or **waterway**.
Integrated water management (IWM)	Water management that considers the urban water cycle as a single integrated system, in which all urban water flows are recognised as potential resources. IWM is practised through a collaborative and jointly planned management of all water systems – where all waters are resources and are valued and put to use.
Level of Service (for Melbourne supply system)	The water security standard that the Melbourne supply system is designed to achieve, less than 1% chance of severe restrictions each year.
Manufactured water	Manufactured water sources include desalinated water, recycled water and treated stormwater.
Megalitre (ML)	One million (1,000,000) litres.
Millennium Drought	The drought in Victoria that began with low rainfalls in late 1996 and ended in 2010, resulting in the lowest **inflows** on record into many of Victoria's **catchments**.
Minimum operating level	The zone below 25% Total System Storage, under which access to this water is limited due to infrastructure constraints and there is an elevated risk to water quality or maintaining water transfers.

Word or phrase	Meaning
Minister	The Minister for Water in Victoria, who administers the Water Act.
Potable water	Water intended primarily for human consumption or for purposes connected with human consumption; has the same meaning as drinking water as defined under the Safe Drinking Water Act.
Non-potable water	Water that is not suitable for human consumption or for purposes connected with human consumption but that may be suitable for other uses, depending on its water quality.
Quadruple-bottom-line assessment	A method of evaluating performance against four criteria: cultural, economic, environmental and social. It is an extension of triple-bottom-line accounting (people, planet and profit) to include cultural needs.
Recycled water	Water that has been derived from sewerage systems or industry processes and treated to a standard that is appropriate for its intended use.
Reservoir	A natural or artificial dam or lake used to store and regulate water.
Restorative justice approach to water	A return of rights that were never ceded, but were enjoyed by Settler communities and then enshrined in Western systems of law. It recognises that past practices have caused historical and continuing harm and inequities.
Self-determination	The United Nations Declaration on the Rights of Indigenous Peoples describes self-determination as the ability for Indigenous people to freely determine their political status and pursue their economic, social and cultural equity, based on their own values and way of life. This means that **Traditional Owners** have the right to make choices that best reflect them on their journey to self-determination and self-governance.
Shared benefits	Benefits achieved when water is managed primarily to meet the needs of the entitlement holder, but also provides secondary environmental, **Traditional Owner** or social benefits through decision-making, without requiring additional water.
Stormwater	Water runoff from urban areas. Urban development increases runoff because development increases surface areas that are impervious to water, such as roofs and roads.
Surface water	Water found on the surface of the land, in **waterways** (such as rivers, **wetlands** and estuaries) and in bodies of water (such as lakes, dams and **reservoirs**).
Surface water availability	Water in **waterways** or bodies of water that can be allocated under Victoria's **water entitlement framework** for **consumptive uses** or to the environment.
Sustainable Water Strategy (SWS)	A long-term plan to secure the water future of Victoria's regions. The Strategy identifies and manages threats to the supply and quality of a region's water resources and identifies ways to improve **waterway** health. A sustainable water strategy must also recognise Aboriginal cultural values and knowledge in water planning and management and include **Traditional Owners** in its processes, and also consider opportunities to provide water for economic, social and **recreational values**.
Total System Storage (for Melbourne Supply System)	The maximum amount of water that the supply system can hold, noting that not all of this water can be used for urban purposes, and that water cannot be accessed under 25% using existing pump and pipe infrastructure.
Traditional Owners	People who, through membership of a descent group or clan, are responsible for caring for particular **Country**. A Traditional Owner is authorised to speak for Country and its heritage.

Word or phrase	Meaning
Urban Water Strategy	All urban **water corporations** in Victoria are required to develop an Urban Water Strategy, stating how water supplies and water demands will be balanced over the long term. These strategies are the next iteration of Water Supply Demand Strategies first prepared in 2007.
Victorian Environmental Water Holder (VEWH)	An independent statutory body responsible for holding and managing Victoria's environmental **water entitlements**.
Water Act	*Water Act 1989* (Vic).
Water corporation	A government-owned organisation that provides a range of water services to customers in its service area, including water supply; sewage and trade waste disposal and treatment; water delivery for irrigation, domestic and stock purposes; drainage; and **salinity** mitigation. Some **water corporations** have regulatory functions for diverting water from **waterways** and extracting **groundwater**.
Water entitlement	An authorisation to take and use water depending on resource **availability** – it could be a **water share, take-and-use licence**, water allowance or **supply by agreement**.
Water grid	Victoria's water grid connects sources of water through a network of natural and built infrastructure to meet demand for water by people, industries and the environment. It also incorporates arrangements by which water can be purchased and sold through **water markets** and allocated through the **water entitlement framework**.
Water recovery target	The volume of water to be recovered in a given flow-stressed system to maintain or improve specific **environmental values**.
Water sector	The broad range of entities with a stake or role in water management, for example **water corporations, catchment management authorities**, local government and the **Victorian Environmental Water Holder.**
Water security	The capacity of a population to access adequate quantities of acceptable-quality water to sustain life, socio-economic development and human wellbeing.
Water storage	A hydrological feature that stores water. **Surface water** storages include natural and artificial ponds, lakes, reservoirs and lagoons, as well as **weirs** and dams.
Waterway	A river, its associated estuaries and **floodplains** (including floodplain **wetlands**) and non-riverine wetlands.
Waterway health	The overall state of the main features and processes underpinning a functioning waterway **ecosystem** (such as species and communities, habitat, connectivity, **water quality, riparian** vegetation, physical form, and ecosystem processes such as nutrient cycling and carbon storage).
Yield	The quantity of water produced by a storage or **aquifer**.

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