

# Guidelines for the development of urban water strategies

Final

March 2021

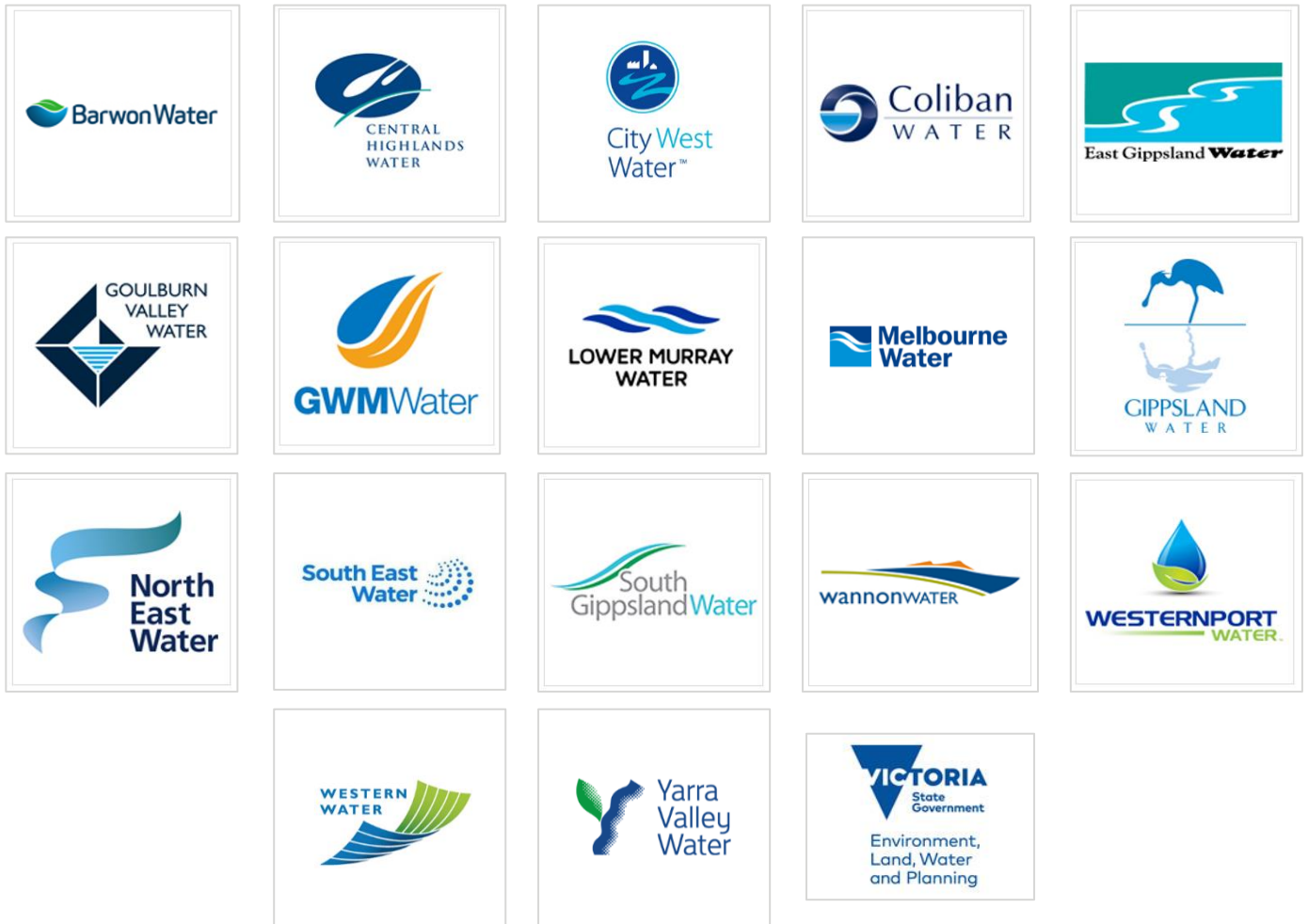


To meet the requirements of the Statement of Obligations (General)



Environment,  
Land, Water  
and Planning

OFFICIAL



## Acknowledgment

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.



© The State of Victoria Department of Environment, Land, Water and Planning 2021



This work is licensed under a Creative Commons Attribution 4.0 International licence.  
To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>.

# **Guidelines for the development of urban water strategies**

Final

March 2021

**Citation**

DELWP 2021 Guidelines for the development of urban water strategies, Department of Environment, Land, Water and Planning, East Melbourne, Victoria

# Contents

Abbreviations.....	8
Glossary .....	9
Context for Urban Water Strategy development	16
<b>1. Purpose .....</b>	<b>17</b>
<b>1.1 UWS development.....</b>	<b>18</b>
<b>1.2 Guideline development.....</b>	<b>20</b>
1.2.1 Principles .....	20
1.2.2 Review .....	20
1.2.3 Structure.....	21
<b>1.3 DELWP support and community of practice.....</b>	<b>22</b>
<b>1.4 Core requirements .....</b>	<b>22</b>
<b>2. Urban water planning .....</b>	<b>24</b>
<b>2.1 Roles and responsibilities.....</b>	<b>25</b>
<b>2.2 Water corporation obligations .....</b>	<b>26</b>
2.2.1 <i>Water Act 1989</i> .....	26
Functions.....	26
Sewerage .....	27
2.2.2 <i>Water for Victoria</i> .....	27
Integrated water management planning .....	28
<b>2.3 Urban water corporation functions.....</b>	<b>29</b>
<b>2.4 UWS strategic fit .....</b>	<b>32</b>
<b>3. Objectives and principles .....</b>	<b>34</b>
<b>3.1 Objectives.....</b>	<b>34</b>
3.1.1 Adaptive management.....	35
3.1.2 Consider all aspects of the urban water cycle.....	36
<b>3.2 Principles.....</b>	<b>36</b>
<b>Undertaking the Urban Water Strategy</b>	<b>38</b>
<b>4. Stakeholder engagement .....</b>	<b>39</b>
<b>4.1 Engagement approach: community at the centre.....</b>	<b>39</b>
4.1.1 A tailored approach for local communities.....	39
4.1.2 Use of existing engagement forums.....	40

4.1.3 Drawing on recent engagement processes .....	40
4.1.4 Key definitions .....	41
4.2 Engaging with key stakeholders .....	42
4.2.1 Key issues requiring stakeholder feedback.....	43
4.3 Monitoring and evaluating engagement efforts .....	44
<b>5. Managing risk and uncertainty .....</b>	<b>46</b>
5.1 Adaptive decision-making framework .....	46
5.2 Scenario planning .....	47
5.3 Uncertainty considerations .....	48
5.3.1 Water supply uncertainty .....	49
5.3.2 Demand uncertainty .....	51
5.3.3 Environmental water requirements .....	52
5.3.4 Interdependency risks .....	52
5.3.5 Low carbon economy transition risks.....	53
<b>6. Incorporate recent experience.....</b>	<b>55</b>
<b>7. Understanding current water system/s.....</b>	<b>59</b>
7.1 Regional and geographic context.....	59
7.2 Water access and delivery arrangements .....	60
7.2.1 Entitlements to water and trade.....	60
7.2.2 Water supply systems .....	61
7.2.3 Sewerage system (major components).....	64
7.3 Current water demands .....	65
7.4 Assessment of existing system resilience.....	65
<b>8. Defining levels of service.....</b>	<b>68</b>
8.1 Background.....	69
8.2 Determining ‘levels of service’ .....	69
8.2.1 Describing ‘Levels of Service’ .....	69
8.2.2 Agreed ‘Level of Service’ .....	70
8.2.3 Minimum ‘Levels of Service’ .....	71
Meeting minimum levels of service .....	72
<b>Assessing system performance .....</b>	<b>74</b>
<b>9. Water supply projections (climate dependent) .....</b>	<b>75</b>
9.1 Climate change versus climate variability .....	75
9.2 Guidelines for Assessing the Impact of Climate Change on Water Availability in Victoria .....	75
<b>10. Water demand projections.....</b>	<b>77</b>
10.1 Factors influencing demand.....	77

<b>10.2 Approaches to projecting water demands .....</b>	<b>78</b>
<b>10.3 Projecting water demands.....</b>	<b>79</b>
10.3.1 Understanding demand drivers .....	79
10.3.2 Rigour and complexity .....	79
10.3.3 Projecting sewage volumes and flows.....	81
10.3.4 Alternative water supplies.....	82
10.3.5 Consistency with other projections.....	82
<b>10.4 Establishing and applying demand scenarios .....</b>	<b>83</b>
10.4.1 Sensitivity analysis.....	84
10.4.2 Accounting for water restrictions in demand scenarios.....	85
<b>11. System performance assessment .....</b>	<b>86</b>
<b>11.1 Water supply system performance – scenario assessment .....</b>	<b>86</b>
11.1.1 Uniform system stress test .....	88
Scenarios to explore vulnerability .....	88
Modelling assumptions and inputs.....	89
<b>11.2 Sewerage system performance – scenario assessment .....</b>	<b>90</b>
Determining sewerage system capacity.....	90
<b>11.3 Form a view on the need for action .....</b>	<b>92</b>
<b>Actions to ensure the balance of supply and demand .....</b>	<b>93</b>
<b>12. Identifying and evaluating options.....</b>	<b>94</b>
<b>12.1 Identifying a long list of options .....</b>	<b>95</b>
12.1.1 Existing options from other strategies, resilience initiatives and the community .....	96
12.1.2 Demand management options .....	96
12.1.3 Supply options.....	99
Additional considerations – grid and markets .....	99
12.1.4 Sewerage/recycled water initiatives .....	102
<b>12.2 Long list to short list.....</b>	<b>104</b>
<b>12.3 Detailed options evaluation.....</b>	<b>106</b>
12.3.1 Approach and extent of detailed options evaluation.....	106
12.3.2 Considerations for options evaluation.....	108
Financial analysis .....	108
Environmental costs and benefits.....	109
Socio-economic costs and benefits .....	110
Accounting for uncertainty .....	110
<b>Implementation, monitoring and evaluation .....</b>	<b>112</b>

<b>13. Implementation of priority actions .....</b>	<b>113</b>
<b>13.1 Action Plan - identifying priority actions.....</b>	<b>113</b>
13.1.1 Visual representation .....	114
<b>13.2 Actions in the immediate to short term (0-5 years) .....</b>	<b>114</b>
13.2.1 Implementing the priority actions.....	114
<b>13.3 Actions in the longer-term.....</b>	<b>114</b>
13.3.1 Ensuring readiness for action.....	114
<b>14. Monitoring and evaluation .....</b>	<b>116</b>
<b>14.1 Annual review of UWS through the AWO .....</b>	<b>116</b>
<b>14.2 Review by DELWP.....</b>	<b>117</b>
<b>14.3 Five yearly review and update of the strategy .....</b>	<b>117</b>
<b>Drought preparedness plans .....</b>	<b>119</b>
<b>15. Drought preparedness plans .....</b>	<b>120</b>
<b>15.1 Key considerations .....</b>	<b>120</b>
<b>15.2 Component 1: Preparedness.....</b>	<b>121</b>
<b>15.3 Component 2: Response plan.....</b>	<b>122</b>
<b>15.4 Key inclusions - preparedness .....</b>	<b>123</b>
15.4.1 Community engagement .....	123
List of priority community assets.....	123
Exemptions and Water Use Plans for community assets.....	123
Alternative water sources for community assets .....	124
<b>15.5 Key inclusions - Drought Response Plan.....</b>	<b>125</b>
<b>Appendices .....</b>	<b>126</b>
<b>Appendix A Extract from SoO (General).....</b>	<b>127</b>
<b>Appendix B Regional and state-wide processes .....</b>	<b>129</b>
<b>Appendix C SDG6 - Indicators and targets.....</b>	<b>135</b>
<b>Appendix D Partnering with Traditional Owners.....</b>	<b>136</b>
<b>Core requirements - consolidated list .....</b>	<b>142</b>
<b>List of tables</b>	
Table 1: Principles for the development of the UWS Guidelines.....	20
Table 2: Guideline structure .....	21
Table 3: Key roles in managing urban water (in alphabetical order) .....	25
Table 4: Water corporations' responsibilities under the water management framework.....	29
Table 5: Principles for the development of UWSs .....	36
Table 6: Interaction with the public.....	40
Table 7: Key definitions in stakeholder engagement .....	41



Table 8: Key stakeholder groups.....	42
Table 9: Key issues requiring stakeholder input.....	43
Table 10: Scenario characteristics .....	47
Table 11: Sources of water supply uncertainty.....	49
Table 12: Source of water demand uncertainty .....	51
Table 13: Transition risks likely to affect water agencies.....	54
Table 14: Taking stock of existing actions, risks and community views relevant to UWSs.....	56
Table 15: Types of entitlements in regulated and unregulated systems .....	61
Table 16: Existing water supply elements .....	62
Table 17: Existing bulk sewerage system elements .....	64
Table 18: Assessment of system resilience considerations.....	65
Table 19: Common approaches to projecting water demands.....	78
Table 20: Drivers of demand.....	79
Table 21: Issues to be considered in the development of options .....	95
Table 22: Examples of demand reduction .....	97
Table 23: Initiatives that aim to increase the supply or resilience of water services.....	99
Table 24: Additional consideration for grid and market supply options .....	100
Table 25: New supply options hierarchy for shortlisting.....	105
Table 26: Financial analysis considerations .....	108
Table 27: Potential socio-economic cost and benefits.....	110

## List of figures

Figure 1: Victoria’s water corporations’ boundaries.....	18
Figure 2: Grouping of the SDGs most relevant to urban water corporations.....	31
Figure 3: Key planning tools and processes.....	32
Figure 4: Elements of the adaptative management-decision making framework .....	35
Figure 5: Example plots of source water supply .....	63
Figure 6: Trade-off for setting level of service objectives.....	70
Figure 7: Consolidated views from community engagement on the value of water.....	71
Figure 8: Typical factors affecting urban water demands .....	77
Figure 9: Required segmentation of water demands .....	80
Figure 10: Example of supply and demand scenario analysis .....	87
Figure 11: Example of scenario analysis for a sewerage system .....	91
Figure 12: Transitioning from a linear treatment system to a circular economy .....	102

# Abbreviations

---

AAP – a system Adaptation Action Plan, as specified under the Victorian Climate Change Act 2017

---

ARR – Australian Rainfall and Runoff: A guide to flood estimation

---

AWA – Australian Water Association

---

AWO – Annual Water Outlook

---

BAU – business as usual

---

BOM – Bureau of Meteorology

---

CMA – Catchment Management Authority

---

CSIRO – Commonwealth Scientific and Industrial Research Organisation

---

DEWLP – Department of Environment, Land, Water and Planning

---

DHHS – Department of Health and Human Services

---

DPC – Department of Premier and Cabinet

---

DPP – Drought Preparedness Plans

---

DTF – Department of Treasury and Finance

---

EMV – Emergency Management Victoria

---

EPA – Environment Protection Authority

---

ESC – Essential Services Commission

---

IPCC – Intergovernmental Panel on Climate Change

---

IWM – Integrated Water Management

---

IWN – Intelligent Water Network

---

LOS – Level of Service

---

LTWRA – Long-Term Water Resource Assessment

---

MDBA – Murray Darlin Basin Authority

---

MLDRIN – Murray Lower Darling River Indigenous Nations

---

NPV – net present value

---

RCS – Regional Catchment Strategies

---

SDGs – Sustainable Development Goals

---

SWS – Sustainable Water Strategy

---

UWS – Urban Water Strategy

---

VDP – Victorian Desalination Plant

---

VEWH – Victorian Environmental Water Holder

---

VFMS – Victorian Floodplain Management Strategy

---

VicCI – Victorian Climate Initiative

---

WMIS – Water Measurement Information System

---

WSAA – Water Services Association of Australia

---

WSAAP – Pilot Water Sector Climate Change Adaptation Action Plan, which is the water cycle system adaptation action plan as specified in the Victorian Climate Change Act 2017

---

# Glossary

---

**Aboriginal Victorians:** an Aboriginal Victorian is a person of Aboriginal descent who identifies as an Aboriginal and is accepted as such by the Victorian Aboriginal community in which he or she lives.

---

**Act:** the *Water Act 1989* (Victoria).

---

**Adaptation:** changes in natural or human systems to prepare for actual or expected changes in the climate in order to minimise harm, act on opportunities or cope with the consequences.

---

**Adaptive management:** Systematic process of continually improving management policies and practices in response to change.

---

**Allocation:** water that is actually available to use or trade in any given year, including new allocations and carryover. The water that is actually in the dam in any given year is allocated against water shares. The seasonal allocation is the percentage of water share volume available under current resource conditions, as determined by the resource manager.

---

**Alternative water:** is water not supplied from a traditional drinking water catchment and includes sources such as rainwater, stormwater or recycled water.

---

**Assets:** assets are resources that provide benefit. This includes, for example, infrastructure such as treatment plants, pipes and pumps, water assets such as dams, bores and wetlands, and community assets such as sporting facilities, public gardens and street trees. Natural assets are assets of the natural environment, for example waterways and vegetation, also known as natural capital.

---

**Aquifer:** a layer of underground sediments which holds groundwater or allows water to flow through it.

---

**Augmentation:** increase in size and/or number, for example of assets in a water supply system.

---

**Basin (river basin):** the area of land which a river and its tributaries drain. In the Victorian Water Accounts, river basins are consistent with those defined by the Australian Water Resource Council (AWRC). The exception is the Murray basin which, for the purposes of this report, includes the Upper Murray basin as defined by AWRC and areas in Victoria supplied from the River Murray downstream of Lake Hume.

---

**Biodiversity:** the numbers and variety of plants, animals and other living beings, including micro-organisms, across our land, rivers and oceans. It includes the diversity of their genetic information, the habitats and ecosystems in which they live and their connections with other life forms.

---

**Bulk entitlement:** the right to water held by water corporations and other authorities defined in the *Water Act 1989*. The bulk entitlement defines the amount of water in a river or storage to which an authority is entitled and the conditions under which it may be taken.

---

**Cap:** an upper limit for the diversion of water from a waterway, catchment, basin or aquifer.

---

**Capital works:** construction activities, like building and engineering, that create an asset.

---

**Carryover:** allows entitlement holders to retain ownership of unused water into the following season (according to specified rules).

---

**Catchment management authorities (CMAs):** statutory bodies established under the *Catchment and Land Protection Act 1994*. CMAs have responsibilities under the *Catchment and Land Protection Act 1994* and the *Water Act 1989* which include river health, regional and catchment planning and coordination, and waterway, floodplain, salinity and water quality management.

---

**Catchment:** an area where water falling as rain is collected by the landscape, eventually flowing to a body of water such as a creek, river, dam, lake, ocean, or into a groundwater system.

---

---

**Climate change:** is the change in climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.

---

**Climate:** is the average weather over time which occurs in a given location. Weather is day-to-day individual events which make up climate. These are partially determined by the climatic systems and local conditions. Climate is what you expect; weather is what you get.

---

**Climate variability:** is the mean state and other statistics (such as standard deviations, the occurrence of extremes, etc.) of the climate on all spatial and temporal scales beyond that of individual weather events. Variability may be due to natural internal processes within the climate system (internal variability), or to variations in natural or anthropogenic external forcing (external variability).

---

**Consequence:** the impact arising from a climate change incident, e.g. water operators become severely dehydrated in a heatwave.

---

**Consumptive entitlement:** a water entitlement that permits the holder to use the water taken under the entitlement for the purposes of consumption.

---

**Consumptive use:** water that is provided for all human uses (i.e. non-environmental uses).

---

**Country:** Aboriginal culture revolves around relationships to the land and water. For Traditional Owners, Country is a part of who they are, just as they are a part of it.

---

**Country Plans:** Country Plans are one way for Traditional Owners to articulate their priorities and aspirations for looking after Country. They can be strategic plans that encompass physical and spiritual concepts of Country, provide a strategic basis for partnerships, and identify management actions and economic opportunities.

---

**Critical human needs:** the amount of water required to supply Stage 4 restricted demand in urban areas, supply domestic and stock needs and operate the distribution system to deliver that water.

---

**Community:** includes individuals, public and private landholders, community groups and business owners.

---

**Dead storage:** water in a storage that is below the lowest constructed outlet.

---

**Delivery bulk entitlement:** provides a set volume of water each year to the entitlement holder, subject to defined rules for restricting supply during periods of water shortages.

---

**Delivery share:** an entitlement to have water delivered to land in an irrigation district and a share of the available channel capacity in a delivery system. It is linked to land and stays with the property if the water share is traded away.

---

**Desalination:** removing salt from water sources, normally for drinking purposes.

---

**Distribution system operating water:** water used to operate the irrigation distribution system from river off-take to the farm gate, including evaporation, seepage, leakage, outfalls and meter error (see also System operating water).

---

**Diversions:** the removal of water from a waterway.

---

**Drainage:** the works and functions related to the collection and removal of local rainfall runoff from land prone to natural water-logging.

---

**Drinking (potable) water:** drinking water is water that is intended for human consumption or for purposes connected with human consumption, such as the preparation of food or the making of ice for consumption or for the preservation of unpackaged food, whether or not the water is used for other purposes.

---

**Drought response plans (DRPs):** used by urban water corporations to manage water shortages, including implementation of water restrictions.

---

**Ecosystem:** a dynamic complex of plant, animal, fungal and microorganism communities and the associated non-living environment interacting as an ecological unit.

---

**Emission reduction:** actions taken to reduce greenhouse gas emissions, leading to a reduction in climate change related events. Some climate change specialists refer to these actions as climate change mitigation.

---

**Environmental (bulk) entitlement:** a water entitlement that permits the use of water in a river or storage for a purpose that benefits the environment.

---

**Environmental flow regime:** the timing, frequency, duration and magnitude of flows for the environment.

---

---

Environmental flow: the streamflow required to maintain appropriate environmental conditions in a waterway.

---

Environmental manager: the government agency such as the Department of Environment, Land, Water and Planning or a catchment management authority responsible for environmental outcomes for a relevant waterway.

---

Environmental water: water to support environmental values and ecological processes.

---

Environmental water reserve (EWR): the share of water resources set aside to maintain the environmental values of a water system and other water services that are dependent on the environmental condition of the system.

---

Events: the intrinsic source of a climate change related risk that may result in an undesirable outcome. Events include, for example, drought, storms and sea level rise.

---

Fit-for-purpose: a description of water requiring no further treatment for its intended use.

---

Floodplain: low-lying land adjacent to a river or stream with unique ecosystems dependent on inundation from flood events.

---

Fresh: a small and short peak in flow in a waterway; a 'flush' of water through a waterway.

---

Gigalitre (GL): one thousand megalitres / one billion (1,000,000,000) litres.

---

Green and blue infrastructure: green infrastructure refers to key vegetation features such as street trees, parklands, grassed sports fields and vegetated walls. Blue infrastructure refers to key waterways, wetlands, recreational lakes, stormwater retarding basins, or other water body features. Green-blue infrastructure brings these assets together through integrated approaches to deliver community benefits.

---

Greywater: household water that has not been contaminated by toilet discharge and can be reused for non-drinking purposes. Typically includes water from bathtubs, dishwashing machines and clothes washing machines.

---

Groundwater management area (GMA): a GMU where groundwater resources of a suitable quality for irrigation, commercial or domestic and stock use have been developed (or have the potential to be developed) and warrant careful management.

---

Groundwater management plan: a management plan prepared for a water supply protection area to manage the groundwater resources of the area.

---

Groundwater management unit (GMU): a discrete area – such as a groundwater management area (GMA), a water supply protection area (WSPA) or an unincorporated area – identifying an aquifer or group of aquifers.

---

Groundwater: all subsurface water, generally occupying the pores and crevices of rock and soil.

---

Hazard: a potential or contained threat.

---

Headworks: large dams, weirs and associated works used for the harvest and supply of water.

---

High-reliability water share (HRWS): a legally recognised secure entitlement to a defined share of water as governed by the water-sharing rules.

---

Hydrological modelling: simplified, conceptual representations of a part of the hydrologic cycle, used primarily for prediction of water behaviour within catchments and associated water supply systems.

---

Incidents: happen when a desired outcome is not achieved because of climate change. It occurs when an event leads to a consequence, e.g. a flood event becomes an incident when it destroys valuable crops that were ready for harvest.

---

Indirect potable reuse: is the intentional introduction of treated alternative water into an environmental buffer e.g. a storage reservoir, a water feeding into a storage reservoir or a groundwater aquifer.

---

Inflows: water flowing into a storage.

---

Integrated catchment management: the coordinated management of land, water and biodiversity resources based on catchment areas. It incorporates environmental, social, cultural and economic considerations. This approach seeks to ensure the long-term viability of natural resource systems and human needs across current and future generations.

---

---

Integrated water management: a collaborative approach to planning that brings together all elements of the water cycle including sewage management, water supply, stormwater management and water treatment, considering environmental, economic and social benefits.

---

In-stream: the component of a river within the river channel, including pools, riffles, woody debris, the river bank and benches.

---

Irrigation district: an area declared under the *Water Act 1989* supplied with water by channels and pipelines used mainly for irrigation purposes.

---

Licensing authority: administers the diversion of water from unregulated waterways and the extraction of groundwater on behalf of the Minister for Water.

---

Likelihood: is the probability that a climate change-related event or incident might happen, e.g. heatwaves will be more common (likely) because of climate change.

---

Low-reliability water share (LRWS): a water share with a relatively low reliability of supply. In northern Victoria, these shares are allocated from the available water once there is enough water to meet higher-reliability water shares in the current year, and, with minimum inflows, to meet higher reliability water shares in the following year.

---

Megalitre (ML): one million litres.

---

Millennium Drought: the drought period that occurred in Victoria (and other parts of southeastern Australia) from 1997 to 2009.

---

Natural capital: the various resources provided by nature that are essential for human survival and economic activity. Natural capital includes minerals, soil, air, water and all living things from which we derive not only material or financial value, but also ecosystem services.

---

Non-residential water use: water used in industry, commercial/institutional buildings, open spaces, such as parks and gardens, and the water distribution system.

---

Offset measure: a measure taken by the occupier of a premises to reduce the impact of a wastewater discharge by undertaking works to achieve a net environmental benefit, as part of a licence issued by the Authority;

---

Order (ordering of water): the advance notification given to the storage operator by individual entitlement holders to enable the storage operator to regulate water flows so that all entitlement holders' water needs can be delivered at the agreed time.

---

Passing flows: flows that must be allowed to pass a dam or weir before water can be harvested for later use.

---

Permanent trade: transfer of ownership of a bulk entitlement, water share or licence.

---

Permissible consumptive volume (PCV): the total amount of water that can be taken in a water management area under a Ministerial declaration. PCVs can apply to surface water, groundwater or both.

---

Potable: water of suitable quality for drinking.

---

Qualification of right (temporary): a temporary water shortage response under section 33AAA of the Act, when the Minister of Water declares a water shortage and qualifies existing water entitlements to reallocate water to priority uses.

---

Recharge (to groundwater): the process where water moves downward from surface water to groundwater due to rainfall infiltration or seepage/ leakage.

---

Recreational benefits or recreational values: the objectives and benefits that recreational users and community members associate with the use of water, reservoirs and waterways for recreational activities. These objectives and benefits include wellbeing and enjoyment, derived from social interaction, physical activity and relaxation associated with activities including sporting events, fishing, water skiing and rowing, camping, walking and gathering with friends and family. It also includes flow-on economic benefits to local communities from visitors to regional areas to make the most of these opportunities.

---

Recreational water: water allocated in a regulated water system for recreational purposes.

---

Recycled water: is water derived from sewerage systems or industry processes that is treated to a standard appropriate for its intended use. Also known as reclaimed water or wastewater reuse.

---

---

Regulated system: systems where the flow of the river is regulated through the operation of large dams or weirs.

---

Reliability of supply: the frequency with which water that has been allocated under a water entitlement is expected to be supplied in full.

---

Reserve rules: rules that govern the balance between water allocated to entitlement holders in a given year and water kept in reserve for the following year.

---

Reservoir: natural or artificial dam or lake used for the storage and regulation of water.

---

Residential use: water use in private housing.

---

Resilience: the capacity of a community, business, or natural environment to prevent, withstand, respond to, and recover from disruption.

---

Reticulation: the network of pipelines or channels used to deliver water to end users.

---

Return flows: the portion of an allocation that the entitlement holder returns to the bulk supply system.

---

Risk: the chance of something happening that will have an impact on an objective, system, sector, asset, activity or community. A risk is often discussed in terms of the event (for example, a weather event or climatic change), the consequence of the event (positive or negative), and the likelihood it will happen. Residual risk is the remaining chance of something happening after action has been taken to reduce the risk.

---

River operating water: water used to operate regulated rivers (in accordance with bulk entitlements) and deliver water to off-take points for distribution systems, including evaporation, seepage and water to provide passing flows for riparian rights and maintain environmental and other assets.

---

River: large stream of water flowing to sea or lake or marsh or another river.

---

Run-off: precipitation or rainfall that flows from a catchment into streams, lakes, rivers or reservoirs.

---

Seasonal allocation: the volume of water available to an entitlement holder for a water year, as determined by the relevant water corporation and often expressed as a percentage of the entitlement volume. Sometimes shortened to 'allocation'.

---

Seasonal determination: the process by which a seasonal allocation is made consistent with requirements of the Act and any rules in the relevant bulk entitlement.

---

Sewage: is wastewater produced from households and industry.

---

Sewerage: the network of pipes, pumps and equipment that transfers all our wastewater from our homes and businesses to a treatment plant.

---

Shared benefits: shared benefits are achieved when water is managed primarily to meet the needs of the entitlement holder, but also provides other types of benefits through decision-making that deliberately targets other outcomes.

---

Small catchment dam: a farm dam that is filled from its own catchment and is not located on a waterway. This includes small catchment dams used for domestic and stock purposes which are not required to be licensed and dams used for commercial and irrigation use, which are now required to be registered (under the *Water Act 1989*).

---

Source bulk entitlement: a type of bulk entitlement held by water corporations to provide a share of inflows, storage capacity (if applicable) and releases.

---

Spillable water account: an accounting method for managing carryover ensuring entitlement holders lose their carryover only when storages spill.

---

Statement of Obligations: Statements made under section 41 of the *Water Industry Act 1994* that specify the obligations of Victoria's water corporations in relation to the performance of their functions and the exercise of their powers.

---

Storage losses: water lost from storages through evaporation, seepage and spills.

---

---

Storage manager: water corporation managing water storages; may be appointed under section 122ZK of the Act where water in the storage is shared between entitlement holders.

---

Stormwater: is water that runs off impervious surfaces like roads and footpaths when it rains, that would have seeped into the ground and been taken up by vegetation before urban development occurred. Unless rainwater is captured, it also contributes to stormwater.

---

Stranded assets: distribution infrastructure left with too few customers to pay for its maintenance when water entitlements delivered by that asset are traded to other systems.

---

Streamflow management plan: a management plan prepared to manage the surface water resources of the area.

---

Surface water: freshwater found above ground in rivers, wetlands and storages.

---

Sustainable diversion limit: the upper limit on winter-fill diversions within an unregulated river sub-catchment, beyond which there is an unacceptable risk to the environment.

---

Sustainable water strategies: regional long-term planning documents legislated under the *Water Act 1989*, to address threats to, and identify opportunities to improve water security and river health outcomes.

---

System operating water: water released out of storages to operate river and distribution systems (to deliver water to end users), provide for riparian rights and maintain environmental values and other community benefits (see also storage losses, distribution system operating water, river operating water).

---

System operator: the water corporation responsible for operating water storages and other infrastructure as specified in the relevant instrument of appointment and bulk entitlement(s) for that water system.

---

Temporary trade: transfer of a seasonal allocation.

---

Threat: a hazard in a state that it is harmful to people, infrastructure or the environment.

---

Traditional ecological knowledge: for thousands of years Aboriginal people survived in the Australian landscape relying on their intricate knowledge of the land and its plants and animals. Aboriginal people have important knowledge of ecological processes and land and water management practices.

---

Traditional Owners: people who, through membership of a descent group or clan, are responsible for caring for Country. Aboriginal people with knowledge about traditions, observances, customs or beliefs associated with a particular area. A Traditional Owner is authorised to speak for Country and its heritage.

---

Unregulated system: a river system that does not contain any dams or major diversion weirs which control the flow of water in the river, and all groundwater sources.

---

Urban Water Strategy: strategies prepared by water corporations with urban supply districts. These strategies consider all aspects of the urban water cycle across a 50-year planning horizon and must be consistent with the guiding principles of the Statement of Obligations and any relevant Sustainable Water Strategy.

---

Vulnerability: the degree to which the water sector is unable to cope with the adverse potential impacts of climate change. Residual vulnerability is the degree to which it is unable to cope after taking into account adaptation actions that are being implemented.

---

Wastewater: water that has had its quality affected by human influence, deriving from industrial, domestic, agricultural or commercial activities.

---

Water corporations: government owned organisations who provide a range of water services to customers within their service areas including water supply, sewage and trade waste disposal and treatment, water delivery for irrigation and domestic and stock purposes, drainage, and salinity mitigation services. Some water corporations have a regulatory function for the diversion of water from waterways and the extraction of groundwater. Formerly known as water authorities.

---

Water cycle system: a term defined in the *Climate Change Act 2017*, which means—

- the collection, storage, treatment, delivery and supply of water, including recycled water; and
  - sewerage services, including the collection, treatment and disposal of wastewater through sewerage systems and wastewater treatment plants; and
  - drainage services, including the operation of drainage systems; and
  - flood management services, including the operation and maintenance of infrastructure to mitigate floods.
-



---

Water cycle: the cycle of processes by which water circulates between the earth's oceans, atmosphere, and land, involving precipitation as rain and snow, drainage in streams and rivers, and return to the atmosphere by evaporation and transpiration.

---

Water entitlement: the volume of water authorised to be taken and used (or stored) by an individual, water corporation or other authority. Water entitlements include bulk entitlements, environmental entitlements, water shares, surface water and groundwater licences.

---

Water infrastructure: facilities, services and installations needed for the functioning of a water system.

---

Water market: market in which the trade of entitlements and allocations is allowed under certain conditions.

---

Water quality: refers to the chemical, physical, biological, and radiological characteristics of water. It is a measure of the condition of water relative to the requirements of one or more biotic species and or to any human need or purpose.

---

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 sector: the broad range of entities with a stake or role in water management. For example, water corporations, catchment management authorities, local government and environmental water holders.

---

Water sensitive city: resilient, liveable, productive and sustainable cities that interact with the urban hydrological cycle to provide water security, healthy watercourses and wetlands, mitigate flood risk, create healthy spaces and contribute to biodiversity, urban heat island reduction and carbon sequestration.

---

Water shares: a legally recognised, secure share of the water available to be taken from a water system that can be traded permanently or leased.

---

Water supply protection area (WSPA): an area declared under the *Water Act 1989* to protect the groundwater and/or surface water resources in the area. Once an area has been declared, a water management plan is prepared.

---

Water systems: all sources of water supply including centralised and decentralised sources and structural or non-structural options, including planning, regulatory or pricing measures.

---

Water-use licence: a licence which authorises use of water on a specific parcel of land (see also winter-fill licence).

---

Waterway: the *Water Act 1989* defines a waterway as a river, creek, stream, watercourse and a natural channel where water regularly flows, whether or not the flow is continuous.

---

Wetlands: inland, standing, shallow bodies of water, which may be permanent or temporary, fresh or saline.

---

Winter-fill licence: a licence that permits the taking of water from a waterway during the winter months (normally between 1 July and 31 October).

---

Works licence: a licence that authorises the construction, alteration, operation, removal or decommissioning of any works on a waterway, a bore or a dam belonging to a prescribed class of dams.

---

Yield: the quantity of water that a storage, water supply system or aquifer produces

---

# Context for Urban Water Strategy development



# 1. Purpose

Urban water strategies (UWSs) are the key planning tool in delivering safe and sustainable water supplies for our cities and towns. The aim of UWSs is to support the development of resilient and liveable communities while balancing social, environmental and economic costs and benefits across the water cycle.

Water is a public resource central to the health and wellbeing of Victorians. Water powers our industries and the economy, underpins our quality of life and supports our natural environment.

Our water resources are subject to the impacts of climate change, climate variability and extreme events while our changing demographics and economy present challenges in balancing the economic, environmental, cultural and social values of water and ensuring the availability of water resources to meet future needs.

Under s. 4I of the *Water Industry Act 1994*, the Minister for Water may make and issue statements of obligations to water corporations. These statements specify the obligations of Victoria's water corporations in relation to the performance of their functions and the exercise of their powers. This Statement of Obligations (General) sets out a broad range of obligations and guiding principles applicable to all water corporations. Appendix A provides extracts from the Statement of Obligations (General). The Statement of Obligations (General) requires the development of UWSs by water corporations providing urban services (see Figure 1). It also requires the development of the Melbourne Water System Strategy covering the region serviced by the Melbourne water supply system. These strategies include plans for securing water supplies over the following 50 years given uncertainty with population, climate change and climate variability.

## Purpose

UWSs identify the best mix of actions to provide water services in our towns and cities now and into the future. To do this UWSs:

- have a long-term outlook of 50 years
- consider the total water cycle (consistent with the principles of integrated urban water management)
- support the development of resilient and liveable communities
- balance social, environmental and economic costs and benefits
- take account of the consequences and uncertainty associated with population changes, climate change and variability and other risks.



Figure 1: Victoria's water corporations' boundaries

## 1.1 UWS development

The Statements of Obligations (General)<sup>1</sup> issued on 20 December 2015 to all water corporations requires water corporations with urban supply districts to develop an UWS by 31 March 2017 and thereafter as directed by the Minister for Water. These must then be submitted to the Minister administering the *Water Act 1989*.

Water for Victoria<sup>2</sup> require urban water corporations to prepare UWS every 5 years.

These guidelines apply to the development of UWSs and the Melbourne Water System Strategy (MWSS) referred to collectively as Urban Water Strategies.

The Melbourne metropolitan retail water corporations along with Melbourne Water can prepare a single UWS for metropolitan Melbourne combining the requirements of the UWS and MWSS which are collectively covered in these guidelines.

DELWP will work with each water corporation to develop a work plan of key deliverables to ensure timely assessment and delivery of the UWS.

1. [https://www.water.vic.gov.au/\\_data/assets/pdf\\_file/0015/54330/Statement-of-Obligations-General.pdf](https://www.water.vic.gov.au/_data/assets/pdf_file/0015/54330/Statement-of-Obligations-General.pdf)

2. <https://www.water.vic.gov.au/water-for-victoria>

## Water for Victoria – Addressing future urban water challenges

- *The amount of water we have to share is getting less, while our need for water is getting bigger.*
- *Climate change alters the amount of water available for use. Less rainfall makes less runoff and warmer temperatures means more water is lost through evaporation. The science indicates that the same amount of rainfall is producing less runoff in some Victorian catchments while the changing seasonality of our rainfall patterns and the increased risks of extreme events, including droughts, floods and bushfires is also presenting challenges. The ability of our catchments to respond has also changed. Land use change results in interception of water before it can reach the streams. While supply of traditional sources is shrinking, demand is growing. Population growth means that each year more and more people share from the same bucket of water. We also need to continue to provide for our environmental values, the values of our Traditional Owners and for recreation.*
- *Urban water corporations manage water resources and deliver water supply and sanitation services within our cities and towns. Ninety-five per cent of total water corporation expenditure is spent by the urban water sector to provide these services. The forecast growth in urban population will increase pressure on our existing water systems, placing growing demand on current assets, infrastructure, water supply and wastewater services.*
- *By managing water well, we can achieve benefits including healthy waterways and greener, cooler urban spaces.*
- *The government's approach to urban water management links all aspects of the water cycle and water services planning and aligns this with land use planning. Better management will help us achieve benefits more efficiently and contribute to an affordable urban water sector. We will make the most of all water sources, including recycled water and stormwater, which is also essential for water security.*
- *In developing their UWSs, water corporations will consider treated wastewater's role in the urban water cycle, including for recycling and environmental outcomes. Water corporations spend a lot of money on sewerage management. By including wastewater in long-term water planning, water corporations can achieve better results for the community and the environment.*
- *The government will implement integrated water planning across Melbourne and regional Victoria. The outcomes of this planning will be included in the UWSs of all water corporations and in the MWSS prepared by Melbourne Water.*
- *Water for Victoria requires water corporations to incorporate integrated water management in all their planning, including UWSs, and the strategies prepared by Melbourne Water for water, sewerage, waterway health and flood management.*

## 1.2 Guideline development

### 1.2.1 Principles

These guidelines have been developed using the following principles in Table 1.

**Table 1: Principles for the development of the UWS Guidelines**

Category	Principle
System performance and diversity	1. Specific, quantifiable and measurable criteria should be used to describe and monitor system performance in terms of levels of service – in a way that means these criteria make sense for each system.
	2. Planning should recognise that water issues and opportunities are not uniform across the State.
Integrated planning requirements	3. Planning must be prepared for a range of possible futures – by making sure that systems could cope with a relevant continued dry sequence as well as the potential for a range of possible climate futures, i.e. “reduce the likelihood of surprises”.
	4. Planning should be integrated and holistic across the complete urban water system.
Taking action	5. A “no regrets” approach to taking action – by doing things that make the most sense under a range of planning scenarios - informed by detailed options assessment and adaptive management through regular monitoring and evaluation.
Customer involvement	6. Customers must be involved in decisions about cost/risk trade-offs – by describing how each system would perform under a range of scenarios and what would be the cost of improving performance.

These principles are consistent with the National Urban Water Planning Principles<sup>3</sup> agreed to by the Council of Australian Governments in 2008.

### 1.2.2 Review

The 2016 guidelines were reviewed by DELWP in consultation with urban water corporations and Melbourne Water. Key updates include:

- restructured to better reflect the process the water corporations will undertake in developing and delivering their UWS
- clarification of the role, requirements and outputs of stakeholder engagement (including increased guidance on partnering with Traditional Owners<sup>4</sup>)
- clearer articulation of the setting of a level of service with customers
- inclusion of a monitoring and evaluation framework linked to the Annual Water Outlook<sup>5</sup> process to drive adaptive management
- clarification of the role Drought Preparedness and Response Plans

---

3. <https://www.agriculture.gov.au/water/urban/policy-reform-urban-water/planning-principles>

4. <https://www.forestsandreserves.vic.gov.au/land-management/what-we-do/the-traditional-owner-settlement-act-2010>

5. <https://www.water.vic.gov.au/water-reporting/outlook>

- updated references to processes such as Victoria In Future<sup>6</sup> and Guidelines for Assessing the Impact of Climate Change on Water Availability In Victoria<sup>7</sup>
- clarification of the extent of sewerage system inclusion
- improved articulation of the strategic context for planning purposes and the sources of information that UWS can build from
- clarification of the commitment from DELWP to assist during the UWS development process on matters of mutual interest
- details of an assessment framework to be applied on submission of UWS to DELWP
- removal of the water systems atlas requirement and replacement with clearer instructions on visual representations of system infrastructure, supply, demands and augmentation options for customer communication purposes.

### 1.2.3 Structure

These guidelines are structured to provide guidance on a range of matters relevant to effective urban water planning and service delivery.

Broadly, the guidelines have been ordered for water corporations to step through each process to prepare their UWS while noting that some processes – particularly those that require stakeholder engagement – will need to be iterative.

The guidelines refer to a number of other key reference and policy documents issued by the Victorian Government which set further obligations and guidance that are to be followed in the preparation of UWSs.

**Table 2: Guideline structure**

Stage	Task	Statement of obligations link
Framing	Setting objectives and principles for strategy development	All
	Engaging with stakeholders	(2) the Corporation must consult with the community and key stakeholders and participate in the development of relevant local and regional plans.
	Managing risk and uncertainty	All
	Reviewing and incorporating learnings from recent experience	(1b) measures to deliver sub-regional planning outcomes, and integrate water cycle management with relevant planning schemes
Understanding the current system	Describing and assessing the existing water system (sources, demand and resilience)	(1d) measures to adapt to climate change
Establishing future system performance requirements	Defining Levels of Service	(1a) proposed levels of service

6. <https://www.planning.vic.gov.au/land-use-and-population-research/victoria-in-future>

7. <https://www.water.vic.gov.au/climate-change/climate-and-water-resources-research>

Stage	Task	Statement of obligations link
Assessing future system performance	Water supply projecting	(1d) measures to adapt to climate change
	Water demand projecting	(1e) measures to maintain a balance between the customer's demand for water and the supply of water in cities and towns
Assessing the need for action	Balancing supply and demand into the future	
Options development	Existing actions	(1c) options to facilitate efficient investments in projects across the urban water cycle that optimise shared benefits and avoidable costs
	System resilience	
	Long list / Short list / Prioritisation	(1g) options and trigger points for major augmentations
Implementation	Trigger points and readiness	
Monitoring and evaluation	Adaptive management	
Drought preparedness and response	Drought preparedness and response actions	(1f) options for the management of extreme event supply contingencies

### 1.3 DELWP support and community of practice

DELWP has committed to making a core team available throughout the development of the UWS.

This team is available to support and provide advice to corporations to deliver the UWS in line with the requirements of the guidelines and ensure consistent application across the state.

The DELWP team can be contact at: [uws@delwp.vic.gov.au](mailto:uws@delwp.vic.gov.au)

As part of this DELWP will facilitate information sharing sessions and the development of a Community of Practice<sup>8</sup> (CoP).

The CoP will be the single source of truth and distribution point for key documents.

Through the CoP water corporations are encouraged to collaborate, participate in discussions and share knowledge and useful resources on all issues relevant to the delivery of their UWSs. This may include technical approaches to modelling, community engagement, options assessment and any other topics identified by water corporations.

### 1.4 Core requirements

DELWP acknowledges the length of these guidelines and in parts their prescriptive nature. This has resulted from ongoing requests for clarity and prescriptiveness in terms of minimum requirements on a variety of matters from the 17 corporations involved.

The guidelines have developed over time and additional requirements have been brought into the UWS process through policy changes such as Water for Victoria and legislative changes. The outputs of new and ongoing work programs also require reflection and considerations in the UWS – such as IWM forums.

Many corporations have asked for direct (prescriptive) guidance on topics and contents while others value flexibility. This level of prescriptive vs flexibility ranges across corporations, and guideline content.

To attempt to alleviate this throughout these Guidelines, key matters that water corporations must take into account when developing their UWS are highlighted in text boxes and labelled as “core requirement”.

8. <https://innovationnetwork.vic.gov.au/my-network/groups/urban-water-strategies-2022-%25E2%2580%2593-community-practice>



The purpose of the core requirements is to provide clear guidance on what is required, ensure a minimum standard is achieved in developing the UWS, assist in ensuring that consistent and meaningful information is presented to stakeholders and the Minister, while attempting to reconcile the diversity of systems and communities to which the guidelines apply.

Core requirements will form the basis of the review framework by DELWP.

For ease of reference a complete list of core requirements is provided in a dedicated section at the end of the document.

**Core  
requirement  
1.1**

Water corporations must:

- develop UWSs every five years in accordance with these Guidelines.
- submit their final UWS to the Minister for Water by 31 March 2022.
- work with DELWP to manage the submission of draft material for assessment throughout the UWS development window to enable a full and final version to be submitted by the due date.
- nominate a project manager as the main contact during UWS development.
- perform a self-assessment of each core requirement as part of their final submission.

Each water corporation may:

- refer to other planning documents to meet core requirements as long as the information in any referenced document meets the intent of the core requirement and is publicly available.

Each water corporation should:

- actively participate in the community of practice

Meeting core requirements may require flexibility. If a corporation believes it may be unable to meet a core requirement, believes a requirement is not applicable or proposes to meet a requirement through an alternative mechanism it must identify any issues in a timely fashion and work with DELWP to reach an agreed position.

## 2. Urban water planning

This section outlines:

- The water management planning framework (setting out water corporations' responsibilities)
- The integrated water management planning framework (including strategic fit of UWSs)
- A decision-making framework (to support adaptive management)

The *Water Act 1989* is the primary legislation guiding the management of Victoria's water resources. Under the Act, the Crown retains the overall right to the use, flow and control of all surface water and groundwater on behalf of all Victorians.

The Act establishes a water entitlement framework, and the government has established a water resource planning framework, to provide for the efficient and equitable sharing of Victoria's water resources. The entitlement framework clearly specifies the legal rights and obligations of entitlement holders and the state in overseeing management of Victoria's water resources.

*A feature of the framework is that it gives entitlement holders - including urban water corporations - flexibility and certainty about how they manage their water and it enables them to make decisions to manage their own risks. This flexibility and certainty underpins investment decisions by irrigators, water corporations, the VEWH and industry and drives placed based approaches to urban water planning.*

Responsibility for implementing the framework lies with Government, catchment management authorities or water corporations depending on their functions as set out in legislation – primarily the *Water Act 1989*, *Water Industry Act 1994*, and associated instruments such as the Statement of Obligations (General).

## 2.1 Roles and responsibilities

The following agencies and bodies have a key role in managing urban water, and may require engagement with, throughout the development of the UWS.

**Table 3: Key roles in managing urban water (in alphabetical order)**

Agency/Body	Accountability
Catchment management authorities	<ul style="list-style-type: none"> <li>• waterway health</li> <li>• floodplain management</li> <li>• environmental water (with the Victorian Environmental Water Holder)</li> </ul>
Department of Health and Human Services	<ul style="list-style-type: none"> <li>• drinking water quality regulation</li> </ul>
Developers	<ul style="list-style-type: none"> <li>• construction of development scale water infrastructure</li> </ul>
Environment Protection Authority	<ul style="list-style-type: none"> <li>• environmental regulation (including best practice guidelines and protection policies)</li> </ul>
Essential Services Commission	<ul style="list-style-type: none"> <li>• economic regulation and service standards</li> </ul>
Local government	<ul style="list-style-type: none"> <li>• urban stormwater management</li> <li>• open space management</li> <li>• onsite domestic wastewater management</li> <li>• urban planning</li> <li>• building and planning approvals</li> </ul>
Property owners, residents and businesses	<ul style="list-style-type: none"> <li>• meeting terms and conditions of services provided</li> <li>• following permit conditions</li> <li>• onsite water management e.g. rainwater, stormwater</li> </ul>
Rural water authorities	<ul style="list-style-type: none"> <li>• bulk water delivery</li> <li>• licensing of groundwater and unregulated systems</li> </ul>
Traditional Owners	<ul style="list-style-type: none"> <li>• managing Aboriginal values and uses of water</li> <li>• caring for country</li> </ul>
Victorian government and departments	<ul style="list-style-type: none"> <li>• legislation</li> <li>• policy</li> <li>• regulation</li> <li>• planning</li> <li>• governance</li> </ul>
Victorian Planning Authority	<ul style="list-style-type: none"> <li>• urban growth structure planning for Melbourne and (where invited) regional Victoria</li> </ul>
Water corporations	<ul style="list-style-type: none"> <li>• water supply</li> <li>• wastewater management (including sewerage and sewage treatment and trade waste)</li> <li>• waterway and major drainage systems (Melbourne Water only)</li> </ul>

## 2.2 Water corporation obligations

### 2.2.1 Water Act 1989

#### **Functions**

Under the *Water Act 1989* water corporations:

“need to ensure that water resources are conserved and properly managed for sustainable use and for the benefit of present and future generations” (*section 93(a)*).

The Act also requires water corporations to:

“integrate both long term and short term economic, environmental, social and equitable considerations” (*section 93(c)*).

The *Water and Catchment Legislation Amendment Act 2019* ensures social and recreational values are explicitly incorporated into future regional water planning processes. Water corporations are now required to consider opportunities to provide for the social and recreational uses and values of waterways, consistently with their respective objectives and legislative requirements.

#### **Water Act 1989 (section 93)**

*Each water corporation, in performing its functions, exercising its powers and carrying out its duties must have regard to the following principles—*

- (a) the need to ensure that water resources are conserved and properly managed for sustainable use and for the benefit of present and future generations; and*
- (b) the need to encourage and facilitate community involvement in the making and implementation of arrangements relating to the use, conservation and management of water resources; and*
- (c) the need to integrate both long term and short term—*
  - (i) economic, environmental and equitable considerations; and*
  - (ii) Aboriginal cultural considerations; and*
  - (iii) social and recreational considerations; and*
- (d) the need for the conservation of biological diversity and ecological integrity to be a fundamental consideration; and*
- (e) if there are threats of serious or irreversible environmental damage, lack of full scientific certainty as to measures to address the threat should not be used as a reason for postponing such measures.*

## Sewerage

The *Water Act 1989* sets out the functions of water corporations with regard to sewerage.

*Water Act 1989 (section 173)*

*(1) An Authority that has a sewerage district has the following functions—*

*(a) to provide, manage and operate systems for the conveyance, treatment and disposal of sewage and, if the Authority so decides, of trade waste;*

*(b) to identify community needs relating to sewerage services and to plan for the future needs of the community relating to sewerage services;*

*(c) to develop and implement programs for the recycling and reuse of treated wastewater;*

*(d) to investigate, promote and conduct research into any matter which relates to its functions, powers and duties in relation to sewerage services*

*(e) to educate the public about any aspect of sewerage.*

### 2.2.2 Water for Victoria

Water for Victoria outlines the water management opportunities and challenges facing Victoria over the coming decades.

Chapter 5 “Resilient and liveable cities and towns” outlines a vision to transform Victorian cities and towns into the most resilient and liveable in the world.

*“We will include all elements of the urban water cycle in the way we plan and manage water so that Victorian communities can continue to thrive in all climates.*

*By managing water well, we can achieve benefits including healthy waterways and greener, cooler urban spaces. The government’s approach to urban water management links all aspects of the water cycle and water services planning and aligns this with land use planning. Better management will help us achieve benefits more efficiently and contribute to an affordable urban water sector. We will make the most of all water sources, including recycled water and stormwater, which is also essential for water security.”*

In an urban context Water for Victoria commits to:

- use diverse water sources to protect public spaces
- reinvigorate water efficiency programs for Melbourne and regional Victoria
- improve stormwater management for greener environments and healthier waterways
- represent community values and local opportunities in planning
- better urban water planning to address key challenges
- make the most of our investment in wastewater
- work across government for healthy and resilient urban landscapes
- put integrated water management into practice

### UWS remit under Water for Victoria

- *Urban water corporations will develop urban water strategies every five years that incorporate sewerage strategies and drought preparedness planning, and link to local integrated water management plans.*
- *Urban water corporations will develop urban water strategies that include:*
  - *climate and population projections that are comparable across water corporations*
  - *drought preparedness planning*
  - *looking at all drinking and non-drinking water sources and the appropriate use of each source to protect human health.*
- *Requiring water corporations to include long-term bulk sewerage planning in their urban water strategies.*
- *Requiring water corporations to incorporate integrated water management in all their planning, including urban water strategies, and the strategies prepared by Melbourne Water for water, sewerage, waterway health and flood management.*

### **Integrated water management planning**

To support and enhance an adaptive water planning framework, Water for Victoria commits to an Integrated Water Management (IWM) planning approach that encourages the identification and implementation of integrated water servicing solutions through collaboration, shared investment and operational efficiencies across key urban liveability and productivity outcome areas.

The framework outlines water's role in creating resilient and liveable cities and towns through:

- safe and secure supplies in an uncertain future
- effective management of wastewater
- flood resilience
- healthy and valued waterways
- healthy urban landscapes and places

Importantly the framework recognises that the urban water cycle is managed by a range of authorities including water corporations, local government and CMAs (see Table 3).

An IWM approach aims to improve value from investments by these entities, by taking account of the integrated nature of the water cycle and the services it provides unconstrained by institutional structures. It involves evaluation of a range of options developed to provide multiple water cycle benefits through a system of infrastructure and natural assets.

## 2.3 Urban water corporation functions

Water corporations' responsibilities under this framework include the development of and/or adherence to the following in Table 4.

Appendix B provides a description of other regional and state-wide planning processes that may have relevance to the preparation of UWSs.

Table 14 depicts how these planning processes may contribute to the development of the UWS.

**Table 4: Water corporations' responsibilities under the water management framework**

Title	Description
Annual Water Outlook (AWO)	Each year by 1 December, water corporations publish an annual water outlook which is a concise customer document providing a short term 12-month overview of each water corporation's systems and resource position for the coming year.  AWOs identify any contingency plans being put in place in response to any potential shortages, including informing customers on the likelihood of responses such as supply augmentation and water restrictions.
Drought Preparedness Plans (incorporating Drought Repose Plans)	Defines actions to prepare for and respond to water shortages in the immediate and short term, resulting not only from drought but other extreme circumstances such as water quality and emergency events. The Drought Preparedness Plan incorporates the Drought Response Plan and is included as an appendix to a water corporation's UWS.
Emergency Management Plans	Respond to severe water shortages from emergencies, such as bushfires, floods, blue-green algae outbreaks or other water quality incidents.
Guidelines for Assessing the Impacts of Climate Change on Sewerage Systems	DELWP is working with water corporations to prepare Guidelines for Assessing the Impact of Climate Change on Sewerage Systems. The guidelines will be relevant to the planning, design and operation of sewerage systems. The EPA will be consulted in delivery of this action, to align regulatory expectations and adaptation efforts. <sup>9</sup>
Guidelines for Assessing the Impacts of Climate Change on Water Availability in Victoria	Set out climate change scenarios for projected temperature, potential evapotranspiration, rainfall, runoff and groundwater recharge to be used across Victoria for assessing the impact of climate change on water availability.
Melbourne Sewerage Strategy (MSS)	The MSS is a 50-year strategy developed collaboratively with Melbourne Water the water retailers – City West Water, South East Water, Yarra Valley Water and Western Water. The Strategy sets the direction for wastewater management in Melbourne for future generations.  The strategy explores the sewerage system's role in a water sensitive city and in Melbourne's waste management, outlining how the system will be managed to enhance its contribution to public health and the environment, and provide valued and affordable services to the community in the future.  The MSS notes a number of strategic actions and outcomes that in order to be achieved will need to be embedded in UWSs including that <i>"an additional 50 GL/year of water from the sewerage system is beneficially reused in an economically viable way by 2040 to support MWSS goals."</i>
Melbourne Water System Strategy (MWSS)	Developed by Melbourne Water, establishes an integrated system view of available consumptive water in the Melbourne water supply system, having regard to relevant UWSs, the outcomes of IWM planning and the strategies of other entitlement holders.  The MWSS must be consistent with Sustainable Water Strategies.

9. . For updates on the status of the document contact [water.climatechange@delwp.vic.gov.au](mailto:water.climatechange@delwp.vic.gov.au)

Title	Description
Permanent Water Saving Rules (PWSR)	A set of common-sense rules that all Victorians are obliged to follow day to day to ensure water is not wasted. The rules are in place at all times on an on-going basis and are enforceable in the same way as water restrictions. When water restrictions are in place, the more severe rule of restriction applies. The rules are set out in each water corporation's legislative instrument known as the Permanent Water Savings Plan. While water corporations may have minor variations in the details to account for local conditions (that is, by providing exemptions), the rules are largely uniform across the state. PWSRs and Water Restriction By-Laws are currently under review.
Pricing Submission	Victorian water corporations are regulated by the Essential Services Commission (ESC), which regulates according to the <i>Water Industry Regulatory Order 2014</i> (WIRO) – an instrument of the <i>Water Industry Act 1994</i> . The WIRO identifies a set of regulated services that the ESC has the power to regulate both prices and services. The Water Industry Act requires the ESC to ensure that regulatory decisions have regard for differences in the operating environment of each water business and that the decision has regard to health, safety, environmental sustainability and social obligations of all water businesses. The ESC Act requires the ESC to have regard to a number of items in making a determination, in particular the efficient cost of producing and supplying regulated water and the return on assets in the regulated industry. These investments must be deemed 'prudent and efficient' by the ESC to be recouped through the pricing system. Where an investment is deemed by the ESC to fail in this regard, it prohibits a water authority from recouping the investment in prices from customers, and the water authority must either fund the investment through another means (such as external funding), or revisit the decision to make the investment. Alternatively, the water authority may seek to demonstrate that its customers support the investment and are willing to pay higher prices to receive the higher level of service. <sup>10</sup>
Uniform stages of water restrictions	A uniform four-stage schedule of water restrictions is applicable to all Victorian towns on reticulated supply. The restrictions set out a range of restrictions, prohibitions and limitations on different water-use activities, ranging from stage one (mild) to stage four (severe). Each restriction stage is set out in each water corporation's legislative instrument, the water restriction by-law. Implementation of water restrictions is guided by each water corporation's Drought Response Plan. While water corporations may have minor variations in the details to account for local conditions (that is, by providing exemptions), the nature of water restrictions are consistent across the state. PWSRs and Water Restriction By-Laws are currently under review.
Urban Water Strategy	Urban water corporations develop a UWS every five years that incorporate sewerage strategies and drought preparedness planning, and link to local integrated water management plans.  Outlining a water corporation's long-term planning for service provision in UWSs is a critical tool for the successful integrated and adaptive management of Victoria's water resources.  To achieve this UWSs are developed to meet community expectations and utilise a fifty-year scenario-based planning horizon which considers changes in population, demand, climate and other system shocks and stresses in setting out the water supply and demand measures needed to balance supply and demand.  UWSs must be consistent with Sustainable Water Strategies.

10. The ESC considers customer support as a strong driver in determining whether or not expenditure can be recovered by the business. In its 2018 Water Price Review Guidance Paper, the ESC placed greater emphasis on customer engagement and demonstrating customer value in water businesses' pricing submission. In particular, the amount of revenue that can be recovered for a project is based on service outcomes that reflect government and regulator obligations or demonstrated customer need. Where no service obligation exists, the demonstrated customer need for the higher service outcome should be supported by customers' willingness to pay for those outcomes. The level of precision on demonstrating willingness to pay is not explicitly defined by the ESC or DTF. The implication of this is that for projects in which quantified benefits do not exceed costs, demonstration of customer support for the project and its outcomes may be required to recover costs from customers through the pricing mechanism.



## United Nations Sustainable Development Goals<sup>11</sup>

The Sustainable Development Goals (SDG) provide a common overarching framework to deliver community wellbeing and a more sustainable future for all people of the world.

Water for Victoria recognises Victoria’s role as a global citizen and notes that the Victorian water sector will contribute to the United Nations Sustainable Development Goals particularly on ‘clean water and sanitation’ and ‘sustainable cities and communities’.

As the State Government’s primary sustainability department, DELWP supports<sup>12</sup> the objectives of the United Nations Sustainable Development Goals.

Various Victorian water corporations and DELWP are realigning operations and reporting in line with SDG requirements to ensure their contribution to the Global Goals.

The goals contain targets and indicators that can be considered as part of a monitoring and evaluation framework for the UWSs.

A breakdown of Goal 6: Clean water and sanitation is provided in Appendix C and additional guidance is available from WSAA<sup>13</sup> and the AWA<sup>14</sup>.



**Figure 2: Grouping of the SDGs most relevant to urban water corporations**

Source: DANVA

11. <https://sdgs.un.org/goals>

12. <https://www2.delwp.vic.gov.au/corporate-plan/home/sustainable-development-goals>

13. WSAA, Global Goals for Local Communities: Urban water advancing the SDGs  
[https://www.wsaa.asn.au/sites/default/files/publication/download/Global%20goals%20for%20local%20communities\\_Urban%20water%20advancing%20the%20UN%20Sustainable%20Development%20Goals\\_WSAA\\_Aug%2017\\_0.pdf](https://www.wsaa.asn.au/sites/default/files/publication/download/Global%20goals%20for%20local%20communities_Urban%20water%20advancing%20the%20UN%20Sustainable%20Development%20Goals_WSAA_Aug%2017_0.pdf)

14. AWA, 2017, United Nations Sustainable Development Goals: Discussion Paper  
[https://www.awa.asn.au/documents/Discussion\\_Paper\\_United\\_Nations\\_Sustainable\\_Development\\_Goals.pdf](https://www.awa.asn.au/documents/Discussion_Paper_United_Nations_Sustainable_Development_Goals.pdf)

## 2.4 UWS strategic fit

Figure 3 shows the key water planning tools and processes in Victoria, while Table 4 provides a brief description of key policy and planning processes relevant to urban water corporations.

This approach means that UWS are an important input into the development of Sustainable Water Strategies and Long-Term Water Resource Assessments by outlining water corporation customer water demands and detailing options for how these demands will be met.

UWSs are also important inputs to the Victorian Government in its development of local, regional and state-wide policies and strategies such as the Victorian Waterways Strategy, the Victorian Floodplain Management Strategy and the Water Grid Partnership and as part of delivering commitments to partner with Traditional Owners in water and natural resources management.

UWSs are key mechanisms to consider and drive localised delivery of global, national, regional and state-wide processes. This includes policy directions outlined in Water for Victoria, actions from Sustainable Water Strategies, relevant actions from Strategic Direction Statements as part of Integrated Water Management Planning, Regional Waterway Strategies and DELWP's commitment to delivery of the UNs Sustainable Development Goals (see Figure 2).

UWSs require a high level of community and customer engagement. This can assist water corporations to understand community support for water supply and demand initiatives, their required level of service, willingness to pay to improve system performance and form the evidence base for infrastructure planning and provision including sewerage services. UWSs are also a key input into water corporation pricing submissions.

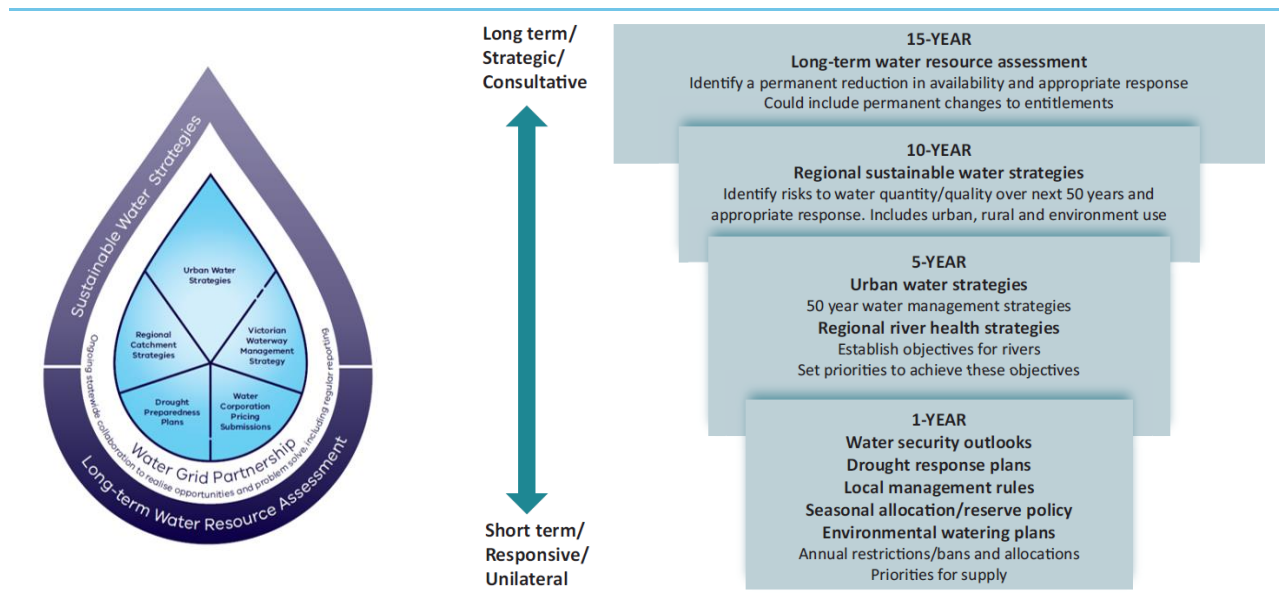


Figure 3: Key planning tools and processes

**Core requirement 2.1**

UWSs must:

- be consistent with Water for Victoria, the guiding principles of the Statement of Obligations (General), these guidelines and relevant Sustainable Water Strategies.
- be consistent with and incorporate the outputs of regional and state-wide processes when developing actions to address identified issues.
- comply with the Victorian Government's Accessibility Guidelines for Government Communications<sup>15</sup> to ensure they are accessible, easy to read and understand by customers and the wider community.

UWSs should:

- consider relevant Sustainable Development Goals, associated targets and indicators in their development and implementation.

**Core requirement 2.2**

Water corporations may produce technical supporting documentation and resource modelling to meet the requirements of these guidelines. It is not expected that all technical documents will be publicly available.

DELWP may require technical documentation and models to be provided on request for quality assurance and peer review purposes.

---

15. <https://www.vic.gov.au/accessibility-guidelines-government-communications>

## 3. Objectives and principles

The preparation and presentation of UWSs should be utilised as a core opportunity to:

- **Integrate:** existing planning processes relevant to urban water security
- **Assess:** a portfolio of water security options holistically, for delivery by urban water corporations over the lifetime of the plan
- **Action:** provide the basis to give effect to portfolio options in a structured way, with clear roles and responsibilities as the need arises accounting for uncertainty
- **Link:** to and support existing planning processes including pricing submissions and sustainable water strategies
- **Communicate:** these to customers and the community

### 3.1 Objectives

Key objectives of the strategies are to ensure that water corporations undertake long term planning that:

1. Identifies actions to improve system resilience in light of climate change and climate variability - that will ensure secure and affordable water and sewerage services that meet society's long-term needs.
2. Encourages the sustainable use of water resources – including rainwater, stormwater and recycled water and rainfall-independent supplies in ways that are efficient and fit-for-purpose, whilst ensuring that public and environmental health are protected.
3. Enhances the liveability, productivity, prosperity and environment of our cities and towns.
4. Ensures that the water needs of environmental assets are transparently considered.
5. Maximises the shared or complementary benefits of all water users, without compromising the needs of the environment, agriculture, towns and businesses.
6. Provides for a transparent and rigorous decision-making process, with clear roles and responsibilities and accountabilities, which can adapt to the changing environment.

### 3.1.1 Adaptive management

In line with the water resource planning framework water corporations undertake short-term and long-term planning to balance the demand of water and available supply and plan for the year ahead. Water corporations develop long-term UWSs to support the development of resilient, liveable communities as well as to balance social, environmental and economic costs and benefits across the environment, agriculture, towns and businesses.

The decision-making framework should bring together considerations of whether to:

- take immediate to short-term action under Drought Preparedness Plans
- take medium to long-term actions in UWSs
- seek a stake in system-wide augmentations that are identified in the biennial statement and decided on as part of a SWS process

This is to ensure water corporations and Government provide a greater level of transparency about decision-making processes.

The relationship between these key elements, and the way in which this translates into action by water corporations is shown in Figure 4.

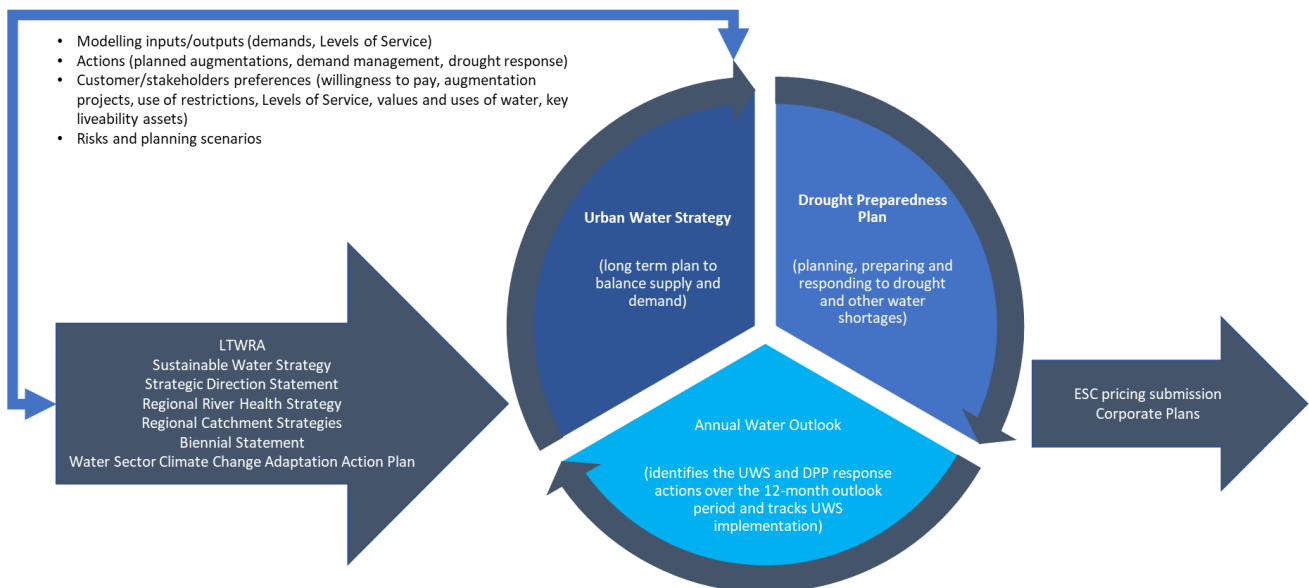


Figure 4: Elements of the adaptive management-decision making framework

### 3.1.2 Consider all aspects of the urban water cycle

UWSs must consider all aspects of the urban water cycle by taking an integrated water management approach to planning. The SoO defines the Urban Water Cycle as:

*“the hydrological cycle within an urban environment, including water supply, wastewater management, waterway health, flood management, and protection of urban amenity. It encompasses the treatment, storage and circulation of water through built infrastructure, such as water supply, drainage and sewerage systems, as well as natural systems.”*

This collaborative process allows organisations to identify and deliver greater value water cycle initiatives to improve the resilience and liveability of Victoria’s cities and towns.

Considering all aspects of the urban water cycle includes:

- managing and protecting the health of our waterways and bays
- wastewater management<sup>16</sup>
- flood resilience
- alternative water supply
- potable water supply
- stormwater management
- water treatment.

## 3.2 Principles

The following principles have been developed to guide the delivery of UWSs by water corporations.

**Table 5: Principles for the development of UWSs**

Category	Principle
<b>Community and customer engagement</b>	1. Opportunities to build water community knowledge on the challenges and options are to be built into engagement processes.
	2. Customers must be engaged on the levels of service of water supply, their willingness and ability to pay and trade-offs.
<b>Planning approaches</b>	3. Planning must be based on the best available information about current and future water resources incorporating agreed climate change projections and local demand drivers, including population changes, environmental flow and other release obligations and where possible future economic development and land use planning.
	4. Planning must be scenario based, incorporating uncertainty in supply and demand, and using probability and potential impact to establish a range of scenarios. Sensitivity testing should be applied to test uncertainties associated with key social, technical, environmental, economic and policy factors.

16. Water for Victoria notes that: *“In developing their urban water strategies, water corporations will consider treated wastewater’s role in the urban water cycle, including for recycling and environmental outcomes. Water corporations spend a lot of money on sewerage management. By including wastewater in long-term water planning, water corporations can achieve better results for the community and the environment.”*

Category	Principle
<b>Options development and assessment</b>	5. An integrated water management approach must be taken when developing and assessing options. All potential water sources and demand options should be considered while also meeting public health and environmental regulations. While the UWS cannot commit to delivering an option outside of current policy, the UWS could consider future supply options that may become available due to future changes for instance in technology, cost, policy settings or community acceptance. The UWS process can build the evidence base to understand levels of community support for these types of options.
	6. All water servicing options are to be assessed on a robust and transparent basis, examining the social, environmental and economic costs and benefits and taking into account specific system characteristics.
	7. The value of individual options to the overall supply-demand portfolio should recognise resilience characteristics (e.g. reliability, flexibility, circular economy, and substitutions for potable water) as well as how much water they can produce.
<b>Adaptive management</b>	8. Pricing and markets should be used to help balance the supply and demand for water, where it is efficient and feasible to do so.
	9. UWSs are to be adapted as necessary to reflect additional information and knowledge as it comes to hand, as well as changing circumstances. Significant changes may require Ministerial approval.
	10. Drought preparedness plans are to specify the supply augmentation/s that will be implemented to increase water supply when a severe and / or extended drought occurs, with sufficient time to restore the supply / demand balance.

<b>Core requirement 3.1</b>	Water corporations <u>must</u> apply the principles in Table 5 when developing their UWS.
-----------------------------	---

# Undertaking the Urban Water Strategy





## 4. Stakeholder engagement

Water for Victoria makes it clear that *“the water sector must understand the customers and community that it serves. Government will be looking for water corporations, catchment management authorities and the Victorian Environmental Water Holder to bring the community closer to decision-making. This will be achieved by better understanding the services the community wants, what the community is willing to pay for, and where the community is willing to make trade-offs.”*

### 4.1 Engagement approach: community at the centre

UWSs with their 50-year outlook provide the opportunity to take a long-term view of our resources and understand how we take action to adapt, in the face of a diminishing resource. Considering environmental, economic and domestic uses of water in our planning is crucial, but in a way that delivers broader community benefit such as liveability, recreational and Aboriginal values, now and in future. As these decisions require significant value judgements, there is a need to involve the public in the decision-making process.

Achieving this requires a detailed understanding of community preferences in order to provide the basis for sharing the benefits of our limited water resources, while ensuring our water services remain affordable.

As part of the adaptive management framework, engagement with customers and other stakeholders for the purposes of developing and implementing an UWS should be an ongoing activity.

#### 4.1.1 A tailored approach for local communities

These Guidelines do not prescribe a particular approach to community engagement, recognising that communities are diverse and will require different issues to be addressed and prioritised by the water corporations for development of the UWSs.

There are different levels of public participation ranging from simply providing the public with information, to seeking the views of the public through more concerted discussion or providing the opportunity for the public to share in the development of policy or the design of projects.




Water corporations can mirror the DELWP community charter<sup>17</sup> in their interactions with the public (see Table 6).

Other engagement tools or techniques that may be useful include – market research, focus groups, open house, public meetings, online and other communication material etc.

---

17. [https://www2.delwp.vic.gov.au/\\_\\_data/assets/pdf\\_file/0017/3248/DELWPCCommunityCharter.pdf](https://www2.delwp.vic.gov.au/__data/assets/pdf_file/0017/3248/DELWPCCommunityCharter.pdf)

**Table 6: Interaction with the public**

 Be available	Place-based community focus	Talk to you where you live, work and play, and be visible in local communities.
	Accessibility	Make sure we are easy to contact and our information is straightforward and available in a variety of different ways.
	Flexibility	Respect the way you want to work with us, and adapt our approach according to local needs.
 Speak and listen	Active listening and understanding	Listen to and understand your views and needs and respect different opinions.
	Honesty and transparency	Be honest about what's driving our priorities, what we can and can't promise to do, our timelines and why decisions have been made.
	Clarity and purposefulness	Be clear why and how we are engaging, making sure we give you real opportunities to influence and make a difference.
 Take action	Timely and proactive	Talk to the community as early as we can, responding quickly to issues and feedback.
	Consistency	Ensure we are consistent in the way we approach decisions.
	Closing the loop	Inform communities about the outcomes of projects and if our plans change we will let you know when this happens and why.

IAP2's Public Participation Spectrum<sup>18</sup> may help determine the level of public participation each stakeholder should have based on their influence in decision making. IAP2 also has numerous public participation guides to help enhance community engagement.

General information and tools for effective engagement can be provided by DELWP via the Department's engagement hub.

Water corporations are encouraged to make use of available and existing and emerging technologies and processes to meaningfully engage with their stakeholders.

For more information refer to the Public Participation in Government Decision-making: Better Practice Guide, Victorian Auditor-General's Office (January 2015)<sup>19</sup>.

#### 4.1.2 Use of existing engagement forums

Water corporations should make use of existing structures and forums, such as Boards, customer consultative committees, industry forums and other stakeholder briefing groups, which will differ from corporation to corporation across the State.

#### 4.1.3 Drawing on recent engagement processes

Water corporations should draw on recent engagement undertaken for other purposes to the extent that it is relevant and may combine or use consultation activities for the Price Submission to inform the UWS.

Recent engagement activities may include Sustainable Water Strategy development and reviews, Long-Term Water Resource Assessments, Regional Waterway Strategies, Water Resource Plans and Integrated Water Management Forums.

18. <https://www.iap2.org.au/resources/spectrum/>

19. <https://www.audit.vic.gov.au/report/public-participation-government-decision-making-better-practice-guide?section=>

#### 4.1.4 Key definitions

The definitions in Table 7 provide a common language and understanding. They have been informed by input from DELWP’s engagement framework co-design process, industry standards and definitions.

**Table 7: Key definitions in stakeholder engagement**

Term	Definition
Aboriginal Victorians	Used to include all people of Aboriginal and Torres Strait Islander descent who are living in Victoria.
Community	Is described as a group of individuals who share a common sense of belonging and where there is a level of trust between members: <ul style="list-style-type: none"> <li>• geographic – based around where people live, such as neighbourhood, suburb, town or region</li> <li>• interest – based around common interests such as conservation, community connection and improvement or recreation interest</li> <li>• identity – based on sharing a common identity such as age, culture or lifestyle</li> </ul>
Community engagement	Refers to the planned and unplanned ways water corporations interact and relate to their partners, stakeholders and communities. Community engagement is undertaken across all aspects of the water corporation’s business and to achieve a range of outcomes, including participation in decisions, actions or outcomes; building and maintaining relationships; and increasing community capacity for planning, action and learning.
Customers	Any individual or group that interacts or transacts with the water corporation and receives a product, service or information.
Engagement practice	Is the term used to describe the understanding and thinking to plan, deliver and evaluate engagement activities and processes.
Partners	Are individuals, organisations and groups that share a common interest and engage early to partner and collaborate on an ongoing basis. Partners have a strong interest in the outcomes and often share responsibility for delivery.
Registered Aboriginal Parties (RAP)	Are body corporates approved to deal with Aboriginal heritage matters on behalf of the relevant Traditional Owners within the RAP area. The members of the body corporate are Traditional Owners. Where the Traditional Owners have also been recognised by the Australian legal system, the Registered Native Title Body Corporate (RNTBC) or Traditional Owner Settlement Entity (TOSE) deals with Aboriginal heritage matters within the relevant area.
Stakeholders	Are described as any individual, group of individuals, organisation, or political entity with an interest or stake in the outcome of a decision.
Traditional Owners	Are people with traditional and customary rights in a particular part of the land (i.e. the 'right people for Country'). Some Aboriginal Traditional Owner groups have also had these rights recognised by the Australian legal system under a Native Title determination (Commonwealth) or a Traditional Owner Settlement Agreement (Victoria).

## 4.2 Engaging with key stakeholders

Water corporations must assess who are the key stakeholders, or the key subsets of the “public”, that need to be given the opportunity to be heard through the UWS process. Table 8 outlines key stakeholder groups.

**Table 8: Key stakeholder groups**

Stakeholder	Description
Water users	<p>Water corporations must engage with both residential and non-residential customers and show evidence of specific engagement with these customers in the development of UWSs.</p> <p>Efforts to engage with representative groups as well as broader actions to reach individual customers will be necessary.</p>
Local government	<p>Water corporations must engage with local councils with regards to identifying and pursuing initiatives that aim to increase the supply of, or demand for, alternative water services.</p> <p>For example, water corporations are to work collaboratively with local councils so that current and future opportunities for the use of alternative water sources in the control of the water corporation or council are identified.</p> <p>It is expected that water corporations will liaise with local councils so that, as a minimum, information about the expected volume of water sources within the works of local councils (stormwater drains) are considered. This information is needed to present a complete picture about the availability of alternative water sources within the service area of a water corporation. Some information may be available from Stormwater Management Plans prepared by local councils.</p> <p>Water corporations must also engage with local government regarding their requirements for watering of open spaces and identification of Priority Community Assets (see 15.4.1).</p>
Traditional Owners	<p>The Victorian Government is committed to continuing to involve Aboriginal representation in water planning. Water for Victoria commits the Victorian Government and water corporations to better recognise and understand Aboriginal values in water resource management.</p> <p>This requires water corporations to:</p> <ul style="list-style-type: none"> <li>• recognise Aboriginal Values and objects of water</li> <li>• include Aboriginal values and traditional ecological knowledge in water planning</li> <li>• support Aboriginal access to water for economic development</li> <li>• build capacity, to increase Aboriginal participation in water management</li> </ul> <p>Since the last round of UWSs in 2017, the <i>Water and Catchment Legislation Amendment Bill 2019</i> was passed, embedding Aboriginal cultural values into the planning and operations of water resource managers.</p> <p>Further guidance is contained in Appendix D.</p>
Recreational users	<p>The Water and Catchment Legislation Amendment Act 2019 ensures social and recreational values are explicitly incorporated into future regional water planning processes. Specifically, the Victorian Environmental Water Holder (VEWH), water corporations and catchment management authorities (CMAs), when performing their functions, are required to consider opportunities to provide for the social and recreational uses and values of waterways, consistently with their respective objectives and legislative requirements.</p>

Stakeholder	Description
Others	<p>There will be a range of other stakeholders that may be affected by or interested in the development of UWSs. For example:</p> <ul style="list-style-type: none"> <li>• property developers that are planning new developments to cater for population and demographic change</li> <li>• environmental groups that have particular concerns about the health of waterways and the sustainability of initiatives to manage supply and demand</li> <li>• industry groups that have particular interests in water quality, reliability, price and other aspects of service delivery, amongst others</li> <li>• advocacy groups that represent vulnerable customers on issues of affordability and accessibility</li> <li>• recreational user groups that utilise water supplies of natural assets to maintain their recreational facilities or support their activities</li> <li>• other Victorian Government entities such as Agriculture Victoria, Regional Development Victoria and the Victorian Planning Authority, local Fire Authority as well as local DELWP regional offices</li> </ul>

#### 4.2.1 Key issues requiring stakeholder feedback

Stakeholder feedback is crucial to ensure that UWSs can deliver on expectations and preferences.

Key issues that require understanding through input are contained in Table 9.

This is in addition to existing legislative requirements to engage with Traditional Owners and recreational water users.

**Table 9: Key issues requiring stakeholder input**

Issue	Explanation
Appropriate levels of service (see section 8.2)	<p>The agreed service level and the minimum service level that a water corporation plans to deliver must be tested with each community noting that different levels of service may be acceptable to different communities and water users.</p> <p>It is likely that this will be an iterative process.</p> <p>Water corporations may take an initial view on levels of service based on local experience, but when the community understands the costs and benefits of actions necessary to improve system performance, to meet service levels, the community may be happy to settle for lesser levels of service or may be happy to pay more for higher levels of services.</p>

Issue	Explanation
Potential need to take action to keep supply and demand in balance (see section 11.3)	<p>The assumptions underpinning the long-term and short-term assessments of system performance - which will inform the potential need to take action – are to be tested with each local community. This will help to inform the level of risk that should be factored into water resource planning. If a community is risk averse, water corporations should adopt conservative scenarios for planning purposes. If a community is willing to accept a higher degree of risk, water corporations can adopt less conservative planning scenarios.</p> <p>Water corporations are to continue to build the capacity of local communities to be engaged in discussing different planning assumptions and to understand the cost-risk trade-offs associated with actions to improve system performance. For example, care needs to be taken to ensure the concept of system yield is well explained in the context of the potential for year to year variability, so that the community are aware of the difference between what might be available “on average” under a particular scenario and what might be available “in a given year” for a particular scenario. Providing examples that are grounded in recent experience may assist, such as:</p> <p><i>“taking this action would impact bills by \$X but would mean that only moderate water restrictions would be necessary in the event of extreme drought conditions rather than severe water restrictions which were necessary during the drought conditions experienced in 2006/07”.</i></p>
Possible initiatives to address any imbalance between supply and demand (see section 12)	<p>Community engagement is to inform the Initial Options Analysis, in which the suitability of a “long list” of possible initiatives is considered.</p> <p>The “short list” of viable initiatives that results from the Initial Options Analysis must be tested with the community to ensure their views are understood, recorded and factored into the decision-making process around which of these initiatives is to be pursued.</p>
Costs and benefits of taking action and which of these initiatives should be chosen for action, and when (see section 13.1)	<p>The costs and benefits for each proposed initiative to address any imbalance between supply and demand should be presented so that these can be cross-checked against and informed by local knowledge.</p> <p>Impacts on water prices arising from each initiative must also be presented, so that customer willingness-to-pay for improvements in system performance arising from these initiatives can also be tested. This will help to inform community views on appropriate levels of service, as discussed above.</p>
Drought preparedness and response (see section 15.4.1)	<p>Drought preparedness requires ensuring that the community is involved and part of an ongoing conversation around planning and preparing for water shortages (not just as a result of drought, but other extreme events including water quality and emergency events including bushfires). All water user groups within the water supply system should be engaged, especially where water shortages may lead to restrictions for some uses and not others (e.g. urban versus rural restrictions), to understand community and user group expectations. The preparedness section of the Drought Preparedness Plan is to define how a water corporation has and will continue to engage with customers and stakeholders on planning for water shortages and is to articulate customer expectations and priorities.</p>

### 4.3 Monitoring and evaluating engagement efforts

Monitoring the implementation of the engagement plan is important for being able to respond to risks. Things to be monitored include budget, timelines and meeting objectives.

The focus of evaluation should be on understanding which parts of engagement efforts worked through speaking to stakeholders. This should highlight if there are any weaknesses and subsequent opportunities to learn from experience and implement improvement. Water corporations should document lessons and recommendations to ensure a documented plan for improvement can occur. Evaluation is an important step and is necessary for water corporations to understand whether engagement with the community was successful and if the objectives were achieved.

**Core requirement 4.1**

Water corporations must:

- show how they plan to partner with relevant Traditional Owners in the development and delivery of their UWS and how the results of this engagement have been incorporated.
- notify and approach Traditional Owner groups during the preliminary stages of planning and prior to any stakeholder engagement to honour their status as partners in natural resource management matters and meet statutory obligations under any agreements with the Victorian Government. For example, the Recognition and Settlement Agreements under the *Traditional Owner Settlement Act 2010 (Vic)* or Native Title determination under the *Commonwealth Native Title Act 2010 (Cth)*.
- engage on areas of interest as identified by Traditional Owners to meet obligations.

**Core requirement 4.2**

Water corporations must:

- use the development and implementation of UWSs to involve their customers and other key stakeholders in decision making and improve water literacy.
- identify key stakeholders to be engaged throughout the development process - at a minimum this must include:
  - water users
  - Local government
  - Traditional Owners (partnership approach)
  - Aboriginal Water Officers
  - connected or neighbouring water corporations e.g. Rural/Bulk Water Corporation as appropriate
  - Catchment Management Authorities / Victorian Environmental Water Holder
- ensure that public participation is undertaken via a planned and transparent engagement process that aligns with government expectations and that water planning processes allow sufficient time to explore options and meaningfully engage the community.
- develop and implement an Engagement Plan to support development and implementation of the UWS which:
  - clearly defines decision making requirements and the scope of public participation
  - demonstrates an understanding of who will be affected, by how they should be included
  - identifies the resources, skills and time required for effective public participation
  - documents the public participation and management approach
  - details implementation of the Engagement Plan and ways to monitor and evaluate the effectiveness of engagement
  - aligns with other relevant regional or state-wide engagement programs such as the CGSWS
- engage stakeholders on the following key matters to understand stakeholder preferences in UWS development and implementation (at a minimum):
  - appropriate levels of service and willingness to pay
  - potential need to take action to keep supply and demand in balance
  - possible initiatives to address any imbalance between supply and demand
  - values and uses of water
  - cost-benefit and trade-offs of taking action
  - which of these initiatives should be chosen for action, and when
  - drought preparedness and response
- Show outcomes-based evidence of their engagement with the above stakeholders - including a structured evaluation of alternatives for augmentation considering the key matters in Table 9 - to demonstrate how actions to keep supply and demand in balance directly link to what the community said.

## 5. Managing risk and uncertainty

This section of the guidelines outlines some of the risks associated with current and future water service provision and outlines approaches to better understand and manage these risks.

Water corporations are required to plan intergenerationally and “*need to ensure that water resources are conserved and properly managed for sustainable use and for the benefit of present and future generations*” (section 93(a), *Water Act 1989*). The Act also requires water corporations to “*integrate both long term and short term economic, environmental, social and equitable considerations*” (section 93(c)).

This is supported by the terms of the Statement of Obligations (General) for water corporations which requires consideration of a number of risks, such as climate change, in their UWSs across a 50-year planning horizon.

The Victorian Government Risk Management Framework<sup>20</sup> provides guidance and tools which may be useful to apply when considering risks relevant to the delivery of urban water services.

The Managing Climate Change Risk - Guidance for Board Members and Executives of Water Corporations and Catchment Management Authorities (June 2019)<sup>21</sup> also provides useful guidance on risk considerations for water corporations.

Key questions related to the incorporation of risk and uncertainty into the UWSs include:

- what are the foreseeable risks?
- what is the materiality of the risk?
- how do we stress test the risk?
- how do we plan for a range of scenarios?
- how do we test our assumptions over time?
- what are the triggers for changing strategy?
- how do we respond if circumstances change?

### 5.1 Adaptive decision-making framework

Adaptive management is a systematic process of continually improving management policies and practices by learning from management actions and using that learning to improve the next stage of management.

---

20. <https://www.vmia.vic.gov.au/tools-and-insights/tools-guides-and-kits/victorian-government-risk-management-framework>

21. [https://www.water.vic.gov.au/\\_\\_data/assets/pdf\\_file/0033/427497/Managing-Climate-Change-Risk-Guidance-Note-for-Water-Entities-20190702-.pdf](https://www.water.vic.gov.au/__data/assets/pdf_file/0033/427497/Managing-Climate-Change-Risk-Guidance-Note-for-Water-Entities-20190702-.pdf)



Decisions about proposed actions in response to expected and unexpected conditions causing a water shortage must be supported by a decision-making framework that enables an adaptive management approach. This ensures the need to take action – be it a short-term drought response initiative or a longer-term augmentation investment – is reviewed on a regular basis and evidence-based decisions are made based on the best available information.

The adaptive decision-making framework for urban water planning is described in section 3.1 with monitoring and evaluation of the roll-out of the UWS discussed in section 14.1.

## 5.2 Scenario planning

Scenario planning focuses attention away from estimating a single most likely event to understanding what could occur under different circumstances. Scenario planning also identifies plausible high impact but low probability events that need to be managed.

The Financial Stability Board Task Force on Climate-related Financial Disclosures<sup>22</sup> (TCFD) defines scenario analysis as a means of evaluating “*a range of hypothetical outcomes by considering a variety of alternative plausible future states (scenarios) under a given set of assumptions and constraints*”.

Scenarios<sup>23</sup> are neither forecasts nor predictions that provide a full description of the future but instead are hypothetical constructs which can be qualitative (relying on descriptive narratives) or quantitative (relying on numerical modelling), or a combination of both.

The TCFD proposes that scenarios have the following characteristics in Table 10.

**Table 10: Scenario characteristics**

Characteristic	Description
Plausible	The events in the scenarios should be possible and the narrative credible.
Distinctive	Each scenario should focus on a different combination of key factors. Multiple scenarios should be used to explore how different permutations and/or temporal development of the same key facts can yield very different outcomes.
Consistent	Each scenario should have strong internal logic. The goal of scenario analysis is to explore the way that factors interact and each action should have a reaction.
Relevant	Each scenario (and set of scenarios) should contribute insights into the future that relate to strategic and/or financial implication of climate-related risks and opportunities.
Challenging	Scenarios should challenge conventional wisdom and simplistic assumptions about the future. Scenarios should try to explore alternatives that will significantly alter the basis for business-as-usual assumptions.

22. <https://www.unepfi.org/climate-change/tcfd/>

23. <https://www.climatechangeinaustralia.gov.au/en/climate-campus/modelling-and-projections/using-projections/application-ready-data/hydrology-case-study/>

Scenarios are inbuilt into various data and planning processes relevant to the UWS preparation and understanding the supply/demand balance. For example different climate change scenarios are presented in a risk-based framework that considers the vulnerability of supply systems to climate variability and climate change (see section 9). These scenarios can be supplemented with a range of alternative techniques and datasets to provide additional information on the behaviour of water supply systems including those matters in Table 11, Table 12 and Table 13.

Victoria in Future 2019 (VIF2019) is the official state government projection of population and households. Projections are used by decision makers in government, business and the community to understand the growing and changing population. Population projections are estimates of the future size, distribution and composition of the population. They are developed using mathematical models and expert knowledge, relying on trend analysis and assumptions about future change. They should not be interpreted as exact predictions or forecasts of the future. Uncertainty about the future increases over longer projection horizons and with smaller geographic areas. Different policy settings and changes in the economy could result in changes to the expected size, distribution and composition of the population.

VIFF projections present a range of outcomes or scenarios for population change. Conditions and trends may change in the future, however, and if other assumptions were used, different growth levels would result. Migration levels are more sensitive to changes in policy or economic conditions than births or deaths. The recent COVID-19 situation has had an immediate effect on population projections in some parts of Victoria – additional guidance will be provided in VIF 2020 but long-term population projections are not expected to change markedly.

**Core requirement 5.1**

Water corporations must:

- apply and document a decision-making approach (such as adaptive management and scenario planning) to enable water corporations to be adaptive and responsive and account for the high level of uncertainty involved in projecting future demand for, and supply of, water services. This should be evidence-based.

### 5.3 Uncertainty considerations

This section outlines some of the sources of water supply and demand uncertainty to be considered when managing risk and uncertainty. Further guidance on approaches to projecting supply, including an assessment of the impacts of a range of plausible climate futures and sensitivity testing is provided in Guidelines for Assessing the Impact of Climate Change on Water Availability in Victoria (DELWP 2020).

### 5.3.1 Water supply uncertainty

Table 11 outlines potential sources of uncertainty relevant to water supply.

**Table 11: Sources of water supply uncertainty**

Category	Description
Climate change and climate variability	<p>The influence of numerous climate phenomena makes Victoria’s climate highly variable. Over the period of recorded climate data (up to ~150 years), Victoria has experienced numerous floods and several prolonged droughts. Pre-instrumental data suggests that our climate may be more variable than we have observed in the instrumental records.</p> <p>Research from the Victorian Climate Initiative (the pre-cursor to the current Victorian Water and Climate Initiative) identified clear reductions in cool season (April to October) rainfall over recent decades. This trend has continued despite some wetter years since the Millennium Drought<sup>24</sup>. This has significant implications for water corporations as it represents a shift in the reliability of rainfall during the traditional storage filling and aquifer recharge season. Climate change, both globally and in Victoria, has manifested to date as a mix of gradual and step changes.</p>
Extreme events	<p>UWSs need to consider the impacts of extreme events, that may make sources of water unavailable through reduced availability or unsuitable condition of the source water. The assessment of risks should give consideration to the diversity of the water corporation’s supplies.</p> <p>The types of extreme events that need to be considered in planning for water supply include:</p> <ul style="list-style-type: none"> <li>• an extreme dry period</li> <li>• a water quality event of an intensity, magnitude and duration that renders water acutely toxic or unusable for established local uses and values</li> <li>• bushfire</li> <li>• extreme wet period</li> <li>• flooding and overbank inundation</li> <li>• major asset failure</li> <li>• point source discharge</li> </ul>
Groundwater supplies	<p>Groundwater has been effectively used as the primary source of supply or to supplement supplies in certain areas of Victoria and is a good supply option where it is available in sufficient quantity and quality. However, groundwater, like surface water, can be vulnerable to drought and climate variability. Groundwater levels have fallen across many parts of Victoria over the past decade in response to increased use.</p>
Changing catchment conditions	<p>Changes in catchment conditions can impact yield through reduced runoff, including</p> <ul style="list-style-type: none"> <li>• the impact of bushfires on catchment characteristics<sup>25</sup></li> <li>• land use changes e.g. increase in area of plantations and/or farm dam changes</li> </ul>
Major asset reliability and limits	<p>Where appropriate UWSs should include an assessment of the risks associated with potential water availability due to the impacts of planned and unplanned shutdown of water and sewerage assets for civil, mechanical or electrical maintenance and repair.</p> <p>For example, water transfer limitations in connecting pipelines have previously led to restrictions being implemented despite adequate bulk water storage levels.</p> <p>UWSs do not need to consider the short-term consequences of water mains shutdowns resulting from water mains failure.</p>

24. <https://www.water.vic.gov.au/climate-change/millennium-drought-report>

25. The Guidelines for Assessing the Impact of Climate Change on Water Availability in Victoria (2020) acknowledge that the risk of bushfires in Victoria is estimated to increase for most climate change projections. However, reliably quantifying projected changes in runoff and recharge due to projected changes in future bushfire risk is extremely difficult. This is due not only to the complex relationship between bushfire, vegetation composition and hydrologic response, but also to the unknown timing, spatial extent and intensity of future bushfires.

Category	Description
Water quality	<p>Water quality is an issue that is known to reduce water security and lead to restrictions. For example restrictions have been implemented in various systems because of a blue green algae outbreak. The frequency and severity of such outbreaks under climate change may warrant consideration for water corporations.</p> <p>Water quality may also be affected by emerging contaminants<sup>26</sup> or through activities taking place in the catchment.</p>
Future water access	<p>Future water access considerations include licencing arrangements renewals, long-term and short-term qualifications of rights and seasonal determinations.</p> <p>The findings of the Long-Term Water Resource Assessment, implementation of the Murray-Darling Basin Plan, renewal of licences, seasonal determinations and allocations, third party impacts including on the environment from the trade and/or extraction of water, could all affect the long and short term availability of existing water sources for consumptive purposes including urban water use.</p>

**Core requirement 5.2**

Water corporations must:

- plan for climate change and climate variability when developing UWSs in consideration of the uncertainty surrounding future climatic conditions. This planning is to reflect the best available information.
- engage with the relevant Rural Water Authority and DELWP to determine the availability and licencing requirements of accessing any proposed additional groundwater resources and undertake or recommend groundwater investigations where there is uncertainty about the quality or quantity of groundwater that can be accessed on an ongoing basis.
- consider the risks of a reduction in yield as a result of changing catchment conditions as result of impacts such as bushfires, increases in farm dams or planation extent.

UWSs must:

- include a qualitative assessment of the risks associated with extreme events (see Table 11) that may make sources of water unavailable.
- include an assessment of the risks associated with water quality that may make sources of water unavailable including emerging contaminants.
- include an assessment of the risks associated with continued access to existing sources of water if changes to current access arrangements occur which may reduce or make unavailable existing sources of water.

Water corporations should:

- consider the risks associated with potential water availability due to the impacts of planned and unplanned shutdown of assets for civil, mechanical or electrical maintenance and repair.
- consider the risks associated with water transfer limitations that might require water supply to be restricted.

26. <https://ref.epa.vic.gov.au/your-environment/land-and-groundwater/pfas-in-victoria>

### 5.3.2 Demand uncertainty

Table 12 outlines some of the sources of water demand uncertainty to be considered.

**Table 12: Source of water demand uncertainty**

Category	Description
Population changes	<p>Population projections are an important input to the development of urban water demand projections.</p> <p>The VIF2019 projections are an indication of possible future populations (not targets) if current demographic, economic and social trends continue. Future policies and external influences may change the current trends of population and distribution and are to be considered as part of a sensitivity analysis.</p> <p>Further information on the VIF2019 population projections, and associated housing projections, can be obtained directly from DELWP. The recent COVID-19 situation has had an immediate effect on population projections in some parts of Victoria – updates will be provided in VIF 2020.</p>
New development	<p>New residential, commercial and industrial developments may require additional water and sewerage services. UWSs are to consider new developments including those in planning documents such as Plan Melbourne<sup>27</sup>, Regional Growth Plans<sup>28</sup> and Growth Corridor Plans<sup>29</sup>.</p>
Water use trends	<p>Long term water consumption trends are influenced by factors such as:</p> <ul style="list-style-type: none"> <li>• additional or higher water use appliances – the uptake of combined washer dryers, and evaporative air-conditioners.</li> <li>• climate change – non-residential customers may have increased demands due to climate change or may be subject to effects for example of transition to a low-carbon economy which could affect their operations and reduce water demands.</li> <li>• climatic conditions – a hot and dry summer will mean more garden watering, and increased outdoor water consumption, in comparison to a mild and wet summer.</li> <li>• demographic change – different demographic groups may use water differently and could be targeted for specific behaviour change programs. For example, young families, religious or cultural groups may have increased laundry usage while lower socio-economic groups may have older and less efficient fixtures and fittings.</li> <li>• housing characteristics – trends towards smaller or no gardens, or drought-resistant gardens, will decrease outdoor water consumption in some areas while a growing prevalence of backyard pools may increase usage in others. Older housing stocks and units may be more prone to leakage or older less efficient fixtures and fittings.</li> <li>• water efficient appliances – the uptake of progressively more efficient, washing machines, dishwashers and dual-flush toilets will decrease indoor water consumption.</li> <li>• water use behaviour – customers may have taken steps to reduce their water use in response to messages about drought, such as taking shorter showers, and these behavioural changes may persist even in the absence of drought.</li> </ul>

27. <https://www.planmelbourne.vic.gov.au/>

28. <https://www.planning.vic.gov.au/policy-and-strategy/regional-growth-plans>

29. <https://vpa.vic.gov.au/greenfield/growth-corridor-plans/>

**Core requirement 5.3**

Water corporations must:

- consider uncertainty around population changes having regard to the Victoria in Future VIF2019<sup>30</sup> (and updated) population projections, noting that these projections can be tailored to reflect local knowledge and experience, provided that there is sufficient evidence to support these variations. Additional caution is to be applied when extrapolating beyond the 30-year period provided by VIF2019.
- consider uncertainty regarding future water use demands<sup>31</sup>

### 5.3.3 Environmental water requirements

The environmental water reserve<sup>32</sup> (EWR) is the water set aside by law to meet environmental requirements, which includes:

- statutory environmental entitlements (such as a volume of water held in storage)
- conditions on bulk entitlements, licences and permits (such as passing flows below a storage)
- the establishment of limits to diversions (such as permissible consumptive volumes and caps)

Proposals to enhance the EWR may arise through the development of regional Sustainable Water Strategies. Further guidance on interpreting proposals or actions in the regional Sustainable Water Strategies can be obtained directly from DELWP.

**Core requirement 5.4**

Water corporations must:

- provide for current environmental water obligations as reflected in the Environmental Water Reserve
- take into account future environmental water obligations as set out in clearly defined proposals or actions in regional Sustainable Water Strategies.

### 5.3.4 Interdependency risks

Risks associated with water supply interdependency on other systems and supply chains may also impact on water sector operations and impact their services to customers indirectly. For example, storms or bushfires may makes it dangerous to drive along a road, this is a disruption to a transport corridor that may impact the services of a water or wastewater treatment facility.

Similarly, disruptions in supply chains that provide chemicals used in water and wastewater treatment can also affect the water industry's ability to provide services.

---

30. <https://www.planning.vic.gov.au/land-use-and-population-research/victoria-in-future>

31. Projecting water demands is detailed in section 10 of these Guidelines and in the Guidelines for Assessing the Impact of Climate Change on Water Availability in Victoria (DELWP, 2020). The guidelines provide projections for changes in temperature and evapotranspiration under climate change, that can be used by water corporations to assess potential changes in demand due to climate change.

32. <https://www.water.vic.gov.au/waterways-and-catchments/rivers-estuaries-and-waterways/environmental-water>

One of the critical inter-sector risks is with the energy sector. The water industry uses energy for pumping and treating water and wastewater. Without power for prolonged periods, sewage can back up in its pipes and may spill into waterways. Most water corporations have backup generators for critical assets in case of power failure, but they may not prevent every sewage spill. Energy and equipment failures are most likely to happen during heatwaves, typically occurring in summer, when sewage spills into waterways are most likely to have a negative impact on the environment.

In recent summers blackouts have also been experienced in operating centres and ICT networks which impacts widespread operations. The energy industry is also heavily reliant on water for cooling its power stations.

Extreme events associated with climate change may impact on the services provided by water sector organisations or require them to invest more to maintain service levels. For example, a water corporation's revenue may decline when water restrictions are introduced in response to drought and heatwaves and storms can also lead to service disruptions and asset damage. Some of the performance measures used by the Essential Service Commission to monitor and assess services provided by water corporations, which may be affected by climate change, include the number of:

- water supply reliability complaints
- sewerage odour complaints
- sewer blockages
- sewerage service quality and reliability complaints
- water supply interruptions
- sewage spills

Depending on the potential impacts of climate change and ongoing efficiency improvements, water corporations, through engagement with customers, may need to decide to lower levels of service or invest more to maintain or improve service levels. Climate change may affect operations and compliance with industry standards, but it may also affect the costs for staff to manage these events.

### 5.3.5 Low carbon economy transition risks

Table 13 details transition risks likely to affect water agencies as they transition to a low carbon economy.

Water corporations have already seen one of the transition risks. Water for Victoria commits water corporations to demonstrating a pathway to net-zero emissions and to pledge an interim emission reduction target to be achieved by 2025. The latter was formalised by the Minister for Water via the Statement of Obligations (Emissions Reduction)<sup>33</sup> issued in March 2018.

Accordingly, future augmentation options that have the potential to increase emissions need to be considered in terms of broader climate change actions and requirements.

Transition risks may also affect customers the viability of some customers which could impact on future demands.

---

33. [https://www.water.vic.gov.au/\\_\\_data/assets/pdf\\_file/0017/120671/Statement-of-Obligations-Emission-Reduction.pdf](https://www.water.vic.gov.au/__data/assets/pdf_file/0017/120671/Statement-of-Obligations-Emission-Reduction.pdf)

**Table 13: Transition risks likely to affect water agencies**

**Transition risks likely to affect water agencies:**

Transition risks” describe the “indirect financial risks that might arise from the transition to a lower carbon economy” (which may or may not occur in unpredictable ways) including:

- changes in regulatory policy (e.g. moving to zero emissions)
- technological innovation (e.g. advances in water treatment efficiency)
- social adaptation (including changing consumer preferences – which might include changes to where people live)
- changes to energy, land-use, urban and infrastructure (including transport and buildings) and industrial system
- climate-related litigation relating to the failure of organisations to mitigate impacts of climate change, failure to adapt to climate change, and the insufficiency of disclosure around material financial risks.

**Core requirement 5.5**

Water corporations should:

- consider interdependency risks on other systems and supply chains that may impact on water service operations and their services to customers.
- consider transitions risks that might arise from the transition to a lower carbon economy when considering future operating scenarios.



## 6. Incorporate recent experience

A thorough stocktake of relevant documentation will provide a strong basis for the UWS to build from, consolidate, understand and give effect to relevant actions that align with the purpose of UWSs:

- to deliver sub-regional planning outcomes, and integrate water cycle management with relevant planning schemes
- measures to maintain a balance between the customer's demand for water and the supply of water in cities and towns
- options to facilitate efficient investments in projects across the urban water cycle that optimise shared benefits and avoidable costs

The review will also minimise duplication of effort across planning processes and ensure that planning processes are pulling in the same direction.

Reviewing of relevant actions and directions relevant to supply and demand, risk and uncertainty from other planning and policy documents is to include but should not be limited to the matters set out in Table 14:

Learnings to incorporate can include:

- community and customer preferences and insights
- supply and demand related augmentation projects and actions
- values and uses of water
- environmental values
- system vulnerabilities and operating changes
- variations in projected and experienced supply and demand

**Table 14: Taking stock of existing actions, risks and community views relevant to UWSs**

Source for stocktake	Example of possible learnings and insight:
Water for Victoria	<ul style="list-style-type: none"> <li>• actions for urban water corporations to deliver relevant to UWSs</li> <li>• stakeholder feedback e.g. feedback in the 'closing the loop report'<sup>34</sup> highlighted four key areas of strong support:               <ul style="list-style-type: none"> <li>– for safe, secure, affordable supplies; effective and affordable wastewater systems; effective stormwater management; healthy urban landscapes; and community values in local planning.</li> <li>– using diverse water sources and better stormwater management, with questions about how we intend to improve stormwater management.</li> <li>– efficiency programs and education about the broader water cycle.</li> <li>– integrated water management and aligning water and urban planning, with requests for details about how integrated water management planning will work.</li> </ul> </li> </ul>
Previous Water Supply Demand Strategies and UWSs	<ul style="list-style-type: none"> <li>• UWSs are to draw on the efforts and outcomes of previous Water Supply Demand Strategy analysis. Learnings from previous Water Supply Demand and UWSs including evaluation of key actions and decisions must be documented.</li> <li>• learnings from previous Drought Response Plans including evaluation of key actions and decisions, particularly emergency or contingency actions taken in the event of extreme water shortage. It is expected that this will include a review of the effectiveness of water restrictions in the face of demand hardening and their impact on key liveability assets.</li> <li>• learning from Annual Water Outlook processes.</li> </ul>
Long-term water resource assessment <sup>35</sup>	<ul style="list-style-type: none"> <li>• findings relevant to availability of surface and groundwater resources and waterway health.</li> </ul>
Water grid partnership <sup>36</sup>	<ul style="list-style-type: none"> <li>• biennial statements outlining future proposals to augment the grid. These grid augmentations are supporting a range of work which make the most of alternative water sources, including stormwater harvesting and the recycling of wastewater.</li> <li>• related programs of work such as the Southern Market Trial and Grid Stress Test.</li> </ul>
Sustainable Water Strategies and reviews	<ul style="list-style-type: none"> <li>• relevant actions that can be localised and delivered through the UWS.</li> <li>• community sentiment e.g. the central Sustainable Water Strategy Review (2018) Submissions highlighted the need for alternative sources of water to supply multiple needs (including urban, environmental and agricultural) and keep cities and towns cool and green in the face of urban densification [CSWS Review Report, p.54]. This includes looking at the use of alternative sources to maintain environmental flows, rather than reducing the environment's share [p.51]. Submissions have also highlighted the need for engagement with the community to understand and discuss trade-offs, in preparation for droughts and water scarcity, and the integration of water and land use planning to ensure secure water supplies in the future [p.61]. Submissions highlighted the potential for peri-urban agriculture to demand alternative water and provide a source for economic growth [CSWS Feedback synthesis report p.4].</li> <li>• identification of any differences in water resources assessments completed for the UWS compared to the 2021 SWS for Central Victoria and Gippsland<sup>37</sup>, the reason for these differences and the implications for urban water security and other uses and values.</li> </ul>

34. [https://www.water.vic.gov.au/\\_\\_data/assets/pdf\\_file/0027/58851/Water-Plan-feedback-report.pdf](https://www.water.vic.gov.au/__data/assets/pdf_file/0027/58851/Water-Plan-feedback-report.pdf)

35. <https://www.water.vic.gov.au/planning/long-term-assessments-and-strategies/twra>

36. <https://www.water.vic.gov.au/water-grid-and-markets/the-grid>

37. <https://www.water.vic.gov.au/planning/long-term-assessments-and-strategies/sws/central-gipps-sws>

Source for stocktake	Example of possible learnings and insight:
Integrated Water Management Plans and Strategic Directions Statements <sup>38</sup>	<ul style="list-style-type: none"> <li>community views on integrated water management and alternative water sources.</li> <li>projects which can influence supply and demand outcomes e.g. alternative water supply projects were heavily prioritised right across Victoria by the 15 IWM Forums currently operational. 42 projects are included in the Forums' Strategic Directions Statements, 31 in Melbourne and 11 in regional Victoria. While these projects identified alternative water as the primary driver, many more IWM projects across the state are examining alternative water as a secondary benefit or objective being sought i.e. greening public open spaces and thereby reducing heat island effects.</li> </ul>
Regional Waterway Strategies <sup>39</sup> and Regional Catchment Strategies <sup>40</sup>	<ul style="list-style-type: none"> <li>projects, actions and directions from these strategies including community values e.g. the Melbourne Water Healthy Waterways Strategy set out ambitious stormwater harvesting targets for protecting waterways. It highlights the need to considerably increase the amount of harvested stormwater to protect waterways, especially ephemeral waterways located within Melbourne's Growth Areas.</li> <li>catchment management and waterway management projects and activities that influence water quality and supply, or may impact discharge of treated water to waterways.</li> </ul>
Murray Darling Basin Plan and associated Water Resource Plans <sup>41</sup>	<ul style="list-style-type: none"> <li>outputs of risk assessments relevant to urban water and meeting critical human water needs.</li> <li>values and uses of water by Traditional Owners<sup>42</sup>.</li> </ul>
Changes to system management e.g. Bulk Entitlements and polices	<ul style="list-style-type: none"> <li>changes in system configuration or system management over the preceding five years, such as infrastructure change, changes in entitlements and carryover arrangements.</li> </ul>
Community sentiment	<ul style="list-style-type: none"> <li>increasingly communities expect to engage with water planners and managers with the aim of delivering 'shared benefits'. These are the additional benefits water planners and managers can provide, beyond the expectation of providing water to the environment and to agricultural, residential and industrial users.</li> <li>recent trends in demand including consideration of the longer-term impact of exemptions to water restrictions granted for sporting and recreational assets.</li> <li>customer and community insights garnered from other engagement processes such as IWM forums, ESC pricing submissions and customer satisfaction surveys and feedback loops, may be valuable and reduce the need to duplicate effort.</li> </ul>
'In-house' technical studies	<ul style="list-style-type: none"> <li>studies that have been undertaken in support of updated UWSs, including key outcomes from these studies and level of detail at which studies were undertaken (i.e. concept, pre-feasibility, feasibility, functional design, detailed design).</li> <li>existing risk assessments and/or management plans undertaken for water corporation planning and financial purposes which identify issues of relevance to the UWSs.</li> </ul>
Industry and academic literature	<ul style="list-style-type: none"> <li>socio-economic analysis of matters such as the impacts of water restrictions, the value of water in storage, liveability and resilience measures related to water supply and affordability.</li> <li>publications from WSAA, VicWater and other industry bodies</li> </ul>

38. <https://www.water.vic.gov.au/liveable/integrated-water-management-program/forums>

39. <https://www.water.vic.gov.au/waterways-and-catchments/rivers-estuaries-and-waterways/strategies-and-planning>

40. <https://www.water.vic.gov.au/waterways-and-catchments/our-catchments/catchment-management-framework>

41. <https://www.water.vic.gov.au/mdb/mdbp/water-resource-plans>

42. [https://www.water.vic.gov.au/\\_data/assets/pdf\\_file/0035/429839/Vic\\_WRPs\\_Traditional\\_Owner\\_Objectives\\_Outcomes\\_compilation\\_2019\\_Ir.pdf](https://www.water.vic.gov.au/_data/assets/pdf_file/0035/429839/Vic_WRPs_Traditional_Owner_Objectives_Outcomes_compilation_2019_Ir.pdf)

Source for stocktake	Example of possible learnings and insight:
Climate change adaption and mitigation	<ul style="list-style-type: none"> <li>• in 2017, Victoria’s 19 water corporations pledged to Government a pathway to achieve net-zero emissions by 2050, with the four metropolitan water corporations setting an early path to net-zero emissions by 2030. Each water corporation has set its own path to net-zero emissions, informed by their customers’ preferences.</li> <li>• Victoria’s water corporations have pledged to reduce their collective annual emissions to or below 504,828 tonnes of CO<sub>2</sub>-equivalent by 1 July 2025. This represents a 42% reduction from the estimated total sector emissions of 868,000 t CO<sub>2</sub>-e in the baseline period of 2011-2016. When factoring for population growth and other variables, this represents an estimated reduction of 446,544 tonnes, or 47% over estimated business-as-usual emissions projections.</li> <li>• the 2018 Pilot Water Sector Climate Change Adaptation Action Plan<sup>43</sup> has been delivered as part of the Water for Victoria program. This pilot outlines current and potential future impacts of climate change, actions already taken to address them, what still needs to be done and 20 priority actions to inform Victoria’s long-term strategy to tackle the effects of climate change and put the sector on the right track to a resilient water future. These actions also put the water sector in a strong position to prepare the inaugural Water Sector Adaptation Action Plan by 2021, as required under the <i>Climate Change Act 2017</i>.</li> </ul>
Sewerage	<ul style="list-style-type: none"> <li>• existing sewerage strategies and documentation such as the Melbourne Sewerage Strategy<sup>44</sup> which sets a target of “an additional 50 GL/year of water from the sewerage system is beneficially reused in an economically viable way by 2040 to support MWSS goals.”</li> </ul>

<p><b>Core requirement 6.1</b></p>	<p>Water corporations <u>must</u>:</p> <ul style="list-style-type: none"> <li>• undertake a review of the matters in Table 14 with key findings clearly documented in the UWS and incorporate: <ul style="list-style-type: none"> <li>– relevant learnings from recent experience</li> <li>– changes to planning and regulatory frameworks</li> <li>– relevant actions from other processes including localising broader scale actions</li> </ul> </li> </ul> <p>Water corporations <u>should</u>:</p> <ul style="list-style-type: none"> <li>• use this review to inform the extent of stakeholder engagement required on particular matters.</li> </ul>
------------------------------------	---

---

43. [https://www.water.vic.gov.au/\\_\\_data/assets/pdf\\_file/0019/410851/WSAAP-Web-version-FINAL\\_v2.pdf](https://www.water.vic.gov.au/__data/assets/pdf_file/0019/410851/WSAAP-Web-version-FINAL_v2.pdf)  
44. <https://www.melbournewater.com.au/about/strategies-and-reports/melbourne-sewerage-strategy>

## 7. Understanding current water system/s

The purpose of this section is to “set the scene” (establish the context) for customers and the community to understand the key components of the current water supply, sewerage and recycled water systems including the regional context, water demands, water sources, system capacity and an overview of alternative water systems<sup>45</sup>.

### 7.1 Regional and geographic context

UWSs must provide an overview of the water supply system/s and sewerage system/s managed by the water corporation.

The overview is to:

- provide an overview of the areas serviced including current demands (e.g. non-potable vs potable and by end use type)
- describe the various water supply sources including catchments/aquifers and their relevant characteristics along with sources of alternative water including stormwater
- identify key physical features of the system/s and region
- highlight any regulatory instruments that govern or are relevant to operation of the system/s

The overview should avoid extensive technical detail and is to utilise schematics and maps to communicate these matters to customers.

The strategy must include a map or maps that provide regional and geographical context for the relevant systems including key supply infrastructure and sewerage infrastructure, as well as other systems that form part of the urban water system such as key stormwater assets, key waterways and creeks, groundwater etc, along with key geographic features such as towns, boundaries and identified Priority Community Assets (see section 15.4.1).

Useful information to include on the map or schematic includes:

- towns serviced
- major water sources and bulk water infrastructure, including rivers, reservoirs and storages, transfer pipelines and water supply and wastewater treatment plants
- key environmental assets and water based recreational features relevant to the community
- surrounding towns, particularly towns that may in future be serviced by the system/s
- major sewerage infrastructure, for example e.g. bulk sewers, and pumping stations and treatment facilities
- priority open space identified by local government, other agencies and/or the community

These maps and schematics can form the basis for further maps showing proposed future actions and projects identified as possible options through the UWS.

---

45. the combined Metropolitan Melbourne Urban Water System Strategy can reference the Melbourne Sewerage Strategy

**Core  
requirement  
7.1**

The UWS must:

- provide an overview of the water supply system/s and sewerage system/s managed by the water corporation. The overview is to:
  - provide a summary of the areas serviced including current demands (e.g. non-potable vs potable and by end use type)
  - describe the various water supply sources including catchments/aquifers and their relevant characteristics along with sources of alternative water including stormwater
  - identify key physical features of the system/s and region
  - highlight any regulatory instruments that govern or are relevant to operation of the system/s
  - avoid extensive technical detail and utilise schematics and maps to communicate these matters to customers.
- include a map or maps that provides regional and geographical context for the relevant systems including key supply infrastructure and sewerage infrastructure as well as other systems that form part of the urban water system such as key stormwater assets, key waterways and creeks, groundwater etc along with key geographic features such as towns, boundaries and identified Priority Community Assets (see section 15.4.1).
  - regard should be given to the potential movement of water between different locations and/or systems.
  - maps and graphical depictions of supply/demands should be developed as a tool to inform community engagement. These can be built upon to graphically depict future options.

## 7.2 Water access and delivery arrangements

### 7.2.1 Entitlements to water and trade

Under the *Water Act 1989*, a person may not take water unless they are authorised to do so. Authorisation for the take and use of water is provided under the Act, particularly through the water entitlement framework. The volume of water authorised to be taken and used is specified in a water entitlement. A water entitlement is the right to take/use/extract water and may be limited by conditions.

Urban water corporations typically access water under the following entitlements for various sources of supply such as a regulated river, unregulated river or from a bore (groundwater) (see Table 15).

The UWS must describe existing water access arrangements.

**Table 15: Types of entitlements in regulated and unregulated systems**

Entitlement	Regulated system					Unregulated and groundwater system			
	Rural water corporation	Urban water corporation	Environment	Irrigator and individuals	Power generating companies	Rural water corporation	Urban water corporation	Environment	Irrigators and individuals
Bulk entitlement	✓	✓	✓		✓	✓	✓	✓	
Environmental entitlement			✓					✓	
Water share	✓	✓	✓	✓					
Licence (section 51)				✓	✓	✓	✓		✓
Section 8 right				✓					✓
Supply by agreement		✓	✓	✓	✓				✓

**Core requirement 7.2**

The UWS must:

- outline the current entitlements held by the corporation under:
  - Bulk Entitlements
  - Take and use license (section 51)
  - water shares in declared water systems
- outline water available under each entitlement, the source of that water, key limitations on take, historical levels of take (minimum of the past 5 years).
- detail the use of water trading by the corporation to meet urban water needs over the past 5 years.

**7.2.2 Water supply systems**

To enable stakeholders to understand the system which supplies their water and engage in the UWS development process, a system overview must be included that describes key characteristics of all currently available sources of water and key elements of bulk water storage, treatment and delivery infrastructure, as set out in Table 16.

The existing available sources of water (supply mix) must be visualised in terms of a “typical/current supply mix” and “possible/available supply mix”.

Trends in supply must be plotted over a minimum 5 previous year period.

**Table 16: Existing water supply elements**

Water source	Element
Surface water	<ul style="list-style-type: none"> <li>• source of water from which the system/s can access surface water, as reflected in bulk entitlements (or surface water diversion licences) held by the water corporation</li> <li>• caps on annual water use and/or maximum diversion rates, as specified in bulk entitlements (or licence conditions)</li> <li>• name and storage capacity of reservoirs, including any capacity or inflow sharing arrangements with other entitlement-holders, as specified in bulk entitlements and/or environmental entitlements</li> <li>• details of any other relevant rules that constrain, limit or otherwise affect how surface water can be accessed from the water source, as specified in bulk entitlements and/or environmental entitlements</li> <li>• key water treatment and delivery infrastructure</li> <li>• constrained areas in delivery infrastructure / 'pinch points' in water system</li> <li>• general comments on water quality</li> <li>• general comments on environmental, Aboriginal and recreational values and health of water sources, as identified in regional strategies for healthy rivers, wetlands and estuaries, sustainable water strategies and other relevant reports such as environmental flow studies or streamflow management plans.</li> </ul>
Desalinated water	<ul style="list-style-type: none"> <li>• grid connections from which access to desalinated water is available</li> <li>• volume of delivery entitlement held by water corporations</li> </ul>
Groundwater (including aquifer storage and recovery)	<ul style="list-style-type: none"> <li>• aquifer/s from which the system/s can extract groundwater, as reflected in groundwater licences (or bulk entitlements) held by the water corporation</li> <li>• number and location of bores</li> <li>• maximum annual and daily extraction rates, as specified in groundwater licences (or bulk entitlements)</li> <li>• details of any other relevant rules that constrain, limit or otherwise affect how groundwater can be accessed from the aquifer, as specified in groundwater licences (or bulk entitlements) and Groundwater Management Plans</li> <li>• key water treatment and delivery infrastructure</li> <li>• general comments on water quality</li> <li>• general comments on aquifer sustainability, as identified in groundwater management plans and/or groundwater resource reports<sup>46</sup></li> </ul>
Recycled water	<ul style="list-style-type: none"> <li>• location and nature of recycled water production facilities</li> <li>• volume of recycled water produced per annum</li> <li>• classes of recycled water produced and general comments on water quality</li> <li>• bulk delivery infrastructure</li> </ul>
Stormwater	<ul style="list-style-type: none"> <li>• location and nature of stormwater production facilities</li> <li>• volume of stormwater produced per annum</li> <li>• volume of harvested per annum</li> <li>• general comments on water quality</li> <li>• bulk infrastructure</li> </ul>

46. <https://www.water.vic.gov.au/groundwater/groundwater-resource-reports>



Water source	Element
Trade	<ul style="list-style-type: none"> <li>• general comments on water trading expectations</li> <li>• use of water trading by the corporation to meet urban water needs over the past 5 years.</li> <li>• volumes expected to be purchased or traded in the short term (0-5 years), medium term (5 – 20 years) and long term (20 – 50 years)</li> </ul>
Other	<ul style="list-style-type: none"> <li>• nature of any other water source being used</li> <li>• volume of each additional water source being used</li> <li>• general comments on water quality</li> <li>• details of any other key elements of bulk water infrastructure</li> </ul>

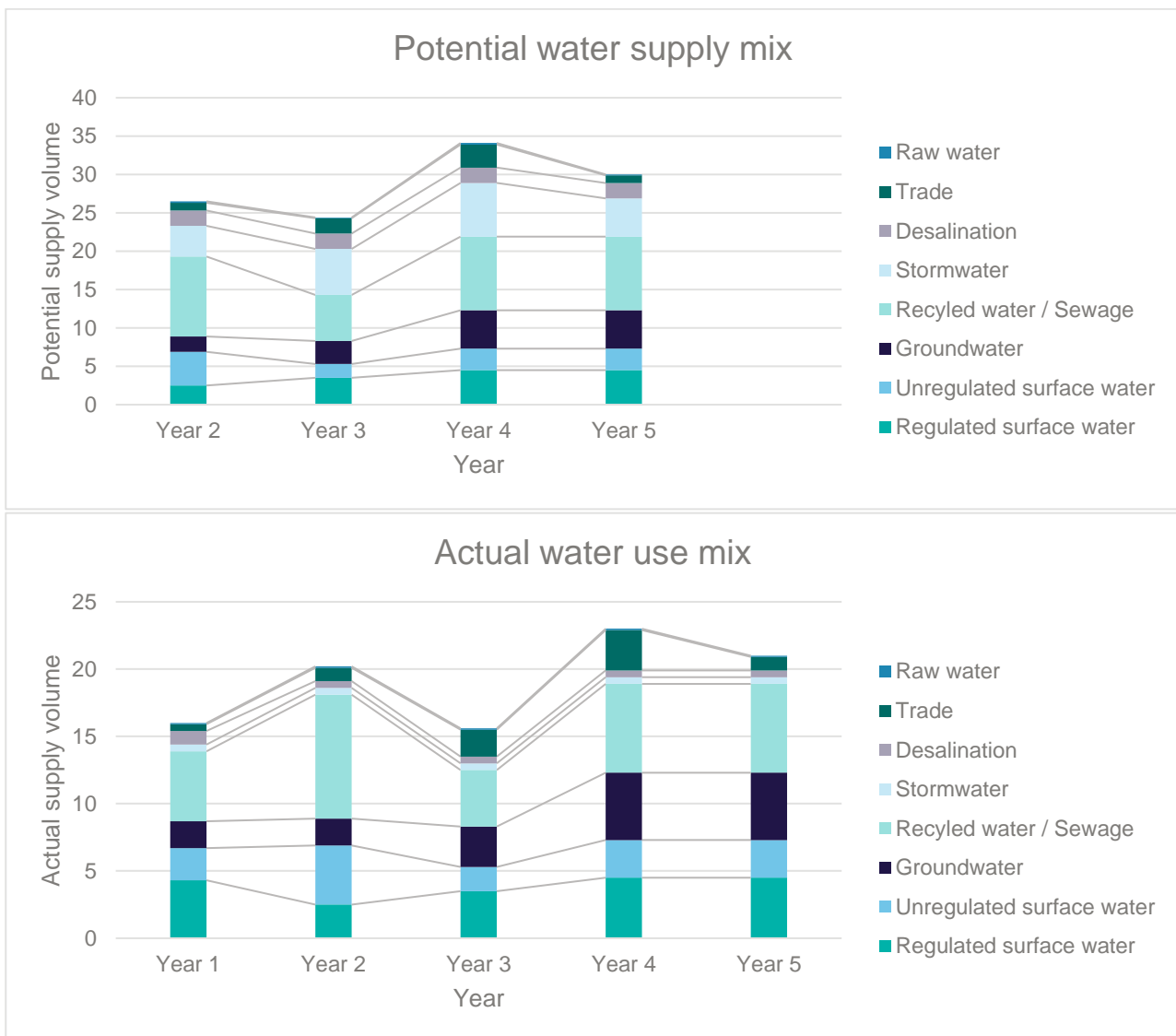


Figure 5: Example plots of source water supply

<b>Core requirement 7.3</b>	<p>The UWS <u>must</u>:</p> <ul style="list-style-type: none"> <li>include an overview that describes key characteristics of all currently available sources of water and key elements of bulk water storage, treatment and delivery infrastructure, as set out in Table 16.</li> <li>visualise the existing available sources of water (supply mix) in terms of a “typical/current supply mix” and “possible/available supply mix”</li> <li>provide trends in supply over a minimum 5 previous year period.</li> </ul>
-----------------------------	---

### 7.2.3 Sewerage system (major components)

The strategy must include a sewerage system overview that describes the bulk components of sewage treatment and transfer assets.

**Table 17: Existing bulk sewerage system elements**

Component	Element
Treatment assets	<ul style="list-style-type: none"> <li>location and capacity of treatment plants, including volume and critical load</li> <li>volume of treated effluent produced per annum including the quality by Class and end use (e.g. discharge to environment, reuse)</li> <li>estimates of timeframe and drivers for renewal of treatment plants</li> <li>description of compliance issues if any</li> <li>description of beneficial uses (environmental, third pipes, etc)</li> <li>details of any other relevant constraints, limits or otherwise that affect how sewage can be managed by the treatment plant</li> <li>general comments on environmental values and health of receiving environments, as identified in regional strategies for healthy rivers, wetlands and estuaries, sustainable water strategies and other relevant reports such as environmental flow studies or streamflow management plans</li> <li>details of the existing use of any offset measures to protect beneficial uses and/or discharges that provide environmental benefits under licence</li> </ul>
Transfer assets	<ul style="list-style-type: none"> <li>capacity of bulk sewer pipes and pump stations (only significant components of the network), such as pinch points in bulk transfer infrastructure</li> <li>description of known compliance issues if any</li> <li>overview of known renewal requirements</li> </ul>

<b>Core requirement 7.4</b>	<p>The UWS <u>must</u> include a sewerage system overview that describes major components of sewage treatment and transfer assets covering the elements in Table 17.</p>
-----------------------------	--

### 7.3 Current water demands

Understanding the existing demands on each water supply system is crucial for input into the projections required in section 10.3.

Current water demands are to be based on metred data where this is available.

**Core requirement 7.5**

The UWS must include detail about the following key elements of current demand for water supply and sewerage services:

- towns or communities serviced by the system/s, including current demand and population
- major industrial customers serviced by the system/s
- other key customer groups serviced by the water corporation and, or, key stakeholders interested in the operation of the system/s
- major demands for water and sewerage services
- Aboriginal values and uses of water (where appropriate)
- key recreational uses and assets
- estimates of non-revenue water

The above must include a graphical estimated break down of current demands in terms of non-potable and potable water requirements. Trends in demand are to be plotted over a minimum 5 previous year period.

### 7.4 Assessment of existing system resilience

It is important that water corporations understand the various vulnerabilities of their existing water system/s and what implications these characteristics have on water supply, water security and the reliability of sewerage services.

The climate resilience of the existing supply system will also influence the extent to which long-term projections or short-term variability will be the trigger for water supply system investment decisions.

Water corporations must assess the resilience and vulnerability and describe their water systems with reference to Table 18.

**Table 18: Assessment of system resilience considerations**

Category	Element	Consideration
System yields	Catchment, demand and storage size	<ul style="list-style-type: none"> <li>• is the catchment small or large in comparison to its storage, or to the demand it supplies?</li> </ul>
	Other users, entitlements and allocations	<ul style="list-style-type: none"> <li>• some water resources are shared by multiple users.</li> <li>• some entitlement structures can be quite complex and allocation processes can also have aspects that are important to understand.</li> </ul>

Category	Element	Consideration
	System recovery	<ul style="list-style-type: none"> <li>• how quickly do storages in your system fill and empty? <ul style="list-style-type: none"> <li>– some storages can take years to fill while other storages frequently go from empty to full in a matter of weeks or months</li> </ul> </li> </ul>
	Geology and soils	<ul style="list-style-type: none"> <li>• do your catchments have deep soils or are they rocky?</li> <li>• what percentage of rain runs off into your storages?</li> <li>• how quickly do the catchments dry out and how much rain is needed to make them wet?</li> <li>• do they have a long dry period?</li> </ul>
	Vegetation	<ul style="list-style-type: none"> <li>• how does the vegetation in your catchment impact the runoff and collection of water in your storages?</li> </ul>
Supply and delivery	Supply diversity	<ul style="list-style-type: none"> <li>• some demand centres can be sourced by multiple sources of supply and some of these may be non-rainfall dependent?</li> <li>• to what extent does your water system rely on a single source of supply?</li> </ul>
	Operational complexity	<ul style="list-style-type: none"> <li>• some systems might require complex operational decisions to be made, e.g. a system has a high cost supply and a low-cost supply and only a portion of the demand can be met by both the low cost and high cost supply.</li> <li>• the operation of other systems might be obvious, e.g. single source of supply with no operational input.</li> <li>• to what extent do you need to weigh up decisions across storages to maximise security, but minimise cost?</li> </ul>
	Transfer and deliverability	<ul style="list-style-type: none"> <li>• some systems may have sufficient supply but deliverability problems.</li> <li>• is your system prone to transfer/deliverability risk?</li> </ul>
	Other issues	<ul style="list-style-type: none"> <li>• what other factors need to be considered in the operation of your water supply system that may be unique? For example, does the timing of water transfer for urban use need to coincide with irrigation releases, environmental releases or other urban releases?</li> <li>• are emerging contaminants or pathogens a potential issue?</li> </ul>
Physical risks to supply and sewerage infrastructure	Extreme events (including climate variability)	<ul style="list-style-type: none"> <li>• temperature increases</li> <li>• lower average rainfall</li> <li>• reduced streamflows</li> <li>• more intense rainfall</li> <li>• more storm events</li> <li>• more bushfire weather</li> <li>• sea level rises</li> <li>• more heatwaves</li> <li>• more droughts</li> <li>• more flash floods</li> <li>• impact on assets / infrastructure / staff</li> <li>• impacts on water quality (during and post fire events / blue-green algae / flooding)</li> <li>• reduced snow melt</li> </ul>
	Major water asset failure	<ul style="list-style-type: none"> <li>• loss or disruption to of major water supply or sewerage asset</li> <li>• dam safety incident</li> </ul>
	External attacks	<ul style="list-style-type: none"> <li>• terrorism or cyber attack</li> </ul>

Category	Element	Consideration
Interdependency risks	Loss of other systems	<ul style="list-style-type: none"> <li>• supply chain vulnerabilities e.g. chemicals and transport</li> <li>• ICT and energy failures</li> <li>• loss of physical access to major infrastructure</li> </ul>

It may be appropriate to highlight key aspects from the above list in Annual Water Outlooks, if they could potentially lead to inherent risks or vulnerabilities in the upcoming outlook period.

The above matters may also have implications for modelling including yield assessments and demands and should be included in this analysis as required.

**Core requirement 7.6**

UWSs must:

- assess the resilience and vulnerability of existing water and sewerage systems and provide a summary of system vulnerability in the context of current and future water security.
- include in the short list of projects for assessment projects that aim to improve the resilience of the existing systems.

Water corporations should:

- engage with Rural Water Authorities, Catchment Management Authorities, relevant areas of DELWP and neighbouring utilities to understand resilience risks and opportunities to water supply and sewerage services.

## 8. Defining levels of service

The 'level of service' of a water supply system includes reliability of supply, pressure and water quality.

Understanding the level of service expected by a community is a critical factor in determining the investment required in water infrastructure and water efficiency measures.<sup>47</sup>

### Terminology

The following terminology is used in these Guidelines:

- **Levels of service:** a statement of the objective or outcome sought by the community with respect to security of their water supply<sup>48</sup> including the:
  - **Agreed level of service:** community expectations about the appropriate use of water under usual circumstances incorporating the environmentally, socially and economically responsible use of water.
  - **Minimum level of service:** community expectations about the appropriate use of water in times of drought or other water shortage (e.g. in the event that a Drought Preparedness Plan needs to be implemented).
- **Security of supply:** a description of the overall ability of a water supply system to meet water demands expressed as a set of system performance criteria.
- **System performance criteria:** specific measure or definition of water system performance, e.g. number of days of water demands that the system can meet, the frequency / severity / duration of water restrictions.
- **System yield**<sup>49</sup>: the average annual volume of water that can be supplied by a water supply system subject to an adopted set of operating rules and a typical demand pattern without violating a given level of service that describes security of supply.
- **Unrestricted demand:** average annual demand for water without water restrictions.
- **Reliability:** percentage of years without restriction or shortfall.
- **Average annual demand:** the water demand for a system varies depending on the climatic conditions for any given year. The average annual demand is the amount of water used in a year under average conditions.

---

47. Water Supply Association of Australia – Water Security Information Pack 5 - <https://www.wsaa.asn.au/sites/default/files/publication/download/WSAA%20Water%20Security%20Fact%20Sheet%20Information%20Pack.pdf>

48. noting that there are a range of ways in which this statement could be made

49. Several factors influence the estimation of system yield including the system infrastructure, system operating rules, restriction triggers, within year demand pattern or inter annual variability of demand, assumed level of service and the period over which yield is assessed.

## 8.1 Background

In 2008, COAG adopted the National Urban Water Planning Principles (NUWPP) to provide governments and utilities with better planning tools for the development of urban water and wastewater service delivery. There are eight principles, the first key principle being:

*“Deliver urban water supplies in accordance with agreed levels of service.”*

This is further detailed as *‘the service level for each water supply system should specify the minimum service in terms of water quantity, water quality and service provision (such as reliability and safety).’*

The other principle of relevance, to:

*“Adopt a partnership approach so that stakeholders are able to make an informed contribution to urban water planning, including consideration of the appropriate supply/demand balance.”*

Three main components in the Victorian urban water planning framework are used to ensure a safe and reliable supply:

- the supply system should be able to maintain adequate supply over the long term – reflected in an agreed service level and developed through an UWS
- short-term measures to protect against water shortages – demand management initiatives such as restrictions, short term supply initiatives specified in a DPP
- contingency plans that ensure basic water needs for a community can be met in an emergency or severe shortage and reflected in a minimum level of service

## 8.2 Determining ‘levels of service’

### 8.2.1 Describing ‘Levels of Service’

Water corporations can choose the system performance criteria used to describe the agreed and minimum service levels. Historically, they have been defined as the *“frequency, severity and duration of water restrictions that would be experienced by the community on average over the longer-term”*.

Water corporations can develop alternatives to defining levels of service other than in the context of water restrictions with community support.<sup>50</sup>

The criteria used to describe levels of service could reflect any of a series of measures, so long as these are specific, quantifiable and measurable and agreed to by customers.

For example, criteria could include the:

- desired frequency, severity and duration of restrictions
- average amount of water to be supplied per capita per day
- average amount of water to be supplied per system per day or week
- desired % reliability, i.e. the probability that restrictions of any given severity will not be imposed in a given year or month
- average amount of water to be supplied per town, per day or week
- number of “months/years of supply” held in reserve

---

50. 'Note: the water restriction schedule is defined in the water corporation's Water Restriction By-Law and Water Savings Plan. The water restriction schedule and Permanent Water Saving Rules are to be followed (unless where exemptions have been made by the Water Corporation). A review of the Permanent Water Savings Rules and Water Restrictions By-Laws is currently underway.

Water corporations can use one or more of these criteria, or criteria of their own devising, to define levels of service.

Water corporations are to set their own specific performance criteria on a system-by-system basis that makes sense for each relevant system and reflect how the local community wants their level of service to be presented.

### 8.2.2 Agreed 'Level of Service'

Determination of an agreed LOS objective requires investigation of associated trade-offs with the community (see Figure 6 and Table 9).

- high investment in infrastructure to augment supply reduces the social costs of water shortages and restrictions and the financial cost of implementing them. However, infrastructure may be more expensive than the cost of restrictions, thus leading to potentially increased costs for the customer and the prospect of the water supply system being 'gold plated'.
- conversely, lack of investment in the system could result in system failure or a high likelihood of severe and long-lasting restrictions. This could cause unpalatable service provider costs for restrictions, messaging and enforcement. Under severe restrictions, there could be social costs too such as loss of amenities (fountains, pools), inconvenience due to specified watering times, and restricted watering of local parks with associated poor aesthetics (brown lawns). This would ultimately impact the earning prospects (tourism and gardening industries), lifestyle, and liveability of the locality.

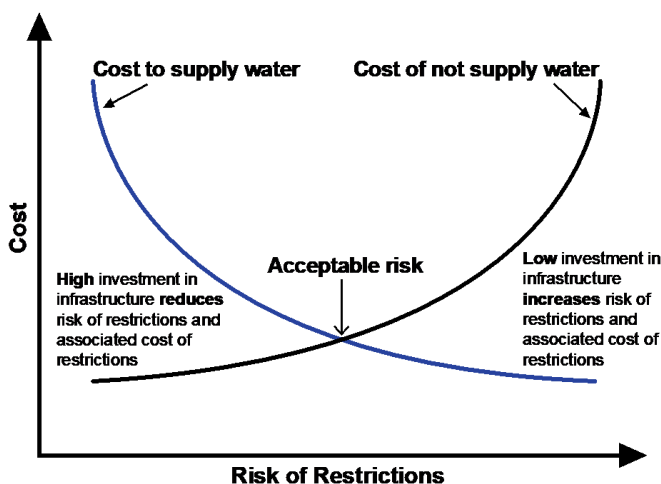


Figure 6: Trade-off for setting level of service objectives

Source: Erlanger and Neal, 2005

The socio-economic costs of implementing water restrictions should be considered as part of the development of UWSs and setting Levels of Service. Figure 7 shows the consolidated views from community engagement on the value and use of water from City West Water, South East Water, Yarra Valley Water and Melbourne Water, 2017, Water for a Future Thriving Melbourne<sup>51</sup>.

51. [https://www.melbournewater.com.au/sites/default/files/2017-10/Water-for-future-thriving-Melbourne\\_0.pdf](https://www.melbournewater.com.au/sites/default/files/2017-10/Water-for-future-thriving-Melbourne_0.pdf)



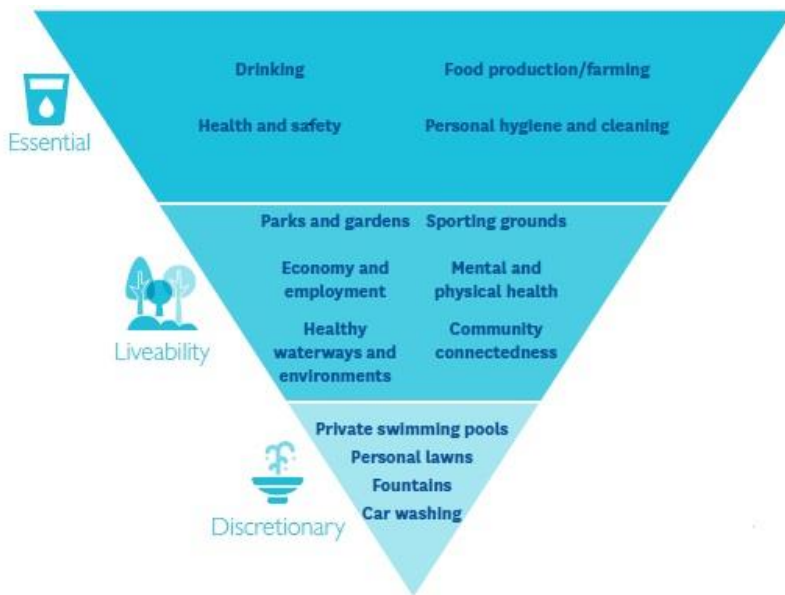


Figure 7: Consolidated views from community engagement on the value of water

Source: City West Water, South East Water, Yarra Valley Water and Melbourne Water, 2017, *Water for a Future Thriving Melbourne*

Although restrictions have been the primary LOS component for determining yield and community acceptability, the other two components (supply/demand balance and contingency plans) also form an important part of water security planning.

Assessment of the system’s ability to maintain supply enables the identification of future stresses on the system (e.g. climate change or increasing demands) and therefore the determination of the year when the next supply augmentation is required. This links back to determining LOS because augmentation can also be delayed through demand response measures or brought forward in times of supply shortage such as drought.

These components can be adapted into objectives for specific systems, usually by setting the frequency, severity and duration of staged restrictions which then defines the average annual volume, or yield, a system needs to supply to meet their adopted LOS objectives.

### 8.2.3 Minimum ‘Levels of Service’

The minimum level of service must at least be able to meet the definition of critical human water needs.

In Victoria **critical human water needs** are defined as the amount of water:

- required to supply Stage 4 restricted demand in urban areas
- supply essential domestic and stock and emergency water supply points to meet water carting requirements for rural customers
- to operate the distribution system to deliver that water

Determining the basic needs of the community requires the balancing of costs. Providing only adequate water to meet critical human water needs could damage the economy, but, with a sufficiently low frequency of occurrence could be perceived an acceptable risk to avoid over-investing in the supply system.

Determining a base level of critical supply enables a minimum point from which planning can commence to ensure there is enough buffer within the system during severe drought.

The minimum service level may be expressed by setting an allowable reduction in demand if there is a water shortage. For example, water corporations may plan to provide unrestricted supply in most circumstances (agreed service level) but plan to reduce demand by no more than 30% in the event of a severe drought or water shortage (minimum service level). This means that water corporations would plan to provide at least 70% of the unrestricted demand of its systems, even if there is a drought or water shortage.

### ***Meeting minimum levels of service***

Water corporations may use a combination of mandatory water restrictions and voluntary measures to achieve their minimum level of service.

Water corporations are to determine the way in which agreed minimum levels of service are achieved.

Actions may include a combination of demand management and supply measures.

For example, supply initiatives such as:

- accessing groundwater
- supplies from emergency water supply points
- purchasing water on the temporary market might be explored.

The full range of measures and initiatives that will be implemented in the event of a drought or water shortage is to be detailed in Drought Preparedness Plans (see section 15).

**Core  
requirement  
8.1**

Water corporations must set an Agreed Level of Service and Minimum Level of Service developed through engagement with customers, having regard to:

- cost of supply
- local conditions such as climate (temperature, rainfall) and urban density (e.g. housing stock)
- maintenance of social and community assets that are of high value or have a high threshold for replacement or recovery
- socio-economic costs of implementing water restrictions
- environmental obligations
- avoidance of any temporary qualifications of rights
- willingness to pay for improvements in system performance as defined in terms of the system performance criteria (noting for some supply systems the cost is spread across the broader customer base)
- meeting critical human water needs

UWSs must clearly document - on a system-by-system basis - the:

- agreed level of service
- the minimum level of service
- levels of service must be expressed as specific, quantifiable and measurable criteria against which system performance can be assessed under a range of planning scenarios.
- levels of service can be different for different customer segments. For example, residential customers, open space and certain commercial customers (such as car washes, nurseries) may be subject to water restrictions, whereas other commercial customers may never be subject to water restrictions. Where this is applicable, estimates of system performance must account for the different levels of service being provided to different customer segments.
- there is scope for variation in both agreed service levels and minimum service levels between different systems.

# Assessing system performance



## 9. Water supply projections (climate dependent)

As most of Victoria's water sources are climate dependent, planning for future climate variability and climate change is an important component of the UWSs. The SoO requires the UWS to outline the measures to adapt to climate change in their UWS.

### 9.1 Climate change versus climate variability

Victoria has a highly variable climate, both spatially across the State, and over time.

Climate variability is represented by the fluctuations in temperature, evapotranspiration, rainfall and other climate variables on daily, seasonal, annual and decadal time scales. Climate variability can be chaotic or cyclical in nature.

For the purposes of these guidelines, natural climate variability is regarded as a phenomenon of the earth's climate system at equilibrium under pre-industrial levels of greenhouse gas concentrations in the atmosphere.

In contrast, climate change represents a change in climate behaviour, including changes in climate variability, associated with an underlying shift in the inputs to the earth's climate system. Under climate change, the earth's climate system is no longer in equilibrium. Various changes in Victoria's climate and water resources have been observed over recent decades. These changes are likely to be a combination of both anthropogenic climate change and climate variability which extends beyond that which has been previously observed.

### 9.2 Guidelines for Assessing the Impact of Climate Change on Water Availability in Victoria

The Guidelines for Assessing the Impact of Climate Change on Water Availability in Victoria (DELWP 2020) provide critical advice on how to assess the impacts of climate change on water supplies.

The climate experienced post-1975 is non-stationary with respect to anthropogenic climate change. Climate conditions in Victoria have been much drier since 1997 than over the long-term, but it is difficult to know how much of this drying is a result of climate variability, and how much is due to anthropogenic climate change. Most Global Climate Models estimate that climate variability has been a stronger driver of the observed cool season drying in Victoria from the 1990s to date than anthropogenic climate change (Rauniyar and Power, 2020 under review). It is still possible, however, as projected by a minority of Global Climate Models, that these observed rainfall declines are predominantly attributable to anthropogenic climate change and could therefore represent a permanent shift in Victoria's climate. This viewpoint is supported by the identification of statistically significant step changes in global and southern hemisphere temperature occurring in or around 1997 (Jones, 2012<sup>52</sup>; Jones and Ricketts, 2017<sup>53</sup>).

---

52. Jones RN (2012), Detecting and attributing nonlinear anthropogenic regional warming in south-eastern Australia, *J. Geophys. Res.*, 117, D04105, doi:10.1029/2011JD016328.

53. Jones RN and Ricketts JH (2017) Reconciling the signal and noise of atmospheric warming on decadal timescales. Climate Change Working Paper No. 38, Victoria Institute of Strategic Economic Studies, Victoria University, Melbourne, Australia. ISBN: 978-1-86272-726-7.

To account for this uncertainty, the Guidelines for Assessing the Impact of Climate Change on Water Availability in Victoria (DELWP 2020) recommend the use of both a post-1975 and a post-1997 historic baseline<sup>54</sup> for the purpose of exploring scenarios of future water availability.

There is no “most likely” scenario that can be specified for future climate in Victoria. Future planning needs to be built around consideration of a range of plausible climate futures. Three plausible future climate scenarios are recommended in the climate change guidelines. These scenarios (low, medium and high climate change) were developed by CSIRO and are based on climate projections derived from the outputs of the CMIP-5 suite of Global Climate Models. A fourth scenario, which utilises the post-1997 historic baseline, is important as it represents the possibility that a step change has already occurred and captures many of the seasonal changes in rainfall that have occurred over recent years that are not fully reflected in the climate projections.

The climate change guidelines also provide a resource for assessing the impact of climate change on groundwater resources, drought and operational planning, alternative water supply projects and demand projections.

<b>Core requirement 9.1</b>	Water corporations <u>must</u> apply the Guidelines for Assessing the Impact of Climate Change on Water Availability In Victoria, as issued by DELWP (2020) when undertaking water system projections.
-----------------------------	--

---

<sup>54</sup> Baseline and scenario nomenclature currently under review and will be confirmed through the final Guidelines for Assessing the Impact of Climate Change on Water Availability In Victoria, as issued by DELWP (2020)

# 10. Water demand projections

Projections of urban water demands over the 50-year planning period are a key input for developing or updating an UWS.

Anticipated demands are also a crucial input into sustainable water strategies, price submissions and other planning processes.

## 10.1 Factors influencing demand

Projections of urban water demand are subject to inherent uncertainty.

They are influenced by a multitude of external factors and, or assumptions including:

- population and demographic changes
- domestic, industrial and commercial water use patterns, which in turn are based on assumptions about the effectiveness of water conservation programs

Water demand projections are typically developed on the basis of “average” weather conditions.

Actual water demands can vary considerably depending on the rainfall and temperatures that occur in a given year.

Hotter and drier conditions expected with climate change are likely to increase the demand for water, notably for private garden watering and the irrigation of municipal parks, gardens and sporting fields.

The complex array of factors that may be relevant to the development of urban water demand projections are shown at Figure 8.

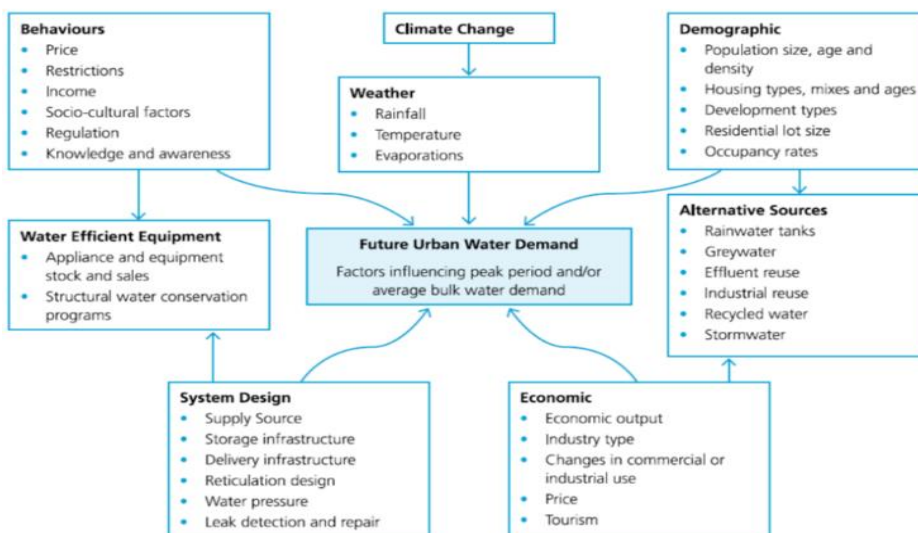


Figure 8: Typical factors affecting urban water demands

Source: Turner et al 2010

## 10.2 Approaches to projecting water demands

A number of approaches can be applied to demand projecting with varying levels of sophistication. The most common approaches are described in Table 19.

**Table 19: Common approaches to projecting water demands**

Approach	Description
Basic litres/capita/day	Raw and unadjusted historical bulk water demand and discharge is analysed and projected forwards using population projections.
Sector based	Residential demand and discharge (single and multi-residential properties), non-residential demand (commercial, industrial and institutional sectors, and sub-sectors within these) and non-revenue water (real and apparent losses) are analysed separately based on historic usage and projected forwards using population projections or other sector-specific base units as appropriate.
End-use analysis approaches	<p>Historical demand and discharge (predominantly in the residential sector) is analysed via a bottom-up approach that disaggregates demand into typical “end uses” or the appliances/stock for which people use water e.g. washing machines, dishwashers, toilets, showers, evaporative air coolers.</p> <p>Each individual end use demand is then projected forwards based on assumptions about frequency of usage, population other demographic projections and functions that reflect changes in appliance efficiency, ownership, penetration of new stock and mix of stock over time.</p>
<p>Approaches for demand and discharge projecting listed above can be complemented by techniques including:</p> <ul style="list-style-type: none"> <li>• climate correction</li> <li>• the application of price and income elasticities</li> <li>• the impact of demographic changes</li> <li>• land use changes</li> <li>• potential for behavioural changes</li> <li>• sophisticated trend analysis</li> </ul>	

Any of the above approaches may be appropriate for developing urban water demand and discharge projections for an UWS, depending on the characteristics and complexity of the system being analysed.

Projecting future discharges also assists with long term planning for the efficient investment and use of recycled water.

Changes in peak demands can also occur under climate change, which are associated with increases in temperature on very hot days. Other long-term shifts in demand in response to climate change can also occur, such as changes in the way water is used and for what purpose. These are often difficult to predict but may be very important to consider when developing future demand projections.

Water corporations may have existing climate dependent demand models for either total water use or the residential component of most urban water supply systems. In this case, the demand models can simply be applied using input climate variables that have been adjusted for climate change using the projected changes previously outlined in the Guidelines for Assessing the Impact of Climate Change on Water Availability in Victoria (DELWP, 2020).



## 10.3 Projecting water demands

### 10.3.1 Understanding demand drivers

Where appropriate, projections should recognise and reflect key drivers of demand, including but not limited to the following categories in Table 20.

**Table 20: Drivers of demand**

Category	Element
Consumer behaviour	<ul style="list-style-type: none"> <li>• government policy objectives for demand management</li> <li>• public education and attitudes towards water conservation</li> <li>• nature and extent of consumer education programs and policies to reduce demand</li> <li>• current and projected levels of water restrictions including agreed or projected exemptions</li> <li>• current and projected changes in climate and weather influences, including temperature, rainfall and evaporation</li> <li>• projected prices and their impact on the demand for water</li> <li>• use of alternative sources</li> </ul>
Demographics	<ul style="list-style-type: none"> <li>• population projections prepared with regard to VIF</li> <li>• tourism and holiday populations</li> <li>• household size</li> </ul>
Housing stock	<ul style="list-style-type: none"> <li>• residential block size and the mix of high- and low-density housing</li> <li>• building standards for new and renovated homes</li> <li>• appliance stock (including efficiency and uptake)</li> </ul>
Land use changes	<ul style="list-style-type: none"> <li>• potential for new development as outlined in Regional Growth Plans, Plan Melbourne and Growth Corridor Plans.</li> </ul>
Non-residential use	<ul style="list-style-type: none"> <li>• demand for public open space to support liveability</li> <li>• linkages between key economic drivers and demand for water (e.g. economic growth more generally, which tends to drive small-business demand)</li> <li>• industrial and commercial uses and projected changes</li> <li>• demand from large industrial and commercial customers, which is usually related to the economic conditions prevailing in the specific industries in which those customers operate</li> <li>• use of alternative sources such as rainwater and wastewater reuse</li> <li>• system losses and leakage, and stormwater infiltration into the sewage system</li> </ul>

### 10.3.2 Rigour and complexity

The degree of rigour and complexity underlying a demand projection should reflect the nature of the system, the customer base and the existing water balance:

- small systems with a high security of supply will usually need less analysis than those serving a large customer base.
- larger systems, and those with more pressing supply-demand issues, will require more sophistication, including greater scenario and sensitivity analysis.

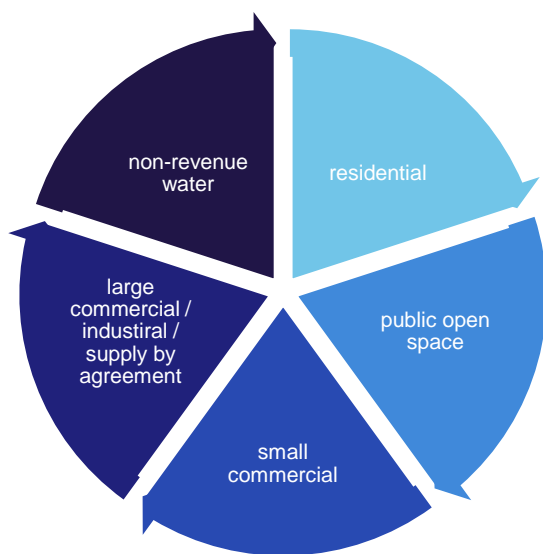
While rigour and complexity is needed, the demand projections are best described as plausible future scenarios and adaptive planning and management actions will need to be considered to ensure robust and efficient investment decisions are identified.

The length of the projection period also has implications for the nature of the projection.

Key issues for forecasts in the immediate to short-term will include storage levels at the start of the forecast period, level of water restrictions at the start of the forecast period and timing of their removal during the forecast period. There is also the potential for bounce-back in residential demand compared to sustained behavioural change following any period of water restrictions.

Key issues for projections in the longer term will include long term trends in housing stock, household size, climate change and population changes. Water is essential to public open space, which in turn is essential to liveability. It is important that the water demand for public open spaces is considered and that water corporations work with local governments, and other open space managers, to understand demands for functional open spaces<sup>55</sup>.

At a minimum, projections must be segmented into the following key areas of demand (see Figure 9). Projections for agricultural demands e.g. from recycled water, if applicable, can also be provided.



**Figure 9: Required segmentation of water demands**

---

55. <https://www.clearwatervic.com.au/user-data/research-projects/swf-files/bpg-final.pdf>

**Core requirement 10.1**

Water corporations must develop projections of urban water demands.

UWSs must document the approach adopted for developing demand projections. Approaches, key drivers for demand and any models or analytical tools used are to be outlined and explained, assumptions documented, source data identified and referenced and outputs clearly set out.

Projections must be based on the best and most recent data available, including Victoria in Future 2019 (VIF2019)<sup>56</sup>, noting that these can be tailored to reflect local knowledge and experience provided that there is sufficient evidence to support these variations.

At a minimum projections must be segmented into the following key areas of demand for each system:

- residential
- public open space
- small commercial
- large commercial / industrial / supply by agreement
- non-revenue water

An assessment of the percentage of the above demands that could be met by non-potable water must be provided for each segment.

Where projections are complex or involve large models or large volumes of data, consideration should be given to having the projections (or models) independently reviewed or checked.

### 10.3.3 Projecting sewage volumes and flows

Projecting of sewage flows into sewerage systems will typically be based upon water demand projecting:

- projected sewage flow may be determined as a factor of water demand, relevant for largely homogenous sewage catchments such as those used in residential developments.
- an alternative approach can involve analysis of end use studies, inflow and infiltration studies and trade waste information.

Ideally the sewerage services demand projections will be outlined over the same time period and to the same level of rigour and complexity as the water demand projection. Where this information is unavailable, it is reasonable to outline sewerage services demand using the best available information.

High level projections of sewage discharge quality are desirable, but not mandatory.

Water corporations should take into consideration any estimates, if known, any changes to infiltration arising from climate change in accordance with relevant guidance such as the Guidelines for the Impacts of Climate Change on Sewerage Systems<sup>57</sup> (DELWP 2020).

---

56. <https://www.planning.vic.gov.au/land-use-and-population-research/victoria-in-future>

57. Currently under development

<b>Core requirement 10.2</b>	<p>UWSs <u>must</u> provide projections of wastewater discharge to each sewerage system. If available these projections <u>should</u> be sourced from existing planning documents.</p> <p>UWSs <u>must</u> clearly document the approach adopted for developing wastewater discharge projections.</p> <p>High level projections of wastewater discharge are required as follows:</p> <ul style="list-style-type: none"> <li>• drivers and key sources of wastewater discharge (e.g. residential, commercial and industrial) are to be considered and documented.</li> <li>• discharge of wastewater volumes at key locations (i.e. treatment plants) in the sewerage system are to be provided.</li> <li>• it is desirable, but not essential to provide sensitivity analysis.</li> </ul>
------------------------------	---

### 10.3.4 Alternative water supplies

Alternative water sources can operate either at a:

- local scale e.g. household rainwater tanks and greywater systems.
- large scale e.g. harvesting of stormwater and recycling water from wastewater treatment plants.

Alternative water supplies alleviate the demand for water from existing potable water supply sources through substitution. Alternative water supplies may also be beneficial, even when not substituting from a potable source, to make water available for agriculture, environmental and other uses. These initiatives also represent an increase in supply, by adding to the overall volume of water that is available for use on a fit-for-purpose basis.

<b>Core requirement 10.3</b>	<p>UWSs <u>must</u> account for alternative water sources as increased supply (specified by usage class and source) while also recognising that fit-for-purpose water use reduces the demand on the potable water supply system and sources. Modelling must be undertaken to understand how this affects yields and demands on the conventional supply system.</p>
------------------------------	--

### 10.3.5 Consistency with other projections

In most cases, the projections prepared as part of pricing submissions to the ESC and the demand projections prepared for the UWS will be similar, based around the same planning inputs and assumptions. Where the two are different, the reasons for the difference should be explained.

The purpose of the projections for the ESC are two-fold:

1. demand has implications for both capital and operating expenditure, which are key elements of the ESC's 'building block' approach to determining total costs.
2. the ESC requires demand to be identified by tariff component to ensure water corporations will not over or under-recover revenue.

The objectives of UWSs have a greater focus on water cycle services planning. They also have a much longer outlook period compared to the projections for the ESC (50 years versus ~5 years) which may lead to differences in the demand projections.

In particular:

- water businesses may use probabilistic methods to establish their long-term demand projections. This does not necessarily mean that the 'mid-point' or 'median' scenario that arises from the long-term probability modelling will exactly equate with the 5-year projection for the ESC. Long term assumptions (e.g. a 1 in 10 chance of level 2 restrictions occurring in a given year across the next 50 years) may differ from short term assumptions (e.g. based on current storage levels, there is only a 1 in 20 chance of level 2 restrictions over the next 5 years).
- the regulatory cycle will not always align with the UWS cycle. The updated UWSs are to be finalised by 31 March 2022. The next regulatory period for most urban water corporations will commence on 1 July 2023, but in other cases this is earlier or later. Events of both a supply or demand nature that occur or become evident after finalisation of the UWSs may mean that ESC projections are different.
- the ESC may accept or reject aspects of water corporations' projections or programs which may lead to the need to revise demand projections.

Water corporations may compare their demand projections, and demand projection assumptions, for consistency with neighbouring or similar water corporations.

#### 10.4 Establishing and applying demand scenarios

Water corporations need to develop various water cycle services demand projections to undertake sensitivity testing.

Water corporations are to consider the following when developing demand curves:

- extent of hard-wired, permanent behavioural change achieved to date, such as the uptake of water efficient appliances, and fixtures and fittings
- extent to which further hard-wired permanent behavioural change may be achieved, for example, through the future uptake of water efficient appliances due to the implementation of national water efficiency labelling standards, 6-star building standards etc
- extent of voluntary behavioural change that might be sustained in the immediate to short-term due to persistent water conservation messaging
- extent to which there may be some 'bounce-back' in levels of per capita residential water usage after water restrictions have been eased
- impact of permanent water saving rules on demands

**Core requirement 10.4**

UWSs must include a 'base case' demand scenario, together with additional scenarios developed for the purpose of sensitivity analysis.

At a minimum UWSs must develop and graphically depict the following demand scenarios for the purpose of analysis:

- Base case/Average annual demands (agreed level of service demand)
- Unrestricted demands
- Low water use demand curve (minimum level of service)
- High water use demand curve

The base case demand (agreed level of service demand) is to be based on a 'business as usual' perspective, which is to incorporate water conservation activities that have been implemented to date and the continuation of the current level of water conservation effort.

The agreed level of service demand is the final level of service agreed with customers.

The high water use demand curves are to be developed through a sensitivity analysis for example by applying an appropriate factor to account for increased demands from climate change to demand types that are influenced by rainfall e.g. increased outdoor water use when rainfall is low.

These are to include an assessment of potable and non-potable demands.

#### 10.4.1 Sensitivity analysis

Sensitivity analysis should be used for assumptions that are most uncertain and those that are most critical to the projection based on local conditions.

This analysis can range from simple model runs by changing single variables, to more complex Monte-Carlo or other more sophisticated probability analyses.

At a minimum, it is expected that sensitivity analysis will be performed for the following parameters:

- population changes
- climate change and variability

Where appropriate, consideration should also be given to the following parameters

- level of water restrictions and the extent of bounce-back in residential demand compared to sustained behavioural change following any period of water restrictions
- changes in long term housing mix
- projected improvements in appliance efficiency and rates of uptake
- changes in large commercial or industrial demand

The longer the analysis period, the more important it is that additional variables are included in sensitivity analysis. The difference between population growth of 1.3% and 1.5% per annum may make little difference in the immediate to short-term but could result in a 15% difference in demand over the longer-term.

**Core requirement 10.5**

UWSs should undertake a sensitivity analysis on anticipated future demands.

At a minimum, it is expected that sensitivity analysis will be performed for the following parameters:

- population changes
- climate change and variability

#### 10.4.2 Accounting for water restrictions in demand scenarios

The following should be included in the UWSs:

- detail about the costs (environmental, social and economic) of restrictions
- differentiation between private and public outdoor use when assessing the cost of restrictions, undertaking community engagement and, or willingness to pay studies
- the impact of water restrictions on liveability, and how this can be mitigated through either improved levels of security, or actions set out in Drought Preparedness Plans
- the environmental impacts on streams and aquifers of providing unrestricted demands during times of drought
- supporting analysis should be provided – preferably quantitative, but qualitative is acceptable

Water corporations should consider the impacts of demand hardening on restriction effectiveness and provide estimates of water demand under the following scenarios:

- Permanent Water Savings Rules
- Target 155, Target Your Water Use or other water efficiency programs,
- Stage 1, Stage 2, Stage 3 and Stage 4 restrictions.

The extent to which water corporations intend to use water restrictions as a drought response mechanism in the future will influence the development of Drought Preparedness Plans (refer section 15).

**Core  
requirement  
10.6**

UWSs must document the way in which water restrictions have been considered when developing demand projections.

The demand reduction impact of restrictions applied in line with the Water corporation's Water Restriction By-law and Permanent Water Saving Plan across the four uniform stages is to be documented including any anticipated exemptions developed through engagement with local government.

The socio-economic costs of implementing water restrictions are to be considered as part of the development of UWSs and when exploring and setting levels of service with customers.

# 11. System performance assessment

The potential need for - and timing of - any future system augmentations need to be informed by a range of projected demand scenarios and climate change scenarios over a 50-year planning horizon.

Action will need to be taken where a water supply or sewerage system - as currently configured - is unable to satisfy the levels of service set for that system (see section 13.1).

## 11.1 Water supply system performance – scenario assessment

Assessing system performance is a product of the expected system yield in terms of the analysed levels of service for water supply systems.

Several factors influence the estimation of system yield including:

- system infrastructure
- system operating rules
- restriction triggers
- within year demand pattern or inter annual variability of demand
- assumed level of service
- the period over which yield is assessed.

Water supply system yield can be defined as the average annual volume that can be supplied by a water supply system subject to an adopted set of operating rules, and a typical demand pattern, without violating a given level of service that describes security of supply.

System yield should be determined by factoring up demands until the agreed and minimum level of service can just be met. This should be done for current (baseline) and future climate conditions.

The assessment of system performance will be affected by the rules used to define when restrictions are applied. The restrictions rules (or triggers) in the system yield analysis should closely represent the rules used in practice, to ensure that the estimated system yield and assessment of system performance is representative of real time system operation.

The determination of appropriate water restriction rule curves is to be based on customer engagement and analytical studies to optimally trade-off the application of restrictions and water supply security in the long-term and optimise system operations rather than based solely on operator experience. This is a task for the update of Drought Preparedness Plans.

Several factors influence the estimation of system yield. When developing estimations of system yield it is important to consider:

- identifying what streamflow data to use – including the length of record and the appropriateness of the streamflow data used in deriving the estimate.
- undertaking sensitivity analysis to assess the influence of the many factors that can affect system yield, such as streamflow outside the range of historical record.
- clearly documenting assumptions.



System yield may exceed, equal, or be less than the current level of demand, which will determine the urgency with which future actions are required.

For example:

- where average annual demand exceeds average annual system yield, the agreed level of service can no longer be met
- where average annual system yield exceeds average annual demand, projections of urban water demand and water resource availability over the fifty-year planning horizon can be used to determine the time available until action is required, as well as the magnitude of any potential shortfall.

While an understanding of the above sets the urgency for system augmentation it should be used in conjunction with an ongoing adaptive management approach incorporating Annual Water Outlooks and continual review of where the system is placed via system monitoring and updated forecasts, to determine the need to bring forward or delay the augmentation (see section 14.1).

Figure 10 shows high, medium and low climate change scenarios alongside low, medium and high demand scenarios, showing the potential impacts on system yield compared to demand scenarios, which illustrates the difference in timing for the potential need for action under different scenarios.

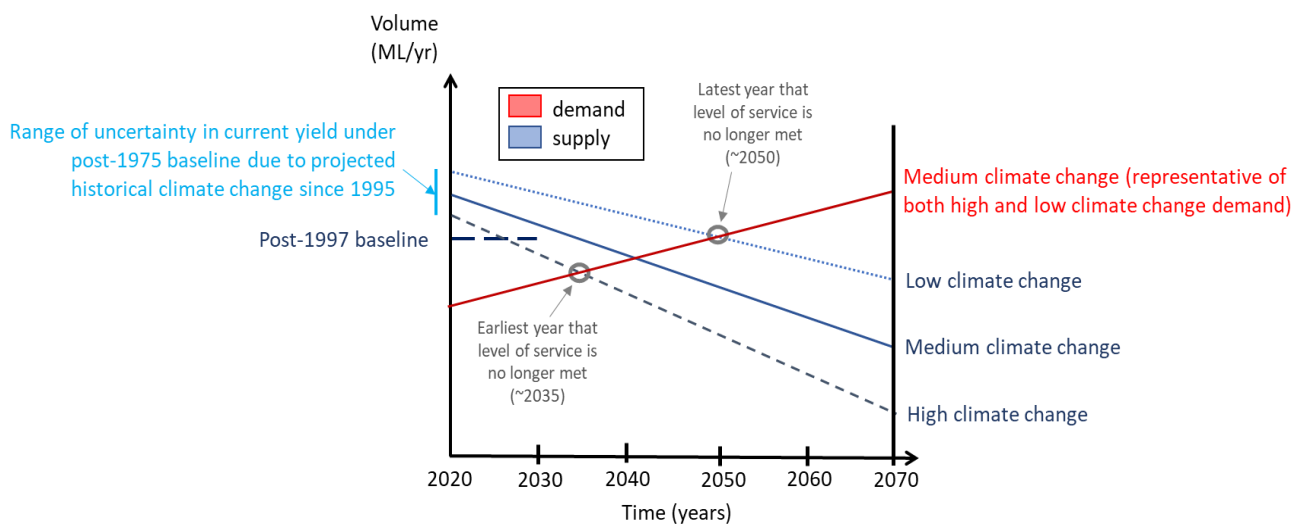


Figure 10: Example of supply and demand scenario analysis

Source: Guidelines for Assessing the Impact of Climate Change on Water Availability in Victoria (DELWP 2020)

**Core requirement 11.1**

Estimates of system yield for the current water supply systems must be carried out using an appropriate water resource model such as REALM<sup>58</sup> or SOURCE.

Complex modelling is not required for very simple systems, or systems with demonstrated high levels of water security. Systems where complex modelling has not been undertaken must be identified with clear justification provided as to why complex modelling is not required.

UWSs must assess system yield to determine if demand projections can be satisfied over the next 50 years without violating levels of service.

Scenarios must be developed with underlying assumptions clearly documented in relation to supply and demand curves, levels of service, use of restrictions and inclusion of alternative water sources and must include at a minimum:

- **Low change:** lower than anticipated demand (e.g. sensitivity test if population growth in the base case does not materialise or major water consuming industry/user leaves), low projected per capita use and low projected climate change scenario.
- **Incremental change (base case):** average annual demand and medium projected climate change scenario.
- **High change:** high demand and high projected climate change.
- **Rapid change:** high demand and post-1997 climate change.

UWSs must clearly state the year that augmentations may be required under each scenario.

Water corporations can also nominate a base case year that augmentations would be required, typically based on the 'incremental change' scenario above.

UWSs must graphically depict and compare various supply and demand scenarios in a supply demand chart including at a minimum the supply and demand scenarios presented above (see Figure 10).

### 11.1.1 Uniform system stress test

To assist government and the water industry in identifying water security projects it is useful to have a common analysis performed across all supply systems, so that cities, towns, regions or system types that may be more vulnerable to water shortages, can be more easily identified and analysed through a 'stress test'.

One driver for this is that the government is seeking to better realise the potential of the state water grid and markets to share water security benefits of the grid and the desalination plant more broadly (chapter 9, Water for Victoria).

Consistent analysis across supply systems can assist in identifying potentially vulnerable supply systems and help direct further analysis to understand the causes of system vulnerability, the needs of communities and the potential for regional scale augmentations.

#### *Scenarios to explore vulnerability*

In order to understand system vulnerability, the following approach has been devised based on answering the following questions with consistent model inputs.

---

58. Victoria is currently transitioning to Source and will progressively wind back the use of REsource ALlocation Model (REALM). Consistent with current practice, no new models will be developed by DELWP using REALM. DELWP will provide only basic maintenance and support for existing REALM models and software until all major systems have efficient and effective base Source models that meet the needs of that system. Allowing for an overlap period of at least 12 months and assuming that the requirements for model development are met, REALM will no longer be supported by DELWP from July 2022. As DELWP transitions to Source, there will be efficiencies and other benefits for Victorian agencies also moving to the new common platform.

### Key questions to explore system vulnerability

1. Does XYZ's water supply system have sufficient capacity to supply customers, without the need for restrictions, if the Millennium Drought rainfall sequence occurring from January 1997 to December 2009 was to occur again?
2. If a water supply system does not have sufficient capacity - without the need for restrictions - for how many months (out of the 156-month period) would the supply system be in Stage 1, Stage 2, Stage 3 and Stage 4 restrictions?

### Modelling assumptions and inputs

Modelling assumptions will be agreed with water corporations during the development of the UWS through a collaborative process to ensure consistent application, harnessing of water corporation expertise in this area and readily interpretable results that align with the Guidelines for Assessing the Impact of Climate Change on Water Availability in Victoria as well as the intent of Action 1 in the Pilot Water Sector Climate Change Adaptation Action Plan (to undertake a water grid stress test).

Up to three scenarios may be required under the stress test. Model inputs to be determined include:

- inflow sequence
- groundwater allocations/availability
- other allocations and alternative supplies
- infrastructure and resources
- demands
- restriction rules
- starting storage levels

#### Notes:

- Whilst a response to the two questions above is required, complex modelling is not necessary for very simple systems or systems with demonstrated high levels of water security.
- If there is any evidence or knowledge that there has been a historic climatic period where the system is more vulnerable than the Millennium Drought period, water corporations can identify and provide an assessment of this alternative period.
- Systems which are vulnerable to non-water shortage related restrictions (such as restrictions related to water quality events) are to be identified.
- This analysis does not need to be published in UWSs, though the analysis may be a useful communication tool for communities to understand system performance if a millennium drought type of event was repeated.

#### Core requirement 11.2

Water corporations must undertake a consistent stress test of their systems and provide the results of the analysis to DELWP.

Scenarios will be developed and agreed with water corporations during delivery of the UWSs.

## 11.2 Sewerage system performance – scenario assessment

### *Determining sewerage system capacity*

Under State Environment Protection Policy (Waters)<sup>59</sup> “a water corporation responsible for sewerage management must implement measures to minimise risks to beneficial uses, so far as reasonably practicable, from losses of wastewater through sewer overflows and leakages from, and collapses of, sewerage infrastructure.”

Providing adequate sewerage system capacity requires planning, designing and delivering the mix of infrastructure and non-infrastructure solutions to assure adequate and timely upgrades to network and treatment plant capacity to accept flows from growth (regional, metropolitan) and climate induced effects (directly from changed rainfall patterns, indirectly from elevated groundwater tables and sea level rise) while continuing to:

- eliminate chronic sewer leakages and dry weather sewer overflows; and
- ensure that sewerage infrastructure is designed and maintained to contain flows associated with at least an 18.1% Annual Exceedance Probability (AEP); and
- meet the General Environmental Duty<sup>60</sup> obligations.

The impact of wastewater discharges to inland and marine water bodies is attracting greater interest, particularly given predictions for a drier climate in the future. Impacts can be exacerbated by drought conditions, when low flows reduce the dilution of discharges.

In other cases, the flow from some wastewater discharges can be an important contribution to waterway health, if they are of the right environmental quality and well managed.

These issues may drive the need for a more detailed assessment of the impact of wastewater discharges and the assessment of management options including:

- the use of offset measures to protect beneficial uses
- discharges that provide environmental benefits
- management of wastewater reuse and recycling<sup>61</sup>.

Sewerage system capacity can be defined as the peak volume (daily) of sewerage that can be treated and discharged to the environment by a sewerage system, subject to system and regulatory constraints.

Estimates of sewerage system capacity are to identify where bulk sewers and wastewater treatment facilities are expected to exceed the capacity of existing infrastructure to convey and treat peak sewerage flows.

These estimates may consider a range of factors including changes in population, changes in inflows and infiltration into sewers and climate change impacts on sewerage systems over the next 50 years. These estimates are to be undertaken for major bulk sewers and wastewater treatment plants to identify:

---

59. <http://www.gazette.vic.gov.au/gazette/Gazettes2018/GG2018S499.pdf>

60. New environmental laws come into effect from 1 July 2021. They give EPA more powers and tools to prevent risks to the environment and human health. They also allow EPA to issue stronger sanctions to hold polluters to account. The general environmental duty (GED) is central to the new laws. It requires all Victorians to manage risks to human health and the environment that their activities create. See <https://www.epa.vic.gov.au/about-epa/epa-is-changing>

61. <https://www.epa.vic.gov.au/about-epa/publications/464-2>

- when peak sewerage flows will exceed peak capacity of bulk sewers
- when peak capacity of wastewater treatment plans will be exceeded
- where the capacity to manage treated effluent for discharge to the environment or beneficial reuse has been exceeded (e.g. breach of licence conditions).

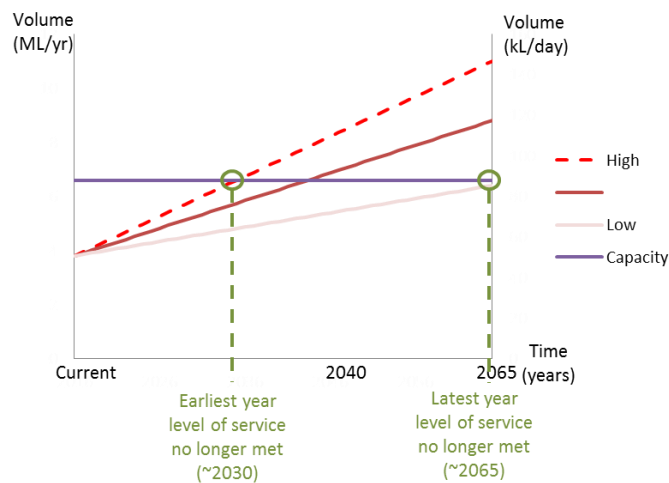


Figure 11: Example of scenario analysis for a sewerage system

**Core requirement 11.3**

UWSs must assess sewerage system capacity to determine if sewerage system demands can be satisfied over the next 50 years. Assessing system performance is a product of the expected capacity of sewerage systems along with compliance with existing licences.

UWSs must clearly state the year of the soonest augmentation and identified baseline year treatment plants, recycled water systems and major transfer infrastructure may require augmentation under a worst-case scenario, as well as the period over which these augmentations may be required.

Water corporations must consider treated wastewater's role in the urban water cycle, including for recycling and environmental outcomes.

**Core requirement 11.4**

UWSs should consider a sensitivity test to account for changing conditions which may affect the ability to discharge treated wastewater to water bodies.

EPA Victoria has developed Guidelines for risk assessment of wastewater discharges to waterways (publication 1287)<sup>62</sup>, providing guidance to practitioners conducting wastewater discharge risk assessments.

The Guidelines for Assessing the Impact of Climate Change on Sewerage Systems should be applied (if finalised).

<sup>62</sup> <https://ref.epa.vic.gov.au/business-and-industry/guidelines/water-guidance/wastewater-guidance-for-industry>

### 11.3 Form a view on the need for action

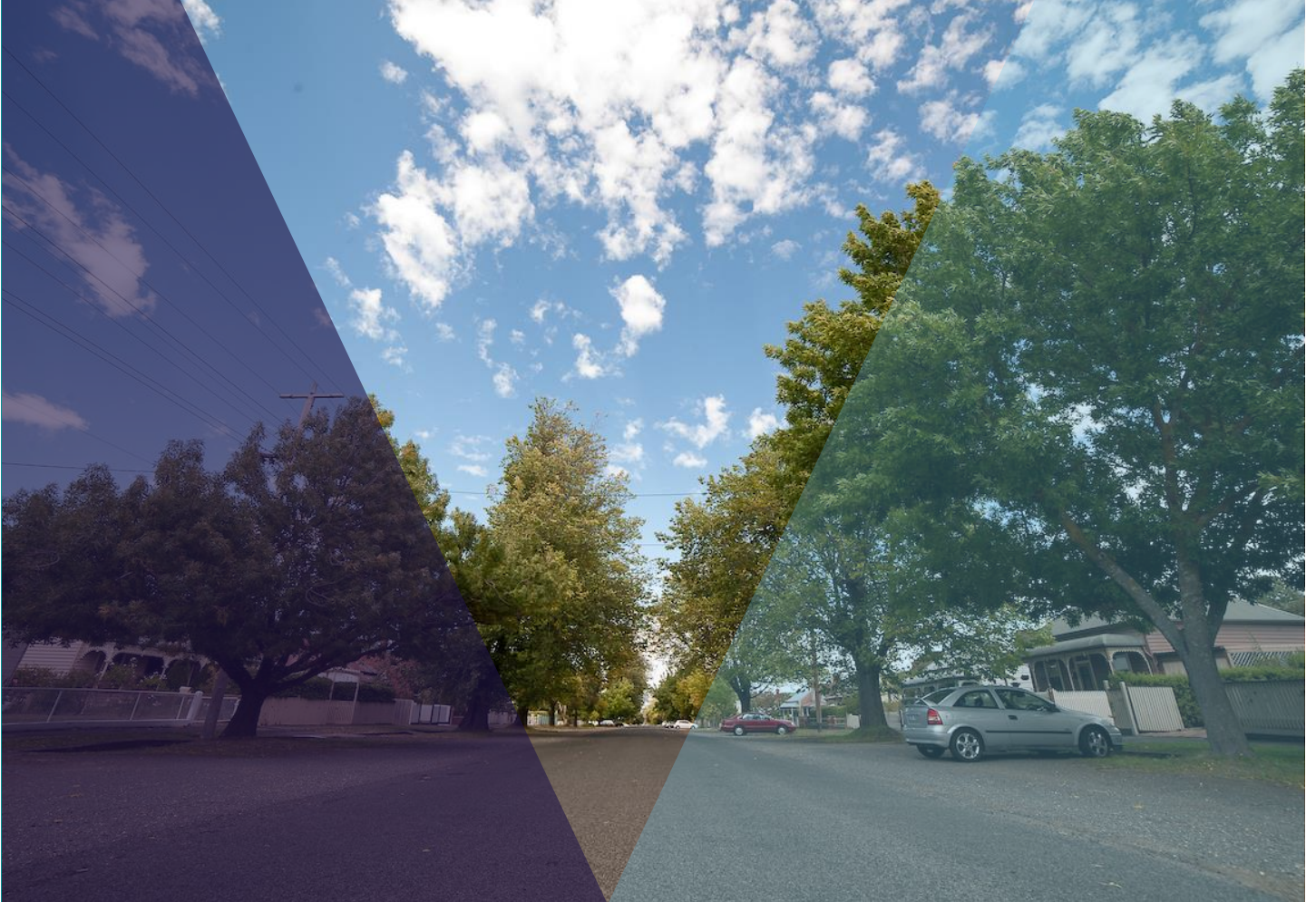
Based on the analysis undertaken, water corporations need to form a view on whether action is required to keep supply and demand in balance and ensure sewerage systems are compliant. This view must be informed by long-term assessments of system performance, via considerations of system yield, and short-term assessments of system performance.

Whether or not there is a need for action is ultimately a judgement call that must be made by each water corporation, in light of their mandate to provide safe, reliable, sustainable and affordable water supplies to customers. These judgements must consider the community's views about willingness-to-pay for improvements in system performance and the desired level of service (see section 8.2).

Where a need for action is identified by multiple water corporations, or, where the scale of the action is such that there is evidence of a willingness to invest in a major system-wide augmentation, it is incumbent on Government to take a leadership role in the planning for, and, delivery of these projects through regional and state-wide planning processes such as Sustainable Water Strategies.

<b>Core requirement 11.5</b>	If the need for action is identified water corporations <u>must</u> test a range of options with the community to keep supply and demand in balance and/or sewerage systems able to service demands.
------------------------------	--

# Actions to ensure the balance of supply and demand



## 12. Identifying and evaluating options

Water for Victoria proposes to achieve resilient and liveable cities and towns through a diverse range of water supplies and sources. This section outlines an option identification and evaluation process.

### Water for Victoria

#### Water supply

*“The government will make the best use of all water sources by:*

- promoting the use of all available sources to support liveability outcomes where the water sources are fit-for-purpose.*
- requiring water corporations to assess the use of all potential water sources in the development of their urban water strategies (these strategies are required under the current Statement of Obligations for water corporations).*
- promoting an evidence-based approach to diversifying our water portfolio that enables informed community consideration of the role of all potential water sources.”*

#### Water demands

*“As part of the next stage of water efficiency initiatives, the government and the water sector will develop materials to help communities better understand the urban water cycle, the importance of water in the urban environment, and challenges we face.*

*We will make decisions locally and use water efficiently so that our cities, towns and regional areas are liveable and resilient.”*

*“Making sure water corporations continue to work actively with industries that use a lot of water to find ways to improve water efficiency.”*

#### Sewerage

*“In developing their urban water strategies, water corporations will consider treated wastewater’s role in the urban water cycle, including for recycling and environmental outcomes. Water corporations spend a lot of money on sewerage management. By including wastewater in long-term water planning, water corporations can achieve better results for the community and the environment.”*



## 12.1 Identifying a long list of options

The first step to inform the options analysis is take stock of water sources and major infrastructure within the geographical boundaries of the areas serviced by each water corporation (as per section 7).

This should include estimates of future system yields and narrative on the vulnerability of water sources to climate variability, change and extreme events.

It should also include major sewerage infrastructure such as wastewater treatment facilities and bulk sewers.

Initially the UWS is to consider all technically feasible centralised and decentralised augmentation options across supply and demand, as well as documenting how the investments have been prioritised to optimise shared benefits and avoidable costs.

When developing a long-list of options the matters in Table 21 may be relevant.

To ensure an integrated assessment of options the long list of options is to include:

- the stocktake of existing initiatives relevant to water supply and demand identified in section 6
- options identified through community engagement
- system resilience options identified in section 7.4.
- demand management options
- water supply options

**Table 21: Issues to be considered in the development of options**

Issue	Consideration
Extent of the imbalance between supply and demand	The severity of the imbalance between supply and demand across the planning scenarios should be considered in terms of the ability of the option to address this.
Potential impacts on downstream users	For inland systems consideration must be given to the existing uses of a water source, such as stormwater, for environmental or consumptive downstream users.
Current practical constraints	Some water sources may not be considered a viable option due to their sporadic nature or their geographic location.
Opportunities for greenfield and brownfield developments	The viability of providing a fit-for-purpose supply of alternative water sources should be considered particularly relevant for any green and brownfield residential or commercial developments, which may also be an integral element of the sewerage servicing strategy. Water corporations should liaise with local councils to understand where potential greenfield development opportunities may exist.

Issue	Consideration
Water within the works of local councils	It is expected that water corporations will liaise with local councils so that, as a minimum, information about the expected volume of water sources within the works of local councils (stormwater drains) are considered. This information is needed to present a complete picture about the availability of alternative water sources within the service area of a water corporation. Some information may be available from Stormwater Management Plans prepared by local councils.
Uncertainty in institutional arrangements	Where uncertainty in institutional arrangements is preventing the immediate uptake of a water source, it is expected that these issues will be highlighted.
Matching fit for purpose supply and demand	Supply initiatives that aim to increase the supply of alternative water services should be considered in the context of regulations aimed at protecting public and environmental health. For example, the class of treated effluent must be suitable for the intended purpose.
Benefits of diverse water supply	The value of diversification of water sources to improve resilience can be considered.

### 12.1.1 Existing options from other strategies, resilience initiatives and the community

The long list must draw on the best available information relevant to improving supply and demand identified through other planning processes.

#### Core requirement 12.1

The long list of options must include:

- the stocktake of existing initiatives relevant to water supply and demand identified in section 6
- options identified through community engagement in section 4
- system resilience options identified in section 7.4.

### 12.1.2 Demand management options

Water conservation and water efficiency are essential for ensuring there is sufficient available water, particularly as climate reduces water availability.

Given their success water efficiency initiatives (such as behaviour change programs) continue to be important.

There should be transparent, measurable targets for water use and incentives such as targeted rebates are plausible ways to improve water efficiency

New approaches to using water more efficiently while optimising how the system is used could work together to secure water supplies.

Visible, ongoing water-efficiency initiatives result in communities being more open and receptive to more-difficult conversations about future augmentations and greater use of alternative water sources: such initiatives help to build 'social licence'.

Although we have come a long way with water efficiency, especially since the Millennium Drought, research tells us there is a lot of potential to conserve water by expanding existing programs, and by introducing new ones, to target specific uses (showers, sporting grounds) and users of water (industry / councils / demographic groups).

Initiatives that aim to reduce the demand for water services should be categorised as either short term, medium-term or on-going. UWSs are to set out how the corporation proposes to invest in these initiatives and their impact on water demands. Examples of such initiatives are in Table 22.

**Table 22: Examples of demand reduction**

Category	Initiative
Water efficient standards and appliances	Regulatory support for water efficient appliances and standards
	Rebates and other schemes to encourage the use of water efficient appliances, including rainwater tanks and household grey water systems
	Water sensitive urban design and development
Behaviour change (voluntary)	Education and awareness campaigns at the macro level <ul style="list-style-type: none"> <li>• Target 155 / Target your Water Use</li> </ul>
	Education and awareness campaigns at the industry, user or use level: <ul style="list-style-type: none"> <li>• encouraging and supporting industry/ies to reduce water consumption e.g. - Schools Water Efficiency Program</li> <li>• working with and supporting local government to promote water conservation and facilitate water sensitive urban design and development</li> <li>• promoting best practice water usage through external programs and rating schemes such as the Alliance for Water Stewardship, Infrastructure Sustainability Council of Australia, Green Building Council of Australia and National Australian Built Environment Rating.</li> <li>• new technologies increasingly provide opportunities to engage with water users in more targeted, immersive and tailored ways (such as with digital metering, through social media and with 'gamification': the use of game elements and principles in non-game contexts).</li> </ul>
Behaviour change (mandatory)	Permanent water savings rules
	Water restrictions
Price signals	Pricing to encourage water conservation
Non-revenue water	<ul style="list-style-type: none"> <li>• leakage reduction</li> <li>• pressure reduction</li> <li>• theft reduction</li> <li>• seepage reduction</li> <li>• evaporation reduction</li> </ul>

**Core  
requirement  
12.2**

UWSs must identify initiatives aimed at decreasing demand on water supplies and efficiency in use.

UWSs are to initially consider all demand related initiatives.

A “long list” of possible initiatives is to be refined to a “short list” of viable initiatives through an Initial Options Analysis with regard to regulations, legislation and Government policy settings.

UWSs must provide the following information for each demand initiative that is included on the “short list” of possible actions:

- the possible volume of water that can be saved under the initiative
- confidence estimates around this volume and plausible impacts of climate change
- time required for development and implementation of the initiative
- time required for water savings to be generated from the initiative
- costs of implementation, including pricing impacts
- description of social and environmental costs and benefits associated with the initiative

This “short list” of viable initiatives must be taken forward for engagement with customers and other key stakeholders.

Water corporations must identify which, if any, of these initiatives may be pursued as part of a long-term strategic plan to balance supply and demand, as reflected in its UWS, and which may be pursued in response to drought or other water shortage, as reflected in its Drought Preparedness Plan.

### 12.1.3 Supply options

Examples of initiatives that aim to increase or secure the supply of water services are contained in Table 23.

**Table 23: Initiatives that aim to increase the supply or resilience of water services**

Category	Initiative
Securing existing sources	Catchment management activities to improve source water quality and associated yield
	Waterway management activities to improve source water quality and associated yield
	New or upgraded treatment plant to increase resilience to anticipated events that could affect future supply e.g. bushfires, water quality events
	Treatment plant upgrades to improve treated water recovery yields
Additional sources	Groundwater
	Desalinated water (sea, surface and groundwater)
	Use of rainwater and stormwater on a fit-for-purpose basis
	Use of recycled water (treated wastewater) on a fit-for-purpose basis
	Connection to existing alternate water schemes
Storage	Aquifer storage and recovery projects
	Additional off-stream storage to enhance harvest
	Major dams: expansion of existing or new
Trade	Trading to secure water from resources already connected to the water grid
	Proposals for water trading between other urban water corporations and/or other water entitlement holders
Operating rules and procedures	Increased uptake from surface water resources, through changes to pumping or storage rules, dams, or off-stream storages
Grid connections	Existing and proposed interconnections to other supply systems
	Opportunities for investments in water savings in other supply systems, which may or may not be managed by the water corporation

#### ***Additional considerations – grid and markets***

Chapter 9 of Water for Victoria sets out that Victoria’s water grid and markets will help Victoria realise the greatest benefit from our valuable water resources. Table 24 sets out some additional considerations for grid and market supply options.

For the water grid and markets to function there needs to be both buyers and sellers of water. This suggests that water corporations should also consider whether they have excess water in the short term that could be sold. Water corporations should consider the benefits of different trading strategies. Water corporations should consider whether or not it is useful or appropriate to provide such information in their UWSs and/or whether this information is commercial in confidence.

Water corporations who have difficulty obtaining information from other water corporations regarding the availability and cost of entitlements, and/or delivery capacity, should seek assistance from DELWP.

**Table 24: Additional consideration for grid and market supply options**

Supply option	Description
Desalinated water	Consideration of the use of desalinated water will be relevant to some, but not all water corporations. Water corporations should consider the use of desalinated water on a temporary, medium term and permanent basis.
Grid connections	<p>The following matters should be taken into account when considering further connections to the grid or changes to its operation:</p> <ul style="list-style-type: none"> <li>• availability (short, medium and longer term) and cost of securing additional entitlements – based on discussions with entitlement holders</li> <li>• availability and cost of securing delivery/transfer capacity – based on discussions with other water corporations responsible for bulk water transfer. Delivery capacity should be considered over multiple time scales, e.g. yearly, seasonal and peak day capacity</li> <li>• whether the grid and resources connected to it can efficiently be used on a temporary or permanent basis</li> <li>• environmental and/or recreational impacts (negative or beneficial), particularly changes to stream flows in situations where a river will be used to convey flows</li> <li>• energy requirements and greenhouse gas production</li> <li>• impacts to the operations of other water corporations</li> <li>• other potential impacts of the options being considered, e.g. heritage, agricultural, etc.</li> </ul>
Use of markets	<p>Water corporations should consider the benefits of different trading strategies and decide if it is useful or appropriate to provide such information in their UWSs or whether this information is commercial in confidence. Water corporations should also consider whether they have excess water in the short term or long-term that could be sold.</p> <p>Water corporations who have difficulty obtaining information from other water corporations regarding the availability and cost of entitlements and/or delivery capacity should seek assistance from DELWP.</p>

## Regional augmentation planning

Chapter nine of Water for Victoria commits the Government to establish a plan for augmentations.

On the basis of this, an augmentation roadmap has been prepared for the south-central region identifying future augmentations and the order in which they will be delivered based on presently available information.

The roadmap is not a commitment to implement the projects, nor is it a static document. It includes estimates of details such as long-run marginal costs and benefits for the purpose of helping to inform assessments regarding the performance of the options.

The roadmap will be canvassed with the community every two years in a Biennial Statement and change as new information is made available.

**Core requirement 12.3**

Water corporations must identify which supply related initiatives could be pursued to address an imbalance between supply and demand.

Water corporations must consider all supply options relating to water services that are feasibly able to be delivered by the water corporation in their own right, noting that the ultimate selection of major system wide augmentations are a matter for Sustainable Water Strategies.

Initiatives that require co-investment from other parties to realise shared benefits can also be included.

A “long list” of possible initiatives must be refined to a “short list” of viable initiatives through an Initial Options Analysis with regard to regulations, legislation and Government policy settings.

UWSs must provide the following information for each supply initiative that is included on the “short list” of possible actions:

- broad categorisation (grid, local, alternative water)
- description of any new infrastructure required for the initiative, including a schematic diagram of this new infrastructure and indication of its connection to existing infrastructure
- key supply characteristics of the initiative, in terms of additional system yield, maximum volume of supply, reliability of supply and fit for purpose water quality
- confidence estimates around these volumes
- time required for development and implementation of the initiative (short term 0-5 years, medium term 5–20 years, long-term 20+ years)
- lead times and triggers for delivery (e.g. triggers for the commencement of phases across the planning lifecycle, e.g. concept, detailed design, business case, procurement, delivery)
- availability of supply once the initiative has been implemented
- costs of implementation, in terms of capital costs, operating and maintenance costs, and pricing impacts
- description of social and environmental costs (including greenhouse gas production) and benefits associated with the initiative
- any potential legislative or regulatory constraints.

This “short list” of viable initiatives must be taken forward for engagement with customers and other key stakeholders.

UWSs must consider and be consistent with the outputs of regional and state-wide processes when developing actions to address shortfalls in supply and demand.

Greater levels of detail are required for actions that are short term (0-5 years) to ensure their readiness for implementation. Items which require co-investment in the short term from other parties should be actively pursued with funders.

### 12.1.4 Sewerage/recycled water initiatives

Examples of initiatives that aim to manage or increase the capacity of wastewater systems and/or the uptake of recycled water could include, but are not limited to:

- new or augmented sewerage treatment plants and bulk transfer system
- use of temporary storages and emergency relief structures to manage peak capacity
- schemes for the beneficial reuse of recycled water such as dual pipe systems, sewer mining, land disposal, managed aquifer storage and recovery projects, and offset measures to protect beneficial uses and/or discharges that provide environmental benefits under licence

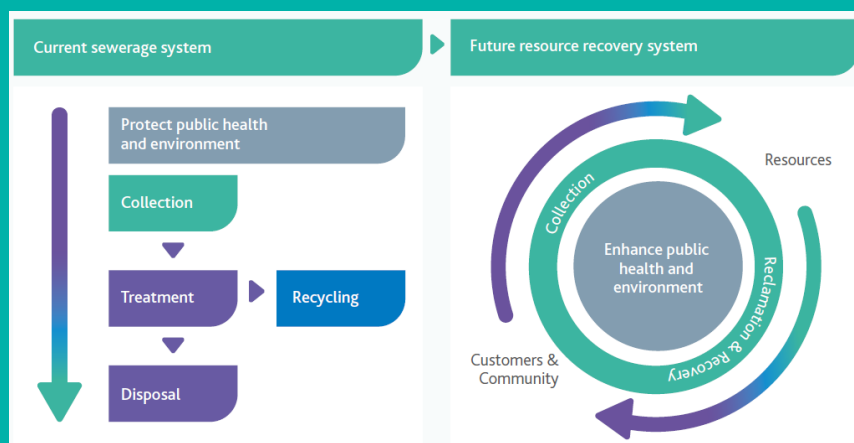
In the metropolitan region consideration may also include initiatives whereby sewage is transferred to the infrastructure of water corporation for treatment (undertaken by agreement).

#### Circular Economy - Recycling Victoria: A New Economy<sup>63</sup>

Recycling Victoria is the Victorian Government's 10-year policy and action plan for waste and recycling. It is Victoria's plan of reform to establish a recycling system that Victorians can rely on while transforming how the Victorian economy uses materials and how Victoria state reuses, repairs and recycles. Victoria's circular economy goals align with the United Nations Sustainable Development Goals, including Goal 8 ('promote sustained, inclusive and sustainable economic growth') and Goal 12 ('ensure sustainable consumption and production patterns').

Recycling Victoria acknowledges that the water sector plays an important role in the circular economy. Organisations in the water sector are well placed to support the transition because of their access to suitable land, expertise managing organic waste and treatment technologies, and commitments to resource recovery and reducing greenhouse gas emissions. It notes that Victoria's water and energy sectors already contribute to a circular economy by ensuring those resources are used efficiently for economic and environmental benefit. The policies and actions within Recycling Victoria are designed to support and provide opportunities for the water sector in a Victorian circular economy.

Recycling Victoria cites: Water for Victoria, the Melbourne Sewerage Strategy and the Intelligent Water Network Program as complimentary policies and strategies supporting its delivery. Figure 12 depicts transitioning from a linear sewerage treatment system to a circular resource recovery system.



**Figure 12: Transitioning from a linear treatment system to a circular economy**

Source: Melbourne Sewerage Strategy<sup>64</sup>

63. <https://www.vic.gov.au/sites/default/files/2020-02/Recycling%20Victoria%20A%20new%20economy.pdf>

64. <https://www.melbournewater.com.au/about/strategies-and-reports/melbourne-sewerage-strategy>



**Core requirement 12.4**

UWSs must identify which wastewater management initiatives may be pursued to address an imbalance between the ability of the wastewater management systems to transfer, reuse and/or dispose of wastewater in line with licence requirements.

UWSs should consider all wastewater management options. However, a “long list” of possible initiatives is to be refined to a “short list” of viable initiatives through an Initial Options Analysis that has regard to regulations, legislation, Government policy settings and other threshold matters.

UWSs should provide the following information for each sewerage management initiative that is included on the “short list” of possible actions:

- description of any new major infrastructure required for the initiative, including a schematic diagram of this new infrastructure and indication of its connection to existing infrastructure
- key characteristics of the initiative, in terms of additional system capacity, maximum treatment volume, reliability of disposal
- confidence estimates around these volumes
- licencing requirements
- estimated time required for development and implementation of the initiative
- high level estimates of the costs of implementation, in terms of capital costs, operating and maintenance costs and possible pricing impacts
- description of social and environmental costs and benefits associated with the initiative

UWSs can include details and initiatives of how water corporations are transitioning to a circular economy.

## 12.2 Long list to short list

Preliminary studies may be required to support an Initial Options Analysis, such as:

- financial and economic analyses
- market research and community engagement
- planning, environmental and/or engineering studies

As a result of the Initial Options Analysis, a “short list” of viable demand, supply and sewerage augmentation options is to be defined.

The Initial Options Analysis should enable water corporations to identify which supply and demand initiatives may be pursued as part of its long-term strategy to balance supply and demand, and this “short list” of viable initiatives are to be taken forward for detailed engagement with customers and other key stakeholders.

Table 25 provides a list of the options that can technically be implemented to address supply and demand imbalances by urban water corporations. They have been assessed and classified using a framework known as the Values, Rules, Knowledge framework<sup>65</sup> which allows options to be considered and evaluated based on:

- the amount known about each of the option
- likely community acceptance of the option
- the extent to which rules and our regulatory framework supports the option.

Table 25 is Government’s classification of the options taking into account assessments made on the basis of the above considerations. Though water corporations are not strictly bound by the way the options are classified, it should guide the language used by water corporations in discussing these options and signal the source of future Government readiness investment.

---

65. <https://research.csiro.au/eap/synopsis-decision-context-values-rules-knowledge-vrk/>

**Table 25: New supply options hierarchy for shortlisting**

Tier	Options
<p><b>Available now:</b> Proven and accepted part of our planning framework and can be delivered in the near-term with a high level of confidence, if justifiable.</p>	<ul style="list-style-type: none"> <li>• catchment management activities to improve source water quality and associated yield</li> <li>• waterway management activities to improve source water quality and associated yield</li> <li>• new or upgraded treatment plant to increase resilience to anticipated events that could affect future supply e.g. bushfires, water quality events</li> <li>• treatment plant upgrades to improve treated water recovery yields</li> <li>• groundwater</li> <li>• aquifer storage and recovery (assessed as technically feasible)</li> <li>• reduction in system losses, such as leakage reduction, theft reduction, seepage reduction, evaporation reduction and changes in system operations such as pressure reduction</li> <li>• increased uptake from surface water resources, through changes to pumping or storage rules, or off-stream storages</li> <li>• proposed interconnections and/or trading to access water from other inter-regional supply systems where compatible with present trade rules</li> <li>• expansion of existing Victorian Desalination Project</li> <li>• use of alternative water on a fit-for-purpose basis</li> <li>• connection/expansion of existing alternate water schemes</li> </ul>
<p><b>Possible in the future:</b> Options may be feasible under the right circumstances, but additional work is still required to improve confidence in their delivery, including further engagement with community members.</p>	<ul style="list-style-type: none"> <li>• opportunities for investments in water savings in other supply systems, which may or may not be managed by the water corporation</li> <li>• new desalination plant (large scale)</li> <li>• large scale reuse of alternative water for environmental flows</li> <li>• large scale reuse of alternative water for non-potable purposes</li> <li>• aquifer storage and recovery projects to facilitate greater use of alternative water</li> </ul>
<p><b>Conceptual:</b> Options are considered conceptual at present and will involve a high-level of investigative work given to improve confidence in their delivery. However, there is benefit in continuing to monitor scientific and economic evidence for fundamental changes.</p>	<ul style="list-style-type: none"> <li>• proposed interconnections and/or trading to access water from other inter-regional supply systems which are contrary to present trade rules</li> <li>• alternative water for potable reuse</li> </ul>
<p><b>Not feasible at urban water corporation level:</b> Evidence suggests they involve unreasonable third party impacts and there is no reason to believe the costs outweigh the benefits.</p>	<ul style="list-style-type: none"> <li>• proposed interstate connections</li> <li>• new or expansion of major dams</li> </ul>

## 12.3 Detailed options evaluation

Water corporations will need to understand how each initiative on the “short list” of potential actions could improve system performance in light of uncertainty about future inflows, future demand and a range of other factors including resilience of supply and infrastructure to extreme events.

The detailed options analysis should recognise that the viability of options may change relative to the:

- scenarios adopted for planning purposes. For example, under a high climate change scenario the incremental yield associated with a surface water supply initiative may decrease dramatically, which may significantly affect the viability of this option. Under these changed circumstances, initiatives that are based on alternative water sources or rainfall-independent water sources may offer greater benefits than would otherwise have been the case.
- time required to develop and implement the initiative, and the effectiveness of the initiative once implemented. For example, a surface water supply initiative may require a long lead time for planning, design, development and construction, and may also require a commissioning or harvesting period before additional water is available for use, whereas a demand initiative may generate effects relatively quickly.

### 12.3.1 Approach and extent of detailed options evaluation

UWS must identify and assess a portfolio of investments across common criteria to reveal the best available options and a proposed sequence of roll-out that is adaptive to change. Developing a merit order curve of interventions would make economically comparable a suite of options. These could then be used as a menu with identifiable costs and benefits, including trigger points with lead times for planning, business case development, community engagement and procurement, processes which can take many years.

The approach chosen should be tailored to the initiative being considered, its potential impacts and the capabilities within each water corporation to complete the appropriate options evaluation.

Some example approaches include<sup>66</sup>:

- cost benefit analysis
- cost effectiveness analysis
- multi criteria assessment
- real options analysis

When determining the extent of options evaluation to be undertaken consideration should be given to the likely impacts on customers that will benefit from, and bear the costs of, the proposed initiative as well as the potential for the option to accrue shared benefits across the broader community or environment. Water corporations should note that, whilst it may not be appropriate to undertake a complex analysis for small projects, if significant environmental or social effects are anticipated additional analysis will be required.

Detailed option evaluation is not necessarily required for augmentations that are needed well into the future. Greater emphasis is to be placed on evaluating options that are required in the short term.

An UWS may not identify a preferred option in some circumstances. It may also be appropriate for State significant options to be assessed as part of a Sustainable Water Strategy.

---

66. [https://waterportal.com.au/swf/images/swf-files/8tr5---003-options-assessment-framework\\_guide\\_sheets\\_combined\\_final.pdf](https://waterportal.com.au/swf/images/swf-files/8tr5---003-options-assessment-framework_guide_sheets_combined_final.pdf)

Options analysis undertaken in previous UWSs, Local Scale IWM studies or Regional Scale IWM studies can be considered. They do, not need to be repeated if still current.

A broad range of guidance material is available to consider when undertaking the Detailed Options Analysis. Particular attention should be given to the: The Investment Management Standard<sup>67</sup> developed by the DTF under the Infrastructure Investment Program, and the Sustainability Investment Guidelines<sup>68</sup>.

### Economic evaluation and cost allocation framework<sup>69</sup>

In most cases, cost-benefit analysis provides a robust method for evaluating the costs and benefits (including both market and non-market impacts) of a project. A multi-criteria analysis can also be used where the major benefits cannot be valued or are impractical to value.

An integrated solution may lead to costs that would typically not have been incurred by the project partners through traditional projects under current regulatory settings. However, the additional costs do not necessarily change at the same scale as additional benefits and can be concentrated on one or two specific entities. Funding streams and cost recovery mechanisms are not always apparent. This can present a barrier to some IWM projects.

DELWP has developed a cost-allocation process to respond to this issue. This provides a process to guide decision making on funding arrangements in such situations. The cost-allocation framework will be further developed and tested collaboratively by DELWP with other Victorian Government departments and the water sector.

This approach may identify a new interested organisation willing to co-invest to achieve the benefits identified. A strong project prospectus that describes the benefits and presents a sound value proposition can be a key tool to leverage external support. This can also be key to achieving opportunistic support and funding when the implementation context or strategic drivers change for a project or plan that has not been adopted due to funding issues.

### Externality valuation<sup>70</sup>

Externalities valuation focuses on assigning values to costs and benefits that are not obviously monetised, such as the community benefit of amenity improvements. Valuing externalities for integrated water cycle management planning is a DELWP-commissioned study that provides a first point of reference when undertaking IWM analysis that involves externalities. Although guidance on the use of externality data is provided in this document, it should be recognised that appropriate economics expertise is important when applying it. As with many technical disciplines, the 'devil is in the detail' and the robustness of the economic assessment is heavily dependent on the conditions under which the information is applied. This topic is an acknowledged gap and work to improve understanding of this area is continuing.

---

67. <https://www.dtf.vic.gov.au/infrastructure-investment/investment-management-standard>

68. Currently under development

69. [https://www.water.vic.gov.au/\\_\\_data/assets/pdf\\_file/0027/89604/DELWP-Cost-Allocation-Framework-Final-Jun17.pdf](https://www.water.vic.gov.au/__data/assets/pdf_file/0027/89604/DELWP-Cost-Allocation-Framework-Final-Jun17.pdf)

70. [https://www.water.vic.gov.au/\\_\\_data/assets/pdf\\_file/0024/89610/15-05-19\\_Valuing-externalities-for-IWCM\\_updated-contact.pdf](https://www.water.vic.gov.au/__data/assets/pdf_file/0024/89610/15-05-19_Valuing-externalities-for-IWCM_updated-contact.pdf)

## Benefit: Cost Analysis (BCA) Tool<sup>71</sup>

The Cooperative Research Centre for Water Sensitive Cities has developed a Benefit: Cost Analysis (BCA) Tool tailored to assessing investments for water-sensitive cities. It supports balanced and systematic decision making and provides evidence for use in business cases. The tool is consistent with BCA guidelines prepared by Australian governments.

The BCA tool is part of a broader package of economic tools and resources developed under the CRCWSC's Comprehensive Economic Evaluation Framework referred to as INFFEWS (Investment Framework For Economics of Water Sensitive Cities).

Another tool developed under the framework, is the INFFEWS Value Tool, which consists of a database of non-market valuation studies that are relevant to water sensitive projects. This tool is linked with the INFFEWS BCA tool in that it provides suitable values of the intangible benefits derived water-sensitive investments (such as green infrastructure) for inclusion in a BCA.

### 12.3.2 Considerations for options evaluation

Water corporations should adopt a “no regrets” approach to taking action, by prioritising actions that are plausible under a range of different scenarios.

#### *Financial analysis*

The methodology adopted for financial analyses must be applied consistently across all options assessed. Particular considerations for the Detailed Options Analysis include:

**Table 26: Financial analysis considerations**

Consideration	Description
Discount rate	Chapter 6 of The Economic Evaluation for Business Cases (DTF) <sup>72</sup> - Technical guidelines provide guidance on discounting, which is the technique of bringing back all future cash flows and economic values to “present values” (i.e. today’s value), based on the concept of time preference (i.e. one dollar given to you today is worth more than one dollar given to you tomorrow).
Long run marginal costs	<p>The long run marginal cost (LRMC) is to be provided for each initiative in the Detailed Options Analysis.</p> <p>This is to include the sum of marginal operating and capital costs associated with the proposed initiative.</p> <p>LRMC reflects the cost of serving an incremental change in demand, assuming all factors of production can be varied. Importantly, because LRMC is a long run concept, it accounts for the fact that suppliers have the option of expanding their capacity in order to meet an incremental increase in demand. Measuring LRMC involves estimating the costs involved with undertaking a capacity expansion sooner than would otherwise be the case in response to that change in demand.</p> <p>For efficient decision-making, the relevant marginal cost is the full cost to society, including any externalities. Further information on the calculation of long run marginal cost is available from the ESC.</p>

71. <https://watersensitivecities.org.au/content/inffews-benefit-cost-analysis-tool/>

72 <https://www.dtf.vic.gov.au/investment-lifecycle-and-high-value-high-risk-guidelines/stage-1-business-case>

Consideration	Description
Evaluation period	<p>Ideally, the period of analysis should cover the full economic life of the assets being evaluated and be reflective of the 50-year planning timeframe of the UWS.</p> <p>Many water infrastructure assets have a long life and it may be impractical to evaluate the investment over the full life cycle.</p> <p>As the study period becomes longer, the integrity of the estimates generally declines, and as a result of discount rates, the longer-term cash flow estimates may be limited to 20 years. In these instances, the estimated residual asset value of the investment should be used to reflect the asset's remaining service value.</p>
Secondary benefits	Any benefits to other systems from using a particular water source. For example, benefits to an existing sewerage system (in particular sewage treatment plants) from sewer mining or demand management activities which reduce flows and could defer upgrades.

### ***Environmental costs and benefits***

Whilst it may be difficult to accurately quantify environmental costs and benefits associated with initiatives, it is important to at least describe these costs and benefits.

Methods of evaluating environmental costs and benefits are available, which generally relate the loss or gain of an environmental asset with its value if used for another purpose or its value based on what the community is currently prepared to pay to maintain that asset.

Water corporations are to consider the potential environmental costs and benefits associated with proposed initiatives on a case-by-case basis.

A typical approach would be to firstly identify costs and benefits in qualitative terms and then assign a weighting to those costs and benefits based on their perceived importance and potential impact of the initiative on those values. As a minimum, the Detailed Options Analysis must include:

- greenhouse gas emissions – for example, pumping of groundwater or surface water is likely to compare less favourably than gravity supply
- significant environmental values identified in regional strategies for healthy rivers, wetlands and estuaries.

Water corporations should also quantify environmental costs and benefits for those environmental assets with previously estimated values that may be impacted by the proposed initiatives.

### ***Socio-economic costs and benefits***

The social impacts associated with proposed initiatives can be significant therefore the Detailed Options Analysis should include (but not necessarily be limited to):

**Table 27: Potential socio-economic cost and benefits**

Consideration	Description
Fit for purpose water supply	<p>The costs of treatment plants can be significant. Options that do not require a potable supply may be less expensive than options that do.</p> <p>If the community expresses a desire to receive treated water, or if the water corporation considers that there is an unacceptable risk associated with not fully treating water, then the relative ranking of options that require water treatment will improve.</p>
Cross-subsidies across systems	<p>The policy adopted by a water corporation regarding cost sharing across different supply systems, particularly in situations where a uniform water tariff is set for the region as a whole, will need to be taken into account in the Detailed Options Analysis and explained in the engagement process.</p>
Externalities	<p>Economic costs and benefits may be different to financial costs and benefits because of externalities. Examples of socio-economic externalities may include the potential economic activity that may be generated by certain initiatives relative to others, and the potential costs to the community of particular initiatives relative to others.</p>
Liveability	<p>Water for Victoria recognised the importance of recreation on and around water for communities across Victoria and committed to supporting recreational opportunities at our waterways.</p> <p>The 2019 amendments to the <i>Water Act 1989</i> continue this commitment, acknowledging the economic, aesthetic and well-being benefits the community derives from the use of waterways for recreational purposes, and now requiring the consideration of social and recreational uses and values in water management and planning.</p> <p>Social and recreational use of waterways — water storages, rivers, wetlands and estuaries — is increasing as the population grows and the amount of private open space diminishes. A drying climate will increase pressure on natural and human-made water bodies as valuable social and recreational assets. All water management can support recreational uses and benefits in various ways.</p>

### ***Accounting for uncertainty***

The Detailed Options Analysis should consider the extent to which a portfolio approach to initiatives will reduce the risk associated with relying on a single initiative. In addition, water corporations are to adopt a “no regrets” approach to taking action, by prioritising actions that are plausible under a range of different scenarios.



**Core  
requirement  
12.5**

UWS must include:

*“options to facilitate efficient investments in projects across the urban water cycle that optimise shared benefits and avoidable costs”*

Once a “short list” of viable initiatives has been identified and tested with the community, water corporations must undertake a Detailed Options Analysis that incorporates financial, social and environmental costs and benefits to determine a prioritised list of initiatives for further investigation and/or implementation over the short term, medium and long term.

The Detailed Options Analysis is to produce a portfolio of actions to be undertaken over the:

- short term (0-5 years)
- medium term (5-20 years)
- long term (20+ years)

Water corporations should use their best judgement to determine and justify the extent of the Detailed Options Assessment required, with consideration given to the range of possible assessment techniques, future applicability in border planning processes such as Sustainable Water Strategies, Pricing Submissions and detailed Business Case development.

UWSs must clearly document the approach adopted for evaluating options.

The methodology adopted for economic analyses must be applied consistently across all options assessed. Options assessment must occur at the portfolio level to allow the comparison of supply and demand projects, as well as at the individual project or initiative level, to capture the true value of projects to the overall supply-demand portfolio taking into account characteristics such as flexibility and reliability.

Quantifying shared benefits and avoidable costs arising from a project is to be undertaken and be clearly documented.

UWSs must document the approach adopted for considering the following when undertaking their Detailed Options Analysis.

- financial analysis requirements
- considering environmental costs and benefits
- considering socio-economic costs and benefits

The Detailed Options Analysis should consider the extent to which a portfolio approach to initiatives will reduce the risk associated with relying on a single initiative. In addition, water corporations are to adopt a “no regrets” approach to taking action by prioritising actions that are plausible under a range of different scenarios.

# Implementation, monitoring and evaluation



## 13. Implementation of priority actions

UWSs are to be implemented in a manner consistent with an adaptive management approach.

The list of priority actions included in the UWSs are to be reflected in the corporation's Price Submission and the Corporate Plan to facilitate their implementation.

### 13.1 Action Plan - identifying priority actions

A list of priority actions is the core output from the analysis conducted and community engagement. The priority actions form a portfolio of opportunities to pursue to ensure supply and demand remain in balance.

Trigger points are required to transparently communicate when particular actions will be taken so that initiatives are ready for implementation when needed actions may range from undertaking further investigation and planning works, through to actual implementation of initiatives if a more immediate need has been identified.

#### Short-term vs long term actions

A key consideration in developing the set of priority actions will be deciding whether a short-term response, such as the implementation of water restrictions, or long-term response, such as investments in alternative water sources is required.

These considerations should be informed by:

- findings from the detailed options analysis
- impact/cost of restrictions
- current water resource position
- appetite for risk
- consequences of system failure or failure to meet agreed levels of service

Water corporations should consider the extent to which the prospect of water shortages in the immediate to short-term warrant the implementation of actions scoped up in a Drought Preparedness Plan in addition to, or instead of, actions scoped up in an UWS.

Having undergone a Detailed Options Analysis to identify a prioritised list of actions, there may be a need to implement an action outlined in their Drought Preparedness Plan while prioritised actions outlined in the UWS are still under development.

The timing of actions that require large capital investments is critical in balancing the need to ensure that communities have enough water whilst minimising the impact on customer water bills and avoiding premature investment, or investment in options that will not be needed.

<b>Core requirement 13.1</b>	<p>UWSs <u>must</u> include a list of priority actions in the form of an action plan that may need to be undertaken:</p> <ul style="list-style-type: none"> <li>• in the short term (0-5 years)</li> <li>• medium term (5-20 years)</li> <li>• long term (20+ years)</li> </ul> <p>UWS <u>must</u> include targets to guide cost-effective investment in water supply and demand programs derived from the prioritised list of actions, for example appropriate triggers or zones for project planning, approvals and design, procurement and implementation to ensure readiness.</p>
------------------------------	---

### 13.1.1 Visual representation

<b>Core requirement 13.2</b>	<p>The outcomes of options assessment <u>must</u> be presented visually building on the map or maps developed for community engagement.</p> <p>The level of detail and commentary provided <u>should</u> reflect the particular characteristics of water corporation's system.</p>
------------------------------	--

## 13.2 Actions in the immediate to short term (0-5 years)

### 13.2.1 Implementing the priority actions

UWSs will set priorities for actions that need to be undertaken by water corporations in the coming year, and over the next five years. As such, these priority actions are to inform and be reflected in other strategic business plans developed by water corporations such as the:

- Price Submission to the Essential Services Commission
- annual Corporate Plan to the Minister for Water and the Treasurer.

The Corporate Plan should set out key actions that the water corporation proposed to undertake over the planning period, consistent with the list of priority actions that will be undertaken to implement the UWS. The Corporate Plan is reviewed by DELWP and the Department of Treasury and Finance and provided to the Minister for Water and the Treasurer.

<b>Core requirement 13.3</b>	<p>The list of priority actions included in the UWSs <u>must</u> be reflected in the Water Corporation's Pricing Submission and the Corporate Plan to facilitate their implementation within the anticipated timelines of these other processes.</p>
------------------------------	--

## 13.3 Actions in the longer-term

### 13.3.1 Ensuring readiness for action

Work should continue on developing medium to long term actions to ensure that these are ready for implementation when needed and are able to be brought forward if required.

Water corporations should also monitor emerging technologies for options that are not currently feasible and any new options that may come to light before the next review of the UWS.

## Readiness options

Water corporations may wish to delay making large capital investments until there is more information available about the prospect of water shortages, for example, whether the shortages are likely to be short-term due to drought or more permanent due to climate change. In such circumstances, the cost of restrictions should be compared to the savings from deferring capital investment.

Water corporations may also wish to delay action as a stake in a major system wide augmentation is considered more feasible. The risk of this augmentation not occurring in the time required should also be balanced against the potential savings.

The Government has initiated in a readiness program to reduce the lead-times and create greater certainty for the major system-wide augmentations. Water corporations too may choose to prioritise and invest in readiness activities.

The development of readiness options might help in this regard, by providing some flexibility in the timing and potentially, in the scale of implementation. Readiness options can be supply or demand initiatives, ideally, initiatives that can be mobilised quickly when required. They are developed to provide a capacity to respond to a water shortage but are not implemented until necessary. Readiness options can be characterised by trigger points based on storage levels or supply allocations for the existing supply system, as for water restrictions in a Drought Preparedness Plan. Trigger points must reflect the lead-time for the specific readiness option.

Developing readiness options may include pilot plants, detailed design, approvals, site preparation and other relatively long lead-time but low-cost elements of implementation. The more preparation and preplanning works that can be done in developing a readiness option, the longer the critical trigger point for final implementation of the option can be delayed. This provides a significant benefit since delaying implementation means that a readiness option may not need to be triggered before a drought breaks. A major financial cost can then be avoided until it is needed at some future point.

Using readiness options in this way reflects a desire to refrain from making large capital investments during an environment of climate uncertainty.

## 14. Monitoring and evaluation

Annual reviews of the UWS are to be undertaken so that actions can be brought forward or deferred on the basis of new or better information as it comes to light.

This means that the prioritised list of actions will be reviewed and reconfirmed on a regular basis in the Annual Water Outlook.

### 14.1 Annual review of UWS through the AWO

The Annual Water Outlook with its yearly cycle is a key part of the 'adaptive management' framework.

Water corporations have expressed a strong desire to utilities the AWO development process as the mechanism to monitor and evaluate the implementation of the UWS and the AWO as the best way communicate to customers and DELWP how the UWS is tracking.

Under the Statement of Obligations General (2015) all Victorian water corporations are required to prepare and make available to its customers and DELWP an Annual Water Outlook by 1 December each year.

The Annual Water Outlook falls under Part 4-2 Customer Information in Customer and Community Engagement. It is a requirement under the Statement of Obligations General (2015) that it must provide information on (for each water supply system):

- a. the current water resource position;
- b. a forward outlook over the coming year at a minimum, and five years if possible, under a range of plausible climate scenarios;
- c. the likelihood of restrictions;
- d. whether agreed levels of service will be able to be met under these scenarios; and
- e. if not, action/s proposed to improve system performance so that agreed levels of service can be met.

#### **Purpose of the Annual Water Outlook**

The purpose of the outlook is to keep customers, stakeholders and the community informed about the current and projected 12-month status of water supplies. It must set out any contingency plans being put in place in response to potential water shortages and include information on the likelihood of responses such as supply augmentation and water restrictions. This information is required to help build an engaged and informed water literate community.

The outlook will also confirm and provide updates on whether the prioritised list of actions for the next five years, as set out by the UWS in the Action Plan, is still appropriate or whether actions should be brought forward or delayed. This provides the opportunity for the community to continue conversations around water security and expectations with the water corporation.

Specific guidance on the AWO is provided each year by DELWP in the *AWO Guidelines for Urban Water Corporations*.

The Annual Water Outlook is to be developed in consultation with DELWP to ensure that it includes consistent information on probable inflow scenarios and other matters. A set of more detailed guidance is made available each year by DELWP to water corporations in advance of the publication date.

<b>Core requirement 14.1</b>	<p>Annual reviews of the progress of implementing the UWS <u>must</u> be undertaken in parallel with the preparation of the Annual Water Outlook and submitted to DELWP at the same time. This will ensure the UWS is a 'live' document and supports adaptive management as circumstances change.</p> <p>The annual UWS review process must include:</p> <ol style="list-style-type: none"><li><b>1. Review of key forecasts</b></li></ol> <p>The supply/demand scenario forecasts made in the UWS have been reviewed against the actual recorded information to depict where the current situation is tracking.</p> <ul style="list-style-type: none"><li>• key forecasts included in the UWS are the number of customers, the demand for water, sewerage inflows and recycled water demand</li><li>• key variances are discussed and potential changes or amendments to these forecasts recommended</li></ul> <ol style="list-style-type: none"><li><b>2. Tracking Implementation of UWS actions</b></li></ol> <p>UWSs recommend several further investigations, key system augmentation and stakeholder engagement.</p> <p>Specific points in the implementation review are:</p> <ul style="list-style-type: none"><li>• key achievements</li><li>• status of actions including commentary of actions being delivered e.g. trigger points being hit or actions at risk</li><li>• changes to the action plan – new actions, modifications to existing actions or actions that are no longer required</li><li>• updates to the UWS - key amendments to the UWS are discussed</li></ul> <ol style="list-style-type: none"><li><b>3. System summaries</b></li></ol> <p>Summary of system challenges (water and sewerage services), proposed resolution and items for further resolution / investigation</p> <ol style="list-style-type: none"><li><b>4. Communication</b></li></ol> <ul style="list-style-type: none"><li>• the key outcomes of the review will be communicated to customers in the AWO.</li><li>• the outcomes of the review are provided to DELWP.</li></ul>
------------------------------	---

## 14.2 Review by DELWP

DELWP will undertake a review of the status of the UWS based on the information submitted as part of the AWO process. Additional information may be required for clarification.

## 14.3 Five yearly review and update of the strategy

Water corporations are required to review and update UWSs at least every five years.

Regularly reviewing UWSs strengthens the adaptive management approach, meaning that decisions will be made on an ever-increasing evidence base. It also enables water corporations to capture future technology gains and take full advantage of options for the future. This responsiveness is especially important because of the uncertain impacts of climate change, and the need to include new knowledge and capture technology gains as they become available.

**Core****requirement****14.2**

UWSs should be dynamic documents that will be reviewed and updated at least every five years to reconfirm the prioritisation and timing of longer-term actions, in light of improving knowledge, technology, costs and policy.



# Drought preparedness plans



## 15. Drought preparedness plans

<b>Core requirement 15.1</b>	A Drought Preparedness Plan (incorporating a Drought Response Plan) <u>must</u> be provided as an appendix to the UWS.
	Drought Preparedness Plan <u>must</u> cover the two components of preparedness and response for each urban water supply system.

Development of Drought Preparedness Plans is a commitment to better urban water planning under Water for Victoria (Action 5.2).

Under this action, water corporations must actively prepare for drought, not just respond to it. To support this commitment, Drought Response Plans are incorporated into Drought Preparedness Plans to drive holistic thinking and integrated action.

The aim of a Drought Preparedness Plan is to define actions to both prepare for and respond to water shortages (resulting not only from drought but other extreme circumstances such as water quality and emergency events) in the immediate and short-term.

### 15.1 Key considerations

A key issue for water corporations, if they are faced with the prospect of water shortages, will be deciding whether to implement short-term actions, such as water restrictions or other actions set out in their Drought Preparedness Plan, or implement long-term augmentation investments set out in the UWS. For this reason, Drought Preparedness Plans are to be developed in parallel with UWSs to capture the potential for better integration of long-term planning with short-term planning.

Water corporations are required to examine the effectiveness of water restrictions and success of Permanent Water Saving Rules in reviewing their Drought Preparedness Plans. Consideration of the effectiveness of other demand management tools available, including water use efficiency programs, public education campaigns and other similar initiatives, should be compared against possible supply options, such as major augmentations and use of alternative supplies.

In addition to developing the Drought Preparedness Plan alongside the UWS every five years, water corporations are obliged to review and update their Drought Preparedness Plans within 12 months of either the lifting of any period of water restrictions or the augmentation of any water supply system.

Drought Preparedness Plans are to be developed considering:

- lessons learned from the experience of managing scarce water resources during recent times of drought and dry conditions
- new tools and options available for balancing water supply and demand as a result of recent infrastructure changes (such as permanent augmentations and short-term measures) and/or policy changes (such as new entitlements and carryover)
- outcomes of any relevant community engagement in considering service needs, preferences, expectations and willingness to pay (e.g. UWS engagement, Integrated Water Management Forums, customer feedback)
- consider the emergence of new options for water security – such as improvements to the water market, or introduction of carryover and construction of new infrastructure – which have improved the ability of some water corporations to manage shortages through building reserves and accessing water from other systems. This includes Integrated Water Management projects that impact supply and demand.

## 15.2 Component 1: Preparedness

The plan must define activities that the water corporation will undertake to ensure that communities are involved in planning and prepared for the eventuality of drought. This approach includes documenting how communities have been and will be involved in ongoing conversations on drought planning, and identification of public spaces to be exempt from, or to be supplied by, alternative water sources in the event of water restrictions. Preparedness activities should reflect those identified in section 12.1.2

The preparedness section of the plan is about outlining the suite of activities that your water corporation is doing, on a business as usual basis, to make sure there are no surprises and that shocks and impacts are minimised for your communities, if and when your Drought Response Plan needs to be invoked.

All types of preparedness activities should be identified, for example communications, incentives, volunteer programs and regulation, which form part of permanent water saving rules.

### 15.3 Component 2: Response plan

The plan must include a Drought Response Plan (as a separately labelled section), in line with and as required under the Statement of Obligations General (2015) outlined below and referred to in the water corporation's relevant Water Restriction By-law.

The Drought Response Plan sets out the decision-making framework whereby actions in response to water shortages (such as water restrictions) are to be triggered.

#### **Under the Statement of Obligations General (2015) section 6-4 Drought Response Plans for Urban Systems:**

1. The Corporation must:

- (a) Develop a Drought Response Plan that governs the management of the supply of water by the Corporation in any period of drought or when the supply of water is limited;
- (b) Not rely on the Minister declaring a water shortage and temporary qualifying of rights to water under the *Water Act 1989* as an option for maintaining supplies as part of the Drought Response Plan;
- (c) Comply with any guidelines issued by the Minister for the purpose of drought response planning; and
- (d) Make its Drought Response Plan available to the public, unless the Minister consents in writing to not making available a Plan or part of a Plan.

(urban only)

2. The Corporation must review, and if necessary, amend, its Drought Response Plan:

- (a) At intervals of no more than five years; and
- (b) Within twelve months of either:
  - i. The lifting of any period of water restriction imposed in accordance with the Corporation's Drought Response Plan; or
  - ii. Any major change occurring to works or arrangements for conserving water for, or supplying water to, any water supply system that is relied upon for the supply of water by the Corporation.

(urban only)

3. The Corporations that share water supply systems must cooperate and coordinate with each other when developing, reviewing or implementing their Drought Response Plans.

(applicable all)

## 15.4 Key inclusions - preparedness

### 15.4.1 Community engagement

One of the key aspects of drought preparedness is ensuring that the community is involved and part of an ongoing conversation around planning and preparing for water shortages (not just as a result of drought, but other extreme events including water quality and emergency events including bushfires). The preparedness section of the Drought Preparedness Plan should define how a water corporation has and will continue to engage with customers and stakeholders on planning for water shortages and should articulate customer expectations and priorities.

It is not expected that engagement under this section is to be undertaken separately, and it should (and most likely already is) part of existing processes and forums. Customer engagement may include, for example, engagement as part of existing processes such as the UWS, ESC Pricing Submission or other feedback processes, or through existing forums such as Integrated Water Management Forums or existing stakeholder working groups.

#### *List of priority community assets*

As part of the ongoing conversation with customers and stakeholders, it is important to consider and document priority community assets that might require water to be made available during periods of water shortages as well as how they will continue to be watered during water restrictions (either under a Water Use Plan, via Exemption or supplied by alternative water sources).

This should include, at a minimum, watering of ovals under council water use plans during water restrictions, and where possible other assets providing important liveability functions, such as public open spaces / gardens and recreational water bodies that need to be watered subject to community preparedness to pay. This process should be undertaken using an evidence-based cost benefit analysis, with consideration of risks.

#### *Exemptions and Water Use Plans for community assets*

As outlined in the 'Schedule of Restrictions' in each water corporations' Water Restriction By-law, Water Use Plans may be considered for the following areas (noting that there might be additional limitations under different stages of water restrictions):

- public gardens
- public lawn areas
- general or particular playing surfaces
- public ponds and lakes
- public pools and spas

Proposed exemptions must be documented and accounted for in Drought Preparedness Plans and include principles for determining what are exempt users and a timeframe in which these will be determined. Water corporations should consult the 'Particular Exemptions' and 'Water Use Plans' sections along with the 'Schedule of Restrictions' in their Water Restriction By-law for more specific guidance.

### ***Alternative water sources for community assets***

The Drought Preparedness Plan must record which public open spaces are, or will be, supplied by alternate water sources and will continue to be irrigated during restrictions. Drought Preparedness Plans should document how the water corporation will work with entities responsible for these assets to assist their access to alternative water sources as part of finalising Drought Preparedness Plans.

**Core  
requirement  
15.2**

The preparedness component of the Drought Preparedness Plan must:

- define how the water corporation has and will continue to engage with customers, communities and stakeholders on planning and preparing for water shortages. This includes how the water corporation has and will work with asset managers to identify priority community assets to be watered during water shortages. This engagement is not expected to be done in isolation of existing processes; for example, through UWS engagement, stakeholder working groups and/or IWM forums.
- list the priority community assets that might require water to be made available during periods of water shortage as well as how they will be watered during water restrictions (i.e. Water Use Plans, exemptions, alternative water).
- where alternative water is identified as a source, document how the water corporation will work with the responsible asset manager (e.g. Council) to access the alternative water source.
- identify proposed exemptions under each relevant stage of water restriction (i.e. public gardens, playing surfaces, public pools).
- include principles for determining what are exempt users and a timeframe for determination on the submissions for exemptions.

## 15.5 Key inclusions - Drought Response Plan

The Drought Response Plan is the response component of the Drought Preparedness Plan. It details response management actions to ensure critical human water needs will be met during emergency or extreme events, such as an extreme dry period, bushfires, blue-green algae outbreaks, or other water quality incidents that render water acutely toxic or unusable for established local uses and values.

Actions identified in the Drought Response Plans and their trigger points should reflect the work water corporations have undertaken in developing the UWS and have regard to the relevant guidance provided in previous sections of these guidelines. This includes, but is not limited to, Core Requirement 8.1 on minimum levels of service and Chapter 13 Implementation of priority actions.

### **Core requirement 15.3**

The Drought Response Plan (to be included as a separately labelled section of the Drought Preparedness Plan) must set out a plan of action to respond to water shortage including the decision-making framework to trigger these actions. This framework is to include relevant indices or variables such as volume of water in storage, inflows to storages, and climatic conditions etc.

Response actions for each trigger level might include:

- water restrictions (as set out in the water corporation's Water Restriction By-law)
- demand reduction measures, or
- supply enhancement measures (including alternative water options).

Water corporations should specifically revisit the suggested "triggers" for action in light of lessons from recent experience, in particular:

- it might be desirable for triggers to be based on more than one variable – for example, current storage levels together with current inflows;
- it might be desirable to specify particular points in the year at which system status is to be evaluated against specific triggers – for example, at the end of the filling season – rather than specifying and applying trigger "curves" on a monthly basis;
- where water restrictions are to be pursued as a possible drought response mechanism in future, it might be desirable to:
  - set different triggers for entering and exiting the various stages of water restrictions to reflect the inherent conservatism that has been demonstrated in recent decisions about easing water restrictions;
  - set triggers in such a way that water restrictions are not entered into, or increased in severity during the winter months, when savings in discretionary water use under restrictions are expected to be minimal; and
  - re-evaluate the "spacing" between triggers in light of potential savings in discretionary water use that may be achieved under the various stages of water restrictions, based on recent experience.

# Appendices





# Appendix A Extract from SoO (General)

## 1-6 Guiding principles

.1	<p>In performing its functions and providing its services the Corporation must assist in the task of transitioning Victoria to an environmentally sustainable economy. The Corporation should respond to the challenges of climate change with due consideration of mitigation and future adaptation measures, having regard to economic and social impacts.<sup>1</sup></p> <p>The Corporation must:</p> <ul style="list-style-type: none"><li>• manage water resources in a sustainable manner that enhances environmental outcomes and amenity in urban and rural landscapes;</li><li>• effectively integrate economic, environmental and social objectives into its business operations;</li><li>• support sustainable and liveable communities;</li><li>• minimise the impacts of its activities on the environment;</li><li>• manage risk to protect public safety, quality and security of supply;</li><li>• operate as efficiently as possible consistent with sound commercial practice;</li><li>• manage its business operations to maintain the long-term financial viability of the Corporation;</li><li>• undertake continuous review, innovation and improvement; and</li><li>• collaborate with other water corporations, public authorities and government agencies to plan for and take account of needs in a geographic area.</li></ul> <p>(applicable all)</p> <p><sup>1</sup> refer <i>Climate Change Act 2010 (Vic)</i>, preamble.</p>
.2	<p>The Corporation must act consistently with any approved Sustainable Water Strategy. The Corporation must also have regard to the principles of informed decision making; integrated decision making; risk management; complementarity; equity; and community engagement.<sup>2</sup></p> <p>(applicable all)</p> <p><sup>2</sup> refer <i>Climate Change Act 2010 (Vic)</i>, sections 8-13.</p>

## 6-A Modelling for Climate Change and Supply Forecasting

.1	<p>The Corporation must comply with any guidelines for forecasting the impact of climate change on water supplies as issued by the Department, setting out:</p> <ol style="list-style-type: none"><li>(a) future climate scenarios; and</li><li>(b) projections for long term rainfall, runoff and inflows.</li></ol> <p>(applicable all)</p>
----	---

## 6-1 Urban Water Strategy

.1	<p>By 31 March 2017, and thereafter as directed by the Minister, the Corporation must develop, in accordance with any written guidelines issued by the Minister, an Urban Water Strategy for its supply districts that must include:</p> <ul style="list-style-type: none"> <li>(a) proposed levels of service;</li> <li>(b) measures to deliver sub-regional planning outcomes, and integrate water cycle management with relevant planning schemes;</li> <li>(c) options to facilitate efficient investments in projects across the urban water cycle that optimise shared benefits and avoidable costs;</li> <li>(d) measures to adapt to climate change;</li> <li>(e) measures to maintain a balance between the customer’s demand for water and the supply of water in cities and towns;</li> <li>(f) options for the management of extreme event supply contingencies; and</li> <li>(g) options and trigger points for major augmentations.</li> </ul> <p>The strategy should consider all aspects of the <i>urban water cycle</i> across a 50 year planning horizon and be consistent with the guiding principles of this Statement and any relevant Sustainable Water Strategy.</p> <p>(applicable all, except rural, and, Melbourne Water)</p>
.2	<p>In developing an Urban Water Strategy, the Corporation must consult with the community and key stakeholders, and participate in the development of relevant local and regional plans.</p> <p>(applicable all, except rural and Melbourne Water)</p>

## 6-2 Melbourne Water System Strategy

.1	<p>By 31 March 2017, and thereafter as directed by the Minister, the Corporation must work with all entitlement holders in the Melbourne water supply system to develop, in accordance with any written guidelines issued by the Minister, a Melbourne Water System Strategy that establishes an integrated system view of available consumptive water in the Melbourne water supply system, having regard to relevant Urban Water Strategies and the strategies of other entitlement holders. The strategy must detail the:</p> <ul style="list-style-type: none"> <li>(a) core system security of Melbourne’s water supply system;</li> <li>(b) integration of supply and demand options and projects from entitlement holders into major investments in Melbourne’s water supply system;</li> <li>(c) options that facilitate efficient investments in projects across the urban water cycle that optimise shared benefits and avoidable costs;</li> <li>(d) measures to adapt to climate change;</li> <li>(e) options for the management of extreme event supply contingencies; and</li> <li>(f) options and trigger points for major investments in Melbourne’s water supply system.</li> </ul> <p>The strategy should consider all aspects of the <i>urban water cycle</i> across a 50 year planning horizon and be consistent with the guiding principles of this Statement and any relevant Sustainable Water Strategy.</p> <p>(applicable Melbourne Water only)</p>
.2	<p>In developing the Melbourne Water System Strategy, the Corporation must engage and consult with all entitlement holders connected to its infrastructure and as requested participate in the development of relevant Urban Water Strategies.</p> <p>(applicable Melbourne Water only)</p>

## Appendix B Regional and state-wide processes

**Table B1: Regional and state-wide processes**

Title/Theme	Description
Long-term Water Resource Assessment	<p>Water corporations long-term planning can also be influenced by long-term water resource assessments, which are a legislative requirement under Division 1C of the <i>Water Act 1989</i>. These assessments of the resource base and river health are required to be undertaken every 15 years, with the first in 2019 for catchments in southern Victoria. The principle objective of the long-term water resources assessment is to determine whether there has been a change in water availability that has had a disproportionate impact on any class of water entitlement or if waterway health related to flow has deteriorated.</p> <p>If there has been a disproportionate impact, a review will be conducted to determine how to restore an acceptable balance. This may involve corrective action to restore a balance between water available for consumption and the environment. The <i>Water Act 1989</i> provides processes for making these adjustments.</p>
Sustainable Water Strategies	<p>Water corporations also provide input to, but are not responsible for, the preparation of regional sustainable water strategies. Regional sustainable water strategies are a legislative requirement under Division 1B of the <i>Water Act 1989</i> and fulfil Victoria's commitment under the National Water Initiative to carry out open, statutory-based water planning. Sustainable water strategies are prepared on a regional basis by the Department of Environment, Land, Water and Planning on behalf of the Minister for Water, under the guidance of a consultative committee appointed by the Minister.</p> <p>Sustainable water strategies examine the needs of towns, industry, agriculture and the environment in a particular region over the next 50 years under a range of possible climate scenarios and set water resource management priorities and actions. Sustainable water strategies guide the development, integration and implementation of local management plans prepared by water managers within the region, including water corporations and catchment management authorities.</p> <p>Each strategy focusses on one region of Victoria. They are used to manage threats to the supply and quality of water resources to protect environmental, economic, cultural and recreational values.</p> <p>Sustainable water strategies are developed to:</p> <ul style="list-style-type: none"> <li>• help entitlement holders manage their own risks</li> <li>• identify potential ways to improve waterway health</li> <li>• progress system wide augmentations identified through grid scale planning processes by government.</li> </ul> <p>300 actions were identified across the past four sustainable water strategies. Implementation of actions was largely the responsibility of DELWP, water corporations, catchment management authorities, the Department of Jobs, Precincts and Regions (formerly DEDJTR) and partners and stakeholders.</p>

Title/Theme	Description
<p>Integrated water management planning</p>	<p>Integrated Water Management planning fits within the existing water planning framework and is dependent upon participants like urban water corporations understanding their own systems and proposed servicing approaches. To meaningfully participate in IWM, water corporations must have well-articulated and current long term UWS to provide water supply and sewerage services to its customers, local government must have a strategy to meet amenity and drainage needs for its ratepayers and catchment management authorities must have a long term strategy to ensure waterway health and effective floodplain management for the environment and stakeholders. The subsequent collaborative IWM process, which aims to identify integrated opportunities to deliver better value for the community.</p> <p>Successful place based IWM planning requires all agencies responsible for the management of the urban water cycle to collaborate by sharing the outcomes to be delivered, sharing data and working positively toward implementing integrated servicing solutions.</p> <p>Integrated Water Management Forums have been established across Victoria comprising of authorities with responsibilities across the water cycle, including water corporations, local government and catchment management authorities as well as planning authorities, traditional owners and other relevant entities.</p> <p>The outcome of the IWM process document in the form of Strategic Direction Statements for each IWM regions are a key input into this iteration of the UWS. Examples of work streams that present potential opportunities include growth area servicing, urban renewal projects, infrastructure renewals and urban greening projects.</p>
<p>Water Grid Biennial Statement and Augmentation Roadmap</p>	<p>In October 2018 the Victorian Government established the Water Grid Partnership.</p> <p>The partnership oversees the operation of Victoria’s water grid and creates a forum for delivering the best possible solutions to Victoria’s water security challenges.</p> <p>By bringing together key players from across the whole industry, the partnership will ensure Victoria is well placed to deal with key challenges, including climate change and population growth.</p> <p>The Water Grid Partnership will publish every two years, a biennial statement about future water availability and proposals to augment the grid to ensure water security for Victorians. The first Biennial Statement was released in 2018 with the next due for release toward the end of 2020. The statements detail grid augmentations and support a range of work which make the most of alternative water sources, including stormwater harvesting and the recycling of wastewater.</p> <p>The Biennial Statement including the augmentation roadmap and the SWS are the vehicles by which major system augmentation options are presented and assessed.</p>

Title/Theme	Description
Regional Waterway Strategy	<p>Water corporation's strategies are also guided by regional strategies for healthy rivers, wetlands and estuaries, which establish local objectives for river systems and set priorities.</p> <p>The Victorian Waterway Management Strategy provides a detailed policy for managing Victoria's waterways over an eight-year period. The Strategy aims to maintain or improve the condition of our waterways so they can support environmental, social, cultural and economic values that are important to communities. It provides direction for regional decision-making, investment and management issues for waterways, as well as the roles and responsibilities of management agencies.</p> <p>Aspirational targets are included in the strategy for long-term resource condition outcomes (to be achieved in 8+ years) and management outcomes (to be achieved in 1–8 year)</p> <p>The regional Waterway Strategies (RWSs) are a single planning document for river, estuary and wetland management in each region and drive implementation of the management approach outlined in the Victorian Waterway Management Strategy.</p> <p>The RWSs were developed by waterway managers in partnership with other regional agencies, authorities and boards involved in natural resource management, plus Traditional Owners, regional communities and other key stakeholders. For coastal regions, the RWSs include the management of estuary health, highlighting the importance of estuaries as the link between catchments, coasts and the marine environment.</p> <p>The RWSs outline regional goals for waterway management. High value waterways are identified and from those a subset of priority waterways were determined for the eight-year planning period. A strategic regional work program of management activities for priority waterways is included. The regional work program provides clear direction to guide investment in waterway management by the Victorian Government.</p> <p>The RWSs also identify regional priorities for environmental water management over the eight-year planning period, together with the complementary management activities required at those sites. This information is used as a key input to environmental water planning arrangements.</p> <p>The regional priority setting process relies on information about values, threats and risks. It is vital that this information is collected and described in a consistent way and, where possible, that the information is based on actual data (for example, data collected from on-ground monitoring activities). A database has been developed to house this information and support the regional priority setting process. The Aquatic Value Identification and Risk Assessment (AVIRA) database contains information about the values and threats associated with selected river, estuary and wetland assets.</p>
Regional Catchment Strategy	<p>Regional catchment strategies<sup>73</sup> are the primary integrated planning framework for the management of land, water and biodiversity resources. They seek to integrate community values and regional priorities with state and federal legislation and policies.</p> <p>Each catchment management authority prepares a regional catchment strategy in partnership with local communities and partners involved in integrated catchment management.</p> <p>The strategy identifies:</p> <ul style="list-style-type: none"> <li>• the region's land, water and biodiversity resources and how they are used</li> <li>• the nature, causes, extent and severity of land degradation of catchments</li> <li>• a long-term vision for the region</li> <li>• regionally significant land, water and biodiversity assets and landscapes</li> <li>• catchment condition objectives</li> <li>• a program of management measures for the life of the strategy.</li> </ul>

73. <https://www.water.vic.gov.au/waterways-and-catchments/our-catchments/catchment-management-framework>

Title/Theme	Description
Unregulated systems and groundwater	<p data-bbox="343 358 1412 481">Statutory management plans and local management plans are developed to manage risks to unregulated and groundwater resources. Management plans aim to ensure the resource is shared equally between users, that impacts on third parties are minimised and the environment and long-term sustainability of the resource is protected.</p> <p data-bbox="343 488 1412 571">Statutory management plans are a requirement for Water Supply Protection Areas under the <i>Water Act 1989</i>. The plans are developed with the community, groundwater users and other stakeholders and define specific rules to meet the management objectives in the area.</p> <p data-bbox="343 577 1428 817">Water corporations responsible for licensing (as delegates of the Minister for Water) unregulated surface water and groundwater are responsible for the development, approval, implementation, reporting and review of an LMP. The objective of an LMP is to ensure the equitable sharing of available water between licensed water users, to protect the environment and ensure the long-term sustainability of the water resource in the applicable area. An LMP will be prepared where required by Government policies<sup>74</sup> to help meet requirements of the Murray-Darling Basin Plan or the delegate decides that specific arrangements are needed for equitable sharing of the water resource. This may occur when:</p> <ul data-bbox="343 824 1412 963" style="list-style-type: none"> <li>• there are competing demands for water;</li> <li>• there is risk from licensed water use to significant environmental values; or</li> <li>• there is a need to manage the system (i.e. surface water and groundwater resources) as a whole (eg. due to significant inter-connection).</li> </ul> <p data-bbox="343 969 1412 1052">LMPs describe how delegates will manage the taking of unregulated surface water and groundwater licensed under section 51 of the <i>Water Act 1989</i>, using the powers delegated under the Act and in accordance with the Policies for Managing Take and Use Licences. An LMP will:</p> <ul data-bbox="343 1059 1428 1310" style="list-style-type: none"> <li>• define the water system to which it applies and provide contextual information (e.g. catchment context, trading zones, winterfill sustainable diversion limit (SDL) zones, any significant water-dependent environmental values)</li> <li>• explain to section 51 licence holders and the community the rules the delegate will apply to licence management, and, in particular sharing arrangements for the water, and the technical basis for their determination</li> <li>• where a water corporation is also the delegate of the Minister in relation to temporary qualifications, document the rules the delegate will apply in carrying out this function.</li> </ul> <p data-bbox="343 1317 1412 1433">The level of detail in an LMP, the technical information required to prepare it and the consultation required to resolve issues should be commensurate with the size and complexity of the system, the extent of licensed water use and the level of risk to the system's water resources and associated environmental values.</p>

74. <https://waterregister.vic.gov.au/images/documents/Policies%20for%20Managing%20Take%20and%20Use%20Licenses%20-%20Approved%20by%20Water%20Min%2002.02.2014.pdf>

Title/Theme	Description
Climate change	<p>Victoria's Climate Change Framework articulates the Government's long-term vision and approach to climate change in a single document. The framework sets out:</p> <ul style="list-style-type: none"> <li>• our shared vision for a net zero emissions, climate-resilient Victoria in 2050;</li> <li>• how action on climate change aligns with the Government's focus on jobs, cost of living and health;</li> <li>• the steps the Government is taking now to commence the transition;</li> <li>• how the <i>Climate Change Act 2017</i> will drive action to 2050;</li> <li>• the challenges to be addressed as we move to a net zero emissions economy; and</li> <li>• how Victoria is preparing for a changing climate.</li> </ul> <p>The Victorian Government has also committed to reduce Victoria's greenhouse gas emissions by 15-20 per cent below 2005 levels by 2020 and reduce emissions from government operations by 30 per cent below 2015 levels by 2020.</p> <p>Water for Victoria says that "<i>our water sector will be a leader in the state's climate change mitigation and adaptation actions</i>" and recognises the State's commitment to achieve net-zero greenhouse gas emissions by 2050 as flowing through to the water sector. Water for Victoria commits the water corporations to demonstrating a pathway to net-zero emissions and to pledge an interim emission reduction target to be achieved by 2025.</p> <p>The Statement of Obligations (Emission Reduction) establishes the water sector's emissions reduction obligations requiring the water sector to:</p> <ul style="list-style-type: none"> <li>• implement actions that reduce emissions resulting from water corporation operations; and</li> <li>• achieve emissions reduction efficiently, making full use of the time available to them to do so.</li> <li>• pursue actions and targets at the lowest possible cost, seeking to minimise the impact on water customer bills; and</li> <li>• have particular regard to price impacts on their vulnerable customers.</li> </ul> <p>The Pilot Water Sector Climate Change Adaptation Action Plan (WSAAP) has been prepared in response to the current and potential future impacts of climate change on the water sector, its customers, and the Victorian community.</p> <p>Victoria's <i>Climate Change Act 2017</i> places a statutory obligation on nominated Ministers to prepare sector-based Adaptation Action Plans (AAPs) for seven different 'systems' by 2021.</p> <p>The 'water cycle system', referred to herein as the 'water sector', is identified in the Act as requiring an AAP known as the Water Sector Climate Change Adaptation Action Plan. The scope covers all sources of water, sewerage services, drainage services, and flood management services. Waterway health, biodiversity, ecology and agriculture are out of scope and form parts of other system AAPs. The first legislated WSAAP is due in 2021.</p>

Title/Theme	Description
Recycling Victoria: A New Economy	<p>Victoria's circular economy will create jobs and economic growth while reducing waste, cutting pollution and establishing a strong recycling system. Businesses, governments and individuals need to work together to realise the benefits of a circular economy. Our community wants a circular economy that prioritises more sustainable and innovative use of materials, minimises the impacts of climate change and creates less waste and pollution.</p> <p>Recycling Victoria is the Victorian Government's 10-year policy and action plan for waste and recycling. It is Victoria's plan of reform to establish a recycling system that Victorians can rely on while transforming how the Victorian economy uses materials and how Victoria state reuses, repairs and recycles.</p> <p>Victoria's circular economy goals align with the United Nations Sustainable Development Goals, including Goal 8 ('promote sustained, inclusive and sustainable economic growth') and Goal 12 ('ensure sustainable consumption and production patterns').</p> <p>Recycling Victoria acknowledges that the water sector plays an important role in the circular economy. Organisations in the water sector are well placed to support the transition because of their access to suitable land, expertise managing organic waste and treatment technologies, and commitments to resource recovery and reducing greenhouse gas emissions. It notes that Victoria's water and energy sectors already contribute to a circular economy by ensuring those resources are used efficiently for economic and environmental benefit.</p> <p>Recycling Victoria cites: Water for Victoria, the Melbourne Sewerage Strategy and the Intelligent Water Network Program as complimentary policies and strategies supporting its delivery.</p> <p>The policies and actions within Recycling Victoria are designed to support and provide opportunities for the water sector in a Victorian circular economy.</p>



## Appendix C SDG6 - Indicators and targets

Table C1: Sustainable Development Goal 6 - Indicators and targets

Goal	Targets	Indicators
 <p>Ensure availability and sustainable management of water and sanitation for all</p>	6.1 By 2030, achieve universal and equitable access to safe and affordable drinking water for all	6.1.1 Proportion of population using safely managed drinking water services
	6.2 By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations	6.2.1 Proportion of population using (a) safely managed sanitation services and (b) a hand-washing facility with soap and water
	6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally	6.3.1 Proportion of domestic and industrial wastewater flows safely treated
		6.3.2 Proportion of bodies of water with good ambient water quality
	6.4 By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity	6.4.1 Change in water-use efficiency over time
		6.4.2 Level of water stress: freshwater withdrawal as a proportion of available freshwater resources
	6.5 By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate	6.5.1 Degree of integrated water resources management
		6.5.2 Proportion of transboundary basin area with an operational arrangement for water cooperation
6.6 By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes	6.6.1 Change in the extent of water-related ecosystems over time	
6.a By 2030, expand international cooperation and capacity-building support to developing countries in water and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies	6.a.1 Amount of water- and sanitation-related official development assistance that is part of a government coordinated spending plan	
	6.b Support and strengthen the participation of local communities in improving water and sanitation management	6.b.1 Proportion of local administrative units with established and operational policies and procedures for participation of local communities in water and sanitation management

## Appendix D Partnering with Traditional Owners

Victoria's Charter of Human Rights and Responsibilities Act 2006<sup>75</sup> [Section 19 (2)] recognises that Aboriginal people hold distinct cultural rights. These are the rights to:

- enjoy their identity and culture
- maintain and use their language
- maintain their kinship ties
- maintain their distinctive spiritual, material and economic relationship with the land and waters and other resources with which they have a connection under traditional laws and customs.

Public authorities have a legal obligation, under section 38 of the Charter, to:

- act compatibly with Aboriginal cultural rights
- properly consider Aboriginal cultural rights when making decisions

Since the last round of UWSs in 2017, *the Water and Catchment Legislation Amendment Bill 2019* has passed, embedding Aboriginal cultural values into the planning and operations of water resource managers. Supporting this important legislative change, in 2019 and 2020 the Victorian Government and DELWP also delivered documentation, providing toolkits and guidance around engagement with Traditional Owners, including:

**Table D1: Guidance documents for engagement with Traditional Owners**

Name	Outline
Pupangarli Marnmarnepu 'Owning Our Future' Aboriginal Self-Determination Reform Strategy 2020-2025 <sup>76</sup>	The Strategy is DELWP's roadmap to building a better future with Traditional Owners and Aboriginal Victorians, through systemic and structural change that fully supports Aboriginal decision-making, evaluation and talent building to inform its policy and processes.
DELWP Aboriginal Cultural Safety Framework <sup>77</sup>	The Aboriginal Cultural Safety Framework drives change through DELWP's staff to transform and create culturally-safe places for Aboriginal staff members, stakeholders and visitors. The accompanying Framework Implementation Plan outlines actions and measures.
Victorian Aboriginal Affairs Framework 2018-2023 <sup>78</sup>	The VAAF is the Victorian Government's overarching framework for working with Aboriginal Victorians, organisations and the wider community to drive action and improve outcomes.
Self-Determination Reform Framework <sup>79</sup>	The SDRF guides government action to enable self-determination in line with the VAAF. It also provides an architecture for government departments like DELWP to report annually on this action, outlining an outcomes based approach to transform government systems and structures to enable self-determination.
DELWP's Traditional Owner and Aboriginal Community Engagement Framework <sup>80</sup>	The Traditional Owner and Aboriginal Community Engagement Framework was developed to help staff improve their engagement with Traditional Owners and Aboriginal communities by creating the mechanisms, opportunities and protocols needed to respect partnership arrangements and increase collaboration.

75. <https://www.justice.vic.gov.au/justice-system/laws-and-regulation/human-rights-legislation>

76. <https://www2.delwp.vic.gov.au/aboriginalselfdetermination>

77. <https://www2.delwp.vic.gov.au/aboriginalselfdetermination/cultural-safety>

78. <https://www.aboriginalvictoria.vic.gov.au/victorian-aboriginal-affairs-framework-2018-2023>

79. <https://www.aboriginalvictoria.vic.gov.au/self-determination-reform-framework>

80. <https://www2.delwp.vic.gov.au/aboriginalselfdetermination/how-we-engage-with-traditional-owners>

Name	Outline
Traditional Owner objectives and outcomes <sup>81</sup>	A compilation of contributions to Victoria's water resource plans (2019). The document outlines the preferred principles for engagement, aiming to increase Aboriginal communities' participation in the planning and delivery of the State's policies, services and projects, with a specific focus on including Traditional owners in decision making and incorporating their values and uses of water into management and planning frameworks.
Aboriginal Participation Guideline for Victorian Catchment Management Authorities (2016) <sup>82</sup>	A guidance document covering engaging with Traditional Owners in catchment management activities.

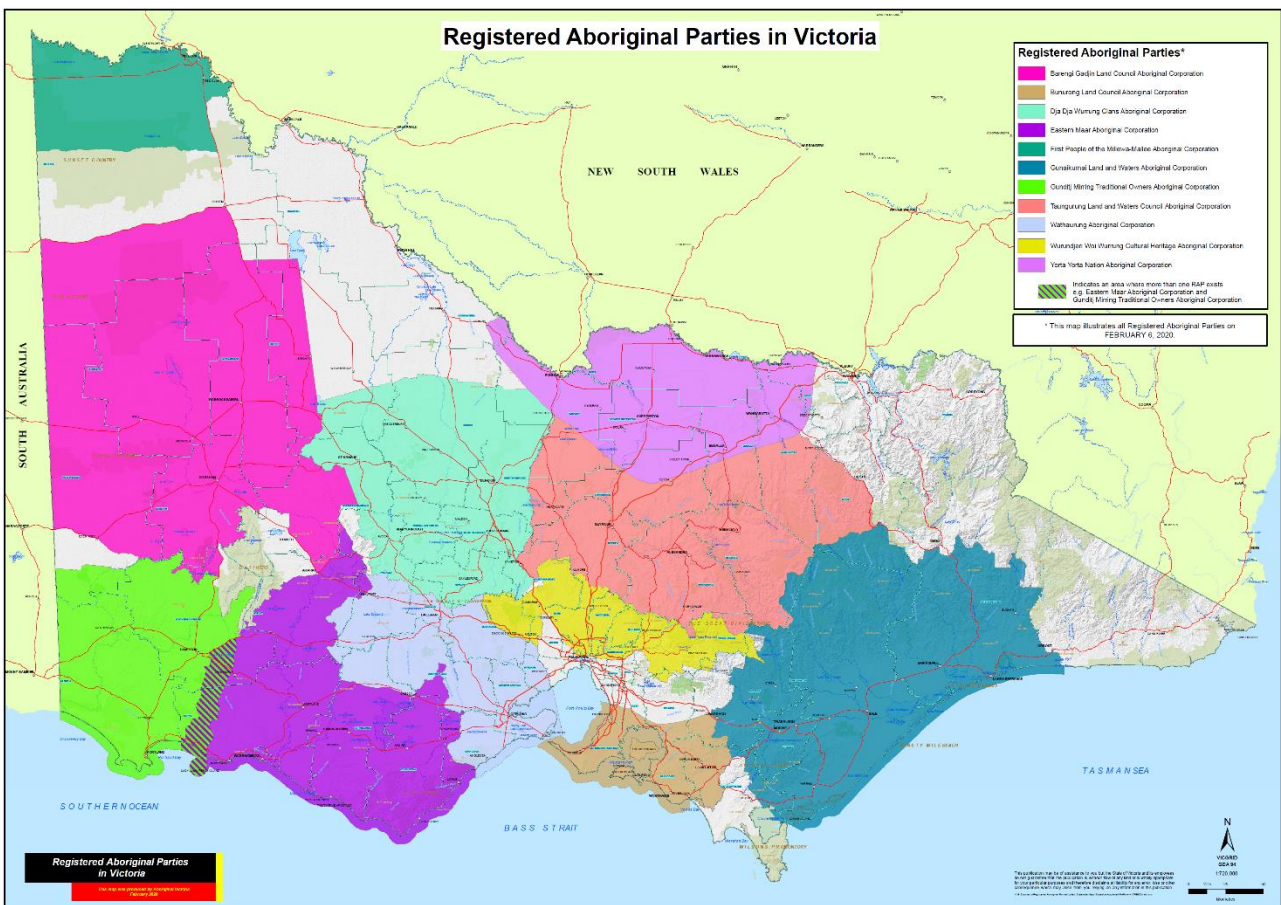


Figure D1: Registered Aboriginal Parties in Victoria

Source: <https://www.aboriginalheritagecouncil.vic.gov.au/victorias-current-registered-aboriginal-parties>

81. [https://www.water.vic.gov.au/\\_data/assets/pdf\\_file/0035/429839/Vic\\_WRPs\\_Traditional\\_Owner\\_Objectives\\_Outcomes\\_compilation\\_2019\\_lr.pdf](https://www.water.vic.gov.au/_data/assets/pdf_file/0035/429839/Vic_WRPs_Traditional_Owner_Objectives_Outcomes_compilation_2019_lr.pdf)

82. [https://www.water.vic.gov.au/\\_data/assets/pdf\\_file/0027/119808/aboriginal-participation-guideline-vic-cma.pdf](https://www.water.vic.gov.au/_data/assets/pdf_file/0027/119808/aboriginal-participation-guideline-vic-cma.pdf)

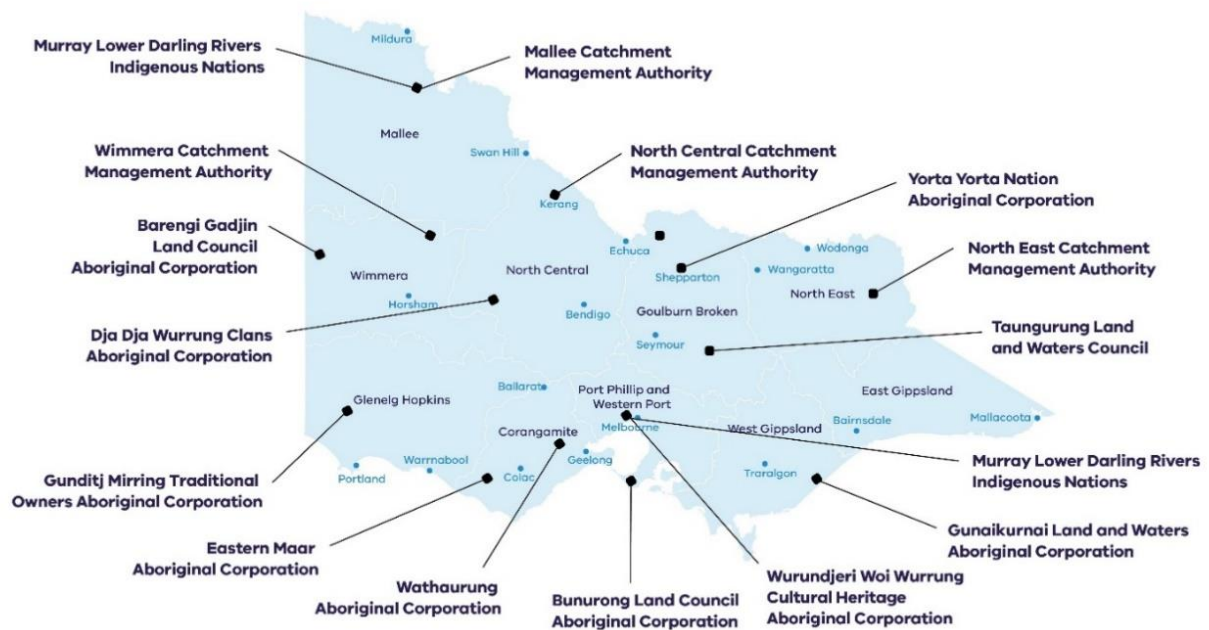


Figure D2: Existing Aboriginal Water Officer positions

Source: [www.water.vic.gov.au/water-for-victoria/progress-report-recognising-and-managing-for-aboriginal-values/implementation-recognising-and-managing-for-aboriginal-values](http://www.water.vic.gov.au/water-for-victoria/progress-report-recognising-and-managing-for-aboriginal-values/implementation-recognising-and-managing-for-aboriginal-values)

It is recommended that water corporations contact DELWP’s “Regional Manager Community Partnership Program” for initial guidance prior to speaking with Traditional Owners. DELWP’s Aboriginal Water Unit can also assist.

The engagement process for development of the UWS over the next few years also presents a good opportunity for water corporations to gain an understanding of what Traditional Owners might be expecting or considering for the Treaty, underway in parallel.

Examples of previous TO recognition and engagement by water corporations is contained below.

### Principles to build better relationships with Traditional Owners and Aboriginal communities

The following principles to build better relationships with Traditional Owners and Aboriginal communities should form the foundation of the Water Corporations partnership approach to delivery of the UWS.

1. Self-determination
2. Traditional Owners as partners
3. Place-based, whole-of-Country approach
4. Respect for decision-making processes
5. Aboriginal people set their own priorities
6. Free, prior and informed consent
7. Acknowledge past injustices and structural inequity

## 8. Aboriginal cultural safety and competency

### Key considerations

The following key considerations should be observed by water corporations when engaging with Traditional Owners.

#### Planning for engagement

- Embed Traditional Owner partnership as a key principle of your project allowing enough time for proper consideration.
- Meet on Country. Participate in community meetings rather than asking people to join pre-determined NRM agency processes.
- Respect Aboriginal Community decision-making processes. Good engagement takes time. Aboriginal community representatives can't always decide on the spot. Often, they need to go back to a committee or their community. Consequently, government timeframes are often too tight and unrealistic. You can't build a partnership unless you respect Aboriginal decision-making processes.
- Resource Traditional Owners for their participation. Good engagement requires dedicated and secure resources. Too often, funding is short-term and tied to projects, making it difficult to sustain capacity development (Hunt 2009, p.43).
- Understand the Traditional Owner group's legal status and rights under the relevant legislation. This is fundamental. Familiarise yourself with all relevant agreements, including the Recognition Settlement Agreements under the *Traditional Owner Settlement Act 2010 (Vic)* (TOS Act), NT determinations, RAP statuses – and find out how any and all of this impact on your DELWP program, project or initiative. Seek advice from the Traditional Owner Agreements Unit or an Aboriginal Inclusion Coordinator in the relevant Region if necessary.
- Engage early and talk to the community. The sooner you start talking to people the sooner you will find out how (or whether) your project connects with community development needs and aspirations. Incorporate what you learn into the design of your project, program or initiative.
- Economic opportunities. The Victorian Government and DELWP have committed to a 1% procurement target for engaging with Aboriginal businesses. Identify potential opportunities as early as possible for working with Aboriginal business.

#### During engagement

- Acknowledge Traditional Owners. You are working on someone's Country. That's why, whenever you are invited to a meeting, you should acknowledge the Traditional Owners and pay respect to their Elders, past and present.
- Use plain English. Avoid jargon and acronyms. Don't use overly scientific or technical language. Talk straight.
- Listen. The Traditional Owners and Aboriginal communities can help you if you take the time to listen to what they have to say.

- Don't make assumptions. In your initial engagement meeting, ask how the group prefers to make decisions and find out about their governance structures. For instance, find out whether they make decisions by a committee of Elders or a Board of directors or appoint a specific project group.

### Other considerations

- Be innovative and flexible. Success comes when government bodies working with Aboriginal people in NRM innovate and incorporate Aboriginal ways of doing business.
- Be purposeful. Establish who you will engage with and be inclusive and clear on the purpose, particularly the negotiables and non-negotiables.
- Engage early. And, once you've made contact, incorporate timeframes compatible with the cultural protocols and decision-making processes of Traditional Owners and Aboriginal Communities.
- Be in it for the long haul. Engagement is a long-term relationship based on trust, respect and honesty. Having the right process is paramount to a successful relationship. Be transparent. Be open from the outset of your project so you can incorporate Traditional Owner and Aboriginal Community aspirations into your project at the planning and scoping stage. Listen and learn. And, where possible, link environmental outcomes to community aspirations.

### Case studies of previous TO recognition and engagement by water corporations

Some examples of projects and work undertaken by water corporations with Traditional Owners, in alignment with Water for Victoria actions follow:

**Table D2: Case study projects undertaken by water corporations with Traditional Owners**

WfV action	Project
Recognise Aboriginal values and objectives in water (Action 6.1)	<p>There are different mechanisms and projects that facilitate identification of local Aboriginal water values, uses and objectives, and incorporate cultural objectives into water management and planning. For example, IWM Forums, Country Plans, Land Management Plans and Reconciliation Action Plans (RAP).</p> <p>Yarra Valley Water's Place-Based Planning Unit works closely with the Wurundjeri Water Unit manager in undertaking cultural flow assessments for the Merri Creek Upper IWM. The cultural flows assessment will identify areas of cultural value to Traditional Owners as well as incorporating opportunities for socio-economic impact and direct benefits. The assessment methodology is used to identify Traditional Owner water values and utilise the vision and objectives of the Traditional Owners in the future planning and management of the values.</p>
Considering Aboriginal values in water planning (Action 6.2)	<p>Water corporations are using Aboriginal Waterway Assessments (AWA) and other tools to incorporate traditional ecological knowledge into water planning and management. The information provides important datasets that feed collaborative planning. For example: Coliban Water has engaged Dja Dja Wurrung to undertake an AWA of the Coliban River and work is underway to develop an AWA for the Campaspe River, to be undertaken by Dja Dja Wurrung and Taungurung</p> <p>Some water corporations are also supporting Aboriginal Water Officers (AWO) through direct employment or indirectly, by funding their involvement in specific projects in the water sector.</p>

WfV action	Project
<p>Building jobs and capacity (Action 6.4)</p>	<p>In 2018-19 Barwon Water entered into a partnership with Wadawurrung for the Porronggitj Karrong project, to trial using traditional land owner management techniques to manage the large parcel of land at Porronggitj Karrong Park. Barwon Water have been working together with Wadawurrung Traditional Owners to identify the Aboriginal cultural values of the river and area, rehabilitate and introduce traditional land and water management practices and develop a plan for the area.</p> <p>Yarra Valley Water has been working with Traditional Owners to trial cultural flows assessments as part of the IWM process. Yarra Valley and Melbourne Water have also partnered to provide additional funding to assist the water units in Wurundjeri and Bunurong with their future planning and identifying opportunities for economic enterprise development.</p> <p>During 2018-19 Wannon Water commenced, and is continuing, to trial different ways of providing Traditional Owner access to water and shared benefits. The Killara Kooyong Project – an initiative to support the growth and development of Traditional Owners by producing and selling eels into a commercial market.</p> <p>Gunditji Mirring secured funding for the Kooyong Killara Water Project as part of the Aboriginal Water Programs economic development initiative. This on-ground project is piloting the access and use of water for an aquaculture facility.</p> <p>The program was set up with a Project Board to oversee the works and provide support to Gunditji Mirring. Wannon Water and other board members have worked in partnership with Gunditji Mirring to establish the facility, by lending equipment such as pipes, pumps and solar panels. Wannon Water have also provided advice and guidance on how to establish an aquaponics system and about making this operation commercial. Southern Rural Water are also supporting Gunditji Mirring by looking at ways to access water for economic use.</p>
<p>Increase Aboriginal inclusion in the water sector (Action 10.8)</p>	<p>It is important that Water corporations develop their own knowledge of Aboriginal culture and cultural awareness but there are also opportunities to sponsor Aboriginal people in relevant study and training courses, for example through scholarships, vocational education or traineeships.</p> <p>For example, Barwon Water’s traineeship program had eight Aboriginal people in 2018-19, and in 2019-20 there are four Aboriginal people participating.</p> <p>Cultural Heritage Management planning and social procurement project and programs also allow staff to work directly with broader Aboriginal and Torres Strait Islander communities, as another means of knowledge and capacity building.</p>
<p>Support economic development through Aboriginal participation and Procurement (Action 10.9)</p>	<p>Several water corporations have engaged Traditional Owner organisations and Aboriginal and Torres Strait Islander businesses to provide certain goods and services, in relation to water and land management as well as for other corporate requirements ranging from IWM and future water planning, natural resource management, cultural heritage work to the production of artwork and graphic design.</p> <p>There are numerous opportunities for water corporations to increase Aboriginal participation: by engaging them to undertake work (such as weed removal, pest management, fencing) that is put out to tender, or contracted out through to the provision of corporate services, professional consultancies, event management, catering, stakeholder engagement etc.</p> <p>Water corps could also consider providing water (either temporarily or permanently) to facilitate economic development opportunities, for example, through water savings, use of recycled water, or substitution.</p>

# Core requirements - consolidated list





## Chapter 1 Purpose

### Core requirement 1.1

Water corporations must:

- develop UWSs every five years in accordance with these Guidelines.
- submit their final UWS to the Minister for Water by 31 March 2022.
- work with DELWP to manage the submission of draft material for assessment throughout the UWS development window to enable a full and final version to be submitted by the due date.
- nominate a project manager as the main contact during UWS development.
- perform a self-assessment of each core requirement as part of their final submission.

Each water corporation may:

- refer to other planning documents to meet core requirements as long as the information in any referenced document meets the intent of the core requirement and is publicly available.

Each water corporation should:

- actively participate in the community of practice

Meeting core requirements may require flexibility. If a corporation believes it may be unable to meet a core requirement, believes a requirement is not applicable or proposes to meet a requirement through an alternative mechanism it must identify any issues in a timely fashion and work with DELWP to reach an agreed position.

## Chapter 2 Urban water planning

### Core requirement 2.1

UWSs must:

- be consistent with Water for Victoria, the guiding principles of the Statement of Obligations (General), these guidelines and relevant Sustainable Water Strategies.
- be consistent with and incorporate the outputs of regional and state-wide processes when developing actions to address identified issues.
- comply with the Victorian Government's Accessibility Guidelines for Government Communications<sup>83</sup> to ensure they are accessible, easy to read and understand by customers and the wider community.

UWSs should:

- consider relevant Sustainable Development Goals, associated targets and indicators in their development and implementation.

### Core requirement 2.2

Water corporations may produce technical supporting documentation and resource modelling to meet the requirements of these guidelines. It is not expected that all technical documents will be publicly available.

DELWP may require technical documentation and models to be provided on request for quality assurance and peer review purposes.

---

83. <https://www.vic.gov.au/accessibility-guidelines-government-communications>

## Chapter 3 Objectives and principles

**Core requirement 3.1** Water corporations must apply the principles in Table 5 when developing their UWS.

## Chapter 4 Stakeholder engagement

**Core requirement 4.1** Water corporations must:

- show how they plan to partner with relevant Traditional Owners in the development and delivery of their UWS and how the results of this engagement have been incorporated.
- notify and approach Traditional Owner groups during the preliminary stages of planning and prior to any stakeholder engagement to honour their status as partners in natural resource management matters and meet statutory obligations under any agreements with the Victorian Government. For example, the Recognition and Settlement Agreements under the *Traditional Owner Settlement Act 2010 (Vic)* or Native Title determination under the *Commonwealth Native Title Act 2010 (Cth)*.
- engage on areas of interest as identified by Traditional Owners to meet obligations.

**Core  
requirement  
4.2**

Water corporations must:

- use the development and implementation of UWSs to involve their customers and other key stakeholders in decision making and improve water literacy.
- identify key stakeholders to be engaged throughout the development process - at a minimum this must include:
  - Water users
  - Local government
  - Traditional Owners (partnership approach)
  - Aboriginal Water Officers (where relevant)
  - Connected or neighbouring water corporations e.g. Rural/Bulk Water Corporation as appropriate
  - Catchment Management Authorities / Victorian Environmental Water Holder
- ensure that public participation is undertaken via a planned and transparent engagement process that aligns with government expectations and that water planning processes allow sufficient time to explore options and meaningfully engage the community.
- develop and implement an Engagement Plan to support development and implementation of the UWS which:
  - clearly defines decision making requirements and the scope of public participation
  - demonstrates an understanding of who will be affected, by how they should be included
  - identifies the resources, skills and time required for effective public participation
  - documents the public participation and management approach
  - details implementation of the Engagement Plan and ways to monitor and evaluate the effectiveness of engagement
  - aligns with other relevant regional or state-wide engagement programs such as the CGSWS
- engage stakeholders on the following key matters to understand stakeholder preferences in UWS development and implementation (at a minimum):
  - appropriate levels of service and willingness to pay
  - potential need to take action to keep supply and demand in balance
  - possible initiatives to address any imbalance between supply and demand
  - values and uses of water
  - cost-benefit and trade-offs of taking action
  - which of these initiatives should be chosen for action, and when
  - drought preparedness and response
- Show outcomes-based evidence of their engagement with the above stakeholders - including a structured evaluation of alternatives for augmentation considering the key matters in Table 9 - to demonstrate how actions to keep supply and demand in balance directly link to what the community said.

## Chapter 5 Managing risk and uncertainty

### Core requirement 5.1

Water corporations must:

- apply and document a decision-making approach (such as adaptive management and scenario planning) to enable water corporations to be adaptive and responsive and account for the high level of uncertainty involved in projecting future demand for, and supply of, water services. This should be evidence-based.

### Core requirement 5.2

Water corporations must:

- plan for climate change and climate variability when developing UWSs in consideration of the uncertainty surrounding future climatic conditions. This planning is to reflect the best available information.
- engage with the relevant Rural Water Authority and DELWP to determine the availability and licencing requirements of accessing any proposed additional groundwater resources and undertake or recommend groundwater investigations where there is uncertainty about the quality or quantity of groundwater that can be accessed on an ongoing basis.
- consider the risks of a reduction in yield as a result of changing catchment conditions as result of impacts such as bushfires, increases in farm dams or planation extent.

UWSs must:

- include a qualitative assessment of the risks associated with extreme events (see Table 11) that may make sources of water unavailable.
- include an assessment of the risks associated with water quality that may make sources of water unavailable including emerging contaminants.
- include an assessment of the risks associated with continued access to existing sources of water if changes to current access arrangements occur which may reduce or make unavailable existing sources of water.

Water corporations should:

- consider the risks associated with potential water availability due to the impacts of planned and unplanned shutdown of assets for civil, mechanical or electrical maintenance and repair.
- consider the risks associated with water transfer limitations that might require water supply to be restricted.

### Core requirement 5.3

Water corporations must:

- consider uncertainty around population changes having regard to the Victoria in Future VIF2019<sup>84</sup> (and updated) population projections, noting that these projections can be tailored to reflect local knowledge and experience, provided that there is sufficient evidence to support these variations. Additional caution is to be applied when extrapolating beyond the 30-year period provided by VIF2019.
- consider uncertainty regarding future water use demands<sup>85</sup>

---

84. <https://www.planning.vic.gov.au/land-use-and-population-research/victoria-in-future>

85. Projecting water demands is detailed in section 10 of these Guidelines and in the Guidelines for Assessing the Impact of Climate Change on Water Availability in Victoria (DELWP, 2020). The guidelines provide projections for changes in temperature and evapotranspiration under climate change, that can be used by water corporations to assess potential changes in demand due to climate change.

**Core requirement 5.4**

Water corporations must:

- provide for current environmental water obligations as reflected in the Environmental Water Reserve
- take into account future environmental water obligations as set out in clearly defined proposals or actions in regional Sustainable Water Strategies.

**Core requirement 5.5**

Water corporations should:

- consider interdependency risks on other systems and supply chains that may impact on water service operations and their services to customers.
- consider transitions risks that might arise from the transition to a lower carbon economy when considering future operating scenarios.

## Chapter 6 Incorporate recent experience

**Core requirement 6.1**

Water corporations must:

- undertake a review of the matters in Table 14 with key findings clearly documented in the UWS and incorporate:
  - relevant learnings from recent experience
  - changes to planning and regulatory frameworks
  - relevant actions from other processes including localising broader scale actions

Water corporations should:

- use this review to inform the extent of stakeholder engagement required on particular matters.

## Chapter 7 Understanding current water system/s

### Core requirement 7.1

The UWS must:

- provide an overview of the water supply system/s and sewerage system/s managed by the water corporation. The overview is to:
  - provide a summary of the areas serviced including current demands (e.g. non-potable vs potable and by end use type)
  - describe the various water supply sources including catchments/aquifers and their relevant characteristics along with sources of alternative water including stormwater
  - identify key physical features of the system/s and region
  - highlight any regulatory instruments that govern or are relevant to operation of the system/s
  - avoid extensive technical detail and utilise schematics and maps to communicate these matters to customers.
- include a map or maps that provides regional and geographical context for the relevant systems including key supply infrastructure and sewerage infrastructure as well as other systems that form part of the urban water system such as key stormwater assets, key waterways and creeks, groundwater etc along with key geographic features such as towns, boundaries and identified Priority Community Assets (see section 15.4.1).
  - regard should be given to the potential movement of water between different locations and/or systems.
  - maps and graphical depictions of supply/demands should be developed as a tool to inform community engagement. These can be built upon to graphically depict future options.

### Core requirement 7.2

The UWS must:

- outline the current entitlements held by the corporation under:
  - Bulk Entitlements
  - Take and use license (section 51)
  - water shares in declared water systems
- outline water available under each entitlement, the source of that water, key limitations on take, historical levels of take (minimum of the past 5 years).
- detail the use of water trading by the corporation to meet urban water needs over the past 5 years.

### Core requirement 7.3

The UWS must:

- include an overview that describes key characteristics of all currently available sources of water and key elements of bulk water storage, treatment and delivery infrastructure, as set out in Table 16.
- visualise the existing available sources of water (supply mix) in terms of a “typical/current supply mix” and “possible/available supply mix”
- provide trends in supply over a minimum 5 previous year period.

### Core requirement 7.4

The UWS must include a sewerage system overview that describes major components of sewage treatment and transfer assets covering the elements in Table 17.

**Core requirement 7.5**

The UWS must include detail about the following key elements of current demand for water supply and sewerage services:

- towns or communities serviced by the system/s, including current demand and population
- major industrial customers serviced by the system/s
- other key customer groups serviced by the water corporation and, or, key stakeholders interested in the operation of the system/s
- major demands for water and sewerage services
- Aboriginal values and uses of water (where appropriate)
- key recreational uses and assets
- estimates of non-revenue water

The above must include a graphical estimated break down of current demands in terms of non-potable and potable water requirements. Trends in demand are to be plotted over a minimum 5 previous year period.

**Core requirement 7.6**

UWSs must:

- assess the resilience and vulnerability of existing water and sewerage systems and provide a summary of system vulnerability in the context of current and future water security.
- include in the short list of projects for assessment projects that aim to improve the resilience of the existing systems.

Water corporations should:

- engage with Rural Water Authorities, Catchment Management Authorities, relevant areas of DELWP and neighbouring utilities to understand resilience risks and opportunities to water supply and sewerage services.

## Chapter 8 Defining levels of service

### **Core requirement 8.1**

Water corporations must set an Agreed Level of Service and Minimum Level of Service developed through engagement with customers, having regard to:

- cost of supply
- local conditions such as climate (temperature, rainfall) and urban density (e.g. housing stock)
- maintenance of social and community assets that are of high value or have a high threshold for replacement or recovery
- socio-economic costs of implementing water restrictions
- environmental obligations
- avoidance of any temporary qualifications of rights
- willingness to pay for improvements in system performance as defined in terms of the system performance criteria (noting for some supply systems the cost is spread across the broader customer base)
- meeting critical human water needs

UWSs must clearly document - on a system-by-system basis - the:

- agreed level of service
- the minimum level of service
- levels of service must be expressed as specific, quantifiable and measurable criteria against which system performance can be assessed under a range of planning scenarios.
- levels of service can be different for different customer segments. For example, residential customers, open space and certain commercial customers (such as car washes, nurseries) may be subject to water restrictions, whereas other commercial customers may never be subject to water restrictions. Where this is applicable, estimates of system performance must account for the different levels of service being provided to different customer segments.
- there is scope for variation in both agreed service levels and minimum service levels between different systems.

## Chapter 9 Water supply projections (climate dependent)

### **Core requirement 9.1**

Water corporations must apply the Guidelines for Assessing the Impact of Climate Change on Water Availability In Victoria, as issued by DELWP (2020) when undertaking water system projections.



## Chapter 10 Water demand projections

### Core requirement 10.1

Water corporations must develop projections of urban water demands.

UWSs must document the approach adopted for developing demand projections. Approaches, key drivers for demand and any models or analytical tools used are to be outlined and explained, assumptions documented, source data identified and referenced and outputs clearly set out.

Projections must be based on the best and most recent data available, including Victoria in Future 2019 (VIF2019)<sup>86</sup>, noting that these can be tailored to reflect local knowledge and experience provided that there is sufficient evidence to support these variations.

At a minimum projections must be segmented into the following key areas of demand for each system:

- residential
- public open space
- small commercial
- large commercial / industrial / supply by agreement
- non-revenue water

An assessment of the percentage of the above demands that could be met by non-potable water must be provided for each segment.

Where projections are complex or involve large models or large volumes of data, consideration should be given to having the projections (or models) independently reviewed or checked.

### Core requirement 10.2

UWSs must provide projections of wastewater discharge to each sewerage system. If available these projections should be sourced from existing planning documents.

UWSs must clearly document the approach adopted for developing wastewater discharge projections.

High level projections of wastewater discharge are required as follows:

- drivers and key sources of wastewater discharge (e.g. residential, commercial and industrial) are to be considered and documented.
- discharge of wastewater volumes at key locations (i.e. treatment plants) in the sewerage system are to be provided.
- it is desirable, but not essential to provide sensitivity analysis.

### Core requirement 10.3

UWSs must account for alternative water sources as increased supply (specified by usage class and source) while also recognising that fit-for-purpose water use reduces the demand on the potable water supply system and sources. Modelling must be undertaken to understand how this affects yields and demands on the conventional supply system.

---

86. <https://www.planning.vic.gov.au/land-use-and-population-research/victoria-in-future>

**Core  
requirement  
10.4**

UWSs must include a 'base case' demand scenario, together with additional scenarios developed for the purpose of sensitivity analysis.

At a minimum UWSs must develop and graphically depict the following demand scenarios for the purpose of analysis:

- Base case/Average annual demands (agreed level of service demand)
- Unrestricted demands
- Low water use demand curve (minimum level of service)
- High water use demand curve

The base case demand (agreed level of service demand) is to be based on a 'business as usual' perspective, which is to incorporate water conservation activities that have been implemented to date and the continuation of the current level of water conservation effort.

The agreed level of service demand is the final level of service agreed with customers.

The high water use demand curves are to be developed through a sensitivity analysis for example by applying an appropriate factor to account for increased demands from climate change to demand types that are influenced by rainfall e.g. increased outdoor water use when rainfall is low.

These are to include an assessment of potable and non-potable demands.

**Core  
requirement  
10.5**

UWSs should undertake a sensitivity analysis on anticipated future demands.

At a minimum, it is expected that sensitivity analysis will be performed for the following parameters:

- population changes
- climate change and variability

**Core  
requirement  
10.6**

UWSs must document the way in which water restrictions have been considered when developing demand projections.

The demand reduction impact of restrictions applied in line with the Water corporation's Water Restriction By-law and Permanent Water Saving Plan across the four uniform stages is to be documented including any anticipated exemptions developed through engagement with local government.

The socio-economic costs of implementing water restrictions are to be considered as part of the development of UWSs and when exploring and setting levels of service with customers.

## Chapter 11 System performance assessment

### Core requirement 11.1

Estimates of system yield for the current water supply systems must be carried out using an appropriate water resource model such as REALM<sup>87</sup> or SOURCE.

Complex modelling is not required for very simple systems, or systems with demonstrated high levels of water security. Systems where complex modelling has not been undertaken must be identified with clear justification provided as to why complex modelling is not required.

UWSs must assess system yield to determine if demand projections can be satisfied over the next 50 years without violating levels of service.

Scenarios must be developed with underlying assumptions clearly documented in relation to supply and demand curves, levels of service, use of restrictions and inclusion of alternative water sources and must include at a minimum:

- **Low change:** lower than anticipated demand (e.g. sensitivity test if population growth in the base case does not materialise or major water consuming industry/user leaves), low projected per capita use and low projected climate change scenario
- **Incremental change (base case):** average annual demand and medium projected climate change scenario
- **High change:** high demand and high projected climate change
- **Rapid change:** high demand and post-1997 climate change

UWSs must clearly state the year that augmentations may be required under each scenario.

Water corporations can also nominate a base case year that augmentations would be required, typically based on the 'incremental change' scenario above.

UWSs must graphically depict and compare various supply and demand scenarios in a supply demand chart including at a minimum the supply and demand scenarios presented above (see Figure 10).

### Core requirement 11.2

Water corporations must undertake a consistent stress test of their systems and provide the results of the analysis to DELWP.

Scenarios will be developed and agreed with water corporations during delivery of the UWSs.

---

87. Victoria is currently transitioning to Source and will progressively wind back the use of REsource ALlocation Model (REALM). Consistent with current practice, no new models will be developed by DELWP using REALM. DELWP will provide only basic maintenance and support for existing REALM models and software until all major systems have efficient and effective base Source models that meet the needs of that system. Allowing for an overlap period of at least 12 months and assuming that the requirements for model development are met, REALM will no longer be supported by DELWP from July 2022. As DELWP transitions to Source, there will be efficiencies and other benefits for Victorian agencies also moving to the new common platform.

**Core requirement 11.3**

UWSs must assess sewerage system capacity to determine if sewerage system demands can be satisfied over the next 50 years. Assessing system performance is a product of the expected capacity of sewerage systems along with compliance with existing licences.

UWSs must clearly state the year of the soonest augmentation and identified baseline year treatment plants, recycled water systems and major transfer infrastructure may require augmentation under a worst-case scenario, as well as the period over which these augmentations may be required.

Water corporations must consider treated wastewater's role in the urban water cycle, including for recycling and environmental outcomes.

**Core requirement 11.4**

UWSs should consider a sensitivity test to account for changing conditions which may affect the ability to discharge treated wastewater to water bodies.

EPA Victoria has developed Guidelines for risk assessment of wastewater discharges to waterways (publication 1287)<sup>88</sup>, providing guidance to practitioners conducting wastewater discharge risk assessments.

The Guidelines for Assessing the Impact of Climate Change on Sewerage Systems should be applied (if finalised).

## Chapter 12 Identifying and evaluating options

**Core requirement 12.1**

The long list of options must include:

- the stocktake of existing initiatives relevant to water supply and demand identified in section 6
- options identified through community engagement in section 4
- system resilience options identified in section 7.4.

---

<sup>88</sup> <https://ref.epa.vic.gov.au/business-and-industry/guidelines/water-guidance/wastewater-guidance-for-industry>

**Core  
requirement  
12.2**

UWSs must identify initiatives aimed at decreasing demand on water supplies and efficiency in use.

UWSs are to initially consider all demand related initiatives.

A “long list” of possible initiatives is to be refined to a “short list” of viable initiatives through an Initial Options Analysis with regard to regulations, legislation and Government policy settings.

UWSs must provide the following information for each demand initiative that is included on the “short list” of possible actions:

- the possible volume of water that can be saved under the initiative
- confidence estimates around this volume and plausible impacts of climate change
- time required for development and implementation of the initiative
- time required for water savings to be generated from the initiative
- costs of implementation, including pricing impacts
- description of social and environmental costs and benefits associated with the initiative

This “short list” of viable initiatives must be taken forward for engagement with customers and other key stakeholders.

Water corporations must identify which, if any, of these initiatives may be pursued as part of a long-term strategic plan to balance supply and demand, as reflected in its UWS, and which may be pursued in response to drought or other water shortage, as reflected in its Drought Preparedness Plan.

**Core requirement 12.3**

Water corporations must identify which supply related initiatives could be pursued to address an imbalance between supply and demand.

Water corporations must consider all supply options relating to water services that are feasibly able to be delivered by the water corporation in their own right, noting that the ultimate selection of major system wide augmentations are a matter for Sustainable Water Strategies.

Initiatives that require co-investment from other parties to realise shared benefits can also be included.

A “long list” of possible initiatives must be refined to a “short list” of viable initiatives through an Initial Options Analysis with regard to regulations, legislation and Government policy settings.

UWSs must provide the following information for each supply initiative that is included on the “short list” of possible actions:

- broad categorisation (grid, local, alternative water)
- description of any new infrastructure required for the initiative, including a schematic diagram of this new infrastructure and indication of its connection to existing infrastructure
- key supply characteristics of the initiative, in terms of additional system yield, maximum volume of supply, reliability of supply and fit for purpose water quality
- confidence estimates around these volumes
- time required for development and implementation of the initiative (short term 0-5 years, medium term 5 – 20 years, long-term 20+ years)
- lead times and triggers for delivery (e.g. triggers for the commencement of phases across the planning lifecycle, e.g. concept, detailed design, business case, procurement, delivery)
- availability of supply once the initiative has been implemented
- costs of implementation, in terms of capital costs, operating and maintenance costs, and pricing impacts
- description of social and environmental costs (including greenhouse gas production) and benefits associated with the initiative
- any potential legislative or regulatory constraints.

This “short list” of viable initiatives must be taken forward for engagement with customers and other key stakeholders.

UWSs must consider and be consistent with the outputs of regional and state-wide processes when developing actions to address shortfalls in supply and demand.

Greater levels of detail are required for actions that are short term (0-5 years) to ensure their readiness for implementation. Items which require co-investment in the short term from other parties should be actively pursued with funders.

**Core  
requirement  
12.4**

UWSs must identify which wastewater management initiatives may be pursued to address an imbalance between the ability of the wastewater management systems to transfer, reuse and/or dispose of wastewater in line with licence requirements.

UWSs should consider all wastewater management options. However, a “long list” of possible initiatives is to be refined to a “short list” of viable initiatives through an Initial Options Analysis that has regard to regulations, legislation, Government policy settings and other threshold matters.

UWSs should provide the following information for each sewerage management initiative that is included on the “short list” of possible actions:

- description of any new major infrastructure required for the initiative, including a schematic diagram of this new infrastructure and indication of its connection to existing infrastructure
- key characteristics of the initiative, in terms of additional system capacity, maximum treatment volume, reliability of disposal
- confidence estimates around these volumes
- licencing requirements
- estimated time required for development and implementation of the initiative
- high level estimates of the costs of implementation, in terms of capital costs, operating and maintenance costs and possible pricing impacts
- description of social and environmental costs and benefits associated with the initiative

UWSs can include details and initiatives of how water corporations are transitioning to a circular economy.

**Core  
requirement  
12.5**

UWS must include:

*“options to facilitate efficient investments in projects across the urban water cycle that optimise shared benefits and avoidable costs”*

Once a “short list” of viable initiatives has been identified and tested with the community, water corporations must undertake a Detailed Options Analysis that incorporates financial, social and environmental costs and benefits to determine a prioritised list of initiatives for further investigation and/or implementation over the short term, medium and long term.

The Detailed Options Analysis is to produce a portfolio of actions to be undertaken over the:

- short term (0-5 years)
- medium term (5-20 years)
- long term (20+ years)

Water corporations should use their best judgement to determine and justify the extent of the Detailed Options Assessment required, with consideration given to the range of possible assessment techniques, future applicability in border planning processes such as Sustainable Water Strategies, Pricing Submissions and detailed Business Case development.

UWSs must clearly document the approach adopted for evaluating options.

The methodology adopted for economic analyses must be applied consistently across all options assessed. Options assessment must occur at the portfolio level to allow the comparison of supply and demand projects, as well as at the individual project or initiative level, to capture the true value of projects to the overall supply-demand portfolio taking into account characteristics such as flexibility and reliability.

Quantifying shared benefits and avoidable costs arising from a project is to be undertaken and be clearly documented.

UWSs must document the approach adopted for considering the following when undertaking their Detailed Options Analysis.

- financial analysis requirements
- considering environmental costs and benefits
- considering socio-economic costs and benefits

The Detailed Options Analysis should consider the extent to which a portfolio approach to initiatives will reduce the risk associated with relying on a single initiative. In addition, water corporations are to adopt a “no regrets” approach to taking action by prioritising actions that are plausible under a range of different scenarios.



## Chapter 13 Implementation of priority actions

**Core  
requirement  
13.1**

UWSs must include a list of priority actions in the form of an action plan that may need to be undertaken:

- in the short term (0-5 years)
- medium term (5-20 years)
- long term (20+ years)

UWS must include targets to guide cost-effective investment in water supply and demand programs derived from the prioritised list of actions, for example appropriate triggers or zones for project planning, approvals and design, procurement and implementation to ensure readiness.

**Core  
requirement  
13.2**

The outcomes of options assessment must be presented visually building on the map or maps developed for community engagement.

The level of detail and commentary provided should reflect the particular characteristics of water corporation's system.

**Core  
requirement  
13.3**

The list of priority actions included in the UWSs must be reflected in the Water Corporation's Pricing Submission and the Corporate Plan to facilitate their implementation within the anticipated timelines of these other processes.

## Chapter 14 Monitoring and evaluation

### **Core requirement 14.1**

Annual reviews of the progress of implementing the UWS must be undertaken in parallel with the preparation of the Annual Water Outlook and submitted to DELWP at the same time. This will ensure the UWS is a 'live' document and supports adaptive management as circumstances change.

The annual UWS review process must include:

#### **1. Review of key forecasts**

The supply/demand scenario forecasts made in the UWS have been reviewed against the actual recorded information to depict where the current situation is tracking.

- key forecasts included in the UWS are the number of customers, the demand for water, sewerage inflows and recycled water demand
- key variances are discussed and potential changes or amendments to these forecasts recommended

#### **2. Tracking Implementation of UWS actions**

UWSs recommend several further investigations, key system augmentation and stakeholder engagement.

Specific points in the implementation review are:

- key achievements
- status of actions including commentary of actions being delivered e.g. trigger points being hit or actions at risk
- changes to the action plan – new actions, modifications to existing actions or actions that are no longer required
- updates to the UWS - key amendments to the UWS are discussed

#### **3. System summaries**

Summary of system challenges (water and sewerage services), proposed resolution and items for further resolution / investigation

#### **4. Communication**

- the key outcomes of the review will be communicated to customers in the AWO.
- the outcomes of the review are provided to DELWP.

### **Core requirement 14.2**

UWSs should be dynamic documents that will be reviewed and updated at least every five years to reconfirm the prioritisation and timing of longer-term actions, in light of improving knowledge, technology, costs and policy.

## Chapter 15 Drought preparedness plans

**Core requirement 15.1** A Drought Preparedness Plan (incorporating a Drought Response Plan) must be provided as an appendix to the UWS.  
Drought Preparedness Plan must cover the two components of preparedness and response for each urban water supply system.

**Core requirement 15.2** The preparedness component of the Drought Preparedness Plan must:

- define how the water corporation has and will continue to engage with customers, communities and stakeholders on planning and preparing for water shortages. This includes how the water corporation has and will work with asset managers to identify priority community assets to be watered during water shortages. This engagement is not expected to be done in isolation of existing processes; for example, through UWS engagement, stakeholder working groups and/or IWM forums.
- list the priority community assets that might require water to be made available during periods of water shortage as well as how they will be watered during water restrictions (i.e. Water Use Plans, exemptions, alternative water).
- where alternative water is identified as a source, document how the water corporation will work with the responsible asset manager (e.g. Council) to access the alternative water source.
- identify proposed exemptions under each relevant stage of water restriction (i.e. public gardens, playing surfaces, public pools).
- include principles for determining what are exempt users and a timeframe for determination on the submissions for exemptions.

**Core  
requirement  
15.3**

The Drought Response Plan (to be included as a separately labelled section of the Drought Preparedness Plan) must set out a plan of action to respond to water shortage including the decision-making framework to trigger these actions. This framework is to include relevant indices or variables such as volume of water in storage, inflows to storages, and climatic conditions etc.

Response actions for each trigger level might include:

- water restrictions (as set out in the water corporation’s Water Restriction By-law)
- demand reduction measures, or
- supply enhancement measures (including alternative water options).

Water corporations should specifically revisit the suggested “triggers” for action in light of lessons from recent experience, in particular:

- it might be desirable for triggers to be based on more than one variable – for example, current storage levels together with current inflows;
- it might be desirable to specify particular points in the year at which system status is to be evaluated against specific triggers – for example, at the end of the filling season – rather than specifying and applying trigger “curves” on a monthly basis;
- where water restrictions are to be pursued as a possible drought response mechanism in future, it might be desirable to:
  - set different triggers for entering and exiting the various stages of water restrictions to reflect the inherent conservatism that has been demonstrated in recent decisions about easing water restrictions;
  - set triggers in such a way that water restrictions are not entered into, or increased in severity during the winter months, when savings in discretionary water use under restrictions are expected to be minimal; and
  - re-evaluate the “spacing” between triggers in light of potential savings in discretionary water use that may be achieved under the various stages of water restrictions, based on recent experience.

