



CRC for
Water Sensitive Cities

Vision and Transition Strategy *for a Water Sensitive Adelaide*

CRCWSC Integrated Research Project 1:
Water Sensitive City Visions and Transition Strategies



Australian Government
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Vision and Transition Strategy for a Water Sensitive Adelaide

Water sensitive city visions and transition strategies (IRP1)

IRP1-1-2017

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Glossary

CRCWSC	Cooperative Research Centre for Water Sensitive Cities
IRP1	CRCWSC Integrated Research Project 1 <i>Water Sensitive City Visions and Transition Strategies</i>
Transition	A fundamental shift in cultures, structures and practices as society changes from one pattern of socio-technological development to another usually more sustainable pattern
Transition Dynamics Framework	A framework that conceptualises how system-wide changes in practice (e.g. the transition to water sensitive practices) unfold over time, based on the establishment of key enabling factors: individual and organisational champions, platforms for connecting, science and knowledge, projects and applications, and tools and instruments
Urban form	The physical characteristics that make up the built environment, including urban density and size, parcels and buildings, public spaces, ecological assets and key services such as transport and drainage
Urban Water Transitions Framework	A framework that conceptualises different forms of urban water servicing as a city responds to evolving drivers: Water Supply City, Sewered City, Drained City, Waterways City, Water Cycle City, and Water Sensitive City
WSC	Water Sensitive City; a WSC provides water system services in a way that reflects an integrated approach to infrastructure, the built form, the environment, governance and community, in order to deliver outcomes that support the enduring sustainability, liveability, resilience and productivity for a place's community and ecosystems
WSUD	Water Sensitive Urban Design; an approach to the planning, design and maintenance of urban landscapes that will deliver WSCs through protecting and enhancing natural water systems and integrating the management of the total water cycle
WSC Index	A tool to benchmark and diagnose the water sensitive performance of a place (from the municipal to metropolitan scale), based on 34 indicators organized by seven goals: good water sensitive governance, community capital, equity of essential services, productivity and resource efficiency, ecosystem health, quality urban space, and adaptive infrastructure.

1. Introduction

1.1 About this report

The Cooperative Research Centre for Water Sensitive Cities (CRCWSC) was invited to develop a WSC vision and transition strategy for Adelaide, encompassing the Greater Adelaide region. This forms part of the *Water Sensitive City Visions and Transition Strategies* integrated research project (IRP1), which aims to deliver a suite of participatory methods and associated tools for guiding cities and towns in accelerating their water sensitive transitions.

The project involved facilitation of stakeholder discussions across a series of three one-day workshops, stakeholder interviews, literature review and the application of benchmarking and diagnostic tools to inform detailed analysis. 38 of Adelaide's leaders and strategic thinkers from across water, planning, environment, community and other related sectors participated in the project between March and July 2017.

This report presents the key outputs of the project. Its purpose is to provide a framework for orienting and coordinating strategic action across the many different stakeholders who will need to collaborate for Adelaide's envisioned water future to be achieved. It is anticipated that this summary report can be used as a resource to inform the design and implementation of operational programs of action within departments of the SA Government and other organisations.

This report is complemented by a companion document, *Benchmarking, Envisioning and Transition Planning for a Water Sensitive Adelaide: Final Case Report* that provides a full description of the case study methodology as well as the detailed analyses that underpin the results.

Alongside the production of practical guidance for the Adelaide water sector contained in this report and its companion document, the engagement process overall has been valuable for strengthening relationships amongst stakeholders and building momentum and commitment for driving Adelaide's transition towards its envisioned water sensitive future.

1.2 What are water sensitive city transitions?

As cities and towns globally are grappling with the challenges of climate change and rapid urbanisation, practitioners, decision-makers and academics are recognising the importance of water in supporting urban liveability, sustainability and resilience for a city's long-term prosperity.

In Australia, the vision of the WSC is now widely used to represent an aspirational concept in which water has a central role in shaping a city. In a WSC, people are not disrupted by flooding, and can enjoy reliable water supplies, effective sanitation, healthy ecosystems, cool green landscapes, efficient use of resources, and beautiful urban spaces that feature water and bring the community together.

A WSC incorporates innovative infrastructure, design and governance solutions. For example, water recycling at different scales through wastewater recovery and stormwater harvesting provides a diversity of water sources and improves the health of downstream rivers and creeks by reducing pollution and flow impacts. Water sensitive urban designs integrate nature-based infrastructure into the landscape to provide hydraulic and water treatment functions, as well as amenity benefits such as an aesthetic environment and mitigation of urban heat island effects. Integrated and collaborative land use and water planning results in catchment-scale approaches to enhancing flood resilience and connecting areas of green and blue to create ecosystem and recreation corridors throughout the city footprint. Citizens are active in caring for water and the environment, and there is cohesion amongst the community as their sense of place and collective identity is nurtured through their connection with water.

Many places are starting to articulate aspirations represented by the WSC concept. Becoming a WSC requires a significant departure from the conventional mode of water servicing, which typically manages water as separate streams for water supply, wastewater and stormwater through large-scale, centralised infrastructure. These traditional water systems have given us critical benefits such as clean water, safe sanitation and effective drainage, and this mode of servicing is still an important part of a WSC. However, we now recognise that adaptations are needed to address key social and environmental vulnerabilities that result from conventional approaches, such as degraded waterways, uncertain and extreme rainfall patterns and growing community expectations for improved liveability.

The Urban Water Transitions Framework presented in Figure 1 depicts the evolution in water system servicing as these drivers unfold. Most cities in the world would appear somewhere on this continuum, however, a city’s journey from a water supply city through to the aspirational WSC is not linear. Australian cities are typically somewhere between a drained city and a water cycle city, with observable features across all six of the city-states.

Developing a shared perspective of water today, a compelling vision for the future and a framework to guide coherent strategic action is critical for establishing the understanding, motivation and capacity amongst stakeholders to drive their WSC transition.

Becoming a WSC requires significant changes in policy and practice as the water servicing system moves through different city-states. A successful transition will therefore rely on commitment and alignment amongst many different people and organisations.

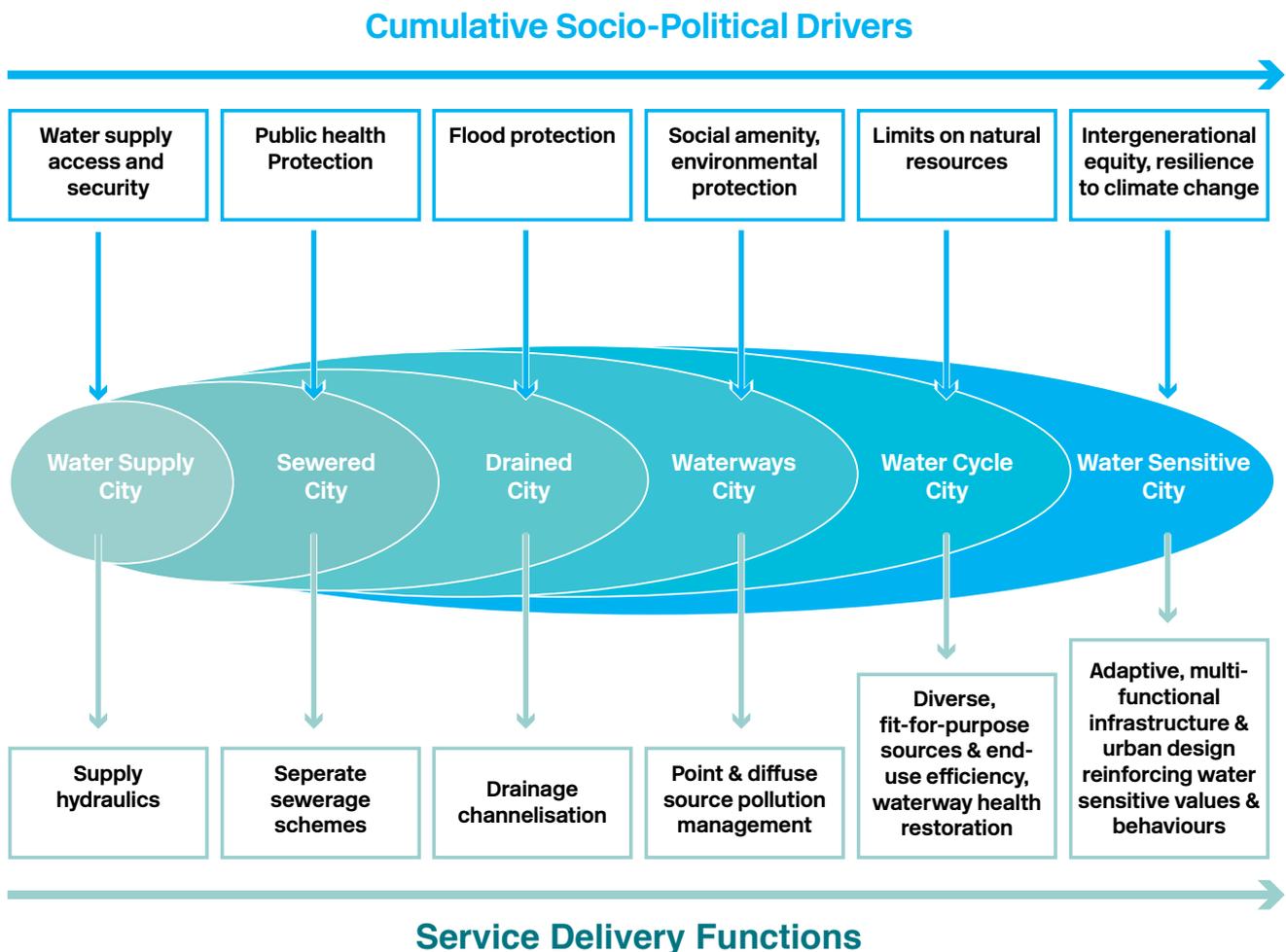


Figure 1. Urban Water Transitions Framework (Brown, Keath & Wong, 2009)¹

¹ Brown, R., Keath, N., & Wong, T. (2009). Urban water management in cities: historical, current and future regimes. *Water Science and Technology: A Journal of the International Association on Water Pollution Research*, 59(5), 847–55.

2. Adelaide's water story so far

2.1. From the past to the present day

The collaborative development of Adelaide's water story up to the present day establishes a shared understanding of the trends that have shaped its current context, and will influence its future. This provides a foundation for reflecting on the future for water in Adelaide, with its cycles of drought and flooding, and the importance of the city's water sensitive transition.

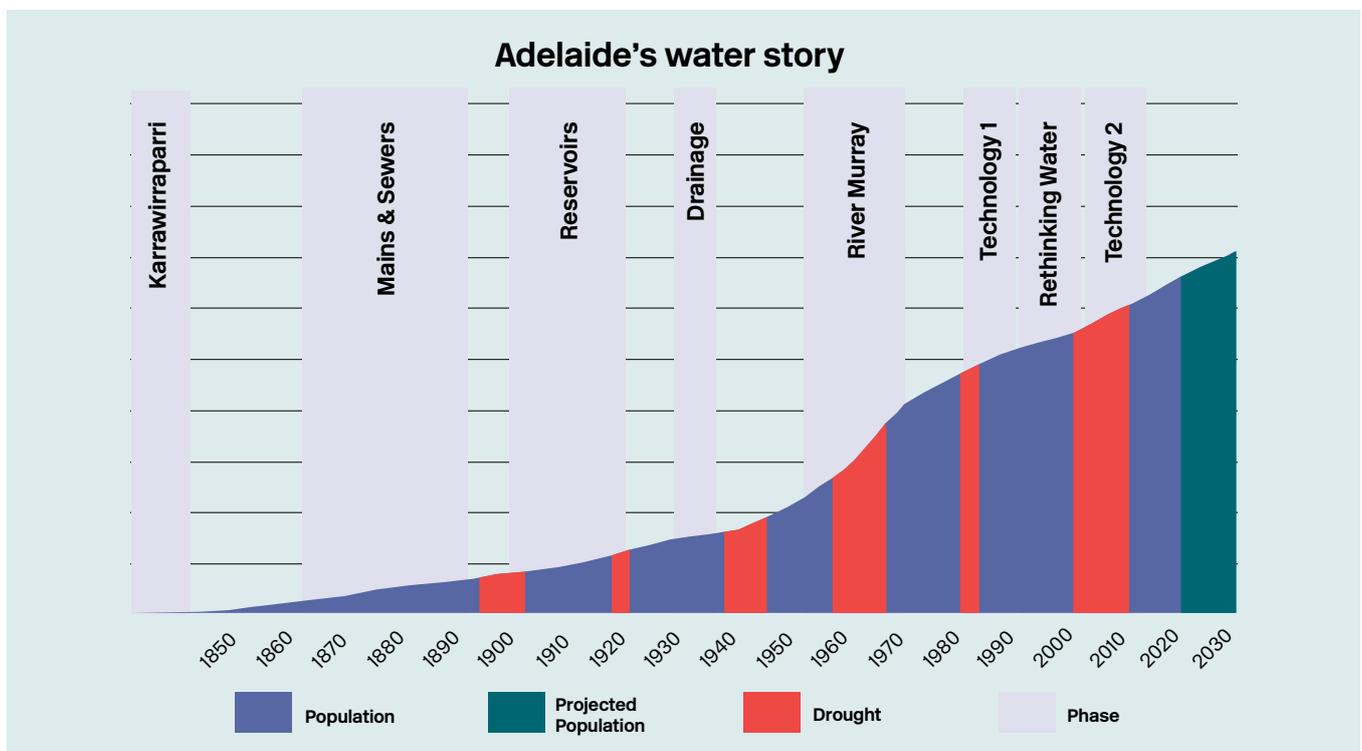


Figure 2. Adelaide's water story

Karrawirraparri

Before settlement by Europeans in the 1800s, the area now occupied by Greater Adelaide was home to the Kurna tribe primarily, although lands at the periphery of Adelaide were also home to the Ngarrindgeri, Ngadjuri and Peramangk tribes. Pre-European settlement, the River Torrens was known by its native Kurna name, Tarndaparri. Around the river grew Karra, or red gum trees. This gave rise to another name for the river, Karrawirraparri, or 'Red gum forest river'. The river was also known by other names, such as Karrundo-ingga west of present-day North Adelaide, and Yertalla everywhere when in flood.

Reservoirs

Major droughts affected Adelaide in 1895-1903 and 1918-20. These droughts strained Adelaide's water supplies and led government to search for new sources of water. By 1897, the Happy Valley Reservoir was completed to provide a storage capacity over four times that of Hope Valley. In 1902, the Barossa Reservoir was constructed to supply the northern Adelaide plains, and in 1918, the Millbrook Reservoir was completed. In 1938, the Mt Bold Reservoir was completed, which remains the largest of Adelaide's reservoirs to this day.

Drainage

Significant early legislation includes the *Waterworks Act 1856* (which led to the establishment of the Waterworks and Drainage Commission), and the *Sewerage Act 1929*. A major River Torrens flood in 1931 affected large areas of the eastern, southern and western suburbs. As a result, there was political drive to introduce legislation to establish new powers to manage stormwater flooding, and the *Metropolitan Drainage Act 1935* was enacted. This led to state investment in selected stormwater drainage works in areas subjected to flooding by the River Torrens, Sturt River, and Keswick and Brown Hill Creeks. Another drainage management decision around this time was to give the River Torrens an artificial outlet to the sea - Breakout Creek was constructed in 1936.



River Murray connections

Post-World War II saw significant population growth in Adelaide, alongside some important infrastructure developments. The South Parra Reservoir, Adelaide's second largest, was completed in 1958, and several other dams followed. However, it was the construction of the Mannum-to-Adelaide pipeline in the early 1950s that was the most significant development. This connected Adelaide's water supply to the Murray-Darling Basin for the first time. Another connection to the River Murray, the Murray Bridge to Onkaparinga Pipeline was completed in the early 1970s. Another major project in this period was the West Lakes land reclamation project.

Technological change, phase 1

Many Adelaide households in the 1970s and early 1980s drank rainwater rather than tap water, which tended to have a brown colour. With the late '70s and early '80s seeing the construction of several water treatment plants (beginning with Hope Valley Water Treatment Plant in 1977), drinking from rainwater tanks began to go out of fashion. Drought in 1982-83 prompted new approaches to water management. The Stop the Drip Campaign for water conservation debuted in the early 1980s. The mid-1980s also saw the City of Salisbury investigate a range of water sensitive urban design practices to manage water quality and stormwater flooding risk. In the 1990s, the City of Salisbury also began using Aquifer Storage and Recovery (ASR) to store treated stormwater over winter for summer irrigation of council reserves. Along with ASR trials in the adjacent City of Playford, this was likely the first use of ASR in an urban context in Australia. This was prompted by the latest research into Adelaide's geology showing Adelaide's natural advantages for ASR. In 1990, the Bolivar and McLaren Vale recycled wastewater schemes were developed.

Rethinking water

Significant attention was focused in the 1990s on national water reform and competition policy, which led to the Council of Australian Governments (COAG) National Water Initiative. Water resources began to be 'prescribed' to better manage their allocation; by the 2000s, nearly all of Adelaide's surface and groundwater resources were managed in this way. A growing desire for cleaner environments also influenced governance and development in Adelaide in the 1990s. The *Environment Protection Act 1993* and *Development Act 1999* were passed in the 1990s. The Catchment Water Management Boards for the Torrens and Patawalonga catchments were created in 1995 following community anger about the condition of the Patawalonga Lake System (recognised at the time as one of the most polluted systems in the country). The 1998 Sydney water crisis (an outbreak of cryptosporidium and giardia) was another stimulus for increased protection of Adelaide's water catchments. Trash racks were installed along creeks from 1997. The Keep South Australia Beautiful (KESAB) campaign, as well as water quality education, was a feature of schools during the 1990s. Climate change became part of the agenda from 1992 following Australia's ratification of the United Nations Framework Convention on Climate Change. Around this time, Australia's first WSUD educator, Professor John Argue, was prominent in Adelaide.

“The Regent Gardens development, more than 20 years ago, one of the first aquifer recharge systems... would be much harder to do these days.”

Technological change, phase 2

The Millennium Drought of 2002-09 put water security high on the government's agenda. In 2009, it was determined that a desalination plant would be constructed for Adelaide. The Glenelg to Adelaide Park Lands recycled wastewater project (GAP) was completed in 2010. 2010 also saw the first recycled treated sewage effluent ASR scheme. The North South Interconnection System, enabling a single integrated potable network for Adelaide, was completed in 2012. Much of this investment was supported by a substantial influx of National Water Commission funding. There were also several stormwater reuse and ASR schemes constructed during this period through programmes such as Waterproofing the North, Waterproofing the South and Waterproofing the West. Many of these projects were foreshadowed by Water for Good, released in 2009, which sought to secure water supplies for Adelaide up to 2050 on a platform of decentralised and multi-source water supplies.

Adelaide experienced reduced amenity during the drought, with parklands being “browned off” to save water. Households experienced severe water restrictions, which appear to have changed household and gardening technology and practices for the long-term. In addition to water efficiency measures, there has also been a focus in recent years on the issue of urban heat and its mitigation.

Other major policy releases in this period concerning water include the 30-Year Plan for Greater Adelaide, first released in 2010 and updated in May 2017, the Stormwater Management Agreement in 2006, which resulted in the formation of the Stormwater Management Authority, and the Adelaide Coastal Water Quality Improvement Plan (2013), which advocated that the coast and marine environment be managed as part of a larger integrated catchment system. The SA WSUD policy, Water sensitive urban design – Creating more liveable and water sensitive cities in South Australia, was also released.

“The Goyder Institute and drought were the two things that helped the most. We’ve got better at innovation and risk than we used to be. We have some way to go in the innovation sense, but we do have quite a strong approach to innovation.”

Looking to the future

Most of Adelaide's new residential development in recent years has occurred in established suburbs rather than at the fringes. This trend is expected to continue, not least due to the target of 85% infill development set by the 30-Year Plan for Greater Adelaide – 2017 Update. If development intensifies and private residential space decreases, quality, multi-functional public open space will be of considerable importance for the community. In particular, green infrastructure will have a valuable role in the future because of its potential to support community health, sustainability and resilience. A key target for health and resilience measures may be Adelaide's significantly higher population of older residents.

“Community don't know what a water sensitive city is, but want green space in their suburbs.”

Green infrastructure will be important for Adelaide if its climate warms as projected. For example, the average number of days exceeding 35°C was forecast to increase from 20 days in the period 1981–2010 to 26 days in 2030 and 32 days in 2090. Days of extreme heat, with temperatures exceeding 40°C, are forecast to increase from 3.7 days in the period 1981–2010 to 5.9 in 2030 and 9 in 2090. Adelaide along with Perth will experience the greatest increase in extreme heat days among Australian capital cities.² Adelaide will need vegetation cover to better manage higher urban temperatures, but will need to do so with lower winter rainfall, with some years expected to receive nearly half the amount of winter rain compared to the present. Therefore, it will need to use water in the urban landscape more productively and efficiently.

Though South Australia's economy is expected to restructure in response to a transition away from heavy manufacturing, WSC pathways favour the skills and technologies that will help the state shift its economy to knowledge-intensive activities and services, and high value food and beverage production. These changes benefit from a move to a more compact city, for example in protecting land and water resources on the periphery of Adelaide to support agriculture. Changes in the use of water in the urban form may also provide conditions supportive of creative industries that drive growth in modern urban economies – through the presence of natural, cultural, and built amenities, well-regarded knowledge institutions, the density of economic activity, and the migration of talented people.

“The [SA] government has a push for jobs, from old manufacturing to new manufacturing, and at some stage there will be water demand outstripping supply.”

A new economy in which energy and water may be significantly more constrained will create new threats to prosperity, but also new opportunities. For example, food production is likely to need to decrease its reliance on climate-dependent water resources, and to increase its reliance on water efficient processes and water resources that are less impacted by rainfall. These changes can achieve a thriving post-carbon economy for South Australia.

“Our challenge is look at water in a more holistic way to maximise its resource value.”

² CSIRO and Bureau of Meteorology (2015). Climate Change in Australia Information for Australia's Natural Resource Management Regions: Technical Report, CSIRO and Bureau of Meteorology, Australia

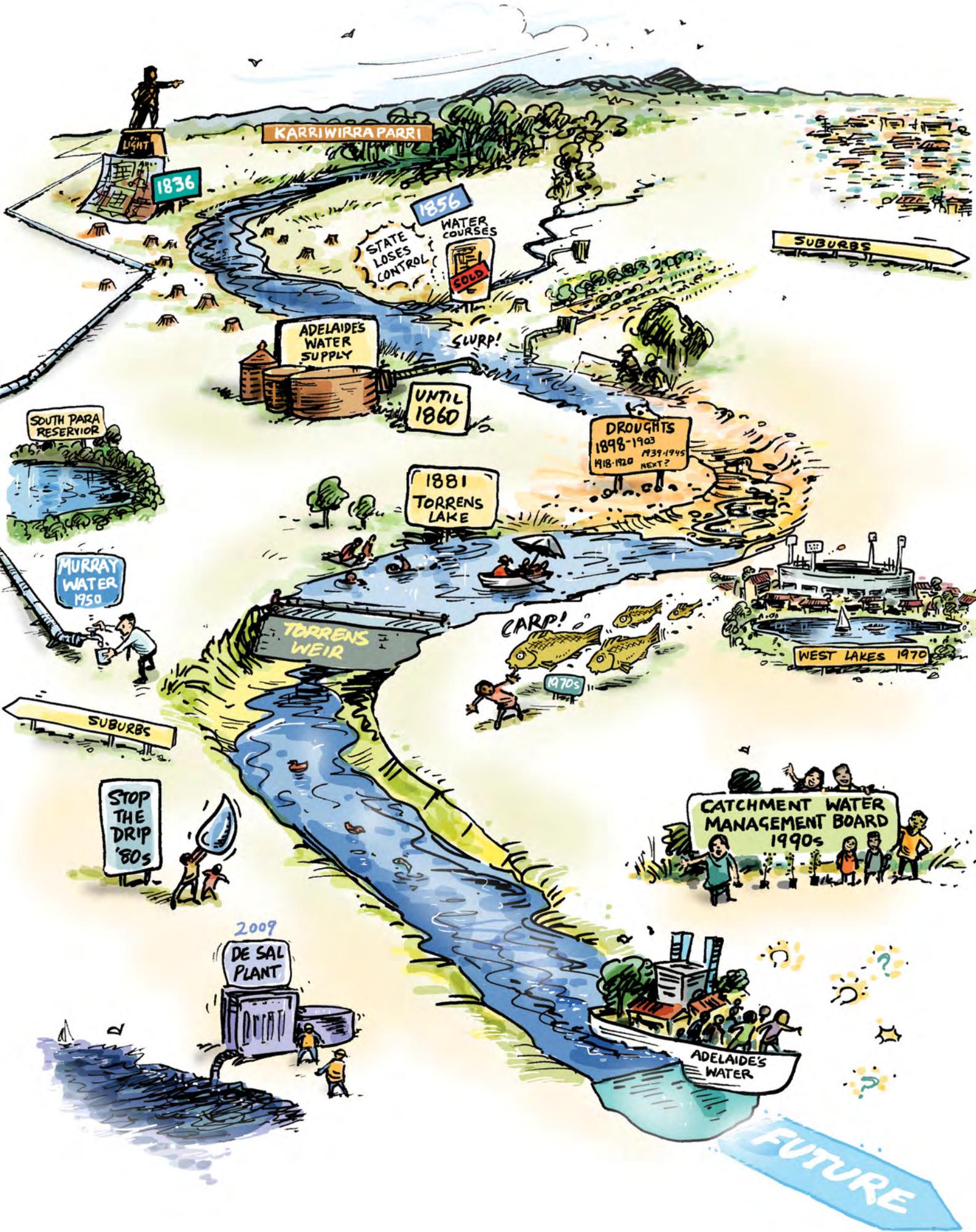


Figure 3. Adelaide's water story (illustration: Simon Kneebone)

3. The vision for a water sensitive Adelaide

The 50-year water sensitive vision for Adelaide aims to orient and align the actions of stakeholders over the long-term. The aspirations of participants for their city's water future are expressed as a suite of outcome statements with accompanying rich descriptions. The timeframe enables people to stretch their ambitions beyond today's systems and constraints to reflect on the transformative change that is possible over such a period.



Adelaide is an attractive and resilient city that uses its diverse water resources and knowledge to drive prosperity, sustain healthy ecosystems, and connect communities

1. Adelaide's terrestrial, freshwater and marine ecosystems are diverse, healthy and productive
2. Adelaide's water infrastructure systems are smart, sustainable, and flexible
3. Adelaide's urban form is accessible, liveable and integrates water creatively to highlight Adelaide's unique features
4. Communities actively participate in water management and embrace the natural cycles of water abundance and scarcity
5. Water supports a strong economy underpinned by Adelaide being an affordable, vibrant and culturally rich city
6. Water governance can adapt to complex challenges and drive holistic, innovative and collaborative solutions

Figure 4. The vision of Adelaide as a WSC



ADELAIDE

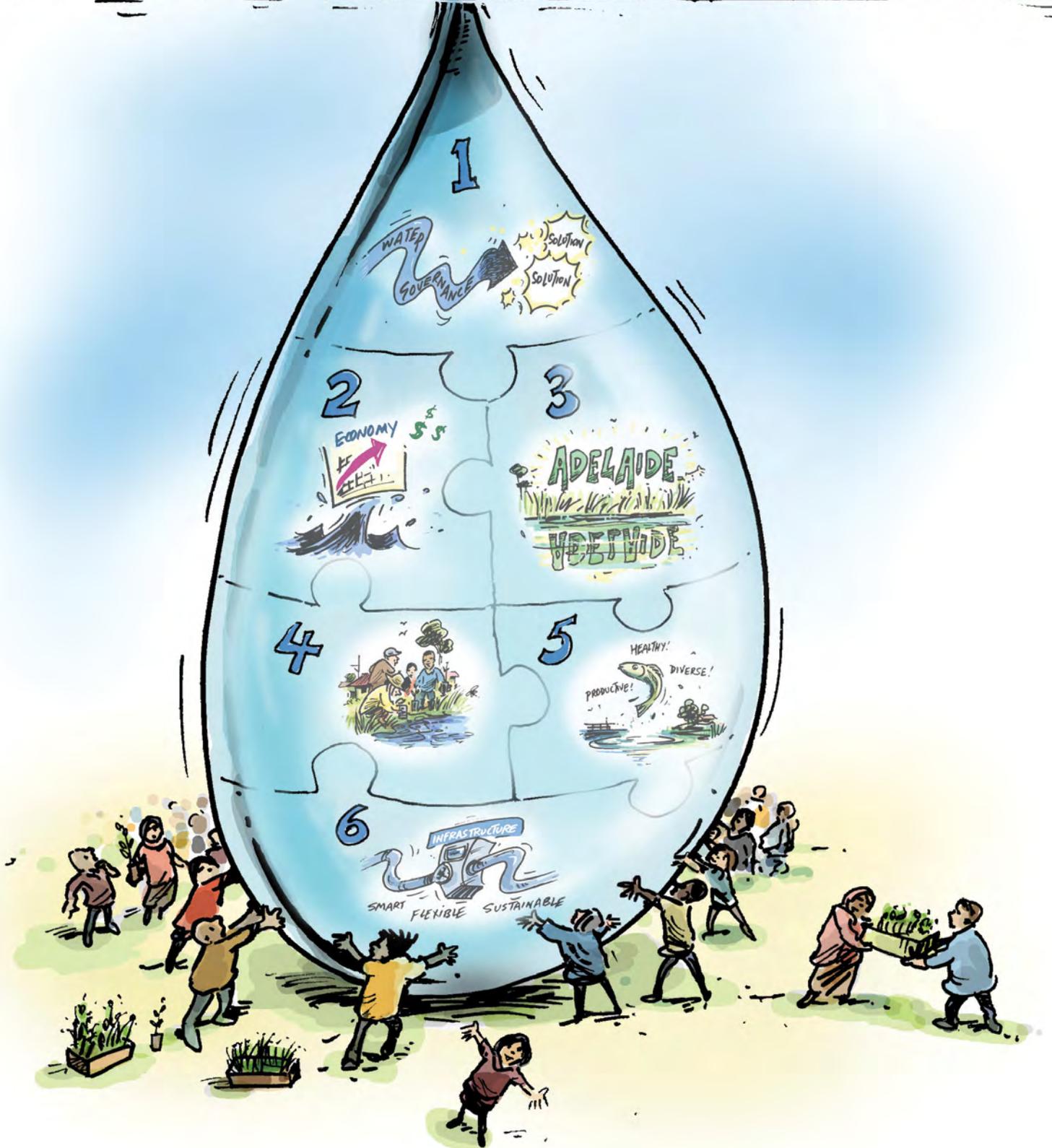


Figure 6. Adelaide's vision of a WSC (illustration: Simon Kneebone)

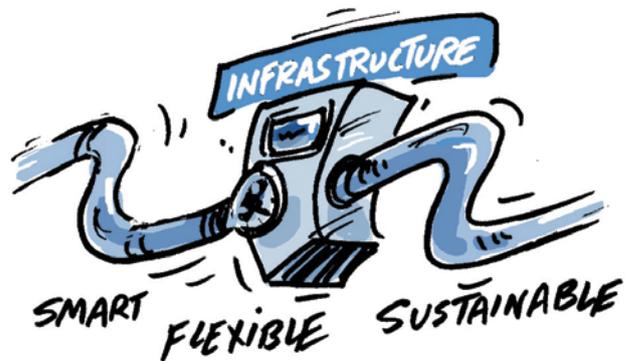


1. Adelaide's terrestrial, freshwater and marine ecosystems are diverse, healthy and productive

Waterways, coastal waters, wetlands and groundwater systems are sustainably managed and ecologically healthy. Adelaide is known for its iconic woodlands and network of ephemeral creeks. Seagrass habitats in the Gulf St Vincent have been restored to good health. Coast and inland waters are safely enjoyed by the community year-round. In all but the driest summers, urban waterways are available for locals to swim. Pollution prevention and waste reduction are key drivers of management.

2. Adelaide's water infrastructure systems are smart, sustainable, and flexible

Adelaide has a sophisticated water system that ensures fit-for-purpose water is available wherever it is needed, there is no waste, and the city's overall energy efficiency is a critical element of management. For this outcome, water infrastructure makes extensive use of smart technology and is designed to fulfil multiple functions. Investment decisions are assessed to ensure they deliver social, economic and environmental benefits, and to be adaptable to new conditions and demands. Water management is carbon neutral and achieves full resource recovery. Ecosystem components such as flora, fauna, waterways, soils and topography are appropriately valued as part of water infrastructure. Intense rainfall occasionally causes flooding that affects some properties, but homes and businesses are safe and Adelaide responds effectively to disruption. Water services are priced equitably for residents irrespective of their location.





3. Adelaide’s urban form is accessible, liveable and integrates water creatively to highlight the city’s unique features

Adelaide’s urban form supports multiple uses and functions that are linked by a celebration of water in the landscape. Public green spaces, including streetscapes, use water to keep the community cool, healthy and connected. There is accessible quality public green space throughout the region. Neighbourhoods are designed and serviced to support healthy communities with well-shaded streets that are walkable on hot days and for all ages. Canopy cover is maintained or increased across the urban area to reduce the urban heat island effect and achieve other goals. There is innovation in how roads and pavements are designed to increase infiltration and rebalance the urban water cycle. Green infrastructure is an integral part of the urban form and incorporates a range of native and exotic plants best suited to the conditions and intended outcomes. Semi-natural areas, such as linear reserves along creeks and rivers, are a much-loved feature of the urban form, and provide opportunities for nature-based play, learning and connections to peri-urban conservation areas. Private open space provides enough room for aesthetic or kitchen gardens.

4. Communities actively participate in water management and embrace the natural cycles of water abundance and scarcity

Adelaide households and businesses are active participants in water management through choices made in the home as well as engagement in local, regional and state water planning processes. The community, including business, has a good understanding of the urban water cycle and how they influence water conservation and quality. The community also knows the importance of green infrastructure to urban liveability, such as its role in mitigating urban heat. Households are viewed as critical to stewardship of the water system, with important responsibilities for rainwater storage and water treatment. There are champions for WSC outcomes in every neighbourhood. The community has high understanding of natural cycles and associated risks. Information about the risk of flooding to property and services, and how to respond, is accessible to all residents.





Figure 5. Leafy and cool streets (illustration: Simon Kneebone)



5. Water supports a strong economy underpinned by Adelaide being an affordable, vibrant and culturally rich city

Adelaide is a desirable place to live and establish and conduct business. New residents as well as new investment are attracted to the city. Innovation is well supported, and there are efficient and sustainable markets for water and energy in which the value of resources is fully captured. There is demand for water that is fit-for-purpose, with strong competition in supply. The community understands the potential benefits and risks of new ideas in water management and are early adopters of new technologies. There is growth and export of water sensitive design skills and technology. Adelaide has a circular economy in food and agribusiness. Adelaide's highly regarded built and natural environment is at the core of a healthy tourism sector. Importantly, Adelaide's growth in prosperity has been shared by all residents equitably to reinforce the city's strong social cohesion.

6. Water governance can adapt to complex challenges and drive holistic, innovative and collaborative solutions

Water resource planning is vertically and horizontally integrated, with organisations across different scales and sectors collaborating to deliver holistic and coordinated solutions. The regulatory framework for water encompasses all aspects of the urban water cycle (i.e. water capture, storage, distribution, use, disposal and treatment) in an integrated and flexible way. This framework promotes public and private sector innovation to create efficient and sustainable water solutions. The public is involved in planning and problem-solving processes through nation-leading approaches to open and transparent deliberation. This generates commitment to long-term water management goals beyond the electoral cycle. Adelaide's Traditional Owners have a stronger role in water management, both as a source of knowledge and as direct participants.



4. Benchmark of Adelaide's current water sensitive performance

Planning Adelaide's transition to its WSC vision requires a detailed understanding of its current performance in relation to its aspirations. The CRCWSC's WSC Index is a benchmarking tool designed for this purpose. It articulates seven WSC goals, which organise 34 indicators representing the major attributes of a WSC. These indicators are also mapped to the idealised city-states represented in the Urban Water Transitions Framework (Figure 1) to provide a benchmarked city-state.

While a city's local WSC vision may not emphasise all indicators of the WSC Index to the same degree, the tool enables diagnosis of key areas of strength and weakness. This insights can then inform the prioritisation of actions and provide a framework for ongoing monitoring and evaluation of a city's water sensitive performance.

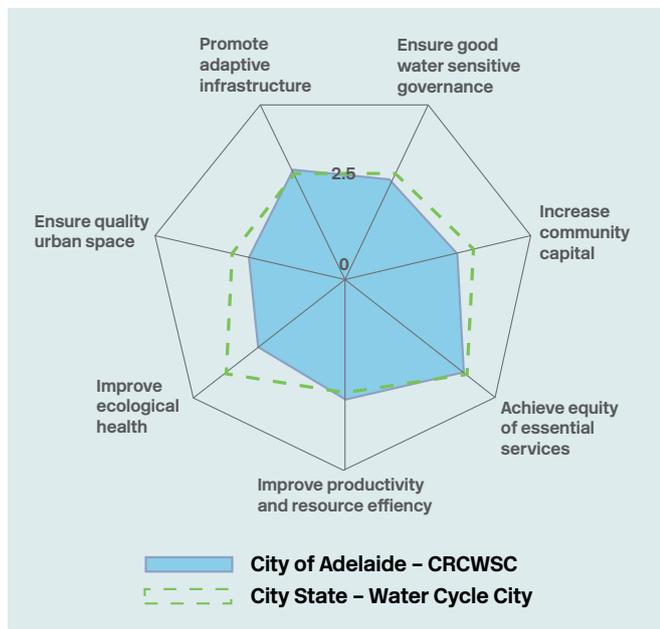


Figure 7. Adelaide's performance (blue area) compared to the water sensitive goals and the idealised Water Cycle City benchmark (dashed green line)

4.1 Adelaide's WSC indicator scores

Table 1 provides the individual indicator scores for each goal and Figure 7 summarises the performance of Adelaide against the seven goals of a WSC and the benchmark of the idealised *Water Cycle City*.

Adelaide is well aligned to the Water Cycle City benchmark goals of *Achieve equity of essential services* and *Promote adaptive infrastructure*. A deficit in attaining key attributes of a Water Cycle City is most evident across the goals of *Improve ecological health*, *Ensure quality urban space*, and *Increase community capital*.

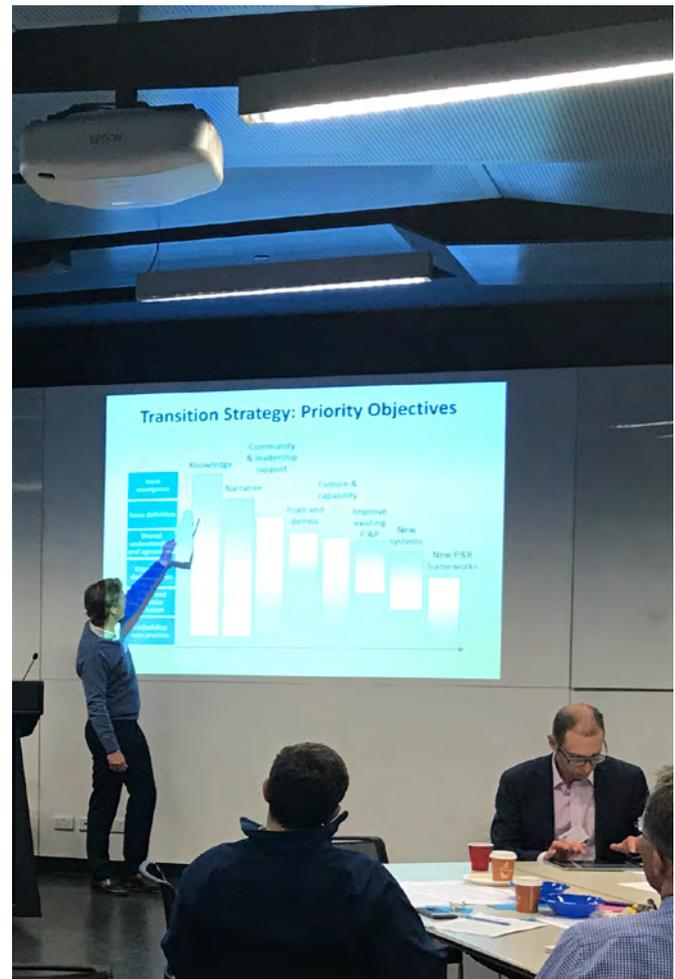


Table 1. WSC Index scores (Goals and Indicators) for Adelaide

WSC Index Goal and Indicators	/5	WSC Index Goal and Indicators	/5
1. Ensure good water sensitive governance	2.8	4. Improve productivity and resource efficiency	3.2
1.1 Knowledge, skills and organisational capacity	2.5	4.1 Benefits across other sectors because of water-related services	3.5
1.2 Water is key element in city planning and design	2.5	4.2 Low GHG emission in water sector	2
1.3 Sound institutional arrangements and processes	3	4.3 Low end-user potable water demand	3
1.4 Public engagement, participation and transparency	3	4.4 Water-related commercial and economic opportunities	4
1.5 Leadership, long-term vision and commitment	3	4.5 Maximised resource recovery	3.5
1.6 Water resourcing and funding to deliver broad societal value	3	5. Improve ecological health	2.8
1.7 Equitable representation of perspectives	2.5	5.1 Healthy and biodiverse habitat	2
2. Increase community capital	3	5.2 Surface water quality and flows	2.5
2.1 Water literacy	3	5.3 Groundwater quality and replenishment	3
2.2 Connection with water	3.5	5.4 Protect existing areas of high ecological value	3.5
2.3 Shared ownership, management and responsibility for water assets	2.5	6. Ensure quality urban space	2.5
2.4 Community preparedness and response to extreme events	3	6.1 Activating connected urban green and blue space	3
2.5 Indigenous involvement in water planning	3	6.2 Urban elements functioning as part of the urban water system	2
3. Achieve equity of essential services	4	6.3 Vegetation coverage	2.5
3.1 Equitable access to safe and secure water supply	4.5	7. Promote adaptive infrastructure	3.1
3.2 Equitable access to safe and reliable sanitation	4	7.1 Diverse fit-for-purpose water supply system	3.5
3.3 Equitable access to flood protection	3.5	7.2 Multi-functional water system infrastructure	3
3.4 Equitable and affordable access to amenity values of water-related assets	4	7.3 Integration and intelligent control	2.5
		7.4 Robust infrastructure	3.5
		7.5 Infrastructure and ownership at multiple scales	3
		7.6 Adequate maintenance	3

4.2 Adelaide's benchmarked city-state

Figure 8 summarises the city-state benchmarking results for Adelaide. Percentage attainment for each city-state ranged from 100% as a Water Supply City and Sewered City and Drained City through to 9% as a Water Sensitive City. This section summarises the key elements that contribute to the overall percentage attainment of each city state.

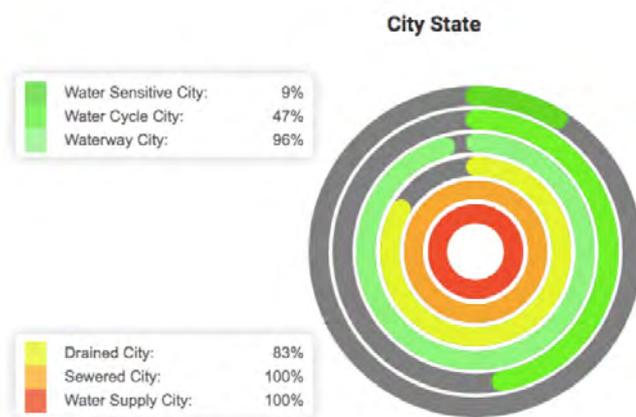


Figure 8. Summary of Adelaide's performance against the ideal measures for each city state.

100% attainment of Water Supply City & Sewered City

Despite its dry climate, Adelaide is well regarded for water security and as such rated 100% as a Water Supply City. Measures to help ensure a safe and secure water supply for a growing population include an extensive network of water mains, water treatment plants and potable water sources such as reservoirs in the Mount Lofty Ranges catchments, the River Murray, and a desalination plant. This supply is managed centrally, provided at an affordable cost to end users and with reliable public health outcomes. SA Water reported that 99.96% of metropolitan tests exceeded Australian Drinking Water Guideline (ADWG) parameters and testing also showed a 99.97% E. coli compliance for 2015-16 in metropolitan samples.

Similarly, nearly everyone in Adelaide – 1,133,000 residents according to a recent SA Water estimate – has access to safe and reliable sanitation. This meant Adelaide rated 100% as a Sewered City. The sewer system is linked to six wastewater treatment plants around Adelaide that treat wastewater to 'developed world standards' prior to release to the environment. Septic tanks systems are used in a few small communities in the Adelaide Hills.

83% attainment of Drained City

Adelaide rated 83% as a Drained City. The region has strong standards in place to protect homes and businesses from the impacts of flooding. This is considered the highest priority in land use planning with respect to water use and management. Most water courses have been piped or channelised to rapidly convey water out of urban areas.

Risks of extreme flooding events are generally well understood at the policy level across Adelaide. Emergency services are also well prepared with an all-hazards approach to emergency response. However, there are concerns about the effectiveness of household plans for extreme events. Though flood risk is limited to certain areas of Adelaide, this is considered the most significant gap in preparedness for vulnerable residents. Many residents are likely unaware they live in a floodplain because local flooding is relatively infrequent. Similarly, there is a general lack of awareness of the forecast impact of future sea level rise. Several flood events in 2016 highlighted the vulnerability of the system to intense rainfall events.

To attain the Drained City, detention measures would need to be implemented throughout Adelaide's flood plains to reduce impacts associated with peak flood events.

96% attainment of Waterway City

Adelaide rated 96% as a Waterway City, reflecting well integrated and diverse water-related assets. Significant investment continues to be directed at improving coastal integrity, waterway amenity and liveability values across Adelaide. Waterways and beaches are readily accessible.

The Adelaide community has a strong connection to water in the urban environment in an aesthetic sense. This is reflected in higher house prices closer to bodies of water and nearer the beach.

The delivery of broader societal value is a key driver of water infrastructure projects. There is a strong recognition of diffuse-source pollution and use of wetlands and other systems to manage it at the policy level across government. This has resulted in significant investment in WSUD and water security in the last 15 years. There are also industry guidelines and programmes in place to promote take-up of WSUD and build professional capacity.

47% attainment of Water Cycle City

Adelaide has shown considerable vision and innovation in water supply diversity. The current limits to traditional water supplies for a growing population and future economic development are understood. Non-potable water sources include groundwater extraction (including aquifer storage and recovery), stormwater reuse, wastewater reuse and rainwater tanks. There is increased decentralisation of stormwater capture, storage and distribution systems, though more can be done to integrate separate networks.

There has been considerable investment in the treatment of wastewater to limit its environmental impact on receiving waters, particularly in terms of the risk of eutrophication. However, stormwater remains an issue for the marine environment, and there is a need for more action to address diffuse source pollution to restore marine water quality. One of the constraints is the need to better integrate Water Cycle City objectives into the existing built form, to ensure there is sufficient open space in established urban areas to be able to treat stormwater. There are also areas that have low proportions of active green-blue space, and Adelaide has been recognised as having the lowest proportion of tree canopy cover among Australia's state capitals.

Permanent water saving measures are in place. Following the Millennium Drought, uptake of demand management measures was common through the installation of water saving fittings, fixtures and appliances. Adelaide has one of the highest proportion of households with rainwater tanks installed among Australian state capitals, though adoption of fit-for-purpose water use within the home (as opposed to the garden) needs more support, and there is potential that tank installations will plateau if there is not more supportive policy in place.

Participants believed there needs to be a more consistent approach to integrated water management through all relevant organisations, particularly in infrastructure provision. There is enthusiasm for integrated water management but a more coordinated approach across the urban form will promote innovation and adoption. However, there is a growing capacity and knowledge across larger organisations, and an interdisciplinary approach to water management is beginning to spread.

A principle of the Water Cycle City is co-management of the water system by government, business and the community. This necessitates broadening of participation in water management beyond traditional groups and disciplines. Currently, the SA Government has policy in place to improve gender equity, and there are recognised policies supporting engagement with indigenous groups. Progress has been made in broadening the representation of local government councillors and in some appointed boards. While several programmes to involve indigenous perspectives in water management have recently commenced or been piloted, indigenous engagement is not yet embedded in Adelaide's water governance. Public participation in water management, for example in managing water courses on private land, should become more widespread.

9% attainment of Water Sensitive City

Adelaide rated 9% as a WSC, achievement of which is largely attributed to equity of essential services of water supply and sanitation. Both supply and sanitation services are accessible to everyone; they are safe, secure and affordable. Treated wastewater discharged to the environment is well managed.

Parts of Adelaide have well-connected urban green space with high canopy cover. Adelaide is also well-served by the central parklands. Policies and planning regulations are in place to protect areas of biodiversity significance, but there are concerns over the effectiveness of the regulations.

To achieve a WSC, Adelaide will need to fulfil the multiple objectives of ecosystem protection and restoration, security of supply, flood control, public health, amenity, liveability and economic sustainability, among others. While Adelaide has begun to make strides towards a WSC, significant efforts are still needed in order to transition current water management practices to water sensitive practices.



5. Transitioning to Adelaide’s WSC vision

5.1 Transition Dynamics Framework

Adelaide’s transition towards its water sensitive city (WSC) vision will require significant changes across the structures, cultures and practices of urban and water system planning, design, management, engagement and decision-making. Transitions theory is a body of interdisciplinary research that studies how these changes are driven and enabled over time.

CRCWSC research has drawn on transitions theory to develop the Transition Dynamics Framework (Brown, Rogers and Werbeloff, 2016³; Brown, Rogers and Werbeloff, 2017⁴). This Framework identifies six distinct phases of change during a city’s water sensitive transition (Figure 9). As a city moves through each phase sequentially, enabling conditions are established to support its trajectory towards its WSC vision and avoid the risk of change pathways that reflect lock-in, backlash or system failure patterns (Figure 10).



Figure 9. Six phases of change during the transition to a new practice

³ Brown, R.R., Rogers, B.C., Werbeloff, L. (2016). Moving toward Water Sensitive Cities: A guidance manual for strategists and policy makers. Melbourne, Australia: Cooperative Research Centre for Water Sensitive Cities.

⁴ Brown, R.R., Rogers, B.C., Werbeloff, L. (2017). A framework to guide transitions to water sensitive cities. Chapter 9 in Moore, T., de Haan, F.J., Horne, R. & Gleeson, B. (Eds) Urban Sustainability Transitions: Australian Cases – International Perspectives. Springer, Japan.

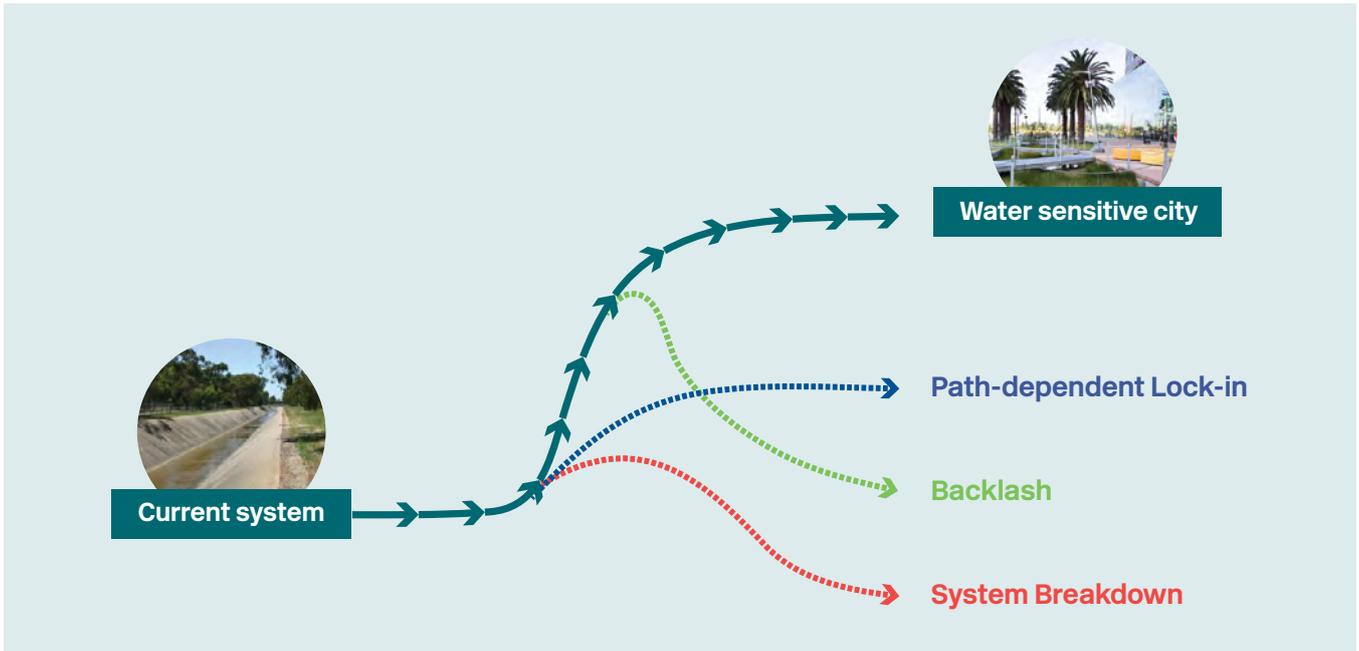


Figure 10. Transition pathways: Successful transition, lock-in, backlash and system breakdown.

Actions to orient and drive change towards a city’s envisioned water sensitive future need to progressively establish these enabling conditions. Actions with the most impact during the early phases of transition will be different from those during the later phases. It is critical to identify a city’s current phase of change to ensure that actions are prioritised according to the effectiveness they will have in accelerating the WSC transition.

The CRCWSC’s Transition Dynamics Framework sets out five types of enabling factors that need to be present throughout a transition: champions, platforms for connecting, science and knowledge, projects and applications, and practical and administrative tools. Together, these five factors create an enabling environment for a WSC transition and, mapped against the six transition phases, they create a matrix (Figure 11) for a deeper understanding of the current transition phase for each vision outcome. A range of desktop and engagement activities provided data on Adelaide’s enabling environment that was analysed using the Framework.

	Transition Phase	People and organisations	Platforms for connecting	Knowledge	Projects and applications	Tools and instruments
Desktop review	1. Issue emergence	Issue activists		Issue highlighted	Issue examined	
Participant review	2. Issue definition	Individual champions	Sharing concerns	Causes and impacts examined	Solutions explored	
	3. Shared understanding & issue agreement	Connected champions	Sharing ideas	Solutions developed	Solutions experimented with	Preliminary practical guidance
Benchmarking discussions (WS1)	4. Knowledge dissemination	Influential champions	Building support	Solutions advanced	Solutions demonstrated at scale	Early policy
	5. Policy and practice diffusion	Organisational champions	Expanding the community of practice	Capacity building	Widespread implementation and learning	Early practical guidance and early regulation
Transition barriers discussions (WS2)	6. Embedding new practice	Multi-stakeholder network	Guiding consistent application	Monitoring and evaluation	Standardisation and refinement	Comprehensive policy and regulation

Figure 11. Transition Dynamics Framework (adapted from Brown et al., 2016⁵; Brown et al., 2017⁶)

⁵ Brown, R.R., Rogers, B.C., Werbeloff, L. (2016). Moving toward Water Sensitive Cities: A guidance manual for strategists and policy makers. Melbourne, Australia: Cooperative Research Centre for Water Sensitive Cities.

⁶ Brown, R.R., Rogers, B.C., Werbeloff, L. (2017). A framework to guide transitions to water sensitive cities. Chapter 9 in Moore, T., de Haan, F.J., Horne, R. & Gleeson, B. (Eds) Urban Sustainability Transitions: Australian Cases – International Perspectives. Springer, Japan.

5.2 Priority objectives and strategies

Adelaide's WSC vision includes varied aspirations that are likely to require diverse implementation actions. Though the short-to-medium term objective is to fully achieve the Water Cycle City benchmark, the Transition Dynamics Framework gives insight into how this can be achieved for each vision outcome in more detail. This analysis is critical for ensuring Adelaide stakeholders pursue the most effective objectives, strategies and actions over the short-to-medium term to accelerate Adelaide's WSC transition. This section discusses the enabling factors for each of the vision outcomes to derive strategic recommendations for advancing Adelaide's performance against relevant WSC Index indicators and therefore achieve the next phase of transition.

Vision outcome 1: Adelaide's terrestrial, freshwater and marine ecosystems are diverse, healthy and productive

To achieve the next phase in Adelaide's transition towards a WSC, the characteristics, functions, conditions and values of ecosystems need to be better understood and respected, and controls are needed to manage the impacts of urbanisation and pollution. Achieving these outcomes will require natural assets to be better integrated into the water management system so their management can be adequately planned and resourced.

For Adelaide, the main concerns appear to be long-term biodiversity decline, in terms of native vegetation fragmentation and degradation, as a result of urban development, stormwater quality in fully urbanised areas, and the health of marine and coastal ecosystems. These threats are well understood by the scientific community and policy-makers. For example, though there are few examples of open water courses in Adelaide, the diversion of flows into these rivers for water supply purposes and the rise in the contribution of stormwater runoff has had significant impacts on their natural flow regimes and water quality. This has had well recognised effects on Gulf St Vincent ecological communities. There is regular monitoring of groundwater levels and salinity, though other aspects of groundwater quality are less well understood by policy-makers. For the broader community, however, there is a more pronounced gap in general awareness of these issues.

Evidence gathered during the project suggests that community knowledge of the interdependence of a range of urban and ecosystem functions, such as the links between hard urban surfaces and increased stormwater volume, and between stormwater and the health of the marine environment, needs to be raised. Without this knowledge, the solutions that address ecosystem benefits are unlikely to gain the support for implementation. Therefore, it is recommended that policy-makers across government and key agencies work towards **improving the community's understanding of the dependence of a wide range of community benefits on ecosystem health** (Strategy 1.1).

“[A big driver will be] an increasing awareness of the values of waterways. Adelaide has pumped a lot of money into the Torrens Lake, and so that can be used as a vehicle to highlight stormwater quality issues. And there'll be growing desire to have good water quality through the Torrens.”

Participants consider there are champions present in many organisations who are advocating for specific ecosystem health outcomes, such as coastal protection solutions, seagrass replenishment, and waterway health. However, these champions are often competing with more influential interests, and they have not yet formed a united voice to advocate for holistic water management to deliver broad environmental outcomes. Several organisations have been given accountability for various aspects of ecosystem health, including the Adelaide and Mount Lofty Ranges Natural Resources Management (NRM) Board, the Department of Environment, Water and Natural Resources (DEWNR), the EPA, and local councils. The influence of these agencies collectively needs to increase beyond the environment sector.



One way champions could be supported is through enhanced coordination and collaboration between the various organisations with a stake in ecosystem health. The project revealed that some agencies work to improve collaboration in the delivery of programs or projects for ecosystem health outcomes, whether through advocacy or statutory mandate, with no single agency carrying this burden. Governance changes may not be necessary to establish this collaborative leadership, as it can be fostered through improved integration and a more holistic approach to ecosystem management at the decision-making level. This would promote cross-agency coordination and support the championing of a whole-system perspective. Key agencies should therefore work towards **developing and implementing a strategy for integrated ecosystem-based management decision-making** (Strategy 1.2).

“There is varying opinion in how you would [manage water quality], but I don’t think anyone is against [action] because they don’t believe that water quality is an issue.”

One way champions could be supported is through enhanced coordination and collaboration between the various organisations with a stake in ecosystem health. The project revealed that some agencies work to improve collaboration in the delivery of programs or projects for ecosystem health outcomes, whether through advocacy or statutory mandate, with no single agency carrying this burden. Governance changes may not be necessary to establish this collaborative leadership, as it can be fostered through improved integration and a more holistic approach to ecosystem management at the decision-making level. This would promote cross-agency coordination and support the championing of a whole-system perspective. Key agencies should therefore work towards **developing and implementing a strategy for integrated ecosystem-based management decision-making** (Strategy 1.2).

“There was a lot of discussion about conserving water during drought, about treating water as a resource. But just because we’re not in a drought, it doesn’t mean we should ignore what happens to water once it leaves our property.”

There are many projects aimed at improving ecological health such as constructed wetlands, floating barriers, bird sanctuaries and Hills Face protection. The River Torrens amenity flow trial has significantly decreased the number and severity of algal blooms within Torrens Lake. While these projects are contributing to improved ecological health, they are seen by participants to be isolated and not carried out with a system-wide approach. For example, the project to increase flow in the River Torrens to address water quality in Torrens Lake has not addressed the potential for water quality impacts to Gulf St Vincent at the river’s outlet. Similarly, efforts at protecting biodiversity may not address landscape level changes such as long-term drying. Evidence also suggests that there is a lack of understanding among decision-makers about how WSUD can also deliver economic and liveability benefits. These examples highlight the challenges facing government and industry in gaining support for new, innovative projects. It is recommended that key stakeholders seek to **trial and demonstrate innovative water system solutions that deliver multiple benefits, such as protecting areas of high ecological value and providing community health and wellbeing** (Strategy 1.3).

Tools and guidance around ecological health exist such as the EPA aquatic ecosystem report cards, environmental flow reports, tree removal controls and water quality targets. There are also strict controls on clearing native vegetation to protect areas of high ecological value. However, despite progress in recent years, the management of diffuse threats to water quality is an ongoing concern. There are currently no mandatory measures for the control of stormwater quality. In Adelaide’s watershed, threats from failing on-site wastewater management require coordinated action. As a result, it is recommended that **improvements are made to the implementation of existing policies and programs for protecting ecosystem health through effective management of surface water, groundwater and wastewater, and protection of areas of high ecological value** (Strategy 1.4).

Adelaide is currently in Phase 3 and Phase 4 of its transition to practices aligned with this vision outcome (Figure 12). These correspond closely with the WSC Index indicators for the *Improve ecological health* goal. Due to coordinated action and generally more effective safeguards, Adelaide is currently in Phase 4 for the protection of areas of high ecological value. For the other indicators of this goal, Adelaide is in Phase 3 of its transition. Areas of strategic priority for Adelaide are deepening and strengthening the network of champions for ecosystem health, and developing platforms for coordinated policy-making, implementation and evaluation.

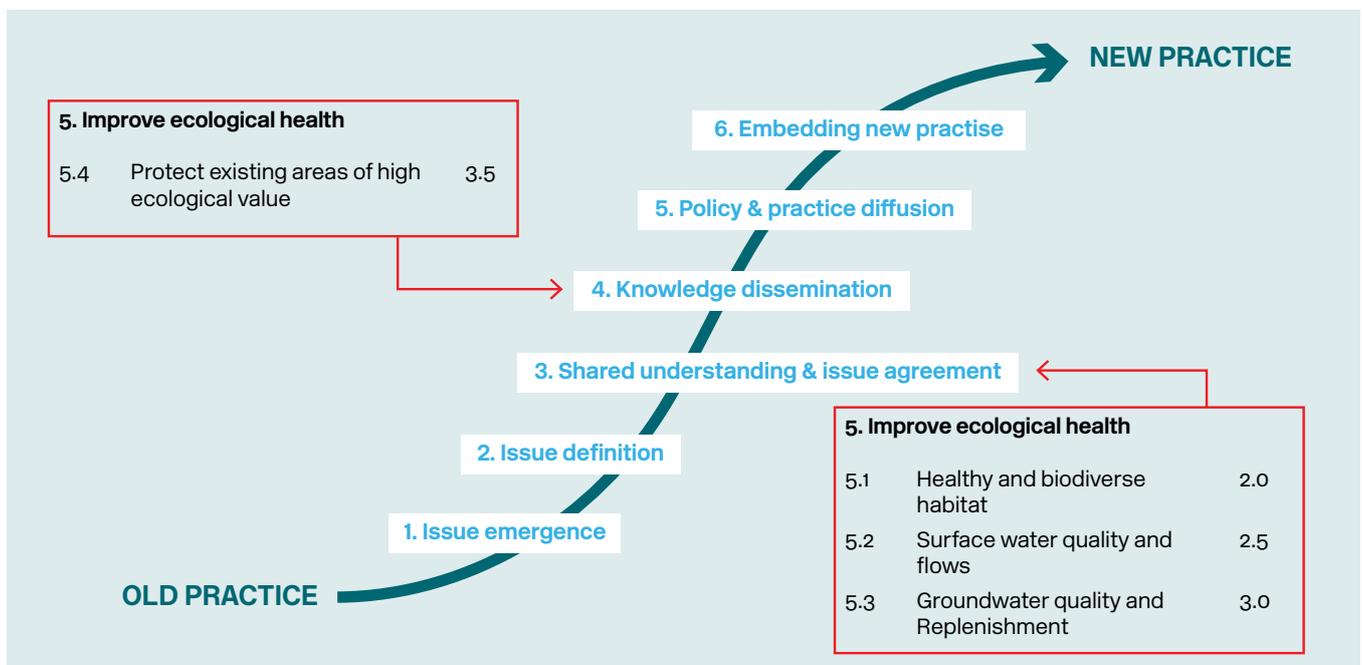


Figure 12. Transition phase for vision outcome 1

Strategies	
1.1	Improve the community's understanding of the dependence of a wide range of community benefits on ecosystem health to ensure community support for aligned water system solutions
1.2	Develop and implement a strategy for integrated ecosystem-based management decision-making
1.3	Trial and demonstrate innovative water system solutions that protect areas of high ecological value and deliver multiple benefits, such as community health and wellbeing
1.4	Improve implementation of existing policies and programs for protecting ecosystem health through effective management of surface water, groundwater and wastewater, and protection of areas of high ecological value

Vision outcome 2: Adelaide's water infrastructure is smart, sustainable, and flexible

Achieving Adelaide's WSC vision will require a gradual transition to a more adaptive water servicing approach, involving greater integration of multi-functional systems, more diverse fit-for-purpose water resources, and greater customer choice of services and service levels. This goal may require greater ability for individuals and businesses to provide infrastructure and services at property and precinct scales, which can be integrated with centralised systems through flexible regulation and intelligent control. The planning, design, management and maintenance practices to deliver such an approach will need to be highly collaborative, with systems and processes in place to enable the sharing of risks, costs, benefits, data and lessons between infrastructure providers and operators, including individual property owners.

The water security crisis in 2006-09 prompted the industry to look to both centralised and decentralised supply solutions. Although centralised solutions proved to be favoured in practice during that period, there is ample knowledge in the industry about the capacity of decentralised urban water management to augment supply. Where there is uncertainty in Adelaide's water sector, it is usually about how to most effectively implement multi-objective infrastructure, rather than its potential value. An area where there is a need for more knowledge is in how to strategically use recycled water, particularly at the household scale.

“We’ve done a pretty good job of becoming resilient to being a water-constrained environment, responding to droughts... In terms of water recycling, water reuse, some fantastic projects we’ve got going, ensuring we have reusable reliable supply. A lot more recognition of the value of green cities, urban heat island effects, we’re doing relatively well in that space.”

Though the state was responsive to the need for regulatory reform to achieve many of these outcomes during the last drought, a more cost-constrained operating environment suggests that there would be less appetite for the type of regulatory approach necessary to promote multi-functional water infrastructure. Other approaches, such as industry incentives and advocacy for practice change, may need to be explored. To this end, there should be a detailed **evaluation of the evidence for the holistic economic benefits of multi-functional water-related infrastructure** (Strategy 2.1). At the same time, there needs to be wide support for these objectives, across all aspects of Adelaide's economy. Therefore, **a compelling narrative of the benefits of adaptive infrastructure in responding to system changes more rapidly and efficiently needs to be articulated and communicated** (Strategy 2.2). This would help build broad community and industry support and develop the capacity of champions to influence practice change.

“Water for Good was really successful for the first few years in that what it did was it set a foundation for things that can’t then be changed back. On a number of levels. So the creation of the Water Industry Act, and ESCOSA and pricing, it took the opportunity to do some things that were fundamental, that needed to happen. It created targets for water recycling, it worked with the Greater Adelaide Plan. In a very short period of time, it did a lot to change our landscape to become a WSC.”

In Adelaide, there is a sound awareness of the value of more adaptive and integrated water servicing approaches. There are champions for these approaches in the SA Government, SA Water, several councils, consulting practices and academic institutions who are driving stormwater recycling and implementing projects and demonstrations. There are good informal connections within industry, and it is relatively easy to build links between stakeholders. However, there are organisations where champions still need to be developed, and overall the network needs to be strengthened, with its influence enhanced, to achieve the effective collaboration that is required. In addition, the potable water, wastewater and stormwater industries tend to be siloed. Individual organisations have their own goals and objectives and more needs to be done at an institutional level to achieve integration in planning and design. Some participants have also suggested there needs to be more support for collaboration by industry leaders. In response to these barriers, there should be concerted effort to improve organisational culture, systems and processes for collaborative and integrated cross-sectoral water system management (Strategy 2.3). This would support the sharing of learning from industry and the community and help build system resilience.

Adelaide's water sector has expertise in a variety of water resource efficiency methods, including aquifer storage and recovery and wastewater reuse. There is willingness to experiment with innovative solutions.

The Goyder Institute is a well-respected knowledge resource that has strong links to policy development. There are many good small-scale examples of multi-functional infrastructure such as wetlands, swales and raingardens, and these have been found to be relatively low maintenance. Participants also disclosed the willingness of Adelaide's water sector to adopt new processes or technologies. Past and recent examples include aquifer storage and recovery and urban heat management. However, there remain many organisations that have so far hesitated to adopt these approaches out of concern for their ongoing management costs. To overcome this barrier, it is recommended that a program be developed to support the **sharing of stormwater system management and asset maintenance capabilities between organisations** (Strategy 2.4). This would facilitate knowledge transfer and support a more flexible and responsive asset management system.

Figure 13 shows Adelaide's current performance for this vision outcome. Adelaide's relatively advanced implementation of fit-for-purpose water infrastructure for stormwater recycling, potable water demand management, and resource recovery suggests Phase 4 of transition for these WSC Index indicators. For other indicators relevant to the vision outcome of smart, sustainable and flexible water infrastructure, there remains a need to recognise the value of the desired practices, particularly at the residential and neighbourhood scales. This suggests that Adelaide is in Phase 3 of the transition to practices relevant to these indicators.

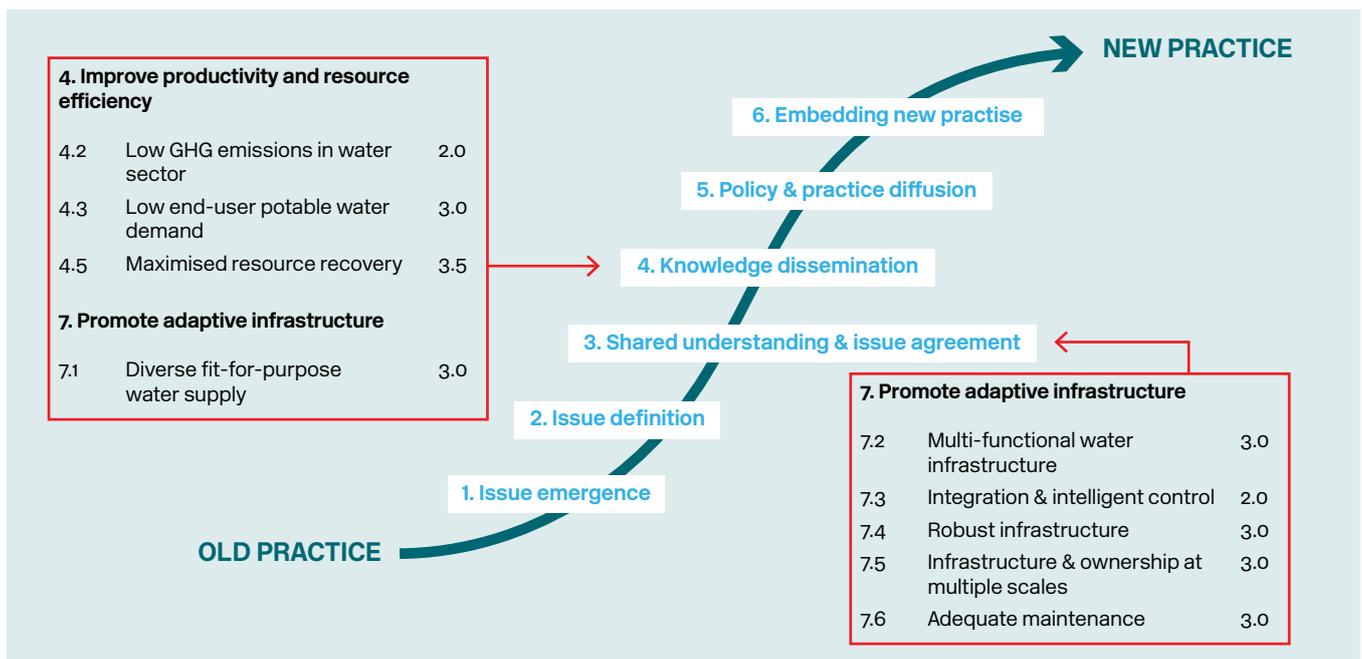


Figure 13. Transition phase for vision outcome 2

Strategies	
2.1	Evaluate evidence about the holistic economic benefits of multi-functional water-related infrastructure
2.2	Develop a compelling narrative of the benefits of adaptive infrastructure in responding to system changes more rapidly and efficiently
2.3	Improve organisational culture, systems and processes for collaborative and integrated cross-sectoral water system management to share learning and build system resilience
2.4	Improve stormwater system management and asset maintenance capabilities across organisational boundaries



Vision outcome 3: Adelaide's urban form is accessible, liveable and integrates water creatively to highlight Adelaide's unique features

A central aspiration of Adelaide's vision of a water sensitive future is quality public open spaces that are blue, green, cool, accessible, and innovative. Achieving these outcomes will require the practices of water system planning and urban planning to be more integrated and collaborative so that standards and service outcomes that link to a broader vision of urban liveability and environmental health can be achieved.

"I think people want an aesthetically pleasing place to live. That's first and foremost... Residents are willing to see investment going in [to avoid parched public open space]"

The findings show that there are a number of champions in Adelaide that understand the importance of cross-sectoral integration to deliver efficient, sustainable and liveable urban form and green infrastructure. It can also be said that there is a general appreciation of the multiple benefits that urban spaces can provide through innovative and strategic water management approaches. However, the mechanisms to translate this understanding into effective cross-sector action are still relatively undeveloped. More work is needed to build the economic case for multi-benefit urban form in the development sector and local government asset management, and to bridge the divide between academic thinking and water sensitive urban design and practice. As a result, the current approach to design of urban spaces is generally single-objective, and land-use, water availability and water management are frequently considered separately. These issues are holding back the potential for more effective collaboration.

To overcome these barriers, effort must be directed towards cultivating greater senior management or political support for implementing WSUD in Adelaide's urban form. Policy should also have the rigour to support the implementation of the substance of WSUD. In the short-term it is recommended that a **compelling narrative of the economic, liveability and health benefits of water sensitive urban form in land use planning strategies be developed and communicated** (Strategy 3.1). In addition, **urban design solutions that integrate urban water management across the public and private realms** should continue to be trialled and demonstrated (Strategy 3.2). This will help provide evidence of the community benefits that can be delivered through innovative water sensitive urban designs, as well as lessons about the necessary conditions for their practical implementation.

There is confidence among key stakeholders that should a conducive economic and regulatory environment arise, there are individuals in Adelaide with the necessary knowledge to design innovative solutions. More work would need to be undertaken to ensure this knowledge is more widely held, including by more practitioners and the community more generally, to deliver solutions at scale. Participants felt that when capacity building programs have broadened their reach, industry capacity and technical skill will be better adapted to providing multi-functional solutions across the whole of Adelaide's urban form. A recommendation to achieve these outcomes is to **promote diverse stakeholder participation in collaborative urban development projects that feature water sensitive designs** (Strategy 3.3). This would increase the capacity of the sector to deliver more accessible, cooler public and private open space solutions that are supported by water.

Overall, most areas of Adelaide have been enhanced by water-related assets. However, water-related assets are not as well implemented in lower socio-economic areas, and areas with higher water-related amenity attract a premium on property prices that exclude lower socio-economic status members of the community. It is therefore recommended that government **develop and implement a strategy for the provision of access to quality public green and blue space, based on community values** (Strategy 3.4). This would help ensure that the provision of access to quality urban spaces across Adelaide is a priority in decision-making.

Water sensitive urban design is promoted in planning policies guiding development, however, it is not viewed as a priority and not well implemented. There is a need for simple-to-use tools to facilitate the inclusion and assessment of **water sensitive green infrastructure in small to medium developments to progress the transition. It is recommended that water sensitive urban design and canopy cover be reinforced in land use planning policy and design standards** (Strategy 3.5). This would support healthier, cooler and more attractive outcomes to be more consistently delivered across the public and private realms, and in all development contexts.

Adelaide’s need to deepen its champions network, strengthen multi-sector collaboration, and see tangible promotion of water sensitive design in urban planning regulations suggests it is currently in Phase 3 for the WSC Index goal, *Ensure quality urban space*, associated with the vision aspirations for accessible, liveable and integrated urban form (Figure 14). Due to priority attached to water in city planning and design and in providing amenity based on water-related assets, Adelaide is in Phase 4 for the relevant WSC Index indicators within the goals, *Ensure good water sensitive governance* and *Achieve equity of essential services*.

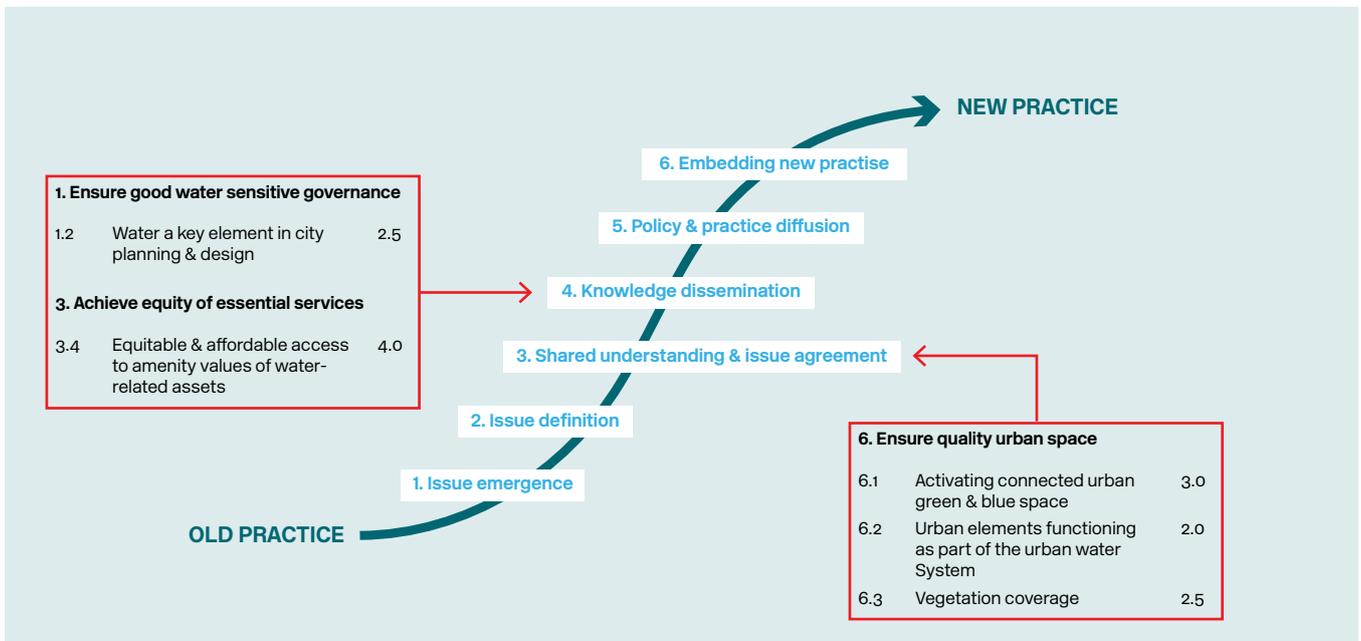


Figure 14. Current transition phase for vision outcome 3

Strategies	
3.1	Develop and communicate a compelling narrative of the economic, liveability and health benefits of water sensitive urban form in land use planning strategies
3.2	Demonstrate urban design solutions that integrate urban water management across the public and private realms
3.3	Promote participation in collaborative urban development projects that feature water sensitive designs
3.4	Develop and implement a strategy for the provision of access to quality public green and blue space, based on community values
3.5	Improve policy and regulatory frameworks to incorporate water sensitive designs and canopy cover into land use planning policy and design standards

Vision outcome 4: Communities actively participate in water management and embrace the natural cycles of water abundance and scarcity

The community's knowledge of, connection with, and sense of responsibility for water as individuals and as part of the broader community will significantly influence Adelaide's transition towards its WSC vision. Fostering success will require community engagement practices to be meaningful and transparent, focused on empowering people to have the interest, capability and opportunity to be active partners in achieving water sensitive outcomes.

“A water sensitive city requires everyone to lean in.”

All participants believed that the community had a strong connection to water conservation, largely due to the impact of the Millennium Drought. Water in the landscape is generally valued by the community, which is evident in the broad acceptance of investment in fit-for-purpose water supply and distribution systems for public open space. On the other hand, some dimensions of water management are less well understood by the community. For example, the risk that stormwater flooding from extreme rainfall, defined as a minimum 1-in-50-year rainfall event, may adversely affect some properties in some areas is generally well-understood by planners, but the community is considered less aware. This is thought to be the result of the infrequency that such events occur, and their relatively minor impact across the Adelaide area. As a consequence, property owners in areas at risk of flooding have limited preparedness. Another example with low community awareness is the benefit of using rainwater or recycled water in homes.

“During the drought there was a water conservation mindset. However, the corollary, one of the perverse outcomes of water conservation measures was this focus on one single objective, that we must aim for water conservation at all costs. So, ‘what’s that useless bit of green space doing at the end of our street, let’s turn off the irrigation because that’s a waste of water’. So the concept of water as a resource which we can use to achieve other things was lost.”

Nationally, the SA Government has been at the forefront of using new forms of public participation to engage communities in policy processes, with citizens juries, deliberative forums and crowd-sourcing being among the techniques demonstrated successfully. Recent policy topics subjected to these processes include cyclists' safety, nuclear waste storage, and neighbourhood improvements. However, some participants felt that engagement by government and non-government organisations on water issues has fallen since the end of the Millennium Drought. Although the water sector has been slower to take up these new approaches to engagement and transparency, examples such as the finalisation of the Brown Hill Keswick Creek Stormwater Management Plan and engagement on the Adelaide International Bird Sanctuary management plan show that progress is being made.

There are several isolated efforts to develop community capital for WSC practices. These include the EPA's Rain Garden 500 project, and Adelaide and Mount Lofty Ranges NRM Board's urban water education program and NRM Plan consultation process. Engagement of Aboriginal nations of Adelaide is not as extensive as the engagement efforts for areas of the River Murray. Overall, there is a need to strengthen Adelaide's institutional engagement capacity appropriate to the scale of community impact by ensuring local engagement is more consistently effective and solutions implemented across the region deliver large-scale changes in community capital.

“[Converts to water sensitive urban design] are remarkably willing to share and volunteer our time.”

For water literacy in Adelaide, there is a need to increase the community's awareness of the role that green infrastructure plays in the urban water cycle to promote local champions to act. To fill gaps in community water literacy and overcome what has in the past been an ad hoc and uncoordinated approach to awareness-raising, it is recommended that **collaboration within and between organisations to improve engagement strategies be promoted** (Strategy 4.1). In addition, **knowledge about the barriers to increasing Aboriginal involvement in water management needs to be developed** (Strategy 4.2).

The general lack of awareness of the urban water cycle adversely affects the demand for WSUD in new and renovated homes, and also in the willingness to assume maintenance responsibility for water assets such as waterways on private land, water tanks and septic tanks. There have been planning policies available to councils to encourage water sensitive practices in residential development, but all policies except those relevant to flood risk management have been discretionary. Historical policies resulted in many urban ephemeral waterways falling into private property, and there are few instruments in place to promote good environmental stewardship practices. There is a need to promote effective, affordable projects that have the potential for significant learning in the community and widespread adoption. It is therefore imperative that strategies be developed to **lift the community's understanding of their role as partners in driving long-term system transformations towards Adelaide as a water sensitive city** (Strategy 4.3). Allied to this, agencies should seek to **trial and demonstrate community engagement approaches that connect people with water and empower community as partners in delivering WSC outcomes** (Strategy 4.4).

The Flood Reform Taskforce is currently accountable for clarifying responsibilities for management of watercourses, levee banks and other flood infrastructure, and to attend to the reform of development controls to explicitly reflect flood risk. However, while these governance issues are being resolved, it is important that households are made aware of the potential for flooding to impact on their property, and of available solutions to mitigate harm, respond to future flooding emergencies, and to rebound from flood events. A key step is to **improve the community's understanding of flood risk and the potential social and biophysical flood resilience solutions** (Strategy 4.5).

Figure 15 shows Adelaide's current transition phases for delivering this vision outcome. For the indicators in the *Increase community capital* goal of the WSC Index, Adelaide is currently in Phase 3 of transition to deliver this vision outcome. For the relevant indicators in the *Good water sensitive governance* and *Achieve equity of essential services* goals, Adelaide is in Phase 4 of transition. There is a need to extend the community's involvement in water management and ensure it is actively engaged in the processes and practices that will achieve a water sensitive Adelaide. To achieve this, it is recommended that engagement on water issues is better coordinated both spatially and across different parts of the community.

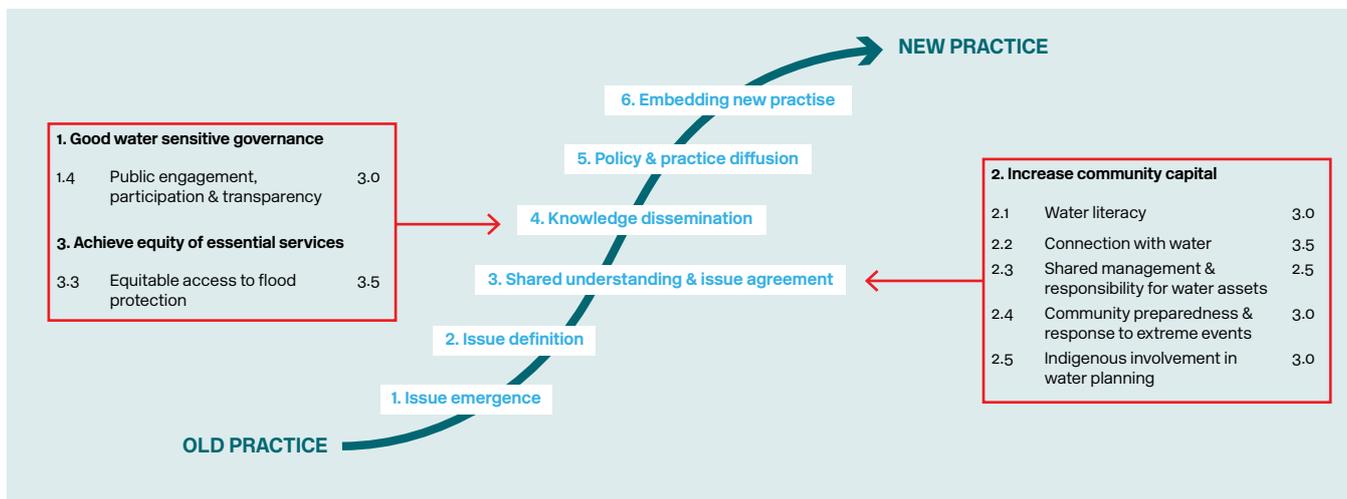


Figure 15. Transition phase for vision outcome 4

Strategies	
4.1	Promote collaboration within and between organisations to find better approaches to improving the community's understanding of the urban water cycle
4.2	Develop new knowledge about the barriers to increasing Aboriginal involvement in water management
4.3	Improve the community's understanding of their role as partners in driving long-term system transformations towards Adelaide as a water sensitive city
4.4	Demonstrate community engagement approaches that aim to connect people with water and empower community as partners in delivering WSC outcomes
4.5	Improve the community's understanding of flood risk and the potential social and biophysical flood resilience solutions



Vision outcome 5: Water supports a strong economy underpinned by Adelaide being an affordable, vibrant and culturally rich city

To progress towards Adelaide's WSC vision, water system services could be designed to take advantage of the synergies and connections between water, energy, food and land resources. The potential for commercial opportunities from such a change in Adelaide's water management practice is significant, both in the community value that could be created through regenerated resources and greater environmental health, and the business that can be attracted to Adelaide as a leading international city in water system innovations.

Champions such as the Water Industry Alliance and Water Sensitive SA advocate for these water-supported outcomes that enhance economic prosperity for Adelaide and recognise the need for collaboration and innovation. SA Water champions the required practices and leads many demonstration projects in this space. While the water sector is leading the promotion of water sensitive solutions, other sectors are still some way from recognising their value. As a result, there is not yet broad support for the transformative restructuring involved.

It is also recognised that a more cohesive policy environment is needed. For example, in many policies with a non-water sector focus, such as energy, links to water efficiency and productivity could be more explicitly drawn. In the urban development space, individual councils' pursuit of policy measures to deliver more water efficiency or productive re-use in new development is considered to be undermined by the drive for a consistent metro-wide regulatory environment. To address these challenges, the government should **develop and communicate a compelling narrative about the water sector's potential to deliver broader economic prosperity through benefits such as more efficient resource use, cross-sectoral value, and preparing for future threats to prosperity** (Strategy 5.1). This narrative would be expected to show the water sector's potential to deliver broader economic growth in diverse strategic and policy initiatives.

"I can't think of any projects that have fallen over purely on the grounds [that they used new approaches]."

There are effective collaborative platforms between elements of the private sector and SA Water in waste management and the deployment of smart infrastructure. Mechanisms such as the Water Industry Act 2012 have the potential to foster collaboration between actors in the water sector. For example, there is ample scope for joint ventures between local governments to capture, treat and distribute stormwater. This has generated several stormwater distribution networks, and it would not take much additional investment to integrate these schemes across the majority of the Adelaide metropolitan area. Another area where there may be opportunities in coming years is in collaboration between the water sector and non-water sector agencies to achieve shared objectives. Productive relationships may be developed with health and community services and development industry collaborations. These have only recently begun to be pursued.

"We're quite forward in realising that this [high-end food production] is part of our future prosperity, 'we cannot afford to waste this resource we need to use it because it's going to result in jobs and growth'."

Alongside the connections being built with non-water sector agencies, there are also strengthening relationships between the industry and research organisations. The Goyder Institute, which is a well-respected knowledge generator that has strong links to policy development, has been significant in this area. In the water sector, participants considered there to be sound knowledge on the technical side of implementation. Where there are gaps, they are likely in the linking of investment in water productivity and efficiency projects with economy-wide costs and benefits. Going forward, water-related resourcing and funding decisions would need to be backed by an appropriate understanding of the wider societal benefits of integrated water practices. It is important that organisations critical to the water sensitive Adelaide agenda **improve systems and processes to incorporate the economic co-benefits and allied commercial opportunities from water investment in budget processes and strategic decision-making** (Strategy 5.2).

“One of the areas to drive innovation is government policy, and we have to work more closely with water industry itself.”

Water use productivity in the state is regarded as generally higher than the Australian average, and there are many projects in Adelaide demonstrating productivity and resource efficiency. Wastewater treatment plants are recycling water and other resources at a large scale, and Adelaide is also leading the nation in stormwater harvesting. SA Water is leading the distribution of recycled wastewater for agriculture. However, wastewater recycling and stormwater capture and distribution have favoured larger, centralised infrastructure due to the economies of scale, and small-scale, decentralised facilities may enable greater resource capture and fit-for-purpose use. Increased productive use of stormwater at-source remains an important objective. More organisations need to be supported to contribute to innovation and commercialisation. In the short-term there is a need to trial and demonstrate **adaptive, multi-functional and integrated water system solutions in different housing densities, neighbourhood forms and system scales** (Strategy 5.3).

Since significant progress has been made in demonstrating effectiveness at the larger scale of operation, trials and demonstrations of stormwater reuse and small-scale recycled water schemes need to be included, particularly at the household or enterprise scale. These demonstrations would contribute evidence of the productivity, resource efficiency and resilience benefits that can be harnessed through innovative water systems, and provide lessons about the conditions supporting their practical implementation.

Nearly every household and business in Greater Adelaide has access to the potable water supply and centralised sewerage. However, some local communities are still reliant on on-site wastewater systems. The need to address failing wastewater systems, which result in discharges to the environment, requires coordination between multiple agencies and the operators of the on-site wastewater systems. In the short term, it is important that **regulatory arrangements support flexible water supply and sanitation service delivery and the availability of valid consumer choice** (Strategy 5.4). This would help ensure the regulatory environment for water servicing system has the flexibility to enable customers to choose different levels of service for different prices, including the adoption of more sustainable options.

In summary, Adelaide has made significant headway in recent years to improve the productivity of available water resources and to reduce demand for potable water. There are strong connections between champions in the water sector and water-dependent industries such as agriculture to coordinate new opportunities to grow Adelaide's economy. However, some sectors, notably the residential development sector, are less well integrated, and therefore opportunities at the residential scale are harder to pursue. Adelaide is currently in Phase 4 of transition to practices that support a strong economy (Figure 16).

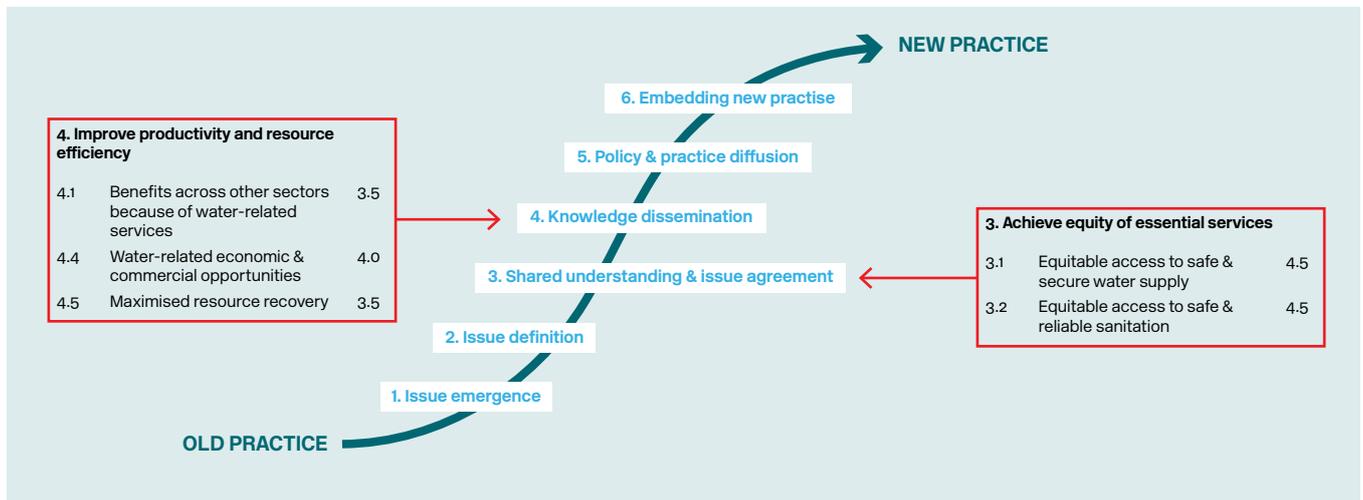


Figure 16. Transition phase for vision outcome 5

Strategies	
5.1	Develop and communicate a compelling narrative about the water sector’s potential to deliver broader economic prosperity
5.2	Improve organisational culture, systems and processes to incorporate the economic co-benefits and allied commercial opportunities from water investment in budget processes and strategic decision-making
5.3	Trial and demonstrate adaptive, multi-functional and integrated water system solutions in different housing densities, neighbourhood forms and system scales (beyond stormwater quality treatment and large-scale recycled water schemes)

Vision outcome 6: Water governance can adapt to complex challenges and drive holistic, innovative and collaborative solutions

Delivering healthy and liveable urban environments that are supported by resilient and sustainable water system services will require governance structures, processes and capacities that enable integrated, long-term, cross-sector and inclusive planning and design decisions.

An analysis of the Adelaide context suggests that WSC champions are dispersed through a relatively large number of organisations. These champions tend to be linked by an informal network that supports knowledge exchange and project delivery. At the senior leadership level, there is some commitment to water sensitive outcomes, although it is somewhat isolated; generally, WSC champions are not in senior leadership positions. As a result, the water sensitive agenda, and the resources committed to support it, suffer from a lack of prioritisation when considering public and particularly private sector activity overall. Though there is progress in promoting water leadership, it remains important for Adelaide's water sector to continue to increase the influence of its champions, and to promote integration, particularly at the local government level.

“We all need to be pushing the same principles [of a water sensitive city]... We can all buy into the vision when it doesn't affect us. [Decision-makers] need to understand how their agenda can be enhanced by buying into this vision.”

The project found there are several institutional arrangements that are effective in driving inter-agency coordination. This is particularly evident in the development approvals process and some flagship policies. There are well-regarded tools in place for increased collaboration, such as the *Working Together* policy guide and prescribed consultation processes in resource management or planning legislation. The *Change @ South Australia* initiative is designed to grow a collaborative culture within government departments. There have been good recent examples of inter-organisational collaboration. For example, the 30-Year Plan for Greater Adelaide is well-integrated and involved substantial engagement with the community and other stakeholders.

Nevertheless, in some critical areas, notably budgeting decisions and implementation, the promotion of WSC principles and collaboration needs to be further developed. It is therefore important to expand the influence of WSC champions and to recruit champions from disciplines and sectors generally considered to be at the periphery of the water sector, such as those in the finance, health and community services disciplines. To address these needs, government should promote **a compelling narrative about the value of a water sensitive Adelaide across diverse planning and strategic initiatives** (Strategy 6.1).

“Project by project there's great collaboration between SA Water and councils.”

Although Adelaide can generally look to a positive record of water sector coordination, the project revealed some critical areas that need review. Coordination at the operational level in transport or urban development projects was one area highlighted during the project. This has often resulted in a misalignment of top-level directions and the on-ground delivery of water-related projects, frequently leading to conventional water solutions when water sensitive solutions could be expected. The most significant area for improvement identified, however, was stormwater management. The evidence suggests that there is substantial scope to achieve more coordinated and integrated stormwater management at the local level. To begin to overcome the barriers to more integrated stormwater planning and management, it is recommended that **the roles and responsibilities of key actors in stormwater management be clarified** (Strategy 6.2). This would be expected to increase collaboration across stakeholders and promote a more responsive asset management approach.

When considering governance relationships between organisations, rather than between organisations and the community, Adelaide’s water sector has been more successful. In this sense, the commitment of organisational champions has helped identify opportunities for collaboration to leverage the benefits into other projects with related agendas, such as health, recreation or urban renewal. The next stage in Adelaide’s transition will need to see this project-by-project approach mature into a more coordinated and integrated process that is less reliant on the influence of individual champions. Therefore, more **opportunities for stronger integration of the water sector with other portfolios should be sought** (Strategy 6.3). Integration should target economic, planning, environment and infrastructure agencies, and local government as a priority. This would help ensure that there

is effective coordination within inter-agency networks, and collaboration by relevant stakeholders in projects. It can also be expected to reinforce WSC principles in regulation governing urban or infrastructure development.

Significant strides have been made in the last ten years to transform Adelaide’s water sensitive governance. Broad consensus has been reached over the importance of leadership and capacity-building, public engagement, and an integrated policy framework. As a result, Adelaide is now in Phase 4 of its transition to practices aligned to good water sensitive governance (Figure 17). Progress is still required to build broad multi-sector commitment towards the vision of a water sensitive Adelaide, and some practices, particularly early engagement with communities and formal cross-sector integration, need attention in coming years.

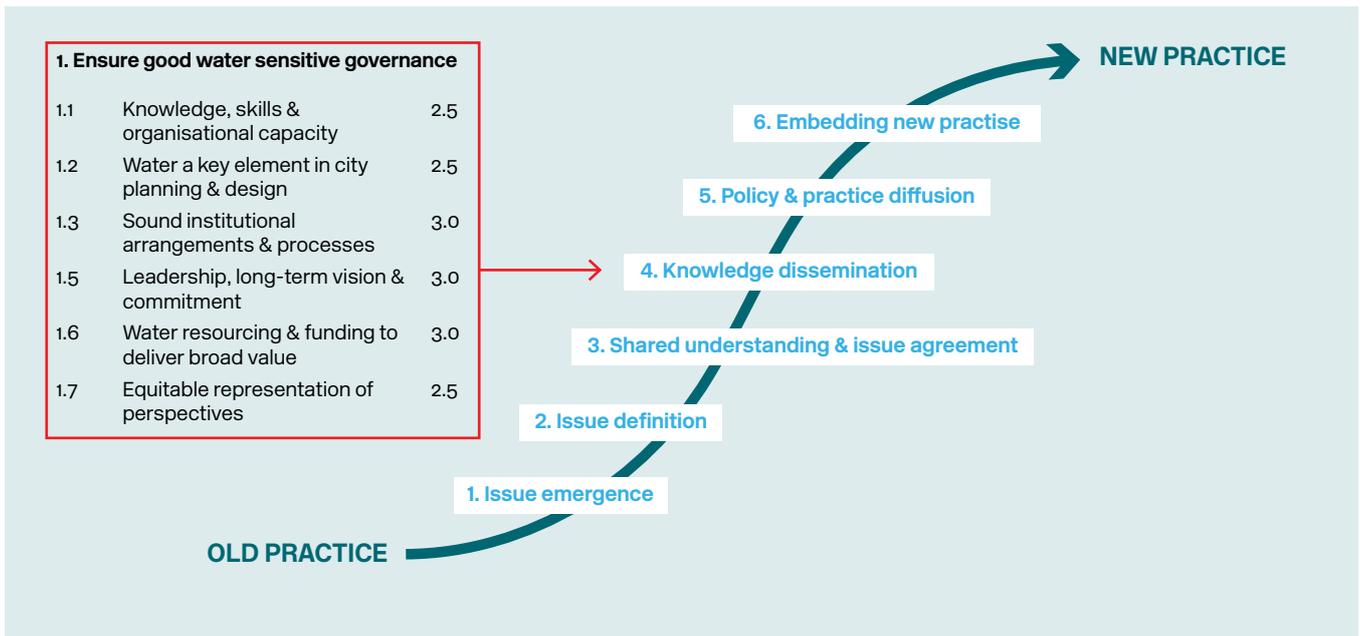


Figure 17. Transition phase for vision outcome 6

Strategies	
6.1	Develop and communicate a compelling narrative about the value of a water sensitive Adelaide across diverse planning and strategic initiatives
6.2	Improve organisational systems and processes to clarify the roles and responsibilities of key actors in stormwater management
6.3	Identify and pursue opportunities for stronger integration of the water sector with other portfolios including economic, planning, environment and infrastructure, and with local government

5.3. Overview of strategies

Comparing across vision outcomes in Section 5.2 reveals that similar priority objectives appear multiple times, which would require similar strategies to be implemented. It is therefore helpful to identify the different types of strategies that would need to be pursued collectively across all vision outcomes as part of Adelaide's transition strategy. In this section, the priority strategies are reorganised in this way. This will inform the development of actions to achieve one or more vision outcomes.

Table 2. Strategies to increase awareness and understanding

Strategy	Focus		Rationale	Vision Outcomes						
				Ecosystems	Infrastructure	Urban form	Community	Economy	Governance	
Examine and evaluate evidence	2.1	About the holistic economic benefits of multi-functional water-related infrastructure	A business case demonstrates the value of multi-functional infrastructure in delivering water system services							
Develop new knowledge	4.2	About the barriers and potential solutions to increasing the involvement of Aboriginal people in water management	Knowledge informs the development of effective governance arrangements for involving Traditional Owners as partners in water management and for enhancing and protecting Aboriginal cultural associations with water systems							

Table 3. Strategies to harness leadership and community support

Strategy	Focus		Rationale	Vision Outcomes					
				Ecosystems	Infrastructure	Urban form	Community	Economy	Governance
Develop and communicate a compelling narrative	2.2	Of the benefits of adaptive infrastructure in responding to system changes more rapidly and efficiently	The authorising environment acknowledges the need and supports solutions for adaptive infrastructure to ensure water system services are resilient						
	3.1	Of the economic, liveability and health benefits of water sensitive urban form	The authorising environment supports the development and implementation of land use planning policies and strategies that drive the adoption of water sensitive designs						
	5.1	About the water sector’s potential to deliver broader economic prosperity through benefits such as more efficient resource use, cross-sectoral value, and preparing for future threats to prosperity	The authorising environment recognises the water sector’s potential to create economic value through more efficient resource use						
	6.1	About the value of Adelaide’s water sensitive future across diverse planning and strategic initiatives	The authorising environment supports solutions and outcomes that are needed to deliver on Adelaide’s water sensitive city vision						
Improve the community’s understanding	1.1	Of the dependence of a wide range of benefits they value on ecosystem health	Communities endorse and advocate for water system solutions that aim to improve ecosystem health						
	4.3	Of their role as partners in driving long-term system transformations towards Adelaide’s water sensitive city vision	Citizens are motivated to actively engage in water-related community dialogue, governance processes and local-scale adaptations to the water system						
	4.5	Of flood risk and the potential social and biophysical flood resilience solutions	Households are aware of the flood risk of their property, support the implementation of flood resilience solutions, and are prepared and capable of responding effectively to flood events.						

Table 4. Strategies to establish an integrated and systematic approach

Strategy	Focus		Rationale	Vision Outcomes						
				Ecosystems	Infrastructure	Urban form	Community	Economy	Governance	
Develop and implement a coherent and comprehensive strategy	1.2	For integrated ecosystem-based management decision-making	Management decisions take into account different elements of ecosystems in a holistic and integrated way							
	3.4	For the provision of access to quality public green and blue space, based on community values	Land use and infrastructure planning processes ensure that providing people across Adelaide with access to quality urban spaces is a priority in decision-making							
	6.3	For stronger integration of the water sector with other portfolios including economic, planning, environment and infrastructure, and with local government, linking data, management and tools	There is effective coordination within inter-agency networks, and collaboration by relevant stakeholders in projects							

Table 5. Strategies to test potential new solutions in real world settings

Strategy	Focus		Rationale	Vision Outcomes					
				Ecosystems	Infrastructure	Urban form	Community	Economy	Governance
Trial and demonstrate	1.3	Innovative water system solutions that protect areas of high ecological value and deliver multiple benefits, such as community health and wellbeing	Evidence of the community and ecosystem benefits that can be delivered through innovative water system solutions and lessons about the necessary conditions for their practical implementation						
	3.2	Innovative urban designs that integrate water management across the public and private realm	Evidence of the community benefits that can be delivered through innovative water sensitive urban designs and lessons about the necessary conditions for their practical implementation						
	4.4	Community engagement approaches that aim to connect people with water and empower community as partners in delivering WSC outcomes	Evidence of the sustained value of community engagement and empowerment approaches and lessons about the necessary conditions for their practical implementation						
	5.3	Adaptive, multi-functional, integrated and intelligent water system solutions in different housing densities, neighbourhood forms and system scales (beyond stormwater quality treatment and large-scale recycled water schemes)	Evidence of the productivity, resource efficiency and resilience benefits that can be harnessed through innovative water systems and lessons about the necessary conditions for their practical implementation						

Table 6. Strategies to enable and encourage people to collaborate and innovate

Strategy	Focus		Rationale	Vision Outcomes					
				Ecosystems	Infrastructure	Urban form	Community	Economy	Governance
Improve organisational culture, systems and processes	2.3	For collaborative and integrated cross-sectoral water system management	Water management planning between organisations is well integrated and collaborative						
	3.3	To promote participation in collaborative urban development projects that feature water sensitive designs	There is increased capacity in the sector to deliver more accessible, cooler public and private open space solutions that are supported by water						
	4.1	To promote collaboration within and between organisations to enhance community engagement	The sector has a strategic and consistent approach for engaging with the community about water, regardless of organisational boundaries						
	5.2	To incorporate the economic co-benefits and allied commercial opportunities from water investment in budget processes and strategic decision-making	Water-related resourcing and funding recognises the wider societal benefits, and budgeting that supports integrated water practices is appropriately prioritised						
	6.2	To clarify roles and responsibilities of key stakeholders involved in stormwater management	Systems and processes for stormwater management are comprehensive, transparent and collaborative						

Table 7. Strategies to improve implementation of existing policies

Strategy	Focus		Rationale	Vision Outcomes					
				Ecosystems	Infrastructure	Urban form	Community	Economy	Governance
Improve implementation of existing policies and programs	1.4	For protecting ecosystem health through effective management of surface water, groundwater and wastewater, and protection of areas of high ecological value	There is better coordination across governments, industry and the community, strong compliance levers and effective asset management systems to deliver ecosystem health protection						
	2.4	For stormwater system management and asset maintenance across organisational boundaries	Increased collaboration across stakeholders and a more responsive asset management approach						
Improve policy and regulatory frameworks	3.5	To incorporate water sensitive designs and canopy cover into land use planning policy and design standards	Elements of the urban form that support healthier, cooler and more attractive outcomes are consistently applied across the public and private realm, and in all development contexts						

6. Conclusion

Cycles of drought, flood, and reaction from decision-makers have characterised Adelaide's water history since European settlement. Now, with a much greater knowledge of the state's climatic variability, there is an opportunity to take proactive steps to preserve and enhance Adelaide's liveability, productivity, resilience and sustainability.

To explore this opportunity, leaders and strategic thinkers from across Adelaide's water sector came together for this CRCWSC-led project to understand Adelaide's unique water story, envision a future water sensitive Adelaide and develop a transition strategy that structures and makes sense of the change processes that will be required to achieve their vision. The results provide a framework for prioritising and designing strategic action across the many stakeholder organisations that will need to work in a collaborative and coherent manner to facilitate Adelaide's water sensitive city transition.

The insights presented in this transition strategy show that Adelaide has a strong foundation to build towards its envisioned water future. The city's culture of innovation and experience in adopting emerging technologies and practices, the value it places on stakeholder collaboration, and its well-connected water industry professionals represent a broad set of existing capabilities that will be valuable as stakeholders pursue their water sensitive city vision.

Participants in this project had a clear and common purpose. The core elements of the vision had unanimous approval, with all acknowledging that water will be central to Adelaide's resilience, prosperity, healthy ecosystems and community wellbeing. However, it is no coincidence that a key attribute of Adelaide's long-term WSC vision is that Adelaide is an attractive city. This demonstrates understandable pride in Adelaide as it is today, but also a shared concern over the potential that a warming and drying climate will threaten the affordability and amenity that Adelaide has long built through sound planning practices for the time. Also shared, though, was concern the planning practices of the past were unlikely to be sufficient to respond to the needs of Adelaide's long-term vision.

Among Adelaide's WSC champions, there is an encouraging awareness of the direction in which water planning and management practices needs to evolve. There is also broad receptivity to the types of solutions needed, such as at-source stormwater capture and reuse, integrated water and urban services planning, multi-functional water and green infrastructure, and community participation in water management. However, it is clear that enabling implementation of these solutions is where Adelaide's WSC stakeholders need to focus their efforts.

Critical focus areas for advancing Adelaide's WSC transition include the need to broaden and strengthen the network of WSC champions, particularly in the finance and development sectors and in local government. There is a need to raise the level of collaboration in WSC networks to reinforce the integration between sectors and jurisdictions, and to make integration more systematic rather than reliant on personal networks. The urban stormwater management system should be a focus for enhanced integration and coordination. Also needing attention is community participation in water management; the capacity to engage the community in water planning and management – and for the community to make informed contributions – needs the coordinated strategic activities of a broad array of organisations working towards WSC outcomes.

Perhaps most importantly, the benefits of a WSC need to be appreciated throughout the Adelaide community so that initiatives to drive change are welcomed and endorsed. This requires a compelling narrative of the value of Adelaide's water sensitive future to be developed to give stakeholders, decision-makers and the community focus and clarity around their priorities and aspirations for the city.

If the openness to water sensitive innovation demonstrated by the project's participants flourishes through Adelaide's society and economy, it would be in a strong position to achieve its vision of becoming an attractive and resilient water sensitive city.



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