



CRC for
Water Sensitive Cities

Vision and Transition Strategy *for a Water Sensitive Gold Coast*

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Australian Government
Department of Industry,
Innovation and Science

Business
Cooperative Research
Centres Programme

Vision and Transition Strategy for a Water Sensitive Gold Coast

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Publisher

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Date of publication: August 2017

An appropriate citation for this document is:

Rogers, B.C., Chesterfield, C., Brodnik C., Church E., Hammer, K. (2017). *Vision and Transition Strategy for a Water Sensitive Gold Coast*. Report for the City of Gold Coast. Melbourne, Australia: Cooperative Research Centre for Water Sensitive Cities.

Acknowledgements

The authors thank the project participants for bringing their enthusiasm, creativity and strategic insight to the workshop series and for their input into the development of this report.

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This document is a result of the work of a the CRC for Water Sensitive Cities and is not a City of Gold Coast endorsed document. However the outputs of the outcomes of the project are informing the development of the City of Gold Coast's Water Strategy.

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1. Introduction

1.1 About this report

The City of Gold Coast (City) engaged the Cooperative Research Centre for Water Sensitive Cities (CRCWSC) to develop a water sensitive city vision and transition strategy for the Gold Coast, drawing on its ongoing research focused on developing methods and tools to guide cities and towns in their water sensitive transition.

The project involved facilitation of stakeholder discussions across a series of five one-day workshops, stakeholder interviews and focus groups, literature review and the application of benchmarking and diagnostic tools to inform detailed analysis. 76 leaders and strategic thinkers in the Gold Coast region from across water, planning, environment, community and other related sectors participated in the project between December 2016 and June 2017.

This report presents the key outputs of the project. A description of methodological details and full analyses that underpin the results is contained in a companion report, *Envisioning, Benchmarking and Transition Planning for a Water Sensitive Gold Coast: Final Project Report for the City of Gold Coast*.

The purpose of the vision and transition strategy is to provide a framework for orienting and coordinating strategic action across the many different stakeholders who will need to collaborate for the Gold Coast's envisioned water future to be achieved. It is anticipated that this summary report, as well as the companion final project report, can be used as a resource to inform the design and implementation of operational programs of action within individual organisations and directorates. In particular, the outcomes of the project are directly informing the development of the City of Gold Coast's Water Strategy.

In addition to producing useful outputs, the process of co-creating the ideas presented in the Gold Coast's water sensitive city vision and transition strategy has been valuable for strengthening the relationships amongst stakeholders and building momentum and commitment for driving the Gold Coast'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 water sensitive city (WSC) is now widely used to represent an aspirational concept in which water has a central role in shaping a city. In a water sensitive city, people can enjoy reliable water supplies, effective sanitation, protection from flooding, healthy ecosystems, cool green landscapes, efficient use of resources, and beautiful urban spaces that feature water and bring the community together.

A water sensitive city 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 function, 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 water sensitive city concept. It 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 water sensitive city. 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 water sensitive city 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.

Becoming a water sensitive city 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.

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

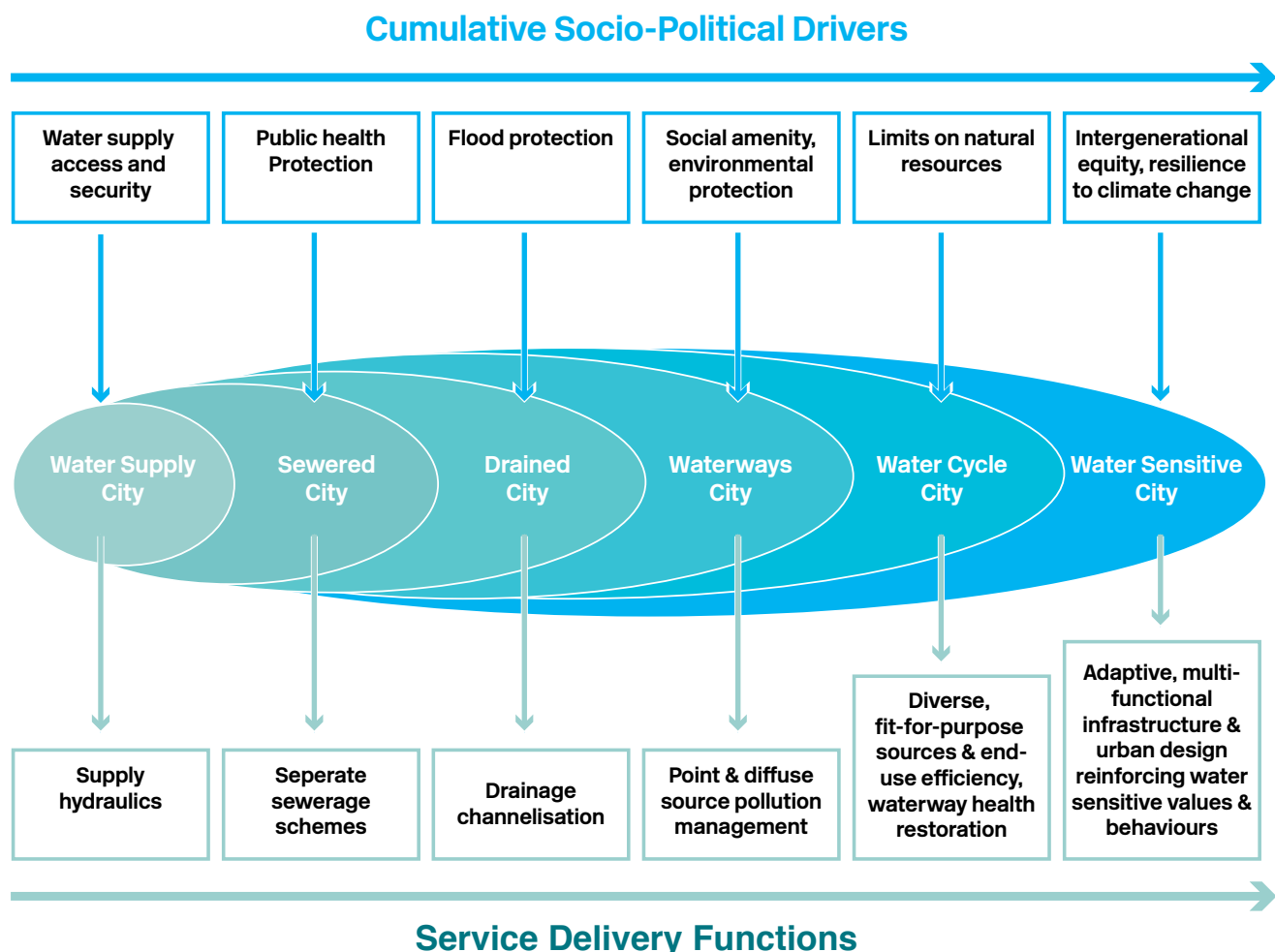


Figure 1. Urban Water Transitions Framework¹

¹ Brown, R., Keath, N., & Wong, T. (2009). Urban water management in cities: historical, current and future regimes. *Water Science and Technology*, 59 (5), 847–55.

2. The Gold Coast's water story so far

A shared understanding of the Gold Coast's historical water story creates a deep appreciation of the contextual drivers and trends that have shaped, and will continue to shape, the Gold Coast as a city and the role of water therein. This provides a foundation for reflecting on the future for water in the Gold Coast and the importance of the city's water sensitive transition.

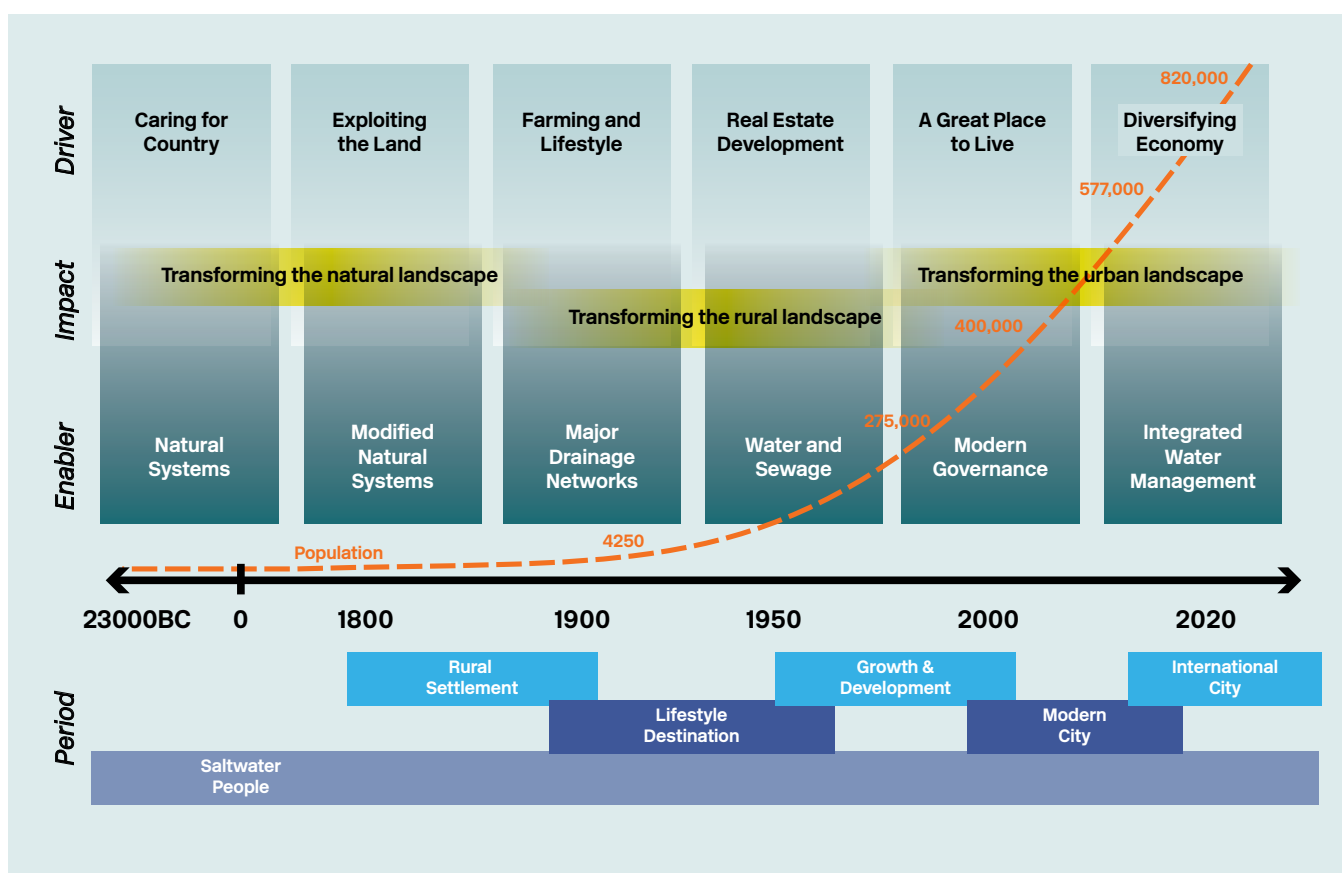


Figure 2. Synthesis of the Gold Coast's water history

23 000 BC – 1800 AD: Saltwater people, caring for country, natural landscapes

The Gold Coast region was for more than 23,000 years the country of the Kombumerri Saltwater People. Their people and culture was sustained by a diverse landscape and rich biodiversity that spanned ocean, beach and intertidal mudflats, extensive coastal wetlands and rivers extending to mountains through subtropical rainforest. Today, an echo of former landscapes remains in fragments of remnant vegetation such as the World Heritage Listed Gondwana Rainforests of Lamington National Park.

1800 – 1950: Rural settlement, exploiting the land, transforming natural landscapes

This continuous connection of indigenous people and country was broken by the arrival of Europeans who gradually transformed the natural landscape by exploiting the rainforest for timber and settling the land to farm. With the growth of Brisbane, the coastline of Southport began to attract visitors drawn to its beautiful beaches and pristine ocean waters.

For the first half of the 20th century, the holiday shacks and small businesses catering for visitors required few services and had little impact on water systems. Beyond the coast, the draining of coastal wetlands and floodplains for farming improved productivity and still provided enough remanent vegetation for huge numbers of water birds ; giving a sense of natural 'paradise'.

In common with much of the rest of Australia, the population of South East Queensland boomed in the late 19th century with a rush to exploit the rich natural resources of the region whether it was gold, timber or farming. In contrast, the first half of the 20th century was characterised by austerity and sacrifice. The First World War, Great Depression and Second World War held back growth and prosperity and there was little investment in infrastructure including water systems.

1950 – 2000: Urban growth and development, modern infrastructure, transforming rural landscapes

Optimism began to return in the 1950s, Australia was again a land of opportunity. A boom of post-war immigration and increasing prosperity catalysed a second transformation of the Gold Coast; from sleepy farming and beachside settlements to a national tourism destination and engine of real estate development. By the 1970s the population had passed 65,000.

The rural landscape was being transformed by urban development. High-rise buildings dominated the coastal fringe and canal estates of detached dwellings grew along drainage channels originally built by farmers. The Gold Coast was quickly becoming a city in need of formal water system services and infrastructure.

Federal infrastructure subsidies supported the development of modern infrastructure. The first sewerage systems and reticulated water systems were constructed and eventually the Hinze Dam was built. Canals and drainage systems were improved. This infrastructure was a critical enabler of urban growth and real estate development that, together with tourism, became the engine of the economy.

2000 – Today: Modern city, a great place to live, modern water governance

Australia's 25 years of unbroken economic prosperity and a new wave of population growth even greater than the post-war boom helped transform the Gold Coast to a modern city. Tourism and real estate development are still important foundations of the economy but a substantial permanent rather than transient population means the city is being shaped as a great place to live as well as to visit.

The scale and complexity of the infrastructure and nature of water system services has been accompanied by a 'modernising' of governance over time, including: the creation of a water 'utility' separate from the City of Gold

Coast; the creation of a 'Gold Coast Waterways Authority' (GCWA) to manage the extensive urban canal systems; the whole of South East Queensland institutional reforms to create a wholesale and retail functions under multiple utilities separate from local government; and more recently, Gold Coast Water being re-acquired by the City of Gold Coast in order to ensure services meet local aspirations.

These all represent phases in the creation of a modern, self-reliant city with a strong identity as a lifestyle city.

Looking to the future

Despite its rapid growth, the city and region is one of the most biodiverse in Australia with around half its land covered in native vegetation. The City of Gold Coast is also home to World Heritage-listed Gondwana rainforests and the Ramsar Convention-listed coastal wetlands of southern Moreton Bay.

Much of what makes Gold Coast unique and attractive to residents and visitors alike is connected to the natural environment. Now as the Gold Coast grows from a modern city to an international city of over 500,000 people (Australia's six largest) with a diversifying economy, water system services will have to evolve to sustain its lifestyle values and prosperity.

Urban growth and an increasing population will put further pressure on already stressed coastal and waterway environments. Scarce water resources will need augmentation. More people and higher urban densities will increase the disruption and damage of floods, storm surges and heat waves expected to be more frequent with climate change.

Water systems, both built and natural and the services they provide, are essential to community well being, the economy and the environment of Gold Coast. Like other Australian cities, the Gold Coast has modern governance arrangements for traditional water services that are well functioning and robust, including a strong legislative base that instills high levels of trust in decisions.

These traditional water systems have given us critical benefits such as clean water, safe sanitation and effective drainage. 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 climate events and growing community expectations for improved liveability. These adaptations should be guided by a vision for a future Gold Coast and the role of water system services in delivering that vision.

3. Vision for a water sensitive Gold Coast

A 50-year vision for the future of Gold Coast's water provides long-term orientation to guide an aligned approach to prioritisation and action planning across many different stakeholders. Expressed as a suite of outcome statements with accompanying rich descriptions, the Gold Coast's water

sensitive city vision represents the aspirations stakeholders have for their city's water future. The 50-year time frame allows people to stretch their ambitions beyond today's paradigms and constraints to reflect the transformative change that is possible over such a period.



50 Year Water Vision

The Gold Coast is a world-leading Water Sensitive City

1. Water and land environments and resources are well-protected and enhance community health, wellbeing and safety.
2. All urban areas have abundant beautiful, well-designed spaces that celebrate water and bring people together.
3. Gold Coast's communities share access to water environments, which supports their identity and lifestyle.
4. Water systems, infrastructure and land-use planning are integrated, deliver multiple benefits, and are adaptive to changing circumstances.
5. Water infrastructure systems enable efficient and sustainable use of resources to maximise social, economic and environmental outcomes.
6. Water infrastructure systems are innovative, support a diverse and sustainable economy and help shape the Gold Coast as a world leading Water Sensitive City.
7. People understand, cherish and protect their surrounding water environments.
8. Collaboration delivers sustainability goals and supports environmental stewardship.
9. Water decisions are made through informed and inclusive processes to support social, economic and environmental sustainability.
10. The Yugambeh people are actively engaged in water decision-making, knowledge sharing and the stewardship of water and land environments.

1. **Water and land environments and resources are well protected, and enhance community health, wellbeing and safety.** The water environments of the Gold Coast are healthy and thriving. Innovative approaches to water management support environmental health. People appreciate the importance of water system services for their health, safety and wellbeing and they are aware of how they interact with them in their daily lives. All water sources are monitored and regulated to ensure that social and environmental needs are continuously met.
2. **All urban areas have abundant beautiful, well-designed spaces that celebrate water and bring people together.** All urban areas showcase water and foster a strong connection between people and their surrounding environment. People value these spaces for their liveliness, opportunities to socialise and the unique beauty of the Gold Coast. A smaller urban footprint encourages the sharing of urban space and protects the hinterlands and other areas of high ecological value from development. Connected waterways and green corridors are plentiful across both public and private land to support ecosystem connectivity.
3. **Gold Coast's communities share access to water environments, which supports their identity and lifestyle.** Public and private access to beaches, lakes and canals is fair and shared by everyone. Waterway access is well managed under denser future conditions to sustain people's connection to water and to allow people to live the Gold Coast lifestyle. Walkability and public transport ensure that water environments are well connected and easily reached by everyone.
4. **Water systems, infrastructure and land-use planning are integrated, deliver multiple benefits, and are adaptive to changing circumstances.** Water systems, infrastructure and land use planning are integrated at all levels to deliver multi-functional services, including transport, recreation, amenity, agriculture and horticulture. Planning is done with a long-term view and in the context of a shared vision for a water sensitive Gold Coast. Planning frameworks are adaptive to changing circumstances and receptive to innovation. Infrastructure systems are flexible to changing environmental conditions and people's needs. The demand for water services is well-managed, and everyone has access to reliable and affordable water supply, sanitation and flood protection. People choose their desired level of service delivery through flexible systems supported by smart and decentralised infrastructure, as well as appropriate governance mechanisms and instruments.
5. **Water infrastructure systems enable efficient and sustainable use of resources to maximise social, economic and environmental outcomes.** Resources are used efficiently and recovered through combined service delivery and closed-loop regenerative systems. Fit-for-purpose water is used where possible to support self-sufficiency and resilience. Tools and data are available for adaptive management of infrastructure systems and continuous learning for design improvement.

6. **Water infrastructure systems are innovative, support a diverse and sustainable economy and help shape the Gold Coast as a world leading Water Sensitive City.** Innovation is embraced within the water sector and facilitates business and employment opportunities. Innovation contributes to the Gold Coast's diverse and sustainable economy while supporting environmental health. Reliable and consistent funding mechanisms support sustainability innovation, its growth, and adoption as business-as-usual.
7. **People understand, cherish and protect their surrounding water environments.** People cherish the canals, lakes, rivers, beaches and hinterlands of the Gold Coast and embrace them and the lifestyle they support. These iconic features are recognised in Australia and overseas for their natural beauty and for contributing to the unique Gold Coast lifestyle. People understand the entire water cycle and how they interact with it in their daily lives. Everyone values the health of all water and land ecosystems and passionately works to protect and sustain them for future generations.
8. **Collaboration delivers sustainability goals and supports environmental stewardship.** Strategic collaboration across government levels and industry sectors leads to the alignment of regulation, policies and strategic plans that support long-term sustainability goals and coordination. Partnerships build on the history of the Gold Coast and strive for a collective and shared approach to environmental stewardship.
9. **Water decisions are made through informed and inclusive processes to support social, economic and environmental sustainability.** Water-related decision-making is consistent in pursuing broader sustainability outcomes. It recognises the regional Queensland context while empowering local government through greater autonomy in policy making and planning. Decision-making frameworks are robust and underpinned by economic instruments and reliable funding mechanisms that facilitate the achievement of sustainability outcomes. Citizens are appropriately involved in decision-making through open and inclusive engagement processes. There is a high level of trust between the community and government authorities, supported by transparent and comprehensive information and knowledge sharing.
10. **The Yugambeh and Kombumerri people are actively engaged in water decision-making, knowledge sharing and the stewardship of water and land environments.** The sovereignty of the Yugambeh and Kombumerri people over Gold Coast land and water environments is widely recognised and the importance of healthy land and water environments for Aboriginal connection, identity and wellbeing is embraced. Traditional Owners are actively engaged in decision-making and a strong partner in collaborative environmental stewardship. Organisations support and champion Aboriginal participation in their strategic planning processes in order to uphold the rights and values of the Gold Coast's Traditional Land Owners.

4. Benchmarking Gold Coast's water sensitive performance

4.1 Gold Coast's WSC Index scores

Table 1 provides the individual indicator scores for each goal and Figure 3 summarises the performance of the Gold Coast against the seven goals of a water sensitive city and the benchmark of the idealised *water cycle city*.

The Gold Coast is currently well aligned to the water cycle city benchmark goals of 'achieve equity of essential services' and 'promote adaptive infrastructure'. Gaps are most evident across the goals of 'improve ecological health', 'improve productivity and resource efficiency' and 'increase community capital'.

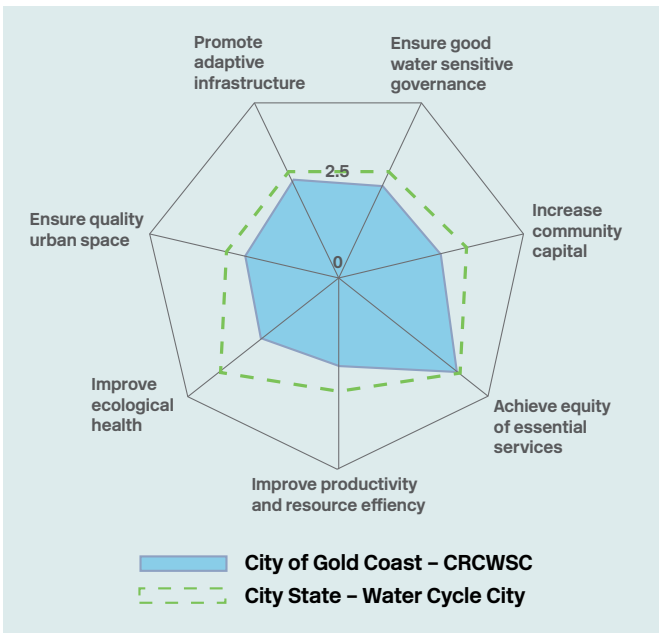


Figure 3. The Gold Coast's performance (shaded light blue area) against the water sensitive goals and the idealised water cycle city benchmark (dashed green line).



Table 1. The Gold Coast's WSC Index goal and indicator scores

WSC Index Goal and Indicators	/5	WSC Index Goal and Indicators	/5
1. Ensure good water sensitive governance	2.6	4. Improve productivity and resource efficiency	2.3
1.1 Knowledge, skills and organisational capacity	3.0	4.1 Benefits across other sectors because of water-related services	2.0
1.2 Water is key element in city planning and design	2.5	4.2 Low GHG emission in water sector	1.0
1.3 Cross-sector institutional arrangements and processes	2.0	4.3 Low end-user potable water demand	4.0
1.4 Public engagement, participation and transparency	3.0	4.4 Water-related commercial and economic opportunities	2.0
1.5 Leadership, long-term vision and commitment	3.0	4.5 Maximised resource recovery	2.5
1.6 Water resourcing and funding to deliver broad societal value	3.0	5. Improve ecological health	2.6
1.7 Equitable representation of perspectives	1.5	5.1 Healthy and biodiverse habitat	2.0
2. Increase community capital	2.7	5.2 Surface water quality and flows	3.0
2.1 Water literacy	2.5	5.3 Groundwater quality and replenishment	2.0
2.2 Connection with water	4.5	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	3.0	6.1 Activating connected urban green and blue space	3.5
2.5 Indigenous involvement in water planning	1.0	6.2 Urban elements functioning as part of the urban water system	2.0
3. Achieve equity of essential services	3.9	6.3 Vegetation coverage	2.0
3.1 Equitable access to safe and secure water supply	4.5	7. Promote adaptive infrastructure	2.8
3.2 Equitable access to safe and reliable sanitation	4.0	7.1 Diverse fit-for-purpose water supply system	3.0
3.3 Equitable access to flood protection	3.5	7.2 Multi-functional water system infrastructure	3.0
3.4 Equitable and affordable access to amenity values of water-related assets	3.5	7.3 Integration and intelligent control	2.0
		7.4 Robust infrastructure	3.5
		7.5 Infrastructure and ownership at multiple scales	2.5
		7.6 Adequate maintenance	3.0

4.2 Gold Coast's benchmarked city-state

Figure 4 summarises the benchmark results for the Gold Coast compared with each of the idealised city-states of the Urban Water Transition Framework (Figure 1). Percentage attainment for each city-state ranged from 100% as a *water supply city* and *sewered city* to 8% as a *water sensitive city*. The key elements that contribute to the overall percentage attainment of each ideal city-state are summarised here.

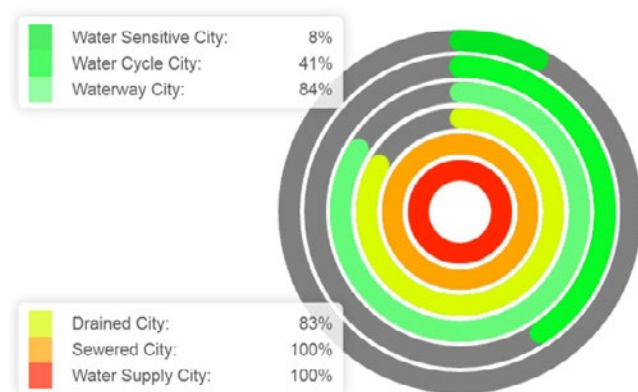


Figure 4. City-state benchmarking results for the Gold Coast

100% Water Supply City and Sewered City

The Gold Coast is well regarded for water security and rated 100% as a *water supply city*. The City of Gold Coast and Seqwater manage the city's water supply catchments and dams. The Gold Coast is connected to the South East Queensland water grid, which includes the Gold Coast Desalination Plant at Tugun. The vast majority of residents have access to safe and secure drinking water supplied by the centralised network system. A small minority in the hinterland secure their own water supply through rainwater tanks.

Similarly, most of the City is serviced by a safe and reliable sanitation system, which means the Gold Coast rated 100% as a *sewered city*. Wastewater is treated to 'developed world standards' prior to recycling or release to the environment.

83% Drained City

The Gold Coast rated 83% as a *drained city*. A significant percentage of the medium-to high-density domestic and commercial properties are located in the flood plain of one of the Gold Coast's many canals, creeks or rivers. Whilst drainage infrastructure is generally well managed, some issues remain.

"We have this tension between increased development in these areas because we don't want to spread out too much and the risk of flooding in these low lying areas."

Higher surface water run-off from low flow rain events are linked to increasing urban densification and a greater percentage of impervious surfaces. Vehicle access during rain events is only a risk in extreme weather. However not all residents have equitable access to flood protection. Heavy rain has caused issues in the past, including sewage backflows into residential properties and sewer overflows onto sports fields. Complaints of flooding during or after heavy rain events are common.

84% Waterway City

The Gold Coast rated 84% as a *waterway city*, reflecting well-connected waterway corridors and water related assets. Significant investment continues to be directed at improving coastal integrity, waterway amenity and liveability values across the Gold Coast. The Gold Coast's beaches, seaways and creeks represent good blue-green assets and the community value of these assets is high. Waterways and beaches are readily accessible and improvements are being made for disabled access. However, connectivity of active recreation infrastructure such as bike and walking paths adjacent to canals and waterways needs improvement.

"Water is why people live here. It's a water city, it's like a water playground and this is why we choose to live here."

The in-stream quality and flow characteristics within the Gold Coast's waterways vary; headwaters and seaways are quite healthy yet some urban sections fall short in supporting highly functioning ecosystems. In-stream habitats vary in condition with many affected by catchment land use. A lack of diffuse pollution treatment results in ongoing damage from stormwater runoff. Workshop participants commented that the development planning scheme is strong; however, implementation of regulations could be improved for better water quality outcomes.

Significant investment into Water Sensitive Urban Design (WSUD) and Stormwater Quality Improvement Devices (SQID) assets has occurred during the last decade, including wetlands and bio-retention projects. Workshop participants suggested that improvement in practice and resourcing is required for the ongoing management and operation of these assets.

Greater support from local leadership and state government legislation could encourage increased exploration and adoption of latest design practices for treatment measures (such as wetlands, rain gardens and harvesting schemes) as well as other technologies.

“We need a vision that inspires across all levels of the organisation and also to inspire the community to get on board as well.”

41% Water Cycle City

The Gold Coast rated 41% as a *water cycle city*. Industry leaders endorse total water cycle management. Strategic documents (e.g. Total Water Cycle Management Plan 2014-2034, Water Cycle Implementation Plan 2015) and urban water policy acknowledge the role of total water cycle management and the concepts of liveability, sustainability and resilience. However workshop participants identified that a unified vision is needed to meet long-term goals.

Following the Millennium Drought, uptake of demand management measures was common through the installation of water saving fittings, fixtures and appliances. A return in water usage levels since the drought is evident and to be expected with reduced policy support for such initiatives (e.g. water tanks are now an opt-in choice for residents and new developments). Nevertheless residential water usage is approximately 200 litres/person/day.

There has been some interest in finding fit-for-purpose diverse water supplies (from sources of varying quality – rainwater, stormwater, sewage, seawater – matched to the most appropriate uses – potable, irrigation, industry, household) at a range of scales. Nevertheless, at present, the volume of water reuse is not large enough to provide a major component of the Gold Coast's supply. 'Green' energy sources are occasionally supplied to new water infrastructure (e.g. bio-gas reuse in waste water treatment plants).

Community members feel a strong connection with water-related assets (e.g. lifestyle values provided by natural assets) near where they live. Water is recognised as an important factor of the appearance and feel of a neighbourhood and the identity of the region.

The public is informed about regional disaster response plans (such as emergency evacuation procedures). The City of Gold Coast's Disaster Management Unit has established strong partnerships with key organisations (e.g. surf lifesaving clubs) and engages through networks across schools and community centres. However, the impact of engagement is difficult to measure and it is unlikely to reach transient populations that often make up a large percentage of the community (e.g. tourists, short term residents).

8% Water Sensitive City

The Gold Coast rated 8% as a *water sensitive city*, 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. Residents experiencing financial hardship can apply to the City for discounted supply and sanitation charges. Treated wastewater discharged to the environment is well managed. Full achievement of water sensitive city status would require significant efforts across all of the goals of the Water Sensitive City Index. The Gold Coast score is typical of modern, well-governed Australian cities.

“Water is a fundamental part for people for being here and people are really attached to their water here and whether it's the lakes, the canals or the coast – it's just a fundamental part of their psyche.”

5. Transitioning to the Gold Coast's WSC vision

5.1 Transition Dynamics Framework

The Gold Coast's transition towards its water sensitive city 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 examines how these changes are driven and enabled over time.

CRCWSC research has developed the Transition Dynamics Framework², which draws on this theory and identifies six distinct phases of change during a city's water sensitive transition (Figure 5). As a city moves through each phase sequentially, enabling conditions are established to support its trajectory towards its water sensitive city vision and avoid the risk of change pathways that reflect lock-in, backlash or system failure patterns (Figure 6).

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 water sensitive city transition.

The Transition Dynamics Framework sets out five types of enabling factors that need to be present throughout a transition: champions, platforms for connection, 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, create a matrix (Figure 7) for benchmarking the current transition phase.

The Transition Dynamics Framework was applied to analyse the Gold Coast's enabling environment for the WSC Index goals, ensuring sufficient focus and specificity to derive nuanced insight for developing a meaningful transition strategy.



Figure 5. Six phases of change in the transition to a new practice

² 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. 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. (Ed) (2017) Urban Sustainability Transitions: Australian Cases – International Perspectives. Springer, Japan.

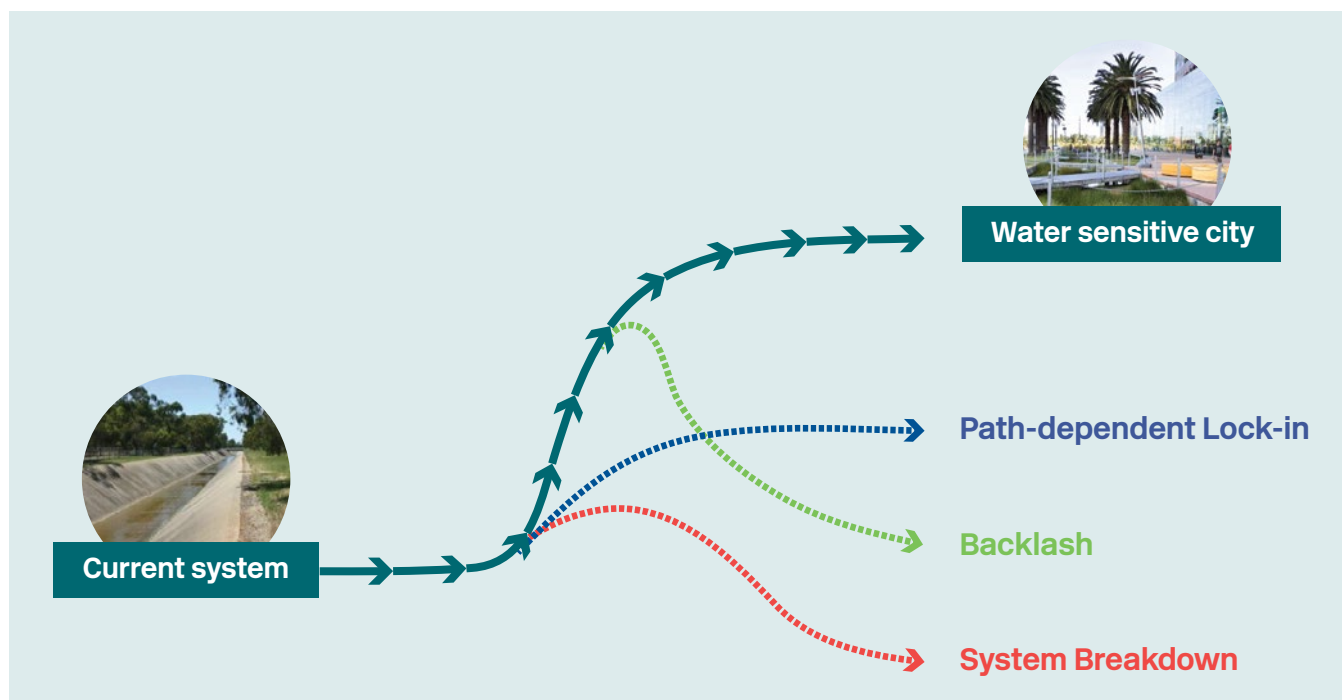


Figure 6. Transition pathways: Successful transition, lock-in, backlash and system breakdown (adapted from Van der Brugge and Rotmans, 2007. Towards transition management of European water resources. *Water Resources Management* 21(1), 249–267).

Transition Phase	Champions	Platforms for connecting	Knowledge	Projects and applications	Tools and instruments
1. Issue emergence	Issue activists		Issue highlighted	Issue examined	
2. Issue definition	Individual champions	Sharing concerns and ideas	Causes and impacts examined	Solutions explored	
3. Shared understanding & issue agreement	Connected champions	Developing a collective voice	Solutions developed	Solutions experimented with	Preliminary practical guidance
4. Knowledge dissemination	Influential champions	Building broad support	Solutions advanced	Solutions demonstrated at scale	Refined guidance and early policy
5. Policy and practice diffusion	Government agency champions	Expanding the community of practice	Capacity building	Widespread implementation and learning	Early regulation and targets
6. Embedding new practice	Multi-stakeholder network	Guiding consistent application	Monitoring and evaluation	Standardisation and refinement	Comprehensive policy and regulation

Figure 7. Transition Dynamics Framework

5.2 Priority objectives and strategies

The Gold Coast's water sensitive city vision comprises a diverse suite of aspirations. Using the Transition Dynamics Framework gives insight into the current enabling environment and transition phase for each vision outcome, and the enabling factors that need to be established to drive further progress into the next phase of change. This is critical for ensuring Gold Coast stakeholders will pursue the most effective objectives, strategies and actions over the short-to medium-term to accelerate the City's water sensitive city transition.

Vision Outcome 1: Water and land environments and resources are well protected and enhance community health, wellbeing and safety

Achieving the vision for well protected land and water environments and enhanced community health and wellbeing requires substantial shifts in water management practice. The characteristics, functions, conditions and values of ecosystems and urban environments need to be understood and respected, and controls need to be in place to manage the impacts of urbanisation, resource extraction and pollution.

The governance arrangements for water supply and sanitation services in the Gold Coast are well functioning and robust, including a strong legislative base that instils high levels of trust in decisions. This ensures the health and safety of the Gold Coast community is protected through the supply of high quality drinking water and removal and treatment of wastewater.

However, the governance arrangements for catchments, stormwater and waterway health are perceived to have a range of shortcomings, incoherencies and inconsistencies. Policies for managing the Gold Coast's surface water quality and protecting areas of high ecological value are in place, however they are not achieving their purpose to the extent intended. Similarly, pollution control technologies to manage surface water quality are well developed, however their impact is sub-optimal and implementation challenges remain, with difficulties in design and maintenance identified as barriers. There are fewer mechanisms in place to manage surface water flows.

The SEQ Healthy Waterways Program aims to improve the health of rivers and catchments. It is an internationally renowned partnership with local government and other stakeholders including Gold Coast and monitors and reports on river health and funds rehabilitation initiatives. However, many natural assets are not well integrated into the water management system, which makes it difficult

for their management and maintenance to be adequately planned and resourced. There is not yet a strategy in place that aligns objectives for the protection and enhancement of ecosystem services across the City directorates and expresses a commitment to resolving conflicting objectives through a holistic management framework.

“A common complaint is the lack of enforcement around sediment and erosion control for developers – the city has best practice guidelines but poor on-ground compliance outcomes.”

There are individual and organisational champions in the Gold Coast advocating for the protection, conservation and enhancement of natural waterways, habitats and other ecosystems on both public and private land but many initiatives do not attract sufficient community and political support to be successful.

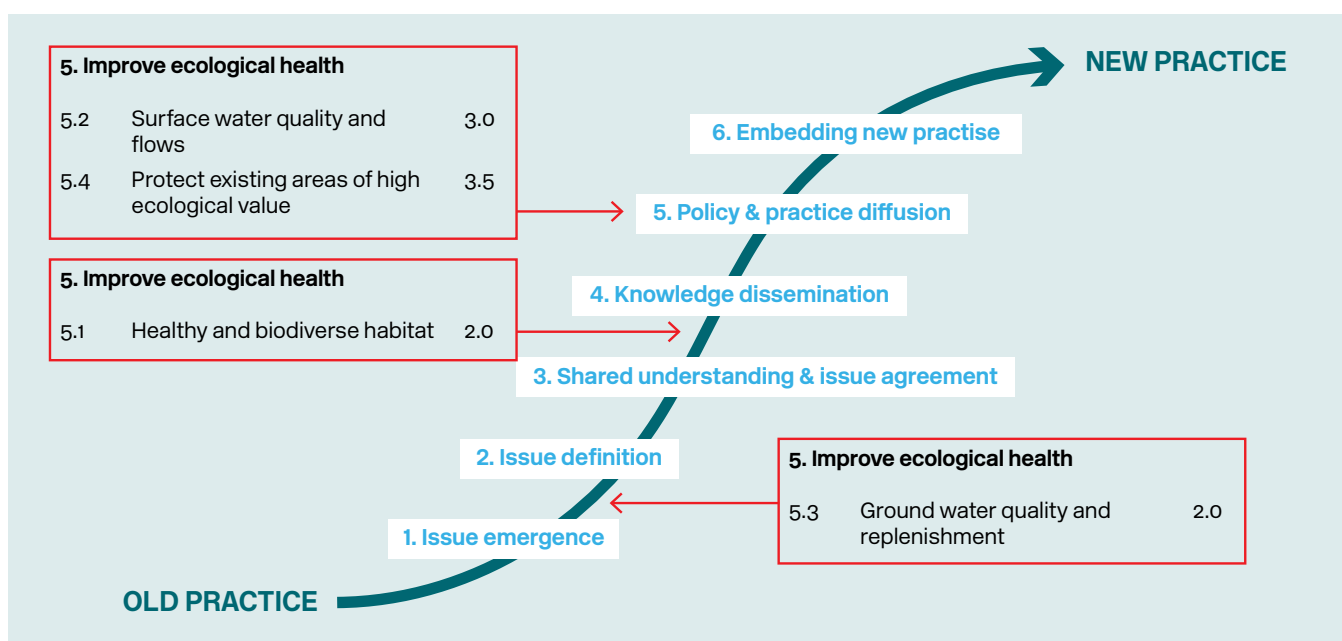
“A water sensitive city is something that the City can promote for its own benefit because there is an appeal for people to move somewhere where they think there is progressive thinking and for the Gold Coast to be seen for an attractive place to live and to use this positive messaging to reinforce that.”



Groundwater is recognised in the Gold Coast as a valuable water source for household bores and commercial extraction. However, there are few management systems in place and a limited scientific knowledge base to inform understanding of the system's functions, resource potential, conditions, vulnerabilities and impacts.

In summary, the Gold Coast's progress in its transition to the envisioned outcome of ecosystem health that supports community wellbeing varies across different aspects of the vision. Surface water management and the protection of highly valuable ecosystems is in Phase 5, with attention needed to improve the implementation of existing policies. The enhancement of healthy ecosystems and biodiversity is between Phase 3 and 4, requiring a compelling narrative and coherent strategy to build broad support and a systemic approach to managing ecosystems in an integrated manner. Groundwater management is early in its transition, with new knowledge needed to inform the development of improved management solutions and practices.

“Groundwater is unregulated which is bizarre so it’s very difficult to even understand it or to get data on or to manage because nobody essentially manages it – it’s a big grey area.”



Vision Outcome 1: Water and land environments and resources are well protected and enhance community health, wellbeing and safety

Priority objectives	Strategies	Rationale
Increase awareness and understanding	1. Develop new knowledge about the Gold Coast's groundwater system	Knowledge to inform the improvement of groundwater management practices
Harness leadership and community support	2. Develop and communicate to the community and decision-makers a compelling narrative that articulates the importance of ecosystem health in delivering broad societal benefits	The authorising environment supports initiatives (including governance improvements) that may challenge current practice but are needed to achieve the Gold Coast's vision for the health and wellbeing of ecosystems and the community
Establish an integrated and systemic approach	3. Develop and implement a coherent and comprehensive strategy for managing the Gold Coast's natural assets as an integrated and changing system	An ecosystem management approach that gives focus to (a) the interconnections between water, the environment and people, and (b) recognising and valuing the ecosystem services provided by natural assets in investment and risk management decision-making
Drive tangible actions that will achieve key water sensitive outcomes	4. Improve implementation of existing policies and programs for managing surface water and protecting areas of high ecological value through more effective regulatory instruments and management systems	Proactive collaboration, strong compliance levers and effective asset management systems and maintenance programs for stormwater quality infrastructure to deliver environmental protection and enhancement of community health, wellbeing and safety Key outcome areas needing attention include: 1. Ensure waterways are connected and have room to move 2. Protect buffer zones along water corridors 3. Promote water infrastructure design that enhances ecological health

Vision Outcome 2: Urban areas have abundant beautiful, well-designed spaces that celebrate water and bring people together

Achieving the Gold Coast's envisioned outcome for public and private spaces that are green, cool, attractive, connected and utilised 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.

The opportunity for improved liveability and environmental health outcomes through integrated water system and urban planning and design practices is generally well understood within the Gold Coast water sector. Some aspects, such as increased tree cover and shade, are supported by current policy and endorsed by political leaders. This provides a good foundation for communicating the link between water system services and broader liveability outcomes.

The urban planning framework of Gold Coast provides a reasonable foundation for environmental objectives to be achieved.

The City's Centre Improvement Program and the Local Government Infrastructure Plan Update (LGIP) are promising examples of initiatives to improve the quality of the Gold Coast's urban space, with the former implementing small-scale urban design innovations and the latter providing opportunity for cross-departmental collaboration and integration at a strategic level.

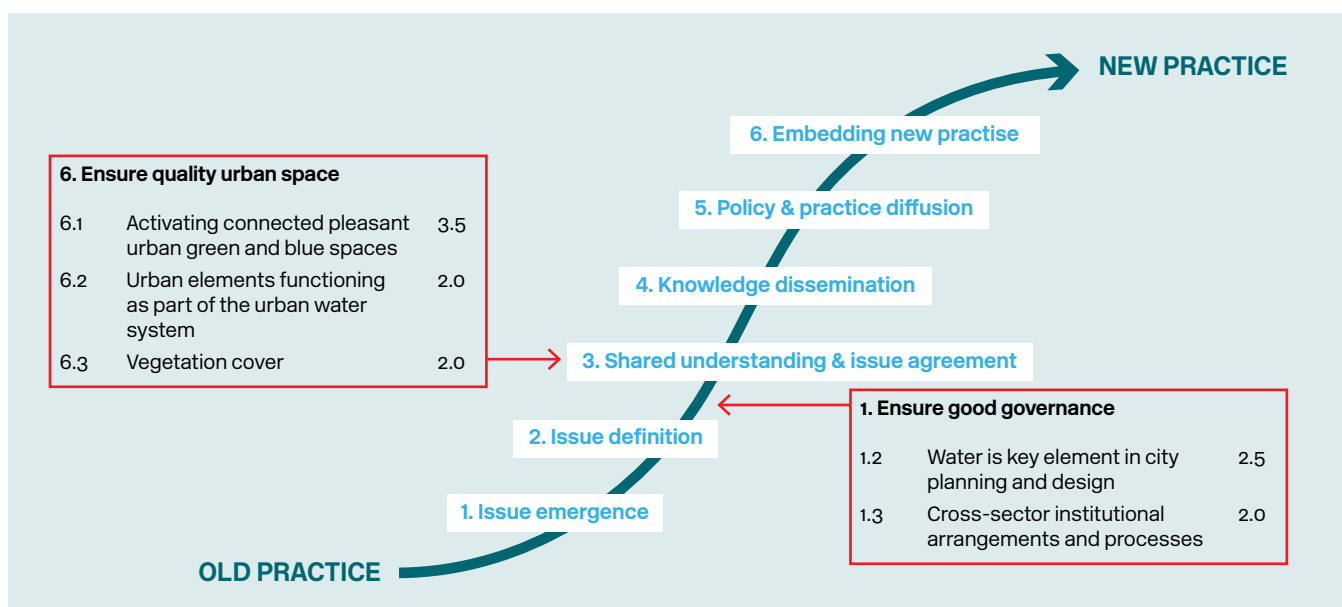
The integration of the Water and Waste Directorate within the City of Gold Coast provides a strong foundation for ensuring water is considered as a key element of urban planning and design and to improve cross-sectoral

“There is a chance to almost condition large urban developments and in particular high rises to take up some of these water sensitive features through our planning schemes.”

alignment and collaboration. There is a clear organisational intention to move in this direction but it is early days for implementation.

Professionals working across the planning, development and environment sectors have not yet formed a community of practice that champions ideas for green corridors, urban forests, waterway access and connectivity. Experimentation with such solutions in the Gold Coast context is limited, so there is not yet a local evidence base to demonstrate their value, develop knowledge about specific target areas of the city, and increase understanding of how different sectors can work together effectively to deliver shared outcomes.

In summary, the Gold Coast's progress in its transition to the envisioned outcome of beautiful, amenable and connected urban environments supported by water is generally in Phase 3, with the enabling governance aspects between Phase 2 and 3. Further progress would be driven through trials of new solutions to enhance the water sensitivity of urban spaces in the Gold Coast context; to build local knowledge and experience, helping people across planning, water and environment work to be more collaborative and improving the implementation of existing policies and programs to achieve the aspired outcomes.



Vision Outcome 2: Urban areas have abundant beautiful, well-designed spaces that celebrate water and bring people together

Priority objectives	Strategies	Rationale
Test potential new solutions in real world settings	1. Implement trials and demonstrations of innovative solutions for urban design that enable the built environment to function as part of water system service delivery	Exploration of how innovative urban design solutions can be delivered; evidence of their costs, benefits and risks; learning about the capabilities needed for their effective implementation
Enable and encourage people to collaborate and innovate	2. Improve organisational culture, systems and processes to promote collaboration and innovation in the delivery of quality urban spaces that support water sensitive outcomes	<p>People work together across planning, development, environment and water to create high quality, socially inclusive urban spaces that are supported by innovative water sensitive solutions, while accepting and managing risk appropriately.</p> <p>Key outcome areas needing attention include:</p> <ul style="list-style-type: none"> • Increase the number of blue and green spaces • Connect blue and green spaces to create a distributed network • Utilise urban spaces and the built form as part of the water system • Align delivery of urban space outcomes with asset renewal programs
Drive tangible actions that will achieve key water sensitive outcomes	3. Improve implementation of existing policies for delivering quality urban space outcomes through more effective regulatory instruments and governance processes	<p>Proactive collaboration, strong compliance levers and high design standards to deliver urban spaces that feature water and encourage social cohesion</p> <p>Key outcome areas needing attention include:</p> <ol style="list-style-type: none"> 1. Distribution and connectivity of blue and green urban spaces 2. Biodiversity of urban spaces 3. Incorporation of quality urban spaces in infill developments 4. Higher design standards for urban space

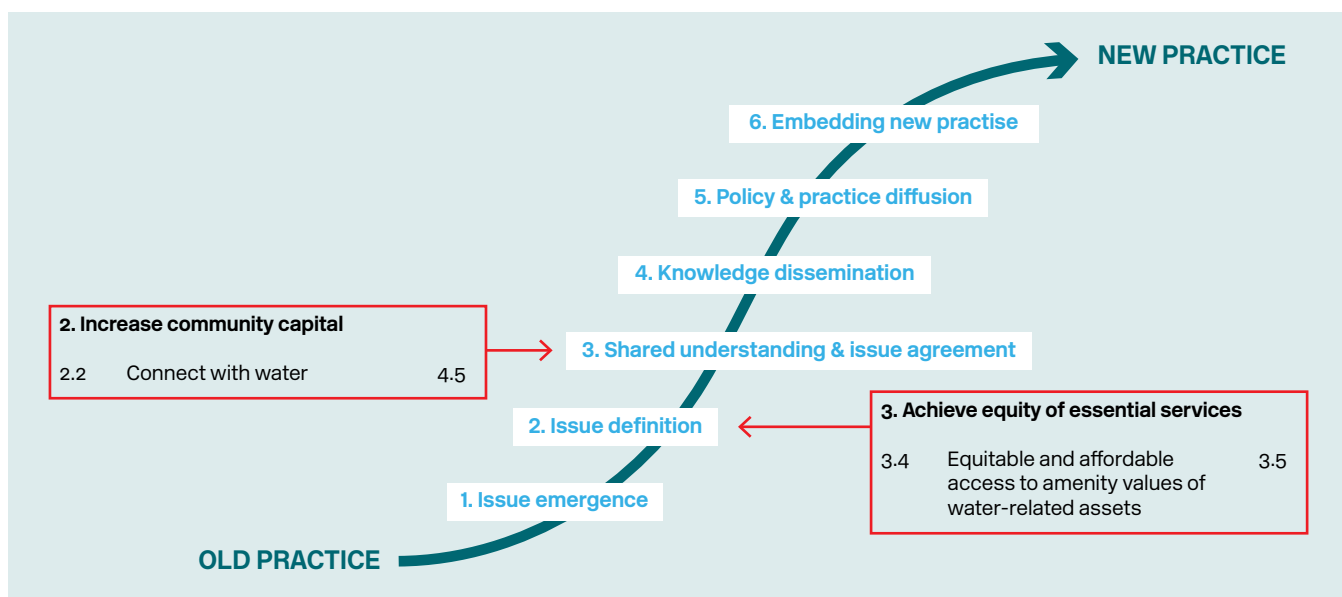
Vision Outcome 3: Gold Coast's communities share access to water environments, which supports their identity and lifestyle

While equitable access to the amenity values provided by assets such as natural waterways and green space are not traditionally considered in the design and management of water system services, evolving community expectations for levels of services are becoming well recognised in the Gold Coast water sector.

The community particularly values the amenity benefits of the Gold Coast's local waterways, reflecting the community's strong identity and connection with their water environments.

Advocates are highlighting the need for more equitable access to water-related amenity services, pointing to the large areas of water frontage land that is privately owned. However there is not yet a shared understanding of the Gold Coast's aspiration to have more equitable amenity access, and improving the connectivity and access is challenging under the current strategic and policy frameworks.

In summary the Gold Coast's progress in its transition to the envisioned outcome of shared access to water environments is between Phase 2 and 3. Developing a coherent strategic approach to guide all urban development activities with equitable access as a central priority would help advance the transition further.



Vision Outcome 3: Gold Coast's communities share access to water environments, which supports their identity and lifestyle

Priority objectives	Strategies	Rationale
Establish an integrated and systemic approach	1. Develop and implement a strategy for improving the connectivity of, and more equitable access to, areas of high water-related amenity	<p>A planning and development approach that supports the incremental and opportunistic improvement of the connectivity of accessible water environments and shared access to areas of high water-related amenity</p> <p>Key outcome areas needing attention include:</p> <ul style="list-style-type: none"> • Easements along waterfront areas for future access creation • Improved connectivity for transport (e.g. walking, cycling) • Restriction of access for areas of high ecological value • Re-establishment of view lines • Access under climate change impacts • Access for elderly and people with disabilities

“Institutionally, we went through significant water reform and we left the City as a water business and we came back and we have had time to settle back down again. And being a part of the City allows us institutionally to engage much more with the rest of the organisation and the activities that occur in the City as compared to other places where the water utility is as separate entity.”

“We’ve got 500 km of canals and rivers where people live along here and 50 kms of beaches where people live... sea level rise in combination with all the other effects of climate change such as storms, sea erosion etc. will have significant infrastructure risks.”

Vision Outcome 4: Water systems, infrastructure and land-use planning are integrated, deliver multiple benefits and are adaptive to changing circumstances

Achieving the Gold Coast’s vision for water systems and infrastructure providing multiple benefits will require a gradual transition to a more adaptive water servicing approach, involving greater integration of multi-functional systems across scales, and possibly greater customer choice of services and service levels.

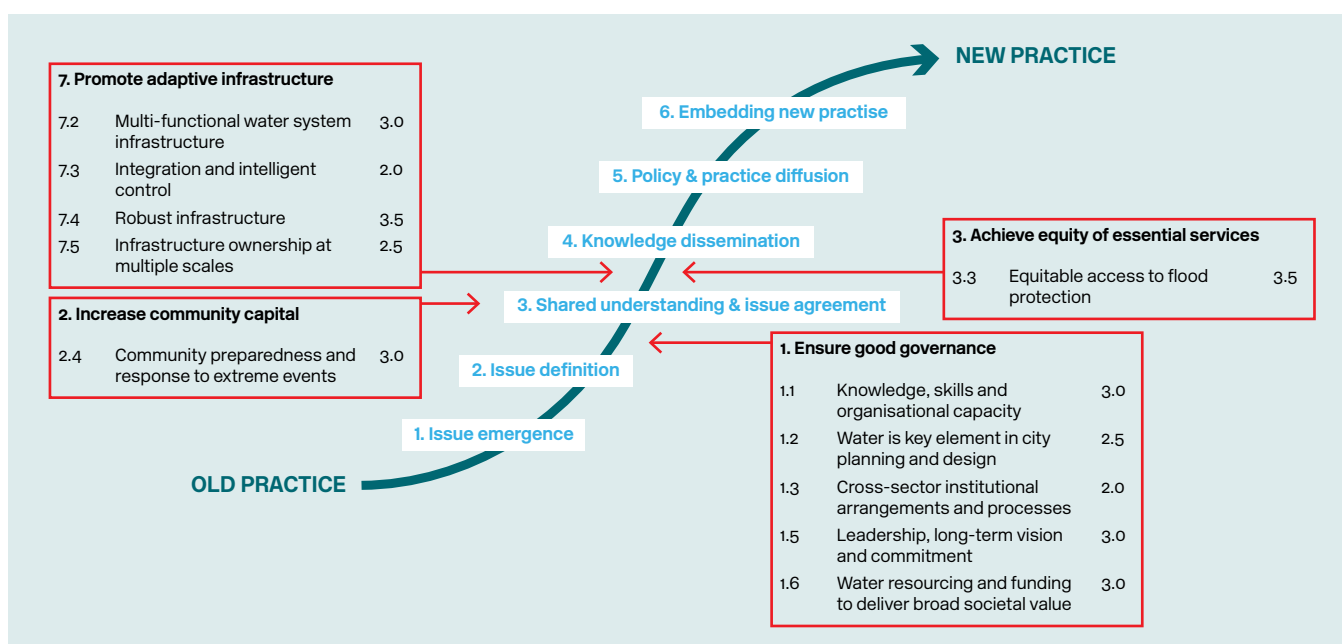
The integration of the Water and Waste Directorate within the City of Gold Coast provides a strong foundation for managing all elements of the water cycle holistically and in coordination with urban planning, environment and development objectives. Industry champions recognise this potential and are advocating changes to governance systems and processes to improve the delivery of water

sensitive outcomes, for example through better alignment in the objectives of the City’s different organisational sections.

There is generally a good awareness among water professionals in the Gold Coast that new modes of service provision are required to continue to meet the community’s expectations over the long-term. Champions of the issue are well connected across both industry and science, building on the historic leadership of the South East Queensland water sector. These champions are beginning to identify and experiment with solutions that can be implemented to increase the adaptive capacity of the Gold Coast’s infrastructure systems (e.g. WSUD installations in the Ecovillage at Currumbin and the Pimpama Coomera recycled water scheme). Less progress has been made for solutions beyond WSUD assets and recycled water schemes.

Policy and political support for implementing adaptive infrastructure solutions, particularly decentralised and green technologies, is not very strong and is hampered by uncertainties about risks and costs. While guidelines for recycled water and WSUD exist, a lack of policy or regulatory frameworks to guide risk and cost sharing makes progress difficult.

Significant data collection and modelling has been undertaken to improve knowledge of flood risk and the City has a good understanding of where local flooding hotspots exist. However, this knowledge is not well synthesised or communicated to inform urban planning and the design and implementation of feasible and practical mitigation strategies



It is difficult to ensure equitable and affordable levels of flood protection for all properties given their different degrees of exposure to flood risk. This challenge is likely to be exacerbated as climate change impacts make cities more vulnerable to flooding during heavy rainfall and storm surge events.

In summary, the Gold Coast's progress in its transition to its vision for integrated land use and infrastructure planning to support the delivery of multi-functional and adaptive

water systems is between Phase 2 and 4. Aspects of the vision relating to adaptive infrastructure itself are between Phase 3 and 4, and would progress further with large-scale demonstrations with a strong learning agenda. This would also help build the knowledge and experience needed to advance collaborative and adaptive management practice across different sectors and to build an evidence base to inform the development of new policy and regulatory frameworks for driving tangible actions towards water sensitive outcomes.

Vision Outcome 4: Water systems, infrastructure and land-use planning are integrated, deliver multiple benefits and are adaptive to changing circumstances

Priority objectives	Strategies	Rationale
Increase awareness and understanding	1. Examine and evaluate evidence about the need for flexibility and choice in delivering water supply and sanitation services	Understanding of the costs, benefits and risks (including avoided costs and risks) for service providers and customers in providing flexibility and choice for customers in their water supply, drainage and sanitation services
	2. Synthesise and disseminate existing knowledge about the Gold Coast's flood risk and its adaptation and mitigation options	Improved flood risk management practices by relevant organisations and the community
Test potential new solutions in real world settings	3. Implement trials and demonstrations of innovative solutions for adaptive, integrated, multi-functional and intelligent water infrastructure systems	Exploration of how innovative infrastructure solutions can be delivered; evidence of their costs, benefits and risks; learning about the capabilities needed for their effective implementation
Enable and encourage people to collaborate and innovate	4. Improve organisational culture, systems and processes to promote innovation in the delivery of integrated, multi-functional and adaptive water system services	People develop innovative and collaborative approaches for water system service delivery, while accepting and managing risk appropriately
Drive tangible actions that will achieve key water sensitive outcomes	5. Improve policy and regulatory frameworks to align the Gold Coast's water sensitive city vision with planning and design objectives and standards for its water systems and the built form	An administrative environment that is coherent, consistent, coordinated and comprehensive for enabling and driving planning and design decisions that achieve water sensitive outcomes

Vision Outcome 5: Water infrastructure systems enable efficient and sustainable use of resources to maximise social, economic and environmental outcomes

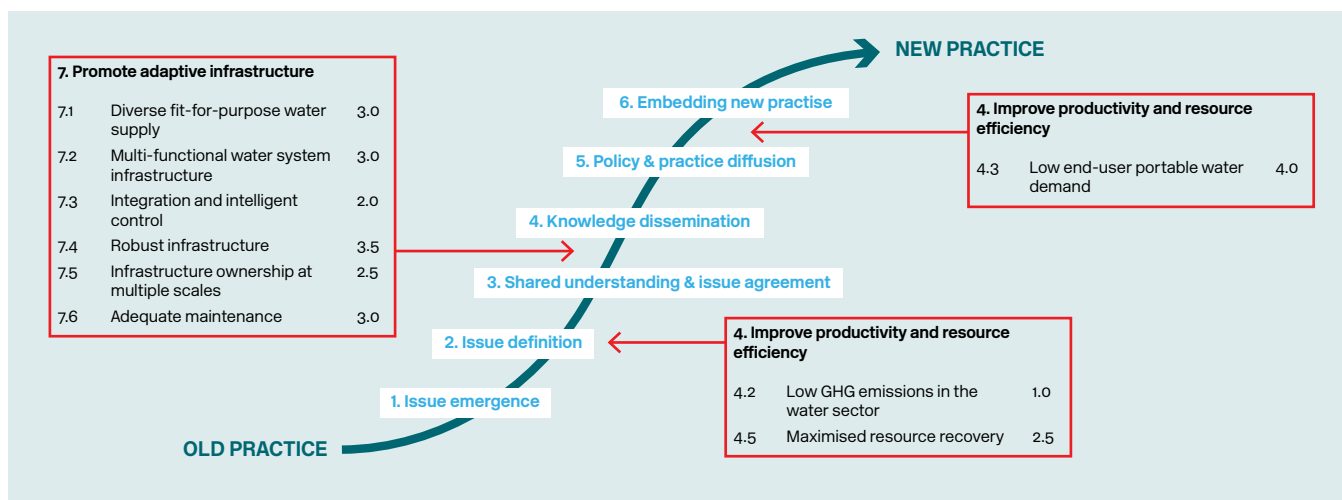
Traditional water system services are generally designed to meet singular objectives (e.g. water supply, sanitation, drainage) and have tended to prioritise cost efficiency over resource efficiency and to externalise environmental costs. As the impacts of human activity on planetary health are recognised, the community has become more aware of the natural limits in the availability of water, energy and other resources and the need for more sustainable water systems.

For the Gold Coast to realise its vision of more sustainable resource use and the broader benefits this could provide, alternative modes of service provision will need to be explored, some of which have been largely incidental to traditional approaches to water system services. This could include taking greater advantage of the synergies and connections between water, energy, food and land resources.

About 20% of the Gold Coast's wastewater is currently recycled and the market for recycling wastewater for agriculture and horticultural purposes is beginning to increase. As local champions are advocating, these and other opportunities to increase the resource efficiency in Gold Coast's water system (e.g. through approaches such as stormwater harvesting, nutrient and energy recovery from wastewater treatment, and the supply of renewable energy to reduce greenhouse gas emissions) need to be well supported.

“If we produce class A recycled water it has much less constraints on how we can use that water and gives us much more opportunities for how we can use that in parks but also for other customers.”

The Gold Coast's progress in its transition to a vision for more efficient and sustainable resource use spans several phases. Reducing potable water demand and providing local sewage treatment for non-potable use is advanced in policy and practice or at Phase 5 in the transitions stage. Other resource recovery and more sustainable energy use is less advanced with no clear policy commitment or shared understanding of solutions to be pursued. Platforms are needed to help generate broader understanding and agreement about these issues and build leadership and community support. Investment will be needed, to explore how innovative sustainability and resource efficiency solutions can be delivered including evidence of their costs, benefits and risks and learning about the capabilities needed for their effective implementation.



Vision Outcome 5: Water infrastructure systems enable efficient and sustainable use of resources to maximise social, economic and environmental outcomes

Priority objectives	Strategies	Rationale
Harness leadership and community support	1. Develop and communicate a compelling narrative that articulates the value of a strong efficiency and sustainability focus in the Gold Coast's water sector	The authorising environment supports using resources more efficiently and taking advantage of cross-sectoral synergies through increasing understanding about the opportunities for water system services to deliver broad social, economic and environmental benefits
Enable and encourage people to collaborate and innovate	2. Improve organisational culture, systems and processes to promote commitment to sustainability and resource efficiency outcomes	People and organisations adopt the necessary collaborative, innovative and risk management behaviors needed to achieve sustainability and resource efficiency outcomes
Test potential new solutions in real world settings	3. Implement trials and demonstrations of innovative solutions for sustainability and resource efficiency that are delivered as part of an adaptive, integrated, multi-functional and intelligent water infrastructure approach	Exploration of how innovative sustainability and resource efficiency solutions can be delivered; evidence of their costs, benefits and risks; learning about the capabilities needed for their effective implementation



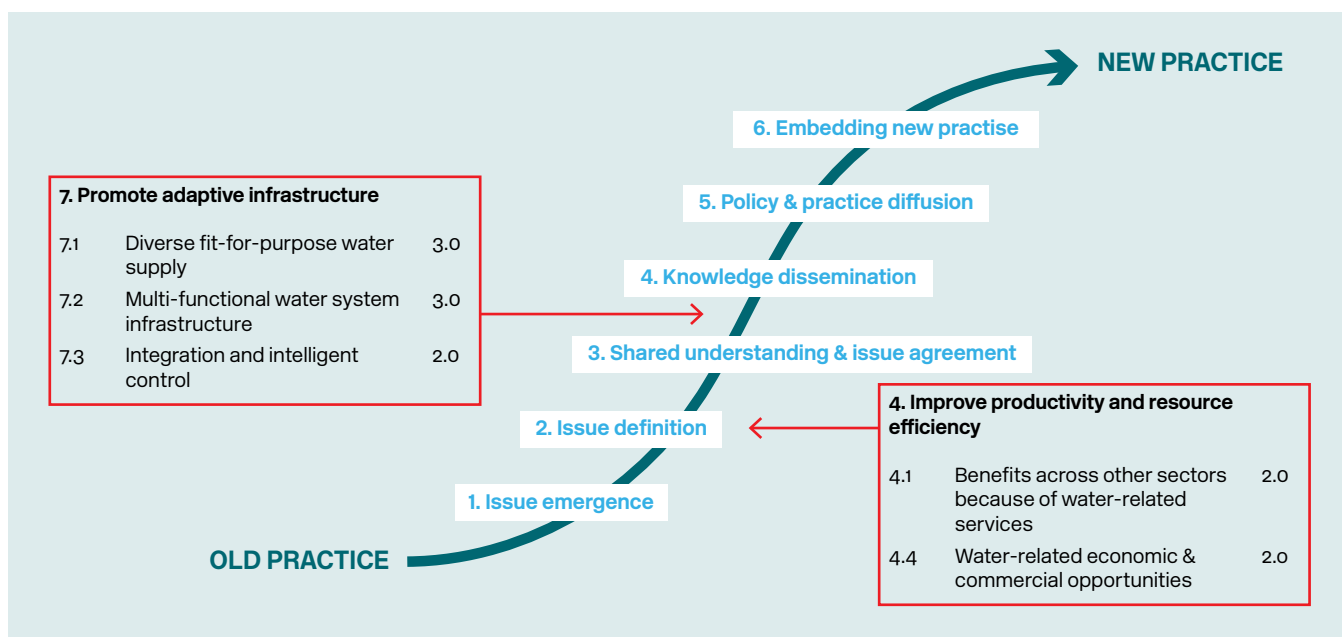
Vision Outcome 6: Water infrastructure systems are innovative, support a diverse and sustainable economy and help shape the Gold Coast as a world leading water sensitive city

There is potential for commercial opportunities for the Gold Coast in shifting to more adaptive, integrated and multi-functional water systems. This is in terms of the direct supply of resources and greater environmental health, and the potential business that can be developed to establish the Gold Coast as a leading international city in water system innovations.

The range of functions and organisational structure of the City particularly its integrated Water and Waste Directorate, provides a promising opportunity to address the institutional barriers that can stifle innovation. The sustainability of the Gold Coast's water system would, however, benefit from a more explicit commitment that encourages endorsement and support for initiatives to capitalise on all these opportunities for both environmental and economic benefit. This support is particularly important to encourage innovative water system services and natural and built infrastructure, even though they may have higher upfront investment costs and risks that need to be managed.

“Some of our current leadership is actually quite open to innovation and experimentation with different options.”

The potential benefits of more water sensitive system services, as well as the broader commercial opportunities for Gold Coast businesses involved in innovative water management, are beginning to be recognised but are yet to be explored in detail. This reflects an early stage of transition equivalent to Phase 2, requiring investment in understanding the economic opportunities for the Gold Coast and its broad city vision and policy agenda in taking an integrated, multi-functional and adaptive approach to water system services provision.



Vision Outcome 6: Water infrastructure systems are innovative, support a diverse and sustainable economy and help shape the Gold Coast as a world leading water sensitive city

Priority objectives	Strategies	Rationale
Increase awareness and understanding	1. Examine and evaluate evidence about the value of transitioning to a more adaptive, integrated and multi-functional water servicing approach	Understanding of the value for the Gold Coast and its broad city vision and policy agenda in taking an integrated, multi-functional and adaptive approach to water system services provision, and its associated collaborative management practices
Establish an integrated and systemic approach	2. Develop and implement a coherent and comprehensive strategy for taking advantage of the economic benefits and commercial opportunities that water system services can provide	An investment planning and decision-making approach that accounts for the broader economic and commercial benefits of innovation in delivering water system services
Drive tangible actions that will achieve key water sensitive outcomes	3. Improve policy and regulatory frameworks to enable and drive innovation for water sensitive outcomes	People and organisations experience few barriers and many incentives to innovate in urban development and the provision of water system services



“Our infrastructure standards are increasing and the community want them to increase, they want better facilities in their parks, they want more parks but the basics such as stormwater quality and quantity infrastructure that people do not understand the absolute need for and cost of these unless there is a problem.”

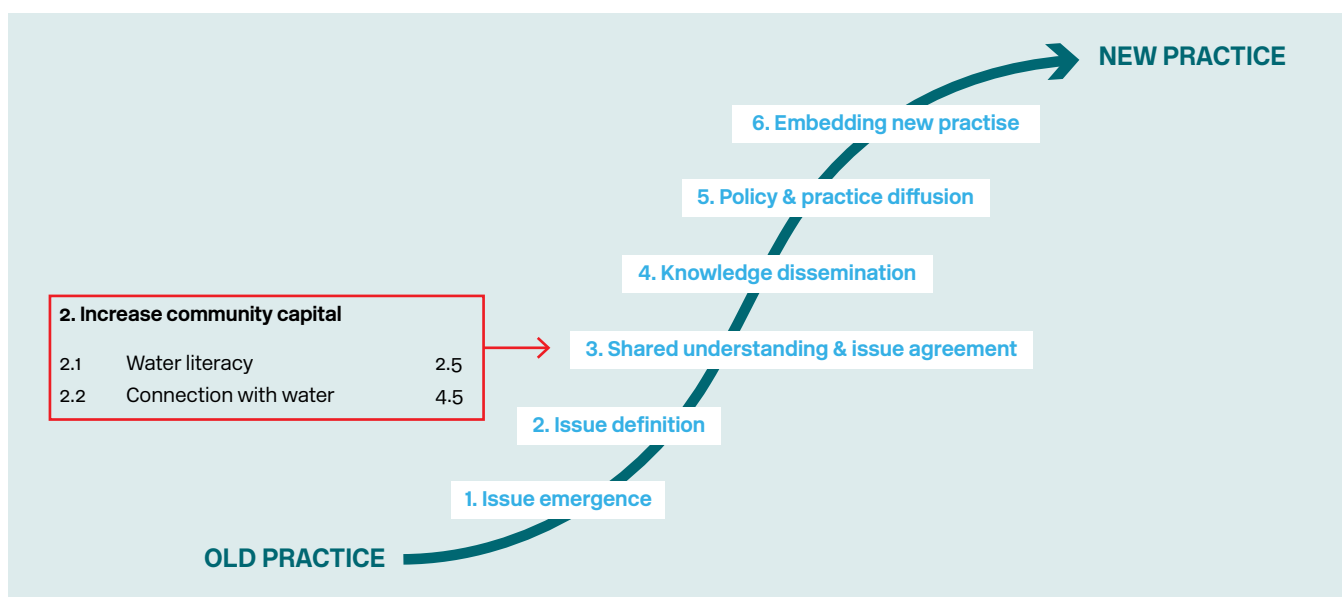
Vision Outcome 7: People understand, cherish and protect their surrounding water environments

The Gold Coast community is strongly connected with their local coastline and waterways and they have responded well to campaigns targeted at reducing personal water consumption. However, for the Gold Coast to realise its vision of a community that values the health of all water and land ecosystems and passionately works to protect and sustain them, will require a deeper understanding of the whole water cycle, catchments and the importance of water system services in maintaining the recreational and amenity benefits provided by these valued natural assets. Fostering this understanding and care is challenging, particularly among the Gold Coast's large transient and migrated retiree population who may not feel as strongly connected to their local environment as other parts of the community.

While the general public's attention on environmental issues fluctuates, specialist community groups and catchment associations of the Gold Coast are perceived as highly active, although not well aligned or coordinated. This results in somewhat ad hoc environmental protection activities led by the community, which attract marginal support. Local champions, some operating at senior levels, are advocating the need to increase community capital in relation to water but there are limited opportunities for stronger involvement and limited interest beyond those champions. This reflects the lack of broad understanding and agreement of the need for greater community awareness and involvement beyond simple messages to conserve water.

“People connect locally so you need to join the dots for them about what’s going on in their local waterway so they will be much more enthusiastic about the measures we are taking or the things that need to happen to maintain their local environmental health.”

Support is needed for a community engagement approach that reflects coordinated, clear and consistent messaging across departments and organisations in relation to the broad range of outcomes expressed in the Gold Coast's water sensitive city vision.



Vision Outcome 7: People understand, cherish and protect their surrounding water environments

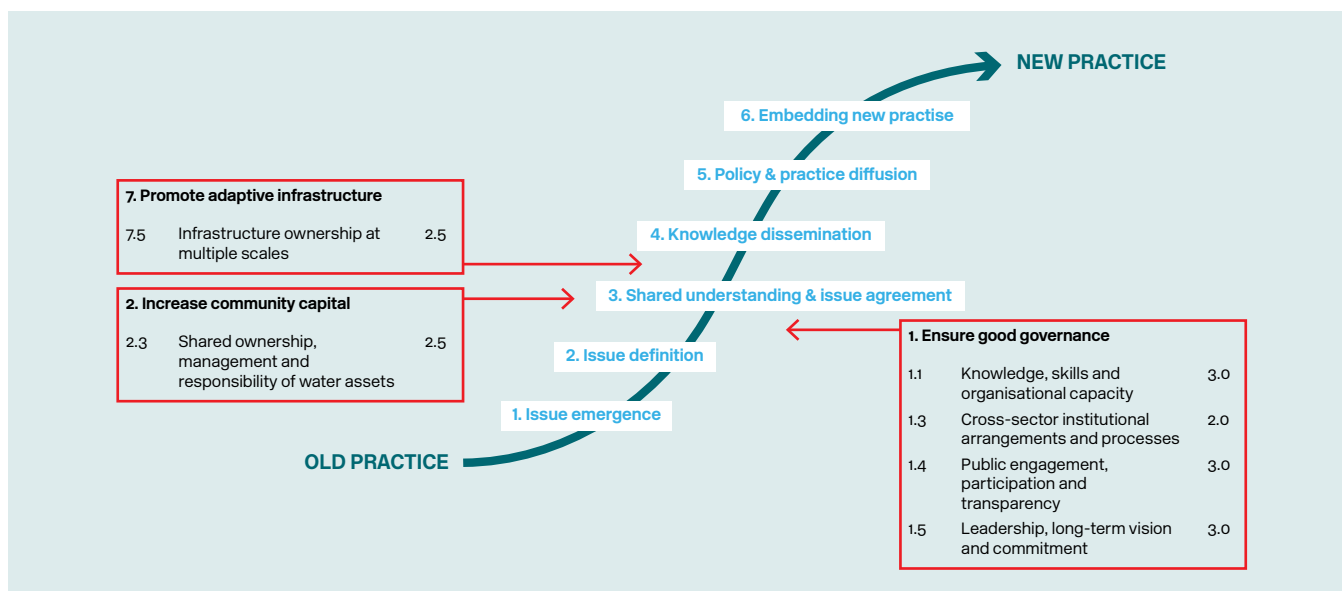
Priority objectives	Strategies	Rationale
Harness leadership and community support	1. Improve the community's understanding of the role of the water system in delivering the ecosystem services they value, building on people's existing strong connections with local waterways	The authorising environment supports water system initiatives that aim to improve the health of ecosystems
	2. Improve the community's understanding of the ways they can take an active role in water system stewardship	Increased motivation and ability amongst the community to adopt behaviours and practices that enable and drive healthy ecosystem outcomes
Establish an integrated and systemic approach	3. Develop a coherent and comprehensive strategy for building the Gold Coast's community capital in relation to water	A community engagement approach that reflects coordinated, clear and consistent messaging across departments and organisations in relation to the broad range of outcomes expressed in the Gold Coast's water sensitive city vision

Vision Outcome 8: Collaboration delivers sustainability goals and supports environmental stewardship

Achieving the Gold Coast's water sensitive city vision may require planning, design, management and maintenance practices to deliver sustainability goals and environmental stewardship are highly collaborative. This means systems and process are in place to enable the sharing of risks, costs, benefits, data and lessons between infrastructure and service providers and across departments, agencies and business.

Collaborative aspirations are often hampered by operational routines and individual departmental requirements meaning that collaboration tends to occur on a transactional rather than strategic basis, with limited sharing of knowledge and data to facilitate learning.

Organisational capacity building initiatives focused on leadership, collaboration and organisational change processes for working towards a shared vision and outcomes are necessary to support changes in practice.



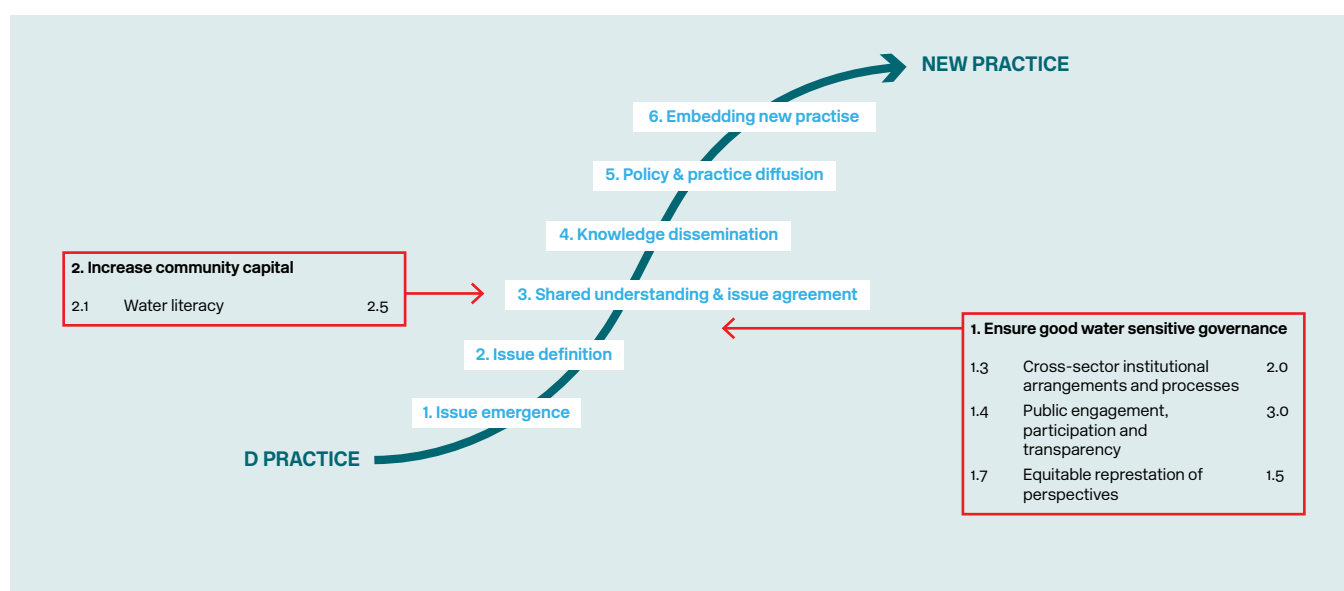
Priority objectives	Strategies	Rationale
Harness leadership and community support	1. Develop and communicate a compelling narrative that articulates the value of the Gold Coast's water sensitive future and the importance of sector-wide collaboration in pursuing the vision	The authorising environment supports sector-wide collaboration to implement water sensitive solutions and achieve outcomes to deliver on the Gold Coast's goals for sustainability and environmental stewardship
Enable and encourage people to collaborate and innovate	2. Improve organisational culture, systems and processes to promote collaboration across planning, development, environment and water for the delivery of water sensitive solutions and outcomes, building on the strong foundations of the City's diverse functions	People work together across different departments, organisations, sectors and levels of government to collaborate and innovate to achieve aligned objectives related to sustainability and environmental stewardship

Vision Outcome 9: Water decisions are made through informed and inclusive processes to support social, economic and environmental sustainability

Achieving the Gold Coast's water sensitive city vision may require planning, design, management and maintenance practices to deliver sustainability goals and environmental stewardship are highly collaborative. This means systems and process are in place to enable the sharing of risks, costs, benefits, data and lessons between infrastructure and service providers and across departments, agencies and business.

Collaborative aspirations are often hampered by operational routines and individual departmental requirements meaning that collaboration tends to occur on a transactional rather than strategic basis, with limited sharing of knowledge and data to facilitate learning.

Organisational capacity building initiatives focused on leadership, collaboration and organisational change processes for working towards a shared vision and outcomes are necessary to support changes in practice.

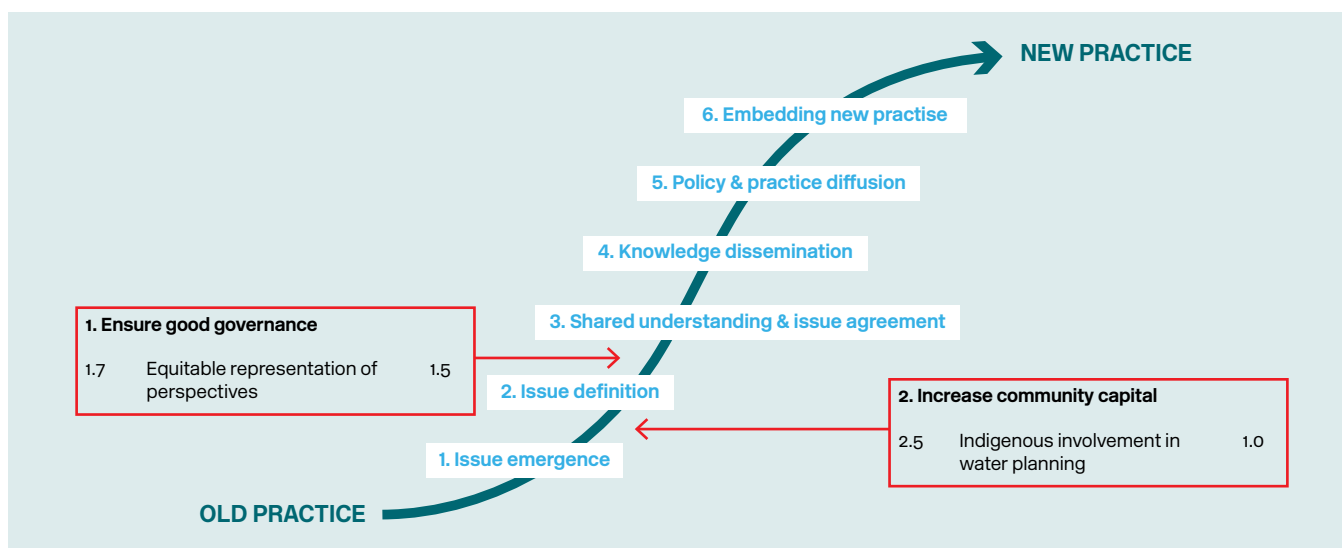


Priority objectives	Strategies	Rationale
Test potential new solutions in real world settings	1. Implement trials and demonstrations of innovative approaches to increase community awareness and engagement in water system services planning and decision-making processes	Exploration of how innovative community engagement approaches can be delivered; evidence of their costs, benefits and risks; learning about the capabilities needed for their effective implementation
Establish an integrated and systemic approach	2. Improve organisational culture, systems and processes to promote transparency and inclusivity in decisions about water system services	People share water system data and knowledge across departments, organisations, sectors and levels of government; there is opportunity for all interested stakeholders to influence decision-making processes about water system services

Vision Outcome 10: The Yugambah and Kombumerri people are actively engaged in water decision-making, knowledge sharing and the stewardship of water and land environments

The Gold Coast is rich in indigenous culture and history; however the value of traditional knowledge has not been fully explored within water systems planning and environmental management.

There is recognition amongst Gold Coast stakeholders that Traditional Owners are not sufficiently involved in water planning and decision-making; while there is some formal representation through key individuals or interest groups, they are not engaged deeply or consistently. Research is needed to understand the barriers to, and potential solutions for, more meaningful engagement with Traditional Owners.



Priority objectives	Strategies	Rationale
Increase awareness and understanding	1. Advocate for Traditional Owners to be meaningfully involved in water planning and decision-making	Broad appreciation of the opportunities for and benefits of greater involvement of Traditional Owners in water planning and decision-making
	2. Develop new knowledge about the barriers and potential solutions to increasing the involvement of Traditional Owners in sharing their knowledge and participating in water planning and decision-making	Knowledge to inform the development of effective structures and processes for involving Traditional Owners as partners in water system stewardship

5.3 Actions to implement the strategies

Comparing across vision outcomes in Section 5.2 reveals that similar objectives appear multiple times, which would require similar strategies and actions to be implemented. It is therefore helpful to identify the different types of strategies and actions that would need to be pursued collectively across all vision outcomes as part of the Gold Coast's overall transition strategy.

Here we present priority strategies and key actions in this way, reorganising the strategies from Section 5.2 to consolidate common types. This forms a coherent basis for developing actions that will achieve one or more vision outcomes. The actions presented are a synthesised list of the hundreds of actions identified through the project. More details can be found in the companion final project report.

Strategies and actions to increase awareness and understanding

Strategy		*V.S	Actions
Synthesise and disseminate existing knowledge	About the Gold Coast's flood risk and its adaptation and mitigation options	4.2	Develop a research plan in collaboration with research organisations to consolidate existing knowledge and address data and knowledge gaps
Develop new knowledge	About the Gold Coast's groundwater system	1.1	Invest in local Gold Coast studies
	About the barriers and potential solutions to increasing the involvement of Traditional Owners in sharing their knowledge and participating in water planning and decision-making	10.2	Establish a working group to develop a knowledge sharing strategy that drives an open and collaborative approach to share data and knowledge for coordinated decision making Develop a cross-sectoral working group focused on communicating existing and emerging knowledge Facilitate processes to engage diverse stakeholders in dialogue to contribute to knowledge development, synthesis and communications
Advocate	For Traditional Owners to be meaningfully involved in water planning and decision-making	10.1	Develop an education strategy to inform the broader community about Yugambeh and Kombumerri culture and their values for caring for country and their connection with, land and water environments Facilitate mutual learning opportunities between Indigenous and non-Indigenous people Identify and support people across different organisations that are, or could be, advocates of Traditional Owner involvement in water planning and decision-making Invest in initiatives that raise the awareness of professionals involved in water system services about Yugambeh and Kombumerri culture and their values for land and water environments Revisit vision outcome statement as participation by Yugambeh and Kombumerri people in water decisions and stewardship evolves

Strategy		*V.S	Actions
Examine and evaluate evidence	About the value of transitioning to a more adaptive, integrated and multi-functional water servicing approach	6.1	<p>Establish a working group to drive the consolidation of evidence for, and evaluation of, the business case for changing practice towards an integrated, multi-functional, adaptive and collaborative approach to water system service provision</p> <p>Conduct systemic analyses of the economic value of integrated, multi-functional, adaptive and collaborative approaches to water system services provision</p> <p>Identify options for shared and long term funding mechanisms</p>
	About the need for flexibility and choice in delivering water supply and sanitation services	4.1	<p>Review evidence in other jurisdictions and sectors</p> <p>Develop possible models for incorporating flexibility and choice into the Gold Coast water system services</p>
*V.S indicates the associated Vision outcome and Strategy number in Section 5.2			

Strategies and actions to harness leadership and community support

Strategy		*V.S	Actions
Develop and communicate a compelling narrative	That articulates the importance of ecosystem health in delivering outcomes that the community values	1.2	Establish a working group to develop the narrative and business case Develop a communications plan to communicate the narrative to different audiences
	That articulates the value of a strong efficiency and sustainability focus in the Gold Coast's water sector	5.1	Use champions to engage with community and organisational leaders to build their support Conduct systemic analyses of the economic value of the Gold Coast as a water sensitive city
	That articulates the value of the Gold Coast's water sensitive future	8.1	Conduct local visioning processes with communities to elicit their values in relation to water sensitive outcomes
Improve the community's understanding	Of the role of the water system in delivering the ecosystem services they value, building on people's existing strong connections with local waterways	7.1	Conduct local visioning processes with communities to elicit their values in relation to social, environmental and economic sustainability Develop engagement tools to raise awareness of the value of water sensitive solutions in supporting the Gold Coast lifestyle
	Of the ways they can take an active role in water system stewardship	7.2	Establish platforms that support community groups with interest in water and the environment to connect with each other and coordinate their stewardship efforts
*V.S indicates the associated Vision outcome and Strategy number in Section 5.2			

Strategies and actions to establish an integrated and systemic approach

Strategy		*V.S	Actions
Develop and implement a coherent and comprehensive strategy	For building the Gold Coast's community capital in relation to water	7.3	Establish a cross-system working group to drive strategy development and implementation
	For taking advantage of the economic benefits and commercial opportunities that water system services can provide	6.2	Consolidate existing knowledge through literature review, compilation of baseline data and analysis of current best practice Clarify the issues, agree on shared objectives and examine opportunities
	For managing the Gold Coast's natural assets as an integrated and changing system	1.3	Conduct systemic analyses to build an evidence base to inform strategy development Develop processes and tools to support strategy development and implementation
	For improving the connectivity of, and more equitable access to, areas of high water-related amenity	3.1	Identify options for shared and long term funding mechanisms to support strategy implementation Facilitate transparent and inclusive processes to identify critical strategy implementation steps and partnerships needed Use champions to engage with community and organisational leaders to build their support for strategy implementation.
*V.S indicates the associated Vision outcome and Strategy number in Section 5.2			

Strategies and actions to test potential new solutions in real world settings

Strategy		*V.S	Actions
Implement trials and demonstrations	Of innovative approaches to increase community awareness and engagement in water system services planning and decision-making processes	9.1	<ul style="list-style-type: none">• Develop a clear learning agenda that scopes the lessons to be learned from trials and demonstrations across technical, social and risk management domains• Establish an innovation program that implements strategic trials and demonstrations of new water sensitive approaches• Develop a dissemination plan for sharing data and communicating lessons from trials and demonstrations to different audiences• Invest in the development of decision-support tools and processes that enable innovation in the delivery of water sensitive solutions
	Of innovative solutions for urban design that enable the built environment to function as part of water system service delivery	2.1	
	Of innovative solutions for sustainability and resource efficiency that are delivered as part of an adaptive, integrated, multi-functional and intelligent water infrastructure approach	5.3	
	Of innovative solutions for adaptive, integrated, multi-functional and intelligent water infrastructure systems	4.3	
*V.S indicates the associated Vision outcome and Strategy number in Section 5.2			

Strategies and actions to enable and encourage people to collaborate and innovate

Strategy		*V.S	Actions
Establish organisational culture, systems and processes	To promote collaboration across planning, development, environment and water for the delivery of water sensitive solutions and outcomes, building on the strong foundations of the City of Gold Coast containing diverse functions within a single organisation	8.2	<p>Establish a Gold Coast Water Sensitive City Network that provides a forum to drive and maintain collective momentum towards achieving the Gold Coast's water sensitive city vision, building on strong long-term relationships</p> <p>Establish a Water Sensitive Gold Coast Knowledge Hub that incorporates data, tools, analyses and visualisations to act as an online regional decision-support, monitoring and communications platform for professional and non-professional stakeholders</p>
	To promote innovation in the delivery of integrated, multi-functional and adaptive water system services	4.4	<p>Establish a working group to develop a knowledge sharing strategy that drives an open and collaborative approach to share data and knowledge for coordinated decision making</p>
	To promote collaboration and innovation in the delivery of quality urban spaces that support water sensitive outcomes	2.2	<p>Identify and pursue tangible opportunities for collaboration and alignment to deliver water sensitive city outcomes</p>
	To promote transparency and inclusivity in decisions about water system services	9.2	<p>Establish programs that aim to improve the knowledge, capability and motivation of professionals to deliver water sensitive city outcomes</p>
	To promote commitment to sustainability and resource efficiency outcomes	5.2	<p>Review organisational systems to identify and pursue opportunities for shared strategic controls, Key Performance Indicators and funding models across departments</p> <p>Review the opportunities, risks, costs and benefits for water sensitive solutions</p> <p>Celebrate and reward people and groups that exhibit water sensitive practices</p> <p>Work with organisational leaders to embed water sensitive principles across all organisational activities</p>
*V.S indicates the associated Vision outcome and Strategy number in Section 5.2			

Strategies and actions to drive tangible actions that will achieve key water sensitive outcomes

Strategy		*V.S	Actions
Improve implementation of existing policies and programs	For delivering quality urban space outcomes	2.3	<ul style="list-style-type: none"> • Capture desired water sensitive outcomes in the forthcoming City Water Strategy and secure additional resources for pursuing them • Review existing and recommend new policies and standards for water sensitive outcomes and programs of implementation, drawing on the latest knowledge and evidence • Develop new plans, standards and incentives to encourage innovation • Conduct spatial analysis to identify high priority areas and strategic opportunities for water sensitive solutions • Establish clear organisational roles and responsibilities for delivering water sensitive outcomes • Influence implementation mechanisms beyond the Gold Coast region • Review and improve monitoring and compliance procedures and remove barriers for improving water sensitive outcomes in new developments • Develop an engagement and incentive program targeted at private landowners and developers
	For managing surface water and protecting areas of high ecological value	1.4	
Improve policy and regulatory frameworks	To align the Gold Coast's water sensitive city vision with planning and design objectives and standards for its water systems and the built form	4.5	<ul style="list-style-type: none"> • Review existing policy and planning frameworks to identify opportunities for establishing shared water sensitive objectives across water, planning, development, environment, community and economic services • Review national and international best practice examples of jurisdictions that have established planning and design standards that reflect aspirational outcomes related to water sensitive cities • Develop new plans, standards and incentives to encourage water sensitive practices
	To enable and drive innovation for water sensitive outcomes	6.3	

*V.S indicates the associated Vision outcome and Strategy number in Section 5.2



6. What the water sensitive city vision will deliver for the Gold Coast community

As the Gold Coast implements the water sensitive city transition strategy presented here, including through developing a City of Gold Coast Water Strategy, it is valuable to identify tangible outcomes that are likely to be delivered for the communities of the Gold Coast as transformative actions identified and developed through this project are pursued.

Vision Outcome 1: Water and land environments and resources are well protected and enhance community health, wellbeing and safety

1. Waterways are more connected and have room to move in order to facilitate:
 - a. Species corridors
 - b. More connected spaces for recreation enjoyment
2. Waterway buffer setback zones are protected, enforced and healthy along water corridors to deliver:
 - a. Improved bank stability
 - b. Improved wildlife habitat connectivity
 - c. Improved water quality for primary and secondary recreation
 - d. Greater resilience and faster recovery from natural hazards
3. Water infrastructure designs enhance ecological health through:
 - a. Aquatic habitats created by natural and artificial approaches
 - b. Reinstated tidal regimes that improve water quality and aquatic species movement
4. Strong compliance levers deliver environmental protection and safeguard community values for their waterways

Vision Outcome 2: Urban areas have abundant beautiful, well-designed spaces that celebrate water and bring people together

1. An increase in number and diversity of connected green and open space habitats supports biodiversity in urban spaces
2. Higher design standards deliver urban spaces that feature water and encourage social cohesion
3. Urban heat is mitigated through features such as:
 - a. Green roofs and walls
 - b. Water features
 - c. Tree scapes
4. Innovative solutions for urban design that enable the built environment to function as part of water system service delivery are demonstrated
5. Urban art celebrates the importance of water to the environment and people of the Gold Coast

Vision Outcome 3: Gold Coast's communities share access to water environments, which supports their identity and lifestyle

1. Growth and development is guided to improve equitable access to and connectivity of areas of high water-related amenity through:
 - a. Improved access to waterways along waterfront easements
 - b. Improved connection of access points by walking and cycle paths
 - c. Re-established vantage points
 - d. Inclusive access for elderly and people with disabilities
2. Water environments are well managed
 - a. Sensitive areas are preserved through restriction zones
 - b. High access areas have appropriate infrastructure and resources
 - c. Waterway access is adaptable to climate change impacts
 - d. Water quality data is accessible to support safe recreation
3. People have opportunities to connect to waterways in diverse ways

Vision Outcome 4: Water systems, infrastructure and land-use planning are integrated, deliver multiple benefits and are adaptive to changing circumstances

1. Integrated infrastructure planning aligns street scapes with networks of blue and green spaces to deliver:
 - a. Multi-functional use of urban space
 - b. Stormwater harvesting
 - c. Open space
 - d. Sewage and drainage services
2. Innovative solutions for adaptive, integrated, multi-functional and intelligent water infrastructure systems are demonstrated, for example:
 - a. Green infrastructure provides flood and storm mitigation solutions (e.g. permeable pavement)
 - b. Overland stormwater flow paths deliver multiple functions, including safe conveyance of stormwater and urban amenity
 - c. Greenfield developments incorporate regional stormwater treatment solutions
 - d. Floodplain areas incorporate wetland habitats
3. Shared objectives for the use of different urban areas are established

Vision Outcome 5: Water infrastructure systems enable efficient and sustainable use of resources to maximise social, economic and environmental outcomes

1. Local, city and regional water infrastructure systems are connected, integrated, adaptive, multi-functional and intelligent to deliver:
 - a. Innovative sustainability and resource efficiency solutions
 - b. Harvesting of stormwater in open spaces
 - c. A comprehensive recycled water supply network to maximise reuse opportunities such as parks, street trees, environmental flows and groundwater injection
 - d. Local processing and reuse of bio-solids and other organics
 - e. New renewable energy technologies in sewage treatment plants
2. Smart technology and intelligent systems incorporate open source data and sensors to inform and improve:
 - a. Decision support tools and processes
 - b. Understanding of customer behaviour and choice
 - c. Asset management and maintenance plans
3. Strong national and regional partnerships support collaboration, innovation and learning
4. Strong partnerships with developers promotes the uptake of innovative technologies (e.g. smart meters and water reuse)

Vision Outcome 6: Water infrastructure systems are innovative, support a diverse and sustainable economy and help shape the Gold Coast as a world leading water sensitive city

1. Digital smart city networks incorporate sensors, integrated data management and data sharing to optimise:
 - a. Informed decision making
 - b. System efficiency
 - c. Demand management
 - d. Diversified customer service and benefits
2. People and organisations experience few barriers and many incentives to innovate
3. Innovation in water systems services supports commercial opportunities and economic benefits
4. Infill and public urban space developments demonstrate innovative water sensitive outcomes

Vision Outcome 7: People understand, cherish and protect their surrounding water environments

1. A targeted communications and education plan improves water literacy and raises awareness, including curriculum-ready education materials made available to teachers
2. Engagement tools raise awareness of the link between ecosystem services, their value and how they support the Gold Coast lifestyle, including:
 - a. Social media
 - b. Signage (e.g. interpretive trails with signage of water sensitive features, sea level rise indicators)
 - c. Mobile applications
 - d. Games
 - e. Visualisations
3. Gold Coast events explore, develop and celebrate the community's connection to water, for example:
 - a. Water festivals
 - b. A public Water Sensitive Cities Conference which features environmental stewardship, water art, education and the United Nations' Sustainable Development Goals
4. There are many opportunities to foster people's connection with water environments (e.g. creating fishing opportunities by incorporating habitat into engineered structures)

Vision Outcome 8: Collaboration delivers sustainability goals and supports environmental stewardship

1. A 'Gold Coast Water Sensitive City Network' provides a forum to drive and maintain collective momentum towards achieving the Gold Coast's water sensitive city vision
2. A compelling water narrative exists that:
 - a. Unites Gold Coast communities
 - b. Articulates the value of the Gold Coast's water sensitive future
 - c. Highlights the importance of collaboration
 - d. Is promoted alongside good news stories
3. Citizen science programs exist that promote environmental stewardship

Vision Outcome 9: Water decisions are made through informed and inclusive processes to support social, economic and environmental sustainability

1. Innovative approaches to decision-making support increased community awareness and engagement in water system services planning and decision-making processes, for example:
 - a. Community visioning processes
 - b. Co-governance models
 - c. Co-design processes (e.g. design charrettes)
 - d. Interactive decision-support tools (e.g. games, collaborative maps, visualisations)
 - e. Citizen juries
2. Real-time water quality monitoring and interactive models of the city support data and reporting that is easily accessible, open and simple to understand
3. Data, tools, analyses and visualisations are centralised online (e.g. on a 'WSC Knowledge Hub') and available as a decision-support, monitoring and communications platform for professional and non-professional stakeholders

Vision Outcome 10: The Yugambeh and Kombumerri people are actively engaged in water decision-making, knowledge sharing and the stewardship of water and land environments

1. Traditional Owners are meaningfully involved in water planning and decision-making through:
 - a. Active participation in collaborative networks across the water sector
 - b. Involvement in local activities of land, water and shore management
 - c. Incorporation of Indigenous narratives into key water strategies and programs, building on their pre-European history of water use and management
2. Special Indigenous sessions are hosted at national and international conferences, including culturally appropriate workshops (e.g. in the form of site visits, inspections of rehab sites, and walks or field trips)
3. Water places special to Traditional Owners are identified on interactive maps in order to support place-based learning (e.g. for schools)
4. Signage and information trails are implemented to raise awareness and understanding of Traditional Owner values and knowledge

7. Conclusion

Leaders and strategic thinkers in the Gold Coast region from across water, planning, environment, community and related sectors came together for this City of Gold Coast (City) and CRCWSC project to envision a future water sensitive Gold Coast and develop a transition strategy for achieving the vision. The results provide an overarching framework to guide initiatives across the many stakeholder organisations that need to work in a collaborative and coordinated manner to drive the Gold Coast's water sensitive city transition.

The insights presented in this Transition Strategy highlight the Gold Coast's strong foundations that can be built upon in striving towards the envisioned water future. The City's scale of operation from catchment to coast, along with its functions and responsibilities across water supply, catchment management, sewerage, stormwater and floodplain management, waterways, open space and environment, provide a promising base for enabling the integration and collaboration needed to deliver water sensitive outcomes.

Across the city there is a broad set of existing capabilities that will be valuable as stakeholders pursue their water sensitive city vision. There is good scientific and practical knowledge, although some specific areas such as groundwater and Traditional Owner involvement need a knowledge focus. Practitioners are highly skilled and recognise the need to expand the water sector's skill base to include disciplines not typically considered in water systems, such as community engagement and urban design. Existing water-related infrastructure performs well and is generally managed effectively, although some improvements to the implementation of policies focused on surface water management and protection of highly valued ecosystems are needed. The Gold Coast's natural assets, including its waterways, beaches, open spaces and hinterlands, offer the community plentiful opportunities to engage with water. This is reflected by the strength of people's connection to and appreciation of natural environments, particularly water environments, which creates an authorising environment that is likely to be receptive to water sensitive solutions and outcomes. The governance and regulatory environment that supports these capabilities is trusted and generally effective.

Harnessing these capabilities through collaboration and a strong learning agenda will enable the Gold Coast to innovate and establish the new water sensitive practices that are needed to orient its water system services to achieve a broad set of liveability, sustainability and resilience outcomes for the city. Advancing practice in this way will require a compelling narrative of the value of the Gold Coast's water sensitive future to give stakeholders, decision-makers and the community focus and clarity around their priorities and aspirations.

This is critical for instilling a sense of purpose amongst the many people and organisations that will need to contribute to achieving the Gold Coast's water sensitive city vision. Ultimately it is persistence and commitment amongst stakeholders, sustained by their shared understanding and common purpose, that will be the most critical ingredient for ensuring success in the Gold Coast's water sensitive city transition.

The enthusiasm and passion of this project's participants, and their eagerness to continue collaborating beyond the final workshop in the series suggests a promising outlook as the Gold Coast plans its next steps in pursuing the transition strategy presented here. With clear focus and strong leadership, the Gold Coast is well-positioned to realise its vision of becoming a world-leading water sensitive city.



CRC for
Water Sensitive Cities

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