CRC for
Water Sensitive Cities

An enhanced WSC visioning and transition planning methodology

Briony Rogers, Alex Gunn,
Katie Hammer, Chris Chesterfield

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An enhanced WSC visioning and transition planning methodology
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Authors

Briony Rogers
Alex Gunn
Katie Hammer
Chris Chesterfield

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Cooperative Research Centre for Water Sensitive Cities
PO Box 8000
Monash University LPO
Clayton, VIC 3800

e. admin@crcwsc.org.au
w. www.watersensitivecities.org.au

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1. Introduction

1.1 About this report

This report describes the methods and principles supporting a recent research program on water sensitive city (WSC) transitions undertaken by the Cooperative Research Centre for Water Sensitive Cities (CRCWSC). The main aim of this report is to provide readers with a sound understanding of the key transition planning steps adopted in the research program and the principles underlying their use.

The methods discussed in this report were used in the CRCWSC's *Integrated Research Project 1: Water Sensitive City Visions and Transition Strategies* (IRP1) and *Mapping Water Sensitive City Scenarios (A4.2)*. These projects aimed to develop tools and processes for bringing city stakeholders together to create strategic alignment and partnerships for transitioning to their envisioned water sensitive future. Through 7 case studies in Australia, the projects developed, tested and refined the CRCWSC's transition support tools, and provided strategic insights about transitioning to water sensitive cities in Australia. The projects also aimed to stimulate practice change through engagement with the needs and interests of senior policy makers, water industry stakeholders and local community members.

The case study locations included Adelaide (SA), Bendigo (VIC), Gold Coast (QLD), Perth (WA), Sydney (NSW), Townsville (QLD), and Elwood (VIC). The engagement process for each city was conducted over a 4–8 month period and involved desktop review by the research team, interviews with workshop participants, a series of one-day workshops, and iterative synthesis and analysis across these data sources to produce key elements of each city's vision and transition strategy. While emergent learning and unique local conditions dictated minor differences in methods between case studies, there were two significant differences in methodologies: half of the case studies used 3 workshops to engage industry and government stakeholders, whereas the others used a 5-workshop methodology. The Bendigo and Elwood case studies also engaged community participants (that is, not representatives of water sector organisations) through a separate 3-workshop process. More information is provided about these differences throughout this report.

1.2 What are water sensitive city transitions?

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

In Australia, the concept of the WSC is now widely used to represent an aspirational state in which efficient, sustainable and productive water use and management is integrated throughout the urban system. Originally the concept was coined to refer to metropolitan areas but is equally relevant to regional cities. In a WSC, people can enjoy reliable water supplies, resource-efficient sanitation, protection from environmental threats, healthy ecosystems, beautiful landscapes, new business opportunities, and cultural and recreational pursuits that help build community resilience.

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

The shift from conventional water management to a more integrated and holistic approach is significant. New technical, design, governance and engagement solutions are required to achieve the range of outcomes associated with water sensitive cities. Embedding these solutions in practice requires the roles and responsibilities of households, communities, local governments, water utilities and state government agencies to change, along with the policy, legislative and regulatory frameworks that guide their activities.

1.3 WSC transition planning processes

The study of transitions has recently gained scholarly attention, as people have become more aware of the sustainability challenges we are facing globally (Loorbach & Rotmans, 2010). The aim of sustainability transitions research is to enable change that would result in a more sustainable system, particularly by overcoming resistant cultures, structures and practices that are 'locked in' to a current unsustainable path. Facilitating transitions is not easy, requiring dedicated attention to disrupt the dominant paradigm (in this case, conventional water management) so that the emerging alternative (water sensitive cities) can become influential.

A key insight from transition studies is that enabling transitional change requires coordinated and aligned action across the many diverse stakeholders that influence a particular type of practice. Effectively steering processes of change relies on a shared vision that provides a framework to orient action towards a common set of goals, as well as a clear understanding of the range of strategic pathways that need to be pursued to achieve the transition.

This research aimed to translate these conceptual insights on enabling sustainability transitions to support real-world water system changes. It drew on a participatory approach commonly used in transition studies, known as transitions management. This approach aims to bring stakeholders together to generate a shared understanding and motivation for enabling transitional change, develop a common vision to guide action, and identify pathways for change that offer a roadmap for navigating change processes. Participation in such processes ideally builds momentum for innovation and action to start implementing the changes identified.

The goal of a water sensitive city has wide-ranging implications for society. Because it involves reconfiguring the way society relates to its water resources, technology and the urban environment, it follows that a long-term, comprehensive and systemic perspective is necessary. Transitions management is an approach that helps us understand and shape this change process by providing an overarching framework that brings together social and cultural practice change, technological innovation, and governance and planning strategies. In the context of a transformation to a water sensitive city, transitions management prompts us to think about the interaction of all relevant actors across society and how this dynamic interaction needs to be coordinated over time (Kemp, Loorbach & Rotmans, 2007).

Transitions management as a process goes beyond traditional strategic planning exercises. It should involve a series of actions to align and influence critical stakeholders and build shared commitment to transition, to organise platforms for collaboration and innovation, and to coordinate strategic and operational transformations in practice. Because it is generally oriented to ambitious long-term goals, transitions management is less concerned with short-term problem solving than with incremental, adaptive and learning-dependent management. Processes therefore benefit from broad participation and conditions supportive of innovative thinking such as looking beyond current barriers and constraints.

This theoretical foundation informed the design of the CRCWSC transition planning process documented in this report. The research adopted a whole-system approach to case study analysis and multidisciplinary, cross-sectoral engagement. The transition planning process developed in A4.2 and IRP1 assumed that the engagement is only the beginning of a long-term process of change and a range of governance changes will be necessary to support the transition.

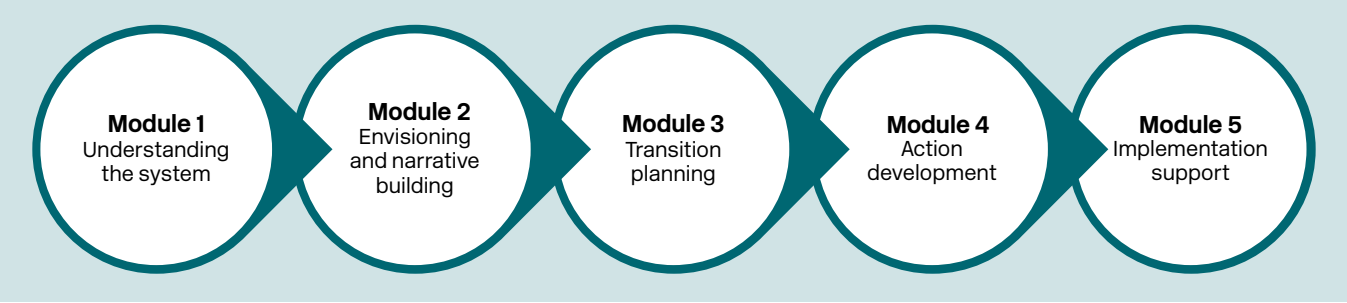

Figure 1: CRCWSC's Transition Planning Process

The process underwent refinement over the course of the two projects and delivery in the different case studies. This report therefore presents project lessons relevant to the methods used, including the consolidation of the different methods into a coherent approach and refined WSC transition planning process.

The transition planning process was designed to respond to local needs and drivers and so varied slightly from case to case. However, it can be broadly broken down into 5 phases, or modules, which form the basis for the structure of this report. These phases are shown in Figure 1 below. Modules 1–3 form the 'light' transition planning process that develops a WSC vision and high level transition strategy. Modules 4 and 5 are included in the full workshop process and expand the vision and transition strategy to include an implementation plan.

Table 1 below outlines the activities and outputs of each of the 5 modules of the transition planning process, as well as the preliminary work needed to lay the foundations for the process.

The strategic framework guiding the development of the WSC transition planning process is outlined in Figure 2 below. It outlines the different components that are needed to develop a WSC vision and transition strategy for a city or region.

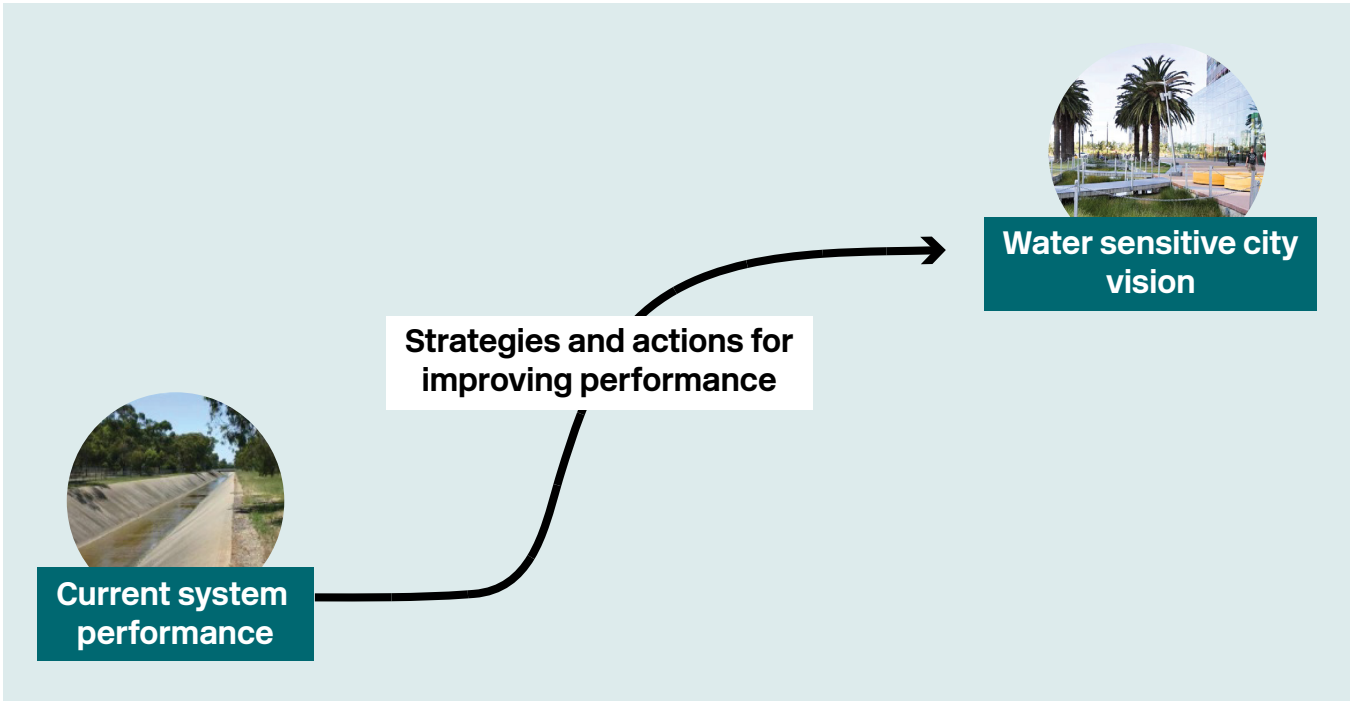

Figure 2: Strategic framework for WSC transition planning processes

Table 1: CRCWSC's Transition Planning Process – Activities and Outputs

Phase	Activities	Outputs
0. Laying the foundations	• Engagement with key institutional stakeholders • Participant selection and recruitment • Individual interviews with participants (optional)	• Strategic positioning of process • Committed set of participants • Preliminary system analysis
1. Understanding the system	• Desktop review of current local reports, plans and policies • Workshop 1: Benchmarking using the WSC Index	• System analysis • WSC Index benchmarking score
2. Envisioning and narrative building	• Workshop 2: Developing a water story and shared future vision	• Local water history • Future WSC vision
3. Transition planning	• Workshop 3: Barriers and enablers to achieving the vision • Analysis using the Transition Dynamics Framework	• Transition Dynamics Framework analysis • Enabling strategies to advance water sensitive practice
4. Action development	• Workshop 4: Action planning	• Initial transition actions list
5. Implementation support	• Workshop 5: Implementation support • Follow-up activities including launch of report, support in setting up transition governance	• Implementation plan • Network of WSC champions

2. Foundations for successful transition planning

A number of foundational factors contributed to the success of the CRCWSC transition planning processes for its case study cities. Commitment to collaboration from participants (and facilitators), multidisciplinary participation and perspectives, and participation of individuals with the necessary influence to exert change over organisations, each made important contributions to the effectiveness of the process. This section elaborates on these key success factors.

2.1 Participant selection and recruitment

A foundational ingredient for successful WSC transition planning processes is assembling a network of champions within each city to shape the strategic agenda and lead the implementation of actions. It is therefore essential to understand who these individuals are, and to engage them early in the process to ensure broad support and buy-in. A transition network of innovators and policy leaders has long been a feature of transitions management (see, for example, Loorbach & Rotmans, 2010). Some researchers have explored the desirable attributes of these individuals, for example that they are (Bos, Brown & Farrelly, 2015; Brown, Farrelly & Loorbach, 2013; Rotmans & Loorbach, 2009):

- strategic thinkers within their organisations or across the sector more broadly
- able to function well in group processes
- able to accept opposing views
- willing to listen to other perspectives and points of view
- strong advocates for sustainable urban water management
- experts in their subject matter, but also have a multi-sector outlook
- have a certain level of influence within their organisation or more broadly.

The criteria used for participant recruitment in this program was a combination of individual capability and expertise, and position of influence in key organisations. Where possible, specific individuals were targeted due to their reputation as WSC champions, level of industry influence or experience in existing cross-sectoral consultation processes.

Typical participants involved in the processes included stakeholders from:

- water utilities
- government departments or agencies with responsibility for water management, sustainability, environmental regulation, land use planning, health, and economic development
- Traditional owner groups
- local governments
- property developers or property industry advocacy organisations
- research institutions
- engineering firms
- consultancies
- capacity building organisations
- community groups
- general community (see section 2.2).

Engaging participants across disciplines is important for creating a more rounded and representative transition narrative, for example one that involves societal change as much as technological and infrastructure innovations.

Within A4.2 and IRP1, the core of the participant groups in each case study was an existing network of people from CRCWSC partner organisations. Case study cities each formed a local steering committee that helped guide local activities and identify the broader group of workshop participants. Participants included individuals outside of the usual water management positions, which resulted in a wide array of disciplinary backgrounds represented. Alongside engineering, there were participants with backgrounds in natural resource management, business management, the biological and physical sciences, education, land use planning, public policy, development, economics, urban design or architecture, and communications. Among participants in the Elwood and Bendigo case studies, there was an even broader disciplinary and sectoral representation due to the added contribution from community members.

Engaging influential individuals from organisations in the transition planning processes helped lay the foundations for necessary organisational and sectoral change. Participants were able to go back to their organisations and drive adoption of the workshop outputs in other strategic and operational processes. Workshops needed to therefore be attractive to

senior decision makers, and pre-engagement activities were needed to ensure strategic positioning with current priorities and secure the necessary levels of support and buy-in.

Since the participants were identified through a targeted recruitment process, invitations were sent directly to the individuals, rather than undertaking an open call for participation. The invitations clearly stated why they were identified, what the project involved, timeframe, and what was expected from their participation. Invitations were co-signed by the CRCWSC and a senior executive member of a local key water organisation (often the state agency or water utility).

2.2 Involvement of community participants

Involving community members in a transition planning process can be a powerful way to build grassroots support for a WSC transition and motivate community action (Lindsay et al., 2019; Rogers, Gunn et al., 2020). If community members are involved, workshop activities will need to be tailored accordingly.

In this research, 2 case studies (Elwood and Bendigo) involved community members. The Elwood case trialled a community-only process, while Bendigo trialled the integration of both community and industry process steps. In both cases, community members were relatively active and engaged around sustainability and the environment,

Table 2: Activity differences for industry vs community groups

Activity	Industry group	Community group
Recruitment	Identification of individuals and invitations signed by senior executive of key organisations	Open invitation publicised through a project website, which included an interactive map Use of a recruitment company to ensure a representative sample
System analysis	Individual semi-structured interviews to understand current challenges and opportunities	Individual phone interviews and surveys to understand current knowledge Interactive online map to identify areas for concern and opportunity
Workshop structure	Five full day workshops held 1 month apart	Three 3-hour workshops held in the evenings 1 month apart Three 2-hour focus group sessions held outside of business hours
Workshop activities	While workshop discussions were supported to be open and creative, they were often based around the use of analytical tools and frameworks (e.g. WSC Index)	Workshop discussions and activities were supported to be open and creative, utilising different engagement methods and building capacity of participants
	For the Bendigo case, 2 industry participants attended the community workshops, and vice versa, to facilitate cross-fertilisation of ideas and support transparency across both processes.	
Workshop reports	Interim reports were circulated that captured workshop discussions, and included main outputs from the community workshops.	Interim reports were circulated that captured workshop discussions using language and visuals more suited to community audiences. For the Bendigo case, they also captured the main activities and outputs from the industry workshops.

presenting a prime opportunity to expand this engagement to a WSC agenda. The processes involved different recruitment and engagement activities for the industry and community groups. See Table 2 below for how these activities differ, drawing on the experience in Elwood and Bendigo.

The process for recruiting participants to the community workshops was very different to the process used for the other workshops. For the Bendigo community workshops, participants were recruited based on an open call for expressions of interest, located on a community-facing project website. This website was publicised in council newsletters, social media, regional newspaper advertising, and direct correspondence to community groups in the conservation and sustainability area. Generally, participants in this process self-selected based on their strong interest in future water planning and management or the more general future sustainability of Bendigo.

Box 2.1: Bendigo community workshop participants

There were 31 participants in the community group. Half of the group were female. Just over two-thirds of participants were aged between 36 and 64 years of age (the most common age range was 46–64, which comprised about 43% of participants). Most participants had a minimum of a Bachelors Degree qualification. About half of the participants in the community group had an interest in participating due to paid or volunteer work in the water sector or natural resource management. Several other participants appeared motivated by particular water management issues, including Bendigo Creek, groundwater management, or management of water bodies for recreational use. The remainder of participants reported a general interest in sustainability, the natural environment, or the future of Bendigo.

There was a small degree of overlap between the community and industry groups; some industry participants attended some of the community workshops to support cross-fertilisation of ideas between the 2 groups. This was made transparent to the participants during each workshop. Two participants recruited through the community process attended the last industry workshop.

2.3 Commitment to ongoing collaboration

At least 3 workshops over a span of 2–3 months were necessary to run vision and transition planning processes in each city, with some cities undertaking 5 workshops over 5 months. The participants therefore needed to commit to ongoing collaboration to sustain productive engagement. This commitment and timeframe needs to be noted and inform early planning and recruitment activities.

Once in a workshop environment, the collaborative ethos may be self-reinforcing. First, the individuals who accepted the invitation to join the workshops may have been more likely to understand the value of collaboration and therefore commit to the desired spirit of participation. Second, early workshop experiences such as generating a WSC benchmark score for the city, exploring the local water story, and developing a shared vision demonstrated tangible benefits of collaboration.

Nevertheless, without the initial willingness to collaborate among participants, the prospect of achieving shared goals and ongoing commitment to implementation could have been affected. In this research, pre-process survey data of invitees indicated most had a tendency to collaborate, with over two-thirds reporting they always collaborated with members of their own organisation on water management issues or collaborated quite often. In addition, the vast majority of prospective participants reported a willingness to collaborate with people in other organisations.

For the participants themselves, the perceived benefits of joining the workshops may have included meeting people from other organisations and learning from their experiences, learning about further opportunities for collaboration, and further developing their professional relationships and networks.

2.4 Workshop delivery and facilitation

Given the representation of broad disciplines, workshops needed skilled facilitation to create conditions for open and candid conversations among participants. Skilled facilitation was effective in drawing out sectoral issues and creating alignment. Facilitated discussions within small groups were typically used to generate new content, while discussions across the whole workshop group focused on bringing the group to a consensus and reaching agreement on content and pathways forward. Clear 'ground rules' were agreed at the start of each workshop that aimed to ensure open and respectful conversation. These included requests to make space for all ideas, allow personal perspectives, respect disagreement and be wary of the need for keeping time.

In this research, workshops were designed to lead participants through an iterative series of discussions to cumulatively develop the component parts of a city vision and transition strategy. This was supported through the production of interim reports after each workshop that synthesised key outputs of workshop discussions and incorporated additional analysis drawing on the desktop review and participant interviews. Later workshops provided opportunities for participants to reflect on the prior interim report and offer revisions.

In terms of logistics, most case studies employed 3–5 full-day workshops, each spaced about 1 month apart. The timeframe was deliberate in maintaining momentum but also giving participants the time to digest and reflect, along with the facilitators time to synthesise the workshop content. Workshops were facilitated by a team of at least 4people in the CRCWSC research team to ensure enough facilitators for small group discussions. Responsibility for leading workshop activities including content presentation and facilitation was often shared between CRCWSC team members. Note-taking and table facilitation was also shared among the team.

2.5 Cultural considerations

This process was developed for the Australian context and was delivered in Australian capital and regional cities. The Australian professional culture is conducive to open conversations about constraints and opportunities within the current water management system and organisations.

When delivering transition planning processes in other countries, cultural context should be accounted for when designing workshop methods and activities. For example, a Monash-led project in Bogor, Indonesia, employed some of the WSC transition techniques and tools, prompting some adaptation to account for the country's hierarchical culture which impeded some participants' willingness to speak up during workshop discussions.

3. Understanding the system

The first module of the WSC transition planning process is all about understanding the current water management system. It is designed to diagnose current strengths and areas for improvement relating to WSC principles and practices. This phase utilises desktop review and analysis, along with application of the CRCWSC's WSC Index, to understand and benchmark current WSC performance.

3.1 Defining system boundaries

Natural systems are typically dynamic and interconnected. Many of the systems we have developed to service our cities (e.g. water supply systems) are also complex and integrated. Biophysical boundaries like catchments will typically not align with governance and political boundaries, hence the need to clearly define the system boundaries from the outset of the project.

In this research, prior to engagement with the broad participant group commencing, a spatial boundary was provisionally set by the project teams in consultation with local steering committees. This was helpful in setting the boundaries of the initial system analysis (discussed in detail in the next chapter). However, it was also important to agree to the spatial boundary at the start of the workshop process with all participants.

Each of the case studies resolved the spatial scope of the project with reference to the urban extent of the city under investigation. For example, the boundaries of the Bendigo case study included Bendigo's suburbs and the parks and recreation areas on at the boundary of urban development. This was not the full area within the jurisdiction of the municipality, but was the area that provided relevant community identification. The largest region examined by area was the Greater Sydney region as defined by the Greater Sydney Commission. This represented a challenge for benchmarking purposes (i.e. which required averaging of scores across the large city area), and though the whole region was considered for IRP1, the value of benchmarking each of 3 different parts of the city (the 'three cities' recognised by the Greater Sydney Commission) separately was recommended for future applications of the WSC Index to provide enhanced insight for localised management actions (Greater Sydney Commission, 2018).

The forward planning timeframe was set at 50 years for each of the case studies. This influenced the content of the vision and scenarios. This timeframe was deemed appropriate to create sufficient opportunity to challenge the status quo and consider that transformative change would be possible over that time horizon, but without seeming too distant from the needs of the present that a utopian and strategically disconnected vision would be developed.

3.2 Preparing the system analysis

Understanding the current biophysical and socio-institutional water system is a significant step in initiating effective WSC transitions. The development of a system analysis is similar to undertaking a SWOT (strengths, weaknesses, opportunities and threats) analysis at the outset of a major project. IRP1 found it beneficial to use the 7 WSC Index goals (see section 3.3) as the organising framework for the system analysis, but other approaches could be adopted. The WSC Index provides a useful framework for structuring the system analysis to ensure the broad range of WSC outcomes is considered in the process from the beginning. No attempt was made to score the indicators at this stage – this was left to the benchmarking workshop.

The system analysis was informed by a *desktop review* and *interviews and surveys*, and was distributed to participants before the first workshop. In sharing the system analysis with participants, the aim was not to confine discussion to the contents of the system analysis but to provide a common knowledge base for participants and stimulate discussion across the breadth of the system.

Desktop review

A desktop review of relevant literature on the local system in question provides important insights into WSC drivers and enabling conditions. For each case study, the project team reviewed relevant literature to examine key themes and developments that have been significant for the city's water system, and identify evidence important for benchmarking the city's current water sensitive performance and transition progress. Key sources of primary and secondary data included:

- government policies or strategies, acts and regulations
- government and agency corporate plans, annual reports and websites
- other 'grey' literature including discussion papers, or independent reviews
- academic literature
- Australian Bureau of Statistics and Bureau of Meteorology publications.

Interviews and surveys

Interviews can examine participants' understanding of water management issues, major challenges and opportunities, organisational priorities, and professional and organisational culture, systems and processes.

Pre-workshop interviews were conducted with practitioners across each city's water, development, planning and environment sectors. Effort was made to interview all workshop participants, and those participants who were not able to attend the workshops but still wanted to be engaged. Most interviews were conducted individually, though in

3.3 Delivery of benchmarking workshop

some cases group interviews were conducted. The majority of interviews were conducted face-to-face, with some by telephone when this was not feasible. Interviews examined participants' understanding of the city's water management issues, major challenges and opportunities, and professional and organisational culture, systems and processes. The interview questions were open-ended to allow for in-depth discussion about personal experiences and perceptions.

Interviews were also conducted with community participants of the Elwood and Bendigo case studies, though with different objectives, methods and application to the system analysis. In these cases, participants were asked to complete a 25-minute telephone-based survey that included open-ended questions about their interest in water management issues and a range of multiple choice questions that addressed their knowledge and attitudes to water sensitive transitions, trust in government decision making and demographic factors. The output was useful for engagement and evaluative purposes, but was not integral to the system analysis and benchmarking.

Each of the case study workshop series (except Elwood) commenced with application of the WSC Index tool to benchmark the city's current water sensitive performance and diagnose key areas of strength and weakness in relation to 7 water sensitive city goals: good governance, community capital, equity of essential services, productivity and resource efficiency, adaptive infrastructure, ecological health and quality urban space.

The WSC Index was designed by the CRCWSC in collaboration with partners in the Australian water sector. Its aims are to generate strategic insights into the current performance of the urban water system and enable inter-city learning and evaluation. It includes 7 goals of a WSC and 34 corresponding indicators (Figure 3) that are scored on a 1–5 rating scale. More information about the development and application of the WSC Index can be found in Rogers, Dunn et al. (2020).

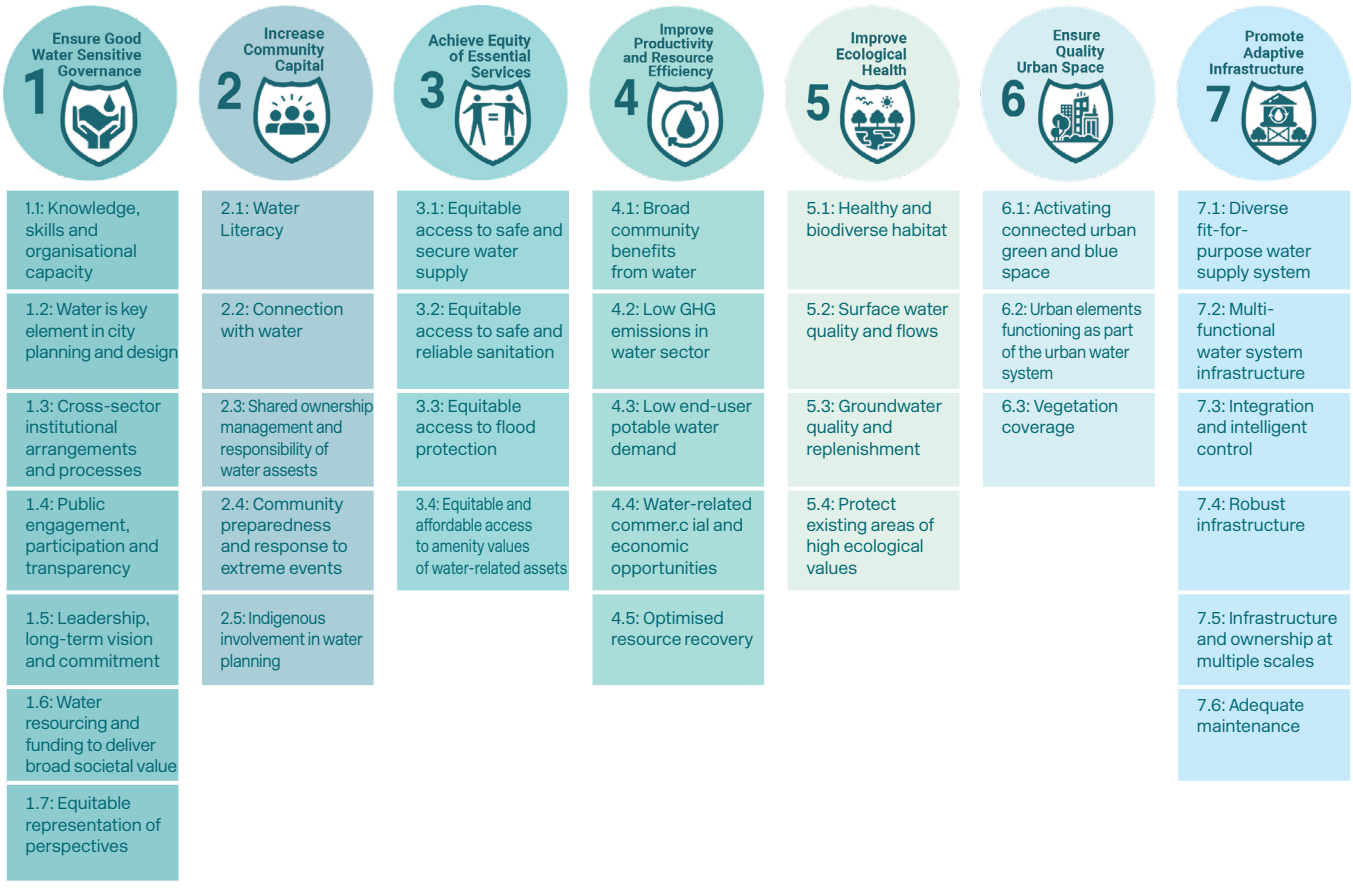

Figure 3: The WSC Index goals (top row) and indicators for each goal

4. Narrative building and envisioning

The WSC Index is applied through a collaborative workshop involving key stakeholders across a city's water, planning, environment and development sectors. It is designed to be applied for a geographic area (e.g. metropolitan city, local government area, or region). Use of the WSC Index in IRP1 was to generate shared understanding of the current water management practices of the case study city, including areas of strength and limitations.

The process for applying the WSC Index has been standardised to ensure consistency in scoring across applications (see Rogers, Dunn et al. 2020). Workshop participants first score Goal 6 *Ensure quality urban space* as an entire group, then break out into 2 separate groups to score the remainder of the indicators. One group scores the biophysical goals and indicators, and the other group scores the socio-institutional ones. The WSC Index workshop takes participants through a 3-step process for scoring each indicator:

1. Live polling using an interactive web-based tool to gauge individual participants' perspectives on the score for the indicator in question
2. Discussion to uncover evidence and justification to inform the indicator's score
3. Determination to reach consensus among the participants on the score to be assigned.

The live-polling technology allows results to be shown promptly to initiate discussion. The final agreed-upon scores are recorded and entered into the interactive Index website to display results. The website shows the goal and indicator scores as well as a number of different filtering options, which allows for discussion around the results and what they mean for informing local water management practices.

At the end of the first workshop, the facilitators led a broad discussion among participants to elicit their initial reflections on their city's WSC Index result. Participant comments at the end of the day invariably highlighted the value they gained from the workshop process, not only in reaching the benchmarking score but in the knowledge sharing and exchange that occurred across diverse stakeholders.

After the workshop, the project team wrote up the results in the first interim report for the process, including the key discussion points that emerged for each indicator and a justification of its score. The interim report was circulated to participants ahead of the next module's workshop.

The second model of the WSC transition planning process moves from the analytical focus of the benchmarking in module 1, into a more reflexive and creative set of activities that aim to draw out the deep values, connections and aspirations that participants have relating to their city. The narrative and vision that emerges from module 2 create a foundation for strategic planning and action development that will lead to transformative outcomes.

Module 2 was typically delivered in a 1-day workshop with participants.

4.1 The water story: developing a shared understanding of the city's water history

When preparing for future changes, it is helpful to look to the past and learn from patterns of change and the social and institutional responses to key events. The first major workshop activity involved developing a shared water story that narrated key water-related trends and events that have shaped how water is managed in the city today. Key moments that have shaped the city's water story were captured according to 5 themes: infrastructure and technical systems, governance and policy, environmental events, community trends, and personal experiences.

In IRP1, the water story was developed through a collective timeline process. A large timeline was hung on the wall and participants were invited to add sticky notes identifying key events and changes according to the 5 themes mentioned above, which were represented by different colour sticky notes. On the whole, the activity indicated there was good depth of knowledge of water among the city stakeholders in each case study. There was a natural bias towards events that occurred in the past 25 years, a period with substantial overlap with the water industry careers of some participants.

Once the timeline was populated, a rough narrative of the history collected on the timeline was co-created through facilitated discussion. In this 'time travel', the facilitator identified key themes evident and sought clarification, elaboration and reflection from participants, building on the comments posted along the timeline. This led to the

identification of dominant drivers and key patterns of change that may be likely to continue to be influential into the future, as well as helping participants create a deep connection to the long history of their place.

Following the workshop, the timeline was synthesised into a coherent written narrative with additional reference to other accounts of history to support the story.

4.2 "I love my city": sharing personal values of place

Following the water story activity, the workshops then took people through an activity to connect people with their local city, town or region, and to describe what they value and appreciate about living or working there. This is an important activity to help participants further connect with their local place and to draw out important place-based outcomes they want to ensure or enhance in their aspirational vision.

Figure 4. Timelines displaying the water story for Townsville (top) and Bendigo (bottom)

4.3 Future drivers and rationale

In IRP1, this activity took the form of a short (15–20 minute) discussion to bridge the city's water history with an exploration of its water future. In this activity, participants were asked what they love about their city and why they choose to live or work there. The aim was to begin the envisioning process with a positive mindset, identifying what is important to the city that should be preserved in the vision, or what has the potential to be impacted in a business-as-usual scenario.

Box 4.1: "I love Townsville"

Townsville participants were quick to promote their city's unique dry tropical environment. They appreciated their surrounding natural assets (Great Barrier Reef, Castle Hill, national parks) and the associated active, outdoor lifestyle offered. They valued the connectedness of their communities and the benefits of a city scale that puts everything they need within a short drive.

The discussion of the city's water story up to the present day was often followed by a short presentation and discussion of the future drivers and trends expected to impact the city. The aim of this activity was to set the scene for the envisioning process with plausible scenarios that would likely demand new technological, social, governance and design responses. This activity varied in the different cities, with some just involving presentations from invited speakers or project team members, and others involving workshop discussions to identify the specific drivers and impacts that would most significantly affect the region, and their future implications on water management.

Box 4.2: Future drivers for Sydney

Sydney's second workshop included a session dedicated to exploring future drivers. The goal of the discussion was to develop a rationale for why a WSC transition is needed.

The session began with 2 presentations by guest speakers to set the scene for a future vision. The presentations discussed global and national trends in society, the economy and the environment, and changes in transport and communications technology and water infrastructure.

At tables, participants were then asked to discuss 1 of 4 highlighted drivers and what they mean for a water sensitive Sydney. Although the 4 drivers of climate change, globalisation, urbanisation and population growth had been preselected, other drivers could also be discussed. Participants were asked to consider and explore the impacts and consequences of the drivers, and the implications were captured on paper.

A facilitated whole group discussion then identified critical drivers and impacts for Sydney. A key question asked of participants was which impact was considered the most important at each table.

This process was repeated for the remaining drivers.

4.4 Envisioning

Envisioning is present in all types of transition management processes and usually takes a central part in the early stages because it is key to setting shared long-term goals. The vision serves various functions: as guidance for shaping water sensitive action, as a communication aid to explain water sensitivity in the local context, and as a means for mobilising stakeholder support for a sustainable future. Visions therefore benefit from efforts to reflect a diversity of perspectives, building consensus among stakeholders, and depicting a plausible and desirable future with which stakeholders can relate. In IRP1, envisioning activities occurred iteratively over numerous workshops to create deep connection, ownership and inspiration among participants. As would be expected, no 2 city visions in this project were the same; each city's vision reflected its historical context and distinct social and water management contingencies. Refer to the individual city transition strategies for more information about the content of case study visions.

Developing vision outcomes

While a large number of envisioning methodologies exist, the methodology developed through this research involved a creative brainstorming activity that encouraged participants to write short scenarios for the city showing either a positive or negative water future. The prompt for participants was writing newspaper headlines that would accompany a profile of the city 50 years from the present day. Box 4.3 presents an example of the outputs of this activity. The headlines were grouped into common themes and turned into high level vision outcomes.

Box 4.3: Vision development in Sydney

As with the other case studies, participants in Sydney were asked to write headlines to accompany an article in year 2067 about the success (or failure) in tackling water management challenges. Examples from this activity are presented below:

- Sydney beats global warming: the city that cooled itself
- Sky gardens provide refuge for threatened species
- Sydney smashes renewable water targets
- Wake up to Sydney – the humble water sensitive city
- Rivers get a vote
- Living the water dream.

The ~60 headlines produced by participants were grouped into 6 basic *outcomes* for the vision: accessing urban amenity, ecology, resources/technology/energy, innovation and economy, knowledge and values, and governance.

The six *outcomes* set up the next activity, with each table of participants allocated up to 2 themes to expand on the outcomes. Taking the 'knowledge and values' outcome as an example, these were amplified by participants into a detailed scenario featuring outcomes such as:

- Respectful relationship with water
- Connectivity with mother earth
- Opening conversations to connect
- Celebrate what connects us
- Different cultural connections to water – hyper-diversity
- Recognition of shared assets – not just something governments manage
- Water creates a sense of place and connection.

Expanding the visions

The 'headline' vision statements resulted in a sense of the high-level common goals for the city, and, in the case of negative headlines, an expression of what may be lost if action is not undertaken. The next step in the process was to expand on the outcomes in more detail to bring them to life and make them relevant to the local city. In this activity, participants were asked to explore the vision outcomes and connect them to local people and place. Discussions explored the daily experiences of water and the broader environment for residents in the different themes. For all case studies except Bendigo, only the positive themes were expanded in this stage. Box 4.4 presents more detailed discussion of the Bendigo process, which had the added step of expanding on the negative scenarios.

Synthesis and refinement

Following an initial vision development workshop, the many ideas generated needed to be brought together into a coherent vision narrative. The objective was to both reflect participant deliberations with transparency and to also articulate a compelling vision to capture broader stakeholder interest. For each case study, between 6 and 10 distinct *outcome statements* were identified through analysis of workshop discussions and outputs. In addition to the thematic vision narratives, synthesis also brought together the dominant ideas into a single overarching vision statement for the city. This work was initially undertaken by the project team following the envisioning workshop and presented to participants before the next workshop in an interim report.

The preliminary vision was then presented at subsequent workshops for discussion and refinement. Participants were asked whether the presented work captured their vision, whether it resonated for the city as a place, and if there was anything missing. This gave them the opportunity to clarify aspects of their vision, stretch their ambition and ensure it was a truly local expression of their aspirations for their city.

Box 4.4: Backcasting undesirable scenarios in Bendigo

In a Bendigo workshop with industry participants, the session following the development of headline vision statements sought to expand on the vision themes with more detailed discussion of the outcomes for Bendigo. This began with the undesirable vision statements, which were distilled into 4 scenarios:

- climate extremes and fire
- poor health and inequality
- poor environmental health
- population decline.

In this activity, participants were asked to move into groups to develop a narrative about how the undesirable future of Bendigo unfolded through a range of causes. Some tables chose to record events on a timeline encompassing the 50 years to 2067.

Participants then worked on the positive vision themes in table-based groups, focusing on expanding on the ideas of the vision themes with the same process used in other cities.

5. Transition planning

An important step for any city wanting to transition to a more sustainable future is to understand the city's current barriers and constraints and to articulate a pathway for overcoming them. Transition planning, the third module of this process, is therefore a key step in understanding how to progress a city's current water sensitive performance and make strides towards its vision. This section outlines a number of transition planning frameworks that are useful in this step, and how they were applied in this research.

5.1 Transition planning frameworks

Sustainability transitions are substantial processes of societal change that involve a broad range of stakeholders. They typically feature technological advancement and innovation, new institutional arrangements and power dynamics, and new system understandings. To be successful, the transition will need to overcome interests promoting existing infrastructure and institutional choices that lead to path-dependent lock-in, and potential backlash to innovations that are perceived failures (Figure 5). This thinking is useful for general transitions towards sustainability, and can be applied to various on-ground practices.

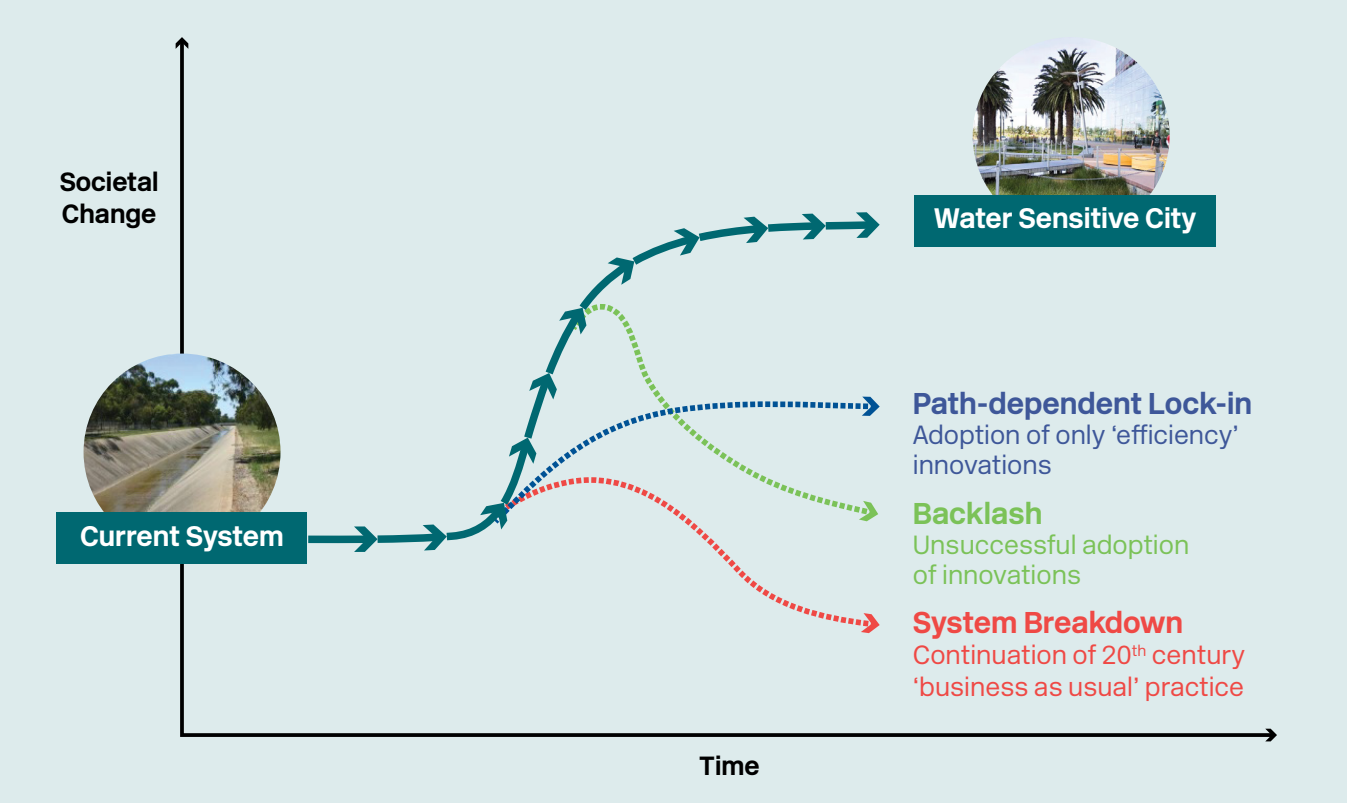

Figure 5: Schematic of transition progress and potential causes of failed transition **(adapted from van der** Brugge & Rotmans, 2007)

Urban Water Transitions Framework

The Urban Water Transitions Framework (Figure 6) is a framework that has been developed specifically for transitions in urban water management. It is used to help cities identify the 6 distinct developmental states that cities may move through on their path towards increased water sensitivity, and to help cities articulate their future water sensitive objectives.

While the Urban Water Transitions Framework (Figure 6) aims to support cities in becoming more water sensitive, it does not provide guidance on the specific enabling pathways that will help cities achieve their unique WSC goals.

Transition phases for policy and practice change

The types of strategic actions that will be most effective for driving a transition will vary depending on a city's current phase of transition. For example, early in a transition, emphasis should be on creating a shared agenda for transition and incubating innovation, while late in a transition, emphasis should be on stabilising the new practice through policy, regulation and other institutional structures.

CRCWSC research has identified 6 phases of transition as an old practice makes way for a new, innovative practice as part of a fundamental change in a complex system. An empirical study of transition to water sensitive urban design in Melbourne identified a series of advocating and contesting narratives that accompanied these phases, as shown in Figure 7.

IRP1 used Figure 7 in a number of the case studies to guide an intuitive discussion with workshop participants that reflected on the narratives they were hearing in their network promoting or resisting further transition progress to their water sensitive aspirations. This served to point to a likely current phase of transition, and therefore the types of strategic actions that may be most effective for driving further change. Brown et al. (2016, p. 16) explained this concept as follows:

Narratives are a useful indicator of the dominant perception of current practices, and the change in narratives over time can usefully reveal a city's current phase of transition. For example, in the early phases of a transition, the dominant advocating narrative may reflect a realisation that stormwater pollution is causing poor waterway health, while the dominant contesting narrative rejects this assertion. By the end of a transition, the advocating narrative may be that improved stormwater management helps deliver enhanced liveability outcomes, while the contesting narrative may challenge the value of improved stormwater management by diminishing its ability to address society's goals.

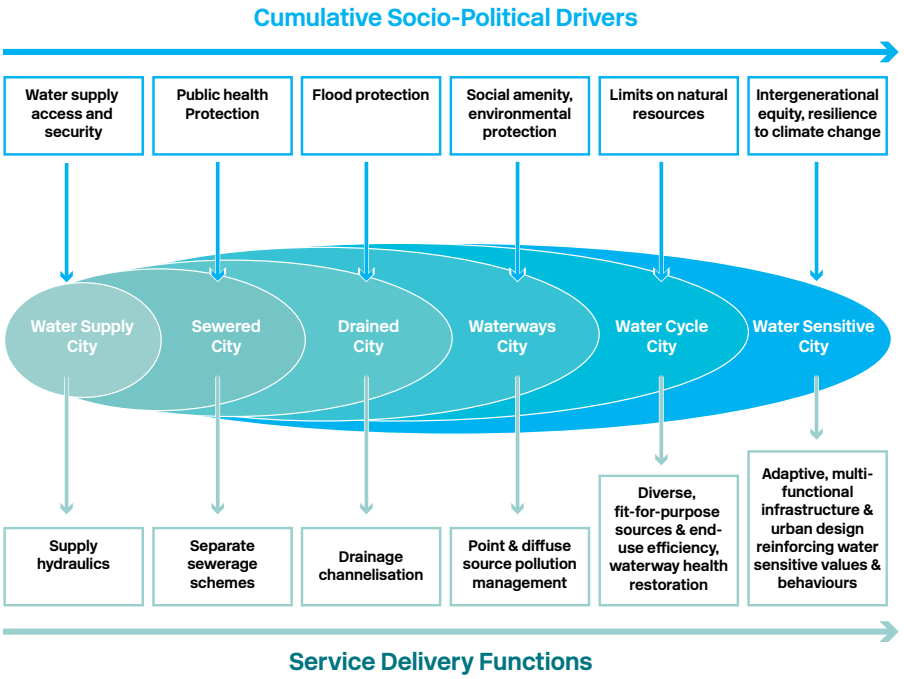

Figure 6: Urban Water Transitions Framework (Brown et al., 2009)

While the advocating and contesting narratives framework provides a useful discussion tool, it does not provide the analytical detail needed to define targeted strategies and actions. It is therefore useful in a shorter workshop series or to be used to set the scene for future transitions analysis.

Transition Dynamics Framework

The Transition Dynamics Framework (TDF) uses the same concept of transition phases described above, but takes a more analytical approach that helps city stakeholders diagnose their current phase of change and associated strengths and weaknesses to inform the design of tailored and effective WSC transition strategies.

The TDF is structured around key enabling factors needed to progress a transition to a new practice (Brown et al., 2017). It sets out 6 broad factors that have been found to enable transitions: Champions, Platforms for connecting stakeholders, Knowledge, Projects and applications, Implementation guidance, and Administrative tools. The matrix is a diagnostic tool that assesses the presence or absence of enabling factors as an indicator of transition phase in relation to its aspired change in practice (Figure 8). It also provides a checklist of the factors that should be deliberately and sequentially built up to inform the prioritisation of strategies and actions. The TDF analysis guides the development of the priority strategies for establishing the necessary enabling factors and in turn overcoming transition barriers to support the city's transition.

As a city progresses through its transition, it will fulfil the requirements of the enabling factor at each phase, and in its current phase of change the city may meet only some of the conditions, which places it at risk of regression. Progression along each phase may be uneven for the 6 enabling factors (e.g. a city may be in Phase 4 for Champions and Platforms for connecting but only Phase 3 for the other factors).

The usefulness of the TDF derives from the fact that water sensitive transitions must occur in complex social, institutional, and technical contexts. In conditions of complexity, there are many different strategies that should be considered together, including organisational change, leadership, cross-sector collaboration, technology demonstrations, research, and community engagement and education activities. The TDF helps cities understand the different types of strategies and actions that may need to be undertaken.

In the transition planning process developed and refined through his research, the TDF became a central framework for developing a shared understanding among participants of how the transition was likely to unfold in case study cities. It was also used to determine the most effective types of interventions to progress the city's transition based on analysis of local context.

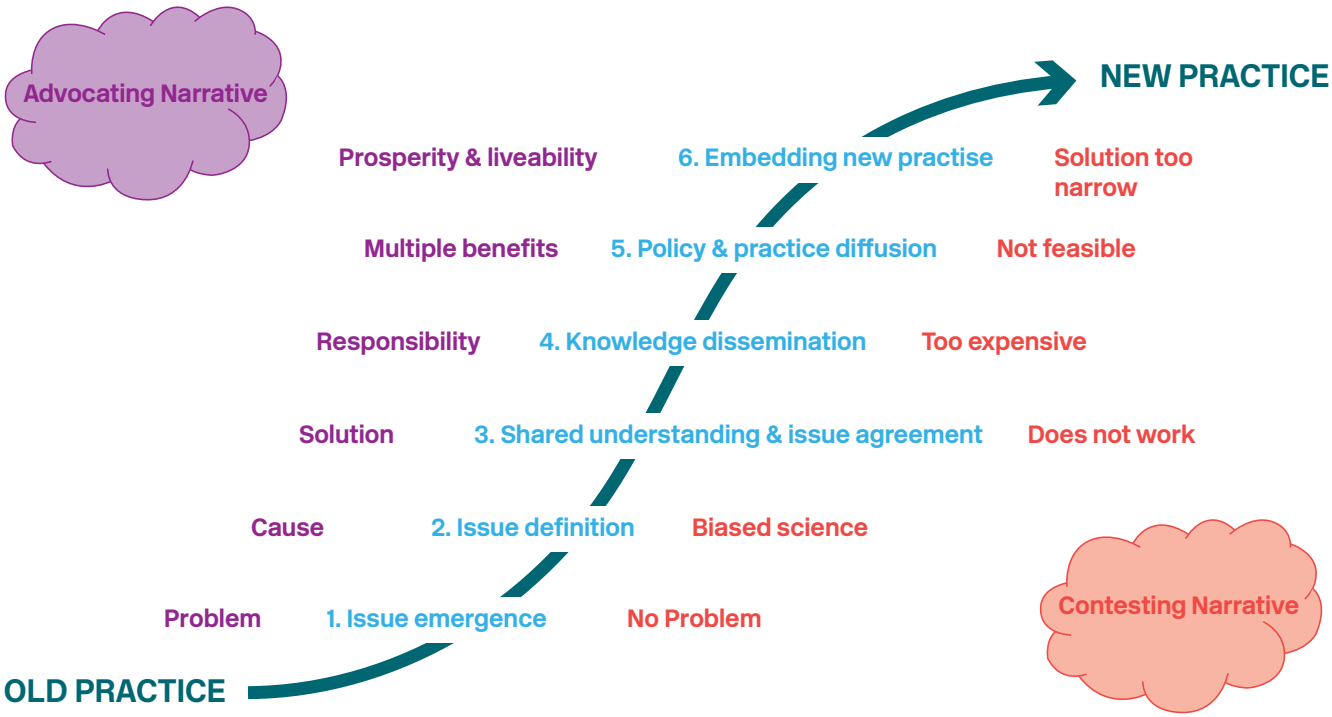

Figure 7: Advocating and contesting narratives present in WSC transitions (Brown et al. 2017)

Transition phase	Champions	Platforms for connecting	Knowledge	Projects and applications	Practical/Implementation guidance	
					Technical	Administrative
1. **Issue emergence**	Issue activists	N/A	Issue highlighted	Issue examined	N/A	N/A
2. **Issue definition**	Individual champions	Sharing concerns and ideas	Causes and impacts examined	Solutions explored	Data and evidence collected	N/A
3. **Shared understanding & issue agreement**	Connected champions	Developing a collective voice	Solutions developed	Solutions experiment-ed with	Preliminary practical guidance	Administrative instruments explored
4. **Knowledge dissemination**	Influential champions	Building broad support	Solutions advanced	Solutions demonstrat-ed at scale	Refined practical guidance and design tools	Early policy and performance standards
5. **Policy & practice diffusion**	Government agency champions	Expanding the community of practice	Capacity building	Widespread implemen-tation and learning	Implementation guidance and guidance for other sectors	Refined policy and standards, early regulation
6. **Embedding new practice**	Multi-stakeholder networks	Guiding consistent application	Monitoring and evalua-tion	Standardi-sation and refinement	Comprehensive/ standardised design and implementation guidance	Comprehensive policy and regulation

Figure 8: Transition Dynamics Framework – assessing the enabling conditions potentially present during transition phases

5.2 How we applied the transition planning frameworks

Workshop discussions

Workshop discussions varied with the length of the process being implemented (3 or 5 workshops), and as our process methodology was refined over the course of the research. In the earlier transition planning process applications (Adelaide, Gold Coast, Perth), workshop activities focused on exploring the barriers to achieving the vision outcomes. Cities that underwent the process later (Sydney, Townsville, Bendigo) focused on exploring what enablers were present across the types of enabling factors of the TDF. Both workshop activities were used to inform transitions analysis using the TDF, however facilitators found the discussions around enablers elicited more useful information and left participants feeling more engaged, knowledgeable about transitions and more positive about driving future actions.

Some of the shorter case studies presented and framed discussions around the advocating and contesting narratives framework. While this discussion was useful in allowing people to explore current narratives and reflect on transition progress, the facilitators found it does not draw out sufficient detail to allow the TDF analysis.

Box 5.1: Identifying barriers to transition in Adelaide

In the second Adelaide workshop, participants explored Greater Adelaide's progress in its WSC transition journey by unpacking the barriers stakeholders were experiencing in trying to implement more water sensitive practice. Insight into these barriers highlighted whether important enabling factors were present or absent, indicating how advanced Greater Adelaide was in its transition towards desired water sensitive practices. Discussions focused on identifying the transition barriers for each of the WSC Index goals. This was a short (20 minute) activity.

The discussion of participants in the workshop was combined with evidence from Workshop 1 discussions and pre-workshop activities (involving interviews and desktop review) to support TDF analysis of the enabling environment for Adelaide's water sensitive transition.

Transitions analysis and development of transition strategies

Some case study cities involved presenting the TDF in the workshop and discussing the presence or absence of enabling factors in detail, while some case study workshops did not involve presentation of the TDF at all, and rather used it for analysis behind the scenes. In all case studies, the project team undertook a traffic light assessment using the TDF to determine current transition phase and therefore the corresponding transition strategies. This was always done with close involvement from the local steering committee. An example of the TDF analysis is presented below.

Development of enabling strategies focused on 2 scales of analysis:

1. Changes toward specific water sensitive practices that would be needed to achieve the vision, which generated tailored strategies for each vision *outcome*
2. Progress for the city's overall WSC transition, which generated overarching strategies to support general advancement toward the vision.

The process for each of these outputs is described below.

1. Progress in changing specific practices
   a. A practice change was identified that corresponded to delivering individual vision themes. Each practice change was assessed using the data collected in desktop review, interviews, and workshop discussions to determine the position on the TDF matrix. A traffic light system was used to assess presence or absence of individual enabling factors, where green indicates the enabling factor is fully present and regression into the previous phase is unlikely; yellow indicates some presence but the enabling factor is vulnerable to regression to the previous phase; red indicates a complete absence of the enabling factor and that progression is unlikely without intervention; grey indicates a transition phase not yet ready for consideration (Figure 9).
   b. Where multiple practice changes were required to deliver the vision theme, each practice change received a separate matrix analysis.
   c. Index goals and indicators were mapped to vision *outcomes*, which results in an assessment of transition phase(s) and enabling environment for both WSC Index goals/indicators and each vision *outcome*.
   d. The analysis was supported using data from earlier investigations such as quotes from interviews or workshop discussions.

e. For each vision outcome, strategies were selected based on their suitability for the transition phase and enabling factor the city has been identified as needing to strengthen. The strategies were further tailored to be relevant to the local context. Example strategies for Bendigo can be found in Table 3.

2. Progress in overall transition
   a. All TDF matrices assessed for the city were reviewed across all practice changes required to achieve the city's water sensitive vision.
   b. A matrix that represents the city's overall transition was prepared. This matrix considered the presence or absence of enabling factors that span the city's entire urban water and planning systems.
   c. Suitable overarching strategies were selected to address the enabling factors in most need of strengthening. The strategies were selected based on the factors' overall transition phase and tailored to be relevant to the local context.

Transition phase	Champions	Platforms for connecting	Knowledge	Projects and applications	Practical/Implementation guidance	
					Technical	Administrative
1. Issue emergence	Issue activists	N/A	Issue highlighted	Issue examined	N/A	N/A
2. Issue definition	Individual champions	Sharing concerns and ideas	Causes and impacts examined	Solutions explored	Data and evidence collected	N/A
3. Shared understanding & issue agreement	Connected champions	Developing a collective voice	Solutions developed	Solutions experimented with	Preliminary practical guidance	Administrative instruments explored
4. Knowledge dissemination	Influential champions	Building broad support	Solutions advanced	Solutions demonstrated at scale	Refined practical guidance and design tools	Early policy and performance standards
5. Policy & practice diffusion	Government agency champions	Expanding the community of practice	Capacity building	Widespread implementation and learning	Implementation guidance and guidance for other sectors	Refined policy and standards, early regulation
6. Embedding new practice	Multi-stakeholder networks	Guiding consistent application	Monitoring and evaluation	Standardisation and refinement	Comprehensive/ standardised design and implementation guidance	Comprehensive policy and regulation

Green boxes indicate the enabling factor is fully present and regression into the previous phase is unlikely.
Yellow boxes indicate some presence of the enabling factor, however they are vulnerable to regressing to the previous phase.
Red boxes indicate a complete absence of the enabling factor, and that progression is unlikely.
Grey boxes indicate the enabling factor is not yet relevant due to absence of preceding enabling factor

Figure 9: Example traffic light assessment for TDF analysis

Table 3 below shows how the traffic light assessment was used to determine enabling strategies for Bendigo. The strategies focus on the cells that are yellow to ensure the necessary enabling factors are built up sequentially to create strong foundations that lock in the changes that reinforce the desired new practice. The TDF analysis detailed in this section was undertaken by the project team outside of the workshops and presented back to the participants, who were given the opportunity to reflect on and refine the strategies.

Table 3: Example enabling strategies for a practice change in Bendigo

No.	Strategies	Outcome
1.1	Develop and communicate a compelling narrative of the liveability and health benefits of multi-functional and connected water sensitive urban form in Bendigo	Broad support exists from across private developers, organisational leadership the general public
1.2	Develop a platform for connecting and aligning stakeholders and promoting a collective strategic voice advocating the health and wellbeing benefits of water sensitive solutions	A broad range of stakeholders understand and are able to communicate the benefits of water sensitive urban design solutions
1.3	Embed the water sensitive vision of a healthy Bendigo based on a compact, connected and green urban form in all strategies under development	There is commitment, action and leadership from agencies and other organisations in driving the implementation of water sensitive urban form solutions
1.4	Evaluate the available evidence to quantify the social, environmental and economic benefits of water sensitive urban form to build a business case and inform a compelling narrative	The costs, benefits and risks of quality urban space solutions are understood and communicated to a broad range of stakeholders
1.5	Develop a broader suite of solutions for water sensitive urban forms, with particular attention to governance processes and structures	A comprehensive suite of solutions is developed ready for testing, refinement and widespread implementation
1.6	Implement trials and significant demonstrations of water sensitive urban space solutions, incorporating an explicit learning agenda	Water sensitive urban form solutions are demonstrated to provide evidence of their costs, benefits, and risks, and to learn about the capabilities needed for their effective implementation to inform the development of practical guidance

6. Action development

The fourth module in the methodology is focused on developing actions that will advance the strategies identified and prioritised in the previous activities. Only the case studies that involved 5 workshops in the series engaged in action development – Bendigo, Gold Coast and Perth.

6.1 Principles for action development

Enabling strategies developed with the TDF describe the approaches needed to progress water sensitive transitions in the city in relatively broad terms. The strategies therefore need to be operationalised through multiple actions to lead to change on the ground. Enabling strategies (identified through the TDF) typically operate at the system level, and usually require multiple stakeholders to work collectively to deliver the strategic objectives. Actions, on the other hand, are usually more narrow in scope with clear organisational or stakeholder leads. Enabling strategies often require several actions to be implemented linearly or in parallel.

Given their greater specificity, actions must have a shorter-term focus as implementation needs to be responsive to evolving operational contexts and drivers. These can include changes in resources, political imperatives, technical or social feasibility or environmental factors (e.g. drought, flooding, or major pollution).

When developing actions to implement enabling strategies, it is important to be mindful of the different options available. Actions can:

- target diverse results, such as consumer behaviour, industry practices, infrastructure development, or knowledge and innovation
- operate across different sectors, such building, water services, recreation, or health
- be led by different stakeholders, such as state or local governments, utilities, industry regulators, or the community.

6.2 Action development approaches

Action development in this research involved an iterative brainstorming and prioritisation process. In most cases, participants were presented with the enabling strategies identified through application of the TDF and asked to develop ideas that would help progress each strategy. The conversations focused on what could be done on-ground in the short to medium term to progress individual enabling strategies. Participants were prompted to think about existing opportunities that could be leveraged.

Initial conversations focused more on brainstorming and considering all possibilities. Subsequent discussions and activities consolidated and prioritised the actions list and began to assign timeframe, cost, and responsibilities for implementation. This process created a template for the local stakeholders to then further progress within their organisations at the conclusion of the CRCWSC-facilitated process.

Community action development in Bendigo and Elwood undertook a similar approach, but naturally focused on things the community could do or influence, and their interactions with councils or organisations. For the Bendigo process, the community ideas complemented the ideas from the industry professionals involved in the parallel series of workshops, creating a comprehensive suite of actions that could be driven by diverse local stakeholders to accelerate the transition to their vision.|

Box 6.1: Action brainstorming in 5-workshop processes

Brainstorming of actions was conducted in small facilitated groups. Tables were allocated either particular vision outcomes with corresponding enabling strategies or one of the overarching strategies, and facilitators invited participants to present ideas on sticky notes and cluster similar ideas. Facilitator prompts in these activities focused on clarifying the rationale for the action, and potential implementation challenges and the resulting adaptations that could be made to the actions.

Box 6.2: Action prioritisation in Bendigo

In the last Bendigo industry workshop, participants were invited to review the actions developed in the 2 previous workshops with the community group and industry group and subsequently synthesised by the research team. Participants were tasked with reviewing the text of each action for relevance to the strategies and potential for complementary action.

Participants were then asked to return to the same groups they had formed in the previous activity to examine the feasibility and importance of the actions. This was not designed as a full-feasibility analysis, but as a means to deepen the enquiry into the actions. Participants were asked to discuss the likely benefits of each action, both in terms of direct impacts and as a potential enabler of other actions. For feasibility, participants were invited to comment on the potential financial cost, any social or technical challenges and capacity to implement. For each action, a rating of benefit and feasibility was decided by consensus along a 2-point axis.

7. Implementation support

The final module, 5, brings together all the insights generated through the earlier stages of the process to consider what initial and ongoing resources, governance arrangements and external support will be needed to drive implementation of the city's WSC vision and transition strategy.

7.1 Transition governance

In all city case studies, it was recognised that not one organisation or agency is responsible for adopting or implementing the WSC Vision and Transition Strategy or the accompanying implementation plan (where applicable). The vision outcomes, strategies and actions are targeted at the city as a whole and not one particular organisational remit. It was therefore critical to guide project participants in discussion that reflected on how responsibility for implementation of actions spanned across numerous organisations and individuals. In each case study, participants recognised that a cross-organisational group of participants would need to lead its implementation and delivery, and that tailored governance arrangements would be needed to support this implementation.

In the cities that underwent the longer process and developed actions, there was agreement across the participant group to continue meeting as a network to ensure implementation of actions. These groups agreed to operate as informal communities of practice that were supported by key agencies (e.g. water utilities, state government agencies or local governments).

7.2 Embed strategies and actions within organisational frameworks

The WSC visions and transition strategies developed through this process methodology are designed to be city-wide and cross-organisational, rather than adopted by a single organisation or agency. However for the strategies and actions to be implemented, they need resourcing and commitment from at least one, and ideally multiple, organisations. It is therefore important to ensure the outcomes and principles, along with the more detailed strategies and actions, are embedded within organisational policies and plans to ensure they have ongoing commitment and funding.

7.3 Monitoring and evaluation

The use of CRCWSC analytical and benchmarking tools to guide transition planning provides an opportunity for cities to evaluate their performance after a certain period of time. It is possible to re-assess a city's WSC Index benchmarking score along with the Transition Dynamics Framework assessment to determine if and where progress has been made, both in terms of on-ground outcomes and the city's enabling environment. It is anticipated that the Transition Dynamics Framework assessment could be completed every 1–2 years, while the WSC Index could be completed every 3–5 years. This is because it takes much longer to see and measure change on the ground than in the enabling environment.

While to date no cities have been re-assessed using either tool, it would be helpful to understand what actions have worked well and led to positive outcomes, and which ones require further intervention.

Box 7.1: Water Sensitive Transition Network in Perth

Upon completion of the transition planning process, the participant group in Greater Perth established the Water Sensitive Transition Network (WSTN) to drive the implementation of Perth's WSC vision. It was established as an informal community of practice where participant organisations support their involvement and meeting attendance. The WSTN has a chair (senior member of government agency, water utility or other leading organisation) and an executive officer. It has a number of subcommittees dedicated to priority focus areas of Perth's vision and transition strategy, including: community engagement, research, policy influence, and technical capacity and partnerships.

While it is an informal group, the WSTN is recognised across Perth as knowledgeable, credible and influential, with its participants having senior roles in diverse organisations and coming from diverse disciplines. It is regularly consulted and engaged on relevant water issues in Perth.

Conclusion

Numerous tools and methodologies are available for cities to diagnose their current practices and set future visions, targets, and action plans for becoming more sustainable. The CRCWSC has developed a process that supports cities specifically in becoming more water sensitive and equips them with the tools and frameworks to support ongoing implementation of more water sensitive practice. The WSC Transition Planning Process was trialled and tested in 7 case study sites across Australia, and refined based on experience and feedback. Delivery of this process led to significant impacts in all these sites including improved alignment and commitment, empowering of local stakeholders, influence of organisational and government policy objectives, and heightened awareness of the need for more water sensitive practices.

Since the completion of the A4.2 and IRP1 projects, the CRCWSC has implemented versions of the process methodology presented in this report for a range of other cities in diverse contexts, all with positive outcomes. These experiences have provided opportunity for adaptations and further experimentation with activities within the broad framework of the methodology. This gives us confidence that the approach developed can be readily applied, tailored and localised to support cities and towns across Australia and internationally as they pursue their vision of a water sensitive city.

References

Bos, J., Brown, R. & Farrelly, M. (2015). Building networks and coalitions to promote transformational change: Insights from an Australian urban water planning case study.*Environmental Innovation and Societal Transitions*,15, 11–25. https://doi.org/10.1016/j.eist.2014.10.002.

Brown, R., Farrelly, M. & Loorbach, D. (2013). Actors working the institutions in sustainability transitions: The case of Melbourne's stormwater management.*Global Environmental Change*,*23*(4), 701–718. https://doi.org/10.1016/j.gloenvcha.2013.02.013.

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

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

Brown, R.R., Rogers, B.C. & Werbeloff, L. (2017). A framework to guide transitions to water sensitive cities. in T Moore, F de Haan, R Horne & B Gleeson (eds), *Urban Sustainability Transitions: Australian Cases-International Perspectives. Theory and Practice of Urban Sustainability Transitions*, Springer, Gateway East, Singapore, 129–148. https://doi.org/10.1007/978-981-10-4792-3_8.

Brugge, R.v.d. & Rotmans, J. (2007). Towards transition management of European water resources.*Water Resource Management*21,249–267. https://doi.org/10.1007/s11269-006-9052-0.

Greater Sydney Commission (2018). *Greater Sydney Regional Plan: A Metropolis of Three Cities*. State of New South Wales.

Kemp, R., Loorbach, D. & Rotmans, J. (2007). Transition management as a model for managing processes of co-evolution towards sustainable development. *International Journal of Sustainable Development & World Ecology*, 14(1), 78–91.

Lindsay, J., Rogers, B.C., Church, E., Gunn, A., Hammer, K., Dean, A.J. & Fielding, K. (2019).The role of community champions in long-term sustainable urban water planning.*Water*,11(3), [476]. https://doi.org/10.3390/w11030476.

Loorbach, D. & Rotmans, J. (2010). The practice of transition management: Examples and lessons from four distinct cases. *Futures*, 42, 237–246.

Rogers, B.C., Dunn, G., Hammer, K., Novalia, W., de Haan, F.J., Brown, L., Brown, R.R., Lloyd, S., Urich, C., Wong, T.H..F. & Chesterfield, C. (2020) Water Sensitive Cities Index: A diagnostic tool to assess water sensitivity and guide management actions. *Water Research*, 186, 116411, ISSN: 0043-1354, https://doi.org/10.1016/j.watres.2020.116411.

Rogers, B.C., Gunn, A., Church, E., Lindsay, J., Hammer, K., Dean, A. & Fielding, K. (2020). *Principles for engaging communities in water sensitive city transitions.* Melbourne, Australia: Cooperative Research Centre for Water Sensitive Cities.

Rotmans, J. & Loorbach, D. (2009). Complexity and Transition Management.*Journal of Industrial Ecology*,13(2), 184–196. https://doi.org/10.1111/j.1530-9290.2009.00116.x.

Appendix A – Individual city methodologies

1. Bendigo, VIC

Context

Bendigo is a regional city in Victoria with a population of 110,000. Its population is expected to double by 2051. It is a water stressed city and is prone to long periods of drought. It has an active community that is engaged on issues of environment and sustainability, which creates a major opportunity for becoming more water sensitive. Bendigo also has a history of mining, which has led to a number of legacy issues such as groundwater contamination.

Participants

- Industry professionals (45) who were identified and invited by the project team
- Community champions (31) who were self-selected
- General community members who were recruited using a recruitment company

Methodology

The full transition planning process was delivered in Bendigo from September 2017–April 2018. This included five full-day workshops with industry professionals, three evening workshops with community champions, and three 2-hour focus groups with general community members. The methodology comprised of the following activities:

1. desktop review
2. individual semi-structured interviews with industry and community participants
3. quantitative pre and post workshop surveys to measure baseline understanding and impacts of process
4. five full-day workshops with industry participants
5. three 3-hour workshops for self-selected community champion group (delivered in parallel to the industry workshops)
6. three 2-hour focus groups with general community members (delivered after the industry and community workshops).

More information can be found in the *Vision and Transition Strategy for a Water Sensitive Bendigo* (Rogers et al., 2018b). For further detail on methodology and timeline, see *Benchmarking, envisioning and transition planning for a water sensitive Bendigo: Final case report (Rogers et al., 2018a)*.

Where are they now?

Key agencies in Bendigo have signed a Memorandum of Understanding to agree to work together to deliver Bendigo's WSC vision. An informal Transition Network, supported by Coliban Water and City of Greater Bendigo, has been established and is working to implement water sensitive actions and monitor progress towards Bendigo's vision.

2. Townsville, QLD

Context

Townsville is a regional city of almost 200,000 people located in the dry tropics of Queensland, adjacent to the World Heritage listed Great Barrier Reef. It is characterised by patterns of extreme weather, including severe droughts, floods, and cyclones. The periods of abundance and scarcity of water have shaped Townsville's current water management system, along with people's connection to water and local identity. Townsville residents are currently among the highest per capita potable water users in Australia, which is due in part to the harsh dry tropical climatic conditions. While infrastructure solutions to increase water supply to the city are pursued, they may not be the most cost effective or sustainable solutions for optimising water management particularly when broader benefits such as liveability and resilience are desired.

Participants

- Industry professionals (29) who were identified and invited by the project team

Methodology

A condensed transition planning process was delivered in Townsville from October–December 2017. The condensed version means the process only went up to strategy development, and did not cover action development, implementation governance, or monitoring and evaluation. The process in Townsville was made up of the following activities:

1. desktop review
2. individual semi-structured interviews with industry participants
3. quantitative pre and post workshop surveys to measure baseline understanding and impacts of process
4. three full-day workshops (note to reduce travel costs, the first two workshops were held across two consecutive days). The workshops covered:
    a. Day 1: Water story and half of WSC Index benchmarking
    b. Day 2: Second half of WSC Index benchmarking and visioning
    c. Day 3: Strategy development.

More information can be found in the *Vision and Transition Strategy for a Water Sensitive Townsville*. For further detail on the methodology and timeline, see *Benchmarking, Envisioning, and Transition Planning for a water sensitive Townsville: Final case report*.

Where are they now?

Townsville City Council has established an internal working group around integrated water management and is continuing to be involved in projects that are associated with WSC planning and business case development. It has also participated in a number of tool training sessions to build internal capabilities in delivering more WSC solutions.

3. Sydney, NSW

Context

Greater Sydney is the largest capital city in Australia, with a population of 5.2 million. It is facing issues with ensuring liveability in the face of a drying climate, rising population, and increased urban heat (particularly in Western Sydney). There is an opportunity for water to play a critical role in delivering liveability objectives, particularly ensuring equitable access to water-related amenity from Sydney's coastal eastern suburbs to the new developments in the west. The Greater Sydney Commission has recently been established to coordinate and align planning to ensure a productive, liveable, and sustainable city for all.

Participants

- Industry professionals (52) who were identified and invited by the project team

Methodology

A condensed transition planning process was delivered in Sydney from June–October 2017. The condensed version means the process only went up to strategy development, and did not cover action development, implementation governance, or monitoring and evaluation. The process in Sydney was made up of the following activities:

1. desktop review
2. individual semi-structured interviews with industry participants
3. quantitative pre and post workshop surveys to measure baseline understanding and impacts of process
4. three full-day workshops. The workshops covered:
   a. Day one: WSC Index benchmarking
   b. Day two: Water story and visioning
   c. Day three: Strategy development.

More information can be found in the *Vision and Transition Strategy for a Water Sensitive Greater Sydney*. For further detail on the methodology and timeline, see *Benchmarking, envisioning and transition planning for a water sensitive Greater Sydney*.

Where are they now?

There have been advancements across Greater Sydney to deliver more water sensitive solutions on the ground, however they are still happening because of the commitment of individuals and organisations. While the creation of the WSC vision for Greater Sydney was valuable in articulating what a future water sensitive Sydney would look like, further work is needed to support a unified and collaborative approach to achieving it. One idea is to apply the WSC Index to benchmark the three cities identified by the Greater Sydney Commission, to produce tailored insight into the specific opportunities for improvement.

4. Adelaide, SA

Context

Adelaide, a city of 1.3 million, is in an optimal position for accelerating its transition to a water sensitive city. It has a history of innovation, as seen through the early adoption of managed aquifer recharge and water sensitive urban design. It is currently leading the nation in renewable energy, and this culture is also represented in the water sector. While it is experiencing challenges such as major and frequent droughts and decreasing water security, the water sector is well placed to address these challenges through an innovative, water sensitive approach to development.

Participants

- Industry professionals (38) who were identified and invited by the project team

Methodology

A condensed transition planning process was delivered in Adelaide from March–July 2017. The condensed version means the process only went up to strategy development, and did not cover action development, implementation governance, or monitoring and evaluation. The process in Adelaide was made up of the following activities:

1. desktop review
2. individual semi-structured interviews with industry participants
3. quantitative pre and post workshop surveys to measure baseline understanding and impacts of process
4. three full-day workshops. The workshops covered:
   a. Day one: WSC Index benchmarking
   b. Day two: Water story and visioning
   c. Day three: Strategy development.

More information can be found in the *Vision and Transition Strategy for a Water Sensitive Adelaide*. For further detail on the methodology and timeline, see *Benchmarking, envisioning and transition planning for a water sensitive Adelaide*.

Where are they now?

The WSC vision for Adelaide has been integrated into state and local policies and strategic directions, including incorporating water sensitive aspirations into the City of Adelaide and Department of Environment and Water. Stakeholders in Adelaide are now working together in a more collaborative way to deliver water sensitive solutions on the ground. This is demonstrated through work applying CRCWSC tools to greenfield development in the City of Salisbury, and high profile events such as the Cooler, Greener Adelaide Forum and Exhibition.

5. Perth, WA

Context

Perth has a long history of working with the CRCWSC to advance more water sensitive practice. Perth is unique to all other Australian cities because the dry conditions from the Millennium Drought never lifted, and they have experienced a drying climate since the 1970s. The Water Corporation has therefore had to implement a number of large scale infrastructure solutions such as two desalination plants. There has been a recent shift within the water sector towards taking a more holistic and collaborative approach to water management, to ensure both water security and liveability for Perth residents.

Participants

- Industry participants who were identified and invited by the project team. Note that due to the piecemeal nature of the process (see below), individual participants differed for the different activities.

Methodology

Perth was the 'guinea pig' for several of the individual component activities that make up the current transition planning process. These activities have been trialled in Perth through a number of individual research projects (A4.2, D6.2, IRP1) beginning in July 2015 through to June 2018. The series of activities includes:

1. five ¾ day envisioning workshops from July–December 2015 (Project A4.2)
2. a WSC Index benchmarking workshop in February 2016 (Project D6.2)
3. implementation workshops to assist stakeholders in delivering their priority focus areas identified previously, which include:
   a. Community messaging and engagement (November 2016)
   b. Building a water sensitive business case (February 2017)
   c. Transition governance (October 2017)
   d. Policy influence (June 2018).

More information can be found in the *Vision and Transition Strategy for a Water Sensitive Greater Perth*, along with its *Implementation Plan 2019-2021*.

Where are they now?

The group of stakeholders in the original visioning workshops (Project A4.2) saw the value in continuing to meet as an informal network of champions, and created the Water Sensitive Transition Network (WSTN). The WSTN has a nominated chair and an executive officer role that is supported by the Department of Water and Environmental Regulation along with the Water Corporation. The WSTN continues to meet regularly and has published the *Perth Implementation Plan*. The WA Government has also recognised the need for a more holistic approach to water management, and has released the Perth Waterwise Action Plan that reflects water sensitive city concepts and principles. The WSTN continues to remain linked to CRCWSC activities and driving water sensitive actions on the ground.

6. Gold Coast, QLD

Context

The Gold Coast is situated south of Brisbane, and is world-renowned for its beaches and laid back lifestyle. With a population of over 550,000, it is the largest non-capital city in Australia. While its major industry is tourism, there is a rapidly growing number of residents who live there for its lifestyle, which is connected to water and nature. Gold Coast City Council is now proactively looking at ways to holistically manage its water to preserve the lifestyle that residents enjoy. It therefore engaged the CRCWSC to deliver a transition planning process as a commercial project to inform the development of their urban water strategy.

Participants

- Industry participants who were identified and invited by the project team

Methodology

The full transition planning process was delivered in the Gold Coast from December 2016–May 2017. This included five full-day workshops with industry professionals. The methodology comprised of the following activities:

1. desktop review
2. individual semi-structured interviews with industry and community participants
3. quantitative pre and post workshop surveys to measure baseline understanding and impacts of process
4. five full-day workshops with industry participants.

More information can be found in the *Vision and Transition Strategy for a Water Sensitive Gold Coast*.

Where are they now?

The City of Gold Coast has developed the *Gold Coast Water Strategy 2019-2024* that builds on the outcomes of the CRCWSC process and sets the future direction of urban water management. An extensive community consultation process for the strategy was delivered that utilised surveys and phone interviews. The strategy includes the WSC Index as a tool to monitor and track progress towards the vision. A network of champions has also been identified through the process that continues to collaborate to ensure water sensitive solutions are implemented on the ground.

7. Elwood, VIC

Context

Elwood is a suburb of Melbourne, VIC, located on the Port Phillip Bay. Originally a swamp, it was drained for development in the late 19th century and is subject to periodic flooding. It has an active and engaged community, including a Flood Action Group that advocates for better flood protection and management. Several CRCWSC projects have been delivered in Elwood, due to its challenging water context and buy-in from water organisations (City of Port Phillip, Southeast Water).

Participants

- Community members who were identified through an open recruitment process
- Several industry members (City of Port Phillip, Southeast Water)

Methodology

The Elwood case study was delivered as part of project A4.2 in 2015. It comprised recruitment activities, pre-workshop interviews with community members, and three community workshops. The community workshops were held for 3 hours in the evenings, roughly 1 month apart.

More information can be found in the report: *Towards a Water Sensitive Elwood*.

Where are they now?

A number of other CRCWSC projects have been delivered in Elwood, including the application of tools and models to develop flood adaptation measures. These were later designed and put on exhibition as part of the Swamp City Exhibition. More information on the Elwood case study *can be found here*.

CRC for
Water Sensitive Cities

Cooperative Research Centre for Water Sensitive Cities

Level 1, 8 Scenic Boulevard
Monash University
Clayton VIC 3800

info@crcwsc.org.au

www.watersensitivecities.org.au