

OCCASIONAL PAPER NO 31

## Liveability Indicators

A report prepared for the water industry

APRIL 2016



WATER SERVICES  
ASSOCIATION OF AUSTRALIA

## OVERVIEW OF WSAA

The Water Services Association of Australia (WSAA) is the peak body that supports the Australian urban water industry.

Our members provide water and sewerage services to over 20 million customers in Australia and New Zealand and many of Australia's largest industrial and commercial enterprises.

WSAA facilitates collaboration, knowledge sharing, networking and cooperation within the urban water industry. The collegiate approach of its members has led to industry-wide advances to national water issues.

WSAA can demonstrate success in standardising industry performance monitoring and benchmarking, as well as many research outcomes of national significance. The Executive of the Association retains strong links with policy makers and legislative bodies and their influencers, to monitor emerging issues of importance. WSAA is regularly consulted and its advice sought by decision makers when developing strategic directions for the water industry.

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## ACKNOWLEDGEMENTS

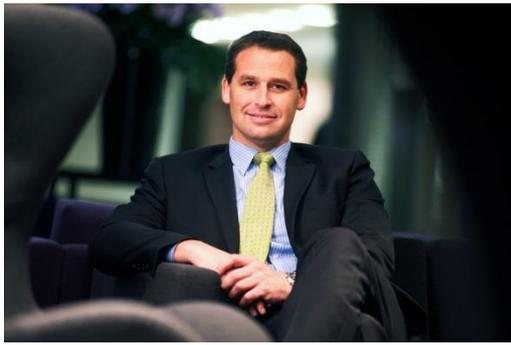
This Occasional Paper has been produced by the WSAA Healthy Liveable Communities Committee (HLCC). The project, including consultation and research, was led by Kaia Hodge of Sydney Water with support provided by Natalie Quinn of Sydney Water and WSAA's Evelyn Rodrigues in the drafting of the paper. The project working group, including Jon Anstey of Coliban Water, Peter Morison of Melbourne Water and Clare Lombardi of City West Water provided valued support in developing the paper. We also appreciate the contributions from WSAA's HLCC and the Adaptive Planning and Integrated Water Management Network members particularly in providing information for the indicator set, carrying out consultation with Councils and reviewing the paper.

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## FOREWORD



Australia is one of the most urbanised countries in the world. In fact, 80% of our goods and services are generated on only 0.2% of our land mass. Liveable cities and regional centres are essential for attracting the talented human capital and global investment that makes our country prosperous. Therefore it stands to reason that Australian cities are regularly recognised as some of the most liveable in the world. Efficient, financially stable and high performing water utilities are a key requirement for a liveable city or region.

In WSAA Occasional Paper 29 *Urban water planning framework and guidelines* and Occasional Paper 30 *The role of the urban water industry in contributing to liveability* we explored the current and potential contributions water utilities make to the liveability of our cities and regions and how that can be improved through greater involvement in strategic planning.

This paper takes this proposition further by developing a 'menu' of liveability indicators. Water utilities have a contribution to make towards *shared value* for the community. Based on input from customers and stakeholders, utilities can select appropriate indicators to demonstrate, measure and manage their contribution in a tangible way.

The paper is also a useful tool to inform the policy environment and consider the ways in which the capabilities of the sector can be employed to further enhance and support urban liveability.

A handwritten signature in black ink, appearing to read 'Adam Lovell'.

Adam Lovell, Executive Director, WSAA

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## Executive Summary

Water utilities provide services that are essential for a liveable city. Utility activities and operations are crucial in safeguarding the health of the community and environment by providing safe drinking water, swimmable water bodies and healthy waterways. Utilities provide water that enables cooler, greener cities and this greening, in turn, plays an important role in reducing flooding. They also ensure productive economic development through water security. Economic growth also benefits from urban habitat and healthy waterways: value capture is not the sole domain of transport infrastructure.

While liveability has many aspects and interpretations, this paper adopts the following definition:

*Liveability is all of those things that make a place somewhere people want to live, communities flourish and businesses choose to invest. To be long lasting and resilient, a liveable city or region must consider the needs of future generations and use systems thinking to understand and respond to shocks and long-term change.*

Beyond the regulated, essential services provided by the industry, there are other opportunities for utilities to contribute to the liveability of their cities and regions. Working from the premise of ‘what gets measured gets managed’ this paper proposes an approach that includes a suite of liveability indicators that the water industry can draw on to measure its contribution in a consistent way. It provides a process for selecting the most appropriate indicators and provides information on how to measure, who else is measuring and why.

The ‘menu’ of indicators was drawn from a wide range of sources ranging from the well-known Property Council of Australia Liveability Index, to research by ARUP, to WSAA member surveys and consultation with Local Councils. The ‘menu’ covers such categories as amenity and wellbeing, productivity, and sustainability and future focus. They are a compilation of those already in use both in the water industry and as liveability indicators for cities.

In addition, this paper will assist WSAA’s continuing conversations with state and federal governments around the water sector’s contribution to liveability, as well as our potential to deliver shared value. In particular, we intend to use this paper to influence existing water-related liveability indicators for cities and regions to ensure that they are appropriate and reflect outcomes that are important to our communities.

The menu will continue to evolve over time as our environment changes and our understanding improves.

## How to use this paper

The main audience for this paper is the urban water industry and stakeholders interested in, and contributing to Australia's liveable communities. Although the main users of the information will be water utilities, it will involve working with collaborators in research, government (federal, state, local) and other organisations. Ultimately, the broader community will be the beneficiary.

This paper provides a wide range of possible indicators, which will be relevant to different utilities and circumstances. We expect utilities will choose only a small number from the menu to develop their individual 'Liveability Scorecard'. The scorecard should represent the priorities of their customers and stakeholders, and the goals of their organisation.

Once developed, utilities can use their scorecard:

- to demonstrate their commitment to liveability and *shared value*
- as a tool to communicate to stakeholders about common objectives and initiate cooperation and collaboration
- as a transparent way to share information and data with stakeholders
- to assist engagement with customers and stakeholders around expectations, competing priorities and setting appropriate targets.

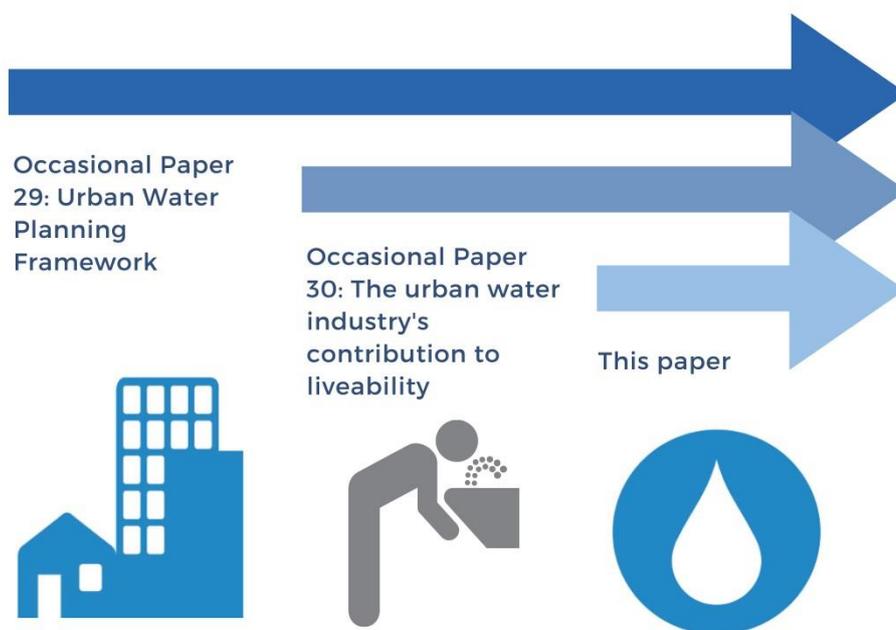
This paper does not advocate that the water industry is, nor should be, responsible for all the indicators listed in Table 1. However, we contend that the list should lead to recognition of the broader outcomes that water enables, and collaboration by water utilities with Councils and other stakeholders in delivering liveability outcomes for the community.

Utilities may also select different targets, depending on various influences. For example, the percentage of recycled water is a commonly used indicator. However, an appropriate target for recycled water involves complex trade-offs between cost, water security, government policy and customer preferences.

In particular, WSAA hope to use this Paper to influence existing water-related liveability indicators, for cities and regions, to ensure that they are appropriate and reflect those things that are important to our communities.

## Introduction

In March 2014, the Water Services Association of Australia (WSAA) published Occasional Paper No 30: *The role of the urban water industry in contributing to liveability*. This work on liveability also supports WSAA's *Occasional Paper 29 Urban Water Planning Framework* by defining the broader range of outcomes possible through better integration of urban planning and urban water management. This paper builds on Occasional Paper 30 by proposing liveability indicators that measure the contribution that the water industry makes to the liveability of our cities and regions as outlined in Figure 1.



*Figure 1: Relationship to other WSAA Occasional Papers*

Liveability is subjective and contextual in nature. Utilities need to focus on understanding and responding to their customers' values and preferences to determine the most appropriate and relevant way for them to contribute to liveability in their city or region.

The approach proposed will help ensure consistency in the way the water industry measures its contribution to liveability, without being prescriptive. The paper provides tools and guidance on the selection of indicators most relevant to water utilities. Establishing a suite of indicators also assists other organisations like Local Councils to assess the liveability of their communities<sup>1</sup>.

Establishing indicators is not intended to enable the comparison and ranking of a water utility's liveability performance. Consultation with WSAA's membership suggested that a structured and prescriptive approach would be unlikely to foster uptake.

<sup>1</sup> Based on consultation with local Councils, see Appendix 1.

## What is liveability?

Based on a review of international and Australian literature and liveability indices, WSAA has adopted the following definition of liveability:

*Liveability is all of those things that make a place somewhere people want to live, communities flourish and businesses choose to invest. To be long lasting and resilient, a liveable city or region must consider the needs of future generations and use systems thinking to understand and respond to shocks and long-term change.*

Occasional Paper No 30 (WSAA, 2014) examined the way the urban water industry contributes to the liveability of cities and regions. The scope of services and the interactions of these with the built and natural environment are extensive and complex; Figure 2 (Holmes, 2013) illustrates this by setting out some of these interactions.



The water industry's contributions are summarised in Figure 3 and described under three key contribution categories:

- Amenity and community wellbeing
- Productivity
- Sustainability and future focus.

These categories have been used to identify indicators suitable for measuring the water industry's contribution towards liveability.

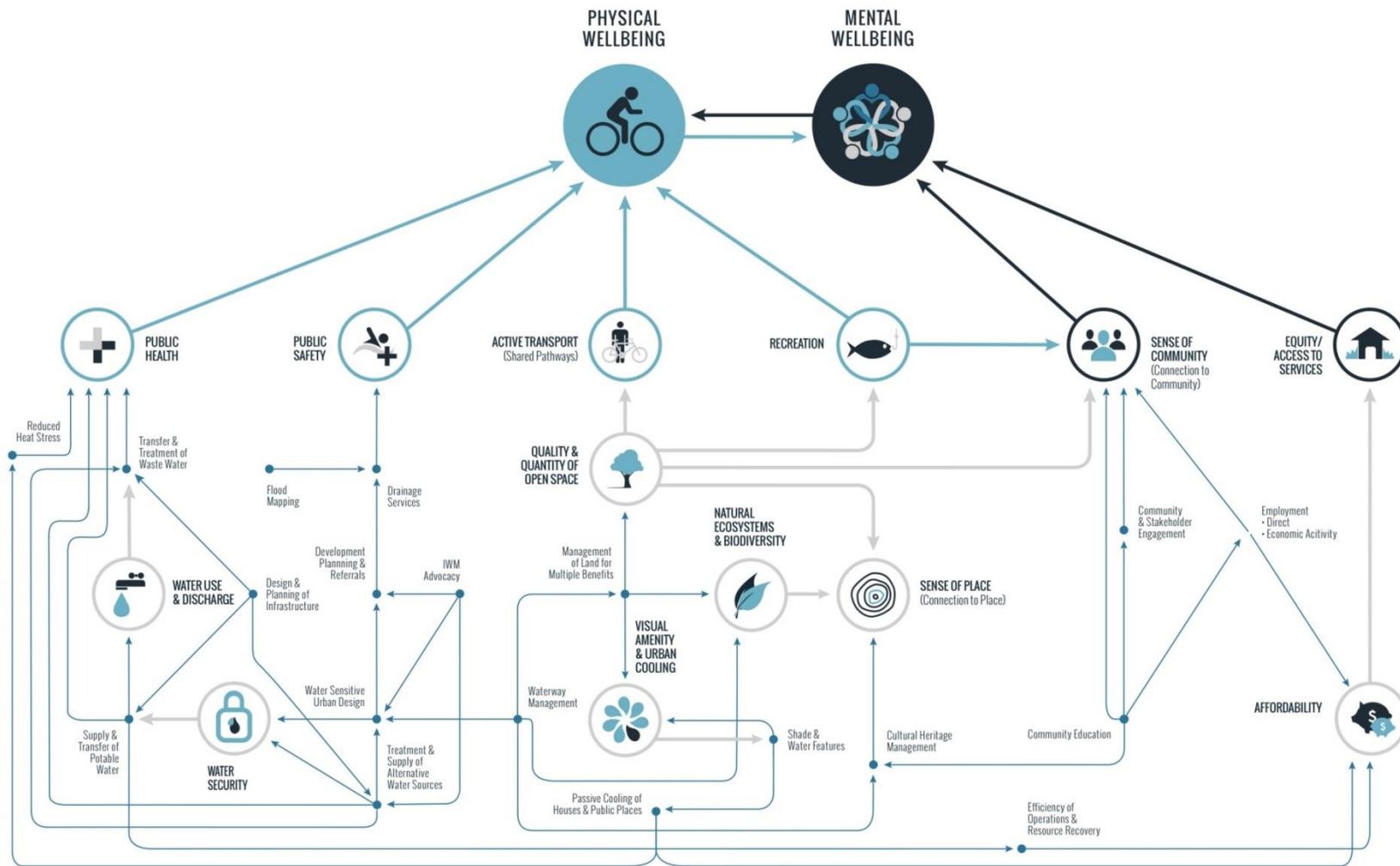


Figure 2 Interactions between water and aspects of liveability (Holmes, 2013)

## Amenity and community wellbeing

We work to maintain the health of our cities, and to understand our customers' values and aspirations for the liveability of our cities.

Supporting our customers' health and wellbeing

Supporting affordable living choices

Contributing to local amenity

## Productivity

We harness the full productivity of our people and infrastructure to ensure that water services remain affordable.

Improving the efficiency of our infrastructure and services

Integrating landuse and infrastructure

Advancing housing supply

Collaborating to improve planning and management of our cities

## Sustainability and future focus

By applying science and understanding risk we contribute to long term sustainability of our cities.

Protecting the natural and built environment

Managing resources sustainably

Increasing resilience to climate change & extreme events

*Figure 3: The water industry's contribution to liveability*

## How do utilities contribute to liveability?

The contribution that utilities make towards liveability will depend on the scope of each organisation's operations and functions. It is best to choose indicators that are relevant to the business situation and relate to an organisation's focus and the level of impact it can have. Indicators ought to reflect a utility's challenges and opportunities. The intent outlined in the corporate strategy and a utility's goals and performance indicators can guide these choices.

Ideally, indicators should reflect the materiality of impact. Consider how much difference the utility can make in achieving a liveability outcome (impact and control), or the extent to which a liveability issue impacts the utility's direction, management or reputation (risk and opportunity) (ARUP, 2014).

### Relevance

When selecting relevant indicators, the following should be considered:

#### Scope of operations

This will determine the direct contribution a utility can make towards the liveability of its city or region. The scope includes:

- Role in the water services value chain
  - bulk water provision, treatment, water distribution, wastewater services, retail provider, stormwater management, recycled water etc.
- Water service functions provided
  - bulk-water, potable and non-potable water supply, wastewater collection and treatment, resource recovery, billing, community education, land management, open space, non-regulated service offerings etc.



#### Characteristics of the region served

The physical and social aspects of the region served by the utility will set the context for the nature of liveability in its region and community. The following aspects should be considered:

- Physical environment:
  - coastal or inland, climate, flood or bushfire prone areas, environmentally sensitive environments, etc.
- Land use:
  - urban, rural, recreational, industrial, etc.
- Social issues and settings:
  - community health, economy, level of development, amenity, environmental issues, demographics, etc.

## Regulatory and planning context

The regulation and planning environment in which a utility operates can limit or drive action in particular areas of liveability. This may depend on priorities of the region at the time such as:

- Regulatory environment:
  - regulation, legislation, operating licences, environment protection licences, health requirements, regulatory pricing principles
- Planning instruments
  - metropolitan plans, regional plans, local plans, water resource plans, planning legislation.

## Customer perspective

Liveability, by definition, centres on the needs of people. It is vital to consider the perspective of customers and communities when selecting indicators that measure the impact on liveability.

Considerations include:

- Customer insight
  - preferences and values, awareness and currency of issues, etc.
- Affordability
  - cost of services, willingness to pay, etc.



The customer perspective will differ from one city and region to another. Understanding of customer and community perspectives requires targeted research and/or engagement. Utilities should consider incorporating these activities into a regulatory business-plan engagement process.

## Corporate objectives

Corporate objectives give insight into an organisation's priorities. The following should be considered:

- corporate vision, objectives and key performance indicators
- strategies and objectives related to liveability, including those for customer engagement, environmental management, renewable energy, waterway management, etc.

## Materiality

Materiality is an assessment of how important something is to the matters at hand and is fundamental to understanding what liveability means to both the business and community. While it has specific meaning in the context of corporate and financial reporting, when selecting liveability indicators utilities should ask 'so what?' Does the indicator capture something of importance? If performance improves or deteriorates, will it make a difference for the city or region? Will anyone notice?

When considering indicators for a utility, also consider whether tackling a specific issue or opportunity will have a material impact on the organisation. This may include reputation, financial exposure, performance (perceived or actual), political implications, operational demands, customer satisfaction etc.

Scale may also be important. An indicator might be immaterial when measured at a utility or regional scale, but quite significant for a particular project, or for part of an organisation's function.

While the approach proposed in this paper can be useful in identifying indicators relevant to individual business units or for specific programs, the intent is to enable the assessment of a utility's contribution to liveability at an organisational and regional scale.

## A 'menu' of liveability indicators for the water industry

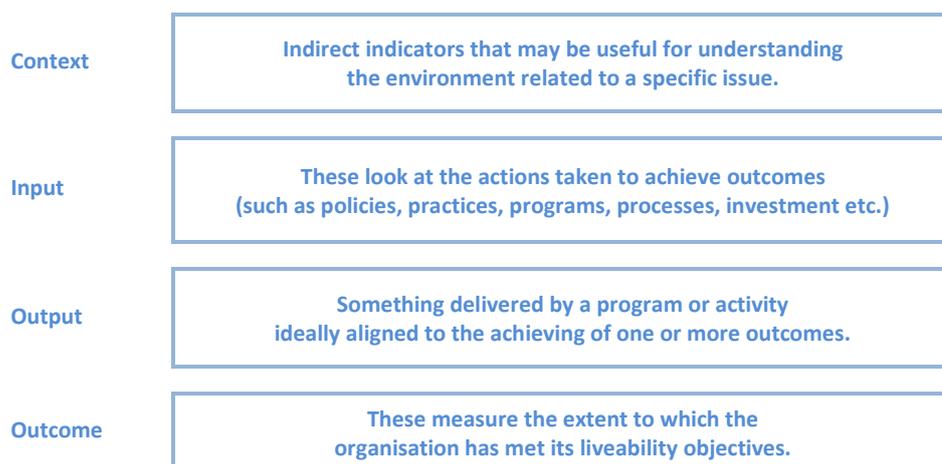
This Paper lists a number of potential indicators to assist utilities in measuring the contribution they make in liveability. The menu emerged from a range of sources. These included WSAA member surveys, the Australian Sustainable Built Environment Council (ASBEC), (ASBEC, 2015), ISO 37120:2014, the City Resilience Index (ARUP, 2014), the Australian liveability index, Local Councils and research from the CRC for WSC.

The Australian liveability index is one of the most widely recognised. Each year Auspol conduct a survey on behalf of the Property Council of Australia (see Stolper & Wyatt 2011). Respondents rank the importance of 17 key liveability attributes for Australian cities and assess their own city against these. This produces a liveability score for each city. The survey receives broad media coverage in capital cities each year.

Local Council is arguably the sector most connected with liveability of communities. In developing and refining the menu of indicators for the water industry, WSAA carried out consultation with Local Councils around Australia. The aim was to understand how they determine their liveability indicators, where they think water utilities can contribute to these and how they could translate to appropriate liveability indicators for the water industry (see Appendix 1).

This research and consultation identified a few additional indicators for inclusion in Table 1. Some of these are not yet measured by utilities although water utilities do have an impact as a result of their operations (for example Community water literacy; and Length of waterways naturalised).

Indicators have been sorted by key contribution categories (Figure 3) and indicator type, i.e. context, input, output or outcome (Figure 4). Utilities should try to include a selection of different indicator types as part of their Liveability Scorecard.



*Figure 4: Types of indicators*

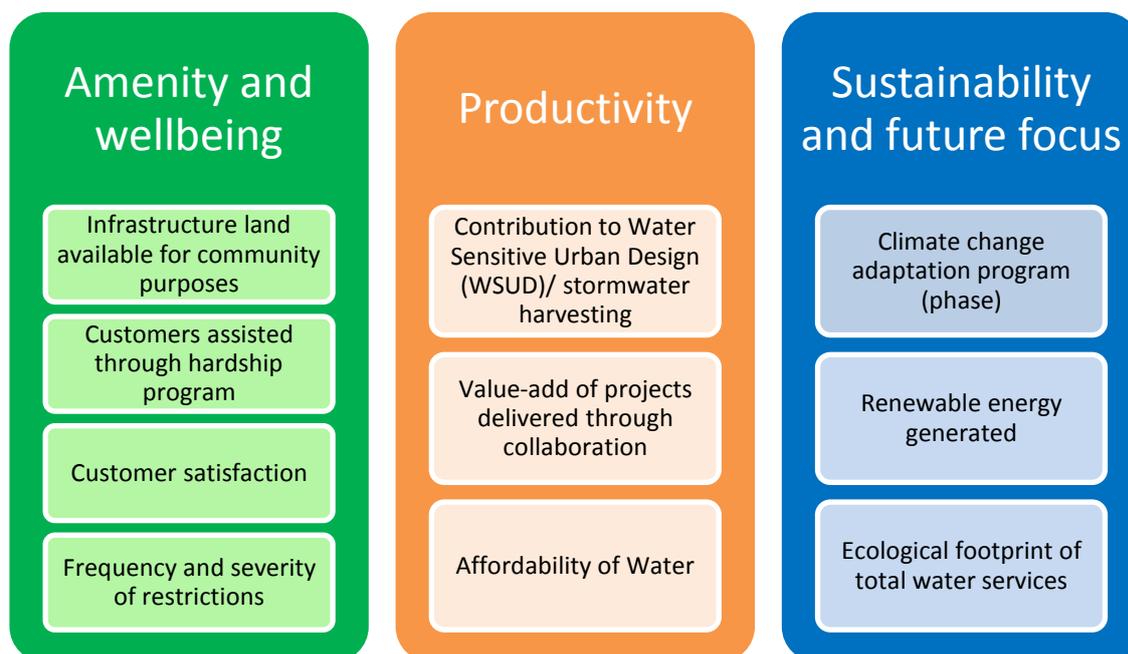
The CRC for WSC is developing a Water Sensitive City Index. The purpose of this index is to measure how water sensitive a city or region is. The WSAA indicators have a different purpose, and measure those things that the utility decides it should manage to contribute to liveability based on what their customers' value.

## Developing a Liveability Scorecard

When developing a scorecard, WSAA encourages utilities to:

- Adopt a small number of indicators (e.g. 9-12 indicators) so effort can be focused on what is most important.
- Understand where the organisation is on its liveability journey and therefore what is most important to measure. Consider the corporate objectives, the things that matter most to the community and customers, and where the utility can make a real difference. Keep in mind that outcomes may require the actions of a number of stakeholders contributing towards a broader outcome. In these cases, some indicators may be more appropriate for an individual project instead of the organisational.
- Include a combination of input (lead), output and if possible, outcome indicators. Success is ultimately measured by the quality of outcomes, which can take time to realise.
- Set targets for the selected indicators. A target is a strong way to demonstrate commitment and transparency to customers and stakeholders. With the exception of regulated indicators, targets should be set in consultation with customers and stakeholders.

Table 1 provides a menu of potential liveability indicators for the water industry. An example of a potential liveability scorecard is shown in Figure 5. This will be different for every utility and so will the targets for each of the indicators.



*Figure 5: A potential liveability scorecard for a water utility*

Appendix 2 includes details, where available, for each of the indicators on how to measure. This is to encourage consistent measures across the industry. They are also designed to help utilities make the most appropriate selection.

WSAA is also developing Performance Indicator Sheets for indicators currently in use. These sheets will provide more detail and background and be available for download on the Member-only section of the WSAA website.

Table 1: A menu of Liveability Indicators for the water industry

	Amenity and wellbeing	Productivity	Sustainability and future focus
	<i>We work to maintain the health of our cities, and to understand our customers' values and aspirations for the liveability of our cities.</i>	<i>We harness the full productivity of our people and infrastructure to ensure that water services remain affordable.</i>	<i>By applying science and understanding risk we contribute to the long term sustainability of our cities.</i>
<b>Context</b>	Days exceeding critical heat threshold**	Regional GDP** Urban Growth**	Tree cover** or Canopy Coverage** Native vegetation gain**
<b>Input</b>	Infrastructure land available for community purposes Land assessed for liveability outcomes Water available for parks gardens and amenity* Length of paths/cycle-ways providing connectivity* Community access to lakes and waterways Assets with alternate/dual use for community outcomes*	Existence of an integrated water management plan* Recycled water supplied to industry Contribution to WSUD/ stormwater harvesting	Climate change adaptation program (phase) Certified to an Environmental Management System Water efficiency programs
<b>Output</b>	Number of complaints related to amenity Sewer overflows Drinking water compliant with ADWGuidelines (ADWG) Catchment water quality risk Frequency and severity of restrictions Water supply security*  Public Safety on or near water infrastructure and land* Customers assisted through hardship program Number of visitors to recreational areas Beaches closed due to sewer overflows	Water service connections available to lots released* Value-add of projects delivered through collaboration* Years to next major augmentation* Total lifecycle cost of network* Total lifecycle cost of treated water/wastewater* Potable water use relative to target  Alternative water volume targets Operating cost Value of Agriculture using recycled water irrigation* Cost of flooding above floor level* Travel time impacts of infrastructure failure*	Volume of water recycled Energy/carbon intensity of treatment and transport Renewable energy generated Nutrients/ biosolids recovered Efficient water use Customer water efficiency Community water literacy* GHG Emissions Infrastructure Leakage Index (ILI) Electricity consumption from renewable sources EA compliance of contractors* Length of waterways naturalised* Waterway quality guidelines** Pervious surfaces*
<b>Outcome</b>	Swimmable beaches Customer satisfaction	Affordability of water Value of water dependent GDP*	River health index** or Health of aquatic ecosystems** Ecological footprint for total water services Resilience*

\* Not currently measured by utilities but potential to be a useful metric

\*\* Water utilities have limited influence over this indicator but it is a valuable context or outcome metric to track

## References

Australian Sustainable Built Environment Council (2014), *ASBEC Cities Draft Indicator Framework*. ASBEC, Sydney, NSW, Australia

Holmes, M. (2013), *Melbourne Water's Contribution to Liveability*. Melbourne Water and State Government of Victoria, Melbourne.

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Stolper, D. and Wyatt, N. (2011), *My City: the People's Verdict*. Report Prepared for the Property Council of Australia, Sydney.

Sustainability Accounting Standards Board (2016), *Water utilities sustainability accounting standard*, Sustainability Accounting Standards Board, San Francisco, CA, USA

Water Services Association of Australia (2014b), *Occasional Paper 30, The role of the urban water industry in contributing to liveability*. WSAA, Docklands, VIC, Australia.

## Appendix 1: Consultation with Local Councils on the WSAA

### Liveability Indicators

Councils, more than any other sector are tasked with ensuring the liveability of communities. As such, they should have an understanding of what liveability means to their communities and how to measure.

Of the 10 Councils consulted, nearly all carried out some form of extensive community consultation to develop their strategic plans and objectives. The outcomes of the engagement processes are indicators and targets related to the aspects of liveability prioritised by their communities.

In Victoria, Councils have a community engagement framework that centres on a citizen jury. Councils are required to consult with this jury when developing their strategic plan. Similarly, all NSW Councils are required to carry out community consultation every 10 years when developing their strategic plans.

Some Councils carry out regular surveys of their community to track performance against their objectives, identify changes to what is important to their community as well as the perceived gaps. In this respect, it is clear that if water utilities are looking to select appropriate indicators for their organisation, Councils can provide useful information on what aspects of liveability are a priority for customers.

A review of the Council strategic plans shows that there are at least some Council indicators that are directly related to water utility objectives. These include reduction in potable water use or 'water smart' behaviours. They also include objectives related to flooding and water quality where utilities have responsibility for managing stormwater assets.

While utilities could contribute to many of the Council objectives (at minimal cost), they are not necessarily a priority or obligation of the utility. For example, utilities could provide access to their assets for connecting green spaces. Also, some utilities are trialling co-digestion using commercial waste. The reduction of waste, along with generation of green energy, features strongly in Council plans.

Key messages from the Council consultations included:

- Most had not considered the role of water utilities in liveability beyond water and wastewater services. They were generally pleased to see water utilities thinking beyond water and wastewater, and encourage further discussions to understand how each of the organisations can work together. While the WSAA indicators are not going to drive strategic changes for the Councils, they may be able to assist them in delivering and reporting on their objectives.
- WSAA's list of liveability indicators provides a valuable tool to start discussions and in raising awareness about how utilities can contribute to, and support, Council liveability initiatives. In fact, this consultation may result in some projects between utilities and Councils.

- Some of the amenity indicators in the WSAA list are indirectly related to water utilities (green coverage). While the Councils support these metrics, they also see the water utilities having a role as a catalyst to identify projects and bring people together. They would like to see that reflected in the indicators in some way.
- They suggested a couple of additional indicators such as water loss from the system, level of water literacy in the community, as well as some changes to the existing indicators. While some may take time to develop (such as an indicator relating to biodiversity), some Councils also provided good suggestions on how to measure these indicators.
- Councils see WSAA's indicator menu as a great way to access data that they can also use for their reporting. This makes consultation between our respective organisations important to selecting the appropriate liveability scorecard for a water utility.
- The consultation reinforced the fact that utilities will inevitably have a unique scorecard. In Perth, for example, the water utility's major contribution to liveability (other than regulatory requirements) is a coordinating role to manage drainage and mitigate flooding. In Adelaide and surrounding Council regions, there is a strong focus on accessing recycled water for greening the city and an expectation that the water utility will play a role in this. Indicators should reflect the different expectations, responsibilities and climatic/ geological differences.

The ten Councils consulted during this process are listed below. WSAA plans to continue discussions with these and also engage with regional and outer suburban Councils.

1. Melbourne City Council (VIC)
2. Sydney City Council (NSW)
3. Blacktown Council (NSW)
4. Brisbane City Council (QLD)
5. Moonee Valley City Council (VIC)
6. Hobsons Bay City Council (VIC)
7. Maribyrnong City Council (VIC)
8. City of Subiaco City Council (WA)
9. City of Unley (SA)
10. City of Salisbury (SA)

As part of the consultations, Councils provided information in the form of strategic plans, customer surveys and provided information on the following questions:

- What are the key objectives and indicators for the liveability of the city
- Which of these do water utilities contribute to OR have a potential to make a contribution
- How do you think water utilities should measure this contribution/ do you think the WSAA Indicator set should be amended, added to in any way?

## Appendix 2: Liveability Indicator Details

### Amenity and wellbeing

We work to maintain the health of our cities, and to understand our customers' values and aspirations for the liveability of our cities.

This work includes:

- supporting our customers' health and wellbeing
- contributing to local amenity
- supporting affordable living choices.

### Context

#### Days exceeding critical heat threshold

**Category** - Amenity and wellbeing

**Indicator type** - Context

**What will this tell you?**

Indicates needs for urban cooling initiatives

**Relevant themes**

Amenity	Climate change
Heat island	Public health

**Metrics**

No of days per annum exceeding critical heat threshold

**Who uses it (sources)?**

**Related Indicators**

Water available for parks gardens and amenity, Value of Agriculture using recycled water irrigation, Tree cover, Length of waterways naturalised, Native vegetation gain, Ecological footprint for total water services, Resilience

### Inputs

#### Infrastructure land available for community purposes

**Category** - Amenity and wellbeing

**Indicator type** - Input

**What will this tell you?**

The utility's contribution to public access to land for community uses including community gardens, bike paths, open spaces, playgrounds, etc.

**Relevant themes**

Community land use	Recreation
Connection with customers	Amenity
Open spaces	

**Metrics**

No. of ha of land available for community access

**Who uses it (sources)?**

Melbourne Water

No. of licences for recreational use of land

**Related Indicators**

Land assessed for liveability outcomes, Length of paths/cycle-ways providing connectivity, Community access to lakes and waterways, Assets with alternate/dual use for community outcomes, Number of visitors to recreational areas, Tree cover, Water efficiency programs, Length of waterways naturalised

### Land assessed for liveability outcomes

**Category** - *Amenity and wellbeing*

**Indicator type** - *Input*

**What will this tell you?**

The utility's potential contribution to liveability through alternative use of land

**Relevant themes**

Community land use	Recreation
Connection with customers	Amenity
Open spaces	

**Metrics**

% of land assessed to land owned/occupied  
% of land deemed to have potential for liveability outcomes

**Who uses it (sources)?**

Melbourne Water

**Related Indicators**

Length of waterways naturalised, Native vegetation gain, Length of paths/cycle-ways providing connectivity, Community access to lakes and waterways, Assets with alternate/dual use for community outcomes, Number of visitors to recreational areas, Infrastructure land available for community purposes

### Water available for parks gardens and amenity

**Category** - *Amenity and wellbeing*

**Indicator type** - *Input*

**What will this tell you?**

Extent to which demand is being met for urban greening and cooling

**Relevant themes**

Community land use	Recreation
Connection with customers	Amenity
Open spaces	

**Metrics**

% of water available compared to what is required

**Who uses it (sources)?**

**Related Indicators**

Frequency and severity of restrictions, Water supply security, Days exceeding critical heat threshold, Tree cover, Water efficiency programs

### Length of paths/cycle-ways providing connectivity

**Category** - *Amenity and wellbeing*

**Indicator type** - *Input*

**What will this tell you?**

The utility's contribution to 'walkability' and recreational areas in the city.

**Relevant themes**

Community land use	Recreation
Connection with customers	Amenity
Connectivity	Transport

**Metrics**

km of path on utility land

**Who uses it (sources)?**

**Related Indicators**

Infrastructure land available for community purposes, Land assessed for liveability outcomes, Assets with alternate/dual use for community outcomes, Number of visitors to recreational areas, Value-add of projects delivered through collaboration, Travel time impacts of infrastructure failure

### Community access to lakes and waterways

**Category** - Amenity and wellbeing

**Indicator type** - Input

**What will this tell you?**

The access that the community has to waterways.  
(This indicator is relevant to utilities that have control of waterbodies).

**Relevant themes**

Connection with customers                      Recreation  
Access to waterways                      Amenity

**Metrics**

Average distance to nearest waterway from residential area

**Who uses it (sources)?**

Seqwater

**Related Indicators**

Infrastructure land available for community purposes, Land assessed for liveability outcomes, Assets with alternate/dual use for community outcomes, Swimmable beaches, Length of waterways naturalised

### Assets with alternate/dual use for community outcomes

**Category** - Amenity and wellbeing

**Indicator type** - Input

**What will this tell you?**

The utility's contribution to urban amenity by making alternate use of assets through initiatives such as, street art projects, land share agreements, bike paths, etc.

**Relevant themes**

Community land use                      Recreation  
Connection with customers                      Amenity  
Open spaces

**Metrics**

No of ha of land available for community access

**Who uses it (sources)?**

**Related Indicators**

Infrastructure land available for community purposes, Land assessed for liveability outcomes, Length of paths/cycle-ways providing connectivity, Community access to lakes and waterways, Number of visitors to recreational areas, Length of waterways naturalised, Native vegetation gain

## Outputs

### Number of complaints related to amenity

**Category** - Amenity and wellbeing

**Indicator type** - Output

**What will this tell you?**

Adverse impact on public amenity

**Relevant themes**

Connection with customers                      Amenity

**Metrics**

No of complaints related to amenity (noise, smell, visual, utility, etc.) per annum

**Who uses it (sources)?**

SA Water

**Related Indicators**

Sewer overflows, Customer satisfaction, Cost of flooding above floor level

<b>Sewer overflows</b>	
<b>Category</b> - <i>Amenity and wellbeing</i>	<b>Indicator type</b> - <i>Output</i>
<b>What will this tell you?</b> Adverse impact on health of waterways, public health and amenity	<b>Relevant themes</b> Waterways                      Amenity Wastewater                      Public health Sewer
<b>Metrics</b> No. of overflows into waterways per annum or Frequency of most active overflow to each designated waterway	<b>Who uses it (sources)?</b> SA Water
<b>Related Indicators</b> Sewer overflows, Catchment water quality risk, Swimmable beaches, Community health resulting from clean water, Urban wastewater treatment levels, Waterway quality guidelines, Pervious surfaces, River health index	

<b>Drinking water compliant with ADWG</b>	
<b>Category</b> - <i>Amenity and wellbeing</i>	<b>Indicator type</b> - <i>Output</i>
<b>What will this tell you?</b> Compliance to guidelines that address both the health and aesthetic quality aspects of supplying good quality drinking water. This has a fundamental impact on liveability, in access to clean drinking water.	<b>Relevant themes</b> Drinking water                      Public health
<b>Metrics</b> No. of breaches	<b>Who uses it (sources)?</b> Gladstone Area Water Board, Melbourne Water, SA Water, Coliban Water, Seqwater
<b>Related Indicators</b> Catchment water quality risk, Water supply security, Community health resulting from clean water , Value of water dependent GDP, Affordability of water, Waterway quality guidelines	

<b>Catchment water quality risk</b>	
<b>Category</b> - <i>Amenity and wellbeing</i>	<b>Indicator type</b> - <i>Output</i>
<b>What will this tell you?</b> The risk that there will be a water quality incident in the catchment. This has a fundamental impact on liveability, in access to clean drinking water.	<b>Relevant themes</b> Drinking water                      Public health
<b>Metrics</b> Risk rating	<b>Who uses it (sources)?</b> Seqwater
<b>Related Indicators</b> Drinking water compliant with ADWG, Water supply security, Swimmable beaches, Community health resulting from clean water, Waterway quality guidelines, River health index, Resilience	

### Frequency and severity of restrictions

**Category** - *Amenity and wellbeing*

**What will this tell you?**

How often customers will be required to reduce water use to reduce the impact of drought on available supplies

**Metrics**

No. of months  
Class of restrictions

**Related Indicators**

Water available for parks gardens and amenity, Water supply security, Customer satisfaction, Value of water dependent GDP, Existence of an integrated water management plan, Recycled water supplied to industry, Years to next major augmentation, Affordability of water, Climate change adaptation program (phase), Water efficiency programs, Efficient water use, Customer water efficiency, Resilience

**Indicator type** - *Output*

**Relevant themes**

Drinking water                      Public health  
Greening                                Restrictions  
Water use

**Who uses it (sources)?**

Melbourne Water

### Water supply security

**Category** - *Amenity and wellbeing*

**What will this tell you?**

Management of water supply that reduces the impact of drought on customers (health, wellbeing & amenity), including the potential for and severity of restrictions.

**Metrics**

Probability of reaching 40% supply volume within 5 yrs

**Related Indicators**

Water available for parks gardens and amenity, Drinking water compliant with ADWG, Catchment water quality risk, Frequency and severity of restrictions, Customer satisfaction, Value of water dependent GDP, Existence of an integrated water management plan, Recycled water supplied to industry, Years to next major augmentation, Climate change adaptation program (phase), Water efficiency programs, Efficient water use, Customer water efficiency, Resilience

**Indicator type** - *Output*

**Relevant themes**

Drinking water                      Public health  
Greening                                Restrictions  
Water use

**Who uses it (sources)?**

### Public Safety on or near water infrastructure and land

**Category** - *Amenity and wellbeing*

**What will this tell you?**

Management of infrastructure to protect public safety

**Metrics**

No of deaths and injuries per annum

**Related Indicators**

Number of visitors to recreational areas

**Indicator type** - *Output*

**Relevant themes**

Public safety

**Who uses it (sources)?**



**Customer satisfaction**

**Category** - *Amenity and wellbeing*

**Indicator type** - *Outcome*

**What will this tell you?**

The extent to which customers feel their expectations of the utility have been met

**Relevant themes**

Connection with customers

**Metrics**

Score out of 10 based on questionnaire and statistically valid sample

**Who uses it (sources)?**

Most utilities but conducted using different methodologies and wording of question

**Related Indicators**

Number of complaints related to amenity, Frequency and severity of restrictions, Water supply security, Customers assisted through hardship program, Travel time impacts of infrastructure failure

**Community health resulting from clean water**

**Category** - *Amenity and wellbeing*

**Indicator type** - *Outcome*

**What will this tell you?**

The underlying level of illness in the community that can be attributed to water borne disease

**Relevant themes**

Public health

**Metrics**

Compliance with Health Based Targets based on adopted NH&MRC methodology

**Who uses it (sources)?**

Still in implementation phase but expected to be all utilities

**Related Indicators**

Sewer overflows, Drinking water compliant with ADWG, Catchment water quality risk, Urban wastewater treatment levels, Waterway quality guidelines, River health index, Resilience

## Productivity

We harness the full productivity of our people and infrastructure to ensure that water services remain affordable.

## Context

### Regional GDP

**Category** - Productivity

**Indicator type** - Context

**What will this tell you?**

**Relevant themes**

Strength of the regional economy

**Metrics**

**Who uses it (sources)?**

TBD

**Related Indicators**

Value of water dependent GDP

### Urban Growth

**Category** - Productivity

**Indicator type** - Context

**What will this tell you?**

**Relevant themes**

The extent to which demand for water services is growing due to population growth or housing supply

**Metrics**

**Who uses it (sources)?**

Population growth by region and by year or Lot releases per month, or per annum

Sydney Water

**Related Indicators**

Water service connections available to lots released

## Inputs

### Existence of an integrated water management plan

**Category** - Productivity

**Indicator type** - Input

**What will this tell you?**

**Relevant themes**

Whether water resource planning is optimised across all sources, systems and end uses

**Metrics**

**Who uses it (sources)?**

Yes or No

No one but is a proposed indicator for Water Corporation

**Related Indicators**

Frequency and severity of restrictions, Water supply security, Recycled water supplied to industry, Water service connections available to lots released, Years to next major augmentation

### Recycled water supplied to industry

**Category** - Productivity

**Indicator type** - Input

**What will this tell you?**

Providing water supply options for industry to support productivity

**Relevant themes**

Customers  
Alternate water supply

**Metrics**

% of demand  
ML per annum

**Who uses it (sources)?**

**Related Indicators**

Frequency and severity of restrictions, Water supply security, Existence of an integrated water management plan, Years to next major augmentation, Alternative water volume targets, Water efficiency programs, Volume of water recycled, Efficient water use, Customer water efficiency

### Contribution to WSUD/ stormwater harvesting

**Category** - Productivity

**Indicator type** - Input

**What will this tell you?**

Schemes that the utility assists with the design, support, implementation, operation or supply of water to WSUD features in residential areas.

**Relevant themes**

Waterways  
Greening  
Ecology  
Growth  
Amenity  
Environmental impact  
Development

**Metrics**

Record of WSUD features directly contributed  
Volume of water treated through WSUD features  
\$ contributed to schemes

**Who uses it (sources)?**

SA Water

**Related Indicators**

Sewer overflows, Swimmable beaches, Cost of flooding above floor level, Length of waterways naturalised, Waterway quality guidelines, River health index

## Outputs

### Water service connections available to lots released

**Category** - Productivity

**Indicator type** - Output

**What will this tell you?**

Timeliness of connection so that the utility is not holding up development

**Relevant themes**

Customers  
Development  
Growth  
Service connections

**Metrics**

Water service connections available as % of lots released

**Who uses it (sources)?**

**Related Indicators**

Existence of an integrated water management plan, Value of water dependent GDP

**Value-add of projects delivered through collaboration****Category** - Productivity**Indicator type** - Output**What will this tell you?**

Efficient delivery of projects for better outcomes

**Relevant themes**Customers Multiple benefits  
Collaboration Co-funding**Metrics**

Value added ratio \$ spent to \$ value delivered

**Who uses it (sources)?****Related Indicators**

Length of paths/cycle-ways providing connectivity, Value of water dependent GDP, Operating cost

**Years to next major augmentation****Category** - Productivity**Indicator type** - Output**What will this tell you?**

Management of operations and demand to delay major augmentations

**Relevant themes**Augmentation Demand  
Supply Operations  
Networks**Metrics**

Years

**Who uses it (sources)?****Related Indicators**

Frequency and severity of restrictions, Water supply security, Existence of an integrated water management plan, Recycled water supplied to industry, Resilience, Potable water use relative to target

**Total lifecycle cost of network****Category** - Productivity**Indicator type** - Output**What will this tell you?**

Efficiency of network – an asset based measure

**Relevant themes**Networks Maintenance  
Operations  
Efficiency**Metrics**

\$/km of water or wastewater network

**Who uses it (sources)?****Related Indicators**

Value of water dependent GDP, Total lifecycle cost of treated water/wastewater, Operating cost

**Total lifecycle cost of treated water/wastewater****Category** - Productivity**Indicator type** - Output**What will this tell you?**

Efficiency of treatment and distribution of water – a product based measure

**Relevant themes**Networks Maintenance  
Operations  
Efficiency**Metrics**

\$/ML

**Who uses it (sources)?****Related Indicators**

Value of water dependent GDP, Total lifecycle cost of network, Potable water use relative to target, Alternative water volume targets, Operating cost, Affordability of water, Energy/carbon intensity of treatment and transport, Urban wastewater treatment levels



### Value of Agriculture using recycled water irrigation

**Category** - Productivity

**Indicator type** - Output

**What will this tell you?**

**Relevant themes**

Alternate water sources    Agriculture

Recycled water

**Metrics**

**Who uses it (sources)?**

**Related Indicators**

Alternative water volume targets, Water efficiency programs, Volume of water recycled, Efficient water use, Customer water efficiency

### Cost of flooding above floor level

**Category** - Productivity

**Indicator type** - Output

**What will this tell you?**

**Relevant themes**

Adverse impact of stormwater infrastructure capacity limitations

Alternate water sources    Agriculture

Recycled water

**Metrics**

**Who uses it (sources)?**

\$ cost of flooding above floor level (wrt ARI)

**Related Indicators**

Number of complaints related to amenity, Travel time impacts of infrastructure failure, Climate change adaptation program (phase), Length of waterways naturalised, Pervious surfaces, River health index, Resilience

### Travel time impacts of infrastructure failure

**Category** - Productivity

**Indicator type** - Output

**What will this tell you?**

**Relevant themes**

Impact of infrastructure breakage and maintenance work on transport infrastructure (roads, rail, etc.).

Traffic disruption

Cost

**Metrics**

**Who uses it (sources)?**

hours per annum

indirect cost per annum

**Related Indicators**

Length of paths/cycle-ways providing connectivity, Customer satisfaction, Value of water dependent GDP, Cost of flooding above floor level, Climate change adaptation program (phase), Resilience

## Outcomes

### Affordability of water

**Category** - Productivity

**Indicator type** - Output

**What will this tell you?**

**Relevant themes**

Impact of utility costs on the cost of water for customers relative to the cost of living.

Affordability                      Efficiency  
Cost                                      Cost effective

**Metrics**

**Who uses it (sources)?**

Water bill as a % of median household income

Melbourne Water, SA Water, Coliban

Water bill as a % of median home price

**Related Indicators**

Drinking water compliant with ADWG, Catchment water quality risk, Frequency and severity of restrictions, Customers assisted through hardship program, Total lifecycle cost of network, Total lifecycle cost of treated water/wastewater, Operating cost, Water efficiency programs, Customer water efficiency,

### Value of water dependent GDP

**Category** - Productivity

**Indicator type** - Outcome

**What will this tell you?**

**Relevant themes**

Proportion of overall economic activity that is reliant on the availability and reliability of water resources

**Metrics**

**Who uses it (sources)?**

To be developed

**Related Indicators**

Recycled water supplied to industry, Value of Agriculture using recycled water irrigation, Urban Growth, Regional GDP, Water service connections available to lots released



## Inputs

### Climate change adaptation program (phase)

**Category** – Sustainability and future focus

**Indicator type** - Inputs

**What will this tell you?**

Preparedness for the impacts of climate change (extreme events)

**Relevant themes**

Climate change                      Risk assessment  
Adaptation

**Metrics**

% of system assessed for climate change impacts

**Who uses it (sources)?**

% of system assessed for climate change adaptation

Risk cost of assets due to climate change impacts

**Related Indicators**

Frequency and severity of restrictions, Water supply security, Cost of flooding above floor level, Travel time impacts of infrastructure failure, Water efficiency programs, Energy/carbon intensity of treatment and transport, Renewable energy generated, Efficient water use, GHG Emissions, Electricity consumption from renewable sources, Resilience

### Certified to an Environmental Management System

**Category** – Sustainability and future focus

**Indicator type** - Inputs

**What will this tell you?**

The systems and processes that the utility has to minimise impact on the environment

**Relevant themes**

Environmental impact  
Management

**Metrics**

Yes or no

**Who uses it (sources)?**

**Related Indicators**

EA compliance of contractors, Length of waterways naturalised, Waterway quality guidelines, Native vegetation gain, River health index, Ecological footprint for total water services

### Water efficiency programs

**Category** – Sustainability and future focus

**Indicator type** - Inputs

**What will this tell you?**

Assisting customers to manage their use of water efficiently to assist in ensuring water supply security

**Relevant themes**

Demand                                      Water use  
Efficiency

**Metrics**

No. of customers involved in WE programs

**Who uses it (sources)?**

**Related Indicators**

Infrastructure land available for community purposes, Water available for parks gardens and amenity, Frequency and severity of restrictions, Water supply security, Recycled water supplied to industry, Potable water use relative to target, Value of Agriculture using recycled water irrigation, Climate change adaptation program (phase), Volume of water recycled, Efficient water use, Customer water efficiency

**Urban wastewater treatment levels**

<b>Category</b> – Sustainability and future focus	<b>Indicator type</b> - Input
<b>What will this tell you?</b> Level of effort put into treating and recovering resources from wastewater prior to discharge	<b>Relevant themes</b> Treatment
<b>Metrics</b> Proportion of urban wastewater treated to primary/tertiary/secondary levels %	<b>Who uses it (sources)?</b>
<b>Related Indicators</b> Sewer overflows, Swimmable beaches, Community health resulting from clean water, Total lifecycle cost of treated water/wastewater, Operating cost, Energy/carbon intensity of treatment and transport, Nutrients/ biosolids recovered, Electricity consumption from renewable sources, River health index, Ecological footprint for total water services	

**Outputs**

<b>Volume of water recycled</b>	
<b>Category</b> – Sustainability and future focus	<b>Indicator type</b> - Outputs
<b>What will this tell you?</b> Efficient water use	<b>Relevant themes</b> Alternate water use            Water use Efficiency                            Recycled water
<b>Metrics</b> % of total wastewater ML per annum	<b>Who uses it (sources)?</b> City West Water, SA Water, Water Corporation
<b>Related Indicators</b> Recycled water supplied to industry, Potable water use relative to target, Alternative water volume targets, Value of Agriculture using recycled water irrigation, Water efficiency programs, Efficient water use, Customer water efficiency	

<b>Energy/carbon intensity of treatment and transport</b>	
<b>Category</b> – Sustainability and future focus	<b>Indicator type</b> - Outputs
<b>What will this tell you?</b> Energy efficiency of treatment and pumping	<b>Relevant themes</b> Energy Efficiency
<b>Metrics</b> % of total wastewater ML per annum	<b>Who uses it (sources)?</b> City West Water, SA Water, Water Corporation
<b>Related Indicators</b> Total lifecycle cost of network, Total lifecycle cost of treated water/wastewater, Operating cost, Climate change adaptation program (phase), Renewable energy generated, Efficient water use, Customer water efficiency, GHG Emissions, Electricity consumption from renewable sources, Ecological footprint for total water services	

### Renewable energy generated

**Category** – Sustainability and future focus

**Indicator type** - Outputs

**What will this tell you?**

Waste reuse for energy (efficiency and reduced waste) and reduced reliance on mains power

**Relevant themes**

Energy Reuse  
Renewable

**Metrics**

MWh  
% of total used

**Who uses it (sources)?**

**Related Indicators**

Climate change adaptation program (phase), Energy/carbon intensity of treatment and transport, GHG Emissions, Urban wastewater treatment levels, Electricity consumption from renewable sources, Ecological footprint for total water services, Resilience

### Nutrients/ biosolids recovered

**Category** – Sustainability and future focus

**Indicator type** - Outputs

**What will this tell you?**

Opportunity taken to direct nutrients and soil ameliorants back to the nutrient cycle, avoiding waste or pollution

**Relevant themes**

Reuse  
Waste

**Metrics**

tonnes  
% recovered of total produced  
% used of total generated

**Who uses it (sources)?**

City West Water, Sydney Water

**Related Indicators**

Certified to an Environmental Management System, Urban wastewater treatment levels, Ecological footprint for total water services, Resilience

### Efficient water use

**Category** – Sustainability and future focus

**Indicator type** - Outputs

**What will this tell you?**

The efficiency of water use within the organisation

**Relevant themes**

Water use  
Efficiency

**Metrics**

Water use per person  
Volume saved

**Who uses it (sources)?**

Most use water use per person

**Related Indicators**

Frequency and severity of restrictions, Water supply security, Recycled water supplied to industry, Potable water use relative to target, Value of Agriculture using recycled water irrigation, Affordability of water, Climate change adaptation program (phase), Water efficiency programs, Volume of water recycled, Energy/carbon intensity of treatment and transport, Urban wastewater treatment levels, Ecological footprint for total water services, Resilience

### Customer water efficiency

<b>Category</b> – Sustainability and future focus	<b>Indicator type</b> - Outputs
<b>What will this tell you?</b> Water savings through utility water efficiency programs	<b>Relevant themes</b> Water use Efficiency
<b>Metrics</b> Water use per capita Volume saved	<b>Who uses it (sources)?</b> Sydney Water, Water Corporation
<b>Related Indicators</b> Frequency and severity of restrictions, Water supply security, Recycled water supplied to industry, Years to next major augmentation, Potable water use relative to target, Value of Agriculture using recycled water irrigation, Affordability of water, Water efficiency programs, Volume of water recycled, Energy/carbon intensity of treatment and transport, Efficient water use, Resilience	

### GHG Emissions

<b>Category</b> – Sustainability and future focus	<b>Indicator type</b> - Outputs
<b>What will this tell you?</b> Contribution of utility to GHGs and climate change	<b>Relevant themes</b> Climate change emissions Greenhouse gas
<b>Metrics</b> Tonnes	<b>Who uses it (sources)?</b>
<b>Related Indicators</b> Climate change adaptation program (phase), Energy/carbon intensity of treatment and transport, Renewable energy generated, Electricity consumption from renewable sources, Ecological footprint for total water services	

### Electricity consumption from renewable sources

<b>Category</b> – Sustainability and future focus	<b>Indicator type</b> - Outputs
<b>What will this tell you?</b> How self-sufficient the utility is in producing power	<b>Relevant themes</b> Treatment Renewable Electricity Efficiency
<b>Metrics</b> % total electricity consumption	<b>Who uses it (sources)?</b> Sydney Water
<b>Related Indicators</b> Climate change adaptation program (phase), Energy/carbon intensity of treatment and transport, Renewable energy generated, GHG Emissions, Urban wastewater treatment levels, Ecological footprint for total water services, Resilience	

### EA compliance of contractors

<b>Category</b> – Sustainability and future focus	<b>Indicator type</b> - Outputs
<b>What will this tell you?</b> The adverse impact of contractor work on the environment on behalf of the utility	<b>Relevant themes</b> Environmental impact Management
<b>Metrics</b> No. of non-compliances	<b>Who uses it (sources)?</b>
<b>Related Indicators</b> Certified to an Environmental Management System, Native vegetation gain, Resilience	



### Infrastructure Leakage Index (ILI)

**Category** – Sustainability and future focus

**Indicator type** - Outputs

**What will this tell you?**

It tells you how well the water utility has contained water loss within its system

**Relevant themes**

Water use  
Water efficiency

**Metrics**

A recognised formula and methodology for calculating the ILI exists and is used by water utilities

**Who uses it (sources)?**

Most water utilities

**Related Indicators**

Frequency and severity of restrictions, Water supply security, Recycled water supplied to industry, Potable water use relative to target, Value of Agriculture using recycled water irrigation, Affordability of water, Climate change adaptation program (phase), Water efficiency programs, Volume of water recycled, Energy/carbon intensity of treatment and transport, Urban wastewater treatment levels, Ecological footprint for total water services, Resilience

## Outcomes

### River health index

**Category** – Sustainability and future focus

**Indicator type** - Outcomes

**What will this tell you?**

Impact on receiving waters

**Relevant themes**

**Metrics**

**Who uses it (sources)?**

**Related Indicators**

Sewer overflows, Catchment water quality risk, Swimmable beaches, Community health resulting from clean water, Cost of flooding above floor level, Tree cover, Certified to an Environmental Management System, Urban wastewater treatment levels, Length of waterways naturalised, Waterway quality guidelines, Pervious surfaces, Native vegetation gain, Resilience

### Ecological footprint for total water services

**Category** – Sustainability and future focus

**Indicator type** - Outcomes

**What will this tell you?**

Impact on the environment

**Relevant themes**

**Metrics**

Equivalent footprint in ha - standard WSAA member methodology

**Who uses it (sources)?**

Sydney Water

**Related Indicators**

Days exceeding critical heat threshold, Tree cover, Certified to an Environmental Management System, Energy/carbon intensity of treatment and transport, Renewable energy generated, Nutrients/ biosolids recovered, GHG Emissions, Urban wastewater treatment levels, Electricity consumption from renewable sources, EA compliance of contractors, Resilience

## Resilience

**Category** – Sustainability and future focus

**Indicator type** - Outputs

**What will this tell you?**

**Relevant themes**

Level of certainty that utility will be able to continue providing services in an uncertain world

**Metrics**

**Who uses it (sources)?**

None as yet but proposed standard index

**Related Indicators**

Days exceeding critical heat threshold, Catchment water quality risk, Frequency and severity of restrictions, Water supply security, Community health resulting from clean water, Value of water dependent GDP, Years to next major augmentation, Cost of flooding above floor level, Travel time impacts of infrastructure failure, Climate change adaptation program (phase), Renewable energy generated, Nutrients/ biosolids recovered, Electricity consumption from renewable sources, Waterway quality guidelines