

What is a water sensitive city?  
Objectives, outcomes, criteria,  
indicators and targets for  
water sensitive communities.

Prepared for the  
Water Sensitive Transition Network  
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## Delivering water sensitive communities for Perth and Peel

This guideline outlines objectives, outcomes, criteria, indicators and targets for all aspects of water sensitive communities. It recommends a range of actions that demonstrate best practice application of water sensitive principles and practices.

The guideline can be applied to the complete range of activities that influence water sensitive community outcomes, including environmental and public health management; planning and development; and infrastructure, asset management and service delivery by State and local government, utilities and the private sector.

The guideline contains a comprehensive suite of objectives and outcomes that, together, are considered to represent the characteristics of a water sensitive community. They are arranged under a broad set of aims that are consistent with the vision for a water sensitive Perth and Peel, but can also be applied to regional communities in Western Australia.

Achievement of the objectives and outcomes can be demonstrated through application of the criteria, setting a justifiable target and measuring progress against the chosen indicators. Where published criteria or targets are available, these have been referenced.

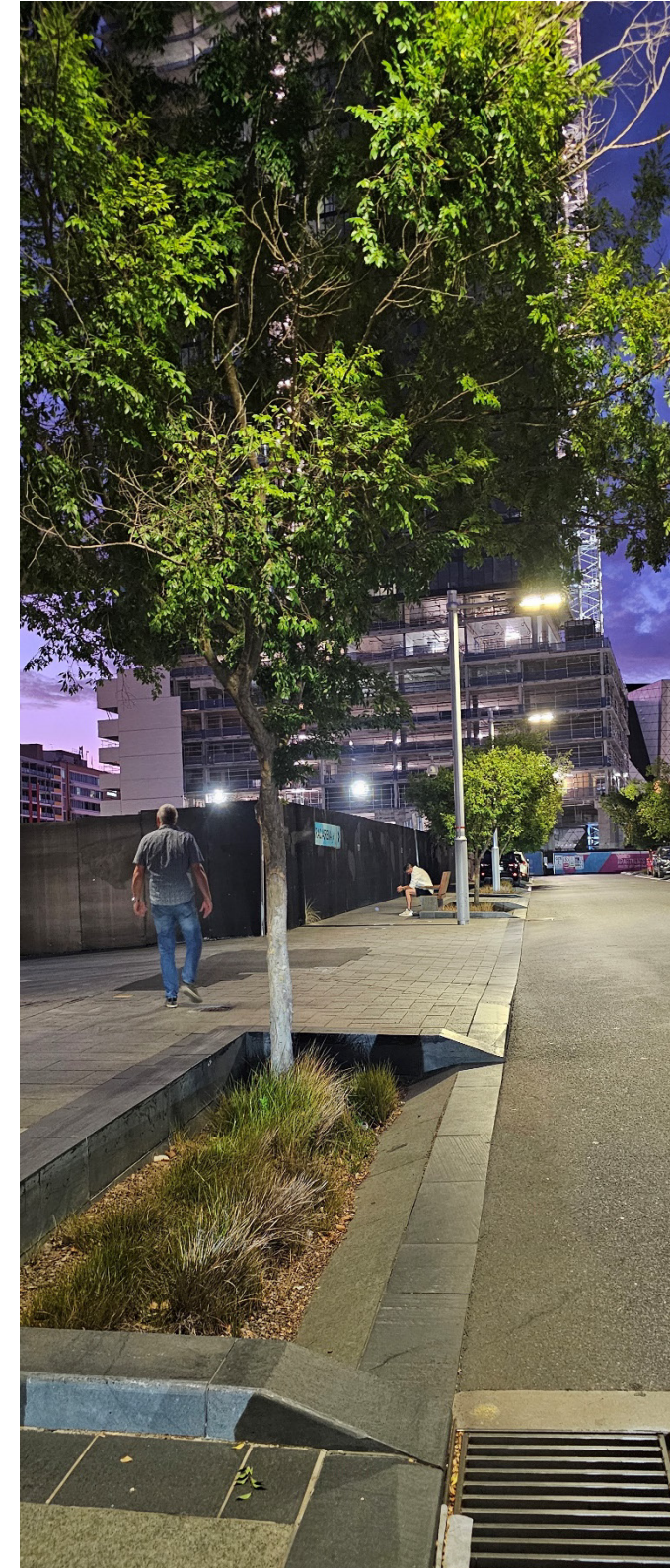
### What is a water sensitive community/city?

In Western Australia, 'waterwise' has evolved to encompass the concepts of a 'water sensitive city'.

In Boorloo (Perth) and Bindjareb (Peel), waterwise cities are where communities care about and value water, while making best use of its various sources (groundwater, dams, stormwater, sea water and wastewater). The city serves as a catchment and provides healthy natural environments, supporting a range of cultural, social, ecological and economic benefits.

A waterwise community is sustainable over the long term, economically productive, highly liveable and resilient to extreme weather events. It is a vibrant community where our connection with water enhances our quality of life. By adopting waterwise approaches, communities and the environment can become more climate resilient and make the Boorloo (Perth) and Bindjareb (Peel) region a sustainable and liveable place for future generations

Kep Katitjin – Gabi Kaadadjan, Government of WA, 2022.



## How do I apply this guideline?

The objectives and outcomes are applicable to a broad range of activities and delivery mechanisms (please see below). However, it is noted that the indicators may be most relevant to particular scales and/or for certain activities. It is therefore intended that the **user identifies the criteria that are relevant** to their particular activity, **chooses the indicators they intend to report on**, and **sets their own targets**. The choice of particular objectives and targets to commit to is likely to be driven by project context and vision.

As stated above, where published targets exist, they have been included, but it is felt that each project/activity should be responsible for setting their own targets that reflect agreed priorities. This ensures the choice of water sensitive solutions is responsive to the local physical, social and economic conditions. For example, where the target is "XX%", it is expected that the proponent/ responsible agency/project team will define a baseline and/or stretch target for their project.

Furthermore, the guideline attempts to reduce repetition by identifying an indicator in one location only. It is recognised that some indicators may be applicable to (and therefore may be used to represent) more than one outcome.



## Who does it apply to?

This guideline can inform all aspects of water sensitive communities delivered through all mechanisms, including:

- Environmental and community health
  - Environmental protection (regulation and management)
  - Public health
  - Land managed for conservation
- Planning and development
  - Strategic planning
  - Subdivision and urban development
  - Built environment
- Infrastructure delivery and operations
  - Water service providers
  - Transport agencies and utilities
  - Other land managers, including schools
- Maintenance and operation of local government assets and services
  - Corporate planning
  - Asset management
  - Community development

### *Definitions*

Green infrastructure – includes biofilters, raingardens, tree pits, swales, living streams, green walls, green roofs, green facades.

Water management - means potable and non-potable water, drainage/stormwater and wastewater services.

## Principles of a water sensitive city

The principles of a water sensitive city/ community (adapted from draft State Planning Policy 2.9: Water) are to:

- Enhance community and system resilience, amenity and liveability.
- Mimic natural hydrological processes – design based on local site conditions and minimise changes to hydrology.
- Enhance natural systems – manage, protect and restore wetlands, groundwater and waterways.
- Provide protection from flooding in 1% annual exceedance probability (AEP) flood event and surface or groundwater inundation/ waterlogging.
- Maximise water use efficiency and facilitate fit-for-purpose water sources including water reuse/recycling.
- Minimise pollution inputs and outputs in flows and in receiving environments.
- Create fit-for purpose, safe and sustainable water management systems that are integrated into the urban form.
- Enhance economic, social and cultural values of water resources and community water literacy.

These principles have been incorporated into the objectives and outcomes.

Key water sensitive solutions include:

- Vegetated stormwater management infrastructure – tree pits, raingardens, biofilters, swales, living streams, constructed wetlands,
- Pervious surfaces, including deep soil areas and pervious paving,
- Green built form, including green walls, roofs and facades,
- Multiple use public spaces,
- Water conservation and efficiency, fit-for-purpose water use, water recycling and water reuse.

### What do the descriptors mean?

- **Goal/Aim** – high level objective/ outcome that provides an overarching framework.
- **Objective** - an idea of the future or desired result that a person or a group of people envision, plan and commit to achieve. Generally begins with a verb – what we want to “do”.
- **Outcomes** - a statement of the benefits, results, impacts or other long-term changes sought.
- **Criteria** - what is required to achieve a target or objective.
- **Indicators** - measures of performance that you want to track. They can be qualitative or quantitative
- **Targets** – what you want to achieve in a specific time and linked to an indicator. Often described as SMART (specific, measurable, attainable, relevant, and time-bound).

## Objectives and outcomes of a water sensitive city

	Objective	Outcome
Our city landscapes are liveable and adaptive	<ol style="list-style-type: none"> <li>1. Ensure the project concept design responds to local site context and conditions</li> <li>2. Improve amenity and liveability of urban landscapes, including blue-green infrastructure and connectivity</li> <li>3. Increase tree canopy coverage, address urban heat and promote cooling</li> <li>4. Design urban spaces to manage stormwater, inundation and flood risks</li> <li>5. Make water infrastructure multi-functional</li> </ol>	<p>The outcome has considered and responds to the specific environmental, social and economic conditions and context of the site and location.</p> <p>Water (blue) and green infrastructure (both natural and built) is integrated into the urban landscape and provides linkages between natural areas.</p> <p>Urban areas are shaded with trees with large canopies. Urban form incorporates climate responsive design. Water is available for irrigation of green space.</p> <p>People and property are appropriately protected from flooding and inundation.</p> <p>Infrastructure is designed and operated to achieve multiple benefits and support alternative uses and functions.</p>
Our community values are supported	<ol style="list-style-type: none"> <li>6. Enhance community health and wellbeing</li> <li>7. Respect and reflect heritage and cultural values</li> <li>8. Increase community water literacy</li> <li>9. Create opportunities for the community to engage with water resources and the environments they sustain</li> </ol>	<p>The community exhibits a high level of physical health and mental wellbeing. Heritage and cultural values are known, shared and respected.</p> <p>The community demonstrate a high level of water literacy.</p> <p>The community has access to the recreational values of green space and water resources and values these natural and built landscapes.</p>
Our natural systems are healthy, and are resilient to climate change	<ol style="list-style-type: none"> <li>10. Improve the health of waterways, wetlands, catchments and natural areas</li> <li>11. Sustainably manage our groundwater</li> <li>12. Achieve a net increase in natural assets (nature positive actions)</li> <li>13. Account for climate change in decision making</li> <li>14. Provide space for regenerative flooding of waterway floodplains</li> </ol>	<p>Waterways, wetlands, catchments and natural areas are healthy and resilient to climate change.</p> <p>Groundwater quality and levels will maintain healthy ecosystems and provide for economic activities and community benefits.</p> <p>Actions result in a net gain of natural assets.</p> <p>Climate change adaptation and mitigation options identified and incorporated.</p> <p>Rainfall events are accommodated in floodplains, as well as drainage systems.</p>

## Objective

## Outcome

<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Our water services are sustainable and efficient</p>	<p>15. Optimise the use of water, encourage reuse/recycling, and reduce the use of non-renewable energy</p> <p>16. Design out waste and pollution</p> <p>17. Support emerging technologies and efficiencies</p> <p>18. Provide adequate maintenance</p>	<p>The quality of water used is equal to the quality of water required.</p> <p>Water is conserved, used efficiently, recycled and reused.</p> <p>Energy associated with water supply and/or use is from renewable sources.</p> <p>Economic sustainability is based on holistic valuations.</p> <p>Water services do not result in pollution of the environment.</p> <p>By-products from water services are reused.</p> <p>Water management solutions represent current best practice.</p> <p>Water-related assets (built and natural) are maintained at an agreed level of service.</p>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">We are collaborative, transparent and innovative</p>	<p>19. Be inclusive and promote equity in our actions</p> <p>20. Support integrated and collaborative delivery</p> <p>21. Continually improve knowledge and governance frameworks</p> <p>22. Support innovation</p>	<p>Decision making to encompass holistic costs and benefits (environmental, social and economic) and intergenerational equity.</p> <p>Equity considerations underpin decision making.</p> <p>Actions are integrated and collaborative.</p> <p>Delivery of the project/action improves the body of knowledge about water sensitive cities.</p> <p>Principles of good governance are observed.</p> <p>Actions are innovative, where innovation will improve outcomes, processes and/or practices.</p>

## Our city landscapes are liveable and adaptive

### Objective 1: Ensure the project concept design responds to local site context and conditions

**Outcome:** The outcome has considered and responds to the specific environmental, social and economic conditions and context of the site and location.

Criteria	Indicator	Target
<ul style="list-style-type: none"> <li>Define the site itself and the surrounding context, including environmental, social (and cultural) and economic attributes.</li> <li>Clarify how the local environmental, social (and cultural) and economic attributes inform the design of the project/action.</li> <li>Minimise changes in/retain landform to protect local hydrology, existing vegetation and sense of place.</li> </ul>	<ul style="list-style-type: none"> <li>Context analysis, including identification of opportunities and constraints for the project/action and local context.</li> <li>Project/action acknowledges and responds to the sense of place, including the natural landform.</li> </ul>	<ul style="list-style-type: none"> <li>Context analysis completed and understood by project team and stakeholders. Design reflects the specific site context and conditions.</li> <li>Development reflects some pre-development slopes and elevations.</li> </ul>

### Objective 2: Improve amenity and liveability of urban landscapes, including blue-green infrastructure and connectivity

**Outcome:** Water (blue) and green infrastructure (both natural and built) is integrated into the urban landscape and provides linkages between natural areas.

Criteria	Indicator	Target
<ul style="list-style-type: none"> <li>Design urban form to support improved management of water resources using WSUD principles.</li> <li>Create built form/structures that are aesthetically pleasing and incorporate green infrastructure.</li> <li>Identify and improve connections between people, water infrastructure and natural areas.</li> <li>Identify opportunities to contribute to Nature Links.</li> </ul>	<ul style="list-style-type: none"> <li>Streetscapes and public open space/public land incorporating vegetated stormwater assets and green infrastructure.</li> <li>Urban and built form incorporating green infrastructure.</li> <li>Length of open drainage naturalised (vegetated).</li> <li>Length of paths/cycle-ways providing connectivity between water and natural assets.</li> </ul>	<ul style="list-style-type: none"> <li>100% of government-led urban development in Boorloo and Bindjareb to be waterwise (Kep Katitjin).</li> <li>All streetscapes and public open space/public land incorporates green infrastructure.</li> <li>XX% of urban and built form incorporating green infrastructure.</li> <li>XX% or linear metres of vegetated drainage.</li> <li>Connectivity between vegetated areas is improved by XX%.</li> <li>XX% of paths/cycle-ways providing connectivity between water and natural assets.</li> </ul>

### Objective 3: Increase tree canopy coverage, address urban heat and promote cooling

Outcomes: Urban areas are shaded with trees with large canopies and Urban form incorporates climate responsive design.

Criteria	Indicator	Target
<ul style="list-style-type: none"> <li>Retain mature trees and/or replant wherever possible.</li> <li>Require planting of vegetation and new trees in public and private spaces.</li> <li>Urban form responds to local climate conditions.</li> <li>Apply TG040 Environmentally Sustainable Design Guideline for Non-Residential Government Buildings, as appropriate.</li> </ul>	<ul style="list-style-type: none"> <li>% canopy coverage.</li> <li># or % of retained or replanted trees.</li> <li># new trees per m2 of project area.</li> <li>Strategies that reduce the heat island effect, such as:               <ul style="list-style-type: none"> <li>planting vegetation and green roofs, wall and facades</li> <li>removing existing hard surfaces to accommodate natural surfaces</li> <li>limiting the use of hard surfaces</li> <li>shading hard surfaces</li> </ul> </li> <li>Days exceeding critical heat threshold (TBD).</li> </ul>	<ul style="list-style-type: none"> <li>Adopt local government % canopy target, or where no local target exists, then at least 30% (once trees are mature) of the urban area (Nature Based Solutions Institute).</li> <li>XX# or XX % of retained trees.</li> <li>Plant at least one street tree per single residential lot (many LG policies), one tree per 4 car bays in car parks, one tree per 8 m frontage in industrial lots.</li> <li>Meet criteria in SPP 7.3: Residential Design Codes Volumes 1 (draft) and 2.</li> <li>% of the site area, including roof area, that reduce the heat island effect.</li> <li>Solar Reflectance Index of the roof colour consistent with the requirements of the National Construction Code.</li> </ul>

Outcome: Water is available for irrigation of green space.

Criteria	Indicator	Target
Green space (Perth & Peel) to be irrigated at or less than: <ul style="list-style-type: none"> <li>12,100 kL/ha pa for Elite Sport pitch surface</li> <li>7,500 kL/ha pa for Premier Sport pitch surface</li> <li>6,250 kL/ha pa for Local Sport pitch surface</li> <li>5,000 kL/ha pa for Recreation turf</li> <li>3,750 kL/ha pa for Garden beds.</li> </ul>	Water available for parks, gardens and amenity.	Sufficient water is available for irrigation of parks in accordance with best practices outlined in the <a href="#">Public Parkland Planning and Design Guide</a> .

#### Objective 4: Design urban spaces to manage stormwater, inundation and flood risks

Outcome: People and property are appropriately protected from flooding and inundation.

Criteria	Indicator	Target
<ul style="list-style-type: none"> <li>Meet the criteria in the Decision Process for stormwater management in Western Australia through application of the Stormwater Management Manual for Western Australia (DWER, latest editions).</li> <li>Areas for flood protection are multi-functional.</li> </ul>	<ul style="list-style-type: none"> <li>Capacity of land to mitigate flood risk.</li> <li>Vegetated stormwater assets incorporated into streetscape and public realm.</li> </ul>	<ul style="list-style-type: none"> <li>100% of the 1% AEP flood event managed within public land/land reserved for public purpose/conservation/road reserves.</li> <li>All streetscapes include vegetated stormwater assets.</li> </ul>

#### Objective 5: Make water infrastructure multi-functional

Outcome: Infrastructure is designed and operated to achieve multiple benefits and support alternative uses and functions.

Criteria	Indicator	Target
<ul style="list-style-type: none"> <li>Design and operate water infrastructure to achieve multiple benefits and support alternative uses and functions.</li> </ul>	<ul style="list-style-type: none"> <li>Water infrastructure land available for community purposes.</li> <li>Assets with alternate/dual use for community or environmental outcomes.</li> </ul>	<ul style="list-style-type: none"> <li>XX% land for water infrastructure is accessible to the public.</li> <li># or X% above ground public water assets provide for community or environmental use.</li> </ul>

## Our community values are supported

### Objective 6: Enhance community health and wellbeing

Outcome: The community exhibits a high level of physical health and mental wellbeing.

Criteria	Indicator	Target
<ul style="list-style-type: none"> <li>Deliver action/project to incorporate community health and wellbeing benefits from improved access to natural assets and recreational opportunities.</li> </ul>	<ul style="list-style-type: none"> <li>People engaged in weekly physical activity.</li> <li>Proximity to natural areas (bushland, waterways and wetlands) (physical and visual access).</li> <li>Self reported health and/or other measures from Social Health Atlas of Australia (PHIDU).</li> <li>Water resourcing and funding to deliver broad societal value.</li> <li>Visitor numbers to water assets.</li> <li>Complaints/reports of biting insects to State or local government.</li> </ul>	<ul style="list-style-type: none"> <li>XX% community engages in weekly physical activity.</li> <li>XX% project area within 400m of a natural area (including park).</li> <li>7.5% neighbourhood area comprises green space for sport and recreation activities.</li> <li>XX% rooms within the building provide a view of nature.</li> <li>Self reported health over 8 out of 10.</li> <li>Project health and wellbeing policy.</li> </ul>

### Objective 7: Respect and reflect heritage and cultural values

Outcome: Heritage and cultural values are known, shared and respected.

Criteria	Indicator	Target
<ul style="list-style-type: none"> <li>Deliver project/action in accordance with Our Knowledge Our Way in caring for Country: Indigenous-led approaches to strengthening and sharing our knowledge for land and sea management. Best Practice Guidelines from Australian experiences. NAILSMA and CSIRO, 2020.</li> </ul>	<ul style="list-style-type: none"> <li>Traditional Owners engaged in project/action at every stage.</li> <li>Project/action delivered in partnership with Traditional Owners.</li> </ul>	<ul style="list-style-type: none"> <li>100% of project team has completed Aboriginal cultural training / been inducted on the cultural aspect of site.</li> <li>The design retains, conserves and enhances heritage assets and cultural values.</li> <li># interpretive signage or artworks.</li> <li>The project outcome has incorporated Traditional Owner knowledge and values.</li> </ul>

### Objective 8: Increase community water literacy

Outcome: The community demonstrate a high level of water literacy.

Criteria	Indicator	Target
<ul style="list-style-type: none"> <li>Incorporate community water education opportunities into the project/ action.</li> </ul>	<ul style="list-style-type: none"> <li>Community water literacy, as measured by Water Corporation’s Customer Value Survey.</li> <li>Educational signage (with water sensitive communities messages).</li> </ul>	<ul style="list-style-type: none"> <li>Increase community engagement and knowledge about water by 15% - from 6.2 in 2018 to 7.1 out of 10 water knowledge questions answered correctly by 2030 (Kep Katitjin).</li> <li>#educational opportunities provided.</li> </ul>

### Objective 9: Create opportunities for the community to engage with water resources and the environments they sustain

Outcome: The community has access to the recreational values of green space and water resources and values these natural and built landscapes.

Criteria	Indicator	Target
<ul style="list-style-type: none"> <li>Provide green space in accordance with Liveable Neighbourhoods and WAPC open space policy.</li> <li>Provide public access to natural areas.</li> </ul>	<ul style="list-style-type: none"> <li>Average distance to a park/bushland.</li> <li>Community access to wetlands and waterways.</li> <li>Ratio of built up areas to green space.</li> <li># community groups helping to protect, restore and/or maintain a park/wetland/ waterway/bushland.</li> <li>Community group participation rates and demographics.</li> <li>Participation/contribution to citizen science.</li> <li>Economic activity associated with/supported by water assets.</li> </ul>	<ul style="list-style-type: none"> <li>POS delivered exceeds policy requirements.</li> <li>All residences are within 400m of a park/natural area.</li> <li>50 land and water assets in Perth and Peel retrofitted to improve local community access to green spaces (Kep Katitjin).</li> </ul>

## Our natural systems are healthy, and are resilient to climate change

### Objective 10: Improve the health of waterways, wetlands, catchments and natural areas

Outcome: Waterways, wetlands, catchments and natural areas are healthy and resilient to climate change.

Criteria	Indicator	Target
<ul style="list-style-type: none"> <li>Meet the requirements of State Planning Policy 2.9: Planning for Water.</li> <li>Provide adequate wetland buffers and waterways foreshore areas, which also account for climate change.</li> <li>Meet the water quality requirements for recreational contact with waterways (e.g. algae types and quantities, and pollutant concentrations).</li> <li>Meet the water quality requirements for healthy wetland and waterway ecologies.</li> <li>Connect development to reticulated sewerage systems in accordance with the Government Sewerage Policy/SPP 2.9.</li> <li>Achieve the ecological water requirements of wetlands and waterways.</li> </ul>	<ul style="list-style-type: none"> <li>Area in conservation management.</li> <li>Length of continuous, connected foreshore reserve in public ownership along waterways.</li> <li>Ecological and water quality measurements.</li> <li>% Expenditure on protection/restoration of natural values.</li> <li>Suitable water quality in major waterways that is safe to swim and recreate in.</li> <li># harmful or nuisance algal blooms per year in monitored waterways.</li> <li># Significant (&gt;100 fish) native fish kill events per year in monitored waterways.</li> <li># days per year a waterway is the subject of a health warning.</li> <li># mosquitoes or other biting insects.</li> <li>Area or length of waterway/wetland restored (weeds removed and native vegetation planted).</li> <li># wastewater overflows per year into monitored waterways.</li> <li># other contamination events e.g., diesel spills, etc., per year into monitored waterways.</li> </ul>	<ul style="list-style-type: none"> <li>2.7 kg N/ha/year &amp; 0.15 kg P/ha/yr within Sewerage Sensitive areas; 3.6 kg N/ha/year &amp; 0.2 kg P/ha/yr outside sewerage sensitive areas; 5.4 kg N/ha/year &amp; 0.29 kg P/ha/yr in areas directly draining to the coast.</li> <li>100 restoration projects which contribute to improved water quality, ecological health and amenity of the Swan Canning Riverpark, tributaries and catchment (Kep Katitjin).</li> <li>Applicable waterway health targets (as set by management authority) are met to agreed %. These may include: <ul style="list-style-type: none"> <li>Ecological targets</li> <li>Water quality targets.</li> </ul> <p>Where targets have not been specifically identified, ANZECC guidelines are met to agreed % (as defined by managing authority).</p> </li> <li>Downward trend in the number of harmful or nuisance algal blooms (where public notification is required).</li> <li>Downward trend in significant native fish kill events per year.</li> <li>Downward trend in number of days per year a waterway is the subject of a health warning.</li> <li>All surface water and groundwater quality monitoring data uploaded onto the Water Information Reporting database.</li> <li>Conservation valued wetlands are retained and restored.</li> <li>Major waterways have suitable water quality that is safe to swim and recreate in XX days of the year.</li> <li>Constructed water bodies do not create additional mosquito breeding habitat.</li> </ul>

### Objective 11: Sustainably manage our groundwater

Outcome: Groundwater quality and levels will maintain healthy ecosystems and provide for economic activities and community benefits.

Criteria	Indicator	Target
<ul style="list-style-type: none"> <li>Groundwater and surface water use is within allocation limits and provides an opportunity to return allocation for environmental benefit and to mitigate climate change impacts.</li> <li>Mitigate risks to surface water and groundwater quality.</li> </ul>	<ul style="list-style-type: none"> <li>Groundwater quality.</li> <li>Groundwater level.</li> </ul>	<ul style="list-style-type: none"> <li>100% of irrigated open space audited and adopting waterwise management practices (Kep Katitjin).</li> <li>All groundwater aquifers are allocated within sustainable limits.</li> <li>10% less groundwater used across the Perth and Peel region (Kep Katitjin).</li> <li>Opportunities to reduce groundwater use across the project/asset life cycle are assessed, and feasible options implemented to ensure wise use of groundwater.</li> </ul>

### Objective 12: Achieve a net increase in natural assets (nature positive actions)

Outcome: Actions result in a net gain of natural assets.

Criteria	Indicator	Target
<ul style="list-style-type: none"> <li>Retain natural assets, including trees, other vegetation, wetlands and waterways.</li> <li>Restore native vegetation, wetlands and waterways and replant vegetation and trees.</li> </ul>	<ul style="list-style-type: none"> <li>Area/#/% trees, vegetation &amp; water within project/action area or associated with the action.</li> <li>Species richness and abundance.</li> </ul>	<ul style="list-style-type: none"> <li>Area/# trees, vegetation &amp; water after action is greater than before.</li> <li>Net annual increase in area of green surfaces.</li> <li>Species diversity within the project area has increased.</li> </ul>

### Objective 13: Account for climate change in decision making

Outcome: Climate change adaptation and mitigation options identified and incorporated.

Criteria	Indicator	Target
<ul style="list-style-type: none"> <li>Consider the future impacts of climate change in decision making and explore adaptation and mitigation options.</li> </ul>	<ul style="list-style-type: none"> <li>Climate change risk assessment, including mitigation and adaptation actions.</li> </ul>	<ul style="list-style-type: none"> <li>At least 11 climate change management plans adopted by waterwise partner agencies, meet or exceed State Government endorsed climate change guidelines and standards (Kep Katitjin).</li> <li>Climate change risk assessment is completed, and mitigation and adaptation actions identified in policy/plan/design.</li> </ul>

### Objective 14: Provide space for regenerative flooding of waterway floodplains

Outcome: Rainfall events are accommodated in floodplains, as well as drainage systems.

Criteria	Indicator	Target
<ul style="list-style-type: none"> <li>Meet the riverine flooding requirements of State Planning Policy 2.9: Planning for Water.</li> </ul>	<ul style="list-style-type: none"> <li>Number of flood events with community impact.</li> <li>Area of floodway/floodplain in public ownership.</li> <li># flood emergency plans in place.</li> <li>% pervious area.</li> </ul>	<ul style="list-style-type: none"> <li>100% defined floodways retained unobstructed.</li> <li>X% defined floodplain areas retained as public/reserved land increased from current baseline.</li> <li>All flood prone urban land has an active emergency management/evacuation plan in place.</li> </ul>

## Our water services are sustainable and efficient

### Objective 15: Optimise the use of water, encourage reuse/recycling, and reduce the use of non-renewable energy

Outcomes:

- The quality of water used is equal to the quality of water required.
- Water is conserved, used efficiently, recycled and reused.
- Energy associated with water supply and/or use is from renewable sources.
- Economic sustainability is based on holistic valuations.

Criteria	Indicator	Target
<ul style="list-style-type: none"> <li>• Ensure the quality of drinking water complies with the <a href="#">Australian Drinking Water Guideline</a>.</li> <li>• Identify and implement opportunities for reuse of water/wastewater.</li> <li>• Comply with Building Code of Australia requirements for water efficiency.</li> <li>• Source energy associated with water supply and/or use from renewable sources.</li> <li>• Demonstrate that the energy requirements associated with water supply and/or use are net zero.</li> <li>• Water services/systems are economically sustainable.</li> </ul>	<ul style="list-style-type: none"> <li>• % population with drinking water that meets ADWG.</li> <li>• Water conservation &amp; reuse and stormwater management strategy.</li> <li>• Average total water consumption per person.</li> <li>• Average scheme water consumption per person.</li> <li>• Proportion of wastewater that is recycled.</li> <li>• Proportion of IWSS/water generation/ wastewater management powered by renewable energy/renewable energy generated.</li> <li>• Energy/carbon intensity of water treatment and transport.</li> </ul>	<ul style="list-style-type: none"> <li>• 100% population with drinking water that meets ADWG (incl. remote communities).</li> <li>• Total water use is no more than XX L/person/day.</li> <li>• Increase wastewater recycling from 21% in 2022 to 30% by 2030 (Kep Katitjin).</li> <li>• Fixtures and fittings to meet water efficiency ratings:               <ul style="list-style-type: none"> <li>○ Toilets - min 4 stars WELS rated</li> <li>○ Showers - min 4 stars WELS rated</li> <li>○ Taps, other than bath outlets and garden taps - min 5 stars WELS rated.</li> </ul> </li> <li>• Energy requirements for water services are carbon neutral.</li> </ul>

## Objective 16: Design out waste and pollution

Outcomes:

- Water services do not result in pollution of the environment.
- By-products from water services are reused.

Criteria	Indicator	Target
<ul style="list-style-type: none"> <li>• Recover or reuse by-products of water service provision (supply of drinking water and non-drinking water, management of wastewater/provision of sewerage).</li> <li>• Apply waste hierarchy to improve outcomes.</li> <li>• Implement erosion and sediment control measures.</li> </ul>	<ul style="list-style-type: none"> <li>• Groundwater and surface water quality.</li> <li>• Wastewater overflows to the environment.</li> <li>• By-products (e.g. nutrients/ biosolids) recovered and reused.</li> <li>• Type/range, and levels of microbial indicators/ pathogens, and pollutants from treated wastewater, discharged through ocean outfalls etc.</li> <li>• Amount of sediment discharged from site.</li> </ul>	<ul style="list-style-type: none"> <li>• On-site systems do not impact off-site and meet discharge water quality environmental requirements.</li> <li>• # of wastewater overflows to the environment reduced.</li> <li>• \$/X% by-products (e.g. nutrients/ biosolids) recovered and reused.</li> <li>• Resource output streams and quantities reduced by X%.</li> <li>• No discharge of wind or water-borne sediment from the site.</li> <li>• Circular economy principles are considered in the project planning and design, and these opportunities are extended beyond the project boundary.</li> </ul>

## Objective 17: Support emerging technologies and efficiencies

Outcome: Water management solutions represent current best practice.

Criteria	Indicator	Target
<ul style="list-style-type: none"> <li>• Adopt best practice technology (i.e. water monitoring, water quality treatment, technologies to improve ecological health, etc) appropriate for site and context.</li> </ul>	<ul style="list-style-type: none"> <li>• In-situ and real-time water quality monitoring devices installed for popular, or sensitive environmental /recreational water bodies/ waterways.</li> <li>• Irrigation installers accredited by Irrigation Australia.</li> <li>• Number of smart water meters installed.</li> <li>• # Greywater systems.</li> <li>• # rainwater tanks plumbed into toilets, hot water systems and/or laundry.</li> </ul>	<ul style="list-style-type: none"> <li>• All water use is monitored and reviewed.</li> <li>• Adoption of water-efficiency infrastructure, soil amelioration and technology support programs in the Gngangara plan area (Kep Katitjin).</li> <li>• Irrigation installer is accredited by Irrigation Australia and/or endorsed as Waterwise by Water Corporation (see Waterwise Specialists).</li> <li>• # of smart water meters installed.</li> <li>• #/% Greywater systems.</li> <li>• #/% rainwater tanks plumbed into toilets, hot water systems and/or laundry.</li> </ul>

## Objective 18: Provide adequate maintenance

Outcome: Water-related assets (built and natural) are maintained at an agreed level of service.

Criteria	Indicator	Target
<ul style="list-style-type: none"> <li>Design, construct and operate water-related assets at an agreed level of service.</li> </ul>	<ul style="list-style-type: none"> <li>Total lifecycle cost of network.</li> <li>Water-related assets recorded in asset management systems.</li> <li>System failure rates (leaks, overflows, floods, blockages, etc).</li> </ul>	<ul style="list-style-type: none"> <li>100% assets recorded.</li> <li>System failures reduced by XX amount.</li> <li>100% compliance with agreed asset maintenance requirements.</li> </ul>

## We are collaborative, transparent and innovative

### Objective 19: Be inclusive and promote equity in our actions

Outcomes:

- Decision making to encompass holistic costs and benefits (environmental, social and economic) and intergenerational equity.
- Equity considerations underpin decision making.

Criteria	Indicator	Target
<ul style="list-style-type: none"> <li>Demonstrate consideration of equity in the allocation of resources and effort.</li> <li>Meet universal access requirements.</li> </ul>	<ul style="list-style-type: none"> <li>Diversity of representation in decision making.</li> <li>Public engagement, participation and transparency.</li> <li>Universal access.</li> </ul>	<ul style="list-style-type: none"> <li>100% project team completed Diversity and inclusion training.</li> <li>High priority stakeholder issues have been identified and confirmed with project stakeholders.</li> <li>Stakeholder inputs have contributed to positive outcomes for high priority issues.</li> </ul>

## Objective 20: Support integrated and collaborative delivery

Outcome: Actions are integrated and collaborative.

Criteria	Indicator	Target
<ul style="list-style-type: none"> <li>Identify and engage with a diverse range of stakeholders and the community.</li> <li>Adopt a multi-disciplinary approach to planning, design, delivery and operations.</li> </ul>	<ul style="list-style-type: none"> <li># of collaborative partnerships.</li> <li>Value-add of projects delivered through collaboration.</li> <li>Diversity of representation of stakeholders.</li> <li>Other/existing initiatives and collaborations relevant for the project.</li> </ul>	<ul style="list-style-type: none"> <li>Stakeholder engagement strategy implemented.</li> <li>Diversity strategy implemented.</li> </ul>

## Objective 21: Continually improve knowledge and governance frameworks

Outcome: Delivery of the project/action improves the body of knowledge about water sensitive cities and principles of good governance are observed.

Criteria	Indicator	Target
<ul style="list-style-type: none"> <li>Share learnings from delivery of the project/ action relating to WSC outcomes.</li> <li>Implement the principles of good governance (OHCHR).</li> </ul>	<ul style="list-style-type: none"> <li>Water sensitive communities/cities knowledge, skills and organisational capacity.</li> <li>Cross-sector institutional arrangements and processes.</li> <li>Investment in educational programs &amp; materials.</li> <li>Demonstration projects.</li> </ul>	<ul style="list-style-type: none"> <li>Best practice waterwise policies integrated into State Government urban water policies, guidelines and technical advice notes (Kep Katitjin).</li> <li>One sustainability outcome / lesson learned shared beyond the project team.</li> <li>Project delivered by a multidisciplinary team.</li> <li>XX amount of investment in education.</li> </ul>

## Objective 22: Support innovation

Outcome: Actions are innovative, where innovation will improve outcomes, processes and/or practices.

Criteria	Indicator	Target
<ul style="list-style-type: none"> <li>Support innovation resulting in improved outcomes, processes and/or practices.</li> </ul>	<ul style="list-style-type: none"> <li>Added value due to innovation.</li> <li>R&amp;D investment.</li> <li>Demonstration projects.</li> </ul>	<ul style="list-style-type: none"> <li>One innovation is considered and assessed for feasibility.</li> <li>XX level of R&amp;D investment made.</li> </ul>

## Appendix 1: Summary of numeric water quality targets applied in WA

Source	applicable area	applicable scale	Nitrogen	Phosphorous	Notes
Better Urban Water Management (WAPC 2008)	Whole of WA	development	45% reduction	60% reduction	% reduction compared to 'a development that does not actively manage stormwater quality'
ANZECC & ARMCANZ	Whole of WA	catchment	1.2 mg/L	0.065 mg/L	Trigger values rather than 'targets' per se (Lowland rivers shown as example here)
Peel Inlet - Harvey Estuary EPP 1992	Serpentine River catchment	catchment	-	21 tonnes/yr	Allowable export loads from total catchment
	Murray River catchment	catchment	-	16 tonnes/yr	Allowable export loads from total catchment
	Harvey River catchment	catchment	-	38 tonnes/yr	Allowable export loads from total catchment
Peel-Harvey WQIP (EPA, 2008)	Serpentine River catchment	catchment	-	60% reduction	% reduction compared to estimated current loads
	Murray River catchment	catchment	-	40% reduction	% reduction compared to estimated current loads
	Harvey River catchment	catchment	-	48% reduction	% reduction compared to estimated current loads
Murray DWMP (DoW, 2011)	Murray DWMP area	development	2.4 kg/ha/year	0.3 kg/ha/yr	Allowable export loads per unit developed area
Swan-Canning WQIP (SRT, 2009)	Swan Canning Catchment	catchment	128 tonnes/year	14 tonnes/yr	Allowable export loads from total catchment
	Swan Canning Catchment	catchment	49% reduction	46% reduction	% reduction compared to estimated current loads
	Swan Canning Catchment	catchment	1.0 mg/L	0.1 mg/L	catchment with < 100mm average annual runoff
	Swan Canning Catchment	catchment	0.75 mg/L	0.075 mg/L	catchment with 100 to <200mm average annual runoff
	Swan Canning Catchment	catchment	0.5 mg/L	0.05 mg/L	catchment with ≥ 200mm average annual runoff
Nitrogen and phosphorus target export rates for urban development – Discussion paper (Kelsey, DoW, 2015, Unpublished)	Perth-Peel region	development	2.7 kg/ha/year	0.15 kg/ha/yr	Allowable export loads from areas draining to estuaries, estuarine portion of rivers, Ramsar, DIWA and conservation category wetlands, ocean embayments and rivers & tributaries – within specified proximity zone (200m – 1km, see Kelsey 2015)
	Perth-Peel region	development	3.6 kg/ha/year	0.2 kg/ha/yr	Allowable export loads from areas draining to estuaries, estuarine portion of rivers, Ramsar, DIWA and conservation category wetlands, ocean embayments and rivers & tributaries
	Perth-Peel region	development	5.4 kg/ha/year	0.29 kg/ha/yr	Allowable export loads from areas draining to well-flushed ocean
Wungong OWQO Report (GHD, 2011)	Wungong Urban Water	catchment	1.10mg/L	0.09mg/L	Target for in-stream concentration at catchment outlet



Prepared for the Water Sensitive Transition Network

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