



CRC for
Water Sensitive Cities

Salisbury Alternative Water Scheme

Location:
City of
Salisbury,
SA



Case Study — Prepared by Cooperative Research
Centre for Water Sensitive Cities, September 2018



Australian Government
Department of Industry,
Innovation and Science

Business
Cooperative Research
Centres Programme

Insight

Treated stormwater and native groundwater treated to a standard fit for purpose

Project description

Non-drinking water in the City of Salisbury is called 'Salisbury Water' and is a mix of treated stormwater and native groundwater which is used to irrigate parks, reserves, and schools. It is also used in industry and for toilet/garden use in some new residential developments. Collection, storage and distribution of the water uses constructed wetlands, managed aquifer recharge (MAR) and over 150km of 'purple pipe' distribution network across the city.



The drivers

Providing customers with water that provides multiple benefits

- Use alternative water for non-drinking water purposes to conserve drinking water, reduce costs and allow irrigation to occur throughout the year.
- Create wetlands to provide flood protection for property, treat water, increase local biodiversity, and provide passive recreational opportunities and open space buffers between industry and residential areas.
- Capture, treat and reuse stormwater to help protect the sensitive downstream marine environments of the Barker Inlet in Gulf St Vincent.
- Provide opportunities for environmental education and research.
- Help the City of Salisbury achieve its broader goal of a sustainable city.



Salisbury Water uses aquifer storage and recharge as a means of storing treated stormwater underground for later use

What does this case study demonstrate?

Each case study has been selected to demonstrate specific solutions, benefits or enabling structures that support the creation of water sensitive cities. This case study focuses on:

Rainwater and stormwater harvesting

Managed aquifer recharge

Water sensitive homes and buildings

Leadership and influence

Governance and policy

The innovations

City-wide distribution of non-drinking water using constructed wetlands, MAR and a distributed reticulation network

- **Wetlands** – More than 50 wetlands have been established across the council area as part of the Salisbury Water Scheme. These wetlands capture and treat stormwater before it is stored in underground aquifers for later use.
- **Aquifer storage and recovery (ASR)** – One MAR technique used is for excess treated stormwater (e.g. during winter) to be pumped (injected) down into a natural confined aquifer up to 220m below the ground. The aquifer is also naturally recharged as rainwater filters down through the soil and permeable rocks. Water is stored in the aquifer without evaporation losses and risk of contamination until it is required (e.g. summer months) at which time it is pumped out from the same well used for injection.
- **Purple pipe system** – The City of Salisbury has nine major MAR hubs and 22 individual community wells, interconnected via 150km of recycled water pipe network. This network carries recycled water to parks, reserves, schools, industry and some new residential developments where the property developer has installed the recycled water infrastructure.
- **Fit-for-purpose water** – Water is treated to a fit-for-purpose use standard as per the National Stormwater Guidelines. It is suitable for toilet flushing, washing cars, irrigation, industrial/commercial uses and filling ornamental ponds.



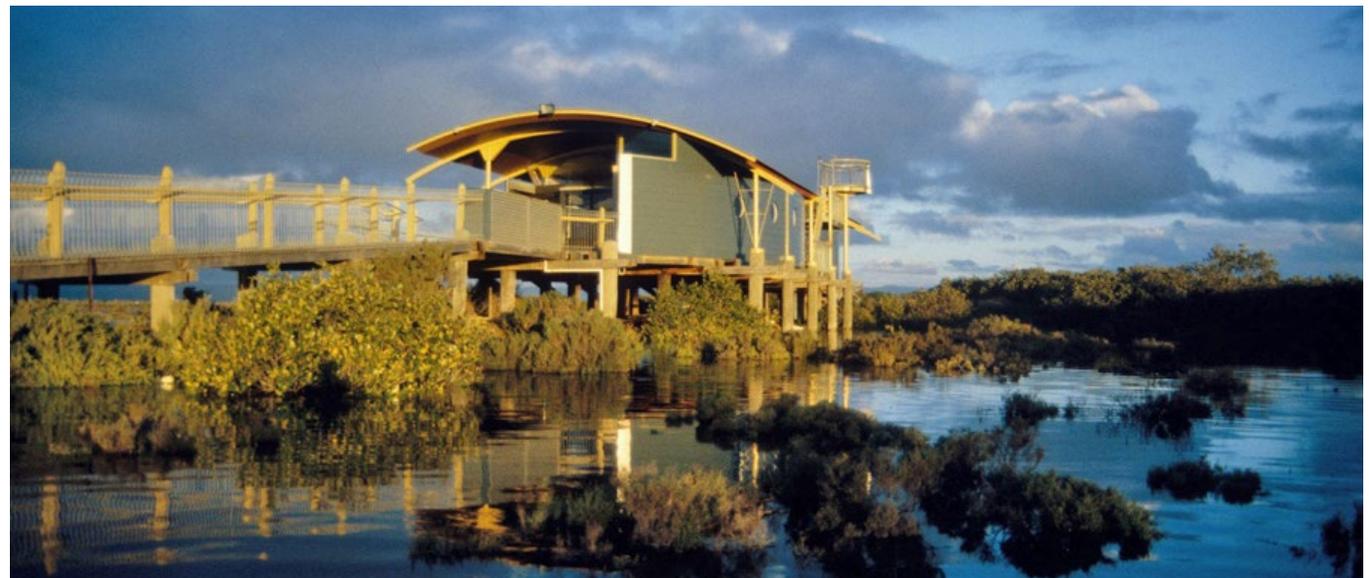
Image courtesy of
City of Salisbury

The outcomes

|  Cities providing ecosystem services |  Cities as water supply catchments |  Cities comprising water sensitive communities |
|--|--|--|
| <ul style="list-style-type: none"> • Creation of new urban ecosystems – Establishment of 50 wetlands to provide stormwater treatment and increase local biodiversity. • Stormwater quality improvements – Protection of sensitive marine environments from litter, sediment and pollutants carried by stormwater, which is instead harvested and re-used as an affordable substitute for the City's mains (drinking) water. | <ul style="list-style-type: none"> • Reduction in mains water demand – Reduction in mains (drinking) water for irrigation and other non-drinking water purposes helps conserve water stores. | <ul style="list-style-type: none"> • Resilient community spaces – Improvement to community public open space amenities through supply of alternative water for irrigation all year round. • Informed community – Education material developed to build community awareness of Salisbury Water. |



Salisbury wetlands and mangroves, like the St Kilda Mangroves shown here, have become an international attraction. Image courtesy of City of Salisbury



Business case

| Costs | Benefits |
|---|---|
| <ul style="list-style-type: none"> • It cost \$60 million to set up the wetlands and distribution network. • Salisbury Water is priced in accordance with State essential services regulations and guidelines. The standard usage charge for 2016–17 was \$2.61/kL compared with \$3.31/kL for mains water. | <ul style="list-style-type: none"> • Use of alternative water for irrigation of sports fields, parks and school ovals instead of potable water has resulted in current cost savings of over \$3 million each year for customers (based on what is paid for recycled water versus what would have been paid for the same volume of mains water). • Social benefits include improved amenity of wetlands and green open spaces which can be irrigated throughout the year and are not subject to water restrictions during drought periods. Walking trails, board walks, picnic areas and bird watching hides provide passive recreational opportunities. • Treating and storing urban stormwater for non-drinking purposes has significantly reduced the volume of pollutants entering sensitive downstream marine environments, which are important fish breeding nurseries and have a very high recreational and economic value for Adelaide and South Australia. |



Image courtesy of City of Salisbury

The lessons

- **Cheap alternative water can support the local economy** – Salisbury Water is provided to its industrial customers at a lower cost than mains water which attracts industry, sustains the local economy and creates jobs for the community. Other new industry opportunities are also continually investigated, including trials for urban farming using recycled water on marginal lands.
- **Retrofit of purple pipe into houses is expensive** – Salisbury Water is only supplied to new residential houses where the property developers have installed the recycled water infrastructure as part of the development. Retrofitting this pipework into existing houses across the city is expensive..
- **An engaged community improves water quality** – During its operation, it became apparent that the community had a role to play in improving water quality and decreasing demand for mains water. Educational materials (including public signage) were developed, and community gardens and urban farming research and development projects are supported.



Transferability

The Salisbury Water example has been so successful, it is already being adopted nationally and abroad. This project could be replicated in numerous urban areas with innovative approaches to land use and water storage adapted for the specific location.

Project collaborators

- Salisbury Water, City of Salisbury
- Essential Services Commission of South Australia (ESCOSA)
- SA Environmental Protection Agency (EPA)
- SA Office of the Technical Regulator (OTR)
- SA Department of Environment, Water and Natural Resources (DEWNR)

Awards

Salisbury Water has won numerous awards, including:

- Stormwater Australia National Awards 2014 – Excellence in Research and Innovation
- Stormwater Industry Association 2012 – National Award for Excellence in Infrastructure
- Institute of Public Works (IPWEA) 2011 – Engineering Excellence Award
- Urban Development Institute of Australia (UDIA) SA 2010 – Environmental Excellence Award

Additional information

More information about Salisbury Water can be found at:

- [Salisbury Water's website](#)
- [Frenchenviro case study](#)
- [Salisbury water brochure](#)



Innovative integrated water management via flood control, wetland systems and aquifers. Image courtesy of City of Salisbury

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