IWM case study 9

OAKLANDS STORMWATER HARVESTING AND REUSE PROJECT

Project description

The Oaklands Stormwater Harvesting and Reuse project has been designed by the City of Marion in Adelaide's southwestern suburbs, to support the redevelopment of 12 hectares of a former driver education centre site.

The system captures and reuses water from the Sturt River that would otherwise be discharged downstream. This is achieved through harvesting pumps, a gross pollutant trap (GPT), and a 2.3 hectare Oaklands Wetland treatment train. All these steps are required to treat the harvested water to comply with licence conditions for injection into the deep aquifer below the site.

Water treated through the wetland is collected into an underground sump where an injection pump delivers water under pressure into four wells. The Aquifer Storage and Recovery (ASR) system can treat up to 700 ML of stormwater each year, although the wetland needs to be augmented with additional electrical and mechanical treatment to increase from its current treatment capacity (400 ML).

The stormwater reuse scheme not only relieves the pressure on drinking water supplies, but also reduces the pollutant loads from stormwater that would otherwise flow downstream to adversely impact marine life in the Gulf of St Vincent. The wetlands provide a diversity of flora and increase the biodiversity of the area with a safe environment for recreation.

At full capacity the scheme is expected to provide up to 700 ML of stormwater for the irrigation of up to 31 council reserves, and 3rd party supply replacing mains or groundwater use.

Project drivers

THE VISION

The City of Marion has an overarching objective of becoming a Water Sensitive City and is seeking to harness the potential of stormwater to overcome water shortages, reduce urban temperatures, improve waterway health and the urban landscape.

The South Australian government has also been developing a Green Adelaide strategy with a vision for the city to become a world-leading, sustainable, green and climate resilient city achieved through an integrated approach to urban water and coastal management, greening streets and enhancing biodiversity.

Part of this vision is for Adelaide to be one of the world's first National Park Cities, bringing together health, education, climate, sustainability, biodiversity, water and coastal management outcomes. The Green Adelaide strategy aligns well with the outcomes of this project and provides a strategic justification for possible future expansion of the project including the ASR component.

THE PROBLEM

Though developed prior to the strategy, the Oaklands project aligns well with the Green Adelaide strategy as a local, place-based response to the problems it has outlined. These problems include:

1. *Urbanisation* – resulting in reduced green open space, stormwater management, increased rainwater runoff and water security issues. The 30 Year Plan for Greater Adelaide identified that 85 per cent of all new housing in metropolitan Adelaide will be built in established urban areas by 2045. The aim is to ensure a healthy balance of public green space, important backyard habitats for wildlife and increased stormwater runoff.

2. *Climate Change* – the consequences of global warming can already be observed in Adelaide through more extreme weather, rising sea levels, diminishing rainfall and increasing temperatures.

Image: Oaklands Wetland. Source: City of Marion, Michael Mullan.

3. *Maintaining health and wellbeing* – Currently 46 per cent of South Australians have been diagnosed with at least one chronic disease or condition[1]. Spending time in nature and living close to parks and other green spaces provides benefits for physical, mental and social health and wellbeing.

4. *Community connections* – The increase in people living in urban areas and the reduction of urban green spaces contribute to a growing disconnect from nature and from each other, resulting in declining health, wellbeing and social connections.

Stakeholder and community engagement

Detailed and extended consultation occurred during the feasibility, viability, funding, development application and construction phases of the project. This ranged from early engagement with Kaurna Nation, State and Federal Governments, residents and contractors.

[1] SA Health, 2009. *Chronic disease action plan for South Australia 2009-2018*. Government of South Australia.

This process enabled the City of Marion to fine tune the project delivering multiple community and benefits, not just stormwater harvesting.

The City of Marion uses the wetland and has an educational viewing platform. Site tours are promoted via the Council website. Local schools regularly visit the site. Flinders University students also use the wetland for water quality monitoring and ecology classes.

Image: Oaklands Wetland. Source: City of Marion, Michael Mullan.

Outcomes sought

The standout IWM outcomes of this project were:

Outcome 4a – Diverse fit-for-purpose water supply system

Outcome 5a – Healthy and biodiverse habitat

Outcome 5b – Groundwater quality and replenishment

Outcome 6a – Activating connected green – blue space

Outcome 6d – Equitable and affordable access to amenity values of water-related assets

Options assessed

The main project features include:

1. Stormwater Harvesting

- *Pre-treatment* – A Gross Pollutant Trap (GPT) removes sediment and debris. An inlet pond consisting of open water with edge vegetation and existing significant trees.
- *Wetland* – for the removal of nutrients, suspended solids, hydrocarbons, pesticides and herbicides. An outflow pit also includes a high level weir to prevent the site flooding, spilling treated stormwater back into the Sturt River.

- *ASR system* – Filtered outflows from wetlands pass from the pit into an underground pump chamber from where a submersible pump delivers flows to the four ASR wells, if water quality meets the required standard for aquifer injection. Otherwise, the water is either recirculated or returned to the Sturt River.

Currently the scheme provides an alternative water supply for 31 reserves, including two large sports fields.

The scheme has capacity to supply other users seeking an alternative, climate resilient water supply.

2. Regulation of water quality

Water is injected into the deeper aquifer, under the terms of a licence issued by the Environment Protection Authority. This protects the precious groundwater resource from adverse impacts.

Evaluation and financing

The project was funded 33.3 per cent each by Federal and State Governments and Marion Council.

Reflections and lessons learned

TECHNICAL

Harvesting the water from a river that carries a high loads of sediment and debris has proven to be a challenge. Various off-take structures were considered, with a grate system eventually being selected that was effective at minimising sediment loads across a range of flow conditions.

Other challenges encountered relate to the hydrogeology. Groundwater injection rates were based on limited well development during feasibility studies. Actual operational rates are lower than predicted but more than adequate to supply current and future Council demand. The site is future-proofed in that any additional demand for treated stormwater can be serviced by installing additional bores.

STRATEGIC

The project is playing an important role in delivering the state government's Green Adelaide vision and Marion Council's vision to become a water sensitive city. The wetland itself is part of an integrated water recycling system helping to keep reserves green across the municipality, reducing the use of mains water and protecting natural groundwater reserves.