An Australian perspective

WATER MANAGEMENT IN AUSTRALIA

Since the turn of the century, Australia has experienced significant and widespread drought followed by periods of extreme flooding in many parts of the country. Climatic extremes have been felt right across the nation and combined with ongoing population growth have highlighted serious shortcomings in how we manage the water cycle. Responses to these extremes have involved efforts to transition to a more water sensitive future.

The reliance on centralised surface water storages for urban water supply and adapting to a changing climate have been key focus areas. There has been widespread recognition of the need to diversify urban water supply portfolios, become more efficient in how we use water, recover more value from wastewater and other alternative sources, and improve planning for long term impacts of climate change.

Water management naturally crosses a range of regulatory, social and political boundaries. This makes management in an integrated way complex and difficult. A further challenge lies in the economics of water and wastewater services, which have traditionally been delivered through economies of scale. With the recognition that services need to be diversified many are turning to local ‘decentralised’ water and wastewater systems, which can carry higher relative costs. Overcoming this barrier is a key and common focus for water service providers in Australia, particularly in relation to who benefits from such integrated and sustainable approaches and subsequently, who should pay.

URBANISATION AND POPULATION GROWTH

Australia’s population continues to grow particularly in the coastal cities. Better planning for these growth areas is required now and will determine how water can be supplied, how it is best managed and how it can assist with the long term resilience and adaptability of these cities. Planning for smart growth and integrating the urban and water planning processes can ensure that growth occurs in the right place, in the right way, for the right reason and with the right solutions. Australia is starting to head down this path, however, there is a long way to go and there is a lot we can learn about how it is best undertaken.

WHAT IS AUSTRALIA DOING?

Across Australia there is good evidence of progression in integrated water cycle management and water sensitive urban design. Initiatives range from small scale stormwater retention and treatment to large scale developments that integrate wastewater and stormwater management and re-use with urban design. However when visiting a number of key projects across Australia, the tour observed an ad-hoc trend from region to region and state to state. Many projects were still at a demonstration scale and tended to be driven by organisations with well-developed strategic vision and an interest in leadership and innovation or a capacity to recover costs through green marketing leverage.

This observation reflects the geographic and socio-political variability in water management challenges. A stormwater treatment project that is viable in Melbourne due to water quality drivers, may struggle to find viability in Sydney where drivers are different. It also highlights the distance we have to go as an industry on the road to achieving water sensitive cities.

Some of the best examples from across Australia include the following:

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The main difference I found between the Australian and European approach to water sensitive urban design was that we have developed some large scale schemes that incorporate aspects of water sensitive urban design but usually in isolation of other aspects of the urban water cycle, whereas the European approach was more holistic and in a number of cases included the energy and transport sectors in their planning and development.

- Greg Ingleton
LOCHIEL PARK, ADELAIDE

Lochiel Park is an ‘ecologically sustainable’ urban development located 8km from Adelaide central business district (CBD). It is a 15 hectare [ha] site, with 4.25 ha for residential development, and the remaining 10.75ha consisting of open space, wetlands and urban forest. One hundred individual homes located at the site are all equipped with smart metering and each home has a solar hot water system, water and energy efficient appliances, and is rated at a minimum of 7.5 stars.

The development incorporates many water sensitive design features, such as swales instead of drains, rainwater tanks, permeable pavements and rain gardens. The ten megalitre (ML) wetland passively treats stormwater which is then stored in an aquifer storage and recovery (ASR) scheme or directly supplied to customers for toilet flushing, outdoor use and potentially for laundry use. This development is the benchmark for future water sensitive/sustainable development in Adelaide. However, it was delivered by the state owned former Land Management Corporation (now known as Renewal SA) and as such was able to deliver a 70:30 ratio of natural open space to built area. It may be challenging for most developers to achieve this in a financially viable way without the ability to incorporate social and environmental externalities.

CAIRNLEA STORMWATER HARVESTING SCHEME, MELBOURNE

The Cairnlea Stormwater Harvesting Scheme is a partnership between Places Victoria, Melbourne Water and Brimbank City Council. It is a 40ha development with a 700ha catchment. The scheme is designed to supply 160ML per year of treated stormwater to a system of interconnected lakes within the development, where it can be drawn for irrigation of public open space. Treatment is achieved using gross pollutant traps followed by a system of wetlands. The whole system has a storage volume of approximately 40ML. The innovative design aims to keep lakes full while performing multiple functions including non-potable water supply, flood attenuation, recreation, urban aesthetic, and a variety of ecosystem services including enhanced water quality and creation and protection of habitat.
Central Park is a new $2 billion redevelopment located on the southern fringe of the CBD, on the old Carlton United Brewery site. It is being delivered by Frasers Property and Sekisui House. Spending over $100 million on green technology, it aims to be the highest environmentally rated mixed use precinct in Australia, comprising 11 buildings, 1,800 apartments, shops, cafes, restaurants, terraces and offices.

The village will feature inter connectivity of buildings and public spaces centred around 6,400m² of urban park land. Buildings will also feature some of the largest green facades/roofs in Australia and extensive solar panels. A critical aspect of the sustainability strategy is the on-site water recycling system. An on-site membrane bioreactor (MBR) treats on-site wastewater combined with on-site stormwater and when required, wastewater from a neighbouring sewer main. Approximately 1.5ML of recycled water will be produced for use in cooling towers, toilets, washing machines and for irrigation of open space and green facades. The water and wastewater systems for Central Park are being provided by a new water utility, (Water Factory Company), independently of Sydney Water Corporation. This represents another aspect of innovation.

**GROUNDWATER REPLeniShMenT, PERTH**

Groundwater replenishment is an innovative concept in water conservation where recycled water is treated to drinking water standards and recharged into groundwater supplies. The water can be stored or "banked" in the groundwater and taken out some time later for further treatment and supply to a drinking water system.

The Water Corporation of Western Australia has trialed groundwater replenishment at its Advanced Water Recycling Plant in Craigie, to determine if it can be used to boost drinking water supplies in the future. The requirement to produce recycled water of drinking water standards for addition to groundwater ensures the highest level of protection for water supplies. This means that once the recycled water is added to groundwater, the water will be as safe as the water currently supplied. The treatment process removes chemicals and micro-organisms to levels in accordance with World Health Organisation standards and Australian guidelines for drinking water.

The comprehensive three-year trial of groundwater replenishment was completed by the Water Corporation on December 31, 2012 with some excellent preliminary results attained. Based on the trial’s positive outcomes, the Water Corporation has been given an interim go-ahead by regulators to continue operating and recharging water at the purpose-built recycling facility.
FITZGIBBON CHASE, BRISBANE

Fitzgibbon Chase is a new development approximately 12km north of the Brisbane CBD. The proposed land uses in the Fitzgibbon area include residential areas, mixed use urban areas, commercial precincts, schools and recreational areas. The key goal of development is to provide sustainable and affordable housing that incorporates best practice water sensitive urban design. There are two notable components to this project:

FITZGIBBON STORMWATER HARVESTING (FiSH)
The FiSH project diverts urban stormwater runoff from the Carseldine drain that runs through the development area. The stormwater is used for non-potable purposes, such as garden watering, toilet flushing, car washing and open space irrigation. The scheme will ultimately capture 89 ML per year of stormwater from a 290 ha urban catchment. Flow is pretreated through a 5 ML lagoon before passing through a filtration and disinfection system. The system will reduce the load on the potable water network and remove the need for rainwater tanks at each residential property (a current Government requirement).

POTAROO – POTABLE ROOF WATER HARVESTING
The potable roof water project harvests about 44ML per year of roof water from approximately 11 ha of roof catchment within the Fitzgibbon Chase development. The roof water is connected to a number of tanks located throughout the development and pumped to a central storage and treatment plant. The treatment performance is strictly monitored and includes a three-year validation phase of non-potable use. In addition, the project incorporates a small pilot plant to assess treatment of stormwater for potable use.

“The Study tour for me was a real life demonstration of how water can best be integrated into our daily lives. When managed sensitively the integration of water can improve both the natural and human environments. The tour allowed me to understand the complexities of the management cycle and appreciate the scale of the issues, but also the rewards that are possible.”

-Tim Buykx

ABOVE L-R: WSUD in Fitzgibbon Chase development, Brisbane, Potaroo rainwater treatment facility, Brisbane. OPPosite Page Top-Bottom: Central Park location, Sydney. Three dimensional masterplan of Central Park. (Source: Frasers Property).