Alternative Water Supplies – Residential Developments

Background

The '*fit for purpose'* philosophy involves matching water sources and water quality to the intended use of that water. Currently, high quality drinking water is predominately used for all water-using activities in and around the home.

Drinking water is needed for drinking, cooking, bathing and dishwashing and other water can be used for toilet flushing, clothes washing and garden watering. The quality of the water is dependent upon use and seeks to ensure that there is no compromise to human health given the level of contact and exposure that is likely to that water.

There a number of sources of alternative water that can be harvested from the urban environment:

- *roof runoff (rainwater)* – rainwater collected from roofs and stored either in a tank on a lot or at a common point in a development
- *superficial groundwater* – this is typically the water tapped by backyard bores. Water quality and availability depends on geographical location
- *drainage water* – stormwater collected from hard surfaces including water conveyed by drains. This water tends to be collected seasonally and its quality can vary
- *domestic greywater* – water collected from showers, baths, bathroom basins and laundry. This water is typically high in organic content and requires considerable treatment
- *sewer mining* – water extracted from the wastewater system (before it reaches wastewater treatment facilities) and treated locally prior to use and
- *treated wastewater* – wastewater that has passed through the advanced treatment processes at a wastewater treatment plant.

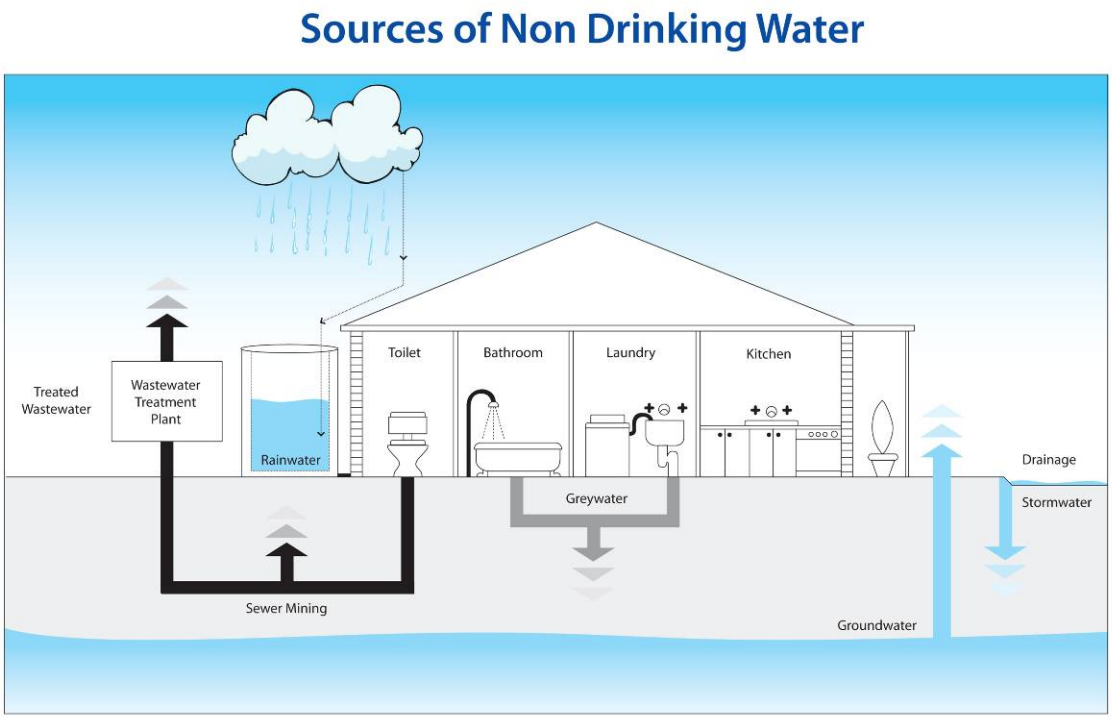
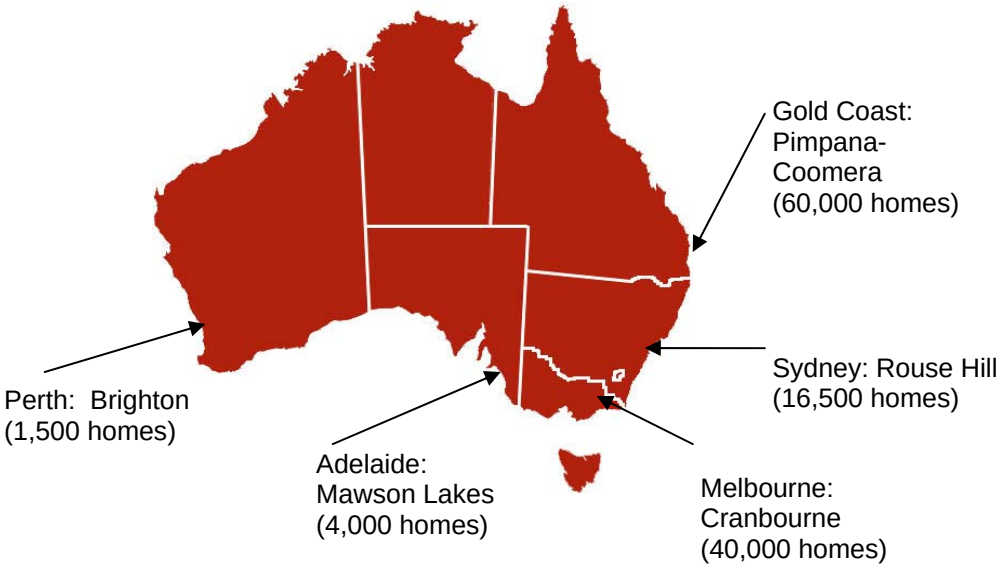


Figure 1. Sources of Alternative Water Supply

Some of these sources are best captured and utilised on an individual lot (e.g. groundwater, greywater and stormwater) while others are suited to being centrally managed and distributed to households (e.g. treated wastewater).

Around Australia it is broadly recognised that given the uncertainty that climate change brings, it's no longer feasible to rely solely on traditional supplies to meet the community's water needs. Most states are trying to develop a diversified portfolio of water supply options. Western Australia led this development nationally through our 'security through diversity' strategy.

Most states have iconic projects that deliver alternative water supplies to residential developments. However, alternative water supplies are still not usually planned to service most new land developments in Australia.



Decisions surrounding the use of alternative water supplies need to occur early in the land use change process to ensure appropriate and sustainable investment in water infrastructure.

Current Situation

In April 2007 the Premier announced the development of a 'State Water Recycling Strategy' to improve water use efficiency and water recycling in Western Australia. This strategy supports the State Water Plan 2007 water policy framework to "Use and recycle water wisely". The Water Corporation, along with other agencies and organisations, has participated in the development of this strategy which is currently being considered by Government.

The strategy provides an overview of the major sectoral uses for water recycling including residential, and uses Western Australian case studies to provide local context and generate learnings to guide policy direction. Four case studies were chosen for the residential sector.

Case study	Details	Cost (dollars a kilolitre)
Alkimos fit for purpose water supply	Shallow groundwater and rainwater tanks for toilet flushing, clothes washing, outdoor household use and public open space.	$2.58
Alkimos with wastewater injection bores	Injecting high quality recycled water into the shallow aquifer to increase groundwater levels and then distributing groundwater through a pipe network to householders for non drinking water uses (toilet flushing, clothes washing and gardens) and to public open space areas for watering.	$4.27
Sewer mining at Riverside development in East Perth	Extracting and treating wastewater for non drinking uses including toilet flushing, clothes washing, irrigation and cooling towers before it reaches a major wastewater treatment plant.	$7.87
Greywater recycling at Bridgewater Lifestyle Village	Each house is equipped with its own greywater recycling system where the water is then used for garden irrigation.	$4.50

The Water Corporation is working with the development industry, regulatory agencies and the community to further examine the potential of alternative supplies to reduce residential scheme water demand. A '*how to'* guide *(*H_2Options*)* has been produced and provides overview of available alternative water supplies and key steps required to deliver solutions (including regulatory approvals).

We are reviewing over 30 demonstration projects including a third pipe groundwater scheme for irrigation at Brighton in Butler; and Evermore Heights in Baldivis.

The Future

The Water Corporation is progressing work on a number of key issues:

- how alternative supplies can best be used (where and when, at what scale)
- what alternative supplies are best suited for use in residential developments (given soil types and proximity to groundwater) and
- the impact on drinking water services.

A regulatory framework required to manage these sources by environmental, land, health and water agencies is urgently required in Western Australia. Pricing for these services also needs to be considered.

Sustainability considerations – addressed in planning

Economic	Social	Environmental
Appropriate pricing of fit for purpose service	Centrally managed system to ensure water efficiency vs. level of householder control	Impact of alternative water scheme on the health of the shallow aquifer in the local area
Additional cost of infrastructure compared to traditional developments	Identification and appropriate management of contact with the fit for purpose supply	Quality of locally-sourced water as a result of previous land uses
Design to meet required levels of service	Risk of cross connection	Continued availability of the source over time

More Information

- Ecological Engineering (2006) *Wastewater reuse in the urban environment: Selection of Technologies* http://www.landcom.com.au/wastewaterreuse.aspx
- National Water Commission (2007) *Recycled Water: Fact Sheet* http://svc044.wic032p.server-web.com/publications/factsheet_recycled_water.cfm
- National Water Commission (2007) *Rainwater tanks and storm water: Fact Sheet* http://www.nwc.gov.au/PUBLICATIONS/factsheet_rain_water_tanks_storm_water.cfm
- Prime Minister's Science, Engineering and Innovation Council Water for our Cities Working Group (2007) *Water for our cities: Building resilience in a climate of uncertainty* http://www.dest.gov.au/sectors/science_innovation/publications_resources/profiles/water_for_our_cities.htm
- Water Corporation (2007) *H_20ptions Alternative Water Supplies in the Perth Metropolitan Area: A Seven Step Guide for Developers* *http://www.watercorporation.com.au/P/publications_alternative_water_supply.cfm*

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