

Water sensitive urban design

Rainwater storage and reuse systems

Summary

Rainwater storage systems are a simple method of capturing rainwater, traditionally from roofs, for use as an alternative water supply source and to reduce consumption of scheme water. When installed and maintained in accordance with recommended guidelines, they can provide a high quality source of water.

This brochure is part of a series that explain various aspects of water sensitive urban design. Please see Water sensitive urban design in Western Australia for background information on water sensitive urban design.

Main benefits

- Rainwater storage systems reduce the demand on potable water supplies.
- More rainwater is harvested when the tank is plumbed inside the house for uses such as toilet flushing. This creates a consistent drawdown on the tank supply, so there is always space to collect rainwater.
- They reduce the amount of directly connected impervious areas.
- They reduce stormwater peak flow rates and volumes.
- They reduce water supply peak flow rates and volumes.
- They can be retrofitted in houses and other buildings. including in high density urban areas.
- They can provide a water supply for (water sensitive) urban gardens and reduce the heat island effect in high density urban landscapes.

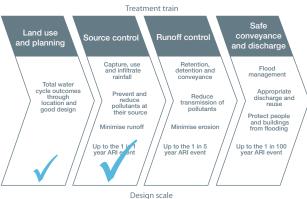
Design factors

- Put 'first flush' devices and mesh screens over all inlets and outlets to minimise maintenance requirements and preserve water quality.
- Designs for stormwater management include an air gap with trickle feed discharge level control and may include an infiltration trench or soakwell, depending on site characteristics.
- Storage can be above or below ground.
- Match storage size to collection area. end use, rainfall quantity and seasonal variability.
- Larger storage sizes are required where rainfall is unreliable and alternative supplies are not available.

Target pollutants

Rainwater storage systems are not designed to achieve direct improvements in stormwater quality.

Where they can be used in the water sensitive urban design process



District

Precinct (subdivision)





Concrete underground tank



Slimline domestic rainwater tank



Poly domestic rainwater tanks

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Example of above ground rainwater tank Roof surface material needs to be Rainwater tank to standard Gutter mesh to prevent leaves and suitable for collecting rainwater suitable for storing rainwater debris entering gutter. Minimises for intended purpose decomposing matter in gutter Access point Roof gutter for collecting rainwater Optional top up from main with screen Mains top up supply when level reaches to keep out system and minimum water level 'Rainhead' to downpipe to flush off mosquitoes float control leaves and debris and prevent and pests Insect proof screens gutters blocking required to all inlets and Downpipe outlets to tank Inlet to tank 'First flush' Floating diverter removes offtake sediment and suspended Air gap pollutants from just below each first runoff surface in event cleanest Rainwater storage zone water Aerobic zone Biofilms on inside of tank Outlet point Flows to garden assist water above Top up from mains supply treatment anaerobic (if applicable) and capture zone microbial Minimum water level contamination Minimum water quantity Anaerobic zone Optional UV disinfection Anaerobic Bottom of overflow pipe Filter to reduce Calmed Pump system to remove bacteria and sludge layer in extends into anaerobic inlet minimises residual to distribute pathogens. System to base of tank zone to remove sludge disturbance sediment. water under have sensor that shows to assist water and sediment off bot-Overflow from system of sediment in taste, colour pressure when lamp is not treatment tom of tank bottom of tank and odour operational

Required reading

Australian runoff quality: a guide to water sensitive urban design, 2006, Engineers Australia, available at <www.arq.org.au>.

Rainwater tank design and installation handbook, 2008, HB230-2008, Standards Australia.

Stormwater management manual for Western Australia, 2004–07, Department of Water, available at <www.water.wa.gov.au>. See Section 2.1 of Chapter 9 – Structural controls.

Testing of products for use in contact with drinking water, 2005, AS/NZS 4020:2005, Standards Australia.

Urban rainwater collection guidelines, Department of Health, Western Australia.

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