



# Rainwater Tanks

Energy conservation in the State Government building standards will be introduced requiring reduction of water consumption in residential accommodation. These will be introduced on 1 July 2005.

## Harvesting of Water

A roof of 150 square metres can provide rainwater harvest of 50 kilolitres per annum using a one kilolitre tank or 70 kilolitres per annum using a ten kilolitre tank. **This is "free water"**.

## What is involved?

When installing a rainwater tank you have to consider these issues:

- Purchase and transportation.
- Installation.
- Alteration of the gutters and downpipes.
- A tank stand or foundation.
- Additional plumbing.
- A first flush device.
- Insect proof screenings and gutter guards.
- A pump (if necessary).
- Maintenance.
- If they are large - approval from the Council.

## Inter-connection to a Public Water Supply

Rainwater tanks cannot be inter-connected to a public water supply without cross contamination protection measures such as an air gap or one-way valve. Usually the tank water supply requires separate plumbing to whatever fixtures are going to be serviced with this supply. Goldenfields Water County Council will advise precisely what measures have to be provided.

## First Flush Devices

The first flush is a diverter device which reduces the amount of dust, bird droppings and leaves that can be washed into rainwater tanks. Some tanks have this in-built and usually has a volume capacity of 20-25 litres. They can be installed as an additional separator barrier to reduce contamination.

## Other Contaminants

There are a number of other potential contaminants which can affect the quality of the water and its taste. These include:

- Old asbestos roofs with loose fibres.
- Old lead-based paints.
- Roofs that have been painted with acrylic paints may have a detergent runoff in the first five flushes.
- Lead flashings.
- Overflow or discharge pipes from roof mounted evaporative air conditioners that have chemicals and disinfectants.

- Berries and flowers from White Cedar trees that may overhang the roof or gutters.
- Oleander leaves and flowers that overhang roofs and gutters.

### **Health & Safety Issues**

This water supply is not chlorinated or fluoridated. Alternative sources of fluoride need to be considered with children. Persons that have medical conditions where immunocompromisation is a problem (i.e. cancer, diabetics or HIV treatments), disinfecting the water by boiling or cooking should occur.

Some specific safety issues are that the roof catchment tank should not be left uncovered. This poses a hazard to small children if they were to fall in.

The inlet points to the tank should be covered and have a mesh or strainer to keep out foreign matter. Any overflow should be covered with an insect-proof screen. Problems that occur can include:

- Mosquitoes which are capable of transmitting Ross River Fever.
- Salmonella growth by bird access.
- Gastroenteritis infestations with the decomposition of animals and birds.

The use of soft woods, including pine treated softwood, is a danger if it is being considered as the structural support for the bottom of a rainwater tank. These timbers will rot over the passage of time. Termites can also affect softwoods and hardwoods and if there was an infestation would lead to the structural collapse of the tank. Siting a tank on loose fill that is not compacted also has dangers of collapse.

### **Maintenance**

The location of drainage outlets is important. Check the tank for sludge accumulation at least every two to three years. If the water draw-out point is above the sludge level, contamination of the water quality will be reduced. It is important to consider how sludge is going to be removed and that an outlet tap at the bottom of the tank does exist for easy cleaning.

If disinfection of the tank is required, it can be done by adding 40mls of liquid sodium hydrochloride or 7gms of granular hydrochloride per 1,000 litres of water. Be careful if using domestic kerosene to stop mosquitoes breeding on the surface as it can affect some tank materials such as aquaplate.

### **Size of the tank**

The size of the tank will vary according to:

- The size of the roof catchment.
- The number of people using the water.
- Rainfall patterns.
- Water conservation devices.
- Water consumption habits of people.
- Seasonal secured reliance for consumption.

### **Roof catchment sizes**

For a two bedroom house - up to 150 square metres.

For a three bedroom house - up to 200 square metres.

For a large house - 200 square metres or greater.

### **Water consumption habits**

These can range from 100 to 200 litres per person per day and in a family situation can be between 300 to 740 litres per day/family.

## Average rainfall

A figure of 500 millimetres per annum is an average for this area, although this can fluctuate with drought. The seasonal variation of month to month has to be considered if relying on a secured supply.

The maximum volume is calculated in litres =  $.8 * (500 - 25) * \text{roof area (m}^2\text{)}$ .

\*The actual volume is discounted with inefficiencies of collections and for evaporation with absorption/volumes wetting of surfaces.

e.g.  $0.8 * (500-25) * \text{two bedroom house roof area } 150\text{m}^2$

= 57,000 litres                      = 57 kilolitres

Harvest volumes could be for a two bedroom house - 57 kilolitres; for a three bedroom house - 76 kilolitres and for a larger catchment area multiple occupancy - 95 kilolitres. These are indicative figures for assessing the potential total volume.

## Water consumption

Capacity for water consumption **per annum** for a daily consumption of **150 litres per day** will require a demand of **54.8** kilolitres; **200** litres per day of **73** kilolitres; **400** litres per day of **146** kilolitres.

## Security reliance

The tank capacity will vary according to reliance for the security of a constant water supply. This will vary in farm areas where bushfire fighting capacity may be an additional requirement where an on-site reservoir is required.

As a guide, the actual daily consumption requirement may well dictate that a 99% security will not be achievable on smaller residences relying on roof catchments. That is, 100 litre per day consumption with 150 square metre roof area would require a tank size of 13 kilolitres. Higher consumption figures would not sustain a reliable 99% water security to service the needs of that house.

By comparison, if a 90% security supply is sought, with 100 litres per day consumption, a roof area of 150 square metres would require a 6 kilolitre storage tank. Where the consumption increases to 200 litres per day, a roof area of 200 square metres would result in a 20 kilolitre storage tank for 90% security.

## Bushfire tanker connections

Where you install a roof water catchment storage tank for bushfire fighting purposes, it is wise to have a dedicated storage capacity where the domestic supply is above that dedicated capacity. The coupling connection at the base of the water tank which is intended for bushfire fighting should have a Storz connection that is compatible with the local bushfire brigade coupling hoses. It is wise to check with the local Bushfire Brigade Captain as to the necessary couplings for the locality.

## More information

There are a number of water conservation devices that are now marketed which include:

- Dual flush cistern volumes for toilets.
- Triple A shower head roses.
- Spring loaded self-closing taps.
- Suds saver washing tubs.
- Diverter valves for laundry and bathroom sub-floor installations (Note: Bleaches and detergents can kill lawns)
- Automatic washing & dishwashing machines use large volumes on full cycles.

If you need further information, please do not hesitate to contact Council officers or view the website [www.enhealth.nphp.gov.au/council/pubs.pubs.htm](http://www.enhealth.nphp.gov.au/council/pubs.pubs.htm) and then "Rainwater Tanks".