Rainwater tanks

Guidelines for residential properties in Canberra

Australian Capital Territory | OCTOBER 2010

ACT GOVERNMENT

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ARABIC	إذا احتجت لمساعدة في الترجمة الشفوية ، إتصل برقم الهاتف :
CHINESE	如果你需要传译员的帮助，请打电话：
CROATIAN	Ako trebate pomoć tumača telefonirajte:
GREEK	Αν χρειάζεστε διερμηνέα τηλεφωνήσετε στο
ITALIAN	Se avete bisogno di un interprete, telefonate al numero:
MALTESE	Jekk għandek bżonn l-għajnuna t'interpretu, ċempel:
PERSIAN	اگر به ترجمه شفاهی احتیاج دارید به این شماره تلفن کنید:
PORTUGUESE	Se você precisar da ajuda de um intérprete, telefone:
SERBIAN	Ако вам је потребна помоћ преводиоца телефонирајте
SPANISH	Si necesita la asistencia de un intérprete, llame al:
TURKISH	Tercümana ihtiyacınız varsa lütfen telefon ediniz:
VIETNAMESE	Nếu bạn cần một người thông-ngôn hãy gọi điện-thoại:

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Foreword

The ACT Government is committed to sustainable use of the region's water. The strategy for sustainable water resource management, *'Think water, act water'*, provides a clear vision and a range of initiatives for the sustainable use of water resources. It sets targets to reduce Canberra's per capita mains water consumption by 12 per cent by 2013 and 25 per cent by 2023. One proposal is to promote the use of rainwater tanks to help reduce the per capita demand on the ACTEW water network.

This Rainwater Tank Guide has been prepared by the ACT Planning and Land Authority (ACTPLA) in partnership with ActewAGL, the Department of the Environment, Climate Change, Energy and Water (DECCEW) and ACT Health. It provides guidance on the installation of rainwater tanks on residential properties.

Commonly asked questions

Why install a rainwater tank?

Rainwater tanks can make an important contribution towards reducing the demand our homes make on dam storages. Rainwater tanks can also help slow the flow of stormwater from our urban environment into local creeks and rivers. By using rainwater you can also make savings on your water account.

These guidelines have been prepared to help you understand the key issues around planning a successful tank installation. Subjects covered include:

- how much water to store
- health and safety
- regulations
- installation requirements.

All the essential requirements of ActewAGL, ACT Health, ACTPLA and DECCEW have been included to make your investigations easier.

However, while this information was correct at the time of printing, requirements can change. It is your responsibility to ensure you are aware of up to date legislation and regulations. You should contact the relevant agencies (page 23) to ensure you have the latest information.

How can I use rainwater?

A tap on a simple rainwater tank can:

- fill a bucket to wash a car
- top-up a swimming pool
- fill an ornamental pond.

With additional plumbing and pumps a rainwater tank can supply water to:

- a hose
- irrigation (sprays or drips)
- a flushing toilet.

With careful control of water quality a rainwater tank can also be used to:

- fill a washing machine
- run showers and baths.

How big a tank do I need?

Estimating the size of a tank requires a combination of experience and calculation. Rainfall is variable and demand will change with the seasons and the needs of the resident. In addition, the size of the rainwater tank may depend on:

- how much rain falls each year
- the area of roof available to capture the rain
- how you plan to use the rainwater
- the number of people living in your house
- the current water usage rate
- available space to install the tank.

You can estimate your yearly water savings with ACTPLA's online water calculator at www.actpla.act.gov.au/designandbuild/waterefficiency for new and existing tanks, or use the tables and charts in Appendix A. The experience of your local rainwater tank supplier will also be invaluable.

Do I need a licence to take water from my rainwater tank?

No. Under the *Water Resources Act 2007* there is no need for a licence to take and store rainwater.

Can I disconnect from the ACTEW water mains?

Making your home self-sufficient and independent from the ACTEW network supply requires a large contributing roof area and substantial tank capacity (probably greater than 100,000 litres for an average house). Canberra has a variable rainfall and is subject to drought, so rigorous water saving habits are required if you want your household to be self-sufficient. Even then there is no guarantee that you would never run out of water.

ActewAGL can disconnect your mains pressure water supply in accordance with the standard schedule of prices. After disconnection you will not be billed for water usage charges but you will have to pay a network availability charge, so there is no financial benefit in disconnecting. **Keeping the network supply for emergencies is a useful safeguard.**

Please note: The use of tank water for drinking or food preparation is not recommended where the ACTEW mains supply is available.

What type of rainwater tank is best for me?

Most residential rainwater tanks are made from plastic, fibreglass, concrete, corrugated galvanised steel or corrugated steel lined with plastic.

Almost any tank material can be used to store water for irrigation or toilet flushing.

Tanks used for drinking, food preparation, washing clothes, showers or bathing should be made from, or lined with, a drink-safe (food grade) material.

Your tank manufacturer can advise about the best material and most economical solution for above or below ground tanks.

How much will it cost?

Rainwater tank prices vary according to size, material, finish, strength and quality. It is worth comparing prices from several suppliers.

Other installation costs will vary according to the complexity of your system but may include:

- transportation
- alteration to gutters and downpipes
- tank stand foundation work
- a first flush rainwater diverter
- inlet and overflow pipe insect screens
- plumbing pipes and fittings
- engaging a licensed plumber for household plumbing
- automatic mains water diverter
- a pump to increase flow rates
- associated electrical works.

Are there any financial incentives?

Financial incentives in the form of rebates may be available to assist your purchase of a rainwater tank. The details of any current rebate programs are available from www.actsmart.act.gov.au.

Will I pay less on my water account?

You can expect to make some savings on your ActewAGL water account if you use rainwater to supplement mains water. However, you may wish to estimate what these savings are likely to be before installing a rainwater system.

What work can I do without a plumbing or electricity licence?

Taking due care, a handy person can install:

- tanks and stands
- irrigation systems from a dedicated tank
- a pressure boosting pump used solely for irrigation
- rainwater guttering, downpipes and stormwater drains.

A licensed plumber must be engaged to install:

- rainwater plumbing pipes providing water to the house
- pressure boosting pumps for household rainwater plumbing
- automatic mains water diverter.

For further detail see the section on regulations.

A licensed electrician must be engaged to modify or install:

- power outlets
- fixed wiring to pumps or electrical appliances.

Electricity to the pump is generally provided by an adjacent post-mounted weatherproof socket outlet mounted above anticipated flooding height.

The pump controller (if not integral with the pump motor) must be mounted above flooding and be weatherproof.

There are cord length limits (under 2 metres) applied to plug-in pump equipment. If cords require protection from damage they may be enclosed in conduit so long as the pump installer does not disconnect and reconnect at the motor. Plug tops can be removed and replaced without a licence. Plumbers can obtain a restricted licence for pump motor disconnections/reconnections incidental to their trade.

Landscape contractors who do not have plumbing/electrical licences cannot perform wiring work or disconnect/reconnect appliance cord sets from motor terminals. They can replace plug tops but have a duty of care to do it safely.

For further detail see the section on regulations.

Are there approval costs?

You may be subject to government charges for planning, building and plumbing approvals. Government plumbing charges may be included in your plumber’s account. Details are listed in the fees and charges booklet available from ACTPLA's Customer Service Centre or online at www.actpla.act.gov.au.

Is tank water safe to drink?

Using tank water for drinking or food preparation is not recommended where there is mains water supply available which meets the Australian drinking water guidelines. If you choose to install a rainwater tank to provide drinking water, you should contact ACT Health for advice and follow the suggestions included in the section on drinking water safety (page 16).

Should I add fluoride?

Rainwater does not contain fluoride. You should not add fluoride to the rainwater tank, as it is very difficult to control the correct dosage rate. Talk to your dentist about substitutes.

Should I use kerosene to control mosquitoes?

Under no circumstances should kerosene be used if the tank is for drinking water. Kerosene may also be damaging to plastic or 'Aquaplate' coatings.

Low oxygen levels in tank water, caused by excessive sludge, will attract mosquitoes. You may have heard that a teaspoon of kerosene poured onto the surface of tank-water will stop mosquitoes from breeding. This is true, however there is no need to use kerosene as fine insect screens or fine mesh screens properly installed on inlet and overflow points will prevent mosquitoes entering the tank.

Do I need to filter tank water?

Sediment and organic material accumulate in rainwater tanks. A filter on the irrigation system can help prevent sprinkler heads from becoming clogged with sludge.

A filter may be installed at the kitchen sink to remove impurities from drinking water. However the unit should be maintained in accordance with the manufacturer's instructions to prevent the filter becoming a secondary source of contamination.

What are first flush diverters?

First flush diverters improve water quality as they prevent the first flush water, which may contain contaminants such as dirt, bird and animal droppings etc. from entering the tank.

When it rains, the first flush of polluted roof water enters the diverter tube. As the water rises in the tube. The ball rises until it seals off the tube. Clean water is now diverted to the tank. The polluted water in the diverter tube slowly drains away (see page 13).

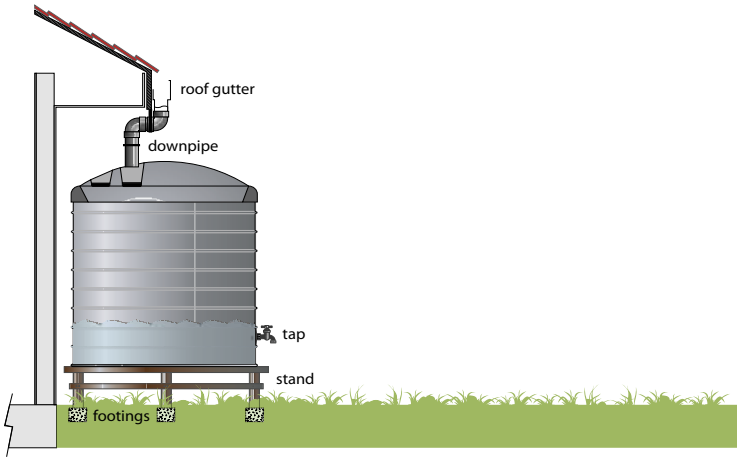
For more details about other water saving initiatives, visit www.actsmart.act.gov.au.

Rainwater assembly options

The following assembly options illustrate some basic rainwater tank and plumbing configurations.

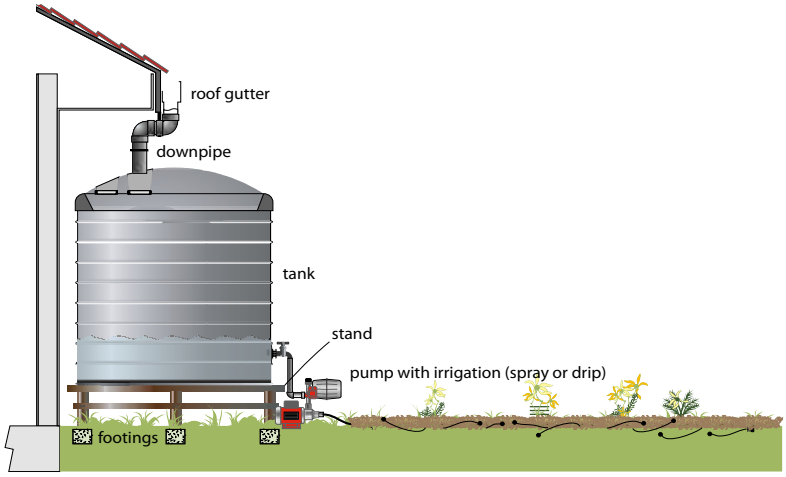
Basic tank

The simplest installation is a rainwater tank on a stand with a simple tap outlet.



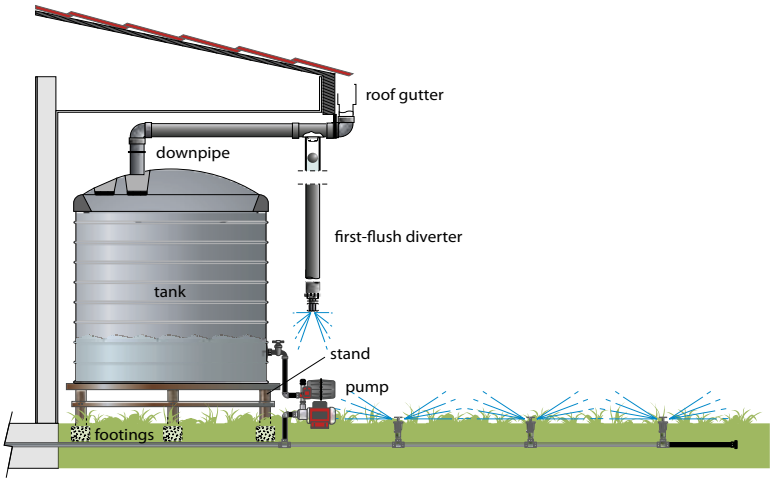
Tap with irrigation system

A dedicated above-ground tank can run a soaker hose or a dripper system (via pump) for the garden or vegetable patch.



Pump connected to irrigation system with sprinklers

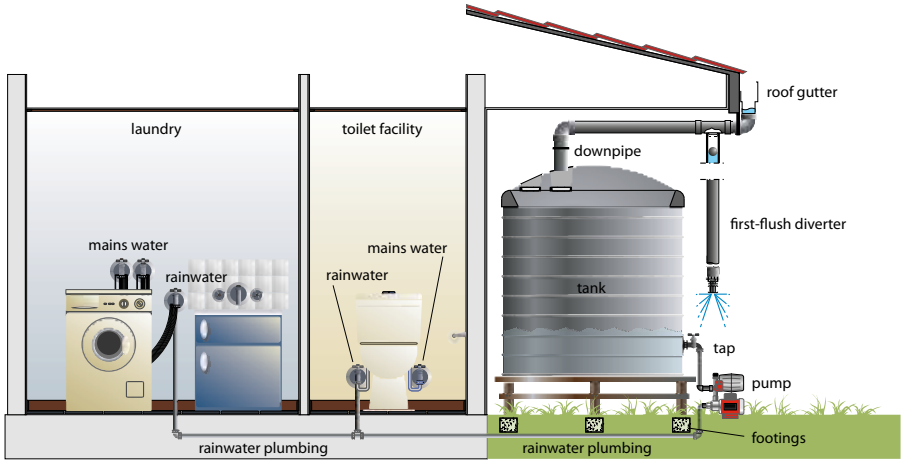
A pump may be necessary to provide the pressure required for irrigation sprinklers or micro-sprays. The rainwater tank may be above or below the ground.*



*Underground tanks can be used for irrigation sprinklers and household appliances but usually will need a pump to boost pressure and flow rates.

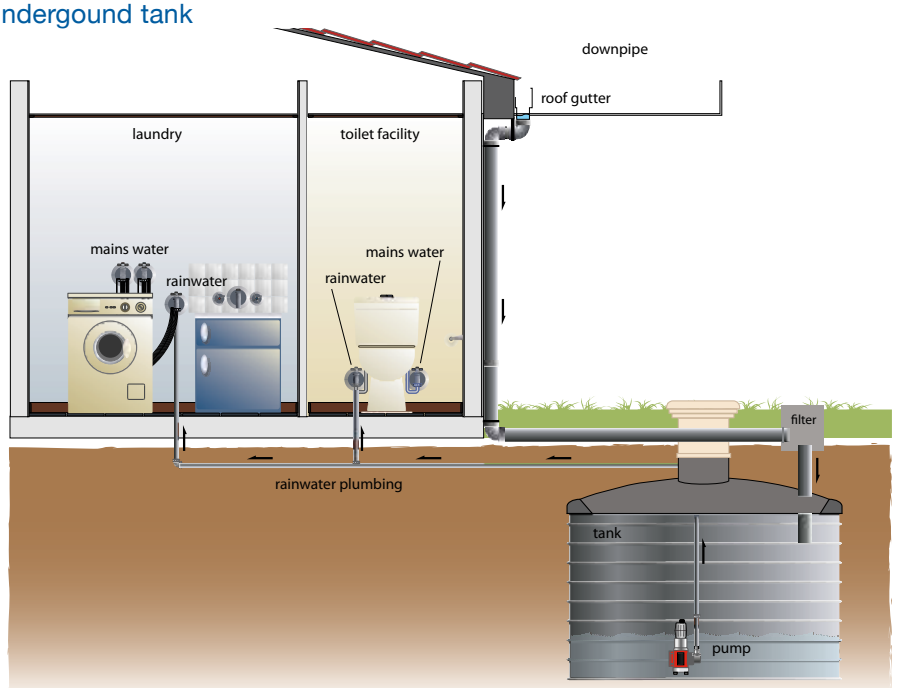
Tank connected to toilets, washing machines and dishwashers

Toilets, washing machines or dishwashers can use tank water. A pump is usually necessary to boost pressure and flow. The rainwater tank may be above or below the ground.*

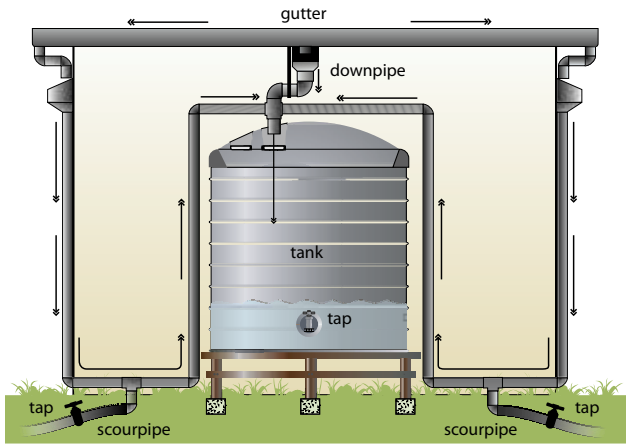


*Underground tanks can be used for irrigation sprinklers and household appliances but usually will need a pump to boost pressure and flow rates.

Undergound tank



Tank with whole roof connected via 'wet downpipe system'



It is generally more beneficial and cost effective to increase the contributing roof area to a rainwater tank than increasing the size of the tank. A wet downpipe system allows for this.

If you choose to use rainwater for toilets, washing machines or dish washers, the following considerations are important.

Washing machine options

Washing machines usually have hot and cold water inlet hoses. If you choose to permanently connect the washing machine to a rainwater outlet, it may be necessary to install an automatic mains diveter in case your tank runs dry (see diagram on page 14).

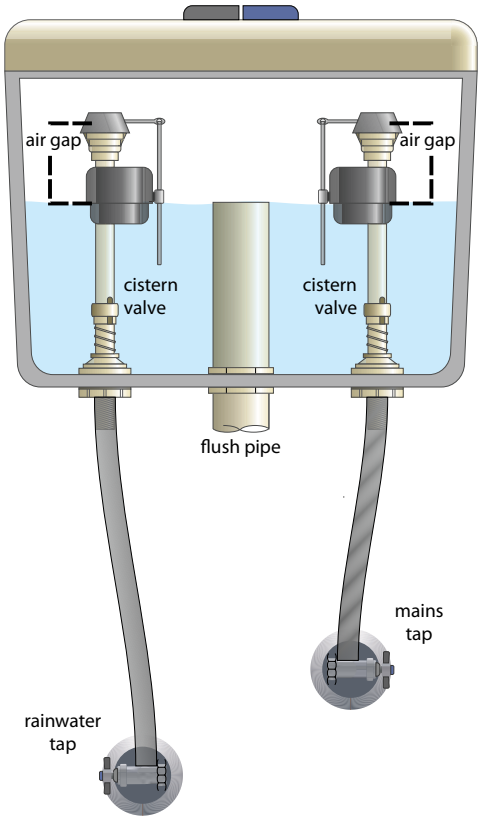
Dishwasher options

Some under-bench dishwashers are connected to the hot water supply. If the hot inlet hose is connected to a cold rainwater outlet, cycle times will be longer. If a dishwasher is permanently connected to the rainwater outlet, you may require an automatic mains water diverter in case your tank runs dry.

Toilet cistern options

Toilet cisterns can be connected to a dedicated rainwater tap, however you may need an automatic diverter to mains water for times when the tank runs dry. It is also possible to connect a cistern to both mains-water and tankwater outlets, provided a second cistern valve (with air-gap backflow prevention) is installed.

Toilet cistern assembly showing combined rainwater and mains water connection



Installation requirements

When installing a rainwater tank, it is essential to address the following:

Rainwater tank bases

Most metal or plastic tanks must have a stand or base to carry the combined weight of the tank and water. Most flat-bottomed tanks are not able to carry the heavy load of water without the support of a strong, level and continuous base.

When a rainwater tank is full, every kilolitre of water weighs 1000 kilograms (one tonne), so for safety it is important to construct a tank stand that is strong and stable. When a rainwater tank is empty it can be blown over by strong winds, so make sure your tank is adequately secured to the stand. Lightweight stands should be securely fixed to a heavy footing.

If you are intending to use a pump to distribute the water, the rainwater tank can be at almost any level. If you wish to feed the water by gravity it is usually necessary to elevate the rainwater tank on a sturdy stand.

To prevent external corrosion, the underside of metal rainwater tanks should be kept above the ground and sit on a self-draining base.

Underground rainwater tanks must be sealed against the entry of surface run-off, groundwater and leaking sanitary drains that may contain pesticides, fertiliser and animal (or human) faecal material.

Underground tanks may float if immersed in water. Make sure the excavation is well drained. Seek engineering advice if you are uncertain about foundation or groundwater conditions.

Care should be taken not to place rainwater tanks inside the drip-line of a tree canopy. Root growth can damage the base of tanks. Trees may fail to thrive if rain cannot get to the roots.

Covers and lids

A rainwater tank should have an impervious cover to prevent the entry of dust, leaves, pollens, debris, vermin, mosquitoes, birds, animals and insects. It is essential to seal access hatches with strong, close-fitting, childproof lids.

Screens and strainers

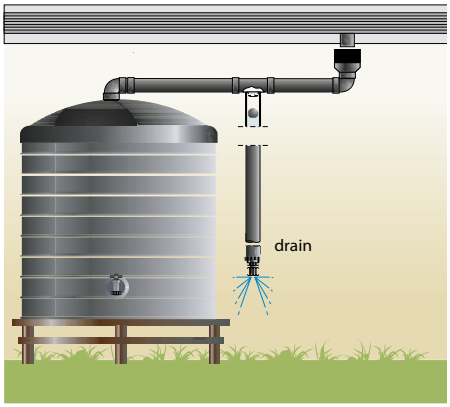
The inlet to the rainwater tank should incorporate a mesh screen or strainer to prevent the entry of live insects and to catch leaves and undesirable roof deposits. A mesh similar to flyscreen with openings smaller than one millimetre is very effective against mosquitoes.

The tank overflow should also be protected with an insect-proof mesh.

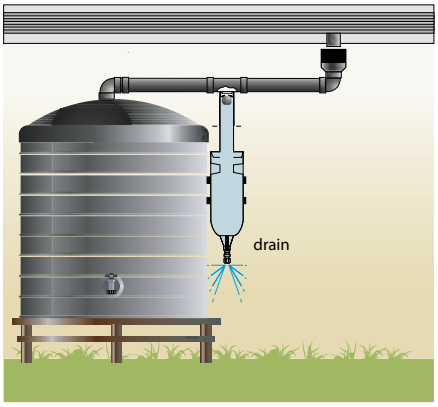
First flush rainwater diverter

For added protection a ‘first flush’ rainwater diverter can be installed to divert the ‘first flush’ of rain (containing roof dust, leaves, droppings, etc.) to the stormwater and then direct clean water into the rainwater tank.

Fabricated first flush diverter



Commercial first flush diverter



First flush diversion valves can be home made using plumbing fittings or purchased as a complete commercial unit.

Plumbing pipes and fittings

Tankwater tends to be acidic and can corrode metal. It is advisable, especially in new installations, to use ‘rainwater-standard’ plastic pipes and fittings. See the section on rainwater plumbing materials and labelling (page 21).

Light proofing

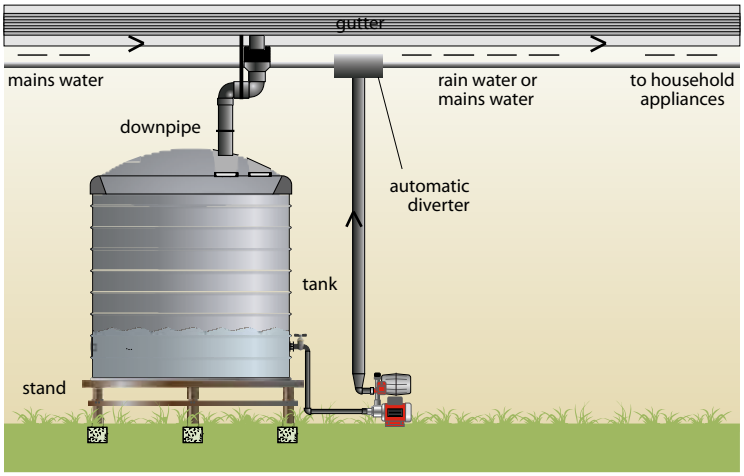
Tanks, covers, plumbing pipes and fittings should be light proof to minimise daylight penetration and algal growth in the water.

Pumps

If the rainwater tank cannot be elevated sufficiently to give adequate pressure to appliances, it may be necessary to install a pressure-boosting pump. The float valves in toilet cisterns, irrigation sprinklers and the solenoid valves in washing machines (or dishwashers) may not operate effectively without adequate pressure. The size of pump will vary according to the height of the tank, height of the appliance, diameter of plumbing pipes and the flow requirements of appliances. You may need the services of a hydraulic specialist and/or pump supplier.

Automatic mains water diverters

If tank water is the sole source of supply for selected taps or appliances, you may need to install an automatic mains water diverter connected to the mains water network so that you have a water supply for these appliances during dry periods. Automatic mains water diverter systems for rainwater tanks should be installed to AS/NZS 3500 Part 1, and approved to the Planning Code of Australia.



Overflow

Although it is common practice in Canberra to connect roof downpipes and tank overflows to the household stormwater drainage system, there is no regulatory requirement to do so. It is permissible to disconnect roof downpipes and tank overflow pipes from the storm water system to allow rainwater to flow directly onto your yard. However it is not permissible to let any of that stormwater run outside the boundaries of your property. It is also illegal to connect the tank overflow to discharge into the sewerage network.

Great care should be taken not to let stormwater pond under floors or flood around the foundations of buildings. High humidity can rot timber floors, corrode metal fittings and promote the corrosion of reinforcement in concrete slabs. An increase in foundation moisture content, especially in clay soils, can cause cracking in house walls.

Maintenance and system management

Rainwater systems need to be maintained regularly to ensure good water quality. To maintain your rainwater tank you should ensure that:

- all the components are kept in good repair and free of corrosion
- gutters are cleaned regularly to remove leaves, debris and animal droppings (gutter guards can help reduce the build-up of leaves but require regular checking)
- rainwater is not ponding in roof gutters
- the rainwater tank's inlet and overflow screens are checked and cleaned regularly
- the first flush water diverter is cleaned and flushed periodically
- the rainwater tank is desludged (if the build-up is clogging filters or colouring the water)
- the rainwater tank roof is free of corrosion
- the access hatch is secure
- all mesh is secure and sealed.

Drinking water safety

Health considerations

In urban areas, access to a reticulated potable water supply remains the most safe and reliable source of drinking water for the community. The use of rainwater for drinking purposes is not recommended where a reticulated supply is available. In urban areas, airborne contaminants and other pollutants may find their way into rainwater tanks.

If you choose to use rainwater for drinking, food preparation or personal hygiene, it is important to minimise the risk of contamination. Please take the following precautions:

- screen all openings to prevent leaves, insects, birds, possums, frogs, faeces and other foreign material from getting into the tank
- make the roof finish, gutters, down-pipes, tank and plumbing system must be made 'drinking water safe' — if in doubt get a clearance from the product/paint manufacturer
- install a first flush device to divert the first flush of dirty roof water away from the tank
- flush stagnant mains or rain water from mains or rainwater plumbing pipes if they have been unused for a long time
- do not let contaminated ground water infiltrate underground water tanks,
- check and maintain the system regularly
- contact ACT Health if you have any health concerns.

Disinfection

Regular disinfection of rainwater held in domestic tanks is not considered necessary in most cases and is generally only recommended as a remedial action.

The microbiological quality of the water may not be as good as reticulated water supplies. People who are very young or elderly, or have a weakened immune system, should consider boiling the water before drinking or using it in food preparation. Heating and holding the rainwater at boiling point for one minute or more will kill many harmful microorganisms.

If the rainwater is suspected as being a possible cause of gastric illness, the rainwater tank and catchment area should be inspected and appropriate remedial action taken.

Should a rainwater tank need to be chlorinated, it is suggested that enough chlorine be added to give a concentration of 1mg/l after 30 minutes. Please contact the Health Protection Service for further advice on dosing.

Roof materials

Roofs constructed of cement or terracotta tiles, Colorbond®, galvanised steel, Zincalume®, fibrous cement, polycarbonate, fibreglass or slate are suitable for the collection of drinking water. If in doubt get a clearance from the manufacturer.

Steel claddings should be free of corrosion.

Lead flashing

As a precaution, lead flashing should not be on those parts of the roof used as a drinking water catchment area. In the case of an existing roof, lead flashing should be replaced if possible, although it may be possible to coat the flashing with suitable roof paint. Ask your paint supplier for advice.

Paints and coatings

Before purchasing material or paint for roofs used to collect drinking water, read and observe the manufacturer's recommendations.

Regulations

This section sets out ACT Planning and Land Authority and ActewAGL requirements for the installation of rainwater tanks.

Planning and building approvals

ACTPLA requires the location, size and installation of rainwater tanks to be appropriate to the streetscape character and not to impact on the amenity of residents.

A development application (and perhaps building approval) is **not** required if:

- the rainwater tank is forward of the front building line and buried
- the tank is not more than 20,000 litre capacity
- the tank does not affect a significant tree
- the tank is not located in a heritage listed area
- is not more 3 metres above natural ground level.

A development application (and perhaps building approval) **is** required if:

- the rainwater tank is forward of the front building line and not buried
- installed within 1.5 metres of a side boundary or rear boundary of the block
- there are other Class 10 structures within 1.5 metres of the boundary (Class 10 structures include pools, garden sheds, gazebos, existing rainwater tanks).

Setbacks and building lines are published in Residential Zones – Single Dwelling Housing Development Code and the Multi Unit Housing Development Code.

For information on development application exemptions and lodgements, the Territory Plan and building approvals, visit www.actpla.act.gov.au.

For design and siting advice in a heritage area, phone Heritage on 13 22 81 or email heritage@act.gov.au.

Building within easements or near utility assets

Rainwater tanks cannot be constructed within easements or within the 'protection envelope' required for utility services where the tank would obstruct utility access contrary to utility requirements. Permissible distances between tanks and overhead electricity mains are set out in Section 19 of the Utility Networks (Public Safety) Regulations, and vary between 0.1 metre to 4 metres, depending on the voltage of the aerial cable conductor. The location of natural gas, stormwater, sewer, water and communication assets can be obtained by phoning Dial-Before-You-Dig on 1100.

Plumbing approvals

The installation of a rainwater tank does not require plumbing approval if the tank is:

- free standing
- to be used only for garden or lawn irrigation
- not delivering rainwater to taps, fixtures or appliances in the house.

All other installations require plumbing approval and compliance with AS/NZS 3500, Part 1, Section 14 Installation of water supply systems from rainwater tanks.

Plumbing requirements

Below is a summary of AS/NZS 3500, Part 1, Section 14 requirements for installing a rainwater tank on a residential property.

1) All plumbed piping systems delivering rainwater to taps, fixtures or appliances in the house must be installed by a licensed plumber and meet the requirements of ACT plumbing legislation and AS/NZS 3500.

2) As a general rule there must be no direct connection between a rainwater tank plumbing system and potable water plumbing pipes served by ActewAGL's reticulated drinking water network. In special cases interconnection may be permitted if the risk is low and additional failsafe engineering controls are evaluated and approved by the ACT Planning and Land Authority and ActewAGL.

3) Where a higher risk of contamination of the water supply is identified the plumbing regulator, ACTPLA, or ActewAGL may require the property owner to install a higher hazard backflow prevention device at the property owner's cost. General requirements can be found under backflow prevention (page 24).

4) Rainwater plumbing work serving internal taps, fixtures or appliances must be notified to the ACT Planning and Land Authority using a start of work notice before work is to commence.

5) A top-up facility or switching device (drawing water from the ACTEW network) requires a start of work notice.

6) The plumber must arrange for all drinking water and rainwater plumbing work to be inspected by ACTPLA.

7) The plumber must submit a certificate of compliance to ACTPLA and the customer at completion of the work.

Rainwater plumbing materials and labelling

Plumbing for a rainwater system must use approved materials and be labelled to distinguish it from plumbing used for (ACTEW) drinking water. All pipes in contact with rainwater should comply with AS/NZS 4020.

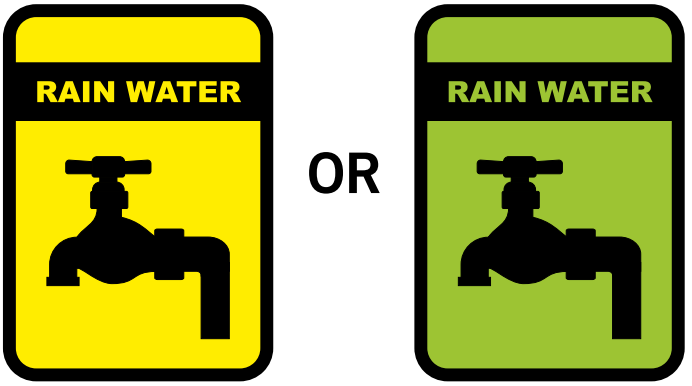
Materials used in plumbing for a rainwater tank must comply with the Plumbing Code of Australia and AS/NZS 3500 Water Services - Section 2 'Materials and Products'. Complying products are marked with the Australian Product Mark, "W" for the WaterMark.

All above ground rainwater service pipes must be clearly marked at intervals not exceeding 500mm with the contrasting coloured wording 'rainwater'. Water outlets shall be identified as 'rainwater' with a label or a rainwater tap identified by a green coloured indicator with the letters 'RW'. This pipe labelling can be achieved for above ground pipes by using adhesive pipe markers (in accordance with AS/NZS1345).

All below ground rainwater service pipes must be clearly labelled 'rainwater' continuously along their length. Rainwater identification tape for below ground pipes should be 75 millimetres wide and be installed on the top of the rainwater pipeline, running longitudinally and fastened to the pipe at intervals of not more than 3 metres. This can be done for below ground pipes by using identification tape (made in accordance with AS/NZS2648).

Rainwater labels

Every rainwater tank outlet must be labelled ‘rain water’ on a permanent sign.



Proximity to other services

Rainwater pipes must not be installed inside the pipe protection envelope of any ACTEW water or sewerage main or ActewAGL electricity mains. All above ground rainwater pipes must be located 100 millimetres from any drinking water service. All below ground rainwater pipes must be located 300 millimetres from any drinking water service.

Backflow prevention

Where there is the potential for the reverse flow of polluted water to contaminate a drinking water supply, an approved backflow prevention device must be installed.

AS/NZS 3500 Plumbing and Drainage Part 1 Water services section 14 Installation of Water Supply Systems from Rainwater Tanks, Table 14.1, sets out the minimum requirements for the installation of backflow prevention devices for zone protection for buried, partly buried and above ground rainwater tanks in residential and commercial applications.

Additional backflow prevention devices may be required when installing an automatic water switching device.

Table 1 on page 22 supplies a summary of backflow protection requirements for zone and containment protection.

Table 1. Rainwater tank backflow prevention

Type of installation	**Hazard rating** AS/NZS 3500	**Containment protection at the property boundary (Water meter)**	**Individual or Zone protection at the automatic mains water diverter**
Residential **Integrated plumbing** (external and internal)			
Underground (fully buried tank)	Medium	Testable device	Testable device or air gap
Underground (partly buried)	Low	Non-testable device or Water meter with integral backflow prevention*	Non-testable device or air gap
Above ground tank	Low	Non-testable device or Water meter with integral backflow prevention*	Non-testable device or air gap
Residential **External rainwater plumbing only** Above or below ground			
External hose taps and irrigation only. No connection to the network utility operator water supply	Low	Non-testable device or Water meter with integral backflow prevention*	Not applicable
Multi-unit developments (residential) below ground tanks	Medium	Testable device at the main meter, property boundry or at the main isolating value, property boundry	Testable device at top up of supply to common under ground tank

* ActewAGL approved water meters.

** Meters at unit boundary do not require additional backflow.prevention.

Contact details

ACT Planning and Land Authority

Development (design and siting) enquiries
16 Challis Street, Dickson
Telephone - 6207 1931 8.30am to 4.30pm weekdays

Building and plumbing enquiries
8 Darling Street, Mitchell
Telephone - 6207 6262 8.30am to 4.30pm weekdays
www.actpla.act.gov.au

ACTsmart

Department of the Environment, Climate Change, Energy and Water
Telephone - 13 22 81
www.actsmart.act.gov.au

ACT Health

Health Protection Service
Telephone - 6205 1700 8.30am to 4.30pm weekdays
www.health.act.gov.au

ActewAGL Water Division (water and sewerage)

12 Hoskins Street, Mitchell
Telephone - 6248 3555 (press 2) 8:30 to 5:00pm weekdays
www.actewagl.com.au

ActewAGL Energy Division (electricity and gas)

28 Oakden Street, Greenway
Telephone - 6248 3555 (press 1) 8:30 to 5:00pm weekdays
www.actewagl.com.au

Dial-Before-You-Dig

Telephone 1100 8.00am to 5.00pm

References

National Environmental Health Forum, 'Guidance on the use of rainwater tanks'.

National Environmental Health Forum Monographs, Water series No 3 1998, David A Cunliffe. www.health.nsw.gov.au/public-health/ehd/water/rainwater.html

www.actpla.act.gov.au

Appendix A – Determining rainwater tank size

These charts and tables will help you choose the size of rainwater tank best suited for established homes in Canberra. They factor in Canberra's rainfall, your available roof area and typical quantities used for garden watering, laundry use and toilet flushing.

The following principles apply when calculating the best tank size:

- The larger the roof area connected to the tank, the more water collected. For example, a tank connected to one downpipe on a house with four downpipes can only capture approximately 25% of the rain that falls on the roof. All downpipes should be connected to get the maximum benefit.
- The more uses made of your tank water, the greater quantity of water available over time. For example, if you only use tank water on the garden, very little will be used in the colder months, so the tank is likely to fill and overflow. Year-round toilet flushing or laundering reduces the amount of overflow losses and increases the total amount of mains water you will save.
- Canberra's rainfall varies, with long drought periods, so the amount of water collected will vary from year to year. Even very large tanks run dry.

The charts (on pages 28-30) show the average amount of water in kilolitres (kl) you can use each year from a tank. This will vary from year to year and household to household. The charts are based on water consumption for an average Canberra detached house (shown in Table 1).

Table 1. Average consumption per household

Water Use	Amount (kl/ year)	% of Total Use
Garden watering and other outdoor use	141	43%
Toilet flushing	60	18%
Laundry	43	13%
Other internal uses (kitchen, shower, bath, etc.)	86	26%
Total	330	100%

Compare these figures with your water bills for the last few years to get a better idea of your own water consumption.

The following examples show how to use the charts to decide what size tank will give you the best return on your investment. If you have difficulty understanding these examples, or you want to examine other options, please talk to ActewAGL, the ACT Planning and Land Authority, or ask your local tank manufacturer for advice.

Example 1

"My roof is 200 square metres (sq m) and has four downpipes each draining one quarter of the roof. What size tank should I install and how much of my roof should I connect to the tank for garden watering, toilet flushing and a washing machine?"

Step1. On Chart 5 - Garden watering, toilet flushing and laundry (page 30) select the vertical line for the different roof areas (for example, four downpipes = 200 sq m). Mark where it crosses each 'tank size' curve. Read the available water from the vertical axis. Record these numbers into a table, for example, table 2 below.

Table 2. Water available (from chart 5)

Tank size	Water collected (availability) from tank in kilolitres per year			
	1 downpipe	2 downpipes	3 downpipes	4 downpipes
(litres)	Roof area: 50 sq m	Roof area: 100 sq m	Roof area: 150 sq m	Roof area: 200 sq m
500	25	41	48	55
1,000	**30**	47	57	65
2,000	30	52	68	79
5,000	30	**59**	**82**	**100**
10,000	30	61	89	110
20,000	30	61	91	**120**
30,000	30	61	92	121

The table shows that increasing the roof area connected to the tank significantly increases the amount of water available, particularly for larger tanks. However, increasing the tank size more than 1,000 litres for 50 sq m of roof will not yield any more water. A larger tank connected to just one downpipe would be ineffective.

For roof areas of 100 to 200 sq m, installing a tank greater than 5,000 litres would have limited benefits. For example, a tank of 5,000 litres for 200 sq m provides 100 kl per year. Doubling the tank size only increases this to 110 kl per year.

Step 2. Using Table 1 work out the expected annual average water consumption for your household for the purposes of garden watering, toilet flushing and laundry. The expected consumption for these uses is 244 kl per year. Toilet flushing and laundry are the simplest internal uses to connect to a tank.

Step 3. Compare the expected annual consumption of 244 kl against the expected availability figures in Table 2. Then decide how much rainwater you want to collect each year. For example, from the figures in Table 2, it can be seen that:

- A 1,000 litre tank connected to one downpipe will provide 30 kl per year
- 5,000 litre tank connected to two downpipes will provide 59 kl per year
- A 5,000 litre tank connected to three downpipes will provide 82 kl per year
- A 5,000 litre tank connected to four downpipes will provide 100 kl per year
- A 20,000 litre tank connected to four downpipes will provide 120 kl per year.

Remember that issues of cost, space, appearance and regulations also need consideration before you select your tank size.

The calculations show the most you can capture from a 200 sq m roof is about 50% of your expected annual consumption for the selected uses. An even larger tank (say 50,000 litres, or even 100,000 litres) will not collect much more water.

Example 2

“My roof area is 150 sq m. I want to know what size tank I could install for a range of uses.”

Step 1. Using Charts 1 to 5, the average water available from a 150 sq m roof can be determined for different tank sizes and purposes (see Example 1 for instructions). Record these numbers in a table (see Table 3).

Table 3. Summary of water available from a150 sq m roof for a combination of uses.

Tank size (litres)	Water available from tank (kilolitres per year)				
	Toilet flushing from Chart 1	Toilet & laundry from Chart 2	Garden watering from Chart 3	Garden & toilet flushing from Chart 4	Garden, toilet flushing & laundry from Chart 5
500	29	36	32	45	49
1,000	37	45	40	52	58
2,000	45	57	48	63	68
5,000	53	70	60	78	82
10,000	58	79	70	87	88
20,000		85	78	90	90
30,000		88	85	91	90

The table shows more water will be available generally if the tank water is used regularly for a range of purposes. The larger tanks are not as efficient as they are already capturing most of the water that can be collected from a roof of 150 sq m.

Step 2. Using Table 1, work out the average water consumption for different purposes. Record these numbers in a table (see Table 4 below).

Table 4. Consumption Calculations

Expected demand (from Table 1) in kl per year				
Toilet flushing	Toilet & laundry	Garden watering	Garden & toilet	Garden, toilet & laundry
60	(60 + 43) 103	131	(131 + 60) 191	(131+60+43) 234

Step 3. Compare the expected annual consumptions in Table 4 with the usable water in Table 3. None of the tank sizes connected to a 180 sq m will satisfy all the anticipated demand but will still make a reasonable contribution. A larger roof area will provide more rainwater. However, issues of cost savings, installation costs, space, appearance and regulations will have to be considered before you make a final decision on which is the optimum tank size.

Tank usage: toilet flushing

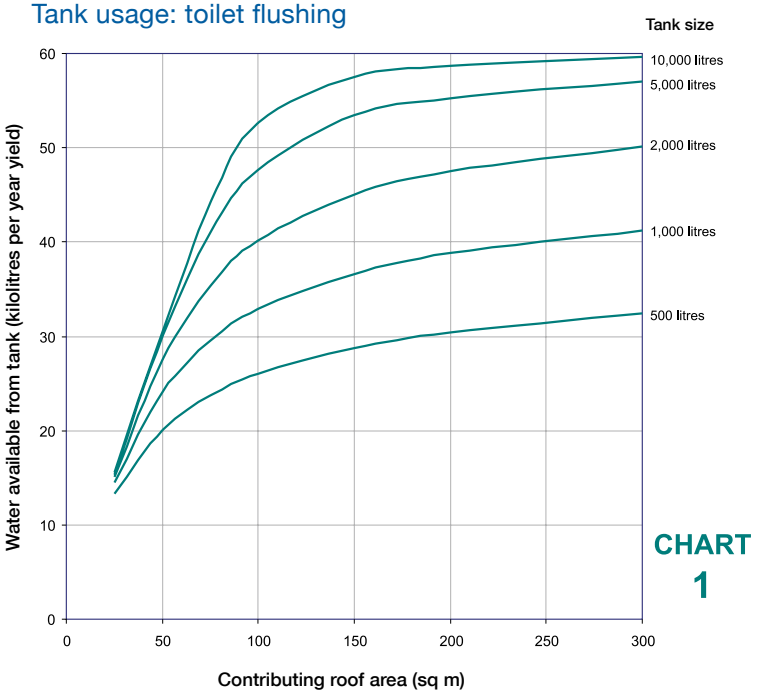


CHART 1

Tank usage: toilet flushing and laundering

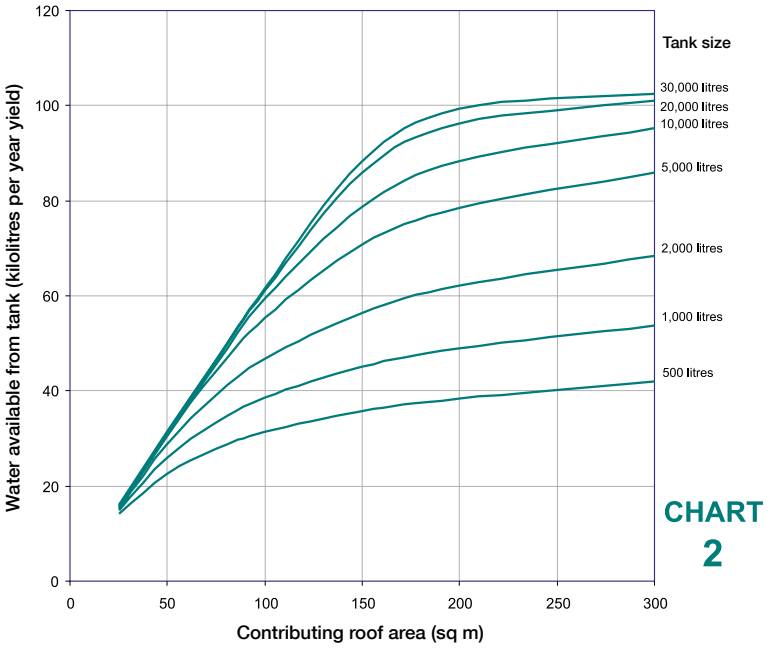


CHART 2

Tank usage: garden watering

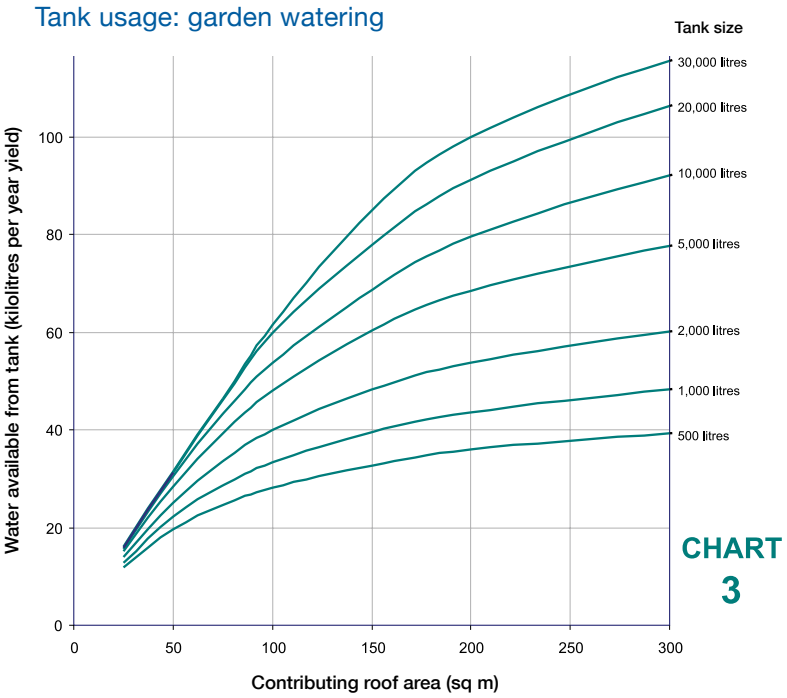


CHART 3

Tank usage: garden watering and toilet flushing

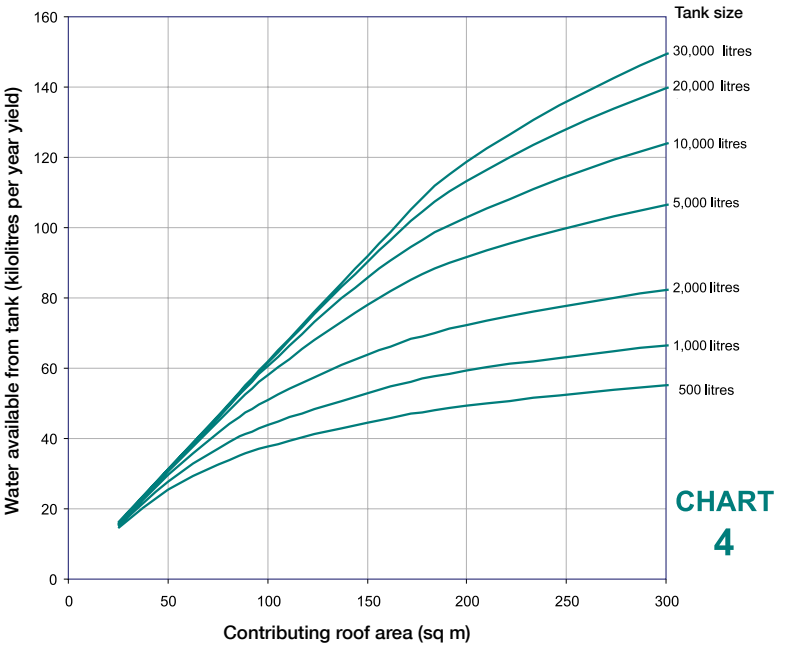


CHART 4

Tank usage: garden watering, toilet flushing and laundering

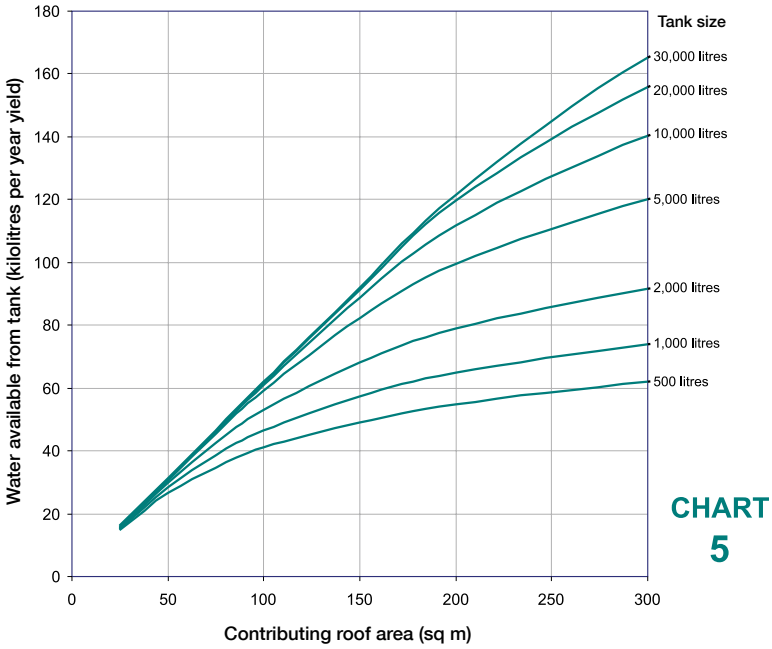


CHART 5

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ENERGY AND WATER