



Queensland Government

Department of Local Government, Planning,
Sport and Recreation



Guidelines for Queensland Development Code Part 25: Water Savings Targets

For councils, plumbers, builders and developers



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Introduction

Queensland is currently experiencing its longest drought for many years. Changes have been introduced in the residential sector as part of the Queensland Government's response to assist in reducing demand on our water resources.

Mandatory water savings targets will apply to applications lodged for construction of new houses in South East Queensland from 1 January 2007, and Statewide from 1 July 2007. The targets are outlined in Part 25 of the Queensland Development Code (QDC) available online at: <http://www.lgp.qld.gov.au/?id=247>.

The targets can be achieved through a number of options including:

- household rainwater tanks;
- communal rainwater tanks;
- dual reticulation; and
- stormwater reuse.

Water savings targets will make an important contribution towards reducing the demand for drinking water. However, certain requirements are necessary to protect reticulated drinking water, wastewater systems and public health. The purpose of this guide is to inform councils and industry about how the targets are to be implemented for several of the options available to meet the targets.

These guidelines should be read in conjunction with the Part 25 of the QDC available online at: <http://www.lgp.qld.gov.au/?id=247>.



Important notes

Compliance

Compliance with water savings targets is assessed during the building approval process. However, compliance measures such as dual reticulation, communal rainwater tanks or storm water reuse may be put in place during the relevant stage of the development process such as at material change of use or reconfiguration of lot(s). The building certifier may assess the building as compliant if water from one of these sources is used to meet the water savings targets in the building.

Alternative provisions - Higher water savings

The *Building Regulation 2006* allows councils to achieve higher water savings than those in the QDC using planning instruments or by council resolution. The additional requirements are termed 'alternative provisions' and can only be made for performance criteria 1 and 2 of Part 25 of the QDC. These performance criteria relate to water savings targets and rainwater tank size, catchment areas and connections.

Alternative provisions such as dual reticulation, communal rainwater tanks or storm water reuse may be required by council during the material change of use or reconfiguring a lot stages. Building compliance is assessed by the building certifier, with concurrence advice as required, when the building work is proposed. Alternative provisions that relate only to rainwater tanks are only assessed by the building certifier, with concurrence advice as required. If a council has not set alternative provisions, the provisions of Part 25 of the QDC apply.

Alternative solutions - councils as concurrence agency

Where the acceptable solutions of Part 25 of the QDC or the quantifiable alternative provisions of a relevant planning instrument are not met, a referral is triggered to the council as a concurrence agency. As part of the concurrence agency powers council decides whether an application complies with the performance criteria of the alternative provisions. This decision is then forwarded to the private certifier as part of the building development application. Non-compliance with alternative provisions in a planning scheme does not trigger a separate planning approval.

1. Household rainwater tanks

Household rainwater tanks installed to meet the requirements under Part 25 of the QDC, must be approved by a building certifier during the building approval process. All rainwater tank plumbing work will require plumbing approval from Council. Specific requirements for household rainwater tanks are outlined below.

1.1 Materials and products

All water supply system components intended for rainwater tank applications must comply with the *Plumbing and Drainage Act 2002* and public health requirements (see <http://www.health.qld.gov.au/phs/Documents/ehu/30632.pdf>).

It is the responsibility of designers, manufacturers, suppliers and installers to verify the suitability of products for their specific application. Materials used in a rainwater tank must be suitable for the intended use. Products must clearly show Standards Marking Compliance, WaterMark Compliance or Type Test Mark Compliance.

In addition, materials and products used in the installation of a rainwater tank must comply with the requirements of the national plumbing products certification scheme and be of an approved type as specified in the appropriate Standard listed in AS/NZS 5200.000, in accordance with the *Plumbing Code of Australia*.

Tanks are available in a wide range of materials including polyethylene, galvanised steel, stainless steel, or concrete. All of these materials are suitable, providing the tanks have been manufactured specifically for the collection of rainwater.

1.2 Continuous supply of water

Internal fixtures supplied from a rainwater tank must have a continuous supply of water, while ensuring water from the rainwater tank does not enter the reticulated supply system. For premises connected to a reticulated water supply with rainwater tanks that are connected for toilet flushing, the cold water tap for a washing machine and other council approved indoor uses, acceptable solutions for continuous water supply include:

1.2.1 Trickle top up

A trickle top up system (Figure 1) provides an approved plumbing connection between the mains water supply and the rainwater tank. This system is designed in accordance with the *Plumbing and Drainage Act 2002* and incorporates a physical air gap that acts as a backflow prevention mechanism and prevents any cross connection between rainwater and mains water supply. The air gap should be designed according to AS/NZS 3500.1.

The minimum flow rate supplied by a trickle top up system should be 2 litres per minute and the maximum flow rate should be 4 litres per minute. The trickle top up system should be installed in an accessible location and the minimum storage volume of reticulated town water supplied from the top up system should not exceed 1,000 litres or a volume specified by the local government in a local planning instrument.

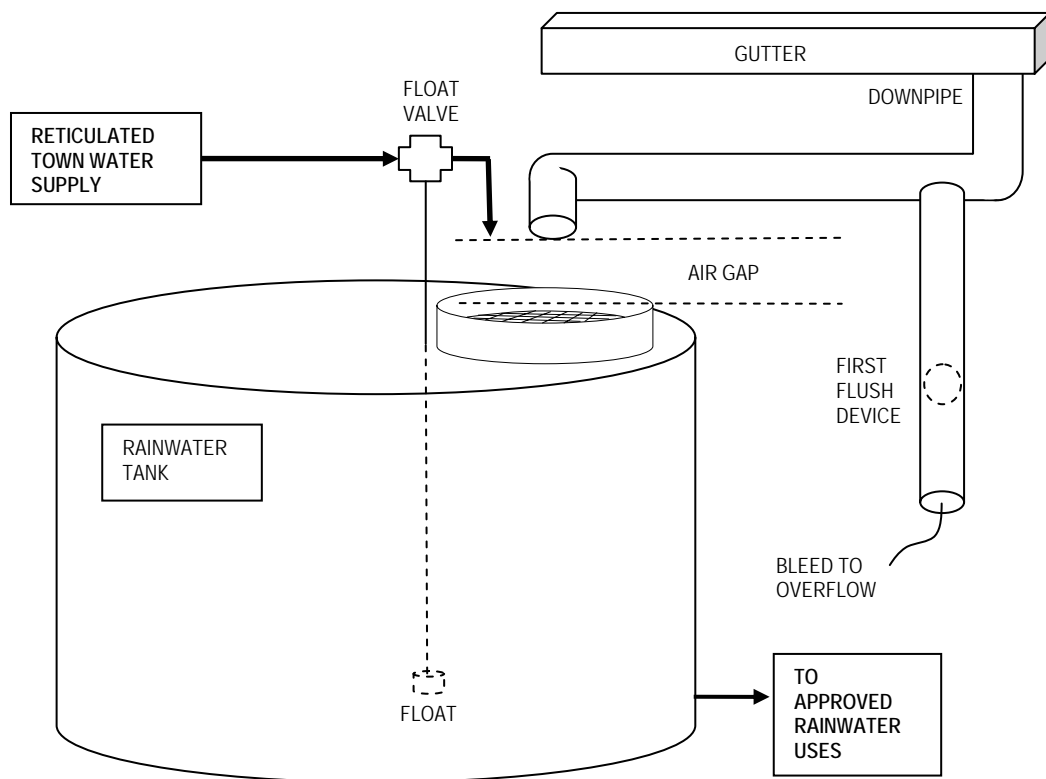


Figure 1. Trickle top up system

1.2.2 Automatic switching device

An automatic switching device (Figure 2) ensures continuous water supply by automatically switching to the reticulated town water supply when rainwater is not available. A built-in backflow prevention device is installed within the automatic switching device to ensure water from the rainwater tank does not enter the reticulated supply system. This option also requires a dual check valve, located at the property boundary in accordance with backflow legislation outlined in the *Plumbing and Drainage Act 2002*.

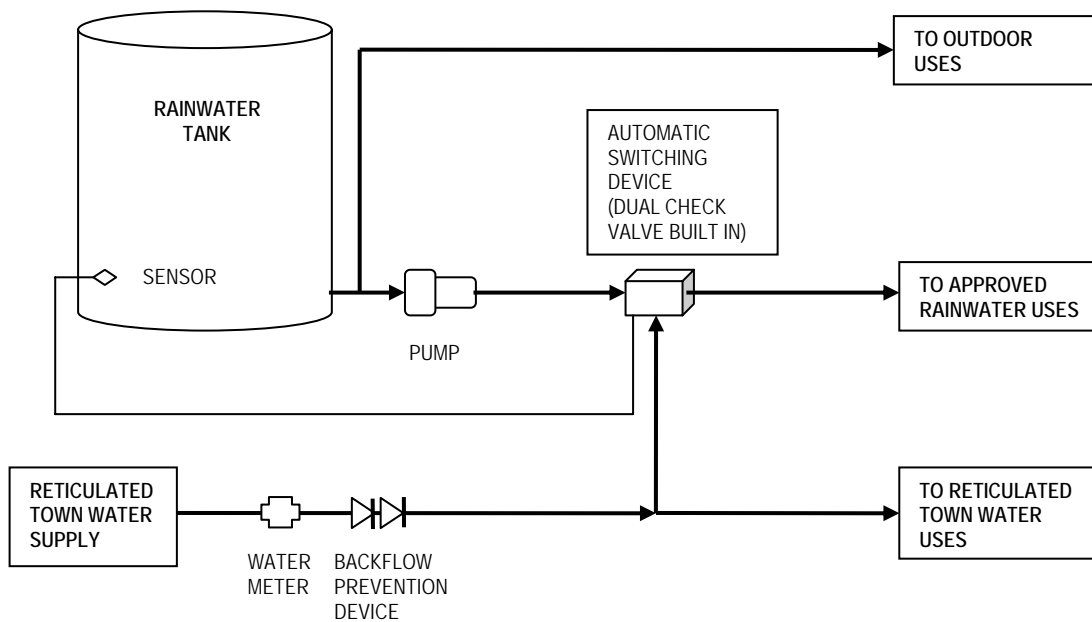


Figure 2. Automatic switching device plumbing

1.3 Overflow from rainwater tank

Rainwater tank placement and tank overflows must be designed to ensure stormwater does not pond under building floors, flood around foundations and footings of buildings or cause nuisance to neighbours.

The following measures need to be adopted to ensure building integrity and health and safety measures are not compromised:

- To avoid rainwater tank overflow blockage, a physical air break on the outlet of the tank overflow and before the stormwater drainage system should be provided. This will also act as a visual inspection point to assist in repairing trickle top up system failures if installed.
- The tank overflow must be connected to the lawful point of discharge for the property, for example the kerb and channel, or the Council inter-allotment stormwater pit. The capacity of the existing stormwater system to manage an increase in flow should be checked with Council before connection is made.

1.4 Wet and Dry systems

There are two types of systems that are used to direct the water from the roof catchment area to a rainwater tank: 'dry systems' and 'wet systems'.

A 'dry system' comprises free draining pipes that dry out and do not hold water after a rainfall event. A 'wet system' comprises pipes that may not be free draining and may hold water after a rainfall event.

'Wet systems' can assist in maximising the usable roof catchment area while maintaining the aesthetic value of a house. If a 'wet' system is used, pipes must be fitted to ensure mosquitoes cannot enter the system. It is also recommended a means of draining a 'wet system' be incorporated into the design so that in the event of prolonged dry periods, stagnation does not occur.

Generally, 'dry systems' are recommended, as any risk of mosquito breeding and water stagnation in the pipes is eliminated.

1.5 Leaf diversion

A screened downpipe rainhead must be installed on each downpipe. The screen mesh must have openings no smaller than 4mm and no larger than 6mm and shall be designed to shed leaves and prevent them entering the tank.

1.6 First flush device

To assist in maintaining rainwater quality, a minimum 15L of the first flush from the total roof catchment area, shall be diverted / discarded before entering the rainwater tank. Individual site analysis is required in heavy pollutant areas to determine if large volumes of first flush rainwater are to be diverted. Council should be consulted to determine areas of high pollutant load. Rainwater from the first flush system must be discharged to the overflow drainage system.

1.7 Pumps

Pumps must be installed or positioned to ensure noise levels do not create nuisance for neighbouring properties. The pumping system should be designed to ensure maximum static pressure at any outlet or fixture does not exceed 500kPa and minimum pressure at the most disadvantaged outlet or fixture is not less than 50kPa at the minimum flow rate required (refer to AS/NZS 3500.1 2003).

1.8 Signage

Green-coloured identification tape marked "CAUTION RAINWATER LINE BURIED BELOW" (Figure 3) should be used to identify underground stormwater pipes to the tank and underground water supply pipes from the tank. Identification tape is to be laid above the pipes and within the trench. Identification markings should comply with AS 1345.

CAUTION RAINWATER LINE BURIED BELOW

Figure 3. Rainwater pipe signage

1.8.1 Pipe markers

Pipe work less than 40mm in diameter shall have a continuous green pipe marker band around the circumference of the pipe with the word “RAINWATER” (Figure 4) in not less than 4mm upper case letters. The tape should be placed longitudinally along the pipe so that the marking is visible from all viewing directions.

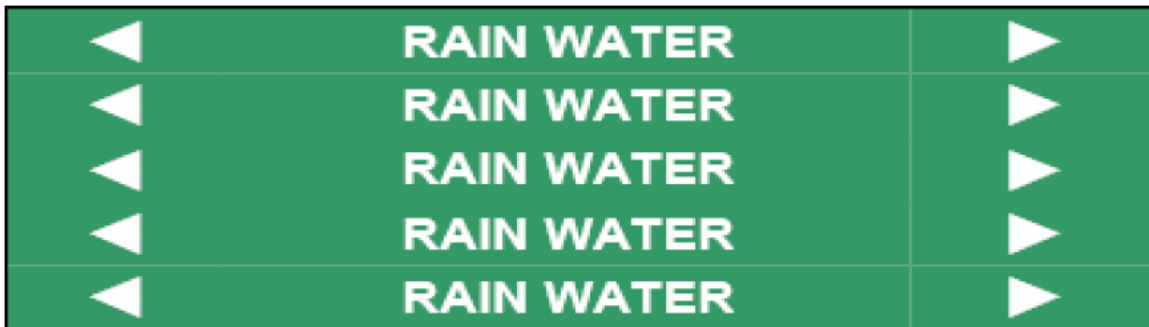


Figure 4. Rainwater pipe markers

All external hose taps that are supplied with rainwater are to be identified with a metallic safety sign (100mm long by 75mm wide) labelled “RAINWATER” (Figure 5), which should be securely fixed above the rainwater hose tap outlet. The word and symbol are to be in black writing on a yellow background. The hose tap should be fitted with a hose connection vacuum breaker valve or backstop valve. Signs must comply with AS 1319.



Figure 5. Rainwater signage

The washing machine cold water outlet should be identified as “RAINWATER” with one of the following: a tap button, a green coloured indicator with the letters “RW” or a sign similar to that specified for external outlets.

Where other internal rainwater connections are approved by Councils, outlets should be identified in accordance with council requirements.

1.9 Maintenance

Tanks fitted with leaf-guards will generally keep out vegetation, insects and small animals. However, to ensure effective on-going operation, water quality and health protection, some maintenance is required.

Comprehensive rainwater tank system management information including potential hazards, preventative measures, and monitoring and maintenance, is contained in the enHealth Council monograph 'Guidance on the Use of Rainwater Tanks' available at:

http://enhealth.nphp.gov.au/council/pubs/pdf/rainwater_tanks.pdf.

A general maintenance schedule derived from the enHealth monograph appears in Appendix 1.

The Queensland Health policy 'Managing the Use of Rainwater Tanks', available at: <http://www.health.qld.gov.au/phs/Documents/ehu/30632.pdf> outlines requirements and responsibilities in relation to human health with the use of rainwater tanks.

1.9.1 Vermin and mosquito control requirements

Rainwater harvesting systems should be constructed and maintained so as to prevent entry and breeding of mosquitos and vermin.

Requirements include the provision of gauze screens of brass, copper, aluminium or stainless steel, not coarser than 1mm aperture mesh provided on all openings. Vermin traps are also required to prevent entry of vermin.

Materials used for mosquito and vermin control should be made from a compatible material to prevent tank deterioration.

Further information on mosquito and vermin control can be found in the Queensland Health policy 'Managing the Use of Rainwater Tanks' available at: <http://www.health.qld.gov.au/phs/Documents/ehu/30632.pdf>.

1.9.2 Rainwater tank maintenance access requirements

Rainwater tank openings should have suitably constructed barriers that prevent entry of children, animals, insects and rubbish. All tanks are to be constructed in a manner which prevents entry of surface stormwater and groundwater.

1.10 Roof catchment area

Under Part 25 of the QDC, a rainwater tank must be installed to receive rainfall from either:

- a minimum roof catchment area that is at least one half of the total roof area or 100 m², whichever is the lesser; or
- a greater minimum roof catchment area as specified by the local government in a local planning instrument.

Where Part 25 of the QDC refers to 'roof catchment area', (performance criteria P2 (b) and acceptable solution A2 (b)) the following definition applies:

Roof catchment area of a house is the plan area of the main roof as well as the plan area of any verandas, covered patios or carports attached to the main roof area.

2 Communal rainwater tanks

Communal rainwater systems are approved on a case by case basis by councils at the material change of use or reconfiguration of lot(s) stage of the development process. Consideration should be given to tenure arrangements for the communal tank and pipe work. Consideration should also be given to intended connected uses and to roles and responsibilities regarding:

- water quality;
- system maintenance; and
- ownership of the system.

Communal rainwater tanks should be sized with a capacity of at least the cumulative total of the capacities required if all the connected houses were to use household rainwater tanks.

2.1 Continuous supply - communal rainwater tanks

Where communal rainwater tanks are connected to internal household uses, provisions must be made to ensure continuous supply to those uses. Where trickle top up is used to ensure continuous supply, the trickle top up volume of the communal rainwater tank should equal the cumulative total of all the volumes required if all the connected houses were to use household rainwater tanks.

3 Dual reticulation

Dual reticulation systems are approved on a case by case basis by councils using a risk management approach at the material change of use or reconfiguration of lot(s) stage of the development process. Dual reticulation systems can supply water for uses such as toilet flushing and garden watering.

The Department of Natural Resources and Water has published *Planning Guidelines for Water Supply and Sewerage* (NRW 2005). In these guidelines, the Queensland Government has adopted the following Water Services Association of Australia (WSAA) codes as suitable standards for the collection/reticulation component of sewerage and water supply schemes, including recycled water:

- WSA 02 – 2002 Sewerage Code of Australia
- WSA 03 – 2002 Water Supply Code of Australia
- WSA 04 – 2001 Sewage Pumping Station Code of Australia

The Water Services Association of Australia (WSAA) supplement to its *Water Supply Code 2002* (Version 2.3) titled *Dual Water Supply Systems* (Version 1.1), covers the design and construction of dual supply systems for servicing new developments that provide both drinking water and non-drinking water via reticulation. The supplement contains advice relating to:

- differentiation of drinking water and non-drinking water pipe systems via colour coding and other markings;
- design considerations for dual supply systems, including system configuration, sizing of mains, pressure, main depths, fittings and flushing points;
- construction and installation of property services; and
- standard drawings for prevention of cross-connections between drinking and non-drinking water supply systems.

While the WSAA codes are not mandated, they are suggested as suitable for installation and maintenance of dual pipe systems in Queensland under the *Queensland Water Recycling Guidelines 2005* available at:

<http://www.epa.qld.gov.au/register/p01734aa.pdf>

Council should be consulted before any work commences on dual reticulation systems to check other requirements aside from, and/or above the WSAA codes.

4 Stormwater reuse

Stormwater reuse systems are approved on a case by case basis by councils using a risk management approach at the material change of use or reconfiguration of lot(s) stage of the development process.

An appropriate risk management approach is outlined in the Queensland Water Recycling Guidelines available at: <http://www.epa.qld.gov.au/register/p01734aa.pdf>. The risk management approach contained in these guidelines is based on the draft National Guidelines for Water Recycling (NRMMC & EPHC 2005), AS/NZS 4360:1999 Risk Management and the HACCP (Hazard Analysis and Critical Control Point) system.

Stormwater may be used for purposes such as irrigation and toilet flushing. As with all recycled water the user must ensure that the water is treated to an appropriate level prior to use.

The Institute of Engineers Australia National Committee on Water Engineering has produced a draft document, *Australian Runoff Quality Guidelines* (Engineers Australia in draft), that contains a great deal of information on stormwater pollution, treatment and reuse. Visit www.wsud.org/tech.htm for more information.

Other stormwater harvesting and reuse information are available at:
<http://www.epa.nsw.gov.au/resources/managestormwatera06137.pdf>

Further information on existing Australian practices in stormwater reuse, innovative design solutions covering the core functions of collection, treatment, storage, flood protection, and water distribution amongst the end uses and best practice recommendations are available at:
http://iswr.eng.monash.edu.au/research/projects/stormwater/index_html

Appendix 1. Maintenance of rainwater tanks and fittings

MAINTENANCE OF RAINWATER TANK AND FITTINGS

MAINTENANCE ACTION	REGULARITY
Check roof and gutters for the presence of accumulated debris including leaf and other plant material. Accumulated plant material should be cleared and overhanging tree branches and foliage should be pruned.	6 months
Check for evidence of animal, bird or insect access including mosquito larvae. If present, identify and close access points.	6 months
Regularly clean the tank to remove accumulated sediment.	2-3 years
Check for evidence of algal growth. If present, find and close points of light entry.	6 months
Check and clean first flush device.	3 months
Check tank for defects and repair.	6 months

More detailed information regarding rainwater tank system management, such as potential hazards, preventative measures, monitoring and maintenance, is contained in the enHealth Council document 'Guidance on the Use of Rainwater Tanks' and is available at: http://enhealth.nphp.gov.au/council/pubs/pdf/rainwater_tanks.pdf



Appendix 2. Useful references

Part 25 of the Queensland Development Code (QDC):

<http://www.lgp.qld.gov.au/?id=247>

Water Savings Targets documentation:

<http://www.lgp.qld.gov.au/?id=4174>

enHealth Council monograph 'Guidance on the Use of Rainwater Tanks':

http://enhealth.nphg.gov.au/council/pubs/pdf/rainwater_tanks.pdf

Queensland Health policy 'Managing the Use of Rainwater Tanks'

<http://www.health.qld.gov.au/phs/Documents/ehu/30632.pdf>

Water Planning Guidelines for Water Supply and Sewerage (Department of Natural Resources and Water 2005):

http://www.nrw.qld.gov.au/compliance/wic/ws_s_consultation.html

Water Services Association of Australia (WSAA) codes:

WSA 02 – 2002 Sewerage Code of Australia

WSA 03 – 2002 Water Supply Code of Australia

WSA 04 – 2001 Sewage Pumping Station Code of Australia

<https://www.wsaa.asn.au>

The Water Services Association of Australia supplement to its Water Supply Code 2002 (Version 2.3) titled Dual Water Supply Systems (Version 1.1):

<https://www.wsaa.asn.au>

The Queensland Water Recycling Guidelines (2005):

<http://www.epa.qld.gov.au/register/p01734aa.pdf>

Australian Runoff Quality Guidelines:

www.wsud.org/tech.htm

Other stormwater reuse information:

<http://www.epa.nsw.gov.au/resources/managestormwatera06137.pdf>

http://iswr.eng.monash.edu.au/research/projects/stormwater/index_html

HB230 2006 - Rainwater Tank Design and Installation Handbook

http://www.arid.asn.au/index.php?option=com_frontpage&Itemid=1