Managing stormwater with storage gutters

A new invention is helping to reduce water consumption and ease stormwater problems.

After an arson attack in 2002, Hunters Hill Council decided to use the Gladesville Road Community Centre refurbishment to:

- demonstrate simple water saving devices;
- show the value of retrofitting these devices to an existing building.

The project received the NSW Sustainable Water Challenge Retrofit Award for 2003. The Centre re-opened in November 2002 and is now part of a program that promotes community awareness of rain harvesting and water sensitive design.

The storage gutter system addresses these problems from two angles. First, it reduces reticulated water usage by substituting rainwater for purposes such as toilet flushing. Secondly, overflow water during heavy or sustained rainfall infiltrates the soil, replenishing the water table and slowing the passage of water to urban waterways.

The rain storage gutters at the Gladesville Road Community Centre, which are connected to toilet cisterns, have reduced the mains water demand by 26%. Also, because rain overflow is directed by a stormwater diffuser into the garden soil, 100% of the rain that falls on the roof is used onsite, except under very severe storm conditions.

Independent costing of the gutter system has confirmed that these savings can be achieved at a cost which is between 5% and 27% less than the installation of traditional guttering plus an equivalent-sized rainwater tank.

Frank Smith of Rainsaver Pty Limited is the inventor of the storage gutter system. He developed it after he saw a need to manage rainwater better when living with a young family on tank water in the Nowra district of NSW. After analysing patterns of rainfall statistics from the Bureau of Meteorology, he developed an oversized gutter that would replace a water tank and use all the rainwater that fell on a roof. Instead of downpipes feeding into the street drainage system, the overflow from the storage gutters would be returned to the soil through the process of infiltration.

The storage gutters come in three sizes and are fitted with lids, and leaf guards for easy maintenance. Medium and large gutters are fixed to roof trusses with purpose-designed internal steel brackets. Lengths are joined with rivets and silicone sealed. The gutters are then coated internally for improved water tightness.

Plugs can be installed at suitable points for plumbers to connect the gutters to toilet cisterns or other outlets. Overflow holes are situated where excess water can flow directly into garden beds. Alternatively, the gutters are connected to a diffuser system that transfers the water to areas of the garden with suitable soil porosity and permeability.

In times of low rainfall or high usage, the storage gutters can be recharged from the mains water supply if they are connected to a toilet or washing machine.

The Gladesville Road Community Centre project demonstrates that water storage gutters are capable of replacing existing roof gutters, downpipes and rainwater tanks. They also reduce the need for stormwater retention systems. They do this while returning moisture to the soil to aid vegetation growth and replenishing the water table.

The benefits

The savings in mains water usage achieved by storage gutters depend on the amount, distribution and intensity of rainfall; water usage by the occupants of the building and the collection area of the roof.

Assuming a 200 m^2 building with average occupancy levels, Professor John Argue of the Urban Water Resources Centre at the University of South Australia estimates that water storage gutters could save between 30% and 60% of mains water usage, depending on gutter size and location, each year over the life of the gutters (estimated to be a minimum of 15 years).

Benefits to the building owner include:

- reduced consumption of mains water resulting in lower bills;
- little maintenance and longer gutter life due to leaf guard system;
- less need to water the garden due to the overflow infiltration system.

Benefits to the community include:

- lower demand for reticulated water leading to less pressure to build new dams;
- less need for piped street drainage and area retention systems and consequently lower cost of developing land for housing;
- greatly reduced cost of stormwater management and flood mitigation.

Further information on this case study, including the implementation process, how problems were overcome, and lessons learnt, can be obtained from the BRITE Project Leader, Dr Karen Manley, at k.manley@qut.edu.au or visit www.brite.crcci.info. The BRITE Project is a research project of the CRC for Construction Innovation.