

Greening Our Hospitals: Water

Case study

Rainwater harvesting for boiler feedwater and using water three times

Overview

Rainwater is a high-quality resource that is often overlooked for the intrinsic benefits available for use in industrial processes. Boilers supplying laundries consume large quantities of high-grade treated water to produce saturated steam. The use of rainwater as boiler feedwater makes ideal use of the softness of the water and significantly reduces chemical use. The Warragul Hospital site has a large roof area suitable for rainwater harvesting but has traditionally directed rainwater to stormwater drains. With funding assistance from the Greening Our Hospitals: Water program, the engineering team at Warragul Hospital implemented an innovative idea to save water, energy and chemicals by harvesting rainwater for use as boiler feedwater. A separate project reclaimed reject water from the reverse osmosis filter for use in the steriliser condenser that is then reclaimed again for use in the flusher system.

Summary

Warragul Hospital is located in the high-rainfall district of Western Gippsland, making this an ideal location for the harvesting of rainwater. A 137-kilolitre tank was installed and the main building downpipe system modified to collect water harvested from the roof. The water is then transferred to two smaller tanks located in the boiler house that provide water to the boiler feedwater tank. The result has been an annual saving of 1,967 kilolitres of water and a 25 per cent reduction in boiler feedwater treatment chemicals.

Reclaimed reverse-osmosis reject water is used for the steriliser vacuum pump and condenser cooling before being discharged to the sewer via the flusher system.

Health service

West Gippsland Healthcare Group
Warragul Hospital

Total investment

\$82,200

Date of completion

August 2009
August 2010

Initial water saving estimate

1,194 kL per annum

Actual water savings

2,000 kL per annum

Estimated annual cost saving

\$10,100

Simple payback

8.1 years

Project design and installation

In house design, local contractors

Water cost

1.6754 \$/kL in 2011
1.24 \$/kL in 2009

Sewage disposal cost

3.2467 \$/kL in 2011 (90%)
2.40 \$/kL in 2009 (90%)



137,400-litre rainwater storage tank.



Boiler house rainwater storage tanks
34,400 each.



Diverting rainwater downpipes to the
storage tanks.

How it works

With an available roof area of 1,400 square metres, we estimated that with average rainfall we could theoretically harvest 1,157 kilolitres of rainwater per year. A large area is needed for a tank that is 137 kilolitres, so a location was selected based on topography, access to the downpipe system and close enough to the boiler house to keep pumping costs low. The boilers consume 3,300 kilolitres of water per day, so two 33-kilolitre tanks were installed in the boiler house to ensure continuity of supply.

Harvested rainwater can also be used for the toilet flusher systems, washing vehicles and for irrigation of gardens and lawn areas.

Reclaimed water from reverse-osmosis system is pumped to a storage tank in the main building roof space. The tank water is circulated through the steriliser vacuum pumps and condenser cooling to condense the steam before it is collected again and discharged to the flusher tanks where it is used for toilet flusher system.

The water is used at least three times before discharged to the sewer:

- reverse-osmosis reject water transferred to storage tank
- steriliser vacuum pump and condenser cooling system
- toilet flusher system.

The temperature in the flusher tank remains stable as the toilets are used regularly enough to maintain low temperature of water circulated.

Meters were installed on both tanks to measure water consumption and are manually recorded.

What worked well:

- saves around 305 litres of water per steriliser cycle
- the system has been working well since it was installed.

What did not work well:

- a fine filter had to be installed to ensure no dirt passes through the steriliser system
- a pressure pump had to be installed in the system to maintain the correct pressure
- it was very difficult to install the water circulation system as the pipe work needed to go through very tight ceiling spaces to reach the required areas.

Health service profile

West Gippsland Healthcare Group (WGHG) provides clinical care services in Baw Baw Shire region to a community of around 40,000 residents. The hospital and the care program provide residential care through two services: Coinda Lodge (60 beds) in Warragul adjacent to the hospital and Andrews House (50 beds) in Trafalgar. WGHG uses a significant volume of water in the conduct of its operations and is considerate of its impact on the local environment. West Gippsland Healthcare operates Warragul Linen Service from hospital site and uses steam for its operations

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