



## Hospitals/medical facilities water conservation

***This information sheet provides property managers with water conservation options, and raises awareness of water issues.***

### Getting started

This checklist will help property managers evaluate where to look for water-saving measures. As different as many hospitals and medical facilities can be, they have similar water uses in equipment, operations and procedures. Hospitals and medical facilities initiating water-saving measures have historically seen significant operating costs and energy savings.

To reduce water consumption in an office or commercial/industrial setting, consider the three-step process below:

1. Educate and involve employees on water conservation through team briefs, management meetings etc.
2. Locate all water using sources (bathrooms, wash sinks, hoses, dish washing machines, HVAC, cooling water etc) in your building and estimate how much water is used.
3. Identify and implement water conservation options by establishing a Water and Environment Team (W.E.T.)

It is important that employees understand how their job affects the amount of water used in their work environment. Seek ideas from those most involved with the daily operations and activities of the organisation. Make water conservation partly their responsibility by asking them to identify where water is used.

Once the areas of water consumption have been determined, ask employees to help implement conservation measures.

Specific information is presented in Information Sheet 1.

### Operations and Equipment

- Recycle and reduce water use wherever possible, consistent with Health Department regulations.
- Conduct a water use survey to update current water use needs. Medical methods, processes and equipment are constantly upgrading, thus changing the need for water in some areas.
- Evaluate daily routines of staff (ie. patient showering, cleanup, scrubbing and handwashing) and encourage efficient water use practices.
- Set up a system for all staff to report leaks.
- Use full loads in sanitisers, dishwashers, sterilisers and laundry washing machines, consistent with Health Department requirements.
- Install automatic valves on film processing or X-ray equipment to stop water flow when equipment is not in use.
- X-ray film processes in hospitals use an average of 4,000 kL of water per year. Package systems are now available for those units that reduce water use to 125kL per year.
- Recycle brine from reverse osmosis or filter backwash for cooling.

### Success story

A major Perth hospital uses reject water from its dialysis and reverse osmosis processes as a supply for toilet flushing.

- Replace lab aspirators with a central vacuum system.
- Eliminate the use of mains water to cool steriliser condensate before dumping to a drain when possible. Consider drain material and diversity of drains, or available floor space for holding tanks.
- Reduce flow to surgical vacuum pumps to an acceptable minimum level and maintain proper

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- Look for and make a list of all single-pass or once through cooling systems. The types of equipment that typically use single-pass cooling water are: ice machines, X-ray machines, CAT scanners, degreasers, hydraulic equipment, condensers, air compressors, welding machines, vacuum pumps and air conditioners. There are various options for saving this water; ranging from: shutting off water when not in use; closed loop systems; and recycling the water elsewhere.

## Success story

Hospital 'A' has several refrigeration and air conditioning units that are cooled with one-through water. By incorporating these units into a recirculating closed-cooling loop, the facility reduced water consumption by 111,400 kL per year to save more than \$22,000 in annual water and sewer costs. The initial cost of this project was estimated at \$29,000 and payback would occur in less than 18 months.

Hospital 'B' had an opportunity to save water in its X-ray developing process. By retrofitting flow restrictors to the developing machines, water consumption was reduced by approximately 700kL annually. The estimated cost of modifying the machines was \$150, while the water and sewer savings were approximately \$1,400 resulting in a payback of less than two months.

## Bathrooms / restrooms

- Domestic water use accounts for an average of 24 percent of the water in health care facilities.
- Repair leaks! A leaking toilet can waste more than 200 litres of water each day, and a dripping tap or showerhead can waste up to 3,500 litres per week.
- Install flow control fixtures on all taps.
- Showerheads and toilets suffering normal wear and tear should be replaced by water efficient models.
- Water efficient showerheads use only 9 litres of water each minute, while older models may use as much as 27 litres/minute.

Water use in toilets can be reduced by:

- Retrofitting flushometer (tankless) toilets with water-saving diaphragms, which save 20 percent of water per flush.
- Replacing toilets with dual flush models. Toilets can use as much as 12 litres per flush, while dual flush toilets use only 6/3 litres per flush. An average saving of more than 7% of a hospital's total water use was possible through this one water conservation action.

- Install spring loaded valves or timers on all non-clinical taps.
- Use aerators on taps.

Water use in urinals can be reduced by:

- Setting urinals with programmable automatic flush valves to a water-saving model that flushes the urinal after more than one use.
- Check timing cycles and volumes for automatic water-flushing system in urinals and toilets. Coordinate automatic systems with work hours so they don't run continuously.
- Replacing the cisterns on urinals with low-volume models. Urinals can use as much as 12 litres per flush, while low volume urinals use only 3 litres or less per flush.

## Success story

Hospital 'D' is installing flow restrictors on all patient and examination room taps at its facility. The existing flow rate of the taps was measured at 16 litres/min. After retrofitting the taps, the flow was reduced to 6 litres/min. The average usage of sinks at the facility is estimated at 25 minutes per day. This results in a water saving of 340 litres/day, or 124 kL of heated water per year for a combined water and energy savings of approximately \$280 annually per sink. The cost to retrofit one sink is estimated at \$12, resulting in a payback of less than one month.

## Laundry

- Evaluate the wash program considering daily wash loads. Consult manufacturer for specifications regarding minimising water necessary for various load soil conditions.
- Check with the chemical vendor and evaluate the wash formula.
- Investigate a rinse water reclamation system to reuse rinse water for the wash cycle.
- Consider installing a wash water and rinse water treatment and reclamation system.

## Success story

Hospital 'E' recently had a rinse water reuse system installed in its laundry that reduces water consumption there by approximately 6,840 kL annually.

## Building Maintenance

### General

- Check the water system for leaks and turn off unnecessary flows.
- Shut off the water supply to equipment and areas that are unused.
- Discontinue water circulation pumping in areas not in use.
- Read water meters at least monthly. Compare the results to the same month of the previous year. This will help to identify leaks as they occur, as well as monitor your conservation efforts.
- Check the pressure. Where system pressure is higher than 400 kpa, install pressure-reducing valves.
- Consider using water-efficient ice machines.

### Heating/cooling (cooling can account for up to 53 percent of the water use in a hospital)

- Reduce excessive blowdown. Many cooling towers operate below the suggested levels of total dissolved solids (TDS) unnecessarily. Adjust boiler and cooling tower blowdown rates to maintain TDS at levels recommended by manufacturers' specifications. Inspect all floats and value switches on older towers more frequently.
- Return steam condensate to the boiler for reuse.
- Consider using ozone as a cooling tower treatment to reduce water used for makeup.
- Shut off water-cooled air conditioning units when not needed, or replace water-cooled equipment with air-cooled systems.
- Check steam traps periodically; repair when necessary.

### Cleaning (water used for general cleaning averages 10 percent of all of the water used in a hospital)

- Overhaul faulty steam traps on sterilisers.
  - Instruct cleaning crews to use water efficiently for mopping
  - Switch from 'wet' carpet cleaning methods (such as steam), to 'dry', powder methods.
- Change your window cleaning schedule from 'periodic' to 'as required'.

### Success story

Hospital 'F': Elimination of seal and cooling water on medical air compressors and vacuum pumps. Recirculating seal and cooling water for four vacuum pumps and one medical compressor, as well as removing a vacuum pump that was not needed, resulted in a net annual saving of 32,300 kL. Project cost \$19,500 - annual savings: \$55,686; payback in four months.

Refrigeration system retrofit: Facility staff discovered the refrigeration system serving the morgue was cooled with once-through cooling water. In 1994 the system was replaced with an air-cooled unit, there by saving 8,000 kL per year. Project cost \$5,500 - annual savings of \$13,750; payback in five months. (Always refer to manufacturers instructions).

## Cafeteria / food service

- Turn off the continuous flow used to wash the drain trays of the coffee/milk/postmix machine. Clean thoroughly as needed.
- Adjust ice machines to dispense less ice if it is being wasted.
- Upgrade equipment with water-efficient models.
- Provide table signs encouraging water conservation.

### Dishwasher hints

- Wash only full loads in the dishwashers.
- Turn dishwashers off when dishes are not being processed.
- Install spray rinsers for pot washing and reduce flow of spray rinsers for prewash.

### Success story

Hospital G installed a foot pedal-operating spray rinser on the pot scrubbing sink in its kitchen. This resulted in a much more efficient rinsing process, saving approximately 1,400 kL of water per year. The cost to implement this measure is estimated at \$240 and the annual savings is approximately \$2,800 resulting in a payback of less than one month.

## Outdoor water use

### General

- Ensure all hoses have shutoff nozzles.
- Use a broom, rather than a hose, to clear pavements, driveways, loading docks and parking areas.

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- Wash vehicles only when needed.
- Investigate the availability of reclaimed water for irrigation and other approved uses.
- Investigate installed a groundwater bore for irrigation purposes.

## Landscaping

- Detect and repair all leaks in irrigation systems.
- Check irrigation systems and timing devices regularly to be sure they operate properly.
- Water only on allocated watering days either before 9am or after 6pm.
- Set sprinklers to water the lawn or garden only - not the street or path.
- Use soaker hoses and trickle irrigation systems.
- Do not leave sprinklers or hoses unattended. A garden hose can discharge 1000 litres or more per hour.
- Test the soil for nutrient content and add organic matter is needed. (Good soil absorbs and retains water better.)
- Use soil wetting agents where appropriate.
- Plant native and/or drought-tolerant grasses, ground covers, shrubs and trees. Once established, they do not need water as frequently.
- Use mulch around shrubs and garden plants to reduce evaporation from the soil surface and cut down on weed growth.
- Remove thatch and aerate turf to encourage movement of water to the root zone.
- Raise the lawn mower cutting height - longer grass blades cut down on evaporation and inhibit weed growth.
- Minimise or eliminate fertilising which requires additional watering.
- Avoid the installation of ornamental water features (such as fountains) unless the water is recycled.

## Make it Policy

- Educate employees about the importance and benefits of water conservation.
- Create water conservation suggestion boxes, and place them in prominent areas.
- Install signs in restrooms, kitchens and cafeterias that encourage water conservation.
- Appoint an employee to evaluate water conservation opportunities and effectiveness.
- Develop a water efficiency program for your facility.

## References

DPPEA FY02-06 (August 2002) - North Carolina Division of Pollution Prevention and Environmental Assistance. Water Corporation, Perth WA.

## Further Information

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