

ACU Water Conservation Plan 2023 - 2025

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INTRODUCTION

ACU has used an average of 83,500 kilolitres of water each year in the period 2014 – 2023. The university is one of the Australian tertiary sector's most efficient users of water but there are always opportunities to improve the conservation of water. This plan focuses on the ways and means to apply water conservation at ACU's Australian campuses.

WATER AUDITS AND MONITORING

Auditing and monitoring are key to water conservation. Audits establish baselines and precede action and monitoring measures the impact of action relative to baselines. There are three components to auditing and monitoring:

1. **Assessment:** A desktop audit of retailer invoices is sufficient to identify typical water use patterns and locations of high water demand (and potential leaks).
2. **Real-Time Monitoring Systems:** in some locations at the university there are smart water meters and sub-meters that enable real-time water usage. These are a vital resource but at present they are too few to support campus-wide monitoring.
3. **Leak Detection:** studies and industry sources estimate that water leaks can account for 6% to 25% of total water consumption in commercial buildings. For example, in well-maintained buildings, leaks may contribute to around 6% to 10% of water consumption but in older or poorly maintained buildings, leaks can account for 20% to 25% of water usage. ACU has a large number of older and heritage buildings that may be vulnerable to leaks. Appendix 4 to this plan provides a leak detection standard operating procedure.

INFRASTRUCTURE AND TECHNOLOGY

Water saving appliances and systems integrate water conservation into the design and operation of ACU's campuses, enabling campus water users to reduce their water demand and limiting the likelihood of water waste. The development of ACU campuses requires the integration of the following four components of water-efficient technology and systems:

1. **Water-efficient fixtures:** All taps, toilets, dishwashers and shower heads should be rated at the highest affordable level of the Australian Water Efficiency Labelling Scheme (WELS).
2. **Fire systems water testing systems:** Hydrants, hoses and sprinklers are tested regularly to ensure their reliability. This testing uses a significant amount of water, but this water demand can be mitigated in many ways. These include:
 - a. Recirculating pump propriety test devices
 - b. Pump recirculating tanks
 - c. Variable speed pumps
 - d. Break tanks and return lines
 - e. Recycled water supplies (such as from stored, captured rainwater)
3. **Rainwater harvesting:** Install rainwater tanks to capture and store rainwater for landscape irrigation, cooling systems, and other non-potable uses. Appendix 3 to this plan details the benefits and considerations associated with the installation and operation of rainwater harvesting infrastructure.

LANDSCAPING AND IRRIGATION

Watering campus grounds uses up to half of the total water consumed by ACU in a typical year. Efficient irrigation and water-efficient landscaping has the potential to save hundreds of thousands of litres of water per year. The following three approaches will enable this goal:

1. **Native and Drought-Resistant Plants:** prefer native Australian plants and drought-tolerant species for landscaping, which require less water and maintenance. Appendix 1 to this plan details the benefits and considerations for xeriscaping, the practice of designing gardens that can survive and thrive without the need for irrigation.
2. **Smart Irrigation Systems:** in all capital works projects with a landscaping component, aim to include weather-based irrigation controllers that adjust watering schedules based on real-time weather conditions, ensuring efficient water use.
3. **Mulching and Soil Improvement:** mulching is a low-cost but extremely effective way to enhance soil moisture retention by mulching garden beds and improving soil quality with organic matter.

EDUCATION AND AWARENESS PROGRAMS

Periodically, ACU will highlight the university's commitment to water conservation and the ways that students, staff and contractors can contribute to ACU's goal to continually increase its water-use efficiency.

ROLES AND RESPONSIBILITIES

The Properties Directorate has responsibility for managing ACU's water consumption, with specific responsibilities assigned to the Directorates functional units:

1. Campus Facilities Management teams are responsible for the day-to-day management and maintenance of water using appliances and equipment, as well as contractors' use of water
2. Development and Capital Projects is responsible for specifying water conservation equipment and infrastructure in all projects it manages
3. The National Sustainability Manager is responsible for auditing, measuring and reporting on water conservation, and the review and updating of this plan.

REVIEW

This plan will be reviewed annually.

APPENDICES

1. Xeriscaping
2. Measurement plan
3. Rainwater capture and reuse
4. Leak detection Standard Operating Procedure

APPENDIX 1: XERISCAPING

Xeriscaping is a landscaping method designed to reduce water use, offers several environmental, financial, and aesthetic benefits. These are its key advantages:

1. Water Conservation

- **Significant Reduction in Water Usage:** Xeriscaping uses drought-tolerant plants and efficient irrigation systems, drastically cutting down water consumption. This is especially beneficial in arid regions or places facing water shortages.

2. Lower Maintenance Requirements

- **Less Frequent Watering:** Since xeriscaped gardens feature plants that thrive in dry conditions, they require less frequent watering compared to traditional lawns.
- **Reduced Mowing and Trimming:** Xeriscaping often replaces grass lawns with native plants, shrubs, and ground covers that require minimal mowing or trimming.
- **Minimal Fertilizing and Pesticides:** The use of native plants means fewer chemical treatments are needed, as these plants are adapted to local conditions and tend to resist pests and diseases better.

3. Cost Savings

- **Reduced Water Bills:** With less reliance on irrigation, households and businesses save significantly on water bills.
- **Lower Maintenance Costs:** Fewer resources are needed for fertilizers, pesticides, and labor, leading to long-term cost savings in maintaining the landscape.

4. Improved Soil Health

- **Less Soil Erosion:** Xeriscaping often incorporates mulching and ground cover, which helps prevent soil erosion by improving moisture retention and protecting the soil from wind and rain.
- **Better Soil Quality:** The plants used in xeriscaping are often well-suited to local soil types, reducing the need for soil amendments and encouraging healthier, more sustainable soil ecosystems.

5. Environmental Benefits

- **Biodiversity Support:** Xeriscaping with native plants provides habitat for local wildlife, including pollinators like bees and butterflies, enhancing biodiversity.
- **Reduced Pollution:** Less use of lawnmowers, fertilizers, and pesticides means lower emissions and fewer pollutants entering the environment.
- **Reduced Urban Heat Island Effect:** Xeriscaped areas, particularly those that incorporate trees and shrubs, can help mitigate the heat island effect in urban environments by providing shade and reducing surface temperatures.

6. Aesthetic Appeal

- **Natural Beauty:** Xeriscaping can create visually striking landscapes that are in harmony with the local environment, featuring diverse plant textures, colors, and shapes.
- **Seasonal Variety:** Many drought-tolerant plants bloom at different times of the year, ensuring year-round interest and beauty in the landscape.

7. Resilience to Drought and Climate Change

- **Drought Resistance:** Xeriscaped landscapes are designed to withstand dry periods, making them more resilient during times of drought or water restrictions.

- **Adaptability to Changing Conditions:** Xeriscaping techniques help landscapes adapt to the impacts of climate change, such as fluctuating temperatures and precipitation patterns.

8. Increased Property Value

- **Attractive, Sustainable Landscaping:** Xeriscaping adds aesthetic and functional value to properties, which can increase real estate market appeal, especially in water-scarce regions.

9. Reduced Runoff and Improved Water Quality

- **Better Water Retention:** Xeriscaping helps control runoff by promoting water absorption into the soil, reducing the likelihood of flooding and water pollution from chemical-laden runoff.

10. Educational Opportunities

- **Promotes Sustainable Practices:** Xeriscaped gardens serve as living examples of sustainable landscaping, offering opportunities for communities to learn about water conservation, biodiversity, and ecosystem health.

APPENDIX 2: MEASUREMENT PLAN

Water conservation measurement

Overview

Measurement of ACU's water consumption enables ACU to establish its water efficiency, which serves as the key indicator of its water conservation practices. This appendix outlines how ACU measures its water consumption and water efficiency.

Establish benchmarks

There are two sources of benchmarks relevant to ACU's water consumption:

1. University sector: KL per EFTSL per institution
2. Internal to ACU: KL per EFTSL per Campus

The function of these benchmarks is to provide a means of assessing over the course of time ACU's institutional performance on water conservation, and to assess each ACU campus's performance on water conservation.

The source of data to establish these benchmarks is water retailer invoices.

Monitor Water Usage

ACU will monitor water use at several scales, including the following:

1. Whole of institution: this is the total water consumption of all ACU campuses, combined
2. Campus: this is the total water consumption of a single campus
3. Building or set of buildings: this is the water consumption of a single building or set of buildings fed by a single invoiced water meter.

Reporting

ACU reports its water conservation performance in the following ways:

1. Quarterly reports to the State Facilities Managers and Director, Properties
2. Biannually, to the ACU Senate
3. Annually, to the Tertiary Education Facility Managers Association Annual Survey

Responsibilities

The National Sustainability Manager is responsible for measuring and reporting on ACU's water consumption and conservation.

APPENDIX 3: RAINWATER CAPTURE AND REUSE

Overview

ACU has more than 650,000 litres of rainwater tank capacity. The university understands that installing water tanks to capture rainwater offers a variety of environmental, financial, and practical benefits, particularly given Australia's dry climate and periodic water restrictions. Accordingly, rainwater harvesting is a practical and sustainable way to manage water resources more effectively. This appendix outlines the key benefits for installing infrastructure to capture and reuse rainwater on ACU campuses.

Water efficient campus operations

Rainwater can be used for a variety of non-potable indoor applications, such as flushing toilets, testing fire systems and irrigation of gardens, which are the activities that account for most of ACU's annual water consumption

Lower Water Bills

The use of rainwater for non-potable uses such as toilet flushing, fire systems testing and irrigation will significantly reduce mains water consumption and wastewater disposal fees, leading to lower water bills.

Environmental Benefits

The environmental benefits of rainwater capture on ACU campuses are as follows:

1. **Lower Carbon Footprint:** Since using rainwater reduces the need for treated mains water, which requires energy for treatment and distribution, water tanks help lower the building's overall carbon footprint.
2. **Reduced Runoff During Heavy Rain:** Capturing rainwater in tanks can help mitigate local flooding issues during heavy downpours, as it decreases the volume of water flowing into stormwater drains and natural waterways.
3. **Sustainable Gardening:** Rainwater is free from chlorine and other chemicals found in mains water, making it better suited for irrigating plants, lawns, and gardens. This promotes healthier growth, particularly for native Australian plants.
4. **Drought Resilience:** Rainwater tanks provide an independent water source that can be used during times of drought or water restrictions, ensuring access to water even when mains supply is limited.

Maintenance of ACU's Social Licence

ACU campuses have a significant, material presence at the sites of its campuses and it must continually work to ensure that it maintains its social licence to operate in those locations. This delivers a range of benefits to the university and to its local communities. Rainwater capture can help maintain that social licence in these ways:

Legitimate and low-impact access to water during periods of water restrictions: during periods of water restrictions, rainwater tanks may enable ACU to maintain the amenity and function of its campuses within the limits of those restrictions.

Reduced demand on mains water systems: rainwater tanks enable ACU to reduce its demand on the community mains water infrastructure in the locations in which it operates.

APPENDIX 4: LEAK IDENTIFICATION STANDARD OPERATING PROCEDURE

ACU recognises that water leaks are a constant risk in its buildings and a source of wasted resources and in the case of substantial leaks, a risk to building integrity. Accordingly, this SOP outlines methods to detect leaks in various parts of campus buildings, from minor drips to hidden leaks in plumbing systems.

1. Monitor Water Meter Readings

The simplest method to determine whether there is a leak in a building is as follows:

- **Turn Off All Water Sources:** Ensure all water-using appliances (taps, toilets, irrigation systems) are off.
- **Check the Meter:** Locate the water meter, typically found at the front of the property, and record the current reading.
- **Wait and Recheck:** After a period of at least 30 minutes (or longer for more precise results), check the meter again.
 - **If the Reading Has Changed:** This indicates there is a leak somewhere in the building.
 - **If the Reading Is the Same:** There is no active leak in the system.

Continuous Leak Indicator:

- Some meters have a small wheel or triangle on the face that spins if water is flowing through the system. If this indicator is moving when all water is off, it suggests a leak.

2. Inspect Common Leak-Prone Areas

Leaks often occur in specific locations, such as bathrooms, kitchens, or outdoor areas. Here's how to inspect these areas:

a. Bathrooms:

- **Toilet Leaks:** Toilets are a common source of hidden leaks.
 - **Dye Test:** Add food coloring or a leak detection tablet to the toilet tank and wait 10-15 minutes without flushing. If color appears in the bowl, the flapper valve or internal components may be leaking.
- **Showerheads and Taps:** Look for continuous drips, which could indicate worn-out washers or seals.
 - **Solution:** Tighten the fittings or replace the washer or cartridge if necessary.

b. Kitchens:

- **Under-Sink Leaks:** Inspect the area under the sink for damp spots, mold, or water stains, which may indicate a leak in the pipes or the tap.
- **Dishwashers:** Check around the base of the dishwasher for any pooling water or signs of leaks. Dishwashers may have hose or valve leaks that can go unnoticed.

c. Laundry Areas:

- **Washing Machine Hoses:** Examine the hoses connected to the washing machine. Look for cracks, bulging, or loose connections that may cause leaks.
- **Drainage:** Ensure that the washing machine is draining properly and not causing leaks or overflows.

d. Outdoor Leaks:

- **Garden Irrigation Systems:** Turn on the system and inspect sprinkler heads, drip emitters, and hoses for leaks or pooling water. Leaks can occur due to damaged pipes or faulty connections.

- **Outdoor Taps:** Check outdoor taps (hose bibs) for drips or wet spots around the base or near connections.

3. Check for Hidden Leaks in Pipes and Walls

Hidden leaks can be harder to detect but may lead to significant water damage if left unattended.

Signs of Hidden Leaks:

- **Damp or Discolored Walls, Ceilings, or Floors:** Water stains, bubbling paint, or damp patches can indicate leaks inside the walls or ceiling.
- **Mold or Mildew:** Persistent mold or mildew growth in areas with no visible water source is often a sign of a hidden leak.
- **Sound of Running Water:** If you hear the sound of running water when no fixtures are in use, this could indicate a hidden leak.
- **Unexpected Increase in Water Bills:** If your water bill rises significantly without any changes in usage, it may indicate a leak in the system.

Professional Leak Detection:

If you suspect a hidden leak, consider hiring a licensed plumber who can use specialized tools such as:

- **Acoustic Leak Detectors:** These devices use sound to pinpoint the location of hidden leaks in pipes behind walls or under floors.
- **Thermal Imaging Cameras:** Used to detect temperature changes caused by leaks in hot water pipes or damp areas.
- **Pressure Testing:** This technique checks the pressure in the pipes to determine if there's a leak in the system.

4. Test for Leaks in Water-Using Appliances

Appliances such as hot water systems, evaporative coolers, and HVAC units can also be sources of water leaks.

a. Hot Water System:

- **Inspect Pressure Relief Valve:** Hot water systems have pressure relief valves that may release water periodically, but if this happens continuously, it indicates a problem. Check the valve and surrounding area for leaks.
- **Check for Rust or Corrosion:** Look for signs of rust, corrosion, or water pooling near the base of the hot water system.

b. Air Conditioning Units:

- **Inspect Drains and Pipes:** HVAC systems, particularly evaporative coolers and reverse-cycle air conditioners, may have drainage pipes or overflow lines that can leak. Check for water stains or dampness around the unit.

5. Monitor Water Pressure

Low water pressure can sometimes be a symptom of a leak, especially in hidden pipes.

Steps:

- **Test Pressure with a Gauge:** Use a pressure gauge to measure the water pressure at various outlets (such as taps and showers). If the pressure is noticeably lower in one area, it could indicate a leak in that section of the system.

- **Contact a Professional:** If you suspect a leak but can't find it, call a plumber to investigate further using advanced diagnostic tools.

6. Use Leak Detection Systems

Many buildings now incorporate smart leak detection systems that can automatically monitor water usage and detect leaks early.

Types of Leak Detection Systems:

- **Smart Water Meters:** These provide real-time monitoring of water usage and alert users to abnormal patterns, such as continuous water flow when none is expected.
- **Leak Detectors:** These are placed near potential leak points (e.g., under sinks, near hot water systems) and emit alerts when they detect moisture.

7. Monitor Water Bills

A sudden, unexplained increase in your water bill is one of the clearest signs of a potential leak. Regularly tracking your water usage can help you catch leaks early before they become major problems.

