TOO GOOD TO WASTE - OPPORTUNITIES FOR EFFECTIVE WASTEWATER REUSE

In many parts of the country water is in short supply. Changing weather patterns, increasing demand and inefficient water management means that less water needs to go further. Environmental Scientist and Sustainability Consultant Josh Byrne provides an overview of the latest developments in domestic wastewater reuse and explains how to make the most of this valuable resource to sustain your garden.

WHY REUSE WASTEWATER?

Water used in the garden accounts for around half of WA's domestic water consumption. Recycling our wastewater by using it to irrigate our gardens is one way of reducing pressure on high-quality water supplies. Studies around Australia have shown that there is strong public support for the reuse of wastewater and that it can lead to significant savings of water, energy and money.

WHAT IS DOMESTIC WASTEWATER?

Domestic wastewater can be classified into two categories:

- Black water – this comes from the toilet.
- Greywater – this comes from the bathroom (bath/shower, hand basin) and laundry (washing machine, laundry trough). While technically classified as greywater, kitchen wastewater (sink, dishwasher) is usually treated as black water because of the relatively high concentration of contaminants, including fats, oils and food waste.

BLACK WATER

Black water requires significant treatment before being reused in the garden to prevent the spread of disease and negative impacts on the surrounding environment. There are numerous commercial on-site treatment systems that have been designed to treat black water to a quality where it can be safely used in the garden, many of which are being used around WA in non-sewered areas.

Aerobic Treatment Units

Aerobic Treatment Units (ATUs) offer greater flexibility than conventional on-site wastewater disposal systems (such as septic tanks and leach drains) and provide an improved quality of wastewater treatment.

While ATUs come in different shapes and sizes, they are similar in operation and typically use biological processes and chlorination or ozone to treat household wastewater prior to pumping the water to an irrigation area. The wastewater is not able to be stored but is pumped out at the end of the treatment cycle. The WA Department of Health (DoH) brochure titled 'Aerobic Treatment Units' describes the basic principles of the operation of these systems – this brochure can be obtained by contacting the DoH Wastewater Management Branch on (08) 9388 4999.

GREYWATER

Reusing greywater to irrigate your garden can dramatically reduce the amount of mains water you use. Greywater reuse can be safely practiced with minimal risk to public health and the environment if done with due caution.

Manual bucketing

The simplest option is to collect greywater from the bathroom and laundry with a bucket and apply it directly to your garden beds or lawn as a substitute for mains water. You don't need to install any special equipment to do this (although note the important points raised under the *Health & safety* section below).

Greywater reuse systems

The other option is to install a DoH approved greywater reuse system. These range from simple direct diversion models that provide basic filtration prior to irrigation, through to more elaborate systems that treat and disinfect the greywater. Greywater volumes and quality will vary according to the number of household occupants, their age, health, water use patterns and the household fixtures from which the greywater is drawn.

Greywater reuse systems must apply the greywater beneath the ground via a sub-soil trench or purple colour-coded drippers covered with 100mm of mulch (unless it's treated and disinfected). This reduces the scope for human contact and minimises the potential health risks associated with greywater systems.

A Waterwise rebate of up to $500 or 50% of the purchase/installation cost (whichever is the lesser amount) is available for an approved greywater reuse system in sewered areas. Go to **www.water.wa.gov.au** and click on the 'Rebates' link to find out which systems are eligible for a rebate.

APPROVALS & MAINTENANCE

You can only install an ATU or greywater reuse system once you have lodged an application and received approval from your Local Government or DoH. Systems must be of an approved design and manufacture, properly sized and suitably located. For an up-to-date list of approved wastewater treatment systems you can contact the DoH Wastewater Management Branch or click on the 'List of Approved Systems' link from one of the following websites:

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ATUs – **www.health.wa.gov.au/envirohealth/water/atu.cfm**

Greywater systems – **www.health.wa.gov.au/envirohealth/water/greywater.cfm**

Note that the installation of wastewater systems (and servicing of ATUs – usually quarterly) can only be carried out by operators who have been approved by DoH. ATUs must also be regularly serviced to ensure that they are operating effectively and the quality of the wastewater is maintained. The full maintenance requirements are set down in the *Code of Practice for the Design, Manufacture, Installation and Operation of Aerobic Treatment Units*. This document can be downloaded from the ATU website provided above. *The Code of Practice for the Reuse of Greywater in Western Australia* further explains the requirements relating to greywater reuse. This document can be downloaded from the greywater website provided above.

HEALTH & SAFETY

The following important requirements should be followed to minimise risks and ensure the safe and effective operation of a wastewater system:

- The system must be designed and operated so as to exclude human and domestic animal contact.
- Cross connection with potable water supply is NOT allowed.
- Be aware of the products that you put down the sink. Choose products with low phosphorous, sodium and boron levels. Avoid using bleaches, fabric softeners and brighteners (see the Soil & water quality management section below for more info).
- Never dispose of paints, automotive oils, trade or industrial wastes into a wastewater system.

There are also minimum setback requirements for ATUs and greywater systems to ensure that these are not located within a certain distance of buildings, boundaries, structures, trafficable areas, wells, bores, watercourses, etc (note that the setback requirements for the associated wastewater irrigation systems are covered in the Irrigation section below).

IRRIGATION

The appropriate type and configuration of the wastewater irrigation system for your garden or property may be limited by the site conditions. The different types of irrigation include spray irrigation, Aquasafe drains (available only with the Aquarius ATU), as well as sub-strata and sub-surface *irrigation.*

Soil & water quality management

The type of soil into which wastewater flows are dispersed can have an impact on the effective operation of a wastewater irrigation system. In addition, key water quality factors such as salt concentration, pH and phosphates also have implications for soil management within the irrigation fields/areas. Potential adverse impacts include decline in soil structure, impeded drainage and negative impacts on plant health. The following measures can reduce these risks:

- Householders can manage wastewater quality to reduce salt concentrations by using appropriate detergents and other cleaning products.
- Soil in the wastewater dispersal area can be amended with soil conditioner and mulch to increase humus content and to improve/maintain soil structure and permeability as well as buffer pH.
- The garden and irrigation system can be designed in such a way to allow for zones of the garden to be rested from wastewater.
- Salt and alkaline tolerant species can be selected for the landscaping plant palette.

Setback requirements for wastewater irrigation systems

Wastewater irrigation fields/areas must have minimum setbacks from the defined list of structures/features as identified in the relevant Code of Practice for either ATUs or greywater systems.

Sizing & design of wastewater irrigation systems

Wastewater irrigation fields/areas must be sufficiently sized to disperse estimated household wastewater volumes. These volumes are calculated by the number of bedrooms (assuming two people in the first bedroom and one person in each additional bedroom), multiplied by estimated wastewater figures per individual. The second factor in determining the size of a greywater irrigation field/area is the capability of the on-site soil to receive the estimated wastewater flows.

Frequency & reliability of wastewater irrigation supply

The volume of wastewater generated by a household is often not sufficient to meet total plant water demand, and this shortfall in overall volume can also be compounded by irregular occupancy. The options available to overcome this include selection of drought tolerant plants, installation of a mains water top-up line, or installation of dual irrigation lines.

There are pros and cons for each option, but either of the last two are preferred because they provide an important back-up supply and can be used to overcome any shortfalls in wastewater flows (without limiting the range of suitable plant species). The use of mains water to supplement wastewater flows (via either a top-up or dual irrigation line) is also a
useful control measure for flushing the system and diluting salt accumulation in the soil.

MORE INFORMATION ON WASTEWATER REUSE

WA Department of Health (Wastewater Homepage) – **www.health.wa.gov.au/envirohealth/water/wastewater.cfm**

Lanfax Laboratories – **www.lanfaxlabs.com.au/**

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