



A Useful Guide to Greywater System Design & Approval

This guide aims to explain the basic principles of greywater disposal for households with waterless compost toilet systems seeking to gain council approval for an on-site sewerage management system (OSMS) on unsewered sites.

It does *not* discuss greywater reuse for two main reasons:

- Greywater reused in the household is primarily used to flush toilets.
- It is not feasible to reuse 100% of greywater in the garden all year round, so the household will still require an approved method of disposal in wet weather.

The guide is based on 35 years of practical experience in the industry, and was drafted in consultation with qualified geotechnical engineers, local government representatives, experienced compost toilet manufacturers and distributors.

The guide does NOT reference government codes and regulations for the simple reason that, in the real world, the policies and rules applied by individual councils vary widely and often bear little or no resemblance to the official documents.

This document should not be used as a legal or regulatory reference. It is simply an explanation of the underlying principles of safe and responsible greywater disposal upon which the regulatory documents are supposedly based. If these principles are applied sensibly, appropriately and responsibly, the system should satisfy council's requirements – but that is not always the case.

Readers are advised to consult closely with their local authorities and qualified professionals before making any decisions regarding on-site wastewater system design and/or installation.

Definitions

Blackwater	Wastewater from a flushing toilet
Excess Fluid	The small amount of fluid which drains from a waterless toilet system chamber
Geo-tech	Geotechnical engineer
Greywater	Wastewater which flows from the <u>kitchen</u> *, bathroom and laundry and does <i>not</i> include 'blackwater' from a flushing toilet
Greywater Pre-filter	A filter designed to remove most solid particles from greywater
Wastewater	All effluent which emanates from a household, including blackwater from toilets and greywater from the kitchen, bathroom and laundry

*AS NZS 1547-2012 defines greywater as "The domestic wastes from a bath, shower, basin, laundry, and kitchen, but excluding toilet and urinal wastes. It may contain pathogens".

Introduction

The use of waterless toilet systems eliminates blackwater from the wastewater stream, reduces the volume of wastewater by approximately 35% and can reduce the B.O.D. of the wastewater by up to 70%. This allows for a much simpler and less expensive OSMS.

Typical Cost Comparison

With waterless toilet/s:

- Geo-tech ~ \$2,000
- Accredited waterless toilet \$2,500-\$5,000
- Grease trap, coarse filter and leach field \$3,000-\$5,000
- TOTAL \$7,000-\$12,000

With flushing toilet/s:

- Geo-tech ~ \$2,000
- Toilets & plumbing \$1,500-\$2,500
- AWTS or septic tank and plumbing \$12,000 - \$20,000
- TOTAL \$15,000-\$25,000

All councils claim to refer to and comply with the Australian Standards, 'Code of Practice' for their state and other official documents, however councils can interpret the documents in different ways, and a lack of experience with waterless toilet systems can make some council officers reluctant to approve non-standard site specific systems, so close communication is the key.

Please be aware there may be legal consequences for failure to obtain the relevant approvals before installing and commissioning an OSMS.

The Basics

An official responsible for writing the OSMS guidelines for NSW Health was once asked what people should do with their greywater.

His answer: "Just stick it in the ground".

It is (or should be) that simple.

To 'stick it in the ground' you need to know three things:

1. The volume of effluent coming from the household
2. The area of land required for the landscape to absorb that volume of effluent
3. A suitable location for the disposal area

The volume of effluent (greywater) is generally based on two things:

1. The number of bedrooms/potential occupants (usually number of bedrooms plus one = occupants)
2. Whether there are flushing toilets

The area of land required depends on the characteristics of the block including:

- Soil type (how absorbent it is)
- The local rainfall patterns
- The vegetation
- The slope

The location will be determined by factors such as:

- Proximity to water courses (creeks, dams, etc)
- Proximity to boundaries
- Contours of the block

Your council may require you to engage a qualified professional (geo-tech) to undertake a land capability assessment (LCA) - calculate the area required and advise on suitable locations within the block for the effluent disposal area (EDA).

Engaging a local geo-tech has two main advantages:

1. The council is generally more likely to accept an application with professional input
2. A local geo-tech will usually know what your local council is likely to approve

The EDA

The EDA can be in a variety of forms, including traditional absorption trenches, evapotranspiration beds or sub-soil irrigation, all of which simply disperse the wastewater below the surface.

Excess Fluid Drain

The low volume of excess fluid which drains from a waterless compost toilet system (as little as 1 litre per day) is normally directed to a small, dedicated absorption trench, although in some circumstances it may be directed to the greywater system.

Gaining approval

Good communication is the key to a positive outcome. Be open and honest with your council officer and be tactful when questioning their advice or recommendations.

Your OSMS application will consist of two parts:

1. the specifications and accreditation of your waterless toilet system
2. the design and layout of your greywater-only system (supported by calculations and recommendations from your geo-tech).

Provided you have selected a properly accredited waterless compost toilet system with sufficient capacity for the residence, councils should normally have no problem with this part of the application.

Many council officers, and some geo-techs, have little or no experience with greywater-only OSMS, which can lead to complications. They may suggest you install a system they are familiar with, like a septic system. However, there is *no* legitimate reason for a council to require a tank of any kind to be included in a greywater-only system*. Aside from the unnecessary expense, installing a tank in a greywater system serves absolutely no purpose, and storing greywater in a tank does little more than cause it to turn anaerobic and produce foul odours.

*Some councils have firm (non-negotiable) planning policies that apply to certain parts of their shire or city, which can make the installation of a simple (sensible) system almost impossible in some circumstances.

Your application will typically need to be accompanied by:

- Site plan – to scale showing buildings, OSMS plumbing, water courses, etc
- System specifications – accreditations, standards compliance, etc of components
- LCA from a qualified geo-tech
- Operation and maintenance details - operation and maintenance requirements for the OSMS and any professional servicing arrangements.

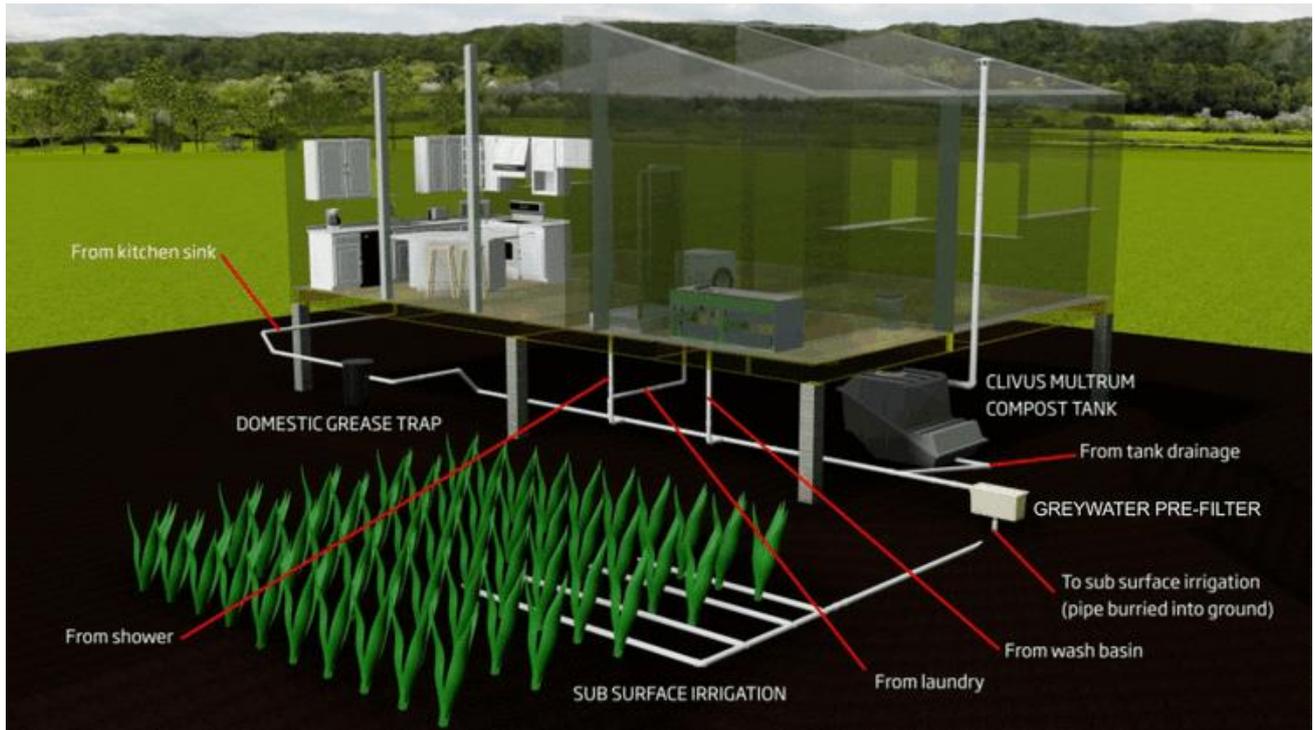
Your application will be assessed with reference to:

- Environment and health protection at the site
- Guidelines and directions – relevant policies, guidelines and directions
- Standards for installation, maintenance and servicing

'Approved' Greywater Systems

There are some 'approved' commercial greywater systems on the market. As a rule, these are one-size-fits-all sewerage systems labelled as 'greywater systems' that have undergone extensive testing and evaluation to gain universal accreditation for use at any site. They are generally far more complicated and expensive than necessary for a typical household.

Typical OSMS for a household with waterless compost toilets



Key Points

Your OSMS is very site specific and there are numerous factors at play in determining the appropriate size, design and location of your OSMS.

- Site characteristics
- Size of household
- Council policies
- Council officers' interpretation of policies and regulations
- Type of toilets installed

We suggest you start by consulting a suitably qualified local geotechnical engineer.

The Last Word

Don't let the system get the better of you.

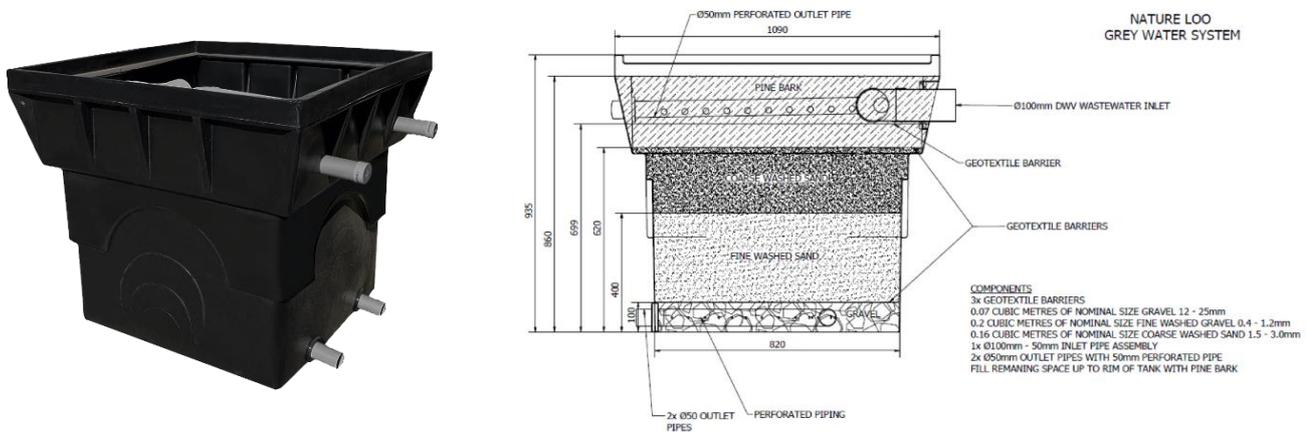
There are a lot of council officers out there who, out of ignorance or fear of the unknown or both, can make the approval process unnecessarily complicated and difficult. Be patient. Talk to your geo-tech and/or call VIROtech for some experienced advice on dealing with council's objections. We don't claim to have all the answers, but we'll do what we can to help.

VIROtech Greywater System Components

Nature Clear Greywater Pre-Filter

The filtration tank, which is less than 1 cubic meter in size, consists of a pine bark coarse filter on top of different grades of sand and gravel. The filter cloth is provided, but due to freight costs the sand and gravel should be sourced locally. Sample bags of these are provided with the system to assist with your selection of the correct grade materials.

The pine bark traps large particles not caught in the grease trap plus lint from the washing machine. The sand filter catches still finer materials, polishes the water and reduces the organic content. The pine bark is separated from the sand by filter cloth. The filtered material and bark will compost over time and should be removed every twelve months and replaced with fresh bark available from your local garden nursery.



Greywater Flow Rotor

Our greywater flow-diverter automatically rotates supply to up to 6 separate areas as required. This is sometimes useful when the area required to disperse all your greywater is not available at one location, or where you'd like to direct it to various sites - e.g. orchards or gardens. The valve is flow activated and can operate with as little as one metre of head. The hydraulic operation means no external power is required.

