

ONSITE WASTEWATER TREATMENT SYSTEMS

also known as

HOME SEWAGE TREATMENT PLANTS (HSTPs)

A summary of types and features
for new owners or home builders in Australia

What you need to know!

1.0 Introduction

Most rural, or rural-residential properties, $\frac{3}{4}$ acre/3000 square metres in size or bigger, built since 1995 now have an onsite wastewater treatment system instead of the traditional septic tank and trenches. This has come about for two main reasons:

- Increasing environmental and health concerns over the operation of septic tank and trench systems, and
- Newer more effective treatment methods and systems becoming available.

What does this mean to you? If you are building a new home, you will need to decide which type of system from the dozens available, may be best for you and your situation.

Your local Council will have standards and policies which determine how you must treat your wastewater, how you can dispose of or use it and what types of system are registered for use in your shire or city.

Contact your Council for their particular requirements. They should be able to provide you with a list of wastewater treatment systems that you can use, but are unlikely to provide you with any thing other than contact details for the various manufacturers.

Australian Wastewater Treatment Services do not sell wastewater treatment systems. We provide you with information on the range and types of systems available and their relative advantages.

If you are purchasing an existing home with one of these types of systems already installed then there are some new considerations about which cleaning and other products you can safely use, and even in the way you use the system, how often and how much washing you do for instance.

Firstly though, some basics

All existing treatment systems use a combination of mechanical, chemical and biological methods to treat the wastes and water produced by your household. It is the biological part, the bacteria, that are one of the most important factors in terms of the success and efficiency of your wastewater treatment system. The treated wastewater can also contain numbers of human 'pathogens' (disease causing organisms). See **1.2 Bacteria and Other Micro-organisms** for more information.

Household wastewater is of two types, **black water** which is the water from the toilet containing most of the solid wastes, and **grey water**, which is the water from the kitchen, shower, bath and laundry, see diagram 1, below.

Black and greywater not only contain high levels of bacteria and other micro-organisms but they also contain nutrients such as nitrogen and phosphorus which in excess, can harm the environment. Other things such as sodium (from salt) can also harm the environment, see **1.3 Other Contaminants**.

Wastewater can be treated to a particular standard. The higher the standard the wastewater is treated to, the wider the range of uses that it can be used for, see **3.8 Treated Water Quality Ratings (Star and Level)**.

Most domestic wastewater treatment systems treat water to a secondary or sometimes advanced secondary treatment standard. Secondary or advanced secondary treated water is not suitable for drinking or for contact use (laundry or showering) because the levels of pathogens may still be too high.

The secondary treated water is disinfected at the final stage (usually by addition of chlorine) before discharge, see section **3.1.6 Disinfection**. In addition potential harm is reduced by ensuring that sufficient separation/set back/buffer distances are maintained to avoid contact with people or sensitive features such as swimming pools or creeks, see **3.1.7 Land Application Areas**.

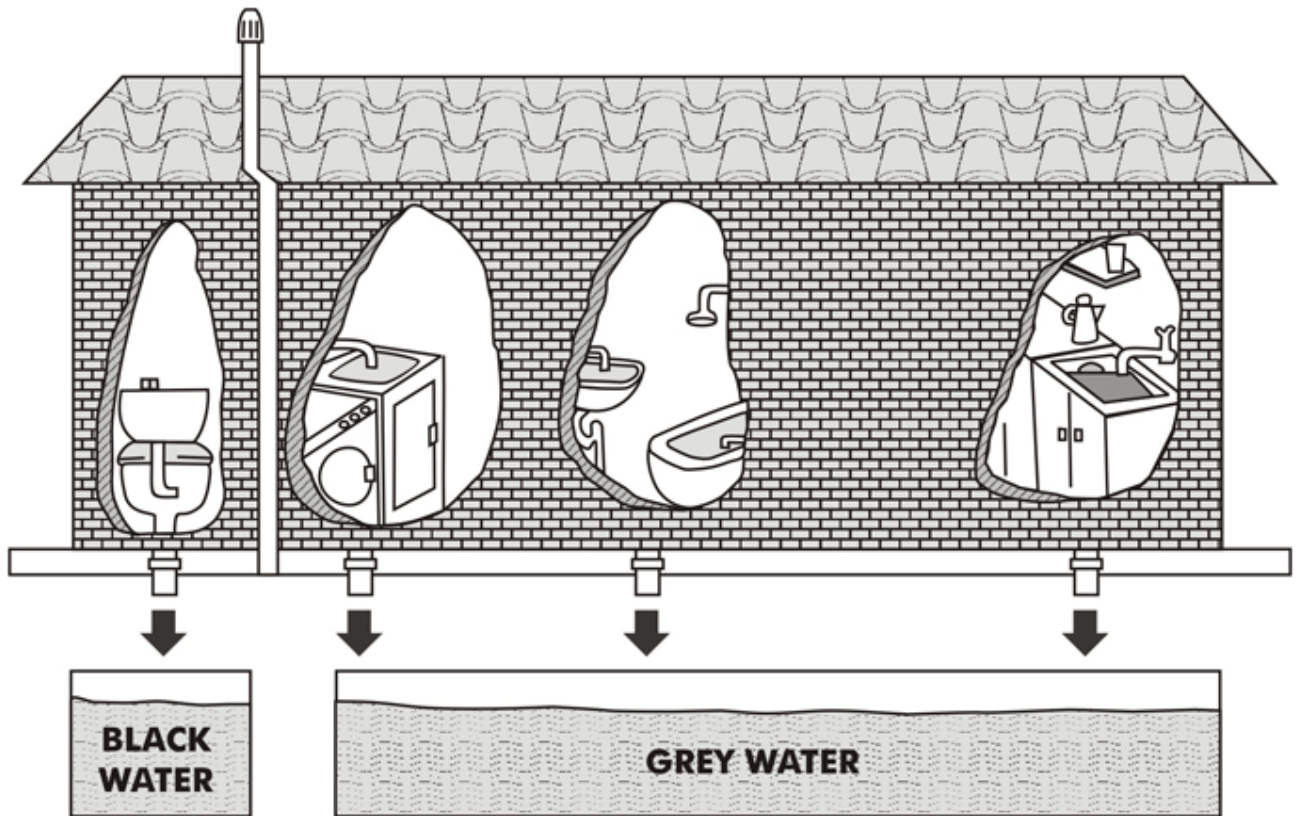


Diagram 1 Black water and Grey water

1.2 Bacteria and Other Micro-organisms

There are three types of micro-organisms in your treatment system, bacteria, viruses and 'protozoa'.

As mentioned above, bacteria are the key workers in any treatment system. Black and greywater contain huge numbers of bacteria. Many of these bacteria are common in the soil, water, in the air or in the human gut. Most of these bacteria are 'helpful' ones, they assist in breakdown of the wastes. That is why you should restrict use of antibacterial cleaners and disinfectants in the house because they will kill or seriously slow down the helpful bacteria in the treatment system. The result is often cloudy, smelly 'treated' water.

A few of these bacteria particularly those from humans or animals are 'pathogens' that is, they are capable of causing disease. *Salmonella* is an example of one of these types of bacterial pathogens.

Viruses are also common in wastewater, especially in black water. Viruses are a common cause of 'gastro'. Viruses are difficult to kill. They may be present even in the treated wastewater.

Protozoa are a group of small or microscopic animals that live in water. The ones of concern that can occur in wastewater are *Giardia* and *Cryptosporidium*. They are only likely to be present in the wastewater if someone in the house is suffering from them. Both

Giardia and *Cryptosporidium* are difficult to kill and can persist/survive outside of a human or the treatment system for some time.

Please see section **3.1.6 Disinfection** for details on how bacteria, viruses and protozoa are controlled in treated wastewater.

1.3 Other Contaminants

Nitrogen and phosphorus are essential nutrients for both plants and animals. It is only when they are in excess that they result in pollution. This is a particular problem where untreated and treated wastewater flows into a creek or stream and down o a lake or stream. See **3.1.1 Nutrients in Wastewater**.

Sodium and antibiotics are contaminants in wastewater. Sodium from salt can cause soil degradation problems while antibiotics can affect the performance of the bacteria in the treatment tank.

1.4 How Big Does a Treatment System Have to be?

Onsite domestic wastewater treatment systems have to comply with Australia New Zealand Standard AS/NZS 1547:2000. This Standard describes the performance criteria for domestic onsite wastewater treatment systems and the design and operational criteria to achieve the required performance.

Included in this Standard are the typical sizes required for septic tanks, grey water tanks and secondary treatment tanks. These are based on the number of '*Equivalent Persons*' (EP). A person in a house on a town or municipal water supply, with standard plumbing fixtures and including an automatic washing machine is considered on average to use 180 litres of water per day, this is considered to be 1 EP.

In contrast, a home with a rain water tank as their water supply on average only uses 140 litres of water per person per day. People who rely on rain water tend to use less water than people used to a town water supply. These average uses can be further reduced by incorporating water reduction features such as dual flush toilets, shower flow restrictors and front loading washing machines.

Treatment systems are sized to be able to treat the wastewater for upto 10 Equivalent persons (10 EP), per day, which is around 1800 litres per day. This water usage is termed the '*hydraulic load*' on the system. It is also important in working out what size '*land application*' or irrigation area is necessary, given the local soil type, the average rainfall and evaporation figures for the particular site.

Therefore any Secondary treatment system you might be considering is very likely to be a 10 EP unit. Some manufacturers produce smaller 'compact' units which may only be rated for 6 EP. Unless cost is a major issue for you, it is much better to go for a standard 10 EP unit as the extra capacity will handle unexpected surges and visitors much better.