The easy septic guide

If your home is *not* connected
to the sewer, this booklet is for you.

Acknowledgments

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Disclaimer

The authors and the NSW Department of Local Government have made all reasonable endeavours to ensure that the contents of this guide are factual and free of error, omission or inaccurate information, based upon the information available at the time of preparation. Readers are advised to seek expert confirmation before acting or making commercial decisions on the basis of this information.

Feedback

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Additional Copies

The Easy Septic Guide may be downloaded in PDF format from the SepticSafe web site <http://www.dlg.nsw.gov.au/ssfpub.htm>

A Microsoft Word 97 SR2 version suitable for amendment and inclusion of local area details is available under licence to local councils and community based sewage management groups. A licensed copy can be obtained by contacting the NSW Department of Local Government at the above address.

Citation

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NSW Department of Local Government. 2000. The Easy Septic Guide. Developed by Social Change Media for the New South Wales Department of Local Government.

As a septic system owner you are responsible for ensuring that your septic system is safe and working properly. A failing septic system is a health risk for your family and the community and may be causing harm to the environment.

This booklet shows how to manage your septic system safely.

You might like to keep this booklet somewhere handy. It contains lots of useful information on trouble-shooting and looking after your septic system.

In the back is a log sheet to help you keep track of your septic system maintenance jobs and inspections.

Note that in this booklet the phrase 'septic systems' refers to all kinds of on-site sewage management systems, including traditional septic tanks, pump-outs, composting toilets and aerated septic systems.

If you need more advice... contact your plumber or local council

CONTENTS

BACKGROUND INFORMATION

Some technical terms

Absorption field: a designated area where effluent is released into the soil. Soil processes, natural organisms and plants in the absorption field further purify the effluent before it enters the wider environment.

Effluent: liquid discharged from a septic system or sewage treatment facility.

Greywater: (sullage), wastewater from domestic laundry and ablution areas (and sometimes kitchen sinks), but not from toilets or bidets ('blackwater').

Septic system: any kind of sewage management system that stores, treats or discharges sewage on or adjacent to the premises on which it was generated.

Sewage: the waste matter from premises normally discharged to a sewer.

PART 1
SEPTICSAFE

A program to protect your health
and the environment

We are all starting to feel the impact of poorly managed septic systems in our growing society. In 1999 leaking septic systems were identified as a possible contributing factor in several cases of hepatitis and a major food safety crisis in the oyster industry. Leaking septic systems can also have more insidious effects, seeping into and contaminating groundwater supplies, and mixing with the water in our favourite swimming holes without us even being aware of it.

There is a growing crisis facing areas where septic systems predominate. Many of these septic systems are leaking, posing health risks to families and communities and to those further down stream. Many of us are simply not aware of the risks, and are not managing these systems safely.

The *SepticSafe* program is helping councils and septic system owners prevent pollution and health problems caused by poorly functioning septic systems.

Badly maintained septic systems can cause environmental problems up to 50 km downstream.

You may have had a septic system for years, or just recently installed one. You may be about to move to the country from the city, or you may be thinking about installing a new septic system. Whatever your situation, this booklet explains how to manage and operate a septic system safely without causing sewage pollution and risking your family's health or the quality of your local environment.

Up to 20 per cent of households in regional NSW own some type of on-site sewage management system such as a pan or pit toilet, a traditional septic tank and trench drain, a compost toilet or an aerated septic system (also called an aerated wastewater treatment system, or AWTS).

Recent research shows that around 70 per cent of systems fail to meet environmental and health protection standards.

That's 290,000 families with septic systems! Yet recent research shows that around **70 per cent of these systems are failing to meet community expectations for public health protection and environmental standards.**

There are new kinds of septic systems which are more efficient, but they can also be more costly. Many older systems have failed without their owners realising it. However, they can often be made to work more effectively with some practical maintenance and a little bit of tender loving care.

This booklet will get you started with some practical maintenance tips and will show you how to keep your septic system happy, healthy and working well.

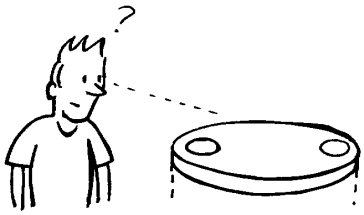
SEPTIC SWIMMING

Septic systems leaking into the Manning River have been blamed for putting a boy in hospital. The boy was hospitalised after a scratch on his leg became infected following a swim in the river. Taree Council is concerned that some parts of the river are contaminated with faecal waste from sewage or septic leakage, posing a health threat to the local community.

Around your home, poorly functioning septic systems can cause household drains to back up and overflow. They can also contaminate backyards where children play. Children often play in stormwater drains, which are a frequent target of septic leakage. Smelly septics are also a nuisance to neighbours.

Once you get to know your septic, it’s not too difficult to keep it working well and safely. There are 18 easy maintenance tips in Part Five to get you started.

PART 2
WHAT YOU NEED TO KNOW



NSW Government regulations now require every septic system to be registered with the council.

This is necessary so the council can monitor and manage the overall impact of all of the septic systems in the drainage catchment. Taken together that is a lot of effluent and no-one wants to be swimming in it.

What is registration?

SepticSafe registration is a bit like registering a car. Information about your septic system is sent to the council with an application for approval. The council issues an '*approval to operate a system of sewage management'* which sets out the basic rules you need to follow to keep the system working well. The details are set out in the council's **on-site sewage management strategy** and **local approvals policy.** Both of these documents are available at your council.

A fee may be charged to help the council cover the costs of monitoring and managing public health and environmental risks associated with septic systems. People in sewered areas already pay for these costs in their sewerage rates.

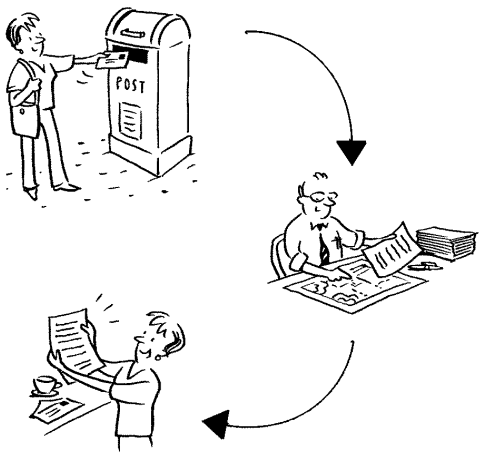
How does council supervision work?

Local councils have to manage sewage pollution risks in a systematic way. Most councils use a simple risk classification to determine supervision levels. The higher the risk, the higher the level of supervision that may be required.

The process works like this –

1) Resident sends in a *SepticSafe* registration and pays a fee (if required).
2) Council records the details and determines a risk classification (eg. high, medium, low)
3) Council issues an operating approval which may require regular reports or site inspections.

NB. The approval relates to the owner, not the land. When the land is sold the new owner should notify the council and obtain an approval in their name.



Your septic system may be classified according to an assessment of public health and environmental risks

Your septic system will be assessed by your council and given a risk classification for the purpose of accountability and supervision. The classification depends largely on the area where the septic system is located.

Many councils use a three class risk classification scheme as set out below but sometimes more complex classification schemes may be necessary.

HIGH RISK AREAS

These are highly vulnerable and sensitive environments like villages and areas close to drinking water sources, oyster leases, rivers and wetlands where the release of sewage pollution can cause a lot of harm.

If your septic system is in a HIGH risk area, the council will arrange to have regular checks made for the assurance of safety and good practice.

MEDIUM RISK AREAS

These are vulnerable areas with a lower risk of water pollution because of factors like set backs, good soil and vegetation and lower housing density.

If your septic system is in a MEDIUM risk area, the council may ask you to do regularly checks yourself and it may do random audits.

LOW RISK AREAS

These are areas where septic systems are located on good soil well away from waterways, drainage lines, homes and sensitive environments.

If your septic system is in a LOW risk area, registration may be all that is required provided you ensure that it is well managed and maintained.

Penalties for water pollution

Water polluters face costly clean-up notices and on-the-spot fines and there are stiff penalties, up to $120,000 for individuals and $250,000 for corporations, for pollution offences under New South Wales law.

Failing septic systems can pollute stormwater, rivers and groundwater – so there's another good reason to keep your septic system working well.

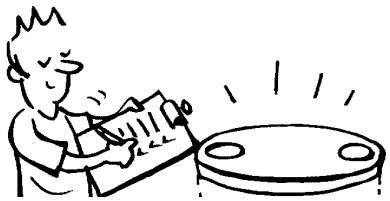
As a septic system owner, you are responsible for –

- ensuring the house drains and tank don't leak
- getting things fixed if they are not working properly
- keeping the system well maintained
- ensuring the system is checked regularly
- getting the tank pumped (de-sludged)when it becomes too full to process the flow going into it
- maintaining and protecting the absorption field
- complying with the council's requirements for installation, maintenance service and operation and paying fees for inspections or maintenance.

Meanwhile, the council is responsible for –

- providing general services for the protection of the environment, public health and safety
- helping people keep their septic systems working well
- providing a scheme of systematic management for all of the septic systems in the council area, including environmental monitoring and technical advice.
- providing advice and contact information when people need professional services to design or maintain septic systems
- regulating the installation, operation and maintenance of septic systems, conducting audits and inspections and keeping a register of systems in use in the council area
- providing community information and education programs
- monitoring and reporting on the overall impact of effluent and other by-products from septic systems in the state of the environment report for the council area
- implementing strategies for ecologically sustainable development.

PART 3 CHECKING YOUR SEPTIC SYSTEM



Your septic tank is a living ecosystem where bacteria digest waste.

Like any living system, it can become sick if it is flooded, poisoned with chemicals, or not looked after.

CHECKLIST: IS YOUR SEPTIC HEALTHY?

Your septic may need attention if any of these conditions occur –

- The air around it smells – usually like rotten egg gas.
- The ground is damp or soggy, or pools form downhill.
- There's lots of dark green grass growing on or around the absorption area.
- The toilet or drains are slow to clear, or keep backing up.
- There are lots of weeds growing downhill from the absorption area, in nearby drainage channels or on the banks of a nearby waterway.
- The septic tank has not been checked for over 12 months.
- The septic tank has not been pumped out (de-sludged) in the past 3-5 years (this is the most common cause of problems - get it pumped!).

If any of these factors apply, you should act quickly so that the damage, and the cost of repair, does not get any worse.

Here's what to do

1) If in doubt, call your council environmental health officer for advice. Often a phone call to the council will either solve the problem or put your mind at rest.

OR

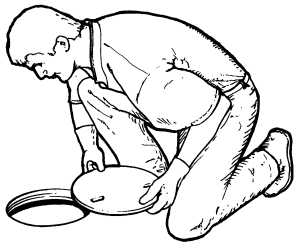
2) Call a plumber, septic system expert or septic pumper (find them under Septic Tank Cleaning Services in the Yellow Pages).

To catch septic problems before they get out of hand, do this simple septic safe check-up at least once a year.

The DO-IT-YOURSELF ONCE-A-YEAR
20-minute SEPTIC CHECK-UP

DON'T FORGET YOUR SAFETY:

- septic tanks are hazardous, plan carefully and don't forget your safety;
- beware of flammable and toxic gases and ensure the site is well ventilated;
- approach the opening only after the lid is left open for a little while;
- never smoke or use a naked flame near an open septic tank;
- ask a second person to watch you and to call for assistance if necessary;
- wear gloves and remember to wash hands immediately after checking;
- let your doctor know if you suffer any injuries during checking.



1. Carefully open the inspection cover - you may need a heavy screwdriver - and then stand clear for a while. Keep naked flames well away. Check the fluid level near the outlet. Use a torch if necessary. Fluid should be no higher than the outlet pipe at the wall of the tank (there should only be floating 'scum' above this level - see the septic tank diagram in Part 4 of this Guide).
Warning – Wear protective gloves and wash hands.

2. If you have an effluent filter, check it is working.

Action: If it's clogged – rinse it clean with a hose so the drainage goes back into the septic tank. If it doesn't clean up, replace the filter cartridge.
Warning – Wear protective gloves and wash hands.

3. If you have absorption trenches check the area carefully. It should not be soggy, should not smell and should not have prolific grass growth. Grass should be kept well mown and clippings removed.

Action: If it's soggy, smells or is overgrown with dense grass, there may be too much water flowing into your septic, or the trenches may be exhausted. You should call a plumber or septic system specialist.

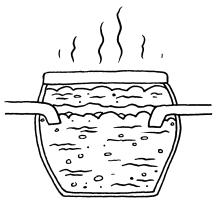
4. Check all drains and toilets in the house are working properly.

Action: If drains and toilets are slow to empty, the pipes may be blocked or the septic system may be full or the trenches may be clogged or exhausted. You should call a plumber or septic system specialist.

If you are unsure, it's best to consult a specialist. Look in the Yellow Pages for a list of plumbers, septic pumpers or septic system specialists.

COMMON CAUSES OF SEPTIC SYSTEM PROBLEMS

- **Tank too full**



If you have a septic tank and absorption trench the level in the tank should not be higher than the outlet. If you have a pump-out system, the tank should be no more than 2/3 full.

Solution: See next section, *Pumping out*.

- **Too much sludge and scum in the tank**

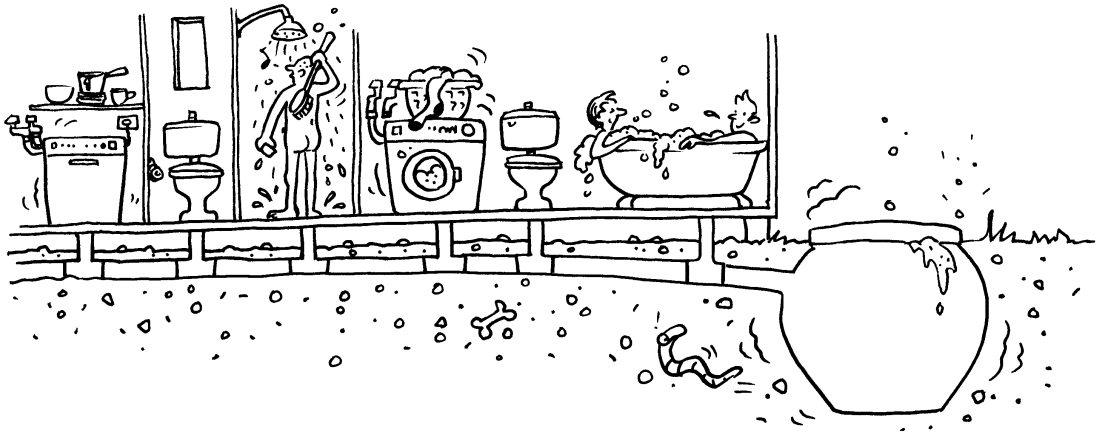
Septic tanks work by retaining solid scum and sludge and just letting liquid effluent flow out to the trenches. The solids don't move out of the tank. They just stay behind and build up. If you don't have the tank pumped out (de-sludged) regularly, it will eventually fail and untreated wastewater with heavy solids contamination will flow out of the tank, clogging pipes and the absorption trenches. You should have your tank pumped every 3 to 5 years.

Solution: See next section, *De-sludging*.

- **Too much water going into the system**

This causes the effluent to flow too quickly through the tank before the bacteria have a chance to work. As a result, solids can be pushed through the system, polluting the holding tank or clogging the absorption trenches.

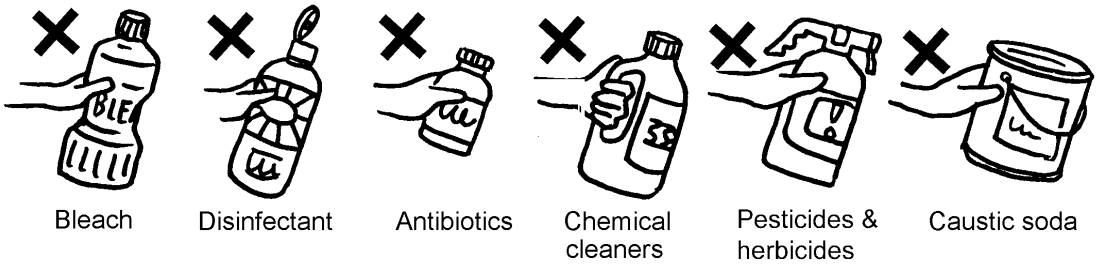
Solution: Use less water.
Homes on tank water are already used to conserving water, but in homes connected to reticulated water, there is much more temptation to overuse water. See *How to maintain a healthy system* for tips on reducing water use.



- **Toxic chemicals going into the system**

  Chemicals like solvents, oils, paints, disinfectants, pesticides, household cleaning products and bleaches can kill the helpful bacteria in your septic system. This may 'kill' the system and stop it digesting effluent.

  Solution: Switch to natural cleaners if possible, and use smaller amounts.



You can protect your septic system by using traditional non-toxic cleaners, like vinegar and bicarbonate of soda, in the kitchen and bathroom.

SHOPPING TIP – use low-phosphorus detergents

Changing washing powders can make a difference to the amount of phosphorus entering rivers from on-site systems.

Using phosphorus-free detergents can mean less phosphorus in the waterways and that means less risk of fish kills and toxic algal blooms.

Septic systems don't work well if too much phosphorus is going into the system. Always look for low-phosphorus or phosphorus-free detergents.

SEPTIC TROUBLE-SHOOTING

What's that smell? If your visitors or neighbours have said this recently, it might be a sign that the septic system needs some tender loving care.

First, check what kind of system you have (see Chapter 6 – *Types of Septic Systems*).

If you have a pump-out system

Pumping out (about every 2 weeks)

If your system is smelly or the toilet is backing up, this is often a sign that the tank is overdue for a pump-out. Generally speaking, the tank needs pumping if it is more than two-thirds full of liquid effluent.

You can check how full it is by using a torch. Or call the council for advice on local pump-out service providers.

Generally, a pump-out septic system in full-time use should be –

- pumped out every 1-2 weeks (depending on the number of people);
- inspected every 1-2 years.

How often you pump out depends on how large the tank is and how many people use the system. Check with your council for guidelines. You can check how full the tank is by lifting the inspection port or lid on top of the tank.

All pump outs should be fitted wit a dip stick (copper pipe with a "+" on the end) in the collection well. The dip stick should be marked with a "full" level marking that says it's ready for a pump-out..

If you have absorption trenches

De-sludging (every 3 to 5 years)

You need to have sludge and grease removed from your septic tank regularly.

Septic tanks need 'de-sludging' every 3-5 years because otherwise these solids build up and reduce the working volume. When this happens the wastewater has less time to settle and solids flow into the absorption trench and clog it up. This drastically shortens the life of the trench and may require costly repairs.

Newly pumped-out septic tanks should be filled with clean water and a handful of lime should be added to reduce odours and encourage helpful bacteria.

You can tell if the trench has failed because the area will be soggy, smelly and covered with dense grass.

Trench warfare

The other place to check if your septic system isn't working properly is around the absorption trench.

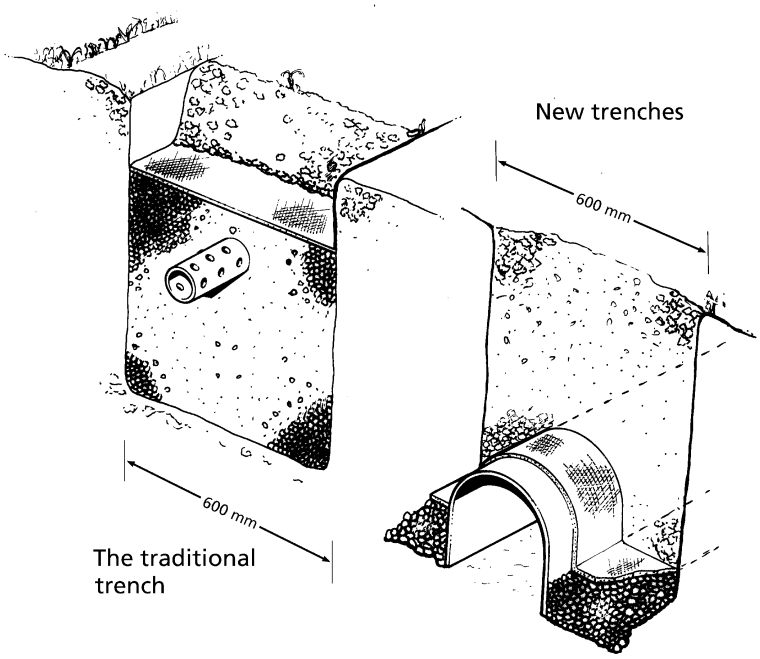
The absorption trench is where the effluent flows after it leaves the tank. An archway or perforated pipe is laid in a gravel trench and covered with soil. Effluent seeps through the archway or pipe and is absorbed by the soil. Soil processes further treat the effluent reducing pollutants and pathogens.

Don't wait until the trench starts to fail before having your tank pumped. With septic systems, an ounce of prevention is worth a ton of cure!

Clogged trenches are a common cause of septic system problems. Trenches fail when they get blocked and effluent is unable to evaporate or drain away.

You can tell if the trench has failed because the area will be soggy, smelly and covered with dense grass.

Absorption trenches should last for 15-25 years, but if they are not well built and maintained properly the trench life can be reduced to as little as two years.



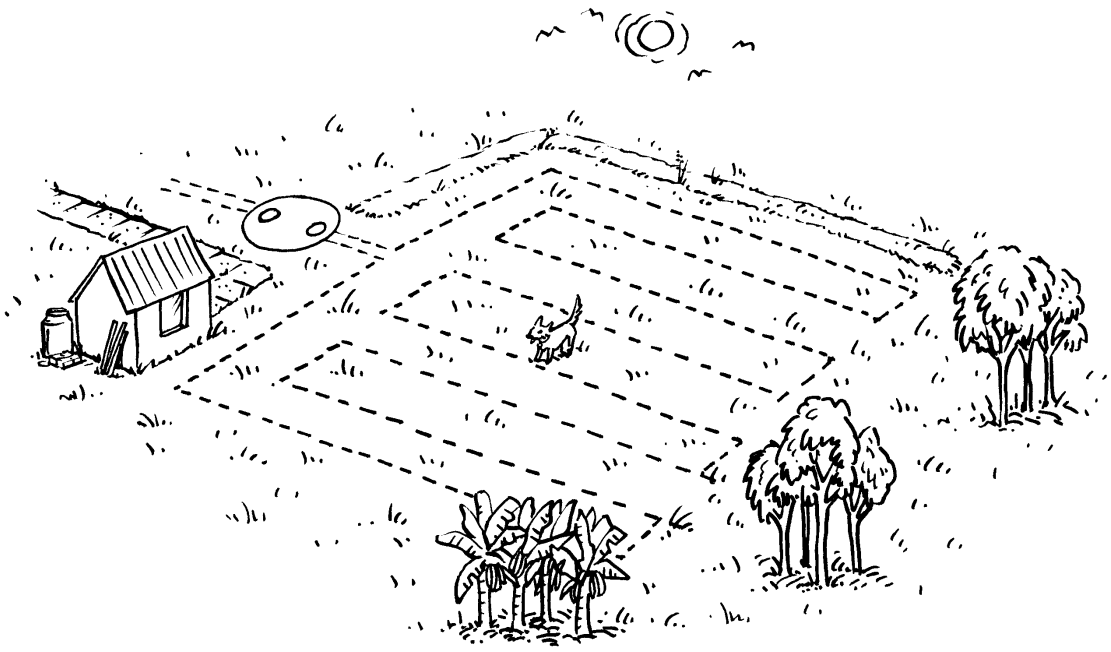
How to keep your absorption trench working well

What can you do to fix a failed trench? It's best to contact your council or consult a septic system specialist (find them in the Yellow Pages).

In the meantime, there are some simple DOs and DON'Ts to help keep your absorption trench working well.

Trench DOs

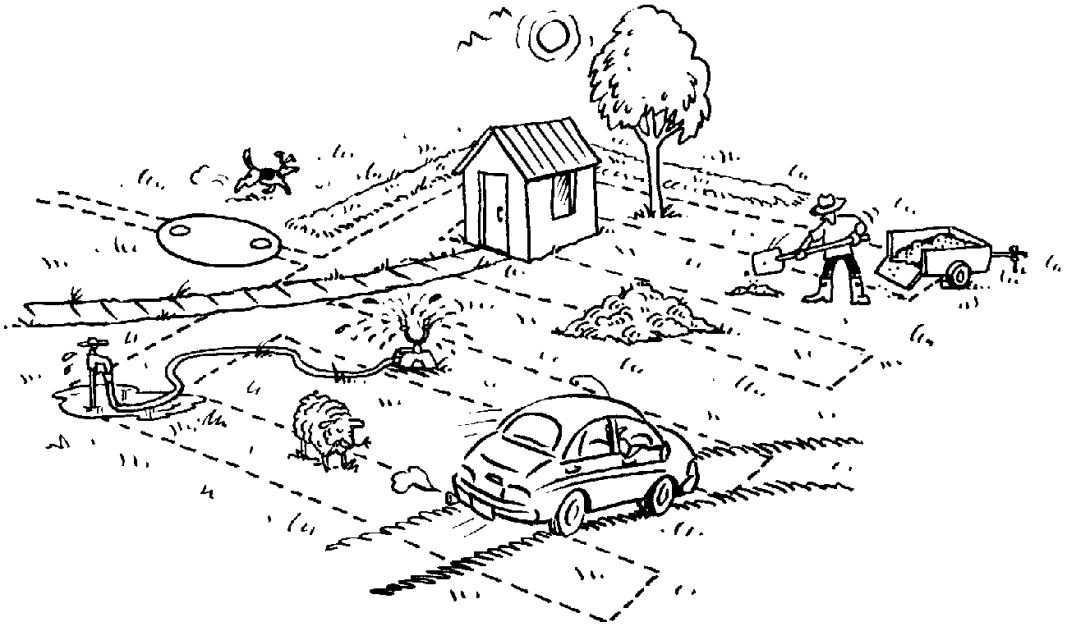
- Ensure that the proper soil tests are done to determine the type of absorption system to be used and how large it should be. A reserve effluent application area should also be identified in case a new trench system is needed later.
- Plant small trees or shrubs down-slope and away from your trench system to help absorb effluent. Use water-loving and shallow rooted plants, such as tropical palms, banana palms, poplars, paperbark trees and wetland plants. (See the plant list at the back of the booklet for some suitable native plants.)
- Consider installing a dual trench system so the separate trenches and soil areas can be rested alternately. They will perform better and last much longer. Dual disposal areas should be swapped over every 12 months or so.
- Build a small earth bund wall (a small ridge) about 15 cm high that is longer than, and uphill from the trench area to divert surface runoff water around it. This will help to reduce the load on your trench in wet weather.



This is a well maintained absorption area.

Trench DON'Ts

- Do not drive over or disturb the stormwater diversion contour mounds.
- Do not build structures on the absorption trench or plant trees that will shade it. The area should be in full sun to help plant growth, evaporation and pathogen breakdown. Small trees should be planted at least 5m away, large trees should be over 20m away, if not the roots will harm the trench.
- Do not flood the disposal area with sprinklers or hoses.
- Do not drive cars on the trench area or graze animals there. Any heavy movement may break the pipework or the dome cover and will compress the soil. A small fence will let visitors know which areas to avoid.
- Do not cover the absorption trench area with concrete, pavers, etc.
- Do not store loads of soil or other materials on your absorption trench area.
- Do not place extra topsoil on top of your trench to 'soak up' overflowing effluent. If the trench area is soggy or water is pooling over the trench, it's best to call a plumber and have it checked.
- Do not let children play in the absorption trench area.



Don't treat your absorption area like this.

Effluent irrigation systems: Do's

Irrigation systems are susceptible to blockage and require regular maintenance service. Ideally small effluent irrigation systems should use fixed distribution lines buried to a depth of 100mm or more with high quality drip emitters.

Specialists should be employed to design and install an effluent irrigation system. If you move into a house which has an irrigation system, get expert advice on maintenance (look under 'irrigation systems' in the Yellow Pages).

The plants which are being watered by your irrigation system must be able to tolerate high amounts of water and nutrients. Seek advice from a horticulturalist or landscape gardener when choosing plants for your irrigation area.

The effluent irrigation area should be clearly signposted to alert visitors that recycled effluent is being discharged. The area should be protected by a low (15cm) bund wall all round to minimise surface water run-on and run-off.

Read the Do's and Don'ts for absorption trench areas - most apply to irrigation.

Stay safe!

Don't attempt to repair a septic system yourself – get an experienced contractor.

If you are checking your septic system, REMEMBER –

- sewage contains germs that can cause disease;
- septic tanks contain toxic and explosive gases;
- never enter a septic tank and avoid breathing fumes;
- never smoke or use naked flames near an open septic tank;
- be sure the area is well ventilated, allow some time for gases to clear;
- be sure someone is watching you and can call for assistance if necessary,
- switch of the power - electrical controls are a shock and spark hazard;
- when done, secure the septic tank lid so that children cannot open it.

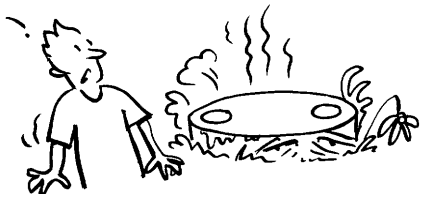
Magic enzymes … do additives work?

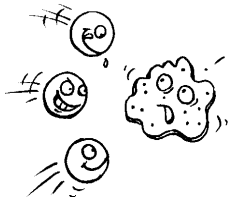
There are many septic system additives such as enzymes and cleansers available on the market. The truth is, these are only suitable for problems which are minor and temporary (eg. antibiotics in the system, or occasional water overuse). A well maintained septic system which is receiving the correct amount of wastewater should not need these additives.

No amount of additives will help a septic system if it needs to be pumped out or if the trench is failing.

PART 4

UNDERSTANDING YOUR SEPTIC SYSTEM

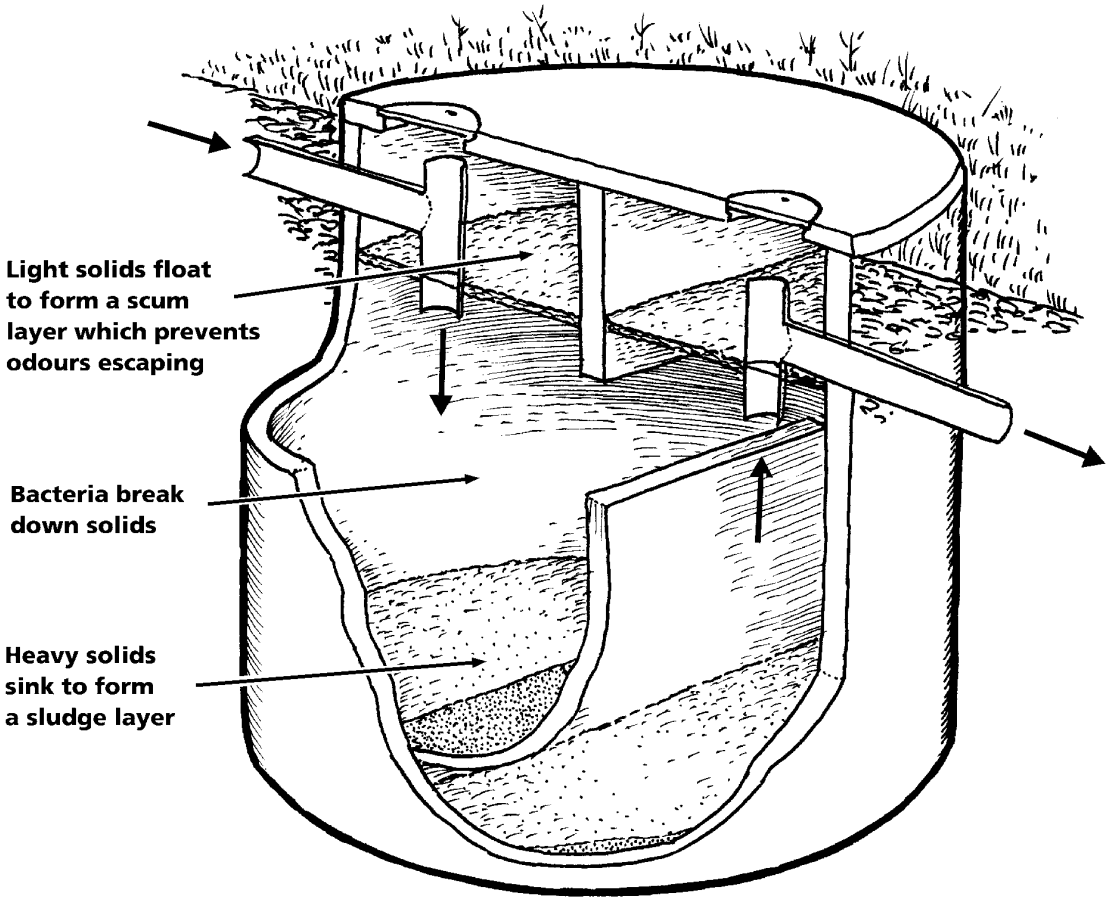




Your septic system is a living ecosystem where bacteria do the work of digesting waste.
Fats and solids are retained in the tank. Liquid effluent flows into the trench and is further treated by the soil.

HOW A SEPTIC TANK WORKS

A healthy septic tank is a living ecosystem where the right bugs (bacteria) thrive in the right proportions to digest waste and treat the water (effluent).



Health caution: Septic tanks do not kill pathogenic bacteria, viruses or parasites. Septic tank effluent must be treated with extreme caution and contact with people, food, clothing and pets must be prevented! Do wash your hands!!

The contents of a healthy septic tank should form 3 layers –

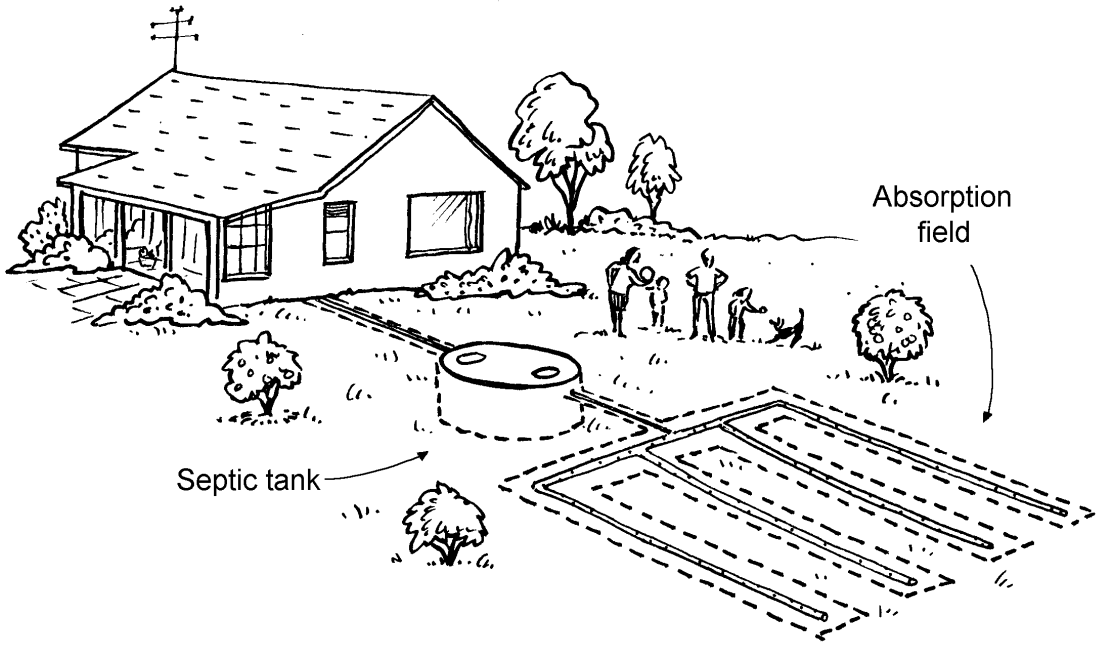
- A layer of fats (called **scum**) which floats to the surface.
- A **clear** layer (called **effluent**).
- A layer of solids (called **sludge** or **bio-solids**) which sinks to the bottom.

The scum helps prevent odours escaping and stops air entering. The treated effluent flows out of the tank through an **outlet pipe** as new wastewater enters.

In some septic systems this effluent is stored in a holding tank before being pumped out into a collection vehicle (**'pump-out' systems**), or to an off site effluent drainage area (**CED systems**) or to a municipal treatment scheme.

In most septic systems, the effluent is discharged from the septic tank directly into the soil by pipes and trenches (an **absorption field**). In areas where soil is shallow or unsuitable, special absorption fields may be constructed (eg. raised earth mounds, evapotranspiration beds, or modified earth absorption fields).

At this stage the effluent still contains large amounts of dissolved pollutants such as salts and nutrients (eg. compounds of nitrogen and phosphorus). It and also contains disease causing pathogens (eg. viruses, bacteria and worms).



In the absorption field, natural soil processes kill off more pathogens and break down some of the nutrients that cause pollution. This is a slow process, and soil bacteria need oxygen to work, so it is important not to overwhelm the soil with too much effluent. In time the effluent evaporates, is taken up by plants nearby or leaches into the groundwater zone. A hazard is created when effluent flows along surface or subsoil pathways into drainage channels, creeks or rivers.

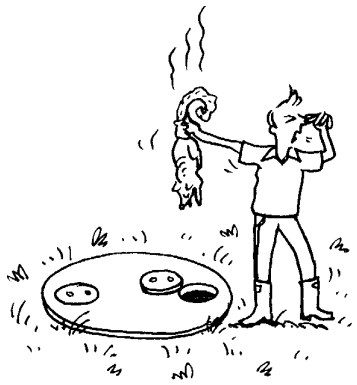
Greywater tanks and greasetraps

Some septic systems have a separate tank for greywater, the wastewater which comes from the kitchen, laundry and bathroom. There may also be a greasetrap (a very small septic tank), for collecting oil and grease from the kitchen. The wastewater from the greasetrap eventually flows into the greywater tank.

Greywater treatment systems are now available if you wish to use your greywater to irrigate your garden. For information regarding accredited greywater treatment systems, call your local Public Health Unit (part of your Area Health Service) or your council environmental health officer.

The dead possum myth

In the old days when a new septic system was started up on a farm, a dead possum or sheep was sometimes thrown in to the septic tank. Septic folklore had it that the carcass would 'kickstart' the system.



In fact the sewage which starts flowing into the tank as soon as it is connected to the house provides plenty of nutrients for the bacteria to begin doing their job.

To start up a new or pumped out system, fill the tank with clean water and add a cupful of lime down the toilet every day for 7 days.

The lime helps prevent odours and increases the pH (alkalinity) which encourages bacterial growth.

This treatment can also be used if the septic becomes smelly.

PART 5

HOW TO MAINTAIN A HEALTHY SEPTIC SYSTEM

17 EASY TIPS

If you don't mind planning ahead a little, you can save thousands of dollars in maintenance costs for your septic system. Here's how.

Many of these tips help reduce the volume of wastewater going into the septic system, and help avoid the use of chemicals which interfere with how well the septic system does its job.

In the laundry

- Wash your laundry in stages over several days – this will avoid flooding the system with large amounts of water at one time.
- Use low-phosphorus or phosphorus-free detergents. Phosphorus is a major pollutant of waterways and contributes to the growth of algal blooms.
- Repair leaking taps and cisterns.
- Extend the life of your trench and avoid blockages by installing a lint filter on the washing machine – a stocking over the outlet hose will do.
- If you've got a blocked drain, use boiling water or a drain eel to clear the line, don't use caustic soda or drain cleaners in a septic tank.

Front loading washing machines are best for households on septic systems because they use less water and detergent.

In the kitchen

- Use a sink strainer – this prevents particles of food getting into the septic system. Food scraps can slow down the digestion process and can make solids build up more quickly (so you need more frequent pump-outs).
- Don't pour oils and fats down the sink – they solidify and may block the system and build up in the tank. Instead, put small amounts in the compost or into a container such as a milk carton to throw out with the rubbish.

In the bathroom

- Install a low-flow shower head to save water.
- Repair leaking taps.
- Minimise the use of commercial cleaners and bleaches – these can interfere with the bacterial breakdown in the tank. Instead, try using baking soda, vinegar, or a mild soap solution.
- Don't flush anything down the toilet that could clog up the system, such as plastic, grease, tampons, condoms, paper towels, plastics, or cat litter. These items will quickly fill up the tank, decreasing its efficiency and making it necessary to pump out more often.
- Don't leave taps running unnecessarily, for instance when cleaning teeth.
- Install a dual-flush cistern for the toilet. And by the way … sometimes it doesn't hurt to let it mellow if it's yellow. Many country households plant lime or lemon trees at an easy strolling distance from the house.

Around the tank and trench area

- Keep water from roof downpipes and paved areas away from the absorption field. If the field is flooded, the soil won't be able to cleanse the wastewater from the septic system.
- Have a plumber fit an effluent filter to the septic tank outlet to keep solids in the tank and extend the life of your trenches.
- Only plant grass near the absorption field – roots from larger plants such as trees and shrubs are likely to damage the trench – and mow it regularly.
- Don't drive or park on any part of the absorption area. This will compact soil and may crush the pipes and trench domes.
- Grow nutrient-tolerant plants near drain fields and irrigation areas.

Ideas for landscaping and irrigation

How the area around a septic system is managed is just as important as how the system itself is maintained. Planning and planting the right kind of vegetation can help keep your septic system in tip-top condition.

Play it safe – contact your council environment health officer before installing an irrigation system or doing landscaping around your trench area.

When choosing what to plant, consider which plants will do best in the local soil type, and which ones can cope best with regular daily doses of nutrient-rich wastewater. These plants must be able to cope with nutrients such as sodium, chloride, nitrogen and phosphorus. Many Australian natives can't cope with high levels of these nutrients. Visit your local nursery for advice.

Generally speaking, it is best to grow a mix of summer and winter grasses on the absorption area. If treated effluent is being used to water landscaped areas, nutrient tolerant shrubs and trees should be planted. This booklet has a list of plants which do well in situations where effluent is for watering.

If you are using disinfected effluent from an aerated septic system, you may find that plants in the irrigation area develop problems with chloride toxicity, which can harm leaves and stunt growth. For trees, chloride toxicity is more of a problem than sodium toxicity. Check with the local nursery to see what they can recommend in these situations.

How to manage greywater and greasetraps

Studies show that greywater contains significant amounts of pollutants and bacteria which are harmful to health and the environment. If you have a separate greywater system, keep your greywater as clean as possible by:

- checking and cleaning the greasetrap every 2-4 weeks
- cleaning the greywater tank at least twice a year
- releasing greywater within two hours of it entering the tank (otherwise it can go bad and smelly)
- spreading your washing over a few days, to reduce the load on the sullage absorption area
- using strainers in the sink and lint filters in the laundry to prevent food and fibre going into the system
- wiping grease out of pans before washing
- using hot water to wash dishes to prevent build up of grease in the sink.
- using hot water in the laundry to give a more efficient wash

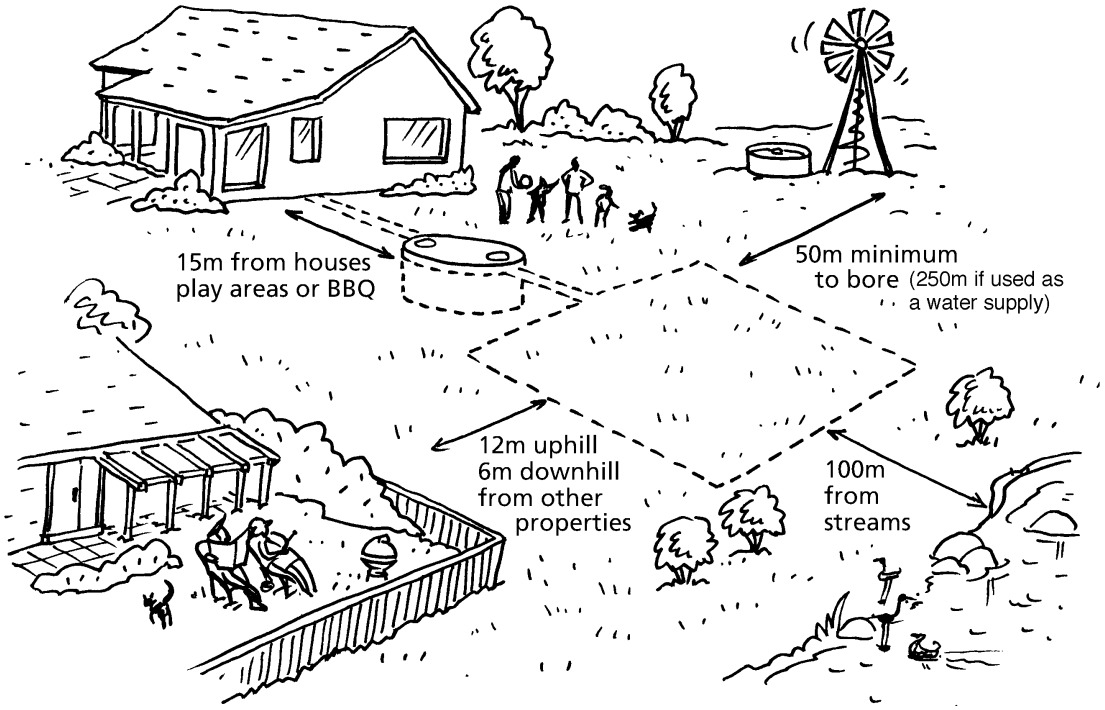
THE FUTURE OF SEWAGE?

An innovative new septic system developed by the CSIRO enables an entire town's sewage to be treated in the community with no noise, odour or waste.

The CRANOS, developed by ACTEW in Canberra, is a totally sealed system which is only the size of a small suburban house but can handle the waste from 5000 people. It works by double-treating sewage using oxygen under high pressure, leaving only water which is clean enough for the garden, and turns the solid waste into a rich fertiliser suitable for agricultural use.

How to protect groundwater

Groundwater (usually from bores) has been tapped for decades, but only recently have we started to understand how vulnerable it is to contamination from surface activities. Pesticides can find their way into groundwater, as can effluent from septic systems. It is vital to locate septic systems a safe distance from wells, bores, creeks, lakes and houses, and to keep it well maintained.



Groundwater is easily contaminated. Make sure your septic system is located a safe distance from wells, bores, creeks, lakes and houses.

Failing septic systems can leak chemicals such as medicines, pesticides, paints, varnishes and thinners into the local groundwater. Some chemicals, even in small amounts, can be dangerous to the environment and public health.

Even if the septic system is working well, these contaminants can get into the groundwater under certain geological conditions. Fractured bedrock and shallow groundwater tables may also allow bacteria and viruses to be transported very rapidly and could contaminate nearby drinking water supplies.

Recommended buffer distances for septic systems

System	*Recommended buffer distances*
All land application systems	• 100 metres to permanent surface waters (e.g. river, stream, lake) • 250 metres to domestic groundwater well or bore • 40 metres to other waters (e.g. farm dams, intermittent streams, drainage channels etc)
Surface spray irrigation	• 6 metres uphill, and 3 metres downhill of driveways and property boundaries • 15 metres to dwellings • 3 metres to paths and walkways • 6 metres to swimming pools
Surface drip and trickle irrigation; Sub-surface irrigation	• 6 metres uphill, and 3 metres downhill of swimming pools, property boundaries and buildings
Septic tank absorption trench area	• 12 metres uphill, and 6 metres downhill of property boundary • 6 metres uphill and 3 metres downhill of swimming pools, driveways and buildings. • 3 metres to paths and walkways

GROUND RULES

If you're drinking untreated groundwater or using it for cooking and washing food you could be in danger of getting ill. A report from the Nagambie/Tongala area in Victoria warns there are all sorts of impurities to be aware of in groundwater. Despite the fact that the water looked and tasted clean, the report found it contained heavy metals, and leakage from septic systems.

PART 6

SEPTIC SHOPPING GUIDE

Investigate before you invest

If you are planning to purchase land for a new home, check before you buy.

If a reticulated sewerage scheme is not available you will need to consider a septic system or something similar.

Your first step should be to obtain advice from your local council or local land use consultant.

Which system is best?

When choosing a septic system, the most important thing to consider is where it will be used, how it will be used and who will use it. A septic system in a weekend holiday home, for example, will get far less use than a septic system in a large permanently occupied family home.

The septic system you choose will depend on the suitability of the site for effluent absorption, how many people will live in the home, what area of land is available, what kind of lifestyle the family lives, and what heavy water-use appliances are in the home. A septic system specialist will advise you about what is best for your particular situation.

Soil type, salt content, local rainfall and the depth of the water table all need to be considered when deciding where to put a new septic system. These decisions should be discussed with an environmental specialist.

Don't forget to ask for a cost estimate for maintenance as well as installation and consider environmental impacts.

Buying an existing home?

If you are buying an existing home, ask the seller a few important questions, such as –

- How old is the septic system?
- When was the tank last pumped out and de-sludged?
- How frequently was it pumped out?
- Have there been any signs of failure?
- Have there been any additions to the house that might make it necessary to increase the size of the system?

It's always a good idea to get a specialist to survey the septic system before you buy a property.

Types of septic systems

If you are in the market for a new septic system, or planning to upgrade your existing one, it's important to be aware that there are several different kinds of systems now available. Still the most common is the basic septic tank, virtually unchanged since it was first used for domestic purposes 100 years ago. Also on the market are aerated septic tanks, also called aerated wastewater treatment systems(AWTS). Composting toilets are also growing in popularity.

Septic tank systems

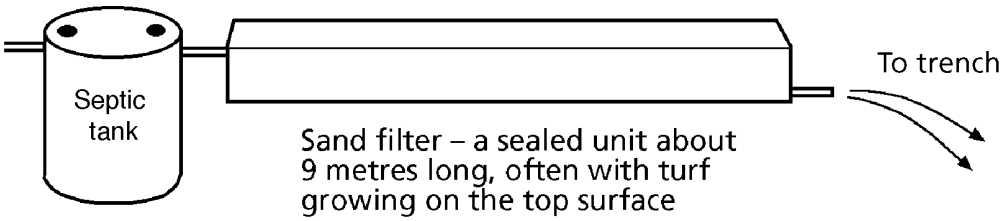
Septic tanks and trench style absorption field systems are the most common type of septic systems in Australia.

Septic tanks are simple technology but they are very versatile. The can be complemented with dual tanks, suspended growth media, effluent filters, reed beds, flow forms and sand filters to produce effluent suitable for ultra-violet disinfection and drip irrigation. They can be used to provide a separate greywater holding tank for water from the bathroom, kitchen and laundry. They can be used for pump-out systems and as a first treatment stage in a common effluent drainage system involving neighbours and a dedicated application area.

You will find pictures of the basic septic tank and absorption trench septic system in Part 4 of the Easy Septic Guide.

Sand filters

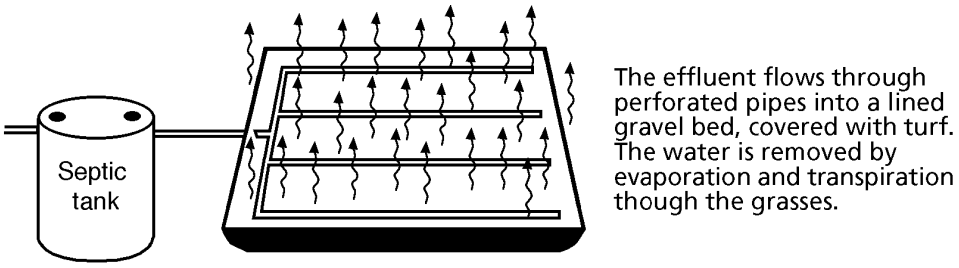
Sometimes the effluent is further treated in a **sand filter**. The effluent percolates through the filter and is collected for disposal. Effluent treated in this way is more easily absorbed in the soil than effluent directly coming from a septic tank. Effluent treated in a sand filter may be suitable for sub-surface irrigation of landscaped areas or for discharge to a constructed wetland area.



Sand filters capture suspended solids and provide an aerobic environment which encourages friendly bacteria that digest waste and reduce pollution.

Evapotranspiration beds

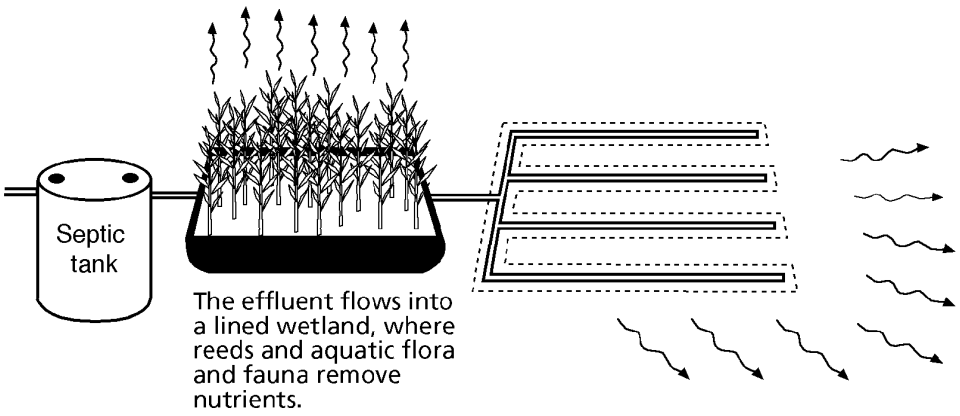
These are used where soil conditions are less suitable for absorption trenches and where evaporation and transpiration rates normally exceed rainfall.



Consult a septic system specialist for further information about designing evapotranspiration systems for effluent application to land.

Wetland treatment systems

Reed beds and wetland treatment systems are widely used in municipal and industrial sewage treatment plants, particularly in Europe. They are now being used to treat septic tank effluent to high standards. Reeds and other water loving plants are grown in high quality soil in a shallow pit sealed with a waterproof membrane. The effluent flows through the soil and treatment is facilitated by friendly bacteria that colonise the root zone. Some wetland systems use rocks and sand as a growing medium, instead of soil.

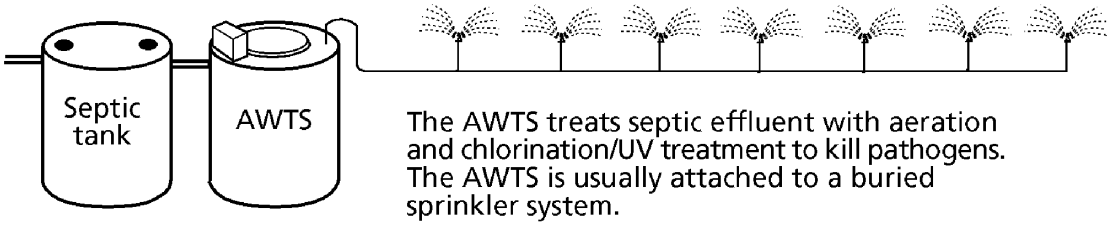


The effluent from reed beds can be directed to a standard absorption trench or may be pumped to a sand filter and ultra-violet light disinfection unit for discharge to a drip irrigation system.

Consult a septic system specialist for further information about designing wetlands and reed beds systems for wastewater treatment.

Aerated Wastewater Treatment Systems or AWTS

The effluent from an aerated septic tank is usually treated and disinfected to a standard suitable for irrigated onto land.



The AWTS treats septic effluent with aeration and chlorination/UV treatment to kill pathogens. The AWTS is usually attached to a buried sprinkler system.

The AWTS system consists of two tanks (sometimes within a single larger tank). The first is a basic septic tank where solids settle and anaerobic digestion occurs. In the second, oxygen is bubbled through the effluent to encourage aerobic bacteria to digest the waste. Finally, the effluent is disinfected using chlorine or ultra-violet light before being pumped to an irrigation area.

Fixed line drip irrigation systems are preferred, although in rural areas some councils also permit the use of low throw spray irrigation on larger properties.

The extra treatment provided by an aerated septic tank reduces pathogen levels, (and can sometimes reduce nutrients) as long as the system is kept well maintained and the disinfection unit is functioning properly. People using aerated septic systems are required to enter into a regular maintenance contract for quarterly servicing, which may be supervised by the council.

New accreditation requirements have been introduced for aerated septic systems in NSW. All new designs must be tested for six months before being released for sale, their operation and maintenance is supervised by the council and manufacturers must continue to audit system performance in the field.

Aerated septic systems may also be used to treat greywater to a standard suitable for garden watering of non-food plants.

Package treatment plants

An AWTS is an example of a small package treatment plant that is in common use in New South Wales. There are a number of other well designed package treatment plants available for sewage treatment in specialised applications.

Package treatment plants are commercially distributed sewage management systems that combine appropriate wastewater technologies in an integrated package. They have breakdown alarms and are sometimes equipped with electronic control systems allowing for remote control of treatment processes.

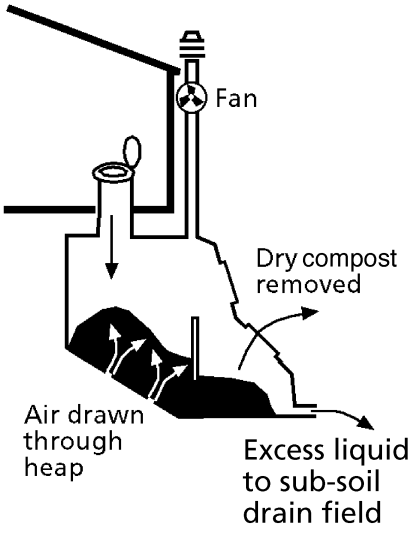
Some special cases

Composting toilets

These are becoming more popular. There are two kinds – the waterless system, which requires a separate greywater tank, and the wet composting system, where all wastes go in together.

Waterless composting system

Dry composting toilets are good for houses on tank water, or on a restricted water supply. They use very little energy are the most water efficient type of 'septic system'.



Most liquid is retained and evaporates but a sub-soil overflow drain is required.

PROS

- saves water – no toilet flush
- reduces volume of solids
- reuses resource use
- no sludge removal necessary
- source of humus for non-food plants
- can cope with short term high use
- cheap to run

CONS

- a separate greywater system is required
- can be smelly
- require additional carbon sources (old sawdust, leaf litter, food scraps)
- compost must be removed (once a year) and buried below ground

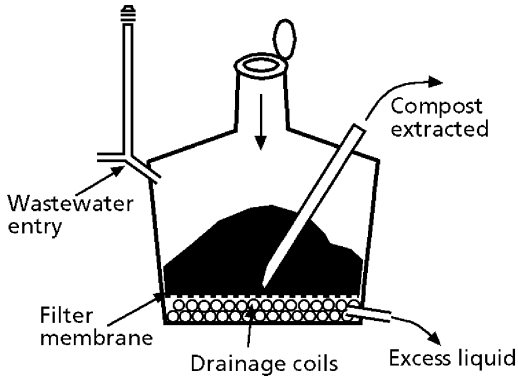
Wet system

PROS

- no need for separate greywater tank
- can accept kitchen and food wastes
- option for flush or no flush toilets

CONS

- compost must be removed and buried below ground
- can be smelly



Effluent is directed to sub-soil drains or to reed beds / sand filter for use for garden watering, etc.

Common effluent drainage system

In some places, septic tanks with effluent filters are used for primary settlement and clarification of effluent which is discharged to a collection well or sewage ejection unit and pumped through a light weight sewer line to a common treatment and land application area.

Pumped CED systems can be used to support cluster housing development in unsewered areas and may be an option for some existing small village areas.

Total water cycle system

New developments in small sewage management technologies mean that total water cycle systems are now feasible, although their use is still experimental. Total water cycle systems use a combination of technologies to constantly treat and recycle the water used by a household. Water for drinking, cooking and showering (potable water) is collected in rainwater in tanks, human waste is composted and used water (greywater) is treated to a high standard and re-used for utility purposes and garden watering.

Living light in the city

An unusual 'biolytic' composting system is at the heart of a near self-sufficient house in an inner suburb of Sydney set up by lawyer and conservation advocate Mr Michael Mobbs.

All greywater and sewage from the house empties into an underground concrete tank. Food scraps from the house and neighbours are also added to the tank through a hatch in the back deck.

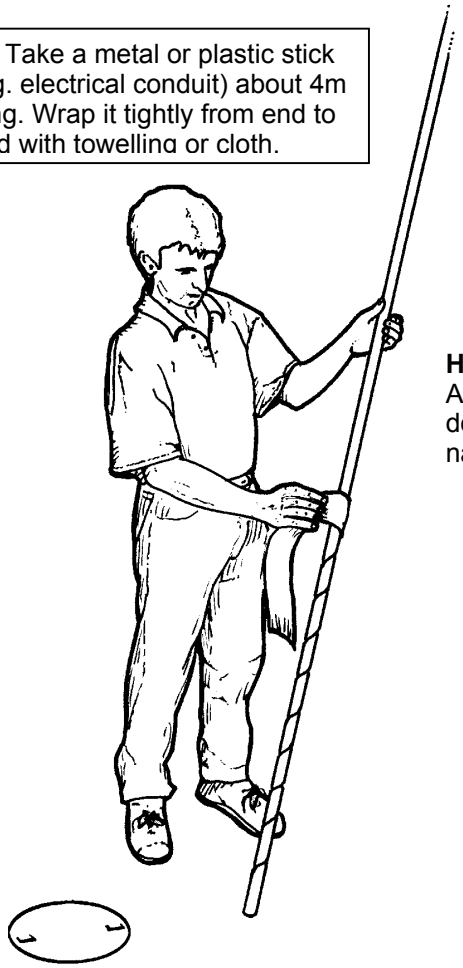
Inside the tank the waste works its way through three filter beds – layers of sand and peat packed with worms. The waste water is treated by UV light to kill bugs before it emerges at the other end, clean enough to flush toilets, wash clothes and water the garden.

The system did suffer three breakdowns during its first year, but it is now reported to be working well, requiring little maintenance and producing few offensive smells. It processes about 100,000 litres of sewage each year.

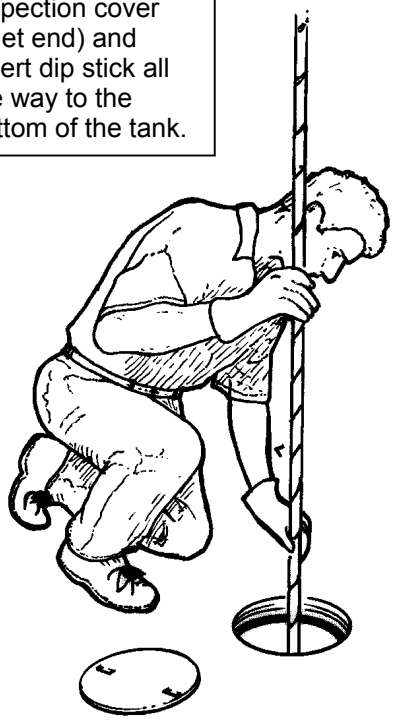
BACKGROUND INFORMATION

(1) How to check the sludge and scum depth of your tank

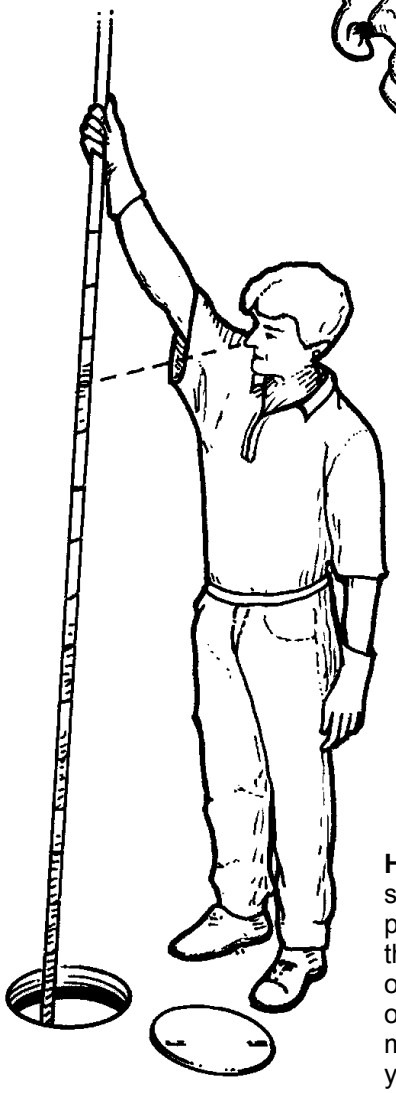
1) Take a metal or plastic stick (eg. electrical conduit) about 4m long. Wrap it tightly from end to end with towelling or cloth.



2) Wearing rubber gloves, remove the inspection cover (inlet end) and insert dip stick all the way to the bottom of the tank.



Health & Fire Hazard
Always wear gloves, don't smoke and keep naked flames away.



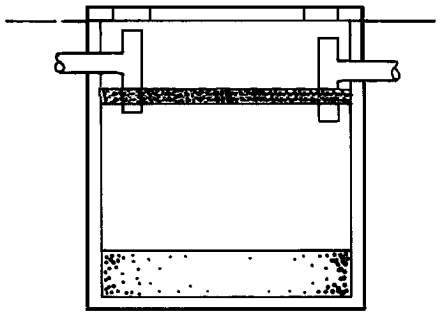
3) Withdraw it completely, observe the size and position of the scum mark (bottom) and the sludge mark (top).

4) Compare the marks on the dip stick with the diagnostic illustrations on the next page.

Health caution: Put the cloth strip in a waste bag and burn or place in the garbage. Wash down the stick and place in sunlight out of reach for a few days. Dispose of the gloves (or soak them in a mild bleach solution) and wash your hands and arms thoroughly.

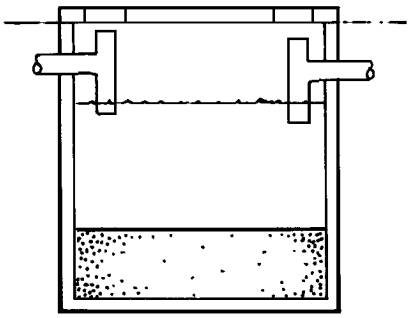
Tank diagnosis

Healthy tank



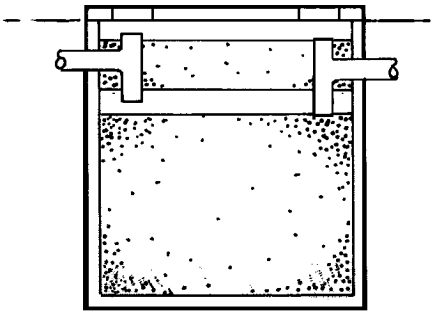
Sick tank

Bacteria have died.
Needs pumping out, filling with clean water and addition of lime.



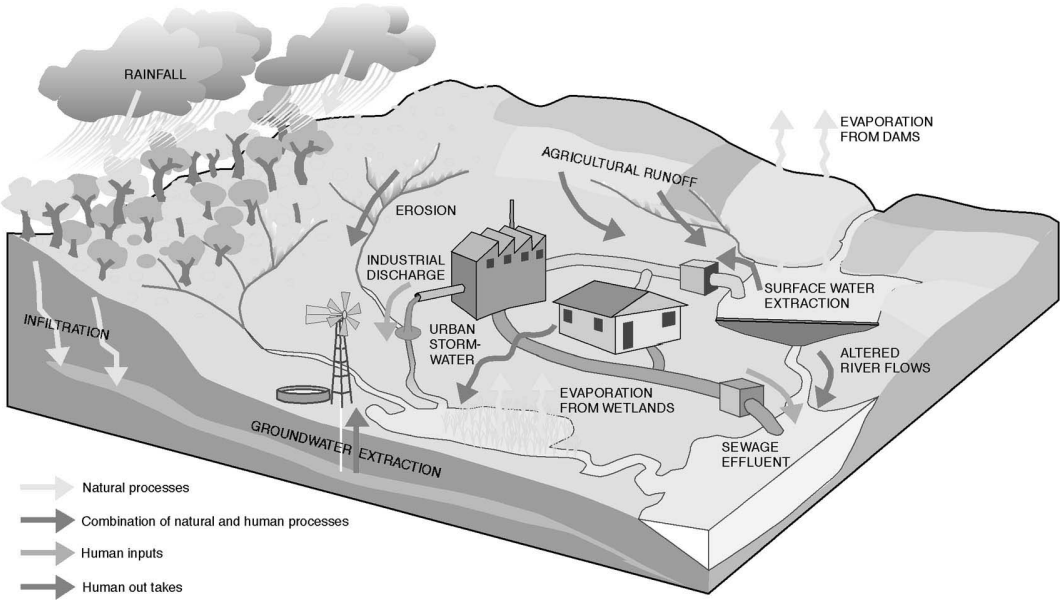
Sick tank

Needs pumping out and trench may be blocked or waterlogged or failed



(2) The water cycle – where our water comes from

Most of us remember those diagrams of the water cycle from high school. Water evaporates from plants and soil into the air, or runs off into waterways, and is eventually recycled back to earth in the form of snow or rain.



The single important message from these old lessons is that water molecules may pass through a tree, a cloud, a river, a person, a septic tank, a fish, a river and back into a person again.

The water we use is not ‘new’ or ‘fresh’ – it has already been through the earth’s great hydrological cycle millions of times.

The journey is a long one. The water we use today may have evaporated from an ocean or river, travelled through the atmosphere, fallen back to the earth’s surface, gone underground, and flowed through creeks leading back to the oceans. Water appears to us in many forms: clouds, rain, snow, fog, lakes, creeks, oceans and polar ice caps. It also lurks deep below the soil as groundwater, an essential resource for the survival of the entire ecosystem.

Some places, such as lakes, rivers, streams and groundwater beds, may act as temporary ‘sinks’. Human activities can pollute these areas. Only when the pollution stops can the water cycle refresh these areas by cleaning them with uncontaminated water.

(3) What to plant in wastewater irrigation areas

Botanical name	Habit	Common name
Grasses		
Carex spp		
Juncea		
Lomandra		
Microlaena stipoides		Available as lawn
Oplismenus imbecillis		
Poa lab		
Stipa spp.		
Ground cover/climbers		
Hibbertia procumbens		
Hibbertia scandens		Snake Vine
Hibbertia stellaris		
Kennedia rubicunda	Climber	Dusky Coral Pea
Scaevola albida		
Scaevola ramosissima		
Veronica plebeia		
Viola hederacea		
Sedges/Grasses/Small plants		
Baumea acuta	Sedge	
Baumea articulata	Sedge	
Baumea juncea	Sedge	
Baumea nuda	Sedge	
Baumea rubiginosa	Sedge	
Baumea teretifolia	Sedge	
Brachyscome spp		
Carex spp	Sedge	
Cotula	Low plant	
Crinum pedunculatum		Swamp Lily
Cyperus gymnocaulos	Sedge	
Dianella caerulea	Grass-like	
Ferns		
Gahnia spp	Tall grass-like sedge	
Juncus australis	Sedge	
Juncus spp	Sedge	
Lomandra spp	Grass-like	
Patersonia fragilis		Native Iris
Patersonia glabrata		Native Iris
Patersonia occidentalis		Native Iris
Restio australis	Sedge	
Restio tetraphyllus	Sedge	
Sowerbaea juncea		Rush Lily
Tetratheca juncea		
Xyris operculata	Grass-like	Tall Yellow Eye

Shrubs		
Bauera ruboides	0.5-1.5 m	
Callistemon citrinus	1 m	
Callistemon sieberi	1-2 m	
Callistemon subulatus	1-2 m	
Goodenia ovata	1-1.5 m	
Kunzea capitata	1-2 m	
Leptospermum flavescens	< 2 m	Tea-tree
Leptospermum juniperinum	1 m	Tea-tree
Leptospermum lanigerum	1-2 m	Tea-tree
Leptospermum squarrosum	< 2 m	Tea-tree
Melaleuca decussata	1-2 m	Honey Myrtle
Melaleuca squamea	1-2 m	
Melaleuca thymifolia		
Pomaderris spp.	Approx. 2 m	
Trees		
Abelia grandiflora	2-3 m	Abelia
Acacia elongata	> 2 m	
Acacia floribunda	2-4 m	Gossamer Wattle
Agonis flexuosa	5-6 m	Willow Myrtle
Allocasuarina diminuta	1.5 m	
Allocasuarina paludosa	0.5-2 m	
Angophora floribunda	Large tree	
Angophora subvelutina	Large tree	
Baeckea linifolia	< 4m	
Baeckea virgata	< 4m	
Callicoma serratifolia	< 4m	
Callistemon linearis	> 2 m	
Callistemon pallidus	> 2 m	
Callistemon paludosus	> 2 m	
Callistemon salignus	3-6 m	White Bottlebrush
Callistemon viminalis	3-6 m	Red Bottlebrush
Casuarina cunninghamiana	10-20 m	River She-Oak
Casuarina glauca	6-12 m	Swamp Oak
Elaeocarpus reticulatis	Large tree	Blueberry Ash
Eucalyptus amplifolia	Large tree	
Eucalyptus botryoides (coastal areas)	Large tree	
Eucalyptus camaldulensis (west of ranges)	15-20 m	River Red Gum
Eucalyptus cosmophylla	5-6 m	Cup Gum
Eucalyptus crenulata	Large tree	
Eucalyptus deanei	Large tree	
Eucalyptus elata	Large tree	
Eucalyptus globulus (coastal)	Large tree	
Eucalyptus grandis	10-20 m	Flooded Gum
Eucalyptus longofolia	20 m	
Eucalyptus pilularis	Large tree	
Eucalyptus punctata	Large tree	
Eucalyptus robusta	Large tree	
Eucalyptus saligna (coastal)	Large tree	
Eucalyptus tereticornis	Large tree	
Eucalyptus viminalis (ranges)	Large tree	
Eugenia smithii	Large tree	Lilli Pilli
Hymenosporum flavuum	3-6 m	Native Frangipani

Melaleuca armillaris	3-4 m	Bracelet Honey
Melaleuca ericifolia	6 m	Myrtle
Melaleuca halmaturorum	4 m	
Melaleuca hypericifolia	2-3 m	
Melaleuca linariifolia	< 10 m	
Melaleuca nesophila	2-4 m	
Melaleuca quinquenervia	5-7 m	Western Tea Myrtle
Melaleuca squarrosa	6 m	Broad Paperbark
Melaleuca stypheloides	6-15 m	
Melia azedarach	15-20 m	
Pittosporum spp		
Pultenaea daphnoides	2-3 m	
Syzgium paniculatum	8-10 m	Bush Peas
Tristania laurina	3-5 m	Bush Cherry
Viminaria juncea	2-3 m	Golden Spray

Source: Australian Plant Society

(4) For further information...

Organisations

NSW Department of Health: Public Health Units in Area Health Services – for health issues

NSW Department of Local Government and local councils – for regulations and *SepticSafe* information

NSW Department of Land and Water Conservation – for groundwater maps

CSIRO – for information on constructed wetlands

Books

On-site Sewage Management for Single Households – Environment and Health Protection Guidelines. February 1998. NSW Government (www.dlg.nsw.gov)

The Green Consumer Guide, John Elkington and Julia Hailes, Penguin Books 1988.

Internet sites

The Septic Tank page (USA)
http://www.geocities.com/RainForest/Vines/5240/Septic_Tanks.html

Septic tank repair links (USA)
http://www.swopnet.com/engr/Septic_Tanks/SepticTankLinks.html

US EPA National Small Flows Clearing House
http://www.estd.wvu.edu/nsfc/nsfc_homepage.html

Septic maintenance record sheet

Sketch of your septic system layout

Council and expert contact details

(e.g. plumber, desludger, service agent, supplier…)

Operating licence issued (date) _____and expires (date)_____

DATE	Pump-out	Inspection	De-sludging	Repairs & maintenance
Frequency	Recommended: every week	Recommended: every 1-2 years	Recommended: every 3-5 years	