Your Septic System

what you need to know

A user's guide to home wastewater systems

GISBORNE DISTRICT COUNCIL

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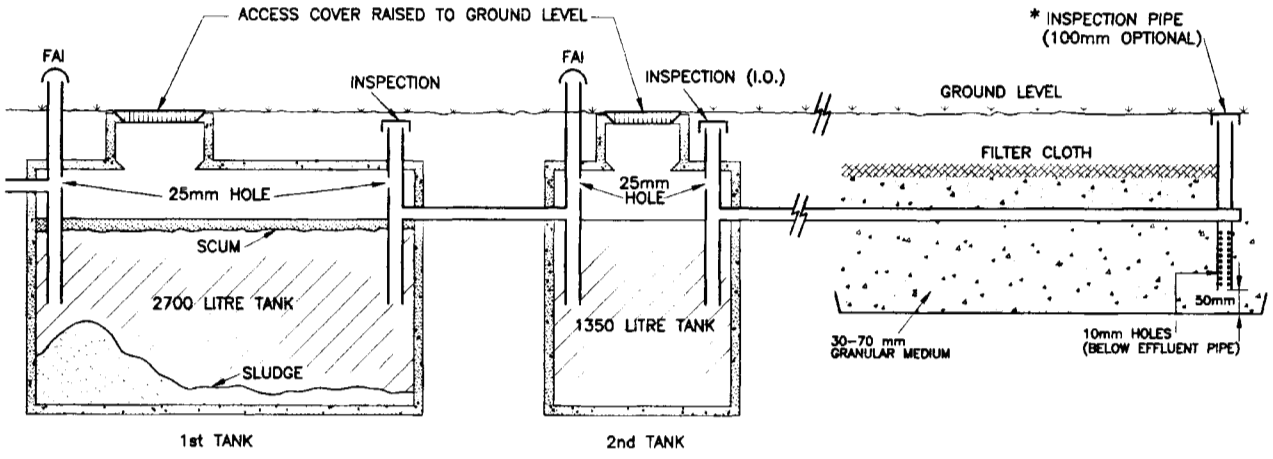
Your Septic System

What you need to know



F.A.I.'s : TO BE REMOVABLE FOR INSPECTION AND CLEARING BLOCKAGES.
I.O.'s : TO BE SCREWED CAP INSTALLED AT GROUND LEVEL.

A user's guide to home wastewater systems

Where to go for more help

If you have a crisis – your toilets are blocked or your gully trap or tank is overflowing, then phone a registered drainlayer (in the Yellow Pages) to help work out what's wrong and a Septic Tank Cleaner to get the tank pumped out. If the winter water tables are high get advice from a drainlayer before your tank is pumped out in case the tank lifts out of the ground when it is emptied.

If you need a new home wastewater system or need to upgrade your system then you need to talk to a site assessor and design person about your options. A list of these people is available from the Gisborne District Council.

If you're not sure what to do, then the Gisborne District Council is the best place to start. They have people who can provide advice about what to do with problems in your home wastewater system, how to go about getting a system designed and options for systems.

Gisborne District Council

Phone 06 867 2049 or free phone 0800 653 800.
Open Monday to Friday 8am to 5pm:
39 Gladstone Road, Gisborne

Te Puia Springs Service Centre

Open Monday to Friday 8.30am to 4.30pm
Phone 06 864 6853 or free phone 0800 653 800

My home wastewater system

Record the details of your system here with any maintenance requirements

House Address	
Tank system type How old is the system? Installed: ……	☐ single septic tank ☐ dual septic tank: with pump ☐ without pump ☐ ☐ aerated treatment system: Brand name…… ☐ vermi-culture system: Brand name…… ☐ grey water system: Brand name…… ☐ composting toilet: Brand name…… ☐ other……
Land soakage system	☐ Trenches ☐ Beds ☐ Evapo-transpiration seepage (ETS)beds ☐ Wisconsin Mound ☐ Drip irrigation ☐ LPED irrigation ☐ Other [give details]

Contact details for System Service Agent:

Name:……

Telephone:…… Cell Phone:……

Contact details for Septic Tank Cleaner:

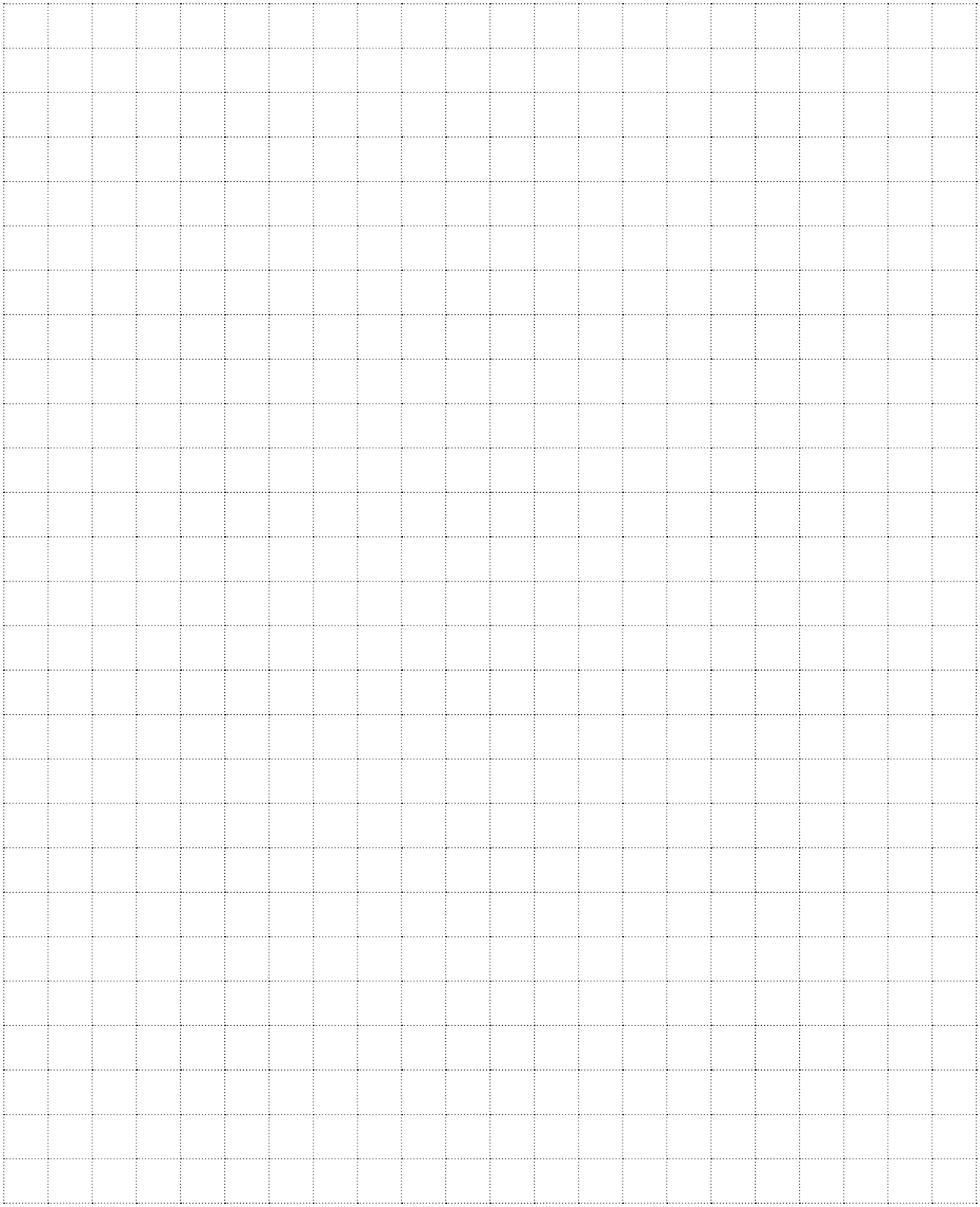
Name:……

Telephone:…… Cell Phone:……

Plan of your system

Fix your 'as-built' drainage plan here – get this from the system installer or the Council; or

Draw in your own plan. Measure the distance from the house to the vent on the system, and the distances from the vent to the edges of the disposal system. Show any lids and vents.



Contents

Septic and home wastewater systems in the Gisborne district

What is a home wastewater system?

A home wastewater system is simply what takes your dirty water and sewage from your house and treats and disposes of it on the same property. Whatever type of system you have, the wastes from your kitchen, bathroom, toilet and laundry are taken into a tank where the separation and treatment of solids and liquids occurs. The liquid effluent is disposed into soils. If your treatment and disposal systems work properly there is little risk the effluent will harm your health or cause environmental pollution.

Home wastewater systems are used in places where properties aren't connected to a sewer. In the Gisborne District this is all areas except Gisborne city and Te Karaka township. Commercial and publicly used buildings including schools, sport and recreation clubs, marae, motels, camping grounds, shops and cafés in areas without connection to a sewerage system also use these home wastewater systems. Their systems will usually be much bigger than a house size system and many have extra parts such as grease-traps and water flow meters installed.

There are two main parts to any home wastewater system, the separation/treatment tanks and the land soakage system. It's important that both parts of the system work properly otherwise there can be pollution or health risks from people coming into contact with sewage. A lot of the wastewater treatment occurs within the soil in the soakage area on your section. It's important this works properly and this area is not wet or soggy or doesn't get flooded in winter. **Remember** - What comes out of your home wastewater system is **not** water or greywater – it's liquid effluent from sewage that has been partly treated, but is still not safe for human contact, and further treatment in the soils is important.

Older home wastewater systems generally have small septic tanks and small soakage field systems. Newer systems can be large septic tanks and big soakage field systems but there are also a range of systems called 'Advanced Treatment Systems'. These are mini sewage treatment plants and the different types use different processes to treat the liquid effluent to improve the quality before discharging it into the land.

Why home wastewater systems need to work well

Home wastewater systems that work well play an important part in making sure that human sewage isn't polluting water in the district – underground, in streams and at the beach, and so people don't risk getting sick from being in contact with sewage.

If untreated or badly treated sewage gets out into the environment then it does a lot of harm especially where there are a lot of systems close to each other like there are in the towns and settlement areas in the Gisborne District.

This can include things like:

- Spreading diseases in people
- Breeding flies, mosquitoes and rats that affect the neighbourhood
- Making nasty smells in your garden that affect your home and the neighbourhood
- Polluting water supplies from bores so people risk getting sick if they use it
- Polluting shellfish and kaimoana so people risk getting sick from eating them
- Polluting swimming areas like water holes and lagoons so people risk getting sick from swimming in them
- Polluting streams so that native fish and eels die and unwanted water plants thrive
- Spreading diseases to farm animals and pets
- Impacting on the mauri of water

Like your car, home wastewater systems need to be looked after properly. As they get older, more things can go wrong, but even new systems can fail if they aren't used correctly and looked after. When wastewater systems don't work well, they add to pollution and can put people's health at risk. When a home wastewater system isn't working properly, the sewage can harm places which are used by, and are important to, a lot of the community. This is especially for systems in neighbourhood areas and systems by the beaches and streams.

A drain polluted with sewage effluent from a failed home wastewater system.

A failed septic tank system - untreated sewage is spilling out across the lawn and garden. This is a serious health risk and offensive for people in the house and in the neighbourhood.

Who is in charge of home wastewater systems?

If you own a property with a home wastewater system then it is your responsibility to maintain and look after it. This includes getting your system cleaned out or serviced regularly – normally every 1 - 3 years for old septic tanks, every 3 - 5 years for new septic tanks and every 6 or 12 months for any Advanced Treatment System.

If you don't maintain your home wastewater system, then chances are it will not work well and it will eventually fail. Once the system has failed, replacement may be the only option, which can be difficult and expensive - especially on properties where there is not much usable land left.

It's much cheaper to maintain a system and keep it working well than it is to replace it.

Getting Consents: New & Replacement Home Wastewater Systems

If you have a home wastewater system that doesn't work well and often overflows from the tanks or the house gully-trap or your soakage system has failed you will need to replace and upgrade parts of your system.

You will need a building consent from Council if you are building a new home or if you are doing building extensions or renovations and you are required to upgrade your existing home wastewater system. You may also need a Resource Consent depending on what type of system you choose, what size the property is, and in beach locations – where the system will be sited.

Gully trap overflows are a sure sign the septic system isn't working correctly and there are blockages in the pipes, the tank inlets or outlets, or the soakage area is clogged.

If you have a system which was installed within the last 15 years, then you might have a Resource Consent from the Council with special conditions about what you need to do to maintain the system, and you need to prove to the Council that you are doing this.

When you are buying a house, it's important to check with the Council whether you will need to do specific maintenance and provide information to meet any resource consent conditions.

Building Consent: All new, replacement and upgraded home wastewater systems including greywater, composting and vermiculture systems need a building consent. Building consent is an approval from the Council for the type of system you plan to install and that the system is suitable for use in the location of your home, and for the size of your home.

If you are building a new home, then the details of your home wastewater system are included with the whole building consent for the house. Don't design your house before you have thought about and sought advice on how to deal with the wastewater. Home wastewater systems need space for your soakage system, as well as space for underground tanks. Clearance from the soakage area and tanks to boundaries, buildings, streams and watercourses, bores and steeply sloping land is required. The design of your house, driveway and gardens needs to allow for the home wastewater system to work well and to provide separated areas between outdoor living spaces and the soakage area.

To get a building consent you will need a 'Site Assessment Report', design specifications for a system and scale plans showing the site layout. This work needs to be done by approved qualified people. The home wastewater system will also need to be installed by a registered drainlayer. It's important to get this right, so that you get a system suited to your home and property without hidden costs during installation or when using the system.

It's worth talking to the Council about what might be options for your situation before making a decision.

Resource Consent: Some sorts of home wastewater systems need a resource consent. This is usually because there are some locations and purposes where systems need close monitoring to make sure they are used and maintained as planned to prevent polluting the environment.

If you are installing a home wastewater system, then you apply for a resource consent usually at the same time as your building consent.

What about landlords and tenants?

If you rent a house with a home wastewater system, then you need to take care about the use of detergents and cleaners, and know what sorts of things you shouldn't put into the system like cooking fat, sanitary products and chemicals or paint. You also need to be careful not to overload the system by using a lot of water each day. Your landlord will be responsible for septic tank clean outs, repairs needed on a system and any regular servicing of an Advanced Treatment System.

Check with your landlord what the arrangements are to care for the home wastewater system and if there is anything extra you need to do, like who to call if an alarm goes off on an Advanced Treatment System. Knowing where the soakage system is on the section is important so you don't accidentally damage it by digging into it, and so you can note if there are changes that might be signs the system is not working well. It's also the landlord's responsibility to make sure that if there are problems with the system they are fixed.

Because you and your family are exposed to health risks if your home wastewater system is not working well or if the soakage system fails, it's important to make sure your landlord is aware of any problems early on. If the landlord doesn't do anything to fix problems, then you should contact the Council.

Living with a home wastewater system

Some people have lived with some sort of home wastewater system all their lives, while others might have recently moved to a property with a home wastewater system.

If you haven't lived with a home wastewater system before, you are going to need to change some of your habits. Modern city lifestyles and water use can often create problems with a home wastewater system. You need to learn how to live with it, and that can mean making a few changes in how much water you use and what you put down the sink.

Even if you have had a system for a long time, there are some important things you need to know about using and looking after it, in order to make sure that you don't end up with a failing system.

A living system

A home wastewater system is alive. The bacteria in the system are what break down the wastes. Dead bacteria form slime that blocks filters in the tank treatment system and blocks up irrigation soakage systems and the soil in the soakage area. This can be the cause of bad odours, pumps burning out and failure of the soakage system. Therefore, it's really important not to kill the bacteria in your home wastewater system – both in the tank and in the soakage area. A lot of modern cleaners and nappy rinsers in particular can kill the bacteria in your system, so you have to be very careful about the sorts of things you use in your kitchen, bathroom, toilet and laundry.

Too much water can also stop the bacteria from thriving in your home wastewater system. The most common ways too much water gets in is from doing a lot of washing on the same day, leaking taps and toilet cisterns continuously running, or from rainwater getting into the tanks.

As well as not putting things down your plug-holes and toilets which will harm the home wastewater system, it's important not to block the soils underground in the soakage area. One thing to be aware of is the use of laundry washing powders with a lot of mineral salts and fillers in them because the salts and fillers change the ability of some soils to let water soak away. The smaller, concentrated powders or liquid laundry detergents are best but it is important to check the labels for 'septic safe' products.

Avoid putting these types of things down the drains.

Don't put these types of things down the drain or down the toilet

The following is a list of things you should avoid using in your home. These things shouldn't be put down any drain or toilet, inside or outside or they will kill the bacterial life in your home wastewater system causing bad odours and the system to not work well.

- Nappy soakers and sanitisers
- Bleach and whiteners
- Disinfectants
- High strength ammonia cleaners
- Stain removers

- Bulky laundry powders with fillers in big boxes
- Excessive grease, cooking oil and fats
- Paints, varnishes, paint thinners, petrol, machine oils
- Caustic or acid products designed to unblock drains
- Unused or old antibiotics or strong medicines
- Swimming pool or spa pool back-flush water from the filter system

It's also important not to put things into the system which can't break down easily or add bulky solids into the tank – this includes sanitary pads, tampons, disposable nappies, tissues, condoms, food from garbage grinders and coffee grounds.

Safer soaps cleaners and chemicals to use

- Soap
- Shampoo and conditioner
- Lux flakes
- Concentrated laundry powders (the ones in the little boxes that you only use very little – choose ones that state they are safe for use in septic systems)
- Liquid laundry cleaners
- Baking soda (sprinkle on a sponge and use as a general cleaner, or put 4 Tbsp in 1 litre of warm water and use as a toilet cleaner)
- White vinegar (put 2 Tbsp in a litre of water – use in a spray bottle as a window cleaner)
- Borax – use ½ cup in 4 litres water as a disinfectant. You can buy this from a chemist shop.

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REMEMBER

Check the label, look for septic safe products.

How to keep your home wastewater system working well

All home wastewater systems eventually need upgrading and replacement, and soakage systems often fail after 15 – 20 years of use, but this depends on what is put in the system, how well the system is maintained and the type of soils in the soakage area. There are lots of things you can do which will help you get the best out of your home wastewater system.

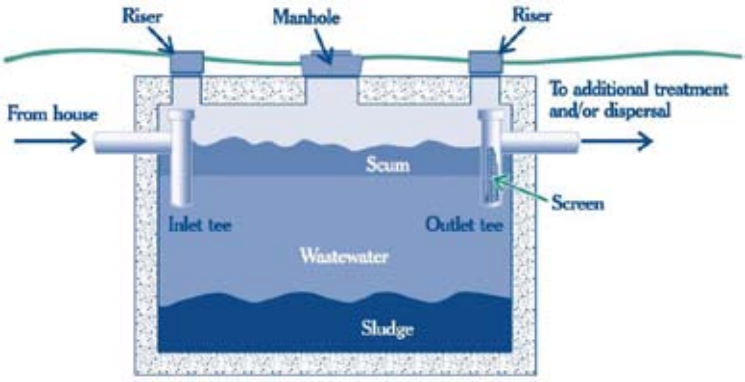
Pay attention to what goes in

- Don't use or install an in-sink waste disposal system or waste disposal unit as these overload your tank system with solids.
- Scrape all your dishes so that fat, grease and bits of food don't go down the drain.
- Use toilet paper, not other sorts of paper and avoid putting tampons and sanitary pads and condoms down the toilet.
- Shake excess dirt and sand off your clothes outside before washing them.
- Try and use less water by installing dual flush toilets, low flow shower heads and water restriction fittings in taps. Have short showers and small baths to limit your water use.
- Try not to do more than one load of washing at a time, and make sure you use a 'septic safe' washing powder.
- If you live by the beach, use an outdoor shower or hose to get sand off rather than using the indoor shower.
- Try and spread your water flows into your wastewater system across the day – don't do the washing, have a bath and run the dishwasher all at the same time.
- Make sure water from the roof downpipes, the overflow from rainwater tanks, and rainwater draining from your section doesn't flow over your septic tank or your soakage area.
- When buying new appliances, try and get ones with high water efficiency – the more blue stars the better.

Don't let your system get blocked up

Make sure you get the solids, floating scum and sludge regularly cleaned out from inside the septic tanks. How often depends on the age of the tanks and the amount of sewage going through the system. When you get the tank cleaned out make sure your septic tank cleaner does this through the tank lid to avoid doing damage inside the tank and to get all the sludge and scum out. There is more advice about maintaining a home wastewater system and more information on cleaning septic tanks further on in this book.

Getting a septic tank outlet filter installed inside the tank helps to stop solid lumps being flushed over into the soakage area. Solids block up the soakage system so keeping them in the septic tank is important. All new tanks have outlet filters, and most old septic tanks can have an outlet filter installed, but you will need to have a registered drainlayer assess your tank and install the filter.



The sludge and scum need to be removed from time to time to keep enough space in the tank for the solids to settle out. Tanks should be cleaned to stop carryover of solids into the soakage area.

Keep tree roots away from the system

Big trees, and plants that like wet areas, can send roots into your home wastewater system pipes and soakage area causing damage and the system will not work well and will eventually fail. While poplars and willows are the worst culprits, other large trees such as gums, pines and pohutakawa can do the same thing. Generally it's best to have the soakage area left in grass, or in wet locations, use raised beds planted with shrubs.

Respect your soakage area

The soakage area is the part of your home wastewater system most likely to fail over time. If your soakage system is working well, it might just seem to be another

part of your lawn or garden, but it's important to remember it has another purpose.

Grazing heavy stock or horses, driving on it, planting trees too close, putting up tents or digging into your soakage area can damage the soakage lines or irrigation pipes and compact the soil. These are all things that can stop the soakage system working properly making it fail. You must not build over the soakage area and it is best not to lay concrete over the top. If there is not much land and the driveway needs to go over the soakage area then a design from an engineer is required to show how the soakage system will be protected under the driveway.

You really need to set aside the land where your soakage area is, and not use it for anything else.

Tree roots in a septic tank can break and damage the inlet and outlet pipes this causes a tank to leak.

Tree roots pulled out of a septic tank – roots can work their way from the tank into the soakage area making the system fail.

Plants for Soakage Areas

SUITABLE PLANTS
Astelias
Ground ferns (e.g. Blechnum, kiokio)
Carex grasses
Toetoe (but not pampas)
Sedges
Tree ferns e.g. wheki
Rengarenga lily
Fuchsia
Rhododendrons
Flax
Begonias
Azaleas
Geraniums
Most native shrubs but especially Fivefinger, Kaka beak and Poroporo
Kikuyu and paspalum lawns

UNSUITABLE PLANTS
Large trees
Pine trees
Gum trees
Poplars
Willows
Macrocarpa
Palm Trees – particularly Phoenix and Date Palms
Oaks (especially Swamp Oak and Silky Oak)
Wisteria
Bougainvilleas
Hollies
Privets
Bamboo
Figs and Rubber Plants
Elms
Karaka
Pohutakawa

Stopping Rainwater Getting Into Your Home Wastewater System

Rainwater getting into a home wastewater system is a common problem which can make a system fail. Roof water and runoff from paths and yards should be diverted away from septic tanks and soakage areas. Cut-off or perimeter drains can be used to stop stormwater seeping through the land into a soakage area.

Where water is getting into a septic tank through the lid, installing a raised lid can solve the problem by stopping water that is ponding on the lawn from getting into the septic tank.

Maintaining a home wastewater system

Like cars, the specific maintenance requirements of different home wastewater systems will vary, but there are a number of key actions you need to take regardless of the type of system.

Locating your home wastewater system

One of the first things you may need to do is locate both the septic tank/s and the soakage area. Usually the tank system is quite close to your house. If the tank lids are not raised above the ground the easiest way to locate the tank is to look for an air vent or 'mushroom'. This is the vent for the septic tank.

If it is a more modern system, concrete or plastic access lids should be visible and there may be other things such as an electrical box or outdoor switch identifying where the tanks are.

The soakage system can be more difficult to find. In older home wastewater systems the soakage area is usually not too far from the tank. In newer systems, where the liquid effluent is pumped, the soakage area can be located some distance away.

Distinct green areas of lawn with lush grass growth or obvious green lines showing up during summer on the lawns are good indicators of where the soakage system is located.

If you can't find the septic tanks or the soakage area of your home wastewater system, it's worth checking with the Council to see if they have it located on some plans. Otherwise you will need to get an experienced person such as a drainlayer out to help you find it. An experienced person can sometimes probe the ground and find the soakage system.

Fix broken septic tank vents to stop water from your section flowing into the tank and overloading the tank and the soakage area.

Don't poke or dig around in the ground yourself, as you might break underground pipes and damage your system.

Once you've found your home wastewater system

Once you have worked out where the septic tank/s are, if there isn't one already, get a registered drainlayer to install a solid concrete lid finishing above ground level for future maintenance and cleanouts. If you have a multi-tank system or a multi-chamber tank, you might need more than one lid. If the tank is well below ground a 'collar' or 'riser' may be needed

These older septic tanks were found by the mushroom/ vent. The buried septic tank lids were nearby quite deep underground.

over the old lid to make the new lid finish above ground level. The collar must be fixed on the top of the tank and be water tight so no groundwater can get in and flood the tank.

When you get the tank cleaned out, make sure your septic tank cleaner does this through the tank lid. If it is cleaned out through the mushroom this can damage your tank inlet and outlet pipes and cause the tank to leak, which will mean pipes will need to be replaced. If you haven't cleaned the tank out for a long time, then it is also worth getting a registered drainlayer to have a good look at it, to check there is nothing broken and the tank is not cracked.

Generally a tank should be cleaned out every 1-5 years depending on the size of the tank and the use of the system. If you have a large family and an old septic tank system then this might need cleaning every one or two years. For a couple with an old septic tank system cleaning every two or three years may be enough. A new larger septic tank system may only need cleaning every 3-5 years depending on how many people live in the home.

If your home wastewater system is not working well and needs cleaning out several times a year to keep it going then it is failing and needs replacing.

What to expect from a septic tank cleanout

Always use a licensed septic tank cleaner to clean out your septic tank – they must be a licensed Offensive Trade Operator.

The tank should be cleaned out through the lid, not the mushroom. If you don't have a lid above ground level, get one installed. When it's cleaned out, the solids at the bottom of the tank and the scum layer at the top should be removed, not just the liquids.

Your septic tank cleaner should also clean the filter on the tank outlet. If you don't have one, then get one installed.

You should get a written report from the contractor. At the least it should tell you:

- his/her name and contact
- the date the tank was cleaned out
- that the tank filter was cleaned and replaced correctly
- if there is anything obviously broken in the tank or if the tank is cracked

Key improvements:

- If the inlet or outlet pipes are broken in the tank get new ones installed to stop solids being washed from the tank into the soakage area and to stop

New septic tanks with vents, risers and lids above ground.

the tank leaking. If the vent is broken get a new one installed to stop stormwater getting in and flooding the tank.

- Electrical alarms and pumps should be checked occasionally by a registered electrician and if there are faults repairs should be made.
- If the tank is cracked a replacement tank is needed urgently to stop liquid effluent seepage.
- Getting an outlet filter installed in the tank outlet stops lumps going into the soakage system, it's a key way of making sure solids don't go out into your soakage area, slowly blocking it.
- Getting tank lids fitted above ground level stops tanks getting flooded and the excess water overloading the soakage area. Lids also help with correct cleaning out of the tank.

Broken mushroom/vent – a replacement is needed.

A septic tank being cleaned out through the lid.

Two new septic tanks with lids above ground and the tank vent – easy to find and easy to access for cleaning.

Fix broken inlets and outlets in the tank. Cleaning tanks through the vents can cause this type of damage.

What to expect from an Advanced Treatment System maintenance service

If you have an Advanced Treatment System then these need to be inspected much more frequently – depending on the brand. They should be serviced every 6 or 12 months by the authorised service agent. Normally you should have a maintenance contract in place with a service agent to do this. Some owners have been trained and have enough expertise to do their own servicing but you should check with Council about doing your own servicing.

Each brand of system has a set maintenance programme for checking the different parts of the system. Service agents approved by the brand supplier or manufacturer should be used wherever possible. However some service agents may have the skills and experience to provide assistance for other brands. If you aren't sure who should be maintaining your system you should contact the manufacturer or New Zealand supplier.

You should get a written service report from the agent. At the least it should tell you:

- his/her name and contact
- the date the system was serviced
- detail about the function of all mechanical parts of the system
- detail about the condition of the tanks, lids, electrical boxes and other parts of the system
- a measure of the sludge in the system and if the system needs cleaning out
- if filters were cleaned and replaced correctly
- if electrical alarms and pumps were checked for operating function
- the condition of the soakage system and if irrigation systems were flushed
- any repairs or work needed on the system and the urgency of the work

Key improvements:

- The report should detail any work that is required to repair or replace system parts or to clean out excess sludge build up. If there are problems it should also advise about using the system correctly to get the best possible performance from the system.
- Repairs should be done urgently and wherever possible by using the approved service agent, the registered drainlayer who is approved by your system manufacturer or supplier, and a registered electrician for electrical faults and installing new pumps

Key issues with dripper irrigation systems

- The liquid effluent is treated but it still has high levels of pathogenic organisms and is a serious health risk to people, so contact with the liquid effluent must be prevented. Because of this, irrigation soakage areas should be separated from the outdoor living areas on the property and shouldn't be soggy or flooded during winter.
- The irrigation systems are specifically laid out to get even irrigation over a set amount of land. The irrigation hosepipes mustn't be moved around the section and should be kept under soil cover so no contact with the liquid effluent happens. Liquid effluent shouldn't be sprayed into the air or run out onto the land.
- Wet or soggy spots in the soakage area means the irrigation system isn't working properly and may have blocked drippers or it is installed too shallow. Irrigation hosepipes mustn't be flushed or left to run out effluent into stormwater drains, culverts or streams.
- More than any other types of soakage systems, dripper irrigation systems must be protected from heavy stock and horses walking on them, and from vehicles driving on them. The irrigation pipes can be easily damaged because they are semi-soft like a hose and only buried 100 – 200mm underground.

This Advanced Wastewater Treatment System is located in a hollow which floods the tank with rainwater causing overflows from the tank lid.

Failing home wastewater systems

Because many home wastewater systems in the Gisborne area have been in use for a long time, and may not have been well looked after in the past, many systems don't work as well as they should. If your home wastewater system has failed completely, then you are going to have to replace it, but there are some ways to help extend the life of an old system that is working reasonably well.

- Firstly it's important to get the tank cleaned and checked out by a licensed septic tank cleaner and a registered drainlayer. If you know there will be extra people in your house during the holidays get the tank cleaned out a few months before to remove the build-up of solids and make space in the tank.
- If there are broken pipes inside the tank, or the mushroom is broken or missing or the tank lid is below ground, get these fixed to stop extra water from the land getting into the tank and overloading the soakage area. Get a tank outlet filter installed to slow down solids washing over and blocking up the soakage area.
- Make sure you are being kind to your home wastewater system – don't use cleaners and chemicals which will kill off the bacteria in the system. If you have used these in the past, then you can buy some additives which you can flush down the loo, to help the bacteria in the tank get healthy and working again.
- Reduce the amount of water going into the home wastewater system – in particular laundry, shower and bathwater – also known as greywater. It might be worth installing a separate system to treat this greywater and help take the pressure off the rest of your home wastewater system.
- The soakage area will fail over time and eventually liquid effluent will not soak away. This may be worse in winter when the groundwater rises up and gets into the soakage system underground and can back-flow into the septic tank, causing it to overflow. Installing land drains to catch and channel stormwater around the soakage system can help. If you can switch between areas of the soakage field this will give parts of the system time to rest and recover.

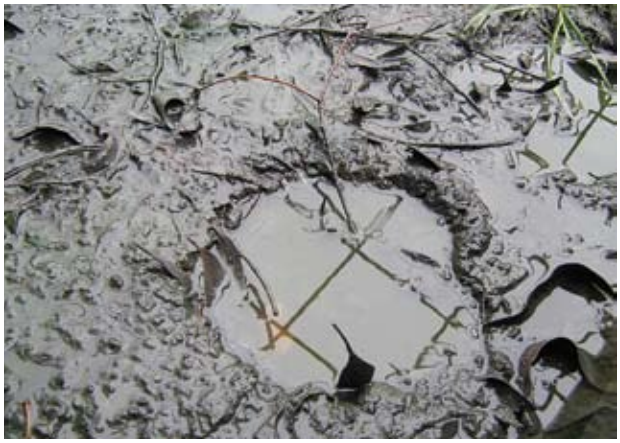
How do I know if my home wastewater system has failed?

There are a number of ways you can tell if your home wastewater system has failed. The system needs to be replaced if cleaning out the tank and drains doesn't stop these things happening.

- You can't flush your toilets or the water in the toilet rises up when you flush, or sewage starts spilling out of your gully-trap or drains
- Your sinks drain slowly or there is a glug-glug gurgling noise when the bath water drains out
- Your tank overflows black smelly water, through the mushroom or around the lid
- You notice a foul rotten egg smell around your septic tank or section that won't go away
- The land around your septic tank is always soggy
- There is a lot of very green growth just outside your septic tank or there is a lot of dark green grass growing in one part of your soakage area
- There is wet, black ooze around your soakage area

Liquid effluent seepage on the ground from a damaged irrigation system.

Seepage from a failed septic tank soakage area. *Ian Gunn*



Black ooze on the surface of a failed soakage area.

Overflowing septic tank. *Ian Gunn*

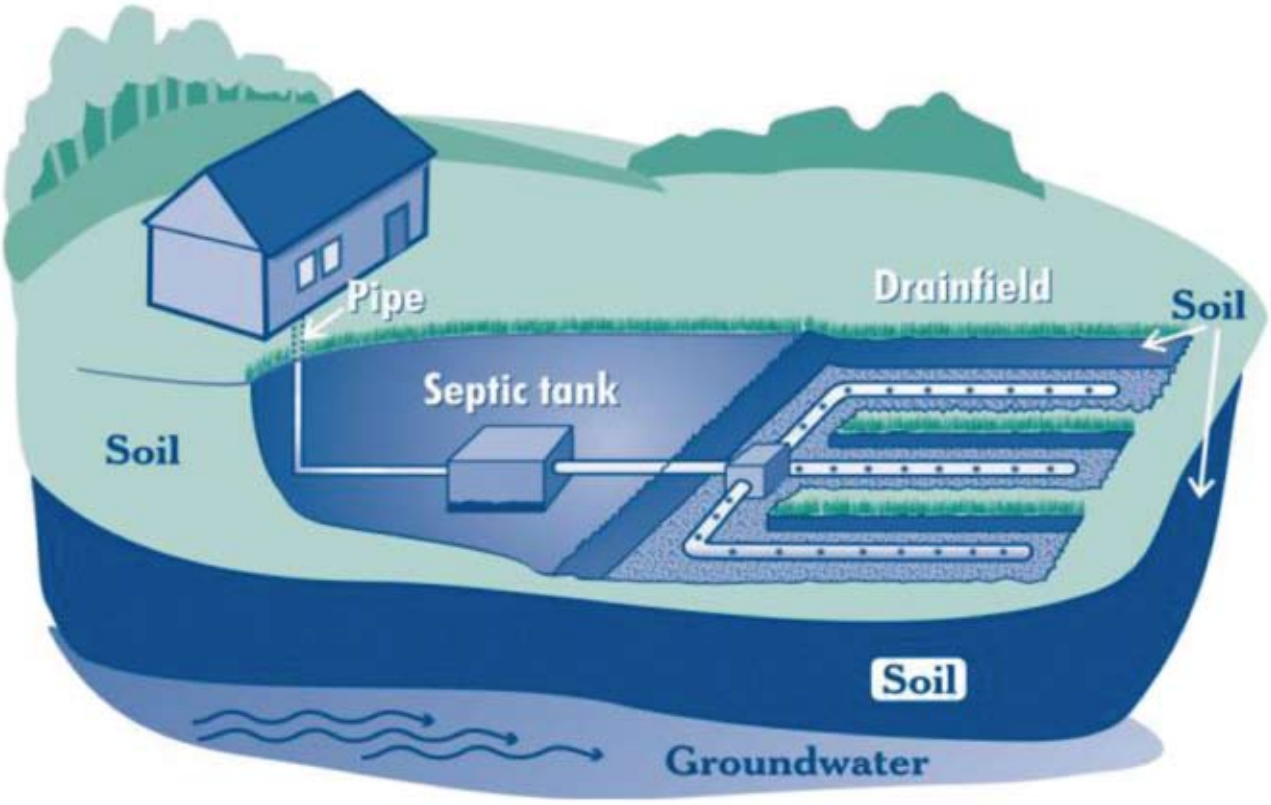
Gully trap overflows are common sign the wastewater system is failing. If this happens again soon after cleaning out the septic tank, this can mean the soakage field has failed and the liquid effluent can no longer soak away. The wastewater system needs to be upgraded or replaced.

General Problem Solving Guide

Problem	Solution
Smell (foul odours) inside or outside the house	Check where the smell is coming from • If it's the tank or drains, get the system cleaned out and checked for broken pipes or damaged parts. • If it's the soakage area, then rest it if you can, or reduce water use in the house for a few weeks. Check the list of "don'ts" and make sure only the right things are going into your home wastewater system.
Septic tank overflow	• Get your septic tank, filter and drains cleaned out immediately. • Get a registered drainlayer in to check for blockages, failed pumps or damage to pipes in the system. • Reduce your water use until the problem is solved. • Check the list of "don'ts" and only put the right things into your septic tank. • If this is an ongoing problem or it happens every winter you need to upgrade or replace the home wastewater system.

Problem	Solution
Gully trap overflows from a blocked filter	• Take the filter out and hose it down back into the tank. • Get your tank pumped out more frequently. • Stop excessive food waste and fats going down the kitchen sink. • Stop sanitary products and condoms being flushed down the toilet.
Ponded liquids or sewage breakout on your soakage area	• Get the tank cleaned out and the soakage pipes flushed if possible. • Reduce water use in the house. • Install a bigger soakage system or a separate greywater system to take some of the house water away from the old soakage area. Position the new soakage area away from trees and onto the northern side of the house to increase evaporation. • Plant irrigation areas with water tolerant grasses and shrubs. • Make sure people and pets are not on the soakage area and coming into contact with the sewage.
High volume wastewater discharge – soakage area is very wet	• Install low flow water fittings such as dual flush toilets, efficient washing machines, efficient shower heads and flow restrictors in the taps. • Reduce your water use throughout the house. • Get advice about increasing the size of the soakage area or changing the type of soakage system. • Get advice about installing a separate greywater system.
Rainfall run-off water-logging soakage area	• Check that no roof downpipes discharge into gully traps, drains or on land which slopes towards the soakage area. • Put in stormwater cut-off drains above and around the soakage area. • Replace any broken vents or mushrooms on the tanks. • Install collars on tanks so the lids are above ground level.
Pollution of groundwater/ surface water	• Make sure soakage area is working well and is at least 20 metres from any stream or creek and a long way from any bores. • Maintain the system regularly including clean outs and service checks. • Check the soakage area doesn't get flooded or saturated in winter. • Don't flush irrigation systems into water courses or drains. • If the tank or treatment system is flooded or overflowing don't empty the tank onto the ground – call a septic tank cleaner to suck out and truck away the sewage. • Repair and replace systems when they don't work properly.
Unknown type of wastewater system or not sure about care of the system	• Check with the Council to see if they know what sort of system you have and if any plans of it are on Council records. • Get a registered drainlayer in to help you find the system parts and explain how the system works. • Refer to operation and maintenance manuals or guides that go with Advanced Wastewater Treatment Systems.

Types of home wastewater systems



The general parts of a home wastewater system

Most home wastewater systems have a number of common parts. They include at least one treatment tank or unit, where solids are collected and treated, and a soakage area, where liquid effluent is treated in the soil and enters the environment.

When wastewater enters the septic tank, the light solids such as fats float to the top, and the heavy solids sink to the bottom and become sludge. The main way in which the solids are broken down is by sludge-eating bacteria in the tank. The scum solids stay at the top of the tank and the sludge solids at the bottom, and the liquid effluent leaves the tank and flows out to the soakage area.

In some situations the liquid effluent is given further treatment by filtering it or aerating it in an extra treatment step before distribution to the soakage area.

Mechanical and pumped treatment systems need a reliable power supply and work best with constant use.

The soakage area is a very important part of your home wastewater system and a lot of the treatment of the liquid effluent occurs in the soils. Your soakage area will fail over time if the soil bacteria are often killed off or the liquid effluent flows are too high for the bacteria to survive and thrive. Pollution from home wastewater systems can contribute to environmental pollution, especially water pollution where there are a lot of discharges in a residential area. A well functioning soakage area that is designed properly for the soil and to overcome any special drainage problems will provide the best protection from adding to environmental pollution.

Septic Tank Systems

The Tank

Many home wastewater systems in the Gisborne District use traditional septic tanks. While these were the accepted type of system to install when they first went in years ago, they can have a lot of problems if they haven't been well maintained, and if the household uses more water each day than the tank was intended to hold.

Septic tanks installed before the mid 1990s can be too small for the use they now get, particularly if there is high water use in the house. They usually don't have an effluent outlet filter on the tank outlet, so soakage areas become clogged over time with solids carried with surges of liquids through the system. They often also have small soakage areas, which are easily overloaded by high water use.

More modern septic tanks are called conventional septic tanks and have larger tanks or two tanks in a row and a filter in the tank outlet. The lids and vents are all above ground for ease of tank cleaning and servicing and to stop water from the land getting in. The advantage of these conventional septic tank systems is that a lot of the fine solids settle out and stay in the tank which helps to increase the life of the soakage area.

In systems with two tanks, the second tank is a bit smaller than the first tank. Most of the solids will build up in the first tank, and the second tank needs to be cleaned out less often.

Pumps for dosing the soakage area can be in a separate small tank or the pump chamber can be inside the second tank.

A new two tank system being installed. Each tank has a riser, solid lid above ground level and vents. A filter is in the outlet of the second smaller tank.

This septic tank has a pump chamber inside the tank. Electricity is required to keep this home wastewater system working.

The Soakage Area

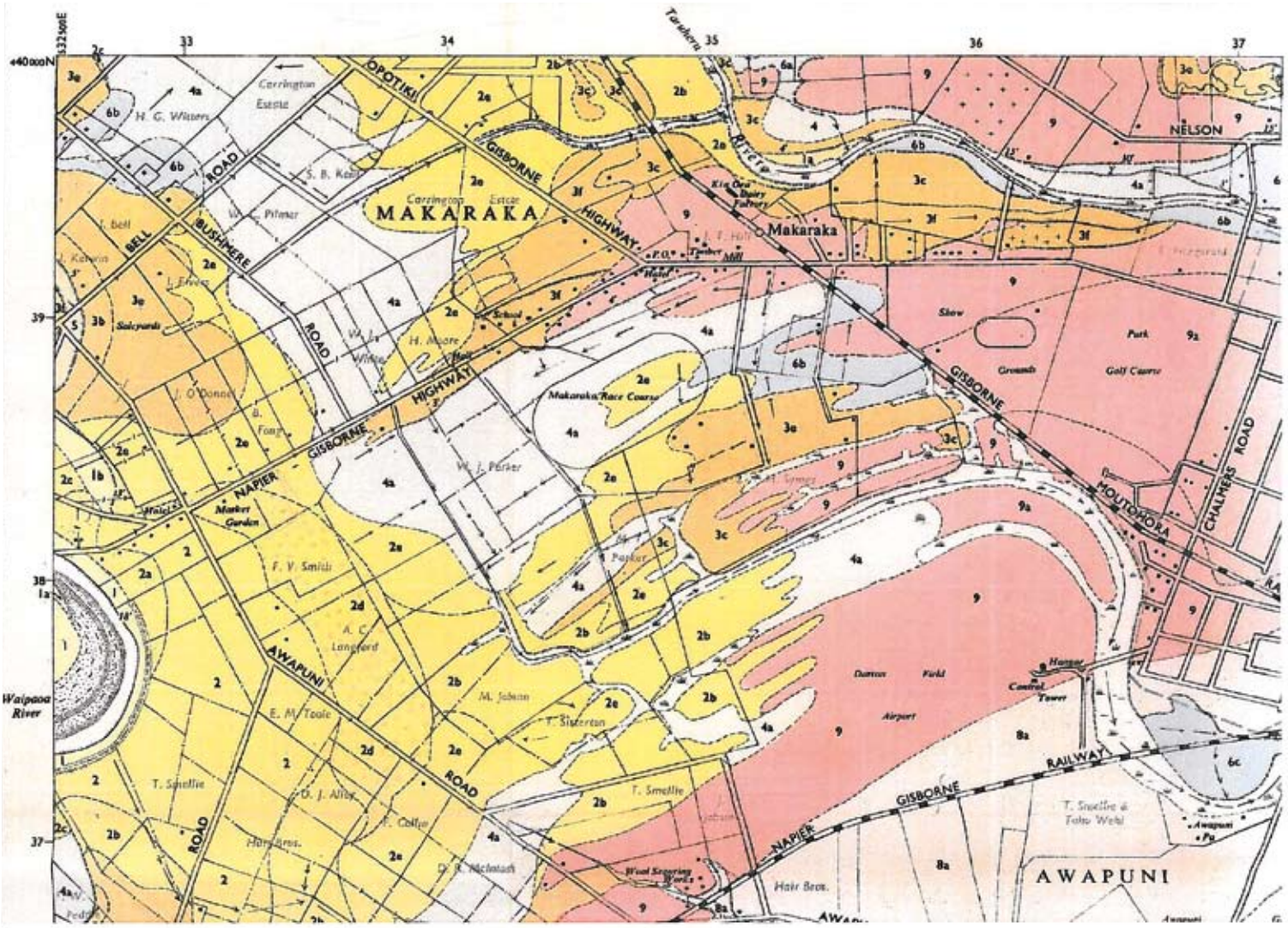
The soakage area in traditional home wastewater systems is designed to take a gentle flow of liquid effluent, trickling out of the tank into a perforated pipe or field tile drain laid inside trenches underground. In some cases soak pits have been used rather than trenches, especially for greywater systems.

Most of these systems rely on gravity and usually all the soakage system doesn't get an even amount of liquid effluent, and this causes 'creeping failure' of the soakage system. In older systems, there is usually no way to rest any area of the soakage system so that parts can recover from use. Soakage areas in traditional septic tanks often don't work well in very clayey soils and very sandy soils.

When new systems are designed, a lot of care is taken to work out where is the best place to put the soakage area. A lot of care also needs to go into deciding what type of soakage system will work best, how large the system needs to be, and how deep underground the system can be.

More modern soakage systems can have a distribution box or a sequencing valve to send the liquid effluent to different parts of the soakage system allowing the unused parts to rest.

Many systems are dose-loaded using a pump or a dosing system so that a controlled amount of liquid effluent evenly loads a section of the



Soil types in the Makaraka/Awapuni Area – each colour on the map is a different soil type. Many properties have several soil types on them, meaning that careful investigation of the best place for a soakage system is needed. Groundwater levels and soil types in some places will mean that above ground soakage systems are the best option.

A pit showing the layers of soils each with different drainage. Slow draining clays are just below the topsoil. These soils are not good for soakage using traditional trenches.

soakage area, avoiding overloading the system and 'creeping failure'.

The Gisborne District has a lot of different soil types and these are often found in layers as you go down through the soil. As a result, what might be best for one house could not work well on the next door property, or even in a different part of that site.

If there is ponded water and oversaturated soils on the soakage area during wet weather, then your soakage system might not be working as well as it should. Liquid effluent will be mixing with the ponded water creating a health risk to anyone in contact. Run-off into drains and water ways contributes to high contamination in the environment. Often, if the land can't be drained, this means a new soakage system needs to be put in, which would be raised above the ponding area in beds, or mounds. Land drains will also be needed to channel water around the soakage system. Raising land to prevent ponding close to the soakage area is often needed as well.

Surface ponding is common in winter in many soil types in Gisborne and this floods trenches and traditional soakage areas. In these locations raised beds or mounds are effective means of disposing of liquid effluent.

Advanced Treatment Systems

These systems use varying processes to treat wastewater to what is termed 'secondary treated effluent' or 'advanced secondary treated effluent' which each have set quality standards. This treated effluent has much lower concentrations of environmental pollutants than effluent from septic tanks.

The extra secondary treatment process in an Advanced Treatment System reduces a lot of the pollutants before the liquid effluent goes into the soakage area. If the Advanced Treatment System is working properly then the liquid effluent should be safer for the environment. It is important to remember that the treated liquid effluent is still harmful to health and contact must be avoided.

The treated liquid effluent from an Advanced Treatment System is often sent to the soakage area using a drip irrigation line system, either under the soil or, on suitable sites, on the surface and covered with a thick layer of bark or mulch. Planting irrigation fields helps with evapo-transpiration. The irrigation lines can be laid in preformed gardens or planted areas (not food gardens) and this helps with garden watering in dry months. When planted with grasses, shrubs or ornamentals the irrigation areas create attractive landscape features on the property.

There are two different sorts of Advanced Treatment Systems.

1. Aerated Wastewater Treatment Systems

Aerated Wastewater Treatment System, AWTS, is a description used for treatment systems that use air loving (aerobic) bacteria to provide much higher quality liquid effluent than that which comes out of a septic tank.

AWTSs have been installed in the Gisborne District since the late 1980s. They are still popular now for sites that have poor soakage, high water tables or steep sloping land where conventional disposal systems aren't good options. They have had a mixed amount of success over time, and for various reasons including design faults, lack of maintenance and in some cases inappropriate use, some of the systems are not working well.

Different brands of these treatment systems continue to be developed for household use and these may be marketed as Activated Sludge Aerated Wastewater Treatment Systems, Biofilter Aerated Wastewater Treatment Systems or Trickling Filter Aerated Wastewater Treatment Systems.

Each type of AWTS has different aerobic treatment processes and in general an AWTS has three parts to it:

- A settlement part where some of the solids are removed. This part is similar to a septic tank and is called the primary treatment process.
- Aerobic treatment process where the air loving bacteria break down the solids and some dissolved pollutants and reduce the number of harmful organisms in the liquids. This is called the secondary treatment process.
- Final settlement where the treated liquids are allowed to settle. Some types of systems have a disinfectant process as well where UV light is used or chlorine is added to the final effluent to further kill harmful organisms.

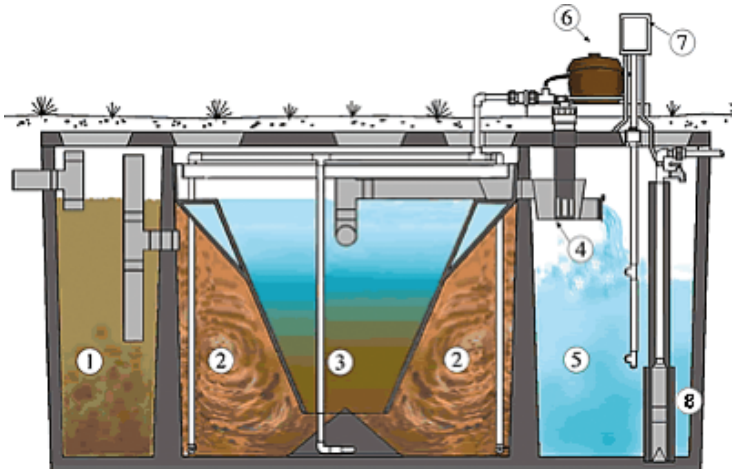
Importantly there are pumps and aerators and filters of various types in an AWTS which need to be maintained and have continuous electricity use – in a system working well, about as much as running a light bulb all the time. In a system not working properly a lot of electricity can be used in the pumping systems.

Generally AWTS systems aren't a good choice for holiday homes and baches, or properties where

there is only seasonal usage. This is because they need to be kept running all the time, and often the bacteria will die if there isn't any waste feeding them. The system will not treat wastewater properly in these situations resulting in bad odours and blocking of filters and irrigation systems.

It's important to also remember that if the electricity is disconnected or the AWTS is turned off to save power, then the pumps and air blower won't operate, meaning air won't get into the system and no treatment will be happening. If this does happen, then it's important that people in the house use the toilets and water as little as possible until the power is on again. If it is left too long before power is put back on, or people keep turning off the power to the system but keep using the toilets and water, then the system will block up, overflow and stop working causing damage that can be expensive to repair.

If you have an AWTS, or are thinking of installing one, it's also important to remember they need regular service and maintenance checks from an authorised agent, usually every 6 months. As well as the treatment system, the soakage area needs to be maintained and irrigation lines need to be flushed regularly so that the irrigators don't get blocked with slimes.



The diagram shows the parts of an activated sludge AWTS (USEPA).

1. Septic tank compartment

2. Aeration chamber (bacterial treatment)

3. Secondary settling

4. Chlorine tablet disinfectant

5. Pump chamber

6. Blower air supply

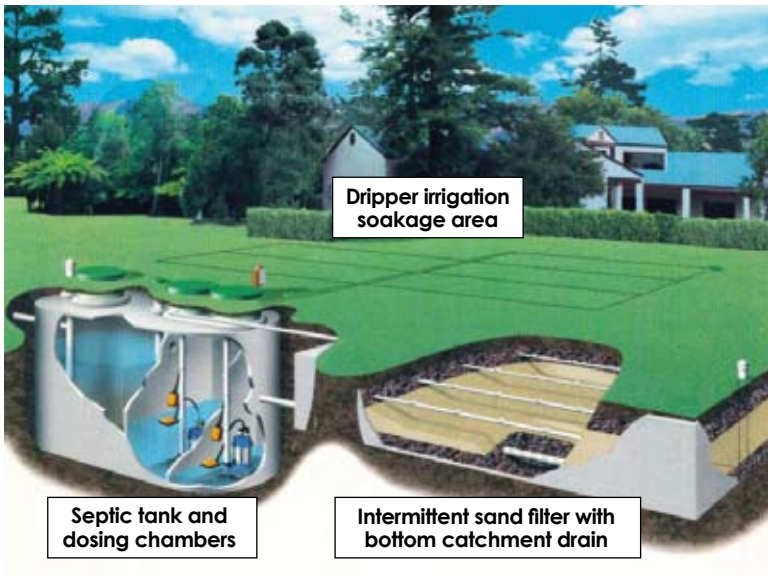
7. Control panel and level controller for pump

8. Pump unit delivering to drip irrigation land application area

2. Advanced Secondary Treatment – Filtration Treatment

These systems involve the use of sand or textile filters as part of the process of advanced secondary treatment of the liquid effluent. They are sometimes referred to in the industry as Packed Bed Reactors (PBR) as the bacteria stick onto sand or textile material in the system and degrade the waste as it flows over the sand/textile surfaces. These are air loving bacteria and are kept alive by natural air circulation through the sand/textile in the system. A very high quality treated effluent comes from these systems. There are systems that can be bought as prefabricated units ready to be installed or PBR can be constructed in place at the site.

A septic tank is the first part of the system. The liquids then leave the septic tank and pass through a sand/textile bed where the bacterial growths clean the liquid effluent before it is pumped out to drip irrigation. PBR systems are either 'Intermittent Sand Filters' where small volumes of liquid effluent are timer dosed evenly across the top of the sand filter where



An example of an Intermittent Sand Filter. (Reflection Technologies Ltd)

An example of a Pre-fabricated Reticulating Pack Bed Reactor. (Innoflow Technologies)

it passes through the filter at a controlled rate. Or a PBR can be a 'Recirculating Sand Filter' where liquid effluent is recycled through the sand filter 3 to 5 times to achieve the level of treatment.

Once the liquids have passed through the PBR secondary treatment system, the treated liquid effluent goes to a small dosing or holding tank from where it is pumped to the soakage area.

In addition to PBR systems using sand or textiles, membrane filter systems are available which effectively strain out the harmful organisms in the liquids, making it much safer for spreading closer to the soil surface.

Like AWTS systems, Advanced Secondary Treatment relies on electricity to run pumps.

Where sand/textile filters form part of the treatment process, these systems can be a better option than AWTS for baches and seasonally used properties, as they are less impacted by the "shock" loading when people come to stay.

Vermiculture Systems

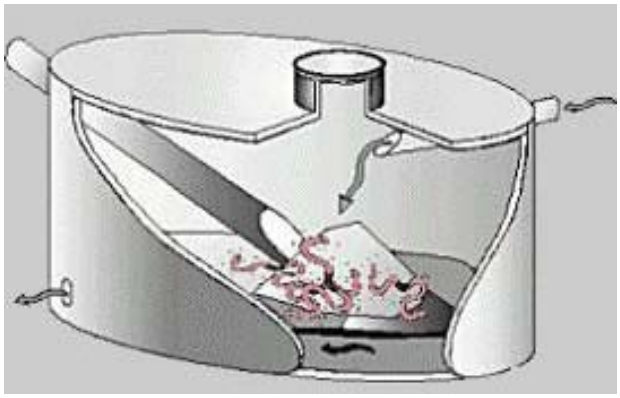
These wastewater systems use worms as part of the treatment process. There are generally two types of worm-based systems and there are several brands of proprietary systems that work in either way.

Being a "living" treatment system, vermiculture systems aren't so good for holiday homes or properties with long periods of 2-3 months of no one using them. This is because without enough food the worms will die off.

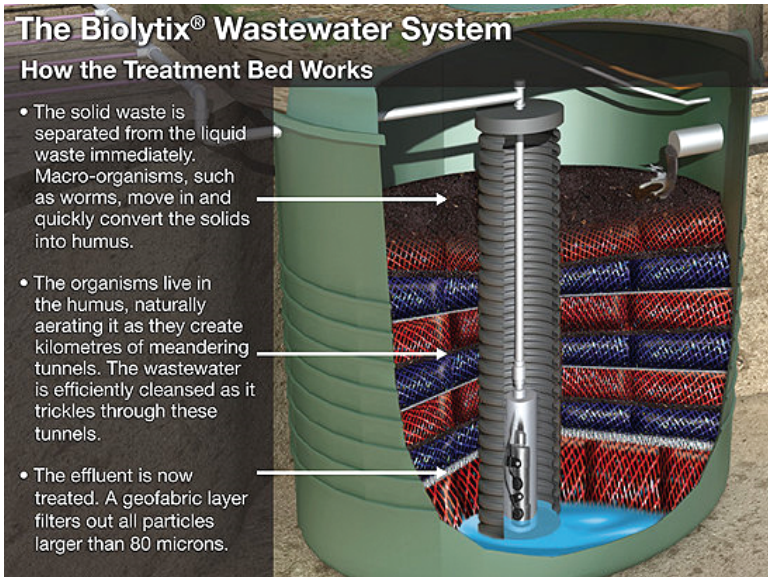
Because the vermiculture system relies on worms to digest the solids and wastes from the toilet and kitchen, it's extra important that you manage things carefully so that you don't kill the worms with chemicals used in the home, or drown them with too much water.

Type 1: In the first type of system the waste from the toilet, and water from your kitchen is directed into the tank with worms in it (the vermi tank), while the greywater from your bathroom and laundry is directed to a different tank, or a different part of the tank, which treats that part of the waste. The liquid effluent from the systems can be combined into a batch reactor tank using wood chips and gravel for more filtration treatment. From there the liquids flow into the soakage area often using a low pressure distribution soakage system. Depending on the site it may be possible for the vermiculture and soakage system to be designed so that it relies on gravity, and doesn't need electric pumps. A typical Type 1 vermi-tank is shown in the next diagram.

Type 2: In the second type of system all waste from



Vermicomposter tank for toilet and kitchen wastes. (Envirosystems Limited)

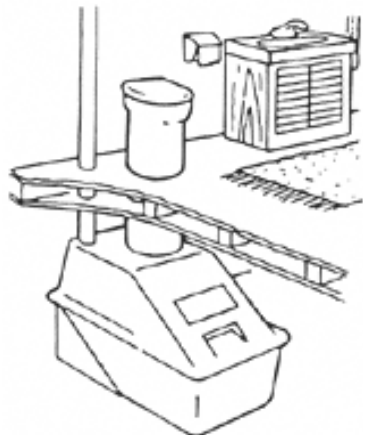


toilet, kitchen, bathroom and laundry flows into a single tank and drains through layers of coarse fibre material containing worms which capture and treat the waste matter. This process is shown in the diagram above (Biolytix NZ Limited). Treated effluent from the base of the tank is then pumped out to a soakage area or irrigation field.

Composting Toilets

These systems are designed to take your toilet waste and work by composting the solid materials. They don't take liquid wastes like bathroom or kitchen water, so you will need to install a greywater treatment and soakage system for those wastes.

Composting toilets need careful use to ensure that a suitable organic bulking material (sawdust, mulch, ground peat, chopped straw) is added regularly to separate the solids and allow air to circulate much like your compost bin in the garden. Depending on the type of system (such as a batch system) they may need to be regularly cleaned out, or if a continuous



This diagram shows a composting toilet (Toatrone Continuous Composting Toilet).

system, have a portion of the mature compost removed periodically. You also need a suitable spot for the compost end product to go – you can use it in your garden but not on vegetables or food gardens. First however it's best to bury it for 12 months before digging up to spread as a germ free soil conditioner. A well operated composting toilet shouldn't smell or be wet or attract flies.

Having a composting toilet does require a reasonable amount of commitment from the household and not all people are comfortable using them. Where they are installed, generally the Council will require that there is enough room left on the property so that an alternative treatment system can be put in. This means future owners of the property would have the option to change to a full water-borne home wastewater system if they wanted, or needed to.

The building must be suitably designed to fit the composting unit with the toilet above. There must be easy access to the composting chamber for servicing and cleaning and the system must be watertight and weatherproof. A system to take the leachate or excess liquids from the composting chamber is needed in some systems. Good ventilation is needed for successful composting and in very cold places a heating system may be needed.

Greywater Systems

Greywater systems take the water from your kitchen, bathroom and laundry.

There are three main types of greywater systems:

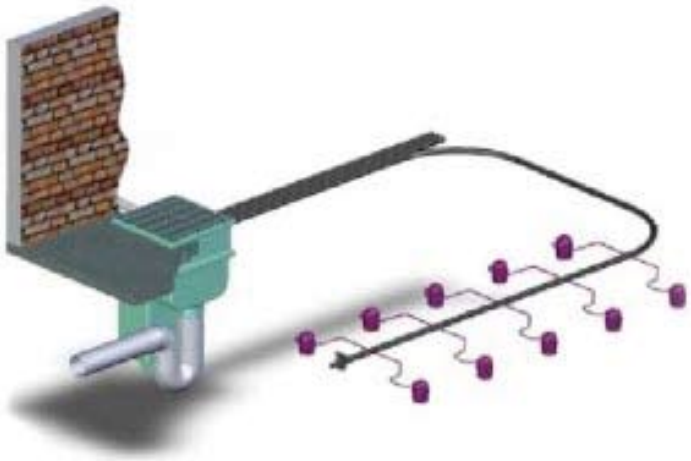
- Systems that treat all greywater sources, including the kitchen, laundry tub, washing machine, shower and bath for discharge to a soakage area underground.
- Systems that treat only the greywater sources from the bath shower and washing machine (but not the kitchen and laundry tub) to a high quality that includes disinfection so the greywater can be recycled for flushing toilets.
- Systems that divert only the greywater sources from the bath, shower and washing machine (but not the kitchen and laundry tub) for subsurface irrigation.

They are used where a composting toilet is installed, or in some split treatment and soakage systems. A split system is used where toilet wastes pass through a "blackwater" septic tank to a soakage system in good soil conditions on the property, with the treated greywater sent to a soakage or irrigation system in other areas on the property.

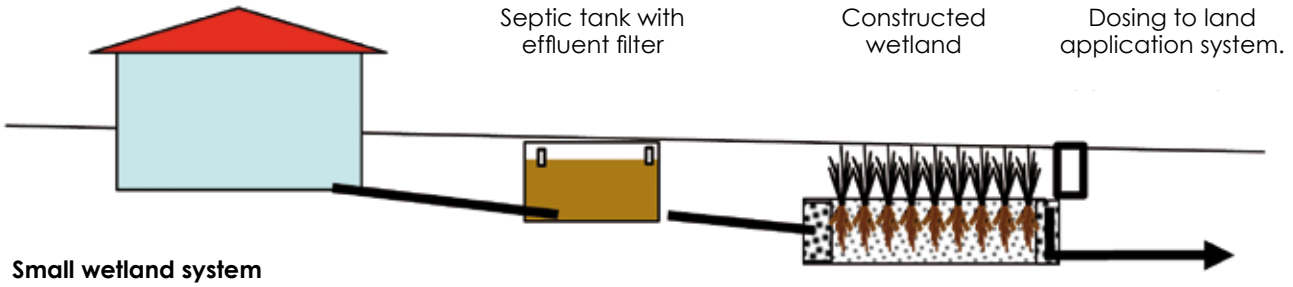
Greywater systems can be a useful way of taking the load off your septic tank and soakage field, and help extend the life of these systems.

They are also particularly useful in areas where water supply is limited and when used for underground garden irrigation can be a good way of saving water. A greywater disposal method used is to divert greywater for garden irrigation using a purpose designed and installed irrigation system. These systems must also be able to send debris and scum to the septic tank or to a sewer or the irrigation system will block up.

Greywater from any treatment or diversion system should be disposed into the land using properly designed trenches, disposal beds or irrigation systems. If you have a system which includes recycling of the treated greywater for toilet flushing, then more maintenance is required. Greywater still has pathogenic organisms in it. Before using it in ways where people may be in contact with it, treatment and disinfection is required to make sure that the greywater is safe especially if it is going to be used back inside your home.



A greywater dirversion garden irrigation system (WaterLillie®)



Small wetland system

Pit Privys and Long Drops

Pit privy's and long drops aren't suitable for use in most places, particularly for people's homes in residential areas. However, there are some times when they are a good option. This includes:

- In rural areas away from the coast or waterways
- Where there is only temporary or occasional use
- Where ground conditions are suitable to prevent contamination of groundwater or surface waters

There must be a lot of clearance from the bottom of the pit to the groundwater and the system must be well away from land drains, water ways and human or stock water supplies. The soils must not be too free draining but also cannot be poorly drained or the pit will fill and overflow.

Smell and flies are downsides of long drops, and the building in which they are located needs to include some good ventilation and the toilet must stop flies and other vermin getting in. When the long drop gets within 1 metre of the top of the ground it's time to cover it over with earth and dig a replacement. The old pit should have soil mounded over it – so that over time it settles, and water doesn't pond on it.

Holding Tanks

Holding tanks can be used in some places for liquid waste storage for off-site disposal. The liquid waste is stored in the tank and emptied into a truck for transport to an approved disposal facility. No liquid waste is disposed on the property where the holding tank is positioned and each time the tank is nearly full it must be pumped out. The expense of emptying holding tanks makes them unsuitable for houses that are lived in permanently, but they may be suitable for low use baches or holiday homes. They may also be suitable in existing commercial areas where there isn't enough land for a soakage area.

A holding tank must be water tight and not allow water from the land to get in. It must not have any overflow outlet and it should be big enough to store 7 days liquid waste flow from the building. It must have a high water alarm or flag to trigger when the tank is nearly full, an air vent, and must be anchored in so it can't pop out of the ground when emptied. This can happen in areas where there is high groundwater. There must be a trucking service available at short notice and the tank must be positioned where the trucks suction hoses can reach for pumpouts.

Wetland Treatment Systems

Small wetlands can be used to further treat liquid effluent from septic tanks to secondary quality. Wetlands are usually built in place in the ground and careful design is needed to make sure the wetland is in the right position where it won't get flooded, is big enough and has enough retention space and flow direction for treating the volume of liquid effluent.

Wetland plants play vital roles in the treatment process and using the right types and enough plants is important. Maintaining the planting and stopping weeds getting established, keeping the right water levels in the wetland and looking after the system over time is necessary to get the best treatment of liquid effluent.

The final treated liquids from a wetland are usually piped into a small tank before going into a soakage system suitable for the site.

Peat Filters and Organic Material Filters

The use of peat as a filter material in systems built in a similar way to intermittent sand filters is an option for treating liquid effluent to a quality suitable for irrigating into soakage areas and planted gardens. Liquid effluent must pass through a septic tank with an outlet filter before being dosed in small amounts over the filter. The size and design of the filter and the type of peat used need careful consideration to get the right level of treatment.

Other organic materials such as corn cobs and coconut fibre have also been successfully used in these types of filter treatment systems.

The final treated liquids from a treatment filter are usually piped into a small tank before going into a soakage system suitable for the site.

The Pros and Cons of Different Systems

Type of Wastewater Treatment System	Good Points	Bad Points
Conventional Septic Tanks (large capacity with effluent outlet filter)	• Good option for larger properties with good soil conditions and flat land. • Provide longer service between cleanout than old septic tanks. • Tanks and filters are easy to access for cleaning. • Outlet filters prevent solids carryover in liquid effluent which can clog soil in soakage areas. • Work even when there is a power cut. • No power costs or only low power costs if the tanks are connected to a pumped dose loaded soakage system. • Can readily handle fluctuating loads and flows. • No mechanical parts within the tanks.	• Rely on healthy bacteria for best function – need care not to put the wrong things or too much water into the system. • Liquid effluent is treated only to a primary or advanced primary level making it less suitable for disposal in areas with sensitive environmental conditions. • Soakage systems after septic tanks and the land area they take up are often large because of the primary level of effluent treatment and soakage rates into soils. • Primary or advanced primary treated effluent is not suitable for dripper irrigation soakage systems. • The tanks take a larger space to install than prefabricated advanced treatment systems.
Advanced Secondary Treatment **Sand filters and Textile Filters - Pack Bed Reactors**	• Give a very high treated effluent quality - best for limiting cumulative environmental pollutants. • Treated effluent suitable for drip irrigation into topsoil over porous sandy soils and poor draining clay soils on flat and sloping land. • Generally low operational cost because of intermittent rather than continuous running of components. • More suitable for holiday homes and baches than AWTS. • Multiple options for treatment – sand filters, pack bed reactors, textile filters. • Includes systems that are compact prefabricated units which are quick to install compared to septic tanks. • Quiet while running components.	• Rely on healthy bacteria for quality treatment – need care not to put the wrong things or too much water into the system at one time. • Need reliable electricity supply to work dosing pumps. • Cost with power usage. • Need regular maintenance of system parts including pumps. • Ongoing costs for service or maintenance in some systems. • Pack Bed Reactors take extra land area especially the intermittent filters. • Still need septic tanks before a Pack Bed Reactor system.

Type of Wastewater Treatment System	Good Points	Bad Points
Secondary Treatment **Aerated Wastewater Treatment Systems**	• Give a higher quality of liquid effluent treatment than septic tanks. • Treated effluent suitable for drip irrigation into topsoil over porous sandy soils and poorer draining clay soils on flat and sloping land. • Are often compact prefabricated units that are quick to install compared to septic tank systems. • When used and serviced correctly can function well for many years and be reliable for treating effluent to a good quality.	• Heavily rely on healthy bacteria for quality treatment – need care not to put the wrong things or too much water down the drain. • Need reliable electricity supply to work. • Cost with continuous power usage. • Require regular maintenance of the whole system including aerators and pumps. • Ongoing costs for maintenance requirements. • Don't generally treat effluent well with fluctuating flows or very high or very low flows. • Can have bad odours. • Can be noisy running components continuously. • Not suitable for occasional use buildings (holiday homes, baches), as can't work well with irregular flows and shock loading.
Composting Toilets	• Batch composters are good for irregular use as at holiday homes and baches. • Particularly good for preventing nitrogen pollution of waterways and groundwater. • Useful in areas with limited water supply as don't need water to flush. • Some systems don't need electricity to work. • Waterless units reduce household wastewater flows needing to be treated.	• Don't work well if a lot of liquids are going into the system. Liquid diversion system and leachate systems are often required. • Only treat toilet waste, so another system is needed for greywaters. • Electricity required to run fan vented systems • Need regular supervision and addition of bulking material to ensure effective composting. • If system fails or has poor function it will create smells and require emptying out and restarting. • The building must be carefully designed so the composting system can be correctly installed and can be correctly maintained and cleaned. • Solids from composting toilets are hazardous and must be carefully handled in a safe way to avoid health risks.

Type of Wastewater Treatment System	Good Points	Bad Points
Greywater Systems	• Used to manage wastewater flows from kitchen, bathroom and laundry when compost toilet is installed. • Can be installed as a separate system to the conventional 'blackwater' (toilet) system. • Filtered greywater can be used to irrigate non-food gardens and trees where water is scarce. • Fully treated greywater can be used to flush your toilet. • Can reduce the flows to a septic system taking the demand off an overloaded system.	• Need to still provide a separate system for treating toilet wastes. • May need several systems for different greywater sources. • Full treatment including disinfection is required before recycling for use in toilets. • Diversion systems for garden irrigation must be connected to the septic tank or sewer as well. • Systems need regular servicing and filter cleaning. • Soakage and irrigation systems must be properly designed and installed for the soil and site limitations. • Greywater systems are not DIY wastewater solutions.
Pit Privies and Long Drops	• A low cost option for isolated areas where there is only light seasonal usage.	• Deliver a low standard of treatment, so only suitable in very limited circumstances. • Can easily contaminate groundwater if installed in the wrong place. • Only suitable for human toilet waste, not for other liquid wastes.
Vermiculture Systems	• Normally only need electricity to dose load a soakage system. • Generally low operational cost because of no mechanical parts in the treatment units. • Low/no operational noise. • Can be quite resilient to low usage. • Are often prefabricated units – quick to install.	• Are a "living" system – need extra care not to put the wrong things down the drain including too much water. • Following non-use periods as for holiday homes may need to be re-seeded with worms. • Some systems only treat toilet waste, so another system is needed for greywater. • Solids from vermicomposting are hazardous waste and must be correctly handled and disposed of in an approved manner. • Can be odorous if not functioning well.

Type of Wastewater Treatment System	Good Points	Bad Points
Holding Tanks	• Low cost to install. • Good for low use buildings and short term irregular flows. • Small area of land need to install. • Can suit low water generation commercial activities.	• Limited where they can be used – need reliable pump out service available. • Expense of pumping out make them uneconomic for homes with permanent or semi-permanent use. • Need to take extra care with water use and reduce flows. • Must be well fixed in the ground to prevent popping out when empty.
Wetlands	• Give a higher quality of liquid effluent treatment than septic tanks. • Interesting and attractive wetland garden feature. • No liquids on the surface to contact with. • Can operate without power on suitable sites dependant on the dosing for a soakage system. • Low/no operational noise. • Can be quite resilient to low and fluctuating usage and shock loading.	• Need regular maintenance of system parts and plants. • Need very gently sloping or flat land to install. • Take extra land area. • Still need septic tanks with an outlet filter before a wetland. • Need to maintain correct water levels during dry and wet periods.
Peat filters and organic filter	• Give a higher quality of liquid effluent treatment than septic tanks. • Can be constructed in ground or above ground. • Low power and operational costs. • Low operational noise. • Can be quite resilient to low and fluctuating usage.	• Need reliable power supply for dosing loading. • Need a suitable supply of peat or other organic filter material. • Only one part of a system, still need septic tanks and soakage system.

Soakage Area and Disposal Options

The soakage area is a critical part of the design of your home wastewater system, and isn't something that should be overlooked when you are designing or extending your home. It's important that there is enough space on the property for a soakage area that will work and give enough distance from streams/rivers, marine areas and groundwater – and especially bores and springs used for water supplies. If you have a small section size, then you might need to limit the size of the house and garage or other structures on it, and you will certainly need to think about what sort of home wastewater system and soakage area you need – and where it should be located. A reserve area of up to 100% of the soakage area should be available on the property for expansion or for duplication of the soakage at a future time. The reserve area should be protected from any development that would prevent it being used in the future.

Soakage areas should be separated from the outdoor living areas on your property and must be kept away from boundaries, buildings and pools - trees with invasive roots and stormwater drains should be a good distance away from the edges of them. Soakage areas must have special protection if carparking or driveways will go over them. It's important to maintain and protect all special plantings and landscaping which are parts of your soakage area, to keep livestock off the area, and not build over them. There must also be effective systems for stopping stormwater and land run-off from oversaturating your soakage area.

Effluent trenches

These are by far the most common way that homes with septic tank systems manage the liquid effluent from the tanks – although the effluent soaking into the soil around the trenches is a key part of the overall treatment in the home wastewater system. Normally in these systems distribution pipes with small holes or slots are laid in shallow trenches about 45cm or 50cm deep and 45cm or 60cm wide, which are half-filled with coarse gravel and covered with soil. The treatment is done by soil bacteria which grow at the base of the trench and eat the organic matter and other pollutants in the liquid effluent. Pathogenic organisms are also filtered out in the bacterial slime growth and soil and die-off over time. Trenches need land left between each trench which means trench systems can take up a lot of land area.

In good soils trenches can be gravity loaded and don't require a pump or siphon system. Otherwise trenches must be dose loaded to make sure the liquid effluent is spread evenly and reaches to the end of each trench. A pump is needed to dose load or if the property has enough slope, a siphon or other dose loading system may work.

A pumped system must be carefully designed so it works properly and be fitted with a high level alarm,

A cross section view of a pump dosed soakage area.

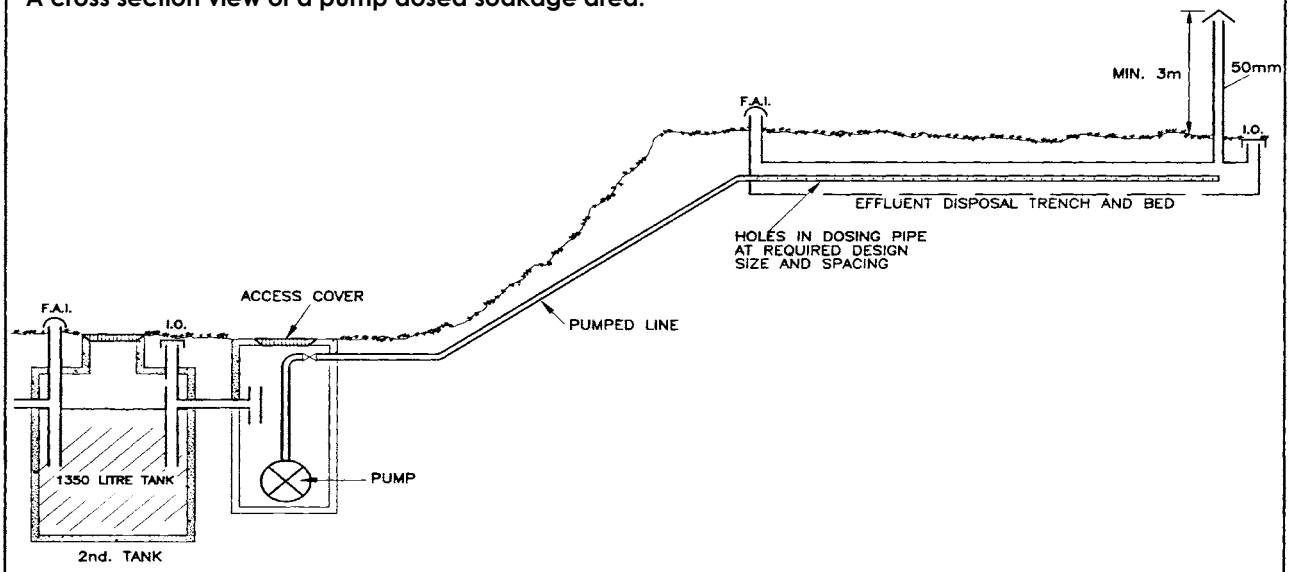
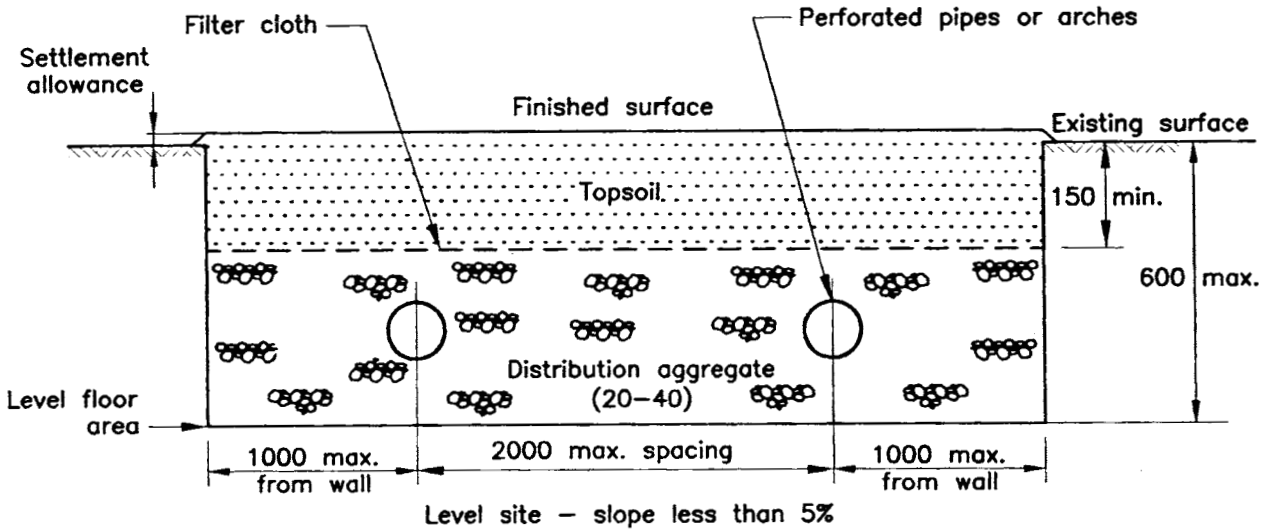


FIGURE A5. PUMPED EFFLUENT DOSING SYSTEM



A cross section view of a soakage bed

such as a buzzer or flashing light in an obvious location. If the alarm indicates a problem, have the pump serviced promptly, to avoid flooding the septic tank and drains.

Key things that make trenches work better are

- If they are shallow – because most of the pollutants are treated by air loving aerobic bacteria found in the upper soil layers.
- If the soil is the right quality to allow final liquid drainage after in-soil treatment – not too much clay, or waterlogged, but also not too sandy.
- The amount of liquids going into the trenches is at a slow enough rate - they don't get clogged up by overgrowth of bacterial slimes.
- If groundwater is well below the trenches and trenches don't get flooded from stormwater on the property.
- If they are dose loaded so all the bottom area of the trench system gets an even amount of liquid effluent.

FIGURE A3. CONVENTIONAL TRENCH SYSTEM

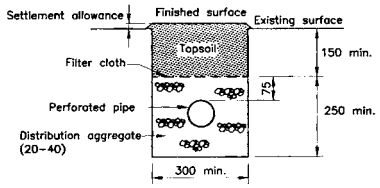
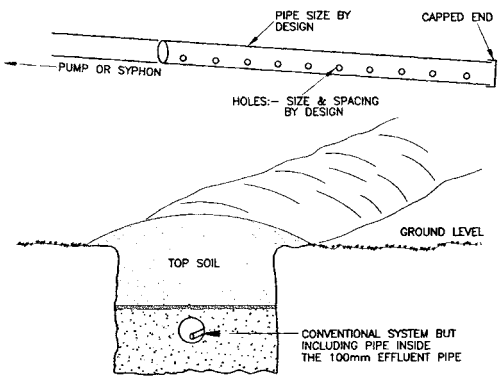


FIGURE A4. DOSED SYSTEM



A cross section view of a shall dose loaded (LPED) trench

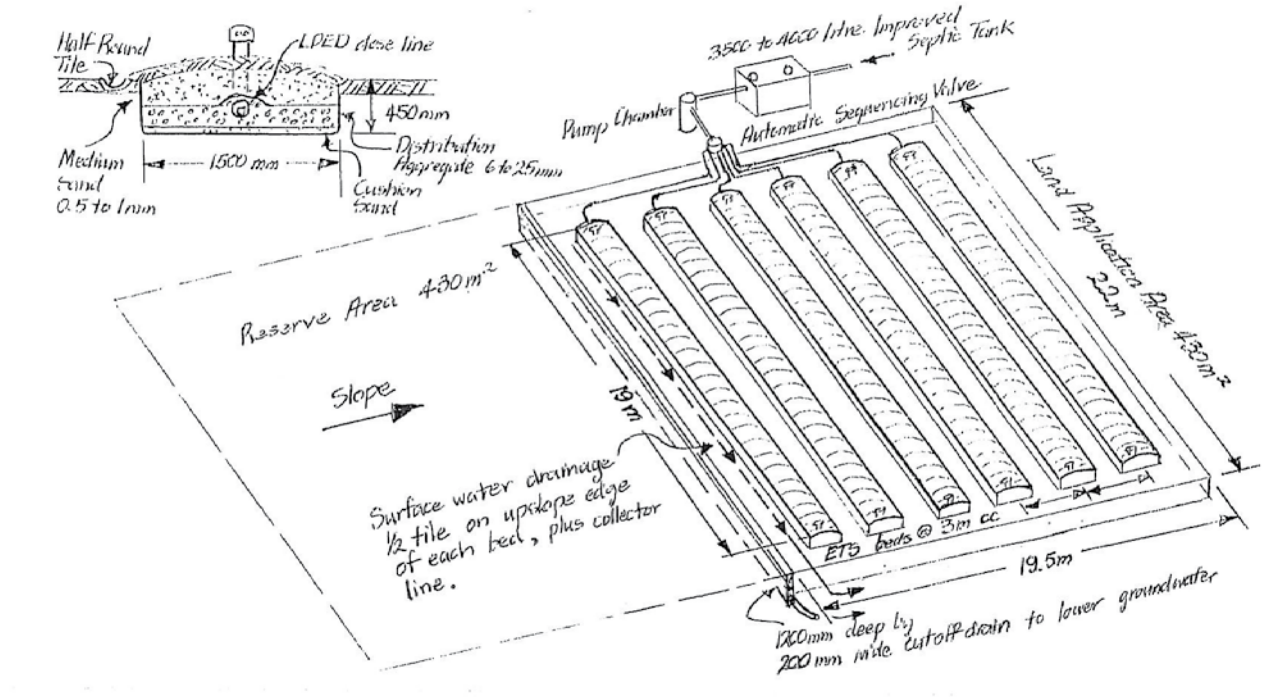
Deep trenches

Where there are sandy or free draining soils lying below the clays deep trenches can be used to reach down to the better draining soils. Deep trenches cut down through the clay and are filled with gravels to reach the deep soils. Deep trenches must be dose loaded so the whole trench system gets an even amount of liquid effluent. However there must be enough clearance to winter water tables below the trenches so the areas where they can be used are limited. Special filter sand can be added into a deep trench to improve treatment of the liquid effluent as it trickles through.

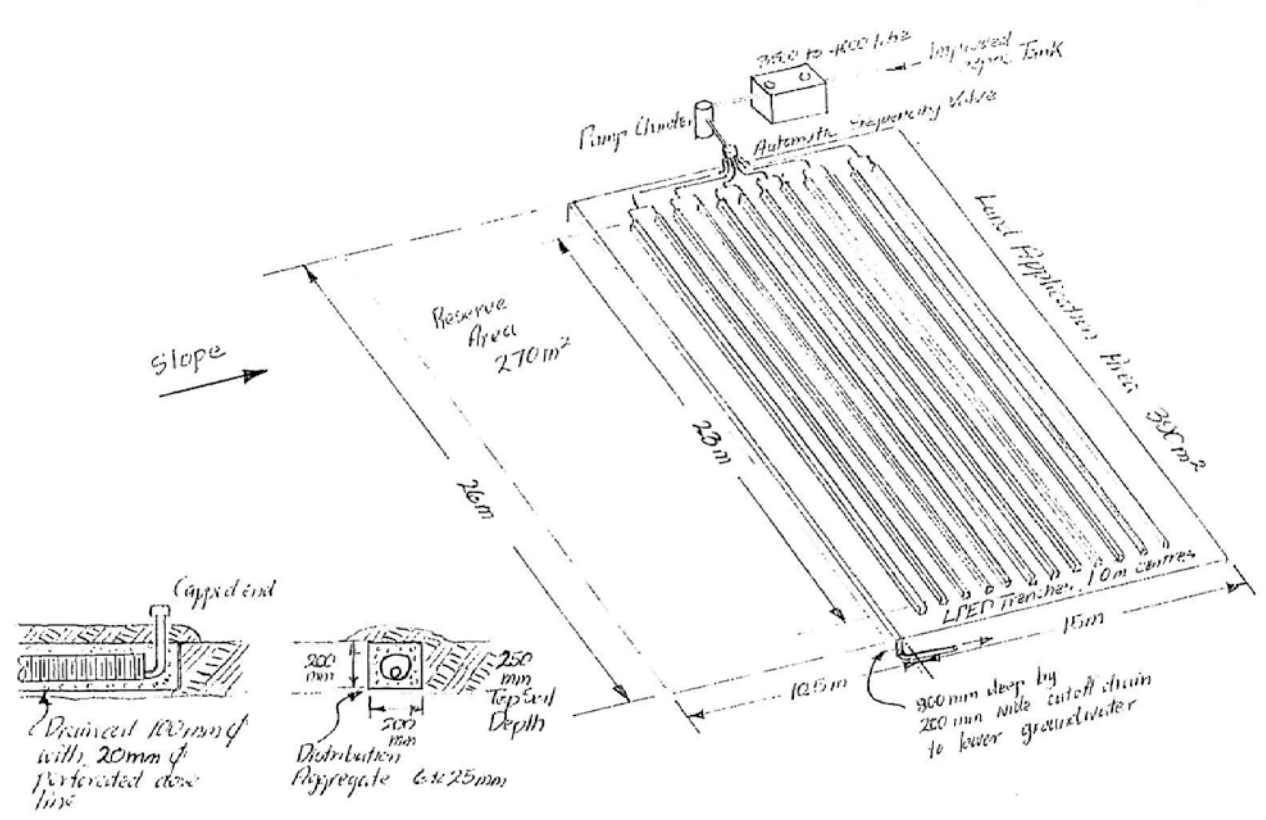
Deep trenches are not normally used if there are other soakage system options on a property.

Effluent beds

Effluent beds are normally used on smaller sites when there isn't enough land for trenches. A bed is normally a rectangle shape but can be long and



An improved septic tank and ETS bed system



An improved septic tank system and LPED irrigation trenches

narrow or wider and more square. A bed is normally about 45cm deep, filled with gravel covered in topsoil and with a number of small effluent distribution pipelines running through the bed. Beds must be dose loaded so the liquid effluent is evenly spread across the bed area and to avoid overloading the bed with liquid effluent at any one time. They can't be used in soils with poor drainage or where high groundwater occurs.

Evapotranspiration (ETS) beds above the ground

These beds are normally used when ground conditions (tight clay soils, surface ponding, high winter water table) mean that the liquid effluent from the septic tank can't be safely put into the ground through trenches.

They are mounded so that rainwater runs off them and doesn't pond, and they are planted so that the plants take up some of the water and help by transferring it to air through leaf transpiration. In many ways they can look just like raised garden beds.

They often have a number of small distribution pipes in each bed that are dose loaded using a pump or siphon system. They normally have drains on either side, to stop water running off from the surrounding area into the bed. This type of bed is particularly suitable for larger rural residential sites in areas where there is a high water table in winter. They are also particularly good in situations with high summer usage such as baches and holiday homes.

Choice of plants is a big part of successful use of ETS beds. You need plants that will take up the moisture and help with the treatment, but not things which will develop large roots and break up the bed.

Pressure compensating dripper irrigation lines before being covered with soil *(I Gunn)*

Bottomless sand filters

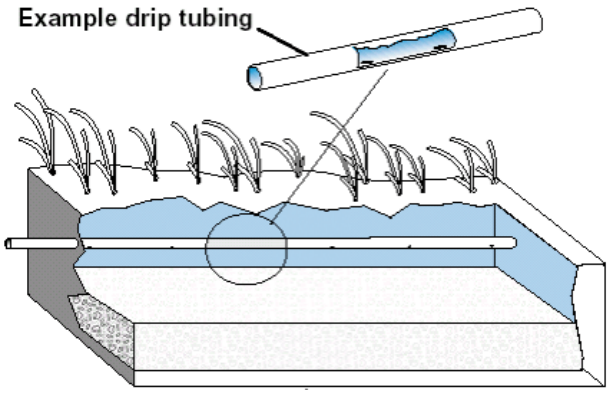
These systems work well in flatter areas with very free draining and sandy soils. They are particularly good for places where shallow trenches or beds won't work because the liquid effluent runs through them too quickly. They are built similar to a soakage bed but in these combined treatment and soakage systems liquid effluent from septic tanks is dose loaded over drainage gravel and then trickles down through special filter sand where the treatment happens, and out the bottom into the soils underneath. Systems are quite small and take less land area than most other types of soakage systems but are only suited to areas where groundwater is deep down.

Shallow dripper irrigation

These are small pipelines with drippers (drip emitters), and which are buried in the topsoil – not more than 20cm deep in the soil. They are used to distribute treated effluent from AWTS, PBR and some vermiculture systems by irrigating it into the soil.

Although they work best in well drained soil, they are well suited to clay type soils with a good cover of topsoil. Sometimes free draining soil is brought in to building up an area if there isn't enough on the property or if groundwater comes close to the ground surface in winter. The drip emitters, which are spaced at around 60cm to 1 meter along the drip line, allow the treated effluent to spray out from the lines at a controlled rate so the soakage area is evenly irrigated. The irrigation system is pressurised by a pump and is termed Pressure Compensating Drip Irrigation (PCDI). PCDI systems work well on flat to moderately sloping sites.

Generally drip irrigation systems are best used under gardens and lawns – but not in frequently used outdoor living areas, as they are so shallow. Care is needed when digging the garden not to cut the



Drip irrigation buried in topsoil to feed plants (USEPA).

A Wisconsin mound being built. This has the dosing part at the top and soil cover and is then planted.

pipelines. The irrigation system must be covered and not allowed to spray out above land.

Shallow LPED irrigation

LPED (low pressure effluent distribution) irrigation systems are used to dose septic tank effluent into shallow and narrow 20cm by 20cm trenches through a pressure pipe with holes in nested within a drain coil line. The trenches are close spaced at 1 metre, and built within a good quality topsoil layer of minimum depth 25cm. If necessary extra topsoil is brought in. LPED irrigation uses around the same size soakage area as a drip irrigation system, but avoids the cost to run an AWTS treatment unit. LPED irrigation needs a lot of flat land area and because it is shallow in the ground, it must not be driven on.

Wisconsin Mounds

Wisconsin Mounds are a good option for areas with high groundwater or other conditions of shallow soils over tight clay, hardpan or rock layers, and flat to gently sloping land. They are built on top of the ground, with sand fill (for treatment) and extra soil brought onto the site, and with distribution pipes laid in gravel over the sand. A good layer of soil is needed between the mound and the poor draining soil so treated effluent from the bottom of the mound can soak into the land. They are often long and narrow, rectangular shaped. They must be planted or grassed, and plants are best located around the edges of the mound to absorb and transpire moisture seeping though the base soils. The size depends on the amount of liquid effluent to soak away and the depth below the mound to the restrictive drainage layer. They can be quite large where the site conditions are difficult.

They require a pumped system to evenly dose the mound with the liquid effluent from the septic tanks.

Deep bores

These allow liquid effluent from septic tanks to be disposed deep underground, typically at about 6 meters deep and are used where there are poor draining soils near the surface but free draining layers at depth. There is no treatment in the ground and the risks are high of polluting groundwater or water that filters through land into springs. They are not suitable anywhere close to streams, rivers or the coast or areas where groundwater is used for drinking water. They are not normally used in the Gisborne District for home wastewater treatment systems especially in residential areas.

Soakholes and deep soakage pits

These are generally used in conjunction with pit privies and long drops. They offer a very low standard of treatment and are best used in places where only very light, occasional use occurs. They should be located well away from streams and the coast, and are generally 1-3 metres deep. They use stone at the bottom of the pit and work best in sandy or gravel soils. They are not normally used in the Gisborne District for home wastewater treatment systems especially in residential areas.

The pros and cons of different types of disposal system

Type of Land Application System	Good Points	Bad Points
Bottomless sand filters	• Work well in very free draining and sandy soils, as provides high quality treatment before effluent soaks into the natural sands. • Need a small amount of land area to install. • Are suitable as soakage systems for primary and advanced primary treated effluent from septic tanks. • Low maintenance and operational costs. • Can be built above ground in a lined box or in the ground.	• Require reliable power supply for dose loading. • Must be dose loaded with small controlled amounts to work effectively - need a suitable reliable pump. • Cannot be used where water tables rise up or where there are tidal influences on the groundwater. • Only suitable for free draining sandy soils. • Additional care is needed to ensure the filter installation won't affect the stability of any building in close proximity.
Deep trenches	• With graded sand can treat septic tank effluent before soakage into soils below. • Can suit on land with poor draining top layer soils but well draining soils below. • Can take up a smaller area than other shallow trench or irrigation systems.	• Require a pumped or dose loaded distribution system to work effectively. • Cannot be used where winter water tables rise up. • Need well draining soils at depth.
Effluent beds in the ground	• Suited to a small site with good soil conditions and where a trench system takes up too much room. • Are suitable as soakage systems for primary and advanced primary treated effluent from septic tanks. • Low maintenance and operational costs.	• Concentrate effluent in a small footprint, so can overload the soil if not sized correctly. • Aren't suitable for heavy, water logged or very free draining sands or gravels. • Require a pumped or siphon distribution system to work effectively. • Need flat land for installing.

Type of Land Application System	Good Points	Bad Points
Effluent trenches	• Effective option on large sections with moderate to good soil conditions. • Can work without any power requirements in moderate to good soil conditions. • Low maintenance requirements. • Land between trenches can be used as the reserve soakage area for the future.	• Aren't suitable for heavy or water logged soils. • Require a pumped or siphon distribution system to work effectively in slower draining soils. • Need flat or very gentle slope on land to install. • Large trench systems can take up a lot of space in slower draining soils.
ETS (evapotranspiration seepage) beds	• One of the few options that work in areas with a high water table or tight clay soils. • Can be built and planted to look like raised garden beds. • Can be operated on siphon or pumped system. • Can be installed on gentle sloping land.	• Can take up a lot of space. • Best sited in a position exposed to wind and sun. • Better for warmer areas with long growing seasons and lower rainfall. • Need land drains installed to capture and channel surface water away from the bed. • Require a pumped or dose loading distribution system to work effectively.
Shallow drip irrigation	• Can irrigate within odd shaped areas and on moderately steep slopes where trench and bed systems aren't practical. • Can provide irrigation of garden areas as an alternative to watering. • An effective way with low pollution risk to dispose treated effluent into soils. • Suitable for use where only shallow topsoils are present are over tight clay, hardpan and water logged soils. • Quick and relatively low cost installation on moderate to good soil conditions.	• Not suitable where ponding occurs in winter unless the land is built up and drains are installed. • Require high quality treated effluent from an advanced treatment system. • Regular maintenance of the drip lines needed so they don't block up. • Require continuous supply of electricity to run the dosing pump. • Easily damaged or crushed and irrigation areas must be protected from damage by stock and vehicles and kept separate from outdoor lawn living areas. • Maintenance required keeping the lines covered under soil or mulch. • Need large areas of land to install.

Type of Land Application System	Good Points	Bad Points
Shallow LPED irrigation	• Irrigate septic tank effluent. • A lower running cost alternative to AWTS and other advanced treatment systems. • Shallow system so good for land with high groundwater in winter.	• Do not have the flexibility of layout possible with drip irrigation. • Require electricity for a pumped distribution system. • Irrigation areas must be protected from damage by stock and vehicles and kept separate from outdoor lawn living areas. • Need large areas of flat land to install.
Soakholes, deep soakage pits and deep bores	• Enable rapid soakage of effluent into the ground in porous soils. • Very small amount of land needed for installation.	• High potential to contaminate groundwater and soils and waterways down flow. • Cannot be used where winter water tables rise up. • Only considered as an option in residential areas when prior treatment of effluent is done to a very high quality before discharge.
Wisconsin Mounds	• One of the few options that work in areas with a high water table and where shallow soils overlay restrictive conditions. • Low maintenance once plants are established. • Can form attractive landscaping features. • Treatment and soakage system for septic tank effluent.	• Expensive to install. • Require electricity for a pumped distribution system. • Plantings require looking after.

What will a system cost?

Costs will depend on what the property is like - the soakage in the soils, land slope, land area available, proximity to water ways, groundwater depth, rising water tables in winter and potential for land flooding.

In addition, the size of the system will affect the cost. The size depends on the number of people and how the building will be used – residential, temporary accommodation, commercial or community use.

Transport and travel costs will also affect the price to install systems in areas further away from Gisborne City.

Generally systems for a house can cost anything from $9,000 to $30,000.

Costs can be much higher for a marae, school or commercial buildings where the systems can be very large or require additional components such as grease-traps, sequencing valves and back-up pumps.

There can also be additional costs for land drains to stop the soakage area from getting flooded and for planting beds and drip irrigation gardens.

If your system has failed and needs replacing you may also need to add the costs of removing the old system on top of the cost of putting in a new one.

As you can see, the costs of a new system can be high, so maintaining your wastewater system in good working order for as long as possible is a good idea.

Local conditions and how they affect your home wastewater system

Soil profile pit dug by site assessor as part of detailed site assessment. The layers of different types of soil can be seen – each layer has different abilities to work as an effective soakage area.

Hole dug for a septic tank installation in an area with high groundwater. In these sorts of conditions above ground dripper irrigation, ETS Beds or Wisconsin Mounds are often the best effluent disposal option.

It's all about the soil

The soil makes up a big part of any decision about what sort of home wastewater system you can install safely in the Gisborne District. While traditional systems rely on trenches, many parts of the district are too wet in winter, with ponding water on the ground and high groundwater meaning that traditional systems don't work well. There are a lot of different soil types and they can be very different from one property to the next. That's why when you want to install a new home wastewater system, or replace a failing one, you need a designer who does a site assessment of the property where the system will go.

Winter and Summer

Winter

Winter is the time when many home wastewater systems are put under a lot of stress – and when failing systems often show up. The combination of high rainfall and high groundwater can often make systems fail, and the result can be ponded sewage effluent on your section.

Things you can do in winter to reduce the chance of your wastewater system breaking down include:

- Making sure rainwater doesn't enter either the tank part of the system or flood the soakage area.
- Installing stormwater "cut off" drains – taking the rainwater around the soakage area and your septic tank system
- Installing raised lids, so that rainwater doesn't flow into any tanks through the lids.

Summer

Summer is usually the time when home wastewater systems are better able to manage, as there is little surface water and the groundwater levels are lower. However it is often the time when the amount of

wastes going into a home wastewater system from your house can increase as friends and whanau come to stay – and this can make a system fail.

While this is great part of our lifestyle, it means your home wastewater system has a lot more it needs to cope with – and people who are not used to using home wastewater systems will need to be told the 'dos and don'ts' of how it works.

If you have a small older system or one that isn't working well, then getting it cleaned out at the start of summer is a good idea. It gives it the best chance of making it through the peak season without failing under extra use.

If your wastewater system is failing and you have sewage spilling or seepage on the ground or into water, it's much more likely that people will come into contact with this contamination when outside or swimming. This makes a high risk of people getting sick.

Baches and Holiday Homes

Baches and holiday homes create a lot of problems for some sorts of wastewater systems. Because they aren't used all the time, and often the power is turned off when they're not in use, some types of Aerated Wastewater Treatment Systems and Vermiculture systems in particular don't work well – or at all.

If you only use your holiday house for summer, then it's best for only a small number of people to stay at the house when you first go there. Give the system a week or two to get activated with waste flows again before having a whole bunch of people come and stay.

Often baches and holiday homes can get more use in the busiest times than the system is designed for. Use an outdoor shower or hose to get rid of sand off people and clothes so it doesn't clog up your treatment tanks, and remember to encourage people to use less water than they might normally do.

Community Buildings

Marae, Sports & Recreation Clubs, Halls, Schools, Camping Grounds

Buildings which have been built for community use have the same sorts of wastewater systems that are commonly used for our houses. That means that the same sort of care is needed in what goes into them, and the same problems can happen.

Because a lot more people are going to use the wastewater system in a community building the problems and risks can be greater if care isn't taken. When putting in a new system, you will need to talk with the Council about the particular things which will be needed to meet the use of your building, and what sort of maintenance is required. There will be a need for extra care with kitchen waste for example, and grease traps are normally required. Signs and instructions for users will also be important, so that problems don't occur. You will need to have in place a maintenance contract for regular system maintenance and cleaning.

Notes

Glossary

Aerobic Treatment System (ATS)
Various types and brands of systems that treat sewage effluent making it suited to irrigation soakage systems.

Aerated Wastewater Treatment Systems (AWTS)
Various brands of systems that have aeration treatment within the system.

Blackwater
The water that comes out of the toilet.

Collar/Extension/Riser
An extra piece fixed around a tank opening to bring the lid up above ground level.

Distribution Box
A device which controls the spreading of liquid effluent into the soakage area.

Effluent Beds
Specially designed raised mounds in or above the ground, used for treating and applying effluent into land.

Effluent trenches
Specially designed trenches in the ground, used for treating and applying effluent into land.

Effluent/Liquid effluent
Wastewater which has had some treatment to remove solids and reduce contaminants. It is not clean water - it is not safe for human contact.

Filter System
A specially designed system (mesh, textile, sand, peat) used for advanced effluent treatment.

Greywater
The water that comes out of your shower, bath, basin, washing machine, laundry tub, dishwasher and kitchen sink.

Mushroom/Vent
The air vent from a septic tank.

Outlet filter
A specially made mesh filter put on the outlet tees to stop solids going out in the liquids from the septic tank.

Outlet tees
Pipes in a septic tank where liquids leave the tank.

Primary treatment
The first level of wastewater treatment where solids and scum are separated from the liquid effluent.

Registered drainlayer
A drainlayer registered under the Plumbing and Drainage Act.

Secondary treatment
A second treatment process where some of the pollutants and micro-organisms are reduced, but the effluent is still not safe for human contact.

Septic Tank
Tank/s into which the wastewater from the house goes.

Septic tank cleaner
Someone who is Licensed as an Offensive Trade Operator

Sludge
The solids that build up on the bottom of a septic tank.

Soakage area, Soakage system
The area where the liquids, from your home wastewater system is put onto the land. They are sometimes also known as soakage fields, drainage fields, disposal fields or land application areas.

Vermi-culture system
A filter treatment system that uses worms to decompose wastes.

Wastewater
All the water that comes out of the drains and toilet in a building.

Service Record - Septic Tank and Soakage Field Systems

Maintenance Requirements	Yearly	3-5 Yearly	Comments
Check scum and sludge depth in tanks and pump chamber.		x	Done by agent, approved person or owner.
Pump out tanks.		x	Completed by approved companies.
Check and clean outlet filter.		x	Done by agent, approved person or owner. Clean prior if needed.
Service pump to manufacturer or supplier recommendations.		Recommended x	Done by a qualified person.
Check high level alarm operation.	x		Done by owner or approved person.
Check pump on/off level switches.	x		Done by owner or approved person.
Check any automatic sequencing valves.		x	Done by approved person.
Check soakage area for wet areas and 'soggy' ground.	x		Done by owner or approved person.
Check and maintain excessive grass/vegetation growth.	x		
Clear surface water diversion channels.	x		
Call in drainlayer to undertake any remedial works.			As required.

Record of servicing and repair work

Date of work	What was done	Who did the work

Date of work	What was done	Who did the work

Notes

Service Record: Aerated Wastewater Treatment Systems, Advanced Filtration Systems and Dripper Irrigation Systems

Maintenance requirements	6-monthly	Yearly	Comments
Service treatment unit by authorised agent or approved person. Service components as specified by manufacturer.			Timing is system-brand specific Agents detailed by system manufacturer. Contact GDC for approved persons.
Clean filter/s.	x		Done by owner and agent or approved person.
Check scum and sludge depth in each chamber.			Timing is system-brand specific Done by agent or approved person.
Service pumps to manufacturer or supplier recommendations.		Recommended x	Done by a qualified person.
Check pump on/off level switches.	x		Done by agent, owner or approved person.
Check high level alarm operation.	x		Done by owner and agent or approved person.
Vegetation maintenance.		x	Done by agent or approved person.
Check irrigation lines are covered by soil or mulch.	x		Done by owner and agent or approved person.
Check soakage area for wet ground.	x		Done by owner and agent or approved person.
Check air release valves are operating correctly.	Recommended x		Done by agent or approved person.
Check flush valves are operating correctly.	Recommended x		Done by agent or approved person.
Flush irrigation lines.	Recommended x		Done by agent or approved person.
Check and clear groundwater diversion drains.	x		
Check and clear surface water drainage channels.	x		

Record of servicing and repair work

Date of work	What was done	Who did the work

Date of work	What was done	Who did the work

Notes

Service Record: Vermiculture Systems

Maintenance Requirements	6-monthly	Yearly	Comments
Service treatment unit by authorised agent or approved person. Service components as specified by manufacturer.			Timing is system-brand specific. Agents detailed by system manufacturer. Contact GDC for approved persons.
Check solids accumulation.			Timing is system-brand specific.
Remove solids following manufacturer or supplier operating instructions.			Precaution required for health protection.
Check worm population (add new worms as required).			Follow manufacturer recommendations.
Service pumps to manufacturer or supplier recommendations.		Recommended x	Done by a qualified person.
Check pump on/off level switches.	x		Done by agent, owner or approved person.
Check high level alarm operation.	x		Done by agent, owner or approved person.
Check soakage area for wet areas and 'soggy' ground.	x		Done by owner or approved person.
Check irrigation system.			Use irrigation system service form.

Record of servicing and repair work

Date of work	What was done	Who did the work

Date of work	What was done	Who did the work

Notes

Service Record: Composting Toilets

Maintenance Requirements	Weekly	Monthly	Yearly	Comment
Add bulking agent.				Timing is system-brand specific.
Check bulking agent supply/ top up bulking agent dosing dispenser.				
Check liquid drainage accumulation.				
Check venting system.				
Empty compost batch container.				Timing is system-brand specific. Precaution required for health protection.
Remove mature compost from output chamber in continuous composter.				Timing is system-brand specific. Precaution required for health protection.
Check maturing container units for completion of composting activity.				
Bury final product and record location.				
Excavate buried product for use as humus/soil conditioner.				

Record of servicing and repair work

Date of work	What was done	Who did the work

Date of work	What was done	Who did the work

Notes

Service Record: Greywater Systems

Maintenance Requirements	6-Monthly	Yearly	Comments
Service treatment unit by authorised agent or approved person. Service components as specified by manufacturer.			Timing is system-brand specific. Agents detailed by system manufacturer. Contact GDC for approved persons.
Service pump to manufacturer or supplier recommendations .		Recommended x	Done by a qualified person.
Check pump on/off level switches.	x		Done by agent, owner or approved person.
Check high level alarm operation.	x		Done by agent, owner or approved person.
Check solids accumulation.			
Pump out tank/s or chambers.			
Service and fill chlorine dispenser (automatic or manual).			Chlorine dispensers are system specific.
Clean inlet and filter.			Filters are system specific.
Clean screens.			Screens are system specific.
UV Lamps/ UV tube cleaning.			UV Lamps are system specific.
Check soakage area for wet areas and 'soggy' ground.	x		Done by owner or approved person.
Check irrigation system.			Use irrigation system service form.

Record of servicing and repair work

Date of work	What was done	Who did the work

Date of work	What was done	Who did the work

Notes

Service Record: Dripper Irrigation Systems

Maintenance Requirements	6-Monthly	Yearly	Comments
Check air release valves are operating correctly.	Recommended x		Done by agent or approved person.
Check flush valves are operating correctly.	Recommended x		Done by agent or approved person.
Flush irrigation lines.	Recommended x		Done by agent or approved person.
Check groundwater diversion drains.	x		Done by owner agent or approved person.
Clear surface water drainage channels.	x		Done by owner, agent or approved person.
Vegetation maintenance.		x	Done by owner, agent or approved person.
Check irrigation lines are covered with soil or mulch.	x		Done by owner and agent or approved person.
Check irrigation area for wet ground, spotting or runoff.	x		Done by owner and agent or approved person.

Record of servicing and repair work

Date of work	What was done	Who did the work

Date of work	What was done	Who did the work

Notes

Notes

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