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## Other brochures in this series

* On-site sewage your legal responsibilities
* Four helpful hints about looking after on-site sewage

Sewage HELP series

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Sewage HELP series

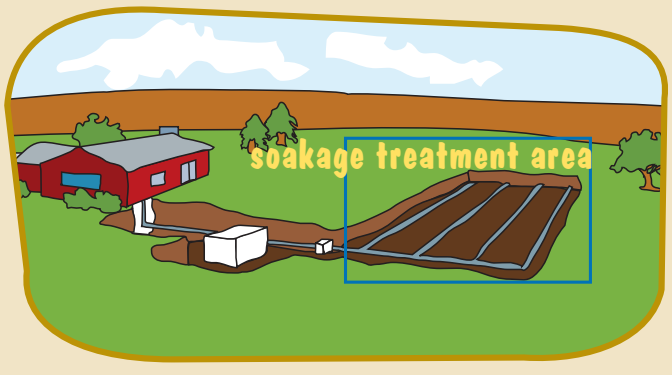

# What's going on in your sewage system



## What's going on in your sewage system

So you've flushed the toilet, or pulled the plug in the kitchen sink, where does that stuff go?

For most of us not on a reticulated town sewer, everything that disappears down the drain goes to a **septic tank**. Liquid passes through the tank and into the **soakage treatment area**.




The tank and the soakage treatment area are both important parts of a sewage treatment system. If sewage isn't treated properly it can harm you and the environment.

! See inside this pamphlet for a description of what happens in the treatment tank and the soakage treatment area.

## Germs in sewage, enough to make you sick

People can come into contact with germs in sewage by:

- handling soil around a soakage treatment area, for example, when gardening
- stroking and cuddling pets that have rolled around on a wet soakage treatment area
- drinking water, especially shallow groundwater, that is near a poorly designed soakage treatment area
- swimming, paddling and splashing around in rivers, lakes and the sea if soakage treatment areas leak into them.

Sewage can contain all sorts of germs. Here's what they are, and what they can do.

***Viruses*** are the smallest kind of germ but probably cause the most sickness in New Zealand. There are hundreds of kinds of viruses. The flu, coughs and colds, and more serious diseases like hepatitis are all caused by different sorts of virus.

***Bacteria*** are another common germ. Some kinds of bacteria can cause skin infections. Others, like campylobacter and salmonella, can cause serious diarrhoea and vomiting.

***Protozoa*** are bigger than bacteria or viruses, and harder to kill. Giardia is a kind of protozoa that can make you very sick for a long time.

***Helminths*** are worms, like roundworm, that live in your intestine.


**Always wash your hands if you handle soil around the soakage treatment area.**

## The problem with nitrogen in sewage

Nitrogen is what makes sewage such a good fertiliser. Some of the nitrogen is in the sludge and scum but most is dissolved in the effluent. If effluent gets into lakes and streams, the nitrogen in it can cause huge amounts of weed growth. Weeds, especially algae, make swimming unpleasant and deprive fish and other aquatic species of oxygen in the water.

Too much nitrogen in water can make it unsafe to drink. This is already the case with groundwater in some parts of the Region. If you drink water from a shallow bore, you can ask the Wellington Regional Council about nitrate levels in the water.

! See inside for a description of sludge and scum.

Sewage HELP series

# What's going on in your sewage system

## Treatment in the tank

The tank is the first part of the sewage treatment system.

The tank can have air pumped into it (an aerobic system), or, if it's a **septic tank**, it will work without extra air (an anaerobic system). The difference between aerobic and anaerobic systems is that they have different kinds of bugs to break down the biodegradable part of the waste.

Most people have septic tanks. These work without added air. What happens in the tank?

- Oil, grease and fat float to the top (**scum**), heavier stuff sinks to the bottom, liquid effluent flows out.
- Bio-degradable stuff is broken down into gases and a liquid **sludge** by "friendly" bacteria.
- Stuff that's not broken down builds up with the sludge

The tank needs to be big enough to give heavier stuff time to settle to the bottom, and for lighter stuff to float to the top.

**Scum and sludge should stay in the tank.**
If sludge and scum escape from the tank, they block up the soakage treatment area.

### What's the best sort of tank?

To get good quality effluent, the best sort of tank is one that:

- gives plenty of time for stuff in the sewage to settle (the tank will need a volume of at least 3,000 litres)
- has an outlet screen or rock filter
- has at least two compartments to keep sludge and scum away from the outlet
- has room to store up to three years of sludge

Two tanks are better than one. If there is a second tank, escaped sludge ends up there instead of the soakage treatment area.

You can "improve" a single tank by putting in an **outlet screen**. Outlet screens go around the outlet pipe and act like sieves. Slimes grow on the screen and these slimes have lots of good bugs in them that feed on the biodegradable stuff and help break it down.

**Outlet screens can be fitted onto most tanks. Make sure you can take it off for cleaning.**

### How clean is the stuff that comes out of the tank?

A lot of germs that can make you sick stick to the solid stuff in the sewage. They will stay in the tank and die if you keep the solid stuff and sludge there. Despite this, the liquid flowing out of the tank can still contain **millions** of germs, as well as nitrogen.

Not all germs can make you sick, but without a microscope you can't even tell if they're there. The best way to decrease any chance of germs infecting people is to keep them away from water and people. This depends on the design of the soakage treatment area.

## The soakage treatment area

The liquid effluent from the tank is treated in a **soakage treatment area** before it soaks away. No matter what sort of tank you've got, and how clean the effluent looks, it still contains nitrogen and probably contains germs so you need to dispose of it safely.

Safe disposal depends on the design of your soakage treatment area.

The soakage treatment area design is important for cultural reasons as well as environmental reasons. A poorly designed soakage treatment area can let partly treated sewage seep straight through to groundwater or rivers. Water has special spiritual and life-sustaining value to Māori. You can help sustain or restore the water bodies near you by making sure that your soakage treatment area properly treats and purifies the effluent from your house.

**Returning waste safely to the land is important to Māori.**

### What kinds of soakage treatment areas are there?

**Soakage trenches.** These are the most common. Pipes with small holes are laid in shallow trenches, which are filled with washed coarse gravel, and covered with soil.

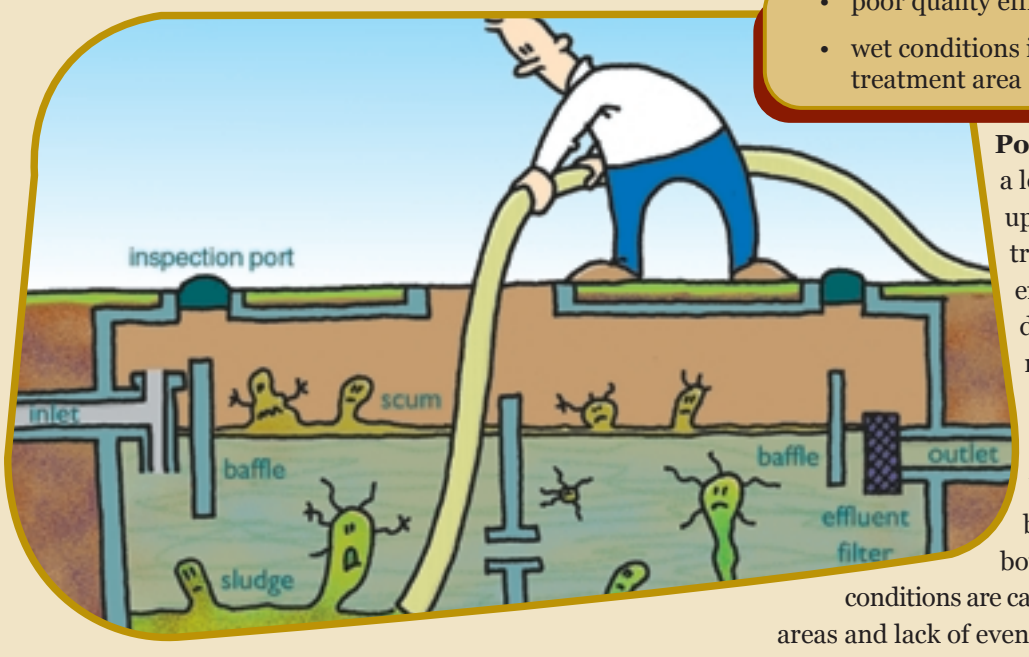
**Low pressure effluent distribution**. Small, pressurised pipes with little holes in them are laid in narrow trenches within topsoil. The pressurised pipes are sometimes put inside larger pipes with holes in them, such as drainage coils.

**Wisconsin mounds**. Pipes are laid in mounds of sand that are specially built on top of the ground. These are good for areas where groundwater is close to the ground surface.

**Irrigation areas**. Effluent is irrigated through small emitters straight onto the soil surface. This is not generally allowed unless the sewage has been treated in an aerobic system (because of the smell).

**Evapotranspiration seepage beds**. Effluent is piped through special beds of plants that use the nutrients in the effluent to grow.

**Soak holes** are **not** soakage treatment areas. They are deep holes in the ground filled with coarse gravel. They are **not allowed** because they let effluent from the tank go straight to groundwater without any treatment in the soil.




### Is bigger better?

For soakage treatment areas, generally the bigger the better. The soakage treatment area could be as big as a tennis court. The smallest would be about half the size of a cricket pitch. It all depends on the sort of soil you've got and the amount of effluent you produce.

It's pointless saving space by putting in a small soakage treatment area. It will block up and effluent will leak out and pollute rivers and streams. Digging up blocked soakage areas and preparing new ones can be a messy and expensive job. Why do it if you can avoid it?

**The bigger the soakage treatment area, the more soil there is to soak effluent up.**

### What's the best sort of soakage treatment area?

What's best depends on your site because every site has different soils and so on. But there are two things that are important everywhere. These are:

- Keep the soakage treatment area as shallow as possible
- Distribute the effluent evenly and not too heavily throughout the soakage treatment area

Shallow soakage treatment areas have the distribution pipes in the topsoil. Topsoil is less compacted than deeper soils, and it's drier and has more air in it. Germs don't survive very well in dry conditions, plus they can be killed by bugs in the topsoil.

If you don't spread the effluent around, almost all of it discharges at the outlet pipe. The soil there gets wet and stays wet, which makes a slime layer grow. The slime layer is pretty good at filtering out germs so it's not a bad thing. But if it gets **too** thick, not even the effluent will get through. Then that part of the trench gets blocked and effluent flows along the pipe and out the next hole where the same thing happens. This is known as "**creeping failure**".

**One way to stop creeping failure is to pump the effluent throughout the entire soakage treatment area.**

### Boggy soakage treatment areas?

Soakage treatment areas get boggy because of:

- poor quality effluent from the tank
- wet conditions in and under the soakage treatment area

**Poor quality effluent** contains a lot of organic matter that clogs up the soils under the soakage treatment area. Poor quality effluent is caused by poor tank design, or not getting the sludge removed often enough. **Get the sludge removed at least every three years.**

**Wet conditions** speed up the build up of the slime layer at the bottom of the trenches. Wet conditions are caused by small soakage treatment areas and lack of even distribution.

**Spread the effluent around a large area.**