SEPTIC STINK

In our third and final in a series about housing on-farm, Jackie Harrigan charts the complex journey of human waste.

The mushrooms at the end of low-pressure effluent dosing trenches, a cheaper option on the right soil type.

In the old days a soak hole in the back paddock sufficed for household and sewage waste, but those days are long gone as district and regional councils clamp down on inferior or outdated systems.

An application for a building consent for renovations now often acts as a flag to councils to require homeowners to upgrade their septic system.

Environmental engineer Dave Miller says many homeowners have had a nasty surprise, after budgeting to add an extra bedroom or do renovations, to find they need to factor in thousands of dollars to upgrade their septic system.

Working as a New Zealand-wide consultant in the field of wastewater treatment, he says he often gets calls from homeowners stunned by the news they need to upgrade in order to get a consent, horrified by the costs, and wondering which system to go with.

A trap for the unwary, he says, is approaching a plumber for advice on upgrading, and being sold whichever system the plumber holds the agency for.

"Often people sign up to spend much more than they need to, because they are talked into the system their plumber is selling."

A standard formula calculates how much capacity is needed for sewage–depending on the number of bedrooms on a property relating to the number of people in the house and possible amount of water used by each a day.

Two treatment processes are recognised in the NZ Standard (AS/NZ 1547:2000) and the system required depends very much on the soil type into or on to which the treated effluent will be discharged, Miller says.

The quality of outflow of effluent is measured in a unit called the BOD5 (Biochemical Oxygen Demand 5, the amount of oxygen required to fully treat a pollutant). The lower the BOD5 figure, the higher the degree of treatment. The standard states raw sewage has a BOD5 of around 350g/m3, primary (septic tank) treatment takes the BOD5 down to 250g/m3, filtered septic tank around 120g/m3

Basic requirements:

- For a rural property without sewerage, the effluent wastewater must be contained on the property (disposed of on-site)
- It must not come to the surface (no ponding)
- Must not flow on to another property
- It cannot flow into a watercourse or groundwater
- It must not cause an odour problem.
- Beyond the general rules, district and regional councils around the country differ in their requirements.

and secondary treated effluent 20g/m3.

Primary (septic tank) treatment uses anaerobic organisms in the tank to provide up to 40% of the required process before the effluent flows into the disposal field. The effluent can flow either by gravity into soakage trenches (the older style system) or be pumped into Low Pressure Effluent Dosing (LPED) trenches, where the micro-organisms in the soil complete the treatment.

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To reduce the volume of septic tank sludge flowing through the septic tank and clogging the natural pores in the soil (a common cause of creeping failure of old systems over the years), tanks are now commonly fitted with an effluent outflow filter as standard practice.

Traditional gravity fed trenches are inefficient because all the effluent seeps out at the start of the trench resulting in progressive trench failure. In modern installations the effluent is pumped into the LPED trenches at a discharge rate designed to be in balance with the soil's ability to absorb and treat the effluent down to a safe BOD5. The disposal area can be fenced off and planted with a selection of slow-growing evergreen trees and shrubs to provide an attractive area.

On well-drained silt soils with room for a series of trenches, a filtered septic system would probably be adequate at a cost of around $8000-$10,000, Miller says, and effluent trenches can be extended or a secondary treatment system added at a later date.

Secondary treatment system with attractively planted garden hiding the drip lines.

On more problematic clay-based or free-draining sandy soils, a secondary treatment system is needed. Additional chambers introduce aerobic organisms for the secondary process, and the effluent (theoretically reduced to BOD5 20g/m3) can be drip irrigated directly on to shelter belts or garden areas. The downside of aerated secondary treatment is that it needs constant oxygen through agitation with an up to $40/month electricity cost and frequent addition of bacterial treatment media to keep the process working effectively.

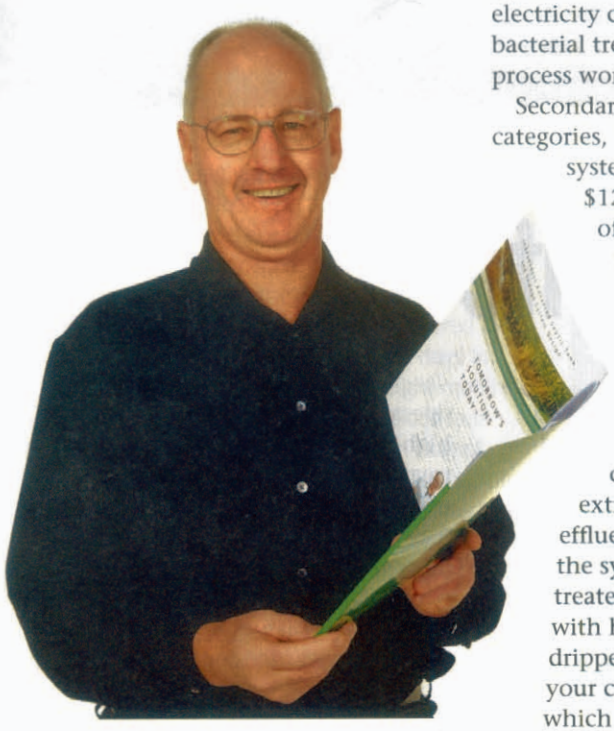
Secondary systems tend to fall in two categories, Miller says. Standard aerated systems, while cheaper (around $12,000-$14,000) to buy, are often more expensive to run, need more regular servicing and frequent component replacement, and are more fragile.

"They will perform well on a good day, but an influx of visitors, or changes in the status quo like extra loads of washing can force effluent to be pushed through the system too quickly to be fully treated – in which case effluent with higher BOD5 loading is being dripped on to your gardens where your children might be playing – which is not ideal."

Advanced systems (costing $18,000-$20,000) tend to be more robust, with a timer and buffered tank level to ensure the effluent stays in the tank long enough to be completely treated.

A study on operating a secondary system over 20 years showed it can cost up to $30,000 more to operate and maintain a standard system than an advanced one over its lifetime. Other studies have shown that more than 65% of sewage-treatment systems operated no better than a filtered septic tank and the cheaper systems were producing the worst results.

Sewage is a dirty and expensive business, and Miller says it pays to get independent advice.



Environmental Engineer - Dave Miller

Questions to ask your treatment system salesman:

- What are the up-front costs including tank/components/groundwork/pump and dump of existing tank/electrical works/consent for system (up to $400 for council)/resource consent from regional council.
- What are the operating costs? Eg electricity a month, bacterial media
- How often is servicing required? At what cost?
- How often does the effluent filter need cleaning?
- Are odours produced as part of operating process?
- Is the aeration within the system noisy?
- Can the system handle shock loadings eg at Christmas? Or intermittent use? (eg holiday homes)
- What is the life expectancy of components? (Filters, pumps, dripline clogging?)