



STAFF REPORT

TO: Environment & Planning Committee

FROM: Jim Trembath, Compliance Officer

REFERENCE: Report to Council: Onsite Wastewater 2008

SUBJECT: **Wastewater Report 2008**

1. INTRODUCTION

The purpose of this report is to present to Council an overview of domestic wastewater issues within the Tasman District.

2. SUMMARY

- Domestic wastewater is constantly generated from every person within the district.
- As community population increase; the volume of generated wastewater increases.
- The generated wastewater often contains bacteria that are potentially harmful to both an individual's health, and the collective health of the community.
- The generated wastewater often contains bacteria and nutrients that are potentially harmful to the receiving environment.
- Careful management of wastewater is required to mitigate the potential harmful effect on both the health of the individual and community together with the health of the receiving environment.
- The domestic wastewater industry has undergone great changes over the past eight years in both technological ability and understanding of how to treat and manage domestic wastewater.
- This rapid change in technology and understanding has resulted in an industry that has grappled with change to different degrees and still includes a wide range of ability and understanding within the industry.
- The Tasman District Council reflect the industry as they have also grappled with the rapid growth of community and the subsequent pressure on infrastructure together with the rapid development of technology and understanding of wastewater management.

- The Tasman District Council is empowered by a number of pieces of legislation in which to manage the effects of wastewater throughout the district.

3. TASMAN DISTRICT COUNCIL WASTEWATER STANDARDS

- **Within the Tasman District Council there are 4 wastewater standards**

The Tasman District has established within its boundaries four wastewater areas in which a particular wastewater management standard is set.

- I. Reticulated: Domestic wastewater is discharged through a reticulated system to a municipal treatment plant. There are eight municipal systems within the Tasman District.
 - Bells Island
 - Motueka
 - Tapawera
 - St Arnard
 - Murchison
 - Upper Takaka
 - Takaka
 - Collingwood

Each of these systems receives both domestic wastewater and industrial wastewater. It is unknown how many domestic households each of these systems service. Flow rates and performance details are held by Council engineering department.

No domestic wastewater standard is set for the discharge into a reticulated system.

II. On-site Wastewater Permitted Activity; TRMP Section 36.1.4:

Any on-site wastewater treatment system that is in any area throughout the Tasman District other than any of the Domestic Wastewater Special Areas and not within the Wastewater Management Area, must meet each of these conditions to be considered a 'permitted activity'.

If the on-site wastewater system fails to meet any of the conditions the on-site system requires resource consent authority or is prohibited.

Simple primary treatment systems may meet these standards. It is unknown how many properties within the Tasman District fall within this required standard.

III. Domestic Wastewater (Special Areas) TRMP Section 36.1.5 (Area Map Appendix 2):

These are different areas identified within Tasman District that have soils that require care in mitigating the adverse affects of receiving discharged wastewater.

Each on-site wastewater system in these areas must meet each of these conditions to be considered a 'permitted Activity'.

The result of these conditions is that a higher standard of treatment is required from an on-site wastewater system than in the Permitted Activity Area.

A wastewater system that includes some form of secondary treatment is required to achieve the required standard of treatment.

If the on-site wastewater system fails to meet any of the conditions the on-site system requires resource consent authority or is prohibited.

As at August 2008 there are approximately 1600 properties within these zones.

IV. Wastewater Management Area TRMP 36.1.13A (Area map Appendix 3):

Any discharge of domestic wastewater after 3 December 2005 in this zone is a 'controlled activity' providing it satisfies the conditions of this section.

This means that resource consent authority will be issued, but Council has reserved control over some aspects of the treatment process and sets conditions accordingly.

Secondary treatment and at times some form of tertiary treatment may be required for systems to meet the set standard.

As at August 2008 there are approximately 850 properties within this zone.

Points of interest:

- Greywater discharges are addressed in TRMP section 36.1.6
- Longdrop toilets are addressed in TRMP section 36.1.7
- There is no TRMP standard set for composting toilets.



'Home made' composting toilet. Bowl sits above the wheely-bin in the cubicle.

Urine passes through the black pipe into a dry swale.

Faeces are discharged into the 'wheely-bin' together with a handful of sawdust to be discharged onto the ground as compost.

4. LEGISLATIVE CHALLENGES

- **A web of legislation regulates the wastewater industry**

The physical installation of Wastewater systems is governed by the Building Act and the Plumbers Gasfitters and Drainlayers Act 2006.

The environmental effect of the discharge is governed by the Health Act and the Resource Management Act 1991.

Design standards are based around the Australian New Zealand standard AS/NZS 1547:2000 and the Auckland Regional Council Technical Publication TP58

Resource Management Act legislation is implemented through the Tasman Resource Management Plan (TRMP)

The relevant TRMP regulations are located in section 36. (Appendix 1)

Those working within the industry (including Council staff) are required to have a working knowledge of different legislation to be proficient at what they do.

Of those working within the industry most are familiar to different degrees with the Building Act and the Plumbers Gasfitters and Drainlayers Act 2006. Many are not as familiar with the Health Act and the Resource Management Act.

There are some active members within the industry who do not appear to be familiar with Design standard AS/NZS 1547:2000 and TP58.

There are some active members within the industry who are not familiar with the provisions of the TRMP discharge regulations.

It appears that throughout the industry, knowledge of the legal responsibility toward compliance with resource consent requirements is poor.

Each wastewater discharge consent whilst similar in form and content; can contain conditions unique to a property. Therefore installing agents and owners are required to be familiar with the conditions of the individual resource consent under which they are authorised to undertake a specific activity.

It appears that most property owners with on-site wastewater systems are not familiar with any of the governing legislation.

5. COMPLIANCE MONITORING: AREAS OF LEGISLATED AUTHORITY

- **Who monitors what?**

Council Building Inspectors monitor and enforce compliance with the provisions of the Building Act and the Plumbers Gasfitters and Drainlayers Act 2006. (Standard of construction)

Council Compliance officers administer the TRMP and RMA including monitoring compliance of both permitted activities and resource consents. (The environmental effect of the activity)

In conjunction with Building Act standards, the RMA resource consent process may set additional standards on construction to ensure mitigation of the resulting environmental effect of the activity, for instance; the position; size and construction method of a disposal field. The position of a disposal field on a property may be directed by resource consent to ensure it is located a suitable distance from a waterway to reduce the possibility of contamination. The size may be directed by resource consent to ensure the flow is spread over a suitable area to reduce saturation of the soil. The method of construction may be directed to ensure a system suitable to the constraints the receiving environment. i.e. dripper line rather than trench.

Building inspectors are not required to monitor RMA conditions; resource consent conditions or the TRMP permitted activity wastewater regulations. Compliance officers are not required to monitor the Building Act standard of construction.

A building inspector will assess a septic tank against the standard in which they are trained. A compliance officer will assess the same septic tank against the standard in which they are trained.

Both officers may stare at the same septic tank and be internally assessing compliance with totally different standards. There is however some informal cross over, the experience of the inspecting officer may alert them to a practice which causes them to raise their concern with a suitably trained colleague.

Council Environmental Health Officers monitor environmental effects on public health. There is some informal cross over as the RMA provides provision for dealing with contaminants discharged to the environment.

Any construction of; or work on an on-site wastewater system that is more than replacing like for like requires building consent.

Any on-site wastewater system that is defined as a 'network utility operator' (NUO) does not require building consent.

Council is notified of the construction of an on-site wastewater system at the time of building consent and/or resource consent application.

On application a Council building consents officer will check each building consent application that may impact on established wastewater systems or contain wastewater design details. The design compliance with TRMP requirements is determined. Applicants are duly notified should the design require resource consent authority.

Council compliance section is not notified of wastewater systems that are installed with building consent as a permitted activity.

Building Inspectors assess compliance with the building consent – not the TRMP permitted activity regulations.

Council compliance section is notified of all new wastewater discharge consents.

6. ON-SITE DOMESTIC WASTEWATER TREATMENT

- **Its interesting stuff.**

The composition of wastewater varies widely. This is a partial list of what it may contain:

- Water (> 95%) which is often added during flushing to carry the waste down a drain
- Pathogens such as bacteria, viruses, prions and parasitic worms.
- Non-pathogenic bacteria
- Organic particles such as faeces, hairs, food, vomit, paper fibers, plant material, humus, etc.
- Soluble organic material such as urea, fruit sugars, soluble proteins, drugs, pharmaceuticals, etc.
- Inorganic particles such as sand, grit, metal particles, ceramics, etc.

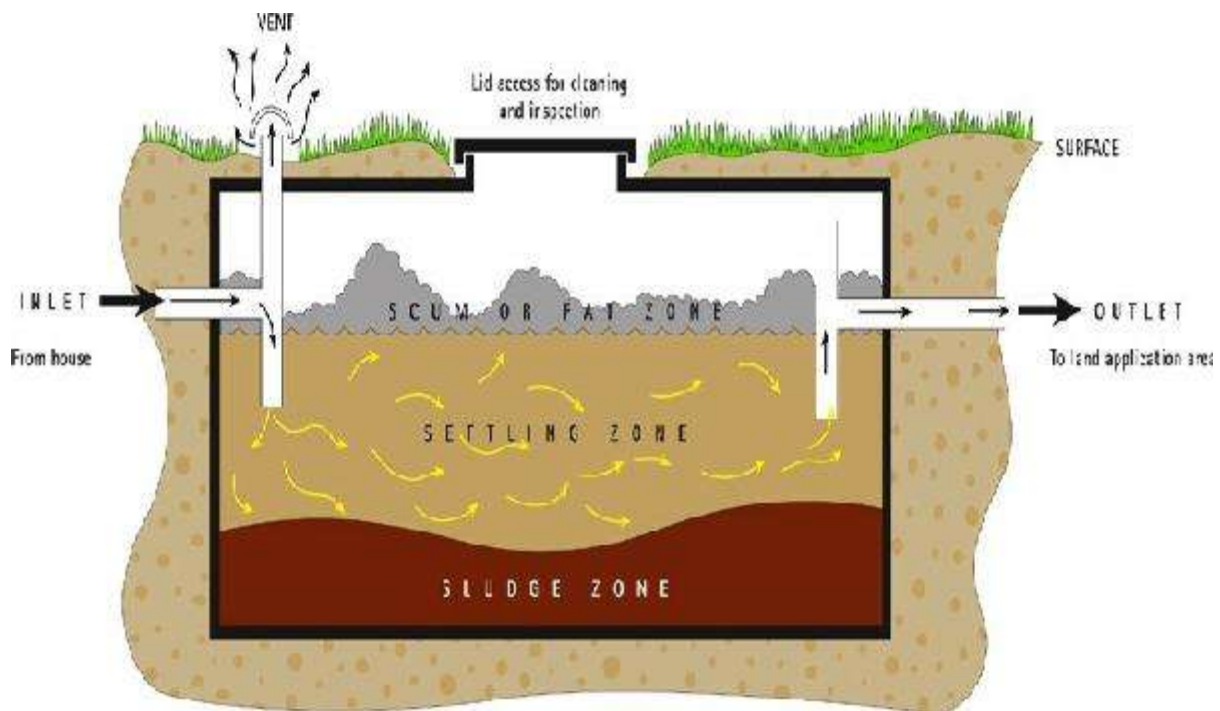
- Soluble inorganic material such as ammonia, road-salt, sea-salt, cyanide, hydrogen sulfide, thiocyanates, thiosulfates, etc.
- Animals such as protozoa, insects, arthropods, small fish, etc.
- Macro-solids such as sanitary napkins, nappies, condoms, needles, children's toys, dead pets, body parts, etc.
- Gases such as hydrogen sulfide, carbon dioxide, methane, etc.
- Emulsions such as paints, adhesives, mayonnaise, hair colorants, emulsified oils, etc.
- Toxins such as pesticides, poisons, herbicides, etc.

Wastewater treatment is not an exact science. Basic treatment involves first discharging waste into a container called a septic tank usually buried in the ground.

The waste eventually passes through the septic tank and is discharged into the soil through some form of delivery system such as a gravel filled trench.

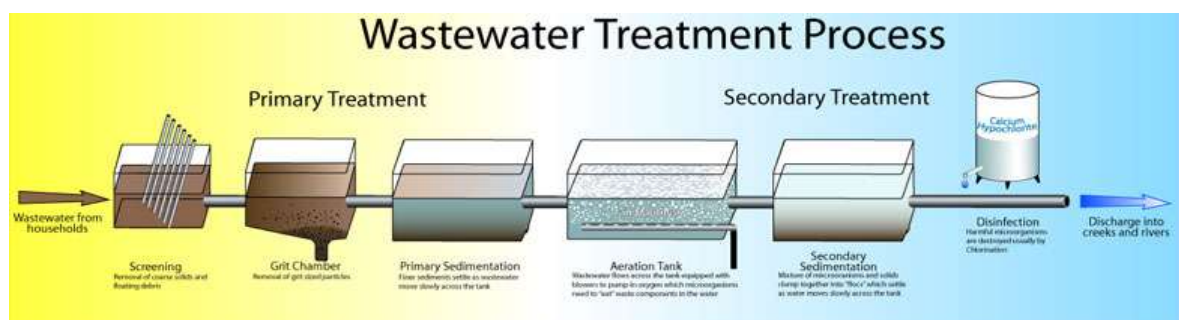
The following (simplified) process takes place within a septic tank; this is referred to as primary treatment:

- As the fluid passes through the tank, solids settle; fats and grease float forming a scum layer.
- The scum layer forms a crust on the surface sealing the tank and creates an anaerobic environment.
- A mass of simple structured bacteria feed on the nutrients within the fluid. The fluid makes its way into the soil where it percolates through the soil pores. Most tanks include some form of filter to restrict gross solids from discharging into the soil.
- Fine solids suspended in the fluid flow into the soil pores. These solids are referred to as total suspended solids or TSS. Too many solids will clog the soil and prevent the fluid from percolating through the soil. This can force the wastewater to the ground surface.
- Bacteria in the soil then feed on nutrients and bacteria that flow from the septic tank. This process draws oxygen from the soil as part of the process. This oxygen demand is referred to as biological oxygen demand or BOD. If the BOD is too great the soil becomes anaerobic.



A wastewater treatment system that incorporates secondary treatment includes a second tank after the primary treatment in relay but prior to discharging into the receiving environment. During this stage the wastewater is oxygenated. Generally this is done through air pumped into the wastewater fluid or alternately the wastewater fluid is pumped over a textile layer. The introduction of oxygen creates an aerobic environment which supports a more complex form of bacteria that feed on both nutrients and the simpler forms of bacteria from the anaerobic tank. This creates a greater form of treatment prior to discharging the fluid into the receiving environment for further treatment.

Tertiary treatment may include passing the secondary treated wastewater fluid through a chemical additive such as chlorine; saturated exposure to UV light; or micro filter in order to kill or remove all bacteria in the fluid.



The receiving environment is an important part of the treatment process:

Soil is the most common receiving environment; the two extreme categories of soil are:

- Category 1 soil; a rapid free draining environment, this fails to provide retention of the wastewater and offers little treatment. Often the wastewater discharges to ground water and can create a fast moving plume. River gravels are generally category 1.
- Category 6 soil; a dense environment with little or no percolation, this traps the wastewater often becoming anaerobic, forcing fluid to the ground surface and becoming boggy. Moutere clay is generally category 6.

Both extreme categories of soil as receiving environments are common throughout the Tasman District. Each wastewater treatment system is designed to mitigate the effect of the contaminant discharge in relation to the individual flow rate the system is required to receive and the characteristics of the receiving environment.



Rented accommodation: This septic tank has failed; note the surface expression of sewage at the point of the blue arrow flowing across the rear of the section in the direction of the red arrows. This system had been failing for some time, neighbours complained of the smell.

7. COMPLIANCE MONITORING HISTORY: WHERE WE WERE.

- **Tasman District Council has a legacy of undetected non-compliance and defacto authorisation of non-compliant on-site wastewater systems.**

Council property records are often incomplete or lack detail; especially detail concerning wastewater systems. This includes incomplete records for both private property and Council owned property.

Incomplete records hinder research and investigation; this has resulted in situations

where property owners discover (usually as a result of failure) an assortment of non complying wastewater systems. In some cases wastewater disposal fields are discovered to be in neighbouring properties, as a result of subdivision without owner knowledge or legal easement.

Wastewater treatment technology along with an appreciation of the receiving environment has greatly increased over recent years.

There are many properties throughout the Tasman District that have dated wastewater systems which are now recognised to be substandard in their treatment and have a potential adverse effect on the receiving environment; these include direct discharges or over flow discharges to streams, rivers, or ground surface; inadequate soak pits and long drops.

The Tasman District includes many holiday properties, including camp grounds with intermittent use, this intermittent use results in periods of high flow and shock loadings over holiday periods.

Most on-site wastewater treatment systems that service campgrounds fail to cope with high flow from intensive holiday period use; this includes camp grounds within local national parks.

Areas that include many holiday properties are beach front properties, small in size often on or close to fragile receiving environments. These properties are often well utilised during the holiday periods resulting in high discharge flows.

Workers accommodation blocks throughout the district traditionally tenanted during seasonal work and makeshift in their wastewater design and construction are now permanently tenanted.



This system services a cluster of 4 old workers accommodation units. Recently refurbished and tenanted full time, the old septic tank system failed to cope with the increased flows.

Note: the lush green grass growing where the sewage overflows from the tanks. In this case the flow runs down through the tenant vegetable garden and into an open drain discharging into the Mariri estuary.

As older systems fail and require significant upgrade, the development of small sections has forced the property owner to invest in expensive on-site wastewater treatment to achieve a standard suitable to be discharged into a small area.

Older systems were often designed for overflow to discharge into roadside drains; paddocks; small open drains; and streams.



Dye discharge: piped from domestic tank to roadside drain; then discharges through culvert 83 onto a Golden Bay beach.

It is believed that a significant amount of work repairing or upgrading wastewater systems is undertaken throughout the district undetected by Council.

Building development also has potential to impact on wastewater systems. Wastewater systems are designed to accommodate specific flow rates based on occupancy and receiving environment. A two bedroom house does not require the same size system a four bedroom house requires as it is reasoned that physical space dictates occupancy. Occupancy dictates flow rate; the greater the number of occupants the greater the flow of wastewater.

However whilst a two bedroom house may have an on-site wastewater system designed for the appropriate occupancy flow rate; should that house receive a two bedroom extension to become a four bedroom house, the increased occupancy and flow rate on the existing wastewater system may cause the system to fail.

Historically it appears the impact of increased wastewater flow to a receiving environment through increased occupancy has not been considered by Council when granting building consent authority.

- **How did we get there?**

Aside from the change and development of population; Industry knowledge; environmental philosophy; and technical development:

Wastewater considerations appear to have been overlooked on occasion during

consent process unless specifically related to the consent.

Building is a separate trade to plumbing and drainlaying.

Council historically employed building or plumbing and drainlaying tradesmen as Council inspectors. Inspectors who were qualified builders would monitor compliance with building standards. Inspectors who were qualified plumber drainlayers would monitor compliance with plumbing and drainlaying standards. Building inspectors are also required to be proficient in their understanding of the relevant TRMP regulations (i.e. building setbacks, daylight angles etc.)

A decision was made to diversify rather than specialise and Inspectors were required to monitor all aspects of a building project regardless of the trade they were trained in. It is unknown what trade training was offered to Inspectors required to monitor the craft of tradesmen from a discipline other than their own.

Given the vast array of regulations building inspectors were required to master there appears to have been a focus on the specific TRMP building requirements; building setbacks; daylight angles; heights etc..

As a result of a lack of staff training; staffing constraints and diversifying; it appears that inspectors not trained in plumbing or drainlaying deferred to the expertise and direction of the tradesmen that they were monitoring. Staff developed a trust or reliance on tradesmen's knowledge. In some cases the word of a tradesman was sufficient if an inspection could not be undertaken.

Not all tradesmen are equal; this reliance has meant that some systems were designed and installed that with current training and understanding are recognised as substandard with a high probability of future adverse environmental effects.

Very little consent monitoring by compliance staff has been undertaken within the Tasman District. Due to staff levels monitoring has been complaint based and therefore reactive only. Proactive consent monitoring has been ad-hoc.

Historically an on-site wastewater system authorised subject to resource consent authority would not be monitored during construction by compliance staff. Instead a building inspector would monitor construction of the wastewater system within his field of expertise. Due to a lack of industry understanding; the property owner and Council staff; resource consent compliance was not considered.

Once constructed a code of compliance certificate was issued which included reference to plumbing and drainlaying. Eventually a prospective buyer purchases the property satisfied that the property (including the attached wastewater system) meets Council standards as certified by the code of compliance certificate.

Eventually as a compliance officer was able, (sometimes years after construction) monitoring of the wastewater discharge consent was undertaken. If the system was discovered to be non-compliant, the house owner would be approached and required to undertake the work necessary to comply.

On occasion the house owner would complain that they reasonably believed at the time of purchase that the property, (including the wastewater system) complied with Council regulations as it had a code of compliance certificate.

Note: Council has settled a number of such complaints through confidential agreements. Anecdotal evidence suggests further cases may develop as monitoring of older consents is undertaken. Some contractors have monopolised wastewater treatment plant installation in recent subdivisions and installed what are now recognised as substandard systems throughout those subdivisions. Council deals with these legal issues on a case by case basis.



Dye discharging from failed septic tank disposal field via preferential flow paths through the soil and into a stream



Dye discharging into a river from a failed wastewater disposal field

6. COMPLIANCE MONITORING: WHERE WE ARE.

- **Council staff grappling with the issues.**

Wastewater management impacts on a number of Council staff and departments including:

- Building Consents officer: Building Act and the Plumbers Gasfitters and Drainlayers Act. PIM assessment.
- Building Inspectors: Building Act
- Engineering Department: Reticulated wastewater system; municipal treatment plant operation.
- Resource Consent staff: Resource Consent authority.
- Planning staff: TRMP provisions.
- Environmental Health Officers.
- Compliance staff: TRMP and RMA provisions.

In May 2008 one full time Council compliance monitoring position: Discharges; was established. This position is primarily focused on monitoring all on-site wastewater discharge consents; the investigation of all domestic wastewater complaints;

monitoring compliance of TRMP wastewater discharge permitted activity regulations; and enforcement of relevant legislation.

In July 2008 one full time Council Building Inspector position: wastewater; was established. This position is primarily a 'front end' position focused on assessing/vetting design and compliance of proposed on-site wastewater treatment systems on consent application.

Tasman District Council is fortunate with the current high standard of staff knowledge and ability in the wastewater field.

Notwithstanding staffing constraints Tasman District Council is in a good position to address the issues outlined in this report.



Note the black pipe running alongside the school playground in an area where children play. This is a wastewater disposal pipe cut in places by a lawn mower and discharging secondary treated sewage from the school on-site wastewater treatment plant directly onto the playing field.

7. CURRENT DEVELOPEMENTS.

Cluster systems:

Council policy includes the encouragement of large privately owned and operated onsite wastewater systems (Cluster systems) that service a collection of dwellings.

Cluster systems are constructed as part of a subdivision and designed so that all dwellings within the subdivision must connect. Although common overseas this is a reasonably new development in Tasman District with some large systems designed to incrementally service 20 to 30 lots, due to be commissioned late 2008.

Ensuring compliance of the operation and management of these systems within consent conditions will fall to Council. Council has no formal in house policy or procedure formulated for the management of a significant failure to a privately owned and operated wastewater treatment plant.

Corporate financial responsibility for the maintenance and operation of these systems is untested and in its infancy within the Tasman District.



Privately owned cluster system installed to service a new subdivision

Resource Consent compliance:

There is a high degree on non-compliance with wastewater discharge consents.

Whilst systems may be installed and physically compliant it is rare for sample points; maintenance contracts and sample results required by consent to be supplied. This requires repeated follow up by compliance.

Most installing agents display little knowledge of resource consent requirements; responsibility is left to the owner. The owner has little understanding and relies on the contractor.

If a system is designed by a wastewater engineer and subject to the engineer's producer statement or certificate it is generally installed in a manner that is compliant with resource consent conditions.

The installation of sample points has been a permitted activity requirement since 1998; however sample points are still not installed as a matter of course.

Education is utilised in the first instance if deemed appropriate with the environmental effects of the non-compliance.

Abatement notice enforcement action is utilised often; (when deemed appropriate for the environmental effects of the non-compliance).

8. FUTURE DEVELOPEMENTS.

The Ministry for the Environment (MFE) is currently conducting a nationwide Road show and receiving submissions concerning a national standard for wastewater.

Indications are the MFE standard may include; the identification of fragile or difficult receiving environments. This has already been done to some degree within the Tasman District with the creation of the domestic wastewater special area and the wastewater management area.

Indications are the MFE standard may include some form of warrant of fitness for an on-site wastewater system. This could have significant financial impact on Council.

For further information visit:

<http://www.mfe.govt.nz/laws/standards/wastewater-systems-standards.html>

A Council wastewater database has been constructed and currently awaits population.

It would appear that the Tasman District more or less follows the national trend with regard to on-site wastewater issues.

