GUIDELINES FOR ENVIRONMENTAL MANAGEMENT

SEPTIC TANKS CODE OF PRACTICE

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FOREWORD

There are about 250,000 households in Victoria that rely on individual onsite systems (septic tank systems) to treat their wastewater. Given the large number of these systems, we must manage them effectively to ensure public health and the environment are protected.

EPA publishes the *Septic Tanks Code of Practice* to provide direction for the management of these systems. The previous edition of the code was published in 1996, however, circumstances have changed significantly since then:

- there is now greater emphasis on sustainably managing our water catchments, particularly controlling the cumulative impacts of large numbers of individual waste sources;
- we better appreciate the need to integrate environmental considerations into the land use planning process; and
- the technology of household onsite wastewater systems has evolved rapidly. There is an increasing number of alternatives to the traditional septic tank, which are gaining acceptance in the marketplace.

These changes drove the development of this new edition of the code.

The code also endeavours to strike an appropriate balance between providing clear direction and certainty to stakeholders, while allowing sufficient flexibility to tailor designs to meet local conditions. EPA believes the new edition of the code will contribute to our continuing efforts to develop an environmentally sustainable community.

MICK BOURKE

CHAIRMAN

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1 INTRODUCTION

1.1 Purpose of the Code

This code is intended to ensure that onsite wastewater treatment systems, used to treat domestic wastewater in areas not served by a centralised sewerage system, protect public health and the environment now and into the future.

In densely populated urban areas, sewerage systems are provided to deal with wastewater. They use a network of pipes (sewers) to collect wastewater and transfer it to a central plant where it is treated so it can be reused, or sustainably returned to the environment in accordance with EPA requirements.

While centralised systems are considered best management practice, they are not practicable in areas with low population density where properties are widely separated. In these areas, properties require individual systems (onsite wastewater treatment systems) that collect, treat and dispose of or reuse the wastewater they generate.

This code describes measures to ensure onsite wastewater treatme nt systems sustainably manage wastewater, while minimising health and environmental risks.

In order to achieve this, the code sets out requirements for:

- integrating consideration of onsite wastewater management with the land development process;
- designing onsite wastewater treatment systems;
- installing onsite wastewater treatment systems; and
- operating and maintaining onsite wastewater systems.

1.2 Scope

This code applies to all onsite wastewater treatment systems, treating less than 5,000 litres of wastewater per day. These systems are referred to as 'septic tank systems' in the *Environment Protection Act* 1970 (the Act).

Systems treating more than 5,000 litres of wastewater per day are subject to individual regulation via EPA's works approval/licence process.

This code applies to all systems, as defined above, that treat less than 5,000 litres in any one day of wastewater generated by, for example, detached houses, flats, units, halls, public toilets and shops. The code does not apply to systems that treat industrial wastewater – such systems usually require an EPA works approval and waste discharge licence. People intending to install a system to treat industrial wastewater should contact EPA to clarify the approval process before installing the system.

The code sets out issues that need to be considered when:

- planning developments that will use onsite systems to manage wastewater;
- onsite systems are being selected, designed and installed; or
- onsite systems are operated and maintained after their installation.

The code adopts a whole of life-cycle approach.

As well as describing issues associated with each of the above stages, the code, in some cases, sets out requirements that must be taken into account in system design.

Nonetheless, the code is not a design manual and should not be regarded as a replacement for technical information. The code does not recommend any specific wastewater treatment method, nor does it endorse any particular process that may be used by an assessor when compiling information about site features.

EPA strongly encourages best practice environmental management (BPEM). As such alternative wastewater treatment and reuse approaches should not be discouraged if they are able to enhance environment protection and meet the design requirements set out in the code.

1.3 Legal Application

This code covers various design elements for small on-site wastewater management systems.

The terms 'shall' and 'must' mean a mandatory requirement of the approving authority.

Other terms, such as 'should' or 'recommended' indicate desirable but not necessarily mandatory procedures or methods.

2 LEGISLATION AND POLICY FRAMEWORK

2.1 Environmental Legislation and Policies

Fundamental principles that guide Victoria's environmental legislation and policy include:

- economic, social and environmental considerations should be integrated in decision making;
- the precautionary principle (to enable prudent action to be taken in the absence of complete scientific certainty);
- the present generation should ensure that the health of the environment is maintained or enhanced for future generations;
- the polluter pays principle;
- protecting the environment is a responsibility shared by all levels of government, industry, business and the community; and
- it is preferable to avoid, reuse or recycle wastes, instead of treating and discharging them to the environment.

Legislation

The *Environment Protection Act* 1970 provides for the control of water, air and land pollution, waste and noise. EPA administers the Act. Part IXB of the Act specifically deals with septic tank systems. It sets out a two-tier approval process for septic tanks where:

- EPA approves the type of onsite systems that may be installed in Victoria, via a 'certificate of approval system', and
- Local government operates a permit system, which controls the installation, maintenance and monitoring of individual units.

Policies

The Act provides for the formulation and adoption of State environment protection policies (SEPPs) by government. SEPPs identify beneficial uses of the environment to be protected, environmental objectives appropriate to those uses, and plans and programs for the attainment of those objectives. SEPPs are statements of government policy and bind state government agencies, local government, the private sector and individuals.

The *State environment protection policy (Waters of Victoria)* sets out requirements for managing domestic wastewater. These require councils to ensure that new subdivisions are either provided with sewerage, or that wastewater can be treated and retained within allotment boundaries. The policy also directs councils to consider this code, when they determine whether wastewater could be retained within allotment boundaries.

This code describes the steps responsible authorities should follow to meet these requirements.

Off site discharge to water may only be approved where council is satisfied that the applicant has demonstrated that:

- the subdivision occurred prior to 15 March 1988;
- the effluent cannot be retained on site;
- the discharge will be consistent with the SEPP (Waters of Victoria); and

- the discharge will comply with the requirements set out in EPA publication 629 *Domestic wastewater management series – Development approvals in sewered and unsewered areas*.

Where council intends to issue a permit for a new off-site discharge of effluent to water, council must notify EPA in writing 14-days prior to decision of its intention to issue such a permit, enclosing a copy of the application and council's reasons for proposing to allow off site discharge.

The *State environment protection policy (Groundwaters of Victoria)* requires that groundwater be protected, with beneficial uses not harmed by the cumulative effects of individual waste discharges.

It directs that best practice approaches be used to ensure that groundwater quality is kept as close as practicable to background levels.

Australian Standards

The following Australian Standards are relevant to onsite wastewater management:

- AS/NZS 1546 On-site domestic wastewater treatment units; and
- AS/ NZS 1547:2000 On-site domestic wastewater management.

On-site wastewater systems should be designed, installed and operated in accordance with the above Australian Standards (and new Australian Standards that may be issued from time to time), unless there is any inconsistency between the Australian Standards and the requirements of this code, in which case the code's requirements take precedence.

The relationship between the Act, SEPPs, this code and Australian Standards is shown in Figure 1.

2.2 Planning Legislation and Policies

Legislation

The key legislation relating to land development in Victoria is the *Planning and Environment Act* 1987. The objectives of the planning framework established under this Act include:

- to enable land use and development planning and policy to be easily integrated with environmental conservation and resource management policies; and
- to ensure that the effects on the environment are considered when…decisions are made about the use and development of land.

Planning Schemes

The Act requires each council to prepare a planning scheme for its municipal district, which is the key tool the council uses to control land use and development. Each planning scheme contains State planning policies on the environment and requires that any development not connected to reticulated sewerage be designed to ensure wastewater can be contained on an individual site in accordance with this code. The ability for proposed developments to meet this requirement should be assessed at the rezoning, subdivision or development stages.

The Act establishes a range of tools to ensure that the objectives set out in planning schemes are realised. These include municipal planning statements, local planning policies and a planning permit process. These are described in Section 3,

where their links with onsite domestic wastewater management are examined.

Ministerial Direction No. 6

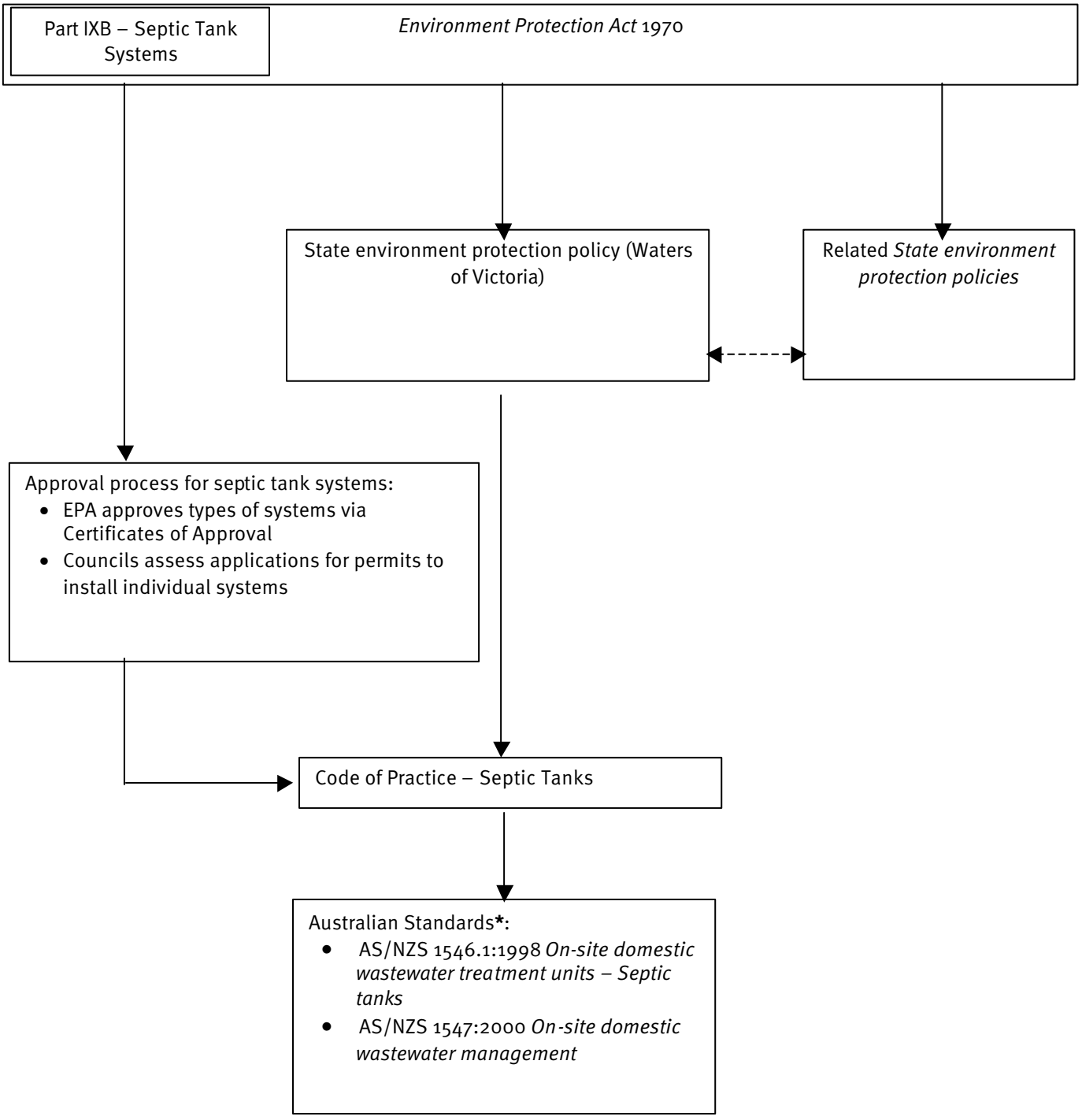
The Act allows the Minister for Planning to issues Directions, which must be implemented by responsible authorities. Ministerial Direction No. 6 requires planning scheme amendments allowing 'rural residential' developments to be accompanied by a report demonstrating how the development would comply with the publication *Guidelines for Rural Residential Developments*. These guidelines require developments to contain wastewater in allotment boundaries.

2.3 Links Between Environmental & Planning Legislation and Policies

Government's intention is that environmental and planning legislation and policies are consistent and mutually supportive. This intent is demonstrated by the objectives of the *Planning and Environment Act* 1987 listed in 2.2 above and by the *State environment protection policy (Waters of Victoria)*, which stresses the need for councils and EPA to work together to implement the policy.

Also, the *State environment protection policy (Waters of Victoria),* planning schemes and Ministerial Direction No. 6 all stress that responsible authorities must ensure that developments not provided with reticulated sewerage only proceed when they are satisfied that wastewater will be treated and retained within the proposed allotment boundaries.

Figure 1: Relationship between the *Environment Protection Act* 1970, State environment protection policies, the Code of Practice and Australian Standards



***Apply Australian Standards, except when**

- they are not consistent with the *Code of Practice*,
- in which case the latter applies

3 ROLES AND RESPONSIBILITIES

Several groups are involved in managing onsite wastewater systems. Each of these groups plays a role in ensuring that health and environmental values are protected.

This section describes the responsibilities of:

- local government;
- land assessors;
- building surveyors;
- system installers; and
- people who are responsible for operating onsite systems (typically the land owner),

as they relate to managing onsite wastewater systems.

3.1 Local Government

Statutory responsibilities

Local government is responsible for developing, implementing and administering various environmental policies and legislation within its area of jurisdiction, including the *Planning & Environment Act* 1987, *Environment Protection Act* 1970, State environment protection policies, Codes of Practice and relevant guidelines.

The Inter-Governmental Agreement on the Environment has indicated that local government has:

'....a responsibility for the implementation of locally relevant and applicable environmental policies within its jurisdiction in co-operation with other levels of government and the local community.'

The *Planning and Environment Act* 1987 (S12 (2) (b)) states that as a planning authority, local government:

' must take into account any significant effects which it considers the scheme or amendment might have on the environment or which it considers the environment might have on any use or development envisaged in the scheme or amendment....'

Section 60 of the *Planning and Environment* Act covers what a planning authority must consider before deciding upon an application.

Local government when assessing proposals in unsewered areas must ensure that they consider:

'any significant effects which the responsible authority considers the use or development may have on the environment or which the responsible authority considers the environment may have on the use or development; (Section 60 (1) (iii)); and

any strategic plan, policy statement, code or guideline which has been adopted by a Minister, government department, public authority or municipal council. (Section 60 (b) (ii)).'

Under the *State environment protection policy (Waters of Victoria)* and municipal planning schemes, councils are responsible for ensuring new residential subdivisions are provided with reticulated sewerage at the time of subdivision or that the allotments created are capable of treating and retaining wastewater within the boundaries of each allotment. Council responsibilities for development approvals in sewered and unsewered areas are detailed in EPA Publication 629.

When preparing amendments to planning schemes to allow rural residential development, local

government must consider Ministerial Direction No 6, Rural Residential Development. This Direction requires local government to consider and comply with *Guidelines for Rural Residential Development, July 1997*. Council must show through the development of an explanatory report, how an amendment complies with these guidelines. Included in this report must be an assessment of the locality's health and hazard-related features that could affect or be affected by the rural residential development. This assessment must include a soil absorption testing program for which 'the results must show compliance with…. the *State environment protection policy (Waters of Victoria)*'.

Where there are concerns that a proposed subdivision (or rezoning) may give rise to environmental degradation, or that certain parts of an assessment report give rise to unresolved questions, it is prudent for council and council officers to seek advice either through the referral mechanism or independently from other agencies. These agencies could include water authorities, particularly if sewer is nearby, EPA, catchment management authorities and the Department of Sustainability and Environment. Councils can also seek technical and planning advice from outside professionals.

Council should be aware that as development densities increase, there will be a risk to the environment from cumulative detrimental effects.

A land capability assessment addressing domestic wastewater management should be carried out as early as possible in the planning phase, to ensure councils have addressed their duty of care obligations. Councils should not issue permits unless they are satisfied that the management program is practicable. Figure 2 shows the overall assessment process for land development using onsite systems.

Council management programs

Councils should develop onsite wastewater management programs that ensure:

- onsite wastewater is managed so that there is no danger to human health;
- developments using onsite systems only proceed after they have been demonstrated to be environmentally sustainable;
- domestic wastewater treatment occurs via EPA-approved on-site systems;
- wastewater is confined within the allotment boundaries;
- programs for ongoing management of onsite systems are feasible and achievable; and
- monitoring and inspection programs are carried out.

Municipal onsite domestic wastewater management plans provide a mechanism for the development, implementation and review of programs to achieve these objectives – see Section 6 for more information about these Plans.

Council may also consider the use of maintenance agreements, linked to the title of the property, binding future owners. This may be achieved using the provisions of S173 and S181 of the *Planning and Environment Act*.

Assessing septic tank permit applications

Local government assesses applications for permits to install and operate septic tank systems under the *Environment Protection Act* 1970 (S53). Permits may be issued with conditions. The council must refuse to issue a permit if the proposed septic tank system is contrary to any State environment protection policy.

Although EPA may have approved a type of wastewater treatment system for use in Victoria, this does not mean it will always achieve the necessary outcomes at a specific site. The suitability of a system for a particular location depends on factors such as lot size, climate, number of people using the system and whether the property is occupied full or part time. The council must look at the suitability of a proposed system for a site when it assesses a septic tank permit application.

Applications for a permit to install a domestic wastewater system must contain sufficient information to enable the council to properly assess and determine the application. The application must show that the proposed system will meet design, installation and performance standards, with regard to the nature and volume of the proposed wastewater and the characteristics of the proposed site.

Typically, domestic dwellings generate up to 2000 litres a day of wastewater. Wastewater generation varies with factors such the number of occupants and the efficiency with which water is used. As wastewater volumes rise, risks to human health and the environment increases.

When wastewater volumes are predicted to exceed 2000 litres a day, councils are strongly encouraged to more critically assess the waste minimisation aspects of the proposal. The routine generation of more than 2000 litres a day of wastewater may indicate a usage that is not purely domestic.

3.2 Land Assessors

It is not the task of EPA or councils to undertake site and soil assessments for developers or individual landowners. Applicants should arrange for this to be done on their behalf.

The usual approach would be to engage a suitably qualified professional to carry out the land assessment. Such professionals should be aware of the requirements of EPA, councils and other government agencies.

The assessment should be sufficiently rigorous to allow council to be fully informed in preparing conditions for the development. This should be done so council may incorporate the necessary environmental protective controls.

It must be stressed that the assessment of a particular site should be more than simply an audit of the provisions and recommendations set out in this code.

The code cannot anticipate every potential environmental impact that may be associated with a development using onsite wastewater treatment systems. Councils therefore need to have a high degree of confidence and certainty with regard to the outcomes and conclusions made by assessors.

Although there is no simple way to guarantee work quality, councils should satisfy themselves as to suitability of those undertaking land assessments.

This could be done by verifying the assessor's:

· qualifications

The ability of an assessor to competently review a site's capacity for onsite wastewater treatment depends on the assessor having suitable professional training and experience. Personnel undertaking or supervising data gathering and assessment should have a relevant and acceptable tertiary qualification from a reputable training institution in a discipline such as engineering, science or geography.

- experience

The knowledge of similar work having been undertaken, or references from councils and other bodies, may allow council officers, developers or the individual landholders to judge the competency and capacity of individuals and organisations to competently carry out land assessments.

- professional membership

Persons should be accredited members of an appropriate professional body. In some instances professional bodies will certify the competence of members to undertake particular works.

· professional indemnity

Individuals should hold pertinent indemnity insurance to a level which will offer protection to the council if problems arise in the future due to inadequate assessment. The council may wish to verify the status of the policy from the insurance underwriter or actually see the relevant parts of the indemnity policy. Land assessors should not be undertaking assessments in areas where they do not hold insurance.

· independence

Advisers need to fully appreciate the consequences of their advice over the long term. 'Consultants should place their responsibility for the welfare, health and safety of the community and environment before their responsibility to sectional or private interests'. (Code of Ethics, Australian Institute of Engineers). Advisers should satisfy themselves that the particular management program and/or equipment recommended are the most appropriate in the particular circumstances and are feasible for the proponent.

It is recommended that land assessors familiarise themselves with the expectations of individual councils through consultation with the relevant council staff.

3.3 Building Surveyors

Private surveyors are now able to issue building permits. However building surveyors must obtain a 'consent and report' from the relevant council at two stages of the building approval process:

· before issuing a building permit; and

· before issuing an occupancy permit

for any unsewered allotment that requires the installation of any onsite wastewater system, or involves the erection of a building over an existing onsite system.

The Minister for Planning and Local Government has directed that an occupancy permit for a building must not be issued unless the necessary consents have been obtained (Minister's Guideline 97/02, 31 July 1997).

These requirements are to ensure that:

- building permits are not issued for an unsewered property where suitable wastewater management arrangements cannot be made; and
- occupancy permits are issued only when the installation of the wastewater system has been approved by the council.

3.4 Onsite Wastewater System Installers

Onsite wastewater treatment systems are varied and often specialist knowledge is required to ensure the particular system is installed to comply with EPA and council requirements.

All wastewater systems installed in Victoria must be approved by EPA and hold a current Certificate of Approval (CA) (see EPA publication 748 Domestic Wastewater Management Series: EPA's Certificate of Approval System). The installer needs to be aware of, and familiar with, the requirements of the relevant CA, the septic tank permit conditions and the site assessment report prior to installing and commissioning the onsite wastewater system. In particular, the installer should be aware of any specific environmental protective measures outlined in the septic tank permit.

Installers must ensure that the system complies with the:

- EPA Certificate of Approval for the particular system being installed;
- septic tank permit;
- manufacturer's specifications; and
- Victorian plumbing regulations.

Prior to installing a wastewater system the installer should ensure the council has in fact consented to the installation of a system by issuing a permit to install a septic tank system. Following the installation and prior to being used a 'Certificate to Use' must be issued by the local council – the system installer will often apply to council for the Certificate to Use on behalf of the system user.

Anyone engaging a contractor to install an onsite wastewater system should verify the installer's:

- knowledge

There are many types of wastewater treatment systems approved by EPA and the number of approved systems is increasing. There are often features associated with a particular system that require specific knowledge. For example, a number of package treatment systems require pump selection and alarm systems to match the expected wastewater loading, together with specific council permit needs. A good knowledge is needed to ensure the installed system will perform satisfactorily. An onsite wastewater treatment course is being developed, for delivery via TAFE.

- insurance

Individual installers should carry relevant insurance to protect other parties in case of treatment plant failure due to faulty installation. This insurance may go beyond the product liability insurance that is attached to the main treatment plant but can include the works associated with the siting, installation and commissioning of the facility.

3.5 People Operating Onsite Wastewater Systems

Persons operating onsite wastewater treatment systems have responsibilities under the *Environment Protection Act* 1970. Typically, this will be the property owner.

They should satisfy themselves that contractors and consultants are competent to undertake works on their property or on their behalf.

The key obligation of a person responsible for an onsite system is to address and comply with the septic tank permit, and the Certificate of Approval requirements. A person who fails to comply with permit conditions could be subject to enforcement action.

The responsible person has an ongoing responsibility to maintain their onsite system in accordance with the septic tank permit. In many instances this will involve a contractual arrangement, which meets with the approval of the council.

These responsibilities may include monitoring of discharge quality from the system, and the routine re-assessment of reuse areas, to ensure they continue to operate efficiently and effectively.

Landholders may need to review their household public liability insurance policy to ensure the wastewater facility is included.

Anyone who may become responsible for the operation of an onsite system should make themselves aware of the responsibilities they would acquire.

Thus, they could familiarise themselves with the type of system in place, the system's location, and the ongoing management program required by the septic tank permit and the Certificate of Approval.

Specific conditions can be obtained directly from council. A number of councils have advice available for new residents to assist with land management expectations on new and existing properties. The solicitor or real estate agent assisting them in the property purchase may also be of assistance.

4 WASTEWATER TREATMENT AND DISPOSAL OPTIONS

4.1 Options for Wastewater Management

There are three principal ways to manage wastewater:

1. Discharge the wastewater offsite (reticulated sewerage);
2. Partially treat the wastewater on-site, then discharge the partially treated wastewater offsite for further treatment; and
3. On-site treatment.

Options 1 and 2 are usually managed by statutory authorities and are not the subject of this code.

The feasibility of providing reticulated sewerage should be seriously considered for the development of individual lots and for subdivision proposals when residential development would result in allotments smaller than 10,000m² (1 hectare). This area should not be seen as a minimum lot size, but as a risk threshold, that is there are significant risks associated with wastewater management on lots smaller than 10,000m².

Reticulated sewerage systems provide the best practice environmental management technical option for collection, treatment and reuse of wastewater. Where reticulated sewerage is available, EPA considers that onsite systems are not acceptable, unless all effluent can be beneficially reused within allotment boundaries. However, this is not possible on typical urban lots. More information is available in EPA Publication 812, *Reuse Options for Household Wastewater*.

This does not preclude the use of alternative systems and approaches. Such alternatives need to be justified by detailed technical information, demonstrating that the proposed alternative is sustainable in the long-term with a high level of certainty.

If sewer is not available, partial on-site or complete on-site treatment, in accordance with this code, will need to be considered. Complete on-site treatment should only proceed if council is satisfied that the proposal:

- is consistent with the *State environment protection policy(Waters of Victoria)*;
- will use EPA approved wastewater systems;
- the systems can be managed and maintained in accordance with this code; and
- incorporates procedures to deal with the possibility of treatment plants failing.

Wastewater Types

Household wastewater can be divided into two categories:

- Blackwater (toilet waste); and
- Greywater (all non-toilet wastewater, including wastewater from the bathroom and laundry areas. Sometimes referred to as sullage).

It is a common misconception that greywater does not contain pathogens and that it is only blackwater that requires treatment prior to land disposal. This is not the case, as greywater streams can exhibit high biological loads, including a pathogen component that, if unsatisfactorily treated, would present a risk to human health.

Greywater from households must not be simply collected and applied to land without first being treated in accordance with this code. However, during dry weather, greywater may be temporarily diverted to sub-surface irrigation, in accordance with EPA publication 812 *Reuse Options for Household Wastewater.*

4.2 Onsite Treatment Options

There are a number of processes used by onsite wastewater treatment systems, as shown in Table 4.1. Treatment can involve one or a combination of the following processes:

- Anaerobic treatment;
- Aerobic treatment;
- Composting; or
- Incineration.

The treatment processes available are numerous and the number and type of methods is increasing. It is not the function of this code to detail all aspects of each and every system approved by EPA. For specific information reference should be made to the EPA Website to highlight specific Certificate of Approval information on each process.

Selecting the wastewater treatment option best suited to a specific site needs a thorough assessment of a number of interrelated factors including:

- Geographic features;
- Expected usage;
- Availability of other services;
- Ongoing management capacity;
- Land holder preferences; and
- Economic considerations.

Table 4.1 shows some of the possible alternatives that may be considered. Consultation with the local council is recommended, before any system is adopted.

Table 4.1: Onsite Wastewater Treatment Options

Wastewater Type	***Onsite Wastewater System Types***	***Disposal Options***		***Maintenance Requirements***
		Treated Effluent	***Residual Solids***	
All wastewater Blackwater Greywater	Conventional Septic (Anaerobic)	Trench	Offsite via desludging contractor	Annual inspection Desludging in accordance with permit conditions
	Package (Aerobic)	Trench Subsurface irrigation Surface irrigation	Offsite via desludging contractor	Quarterly servicing Annual monitoring
	Compost Incineration	Trench	Refer to relevant Certificate of Approval*	Requirements vary – refer to Certificate of Approval* and septic tank permit

*Refer to relevant Certificate of Approval

4.3 Approved Treatment Systems

Only onsite wastewater systems approved by EPA may be used in Victoria. Systems approved by EPA are issued with a numbered Certificate of Approval (CA) (refer to *EPA Publication 748, EPA's Certificate of Approval System*). The local council must also issue a permit prior to the installation of individual units.

Anyone who installs an onsite system that has not been approved by EPA and/or without obtaining a council permit is liable to enforcement action.

EPA approvals typically are issued for a fixed period. Renewal of the approval is dependent on an independent audit of operating units demonstrating satisfactory performance. All treatment systems approved by EPA can be found on the EPA website.

The same approval process applies to one-off owner designed and installed systems.

It is important to be aware that although EPA may have approved a wastewater system, it may not be suited to a particular site. The council should assess the local situation and make a decision as to the suitability of the particular unit to address the land constraints (if any) identified within the land capability assessment.

4.4 Operation and Maintenance of Onsite Systems

4.4.1. General principles

Onsite wastewater systems are typically designed for regular small flows. Surge flows can adversely affect onsite systems. The volume of surge flows from fittings such as spa baths may be greater than the design capacity of the tank.

Surges have the potential to force solids through the system, leading to high solids levels in the treatment plant effluent, which can clog filters, absorption trenches and effluent irrigation pipes. Surge flows should be minimised and, if high surge flows are likely, the system should be designed to deal with them.

Aerobic plants may not be suitable for sites where irregular or intermittent flows are likely, such as holiday homes, or sporting facilities.

There are a number of other factors that can affect the performance of onsite systems. Features vary with respect to the type of treatment and can include:

- Detention time;
- Tank proportions;
- Tank volume;
- Sludge storage;
- Partitioning;
- Aeration capacity;
- Power availability; and
- Maintenance scheduling.

Onsite systems can function for long periods if well maintained and used solely for the purpose to which they are designed. Many systems are old or inappropriately used with the consequence that they no longer treat wastewater properly.

Failed systems are not easy to identify particularly as contamination of subsoils and ground water may be inconspicuous. Section 4.7 provides more advice on identifying failing systems.

The maintenance of on-site systems is the responsibility of the owner. On-site wastewater systems should be seen for what they are - a sewerage system. However unlike the reticulated sewerage systems used in towns, on-site systems must collect, treat, and dispose of, or reuse effluent within individual allotments. Thus, there is a clear need to optimise the operation.

Onsite systems are generally efficient when they have been designed to accommodate the waste loads from the building(s) they service, and when the system has been properly installed and maintained. Householders should not consider that any system, once installed, will continue to function as intended without ongoing care and maintenance.

The maintenance of the onsite system involves more than the treatment unit. Owners need to consider both the treatment plant and the land areas in their maintenance program. The system should be regularly maintained and irregularities identified and corrected.

Many people previously connected to reticulated sewerage on moving to premises with an onsite system are unaware it operates by the biological digestion of organic matter and many householders attempt to disinfect them or expect the system to function indefinitely without care and maintenance.

Advice to householders on the proper care and use of septic tanks can be gained by contacting the environmental health officer at the municipal council, or from the system manufacturer.

Issues regarding land application of the treated effluent will need specialist advice.

Commercial premises with daily flows less than 5000 litres a day may need to consider not only the hydraulic aspects of design but also the capacity of the system to deal with potential organic loadings.

Sources in this category include hotels, motels, guesthouses, bed and breakfast establishments, restaurants, shops, schools, sport centres and public recreational areas. Where loading considerations are in question wastewater treatment should refer to EPA publication 500, *Code of Practice for Small Wastewater Treatment Plants*.

4.4.2. Maintenance of Septic Tanks

Septic tanks reduce wastes by the anaerobic bacterial decomposition of solids and are the most common method in use in Victoria.

A new septic tank should be filled with clean water before use. Domestic wastewater from the dwelling will contain sufficient biological material to allow the initiation and continuation of the treatment process. There is no need to feed or charge the system with starter materials. Generally in the initial chamber, solids are collected and digested by predominantly anaerobic bacteria. A sludge is produced and this together with non-biologically treatable inert material (such as sand) collects on the bottom of the tank. Scum is also produced and forms a surface mat on the top of the partially treated wastewater.

In time the sludge and scum layers build up and will need to be removed (by pump-out) for the tank to function properly. Without the removal of the scum and sludge materials there could be carry-over to the disposal area.

The level of solids accumulation in the tank cannot be accurately predicted, and will be dependent on the waste load to the tank. Therefore, the sludge depth should be checked annually. Householders may be reluctant to undertake this task and a better alternative may be for a contractor to do this.

The pumping out of the tank should be undertaken as specified in the relevant Certificate of Approval or in the council permit. The pump-out process removes non-biological, inert material and allows the tank to function optimally.

Following pump-out, there is no need for tanks to be washed out and they should not be disinfected. They should be refilled with water. A small residue of sludge will always remain which will assist in the immediate re-establishment of bacterial action. In those instances where septic tanks are under a maintenance contract, regular assessment of the sludge and scum layers should be part of the maintenance agreement.

It is not necessary for householders to make use of commercial products added through the toilet or sink system in an effort to dissolve sludge build-up. Such a process is not an alternative to regular pump-out and the consequences of such treatment has not yet been scientifically shown as environmentally sustainable.

Householders should keep a record of their septic tank status and notify the local council that a pump-out has been undertaken in accordance with the septic tank permit.

It is critical that a septic tank system not be used as a simple rubbish unit. Experience from regional sewage treatment works has shown that items such as sanitary napkins, disposable nappies, plastic bags, stockings, clothing, plastic bottles, and various metal containers find their way into sewers. There is no facility in a domestic septic tank system to separate these types of items. Septic tanks are designed solely for the treatment of organic materials.

Detergents, disinfectants and other household materials can affect bacterial action within septic tanks. Used in low quantities these may not unduly hinder efficient operation. Users need to be aware that, due to the tank volume and the subsequent limited dilution capability, indiscriminate use of disinfectants and cleaners (particularly degreasers and bathroom cleaners) will substantially affect the biomass in the tank and subsequently the digestion process. The consequence could be the carryover of undigested materials to the land disposal area with trench lines and the disposal area being clogged, poisoned and no longer functioning.

If tanks have been inadvertently contaminated or poisoned by household materials it is advisable for them to be pumped out immediately to allow for a fresh start-up.

If there is an odour after the initial use of a system a cup of garden lime can be flushed down the toilet each day until the odour disappears.

To determine if a system is approved in Victoria, refer to the relevant Certificate of Approval and the manufacturer's recommendations for advice on operation and maintenance. Tables 4.2 and 4.3 show care and operation recommendations, and a maintenance checklist for septic tanks. These requirements would also generally apply to other onsite wastewater systems.

Previous editions of this code included detailed technical specifications for conventional septic tanks, absorption trenches and sandfilters. These specifications are now included in EPA Certificates of Approval for these systems.

Table 4.2: Care And Operation Of Septic Tanks

- Restrict the use of germicides (such as strong detergents, disinfectants, toilet cleaners and bleaches), as they will kill the bacteria which makes the septic work.
- Use soapy water to clean toilets and other fixtures
- Use only detergents that have low alkaline salts and chlorine levels.
- Use of proprietary or chemical additives is not recommended at any time for septic systems – except for lime used as outlined above.
- Do not flush sanitary napkins or disposable nappies down the system. Minimise the amounts of oil and fat flushed into the system.
- Use a sink strainer to restrict food scraps entering the septic system. Do not use garbage disposal units.
- Odours may occur on installation or after addition of large quantity of germicide. If this happens, flush a cup of lime down the toilet each day until odours abate.
- Fill tank with water to reduce odours on start up or after de-sludging tanks. They should not be washed or disinfected after de-sludging.
- Ensure the tank and disposal field are not built over or disturbed.
- Inspect the system at least annually and desludge the tank at least once every three years, or as otherwise directed by the council

Table 4.3: Maintenance Checklist

- Keep a record of all maintenance (including tank pump-outs and the location of the system, tank inspection and access openings) and send copies of the maintenance reports to the local council in accordance with the septic tank permit and Certificate of Approval.
- Do not add to or alter any part of your system without council approval.
- Ensure that only suitably trained persons work on the system.
- Check sludge level, pumps and alarms regularly.
- Arrange for an inspection of the system, at least annually.
- Pump-out the tank in accordance with the permit conditions

4.4.3. Land Application of Treated Effluent

Although the effluent from a domestic wastewater system has been treated within the treatment unit, further management of this effluent is required to protect public health and the environment.

On-site effluent disposal is based upon a risk minimisation approach. Under favourable circumstances and with proper management, land application of effluent can be sustainable. Most problems associated with effluent application are due to malfunctions or breakdowns of the processing plant, or from inadequate initial planning and on-going maintenance of a proper land application area.

Treatment plant effluent must be applied to land within allotment boundaries in order to comply with this code.

A number of different options are permitted for land application of domestic wastewater including:

- anaerobic treatment followed by subsoil trenches;
- aerobic treatment followed by subsoil trenches, subsurface irrigation, surface irrigation and mound irrigation; and
- composting systems followed by subsoil trenches.

Additional requirements for managing effluent from particular treatment systems may be specified in the relevant Certificate of Approval.

The selection of the land application process should be based upon the land capability of the site. Council must be fully satisfied that the system (that is the land application of treated effluent) being proposed is appropriate and practicable.

Provision shall be made in the design of the disposal field for a reserve field that can be commissioned in the event that the primary field fails, proves to be inadequate, or should be rested.

Effluent disposal fields should be isolated as much as possible from other domestic facilities.

Fields should be protected from disturbance during construction and no paving, driveway, sheds or service trenching shall encroach on the effluent disposal field or on any reserve area.

Care should be taken to protect vegetation across the disposal field. Chemical applications, topdressing or physical barriers such as plastic sheets often reduce the capacity of the site to ameliorate effluent and should be used with caution.

Regardless of what disposal system is adopted it is recommended that the disposal area be clearly identified, to ensure all householders limit their access and impact on the area.

Although ever effort may have been made to initially locate and design a land based effluent application area, the exact environmental situation of the site, the design hydraulic loading and the individual householder attitude to wastewater management are often difficult to predict. All have an impact on the long-term suitability of the program. The expected land disposal outcomes need continual monitoring to ensure that the land area is maintained in a fit state for use within the ongoing management regime.

Effluent which is irrigated must have maximum BOD and suspended solids levels of 20mg/L and 30mg/L, respectively. For surface irrigation, faecal coliform levels must not exceed 10 organisms/100mL. More information is available in EPA Certificate of Approval CA 35/93.

No irrigated effluent should come into contact with any vegetable or fruit that is to be subsequently consumed, even if these foodstuffs may be subsequently washed in potable water. Because of the increased potential for direct contact with effluent, the risks associated with spray irrigation are higher than for other irrigation techniques, such as drip and subsurface irrigation.

4.5 Initial Planning

The development of a wastewater treatment system and associated effluent disposal process should be seen as a primary component of residential property development.

The onus of proof rests with the applicant (not the council) to show that the wastewater treatment system proposed will work in a sustainable manner at the particular site.

The first step that should occur when a property developer, potential buyer or landholder considers subdividing or building a residential dwelling is the site appraisal. An integral part of the appraisal should be a site assessment.

Site selection and assessment should involve defining the building envelope (that part of the property considered suitable for structures) together with the wastewater disposal envelope (that part of the property considered suitable for wastewater disposal/reuse). Site characteristics are typically the main factors that constrain the method of disposal and with it the overall treatment process. Thus, site factors should be assessed first.

Site investigation should outline physical and environmental constraints that will indicate the options and special design features needed to ensure they function adequately. Some constraints make on-site disposal impracticable. Others may be overcome by, for example, increasing the size of the disposal fields or by altering the treatment process.

The successful outcome from an environmental viewpoint may be a substantial increase in management levels, to address the identified constraints. Typically, higher management equates to higher cost. Economic aspects have not been included in this code.

It is strongly recommended that discussions with council staff should be part of the initial work to assist individuals in planning their proposals and also to allow the municipality to address the planning expectations associated with the development.

Commercial type treatment plants are recommended if there is trade waste from food preparation areas.

The general expectation for system design is for an average domestic dwelling (without water restrictions) to discharge in the order of 1000 litres a day, although this depends on factors such as the number of occupants and the efficiency with which water is used. As discharges increase, the risk to human health and the risk to the environment increase, and this increase in risk may be significant.

Where discharge volumes are expected to exceed 2000 litres a day, councils are strongly encouraged to critically assess the waste minimisation aspects of the development. The routine discharge of volumes exceeding 2000 litres a day may indicate a usage that is not purely domestic in nature. Households that undertake a high entertainment program from time to time will need to adequately address such potential impacts when designing the wastewater treatment and disposal system. A high flow of household wastewater can force solids through small plants and not allow sufficient time for adequate treatment to take place. The result is the discharge to the environment of untreated or inadequately treated wastewater.

4.6 Plans and Specifications

Septic tank permit applications must allow a council to assess the particular proposal. A permit must be obtained from the local municipal authority before installing, altering or using any septic tank system. Once a permit has been obtained, the planned effluent disposal field should be protected to prevent deterioration by building activities or vehicular traffic.

Applications for permits to install a system should be accompanied with details, scaled plans and specifications that will allow council staff to assess the system and the potential environmental impact. This information may include:

- a locality plan showing the location of the premises (for example, the direction of north, street or lot number and title description, or a copy of title with property details);
- a site plan showing the relative position of the proposed onsite wastewater system to relevant features existing and proposed;
- measures proposed to intercept and divert drainage from the building and disposal envelope areas; and
- a land evaluation report and a summary of data incorporating the site assessor's report on the physical features of the property, the land capability of the proposed land use and summary details of the wastewater management program.

4.7 Failing Onsite Systems

A failed system is a system that is not achieving the design expectations of:

- the relevant certificate of approval;
- the septic tank permit conditions; or
- the design guidelines set by the manufacturer

Indications of a failing system are shown in Table 4.4

Table 4.4: Indications of Failing Systems

Indications of failing systems may include:

- Seepage break-out at the end of trench lines;
- A lush green growth at the end of trench lines or down slope of trench lines;
- Inspection pit or trench lines consistently exhibiting high water levels;
- Trench lines that fill following storms;
- General waterlogging about the land application area;
- Presence of dead and dying vegetation (often native vegetation) about (particularly below) land application areas;
- A pungent odour about the tank and land application area;
- Fixtures blocked and wastewater overflowing from the relief point;
- Failure to comply with the certificate of approval, or septic tank permit effluent quality requirements;
- High sludge levels within the primary tank (within about 150mm of inlet pipe, or obstructing the flow through the mid baffle); and
- A scum surface layer that is blocking outflow.

4.8 Wastewater flows

This section sets out procedures for the estimation of the volumes of wastewater to be treated. The design capacity of the treatment system should cater for the expected peak daily load.

The volume to be treated will vary considerably depending on the type of premises, the occupancy existing through the year, the inclusion of various water appliances within the property and the water availability.

The procedure below describes how to estimate wastewater volumes based on water source.

4.8.1 Households on reticulated town supply (water unlimited*)*.

In this case water usage is typically unrestricted and wastewater discharges are expected to be potentially high.

There is limited definitive data available to indicate specific water usage in areas throughout Victoria and it is to be expected that variations will occur based upon a number of demographic considerations.

For the assessment and sizing of the system where reticulated water is available the design usage may be budgeted at 200 litres/day/person.

As a general rule, without alternative information, occupancy can be based upon bedroom number. Potential occupancy can be calculated using the criteria of:

Number of Bedrooms plus two.

Daily water discharge in litres to the wastewater system can then be calculated using the formula:

{(No of BRs) + 2} x 200.

Low water volume devices are available, and their use may theoretically reduce the volume of wastewater generated. Future owners may alter such fittings or install less conservative fittings. A reduction in wastewater volume due to low volume fittings should only be allowed where the municipality is satisfied that these fittings will result in a calculated long term wastewater volume and where they will remain a fixture for the life of the property.

It is important that system design should be site specific for unusual circumstances such as a bed and breakfast, boarding house, motel/hotel, hostel, and holiday resort. These facilities often include spa units that may generate very large wastewater loads.

4.8.2 Household on roof water supply, possibly augmented with alternative source.

In this case water is primarily from roof collection from the individual house and associated shedding.

Dwellings may make use of a river, creek, dam or bore supply to increase the total water available.

Some of this additional non-roof supply may be used within the house and will then be discharged to the septic tank. Typically these allocations can be substantial.

It can be assumed that the water usage by individual houses on tanks with alternative supplies will mirror that of reticulated supplies unless it can be satisfactorily demonstrated that lesser quantities will consistently be discharged.

4.8.3 Households on roof supply only.

In these cases all water for the household will be derived from tank water which has been collected from roofs about the residence.

Householders solely on tank supply will need to undertake personal water saving strategies and have good tank storage available. Typically these houses will show the minimum water usage and a reduction in wastewater loads may be allowed .

Reticulated Services

Reticulated water becoming available to an existing development (that was initially designed for roof supply and with an on-site septic tank treatment) may very well result in substantially higher individual household water usage. As a consequence the existing disposal field may become over loaded and inadequate - in effect under designed.

Council should consider the impact on the wastewater system, if an extension of reticulated water supply is likely.

Property Alterations

When a dwelling is upgraded, there may be increased waste loads on an existing treatment system. This may arise from an increase in volumes (as in the case of spas or reticulated supply), extensions that will increase the number of occupants, or the addition of kitchen disposal units.

Generally the extra flow from a spa disrupts small septic tanks and an additional volume should be added to a tank expected to suffer high shock loads. Likewise the potentially high amount of kitchen waste can result in a higher than planned biological load.

Reference should be made to the certificate of approval and initial land disposal design to clarify if any increased loadings will result in an adverse impact.

Building surveyors and councils should follow the procedures set out in Section 3.3 when issuing building permits for property alterations.

As a guide, design wastewater loads are presented in Table 4.5. These are default values that should be adopted unless a site-specific assessment indicates they can be varied.

Table 4.5 also shows sludge and scum accumulation rates, which may be required in calculations to size septic tanks.

Table 4.5: Design Wastewater Flow Rates

Contributing Source	Design Daily Flow (L/person)	Sludge & Scum Rate* (L/person/year)
Household residences		
Unrestricted appliances	200	80
Residential Flats/Units		
(without self contained laundry or spa)	125	80
Hotels, Motels & Guest Houses		
Based on:		
Bar meals	5	5
Resident guest	100	60
Bar attendant	750	150
Camping areas	100	60
Restaurants		
Licensed premises ‹50 seats	35	50
Reception, BYO ›50 seats	25	40
Eating houses	15	30
Shops/shopping centres		
per employee	15	6
public access	5	2
Factories, offices, child care & day training centres	15	10
Schools		
Day students	15	10
Boarders	100	40
Public recreational areas		
Meeting halls	1	1
Picnic areas	2	1
Theatres	5	2
Social clubs	5	2
Shower facilities add	50	2
Sports centres		
Basketball, squash etc	50	5
Swimming	10	2

The figures listed above are the best values available at the time and are a guide only. Variations of about 25 per cent or more are possible. Site-specific investigation at the design stage is recommended.

*Sludge and scum rates may be calculated on the daily average number of people per week

4.9 Setback distances

Even with every effort there are circumstances where wastewater has the potential to pollute. The consequences and impact of such pollution will depend upon the particular situation and the beneficial use affected.

The setbacks listed below are default minimum values for separation buffer distances between the wastewater disposal field (where treated effluent is applied) and other specific sites and sensitive features. The buffer distances are independent of other setbacks that may apply to the development.

The objective of a setback distance is to protect human health and the beneficial uses of the environment by setting adequate control separation distances between land receiving effluent and sensitive features and sites. These setbacks assume there is no short-circuiting of water within this setback.

The responsible authority may consider increasing buffer distances between the perimeter of the land receiving effluent or the effluent envelope and specific receptor sites, when there are particularly high risks associated with a development.

On occasions there may be requests for setbacks to be reduced from those highlighted below. Any request for a reduction in setbacks should be accompanied by a land capability assessment including:

- acceptable evidence that public health and the environment will be protected: and
- a management program that can be incorporated in permit conditions.

It may also be pertinent for councils to seek advice from other agencies and stakeholders although not necessarily required to do so under referral provisions.

Table 4.6: Buffer Distances Table

Situation	Setback, metres[1]
Building	
Wastewater field upslope of building	6[2]
Wastewater field down slope of building	3
Allotment boundary	
Wastewater field upslope of adjacent Lot	6
Wastewater field downslope of adjacent Lot	3
Services	
Water supply pipe	3
Potable supply channel (wastewater field up-slope)	300
Potable supply channel (wastewater field down-slope)	20
Gas	3
Underground water tank	15
Storm water drain	6
Swimming pool	6
Cutting/escarpment	15
Surface Waters (upslope from)	
Dam or reservoir (potable, including food production)*	300
Dam or reservoir (stock & non-potable)*	60
Stream or channel (continuous or ephemeral, non-potable)	60
Stream (Potable Water Supply Catchment)	100
*Does not apply to dams and reservoirs above ground level	
Groundwater & Bore	
Potable or non-potable	20

Notes to table:

1. The setback distances may be reduced by up to 50 per cent where all the following conditions can be met:
    - Effluent quality consistently meets:
        - 20mg/L BOD;
        - 30mg/L suspended solids; and
        - Contains less than 10 *E.Coli* organisms/100ml.
    - The relevant council has a septic tank compliance program that enforces the above; and
    - Slopes are less than 5 per cent.

2. This buffer is based on protecting human health, however installing an effluent field upslope of a building may have implications for structural integrity – this issue is beyond the code's scope and should be examined by a building professional on a site by site basis
3. The 20/30 criteria relate to the BOD and SS levels in the treatment plant effluent. Although systems achieving this standard do provide better treatment than the conventional anaerobic system, the effluent from these systems nonetheless still contains biological and nutrient loads. Runoff or spray from such units will need to be managed so that environmental and health risks are minimised.
4. Distances shall be measured to the nearest point of the defined feature. For streams and dams, the measuring point shall be the 'bank-full discharge level'.
5. In determining setbacks, future uses of water supplies for potable use should be considered. Where possible consult with the relevant agency.
6. Effluent typic ally contains high levels of nutrients that may have an impact on ground and surface waters and native vegetation. When considering set backs the potential impact of nutrient loads from individual or collective concentrations of treatment systems should be considered. If necessary advice should be sought from the relevant government agency.

5 LAND ASSESSMENT

5.1 Objectives

The reasons for undertaking a land assessment for the on-site management of domestic wastewater are:

- to identify the capability of land areas for sustainable on-site wastewater management; and
- to develop a management regime for on-site wastewater systems, to minimise their environmental impacts and enhance their long-term sustainability.

The term 'land' is used generically and can be interpreted as indicating a broad range of intrinsic environmental features associated with the site or land area.

The assessment of land areas for on-site wastewater management essentially follows a four-stage process:

Stage 1

Development of appropriate land capability assessment criteria

Stage 2

Land Inventory information gathering and collation.

Stage 3

Assessment of land capability.

Stage 4

Management program development.

These stages are discussed in Sections 5.2 to 5.5.

5.2 Development of Appropriate Land Capability Assessment (LCA) Criteria

The criteria provide the practical basis which enable council and other regulators to judge the proposed development. The criteria identify relevant land or environmental features, along with a rating scale.

LCA is often confused as being a scientific tool. It is in fact a management tool based upon perceived environmental risk.

It needs to be stressed that an LCA process does not indicate the social impact of a particular development, nor does it indicate whether a proposal will be suitable or economically worthwhile. The system is based upon environmental features alone. The suitability of the development is ultimately based on wider parameters including social, economic and planning considerations.

5.3 Land Inventory Information Gathering and Collation

This stage involves the actual gathering and collation of data related to the proposed development.

There can be considerable variability within the environment and within the landscape and soils generally. The data collection effort should reflect the variability associated with the development site.

The assessor will need to have a good grasp of the geographic processes and it will be critical that the site variability be characterised. EPA publication 746, *Land Capability Assessment for Onsite Domestic Wastewater Management* sets out parameters that may be included in a land

inventory. The current version of EPA Publication 746 forms part of this code.

5.4 Land Capability Assessment

This stage matches the inventory findings with the criteria to ascertain the level of environmental risk expected from the proposal and to highlight the particular features that constrain the development in its present form and on the present location.

This process forms the basis of the overall assessment of the site to sustainably manage wastewater. Proponents may discuss the LCA process with council staff before commencing an assessment, to ensure there is mutual agreement that the process will identify all the constraints that may be associated with the development site.

Land capability assessment as it relates to domestic wastewater management can be undertaken at a number of stages within a planning process.

The stages may relate to:

- statewide and regional planning;
- general municipal reviews;
- applications for rezoning or subdivision; and
- individual lot development.

The degree of investigation and assessment at each stage should reflect scale factors, and the type and form of the proposed development.

It is not possible to detail the information needed at each development phase. However, as:

- the development intensity increases;
- the site variability increases; or
- the environmental sensitivity increases,

the rigor of the assessment (for example the range of LCA criteria and the quantity of data collected) would be expected to increase.

Land capability assessments are considered a critical element in the path to good environmental planning and management. Councils are encouraged to develop their own LCA criteria as part of a municipal on-site domestic wastewater management plan for those areas of the municipality which are not serviced by a reticulated sewerage scheme.

Figure 2 (section 5) indicates how land capability assessment should fit into the overall land development process.

5.5 Management Program Development

The management program describes the actions that can be carried out to address the development site's intrinsic land limitations.

Although a proponent may develop a program in good faith, the council must judge the feasibility of the program, that is, it should be practicable.

Ongoing maintenance and monitoring should be integral parts of the program.

The council will have to assess whether current and future owners of the onsite wastewater systems could implement the program. Some owners may be quite skilled in carrying out specific management programs that may be beyond the capacity of others. In some instances a S173 Agreement (as provided for in the *Planning & Environment Act*) may have to be set in place so that future owners are made aware of their obligations.

If council cannot satisfy itself that the management program or potential permit conditions are practicable the development proposal should not be approved.

Details of the land capability assessment process are described in EPA publication 746, *Land Capability Assessment for Onsite Domestic Wastewater Management*.

5.6 Review of LCA by Council

Applicants should submit the LCA and corresponding management program to the municipal council when seeking development approvals.

The LCA will give councils a firm base from which to assess a proposal for consistency with their municipal strategic statements. The LCA will enable the municipality to highlight those areas at potential environmental risk and those areas that will need particular attention.

The onus of proof rests with the proponent to demonstrate that the proposal is environmentally sustainable.

Councils should not approve applications if the proponent's supporting information (including the LCA) is inadequate, or if the proposed management program is impracticable (that is, beyond the capacity of those who will be responsible for operating onsite treatment systems).

The LCA rating identifies the level of risk associated with a development proposal. As the capability of the land decreases, the risk associated with development increases, and the resources needed to manage the risk would also increase.

In particular, municipalities should seriously question proposals on land areas where the land capability assessment has highlighted that there is a high or very high risk associated with the proposed development. Such situations should be deemed as unsuitable for small lot subdivision unless council is satisfied that the wastewater management program will be practicable and achievable.

The land capability process should highlight the practices that may be adopted by the proponent for the development to proceed sustainably. In reviewing alternative management programs, the proponent and council will need to consider their short and long-term economic and practical implications, particularly the monitoring requirements.

When development proposals appear to be marginal, municipalities would be well advised to arrange for the site assessment report to be independently reviewed regarding the potentially detrimental environmental affects of the proposed program, together with the sustainability of the identified management program.

In these cases, it is to be expected that an independent review would require a site visit together with further field investigation or laboratory work. However examination of inventory and LCA reports may enable the municipality to satisfy itself as to the suitability or potential risk of the proposed development.

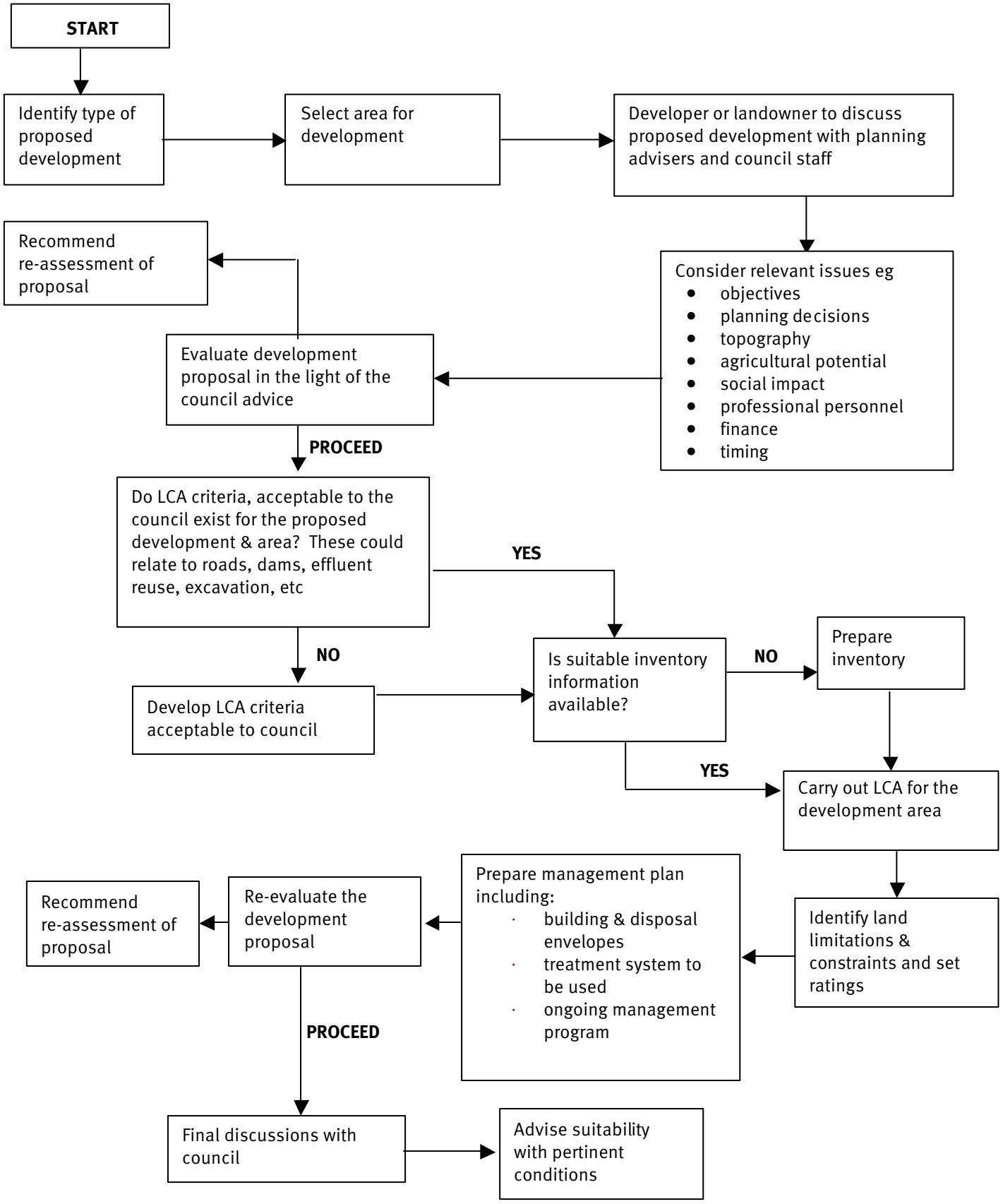
In some instances there may be a considerable delay between the phases of subdivision and actual house site development. Councils therefore need to have in place a process to track the LCA and the

associated recommendations. A more specific land management program may have to be developed when individual lots are developed.

Where there are concerns that an assessment report gives rise to unresolved questions, it is prudent for council and council officers to seek advice from other agencies. These agencies could include water authorities, EPA, catchment management authorities and the Department of Sustainability and Environment. Councils can also seek technical and planning advice from outside professionals.

Inappropriate development may result in reticulated sewerage being retrofitted, with significant financial implications.

Figure 2: Flowchart for development using onsite wastewater systems



6 COUNCIL DOMESTIC WASTEWATER MANAGEMENT PLAN

Councils have the responsibility of regulating onsite wastewater systems to protect public health and the environment, and protect local amenity. One way available to councils to meet these responsibilities is to develop a municipal onsite domestic wastewater management plan (domestic wastewater management plan).

Domestic wastewater management plans are a planning and management document that aims to minimise the impact of domestic wastewater on human health and the local environment using a risk management approach.

This plan should be seen as one of a number of local planning strategies integrated and consistent with other council and local initiatives for example corporate plans, waste management programs, municipal strategic statements, environment management strategies, conservation strategies, stormwater management plans and public health plans.

The domestic wastewater management plan articulates the council's policy and commitment on wastewater and its management and should be developed in conjunction with the local community.

A key need is to ensure that wastewater management is considered as early as possible in the planning cycle. Domestic wastewater management plans can establish processes to ensure this takes place.

They can describe the mechanism councils may use to factor early and comprehensive consideration of wastewater management into planning.

The Municipal Association of Victoria and EPA have developed a model domestic wastewater management plan based on trials conducted by a number of councils across Victoria, representing urban fringe, provincial city and remote rural municipalities.

The model plan assesses key issues including costs, impacts and barriers confronted when developing a domestic wastewater management plan.

7 REFERENCES AND BIBLIOGRAPHY

The following references may assist in achieving best practice management of onsite wastewater systems.

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Standards Australia 2001a, AS/NZS 1546.2:1998 *Onsite domestic wastewater treatment units – Waterless composting toilets*, Standards Australia, Sydney

Standards Australia 2001b, AS/NZS 1546.3:2001 *Onsite domestic wastewater treatment units – Aerated wastewater treatment systems*, Standards Australia, Sydney

8 GLOSSARY

This glossary provides working definitions of terms used in domestic wastewater management. The definitions should not be seen as academic interpretations, but rather they provide working definitions of term used in this code.

20/30 standard: The general EPA standard indicating wastewater quality is meeting a 20mg/L Biochemical Oxygen Demand character together with a 30mg/L Suspended Solids character.

Absorption: The taking up of material (generally in liquid form) into a soil by capillary action.

Aerobic: Aerobic processing of wastewater requires the presence of readily available oxygen for micro-organisms to metabolise nutrients present in wastewater. Oxygen is typically added to the wastewater through sparging with air to facilitate this process.

Anaerobic: Anaerobic processing of wastewater requires the absence of readily available oxygen for micro-organisms to metabolise nutrients present in wastewater. Conventional septic tanks process wastewater by anaerobic means.

Australian Standard: A document produced by Standards Australia. Standards Australia produces technical guidance documents.

Best Practice Environmental Management (BPEM): The guideline approach enunciated by EPA to define the role and responsibility of industry sectors or activities to achieve environmental performance that is sustainable. The BPEM may encompass site selection; process design; technology choice; key operating parameters and procedures; contingency arrangements; and monitoring and auditing aspects.

Biochemical Oxygen Demand (BOD): A measure of the organic matter content of wastes as indicated by the amount of oxygen consumed by micro-organisms feeding on a known quantity of waste in a sample held under controlled conditions, usually for 5 days. Assessment is undertaken in the laboratory with results expressed in milligrams per litre (mg/L).

BOD: Abbreviation for Biochemical Oxygen Demand.

Blackwater: Domestic wastewater that is expected to be contaminated by faeces or urine or with other biological contaminants. This material is typically that from toilets or urinals. It is generally differentiated from the non-contaminated greywater stream.

Desludging: See Pump-out

Disposal: The process where treated wastewater is applied to land in such a manner that there is limited use made of it by vegetation and amelioration is primarily by soil filtration. This is generally the case with subsoil trench disposal or treatment through a pondage system.

Disposal Field: That area utilised for actual disposal of wastewater. Its design will include appropriate setback Buffer Distances from existing and proposed development.

Domestic Wastewater: Wastewater arising from a domestic dwelling or a dwelling primarily used for domestic purposes. Domestic residences would be those as zoned by council as suitable for residential use. Domestic wastewater can comprise of blackwater (toilet waste) or grey water (sullage waste from bathrooms, laundries, and kitchens), or a combination of both.

Effluent: Organic waste products produced from a domestic residence and within the wastewater going to and coming from the septic tank.

Greywater: Domestic wastewater that is not or is never expected to be contaminated by faeces or urine or with other biological contaminants (generally viewed as blackwater). Generally greywater consists of all non-toilet wastewater - that is wastewater from showers, baths, spas, hand basins, washing machines, laundry troughs, dishwashers and kitchen sinks. If there is a concern that these wastewater streams may include faeces or urine products they should be treated with the blackwater.

Groundwater: For the purposes of this code the term is meant to refer to any underground waters that may occur within the underlying soil profile or as an aquifer body.

Nutrients: Elements which are obtained from the soil, water and air which are essential for plant growth including nitrogen, phosphorus, potassium, carbon and a range of trace elements.

Precautionary Principle: This states that if there are considered to be threats to human health or to the environment the lack of full scientific certainty or proof should not be used as a reason for not restricting a proposed domestic wastewater management programme. It is viewed that it is the responsibility of all parties to undertake careful unbiased evaluation in an effort to avoid environmental damage and any consequences to human health. In undertaking an assessment of a particular program individuals and regulators should weigh the consequences of the program being proposed.

Pump-out: The removing of sludge and sediment from the wastewater treatment tanks. This would include the removal of the surface crust (or cake) material, and the removal of the deposits that rest on the base of the tank. These deposits include inert matter (including sand) that has not been broken down during the digestion process or material that cannot be further digested by the particular treatment. The pump-out should not attempt to drain tanks dry as some residual untreated wastewater will allow a seed source of digesting flora. Pump-outs should follow the manufacturers recommendations to ensure full optimum ongoing wastewater processing.

Qualified person: A person who holds relevant, accredited formal qualifications, or a person who is accepted by a professional body to practice in the pertinent area.

Recycling: the process where a component of the treated wastewater can be returned to the house and be again incorporated through a plumbing reticulation fixture for substitution or mixing with the main household water supply. It is imperative that no treated wastewater can come into direct human contact or mixes with water that is to be used for drinking, personal washing or laundry use unless it can reach potable quality. General domestic wastewater that has been treated to an acceptable standard could be recycled to toilet cisterns following appropriate plumbing installation. No recycled wastewater should come into contact with pets unless it is of a potable quality.

Re-use: The process allowing for any program where treated wastewater through land application can be substantially used by vegetation. The re-use program is expected to follow a higher form of treatment process than that available within the conventional anaerobic septic tank. Any re-use program will need to take into account the treated wastewater quality, land-use assessment and local environmental considerations. Generally wastewater treated through an aerobic package process could be re-used for garden, shrub and tree use.

Reticulated Water: Water suitable for human consumption that is delivered by a water authority to a dwelling through an approved process of pipes. This water is expected not to contain pathogenic organisms.

Scum: The material that settles on the top of the anaerobic wastewater treatment tank. Generally most of this scum is within the first chamber.

Septic Tank: This is a vessel that is used to hold and preliminary treat wastewater from a dwelling. In a conventional tank this treatment involves a physical settling out of the inert matter together with an anaerobic process where digestion of biological matter commences. Conventional tanks typically then discharge wastewater to land areas through a trench system. In the aerobic treatment process (which within certain tank types follows the anaerobic process) this digestion continues with the addition of oxygen through air sparging. The aerobic process further reduces the biological loading of the wastewater.

Septic Tank System: The term is defined within the *Environment Protection Act* (S53J) and '...means a system for the bacterial, biological, chemical or physical treatment of sewage, and includes all tanks, beds, sewers, drains, pipes, fittings, appliances and land used in connection with the system'. In essence this includes the wastewater storage tanks (whether it be an anaerobic or aerobic system), the distribution pipes, the irrigation system and the associated wastewater land application area.

Sewage: For the purposes of this code the term is defined within the *Environment Protection Act* (S53J) and '...means any waste containing human excreta or domestic waste water...'

Sewerage: The infrastructure system associated with the collection and distribution of sewage. The sewerage system includes the wastewater tank (and if present the package treatment tank), the distribution box, the trenches and distribution lines (or the irrigation lines).

Sludge: The material that rests on the bottom of a septic tank. It can include inert matter (such as sand, glass and plastics) together with biomass (product produced from the biological process).

Soil: The unconsolidated mixture of mineral and organic material which has developed on the surface of the earth by physical, chemical and biological processes and is the natural medium for the growth of plants.

Sub-surface: For the purposes of this code, an area within the profile below the surface but generally above the subsoil horizons.

Sullage: Household greywater that does not contain human excreta, but may still contain many of the harmful pathogens, nutrients and other chemicals contained in blackwater waste, presenting a similar hazard.

Suspended solids (SS): This is a measure of the solids retained in wastewater after treatment. Assessment is made by laboratory analysis with results expressed in milligrams per litre (mg/L).

Sustainability: In the context of this code the term is used broadly to mean a state where the soil and water environments are not altered to such an extent as to detrimentally affect its use by future generations. In a real sense practices that prepare a land area for wastewater application and the process for disposal onto land may very well alter the soil beyond that which could be expected under natural conditions. As a consequence this code presents a practice that endeavours to substantially limit the environmental impact of domestic wastewater treatment and its associated land disposal.

Treatment: A process that is meant to alter the wastewater biological, pathogen and nutrient components to a defined level. There can be a number of different processes each giving rise to a different standard of output water quality. These can involve varying processes including simple screening, separation of grey and black-water, anaerobic and/or aerobic action. Treatment systems must be such as to meet the proposed wastewater management programme.

Topsoil: The topsoil horizon typically containing the highest organic matter, the root zone and the lighter more structured textured materials.

Wastewater Envelope: That area of land within which a disposal field is capable of being located. The wastewater envelope should be sized following a land capability assessment and located to comply with setback requirements from geographic features.

9 FURTHER INFORMATION

EPA Information Centre

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Southbank 3006
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EPA regional centres:

Gippsland

7 Church Street, Traralgon 3844
Tel: (03) 5176 1744 Fax: (03) 5174 7851

North-East

24 Ely Street, Wangaratta 3677
Tel: (03) 5721 7277 Fax: (03) 5721 2121

North-West

43 Williamson Street, Bendigo 3550
Tel: (03) 5442 4393 Fax: (03) 5443 6555

South Metro

45 Princess Highway, Dandenong 3175
Tel: (03) 9794 0677 Fax: (03) 9794 5188

South-West

State Government Offices
Cnr Lt Malop & Fenwick Streets, Geelong 3220
Tel: (03) 5226 4825 Fax: (03) 5226 4632

West Metro

Herald & Weekly Times Tower
40 City Road, Southbank 3006
Tel: (03) 9695 2649 Fax: (03) 9695 2691

Yarra

Herald & Weekly Times Tower
40 City Road, Southbank 3006
Tel: (03) 9695 2617 Fax: (03) 9695 2691

EPA website

www.epa.vic.gov.au

Information about domestic wastewater treatment systems is listed under the *For Local Government* heading on the website.

Local government

Municipal Association of Victoria
Level 12, 60 Collins Street, Melbourne 3000
Tel: (03) 9667 5555

Contacts for professional associations

Soil Scientists

C/- Australian Institute of Agricultural Science & Technology
PO Box 2271 Hawthorn, Vic 3122
Tel: (03) 9815 3600
www.aiast.com.au

Engineers

Institution of Engineers
21 Bedford Street, Nth Melbourne
Tel: (03) 9329 8188
www.ieaust.org.au

Environmental Health Officers

Australian Institute of Environmental Health
PO Box 806, Macleod, 3085
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