

## **Building Act 2016**

# **Director's Guidelines for On-site Wastewater Management Systems**

I, Dale Edward Webster, in my capacity as Director of Building Control, and acting pursuant to Section 19(1) (a) of the *Building Act 2016*, hereby make following guidelines.

Guideline title	Director's Guidelines for On-site Wastewater Management Systems
Description	This guideline specifies: (a) how onsite wastewater management systems can be designed to satisfy the National Construction Code performance requirements for on-site wastewater management systems (Part F1.1); and (b) a means of determining if building works are likely to impact on existing on-site wastewater management systems.
Version	Final v2.0 July 2017
Application	For the purposes of 19(3)(b) of the Act, this Guideline applies from the date of its approval until its revocation.
Date of Director's approval	20 November 2017



Dale Edward Webster

Director of Building Control

This Determination is issued pursuant to the anticipatory powers provision of section 11(1) of the *Acts Interpretation Act 1931*

## Purpose

The purpose of this guideline is to complement AS/NZS1547 and outline standards and criteria for all on-site wastewater management systems up to 100KL/day dry weather flow, in relation to:

- the location of wastewater land application areas;
- the design, operation and installation of on-site wastewater management systems (OWMS);
- assessing the impact of building works on an existing OWMS;
- the assessment of applications for plumbing permits for OWMS; and
- alternative wastewater management options.

## Application

This guideline applies to the following building and plumbing works in areas not connected to mains sewerage operated by a network utility such as:

- installation of on-site wastewater management systems for new buildings (Section 164 Building Act 2016 and Regulation 37 Building Regulations 2016)
- new on-site wastewater management systems for existing buildings (Section 164 Building Act 2016 and Regulation 37 Building Regulations 2016)
- extensions, outbuildings and re-development of buildings (Section 91, 96 and 138 Building Act 2016 and Regulation 25 Building Regulations 2016)

OWMS that require a planning permit and may result in environmental harm are a level one activity as defined by the *Environmental Management and Pollution Control Act 1994*.

## Use of the guideline

This guideline outlines minimum standards, acceptable solutions and performance criteria.

Acceptable solutions specify objective standards for on-site wastewater management systems that demonstrate compliance with the relevant performance requirements of Part F1 of the National Construction Code Volume 3 (Plumbing Code of Australia). The performance criteria require more evidence to be provided to demonstrate compliance with the PCA, including a site specific risk assessment.

Acceptable solutions are based on the more conservative criteria included in AS/NZS1547, whereas performance criteria require a more detailed assessment of risk using the framework specified in AS/NZS1547.

Acceptable solutions are also provided to enable a building designer, builder or building surveyor (where appropriate) to determine if building works such as; additions, alterations or outbuildings will impact on an existing OWMS. If so, the OWMS will need to be either relocated or upgraded. If not possible the building works may need to be relocated or amended. If a builder, designer or building surveyor is relying on performance criteria specified in this guideline the relevant Environmental Health Officer should be contacted for advice.

Section 166 of the *Building Act 2016* requires that where a performance solution under the NCC is proposed the following information must be provided with the plumbing application:

- (a) a letter from the owner of the premises where the proposed permit plumbing work is to be performed stating that the owner is aware that the proposed work includes a performance solution;
- (b) evidence of the suitability of the proposed performance solution in accordance with Part A2.2 of the Plumbing Code of Australia in Volume 3 of the National Construction Code;
- (c) if the proposed performance solution involves plumbing work on an installation that connects directly or indirectly to a water supply system, a waste-water system, an onsite waste-water management system or a sewerage system, a copy of the written consent, from the owner of the system, to the use of the performance solution.

The PCA specifies that the system designed in accordance with AS/NZS 1547 is deemed to satisfy the performance requires of the NCC. However, if the proposed OWMS is not contained in AS/NZS 1547 it must be designed as a performance solution.

An OWMS which has a certificate of accreditation issued by the Director of Building Control is deemed to satisfy the performance requirements of the NCC, however the associated land application area must be designed in accordance with AS/NZS 1547 and this guideline, otherwise a performance solution will be required.

## Definition of terms

Term	Definition
<b>Approved disposal system</b>	Means a sewerage reticulation system or a wastewater treatment plant operated by a regulated entity.
<b>AS/NZS 1547</b>	Means the Australian/New Zealand Standard AS/NZS 1547—2012 <i>On-site domestic wastewater management</i> .
<b>Base of land application area</b>	means in the case of an: <ul style="list-style-type: none"> <li>• Absorption trench or bed – the base of the excavated trench</li> <li>• Irrigation area – the base of the irrigation pipe</li> <li>• Mound or raised bed – the base of the distribution bed</li> </ul>
<b>bedroom</b>	Means a habitable room used, or potentially used, primarily for sleeping.
<b>building class</b>	Has the same meaning as the National Construction Code.
<b>downslope surface water</b>	Means surface water that is in the likely direction of wastewater flow across or through the soil once it has been discharged from a Land Application Area or an overflow from a wastewater treatment or storage unit.
<b>dwelling</b>	Means a class I as defined by the National Construction Code.
<b>effluent</b>	Is the liquid discharged from a wastewater treatment unit.
<b>greywater</b>	Is domestic wastewater from a washing machine, laundry trough, basin, bath, shower, kitchen sink or other sanitary plumbing fixture excluding the toilet.
<b>greywater diversion device</b>	Is a plumbing product that filters greywater (not including the kitchen sink) and directs greywater to a sub-surface land application area.

Term	Definition
<b>greywater treatment system</b>	Is a system that treats greywater to produce secondary treated effluent.
<b>horizontal (setback) separation distance</b>	Means the distance measured along the surface of the ground (i.e. at right angles to the topographic contours) from the land application area to a feature such as a property boundary, building, surface water or watercourse. The distance downslope to surface water is measured to either the high water mark if tidal waters are adjacent to a dunal system, or to the top of the riverbank or cliff if a watercourse or a coastline.
<b>land application area (LAA)</b>	Means an area of land used to apply effluent from a wastewater treatment unit and reserved for future wastewater application (where required).
<b>limiting layer</b>	Means a layer such as hardpan, bedrock, or soil that restricts the movement of effluent vertically through the soil profile.
<b>Non-residential building</b>	Means a class 2-9 building.
<b>NCC</b>	Means the National Construction Code.
<b>OWMS</b>	Means an onsite wastewater management system used for the treatment, land application and/or re-use of wastewater.
<b>Outbuilding</b>	Includes a shed, garage, carport or similar structure.
<b>PCA</b>	Is the National Construction Code Volume 3 – Plumbing Code of Australia
<b>Planning Scheme</b>	Has the same meaning as the Land Use Planning and Approvals Act 1993
<b>primary treated effluent</b>	Means effluent that has been treated via the separation of suspended material from wastewater by settlement and/or floatation in septic tanks or primary settling chambers.
<b>secondary treated effluent</b>	Means effluent that has been treated via aerobic biological processing and settling or filtering of wastewater to a quality equal to, or less than, 20mg/L BOD5 and 30mg/L suspended solids.
<b>soil category</b>	Means the predominant soil category for the top 1.5m of soil profile as listed in AS/NZS 1547.
<b>site and soil evaluation (SSE)</b>	Means a soil evaluation of the site for a proposed OWMS completed in accordance with AS/NZS1547 prepared by a suitably qualified person.
<b>Sub-surface application</b>	Includes wastewater applied into the soil via sub-surface irrigation, absorption trench or bed or sand mound.

Term	Definition
<b>surface water</b>	Surface water means any fresh water or geothermal water in a river, lake, stream, or wetland that may be permanently or intermittently flowing. Surface water also includes water in the coastal marine area and water in man-made channels and dams unless these are to specifically divert surface water away from the land application area. Surface water excludes any water in a pipe or tank or stormwater drain.
<b>Vertical separation (setback) distance</b>	Means the distance measured vertically through the ground from the base of the land application area to a feature such as bedrock, a limiting layer or groundwater. The distance to groundwater is measured to the highest known seasonal water table
<b>wastewater</b>	The discharge from sanitary fixtures and sanitary appliances.
<b>Wastewater treatment unit(WTU)</b>	Is a primary or secondary treatment system and includes a septic tank, aerated wastewater treatment system, composting toilet, greywater treatment system, or other treatment system that discharges wastewater to a land application area.
<b>watercourse</b>	Means a stream that:  Has visible bed and banks, that is, an eroded channel no matter how small but not a defined non-eroded grassy course or drainage depression; and  Is partially fed with water from some source other than surface water run-off (for example, springs, snowfields, or spongy soil that absorbs rainfall and then releases it into the stream over a longer period).

## 1. Area required for On-site wastewater management – new dwellings and non-residential buildings (Building Class 1-10)

### 1.1 Objective (PCA FPI.5)

To ensure sufficient land is available for sustainable onsite wastewater management for buildings.

Acceptable Solutions	Performance Criteria
<p>AI</p> <p>A new dwelling must be provided with a land application area that complies with Table 3.</p>	<p>PI</p> <p>A new dwelling must be provided with a land application area that meets all of the following:</p> <ul style="list-style-type: none"> <li>a) The land application area is sized in accordance with the requirements of AS/NZS 1547; and</li> <li>b) A risk assessment in accordance with Appendix A of AS/NZS 1547 has been completed that demonstrates that the risk is acceptable.</li> </ul>

## 1.2 Objective (PCA FPI.5)

To ensure sustainable onsite wastewater management for commercial and non-residential buildings (Class 2-9).

Some non-residential buildings such as professional offices or toilets in commercial buildings may only be generating wastewater which has a similar composition to residential buildings. In these situations design criteria in AS/NZS1547 may still be applicable.

Acceptable Solutions	Performance Criteria
<p><b>A1</b></p> <p>An onsite wastewater management system including the land application area for non-residential buildings must satisfy all of the following:</p> <p>(a) be sized based on the hydraulic and organic loadings contained in Table 4 and design loading or irrigation rates contained in AS/NZS 1547; and</p> <p>(b) be located in accordance with clause 3.1</p>	<p><b>PI</b></p> <p>An onsite wastewater management system including the land application area for non-residential building must satisfy all of the following:</p> <p>a) A site and soil evaluation and design report prepared by a suitably qualified person determined by the Director demonstrating that the land application area is of sufficient size to treat and manage the wastewater generated from the proposed building within the property boundaries.</p> <p>b) The SSE report and system design demonstrates the design is consistent with AS/NZS 1547 and uses appropriate hydraulic and organic loading rates for the proposed activity.</p> <p>c) A risk assessment in accordance with Appendix A of AS/NZS 1547 has been completed that demonstrates that the risk is acceptable.</p> <p>d) The land application area is to be located in accordance with the acceptable solution or performance criteria specified in clause 3.1.</p>

## 2. Area required for on-site wastewater management - building extensions, alterations or outbuildings (Building Class I-10)

### 2.1 Objective PCA FPI.4 (m)

That sufficient area is available on a property for the current and future on-site wastewater management system and that an existing suitable OWMS is not impacted on by the proposed building works.

If appropriate an existing OWMS may need to be relocated, upgraded or a new land application area constructed.

Acceptable Solution	Performance Criteria
<p><b>A2</b></p> <p>An outbuilding, addition or alteration to an existing building, or change of use of that building, must not encroach onto or be within 2m (if upslope) or 6m (if downslope) of an existing land application area (including land reserved for a future land application area) or a wastewater treatment unit and comply with at least one of the following:</p> <p>a) not increase the number of bedrooms (or rooms reasonably capable of being used as a bedroom) or otherwise increase the potential volume of wastewater generated onsite; and</p> <p>b) not increase the number of bedrooms (or rooms reasonably capable of being used as a bedroom) or otherwise increase the potential volume of wastewater generated onsite to greater than that allowed for in the design of the existing OWMS.</p>	<p><b>P2</b></p> <p>An outbuilding, addition or alteration to an existing building or change of use of that building, must be provided with a land application area (including land reserved for a future land application area) that meets all of the following:</p> <p>a) The land application area is of sufficient size to comply with either Appendix L, M or N and setback distances are consistent with Appendix R of AS/NZS 1547; and</p> <p>b) A risk assessment in accordance with Appendix A of AS/NZS 1547 has been completed that demonstrates that the risk is acceptable.</p>

### 3. Standards for Wastewater Land Application Areas

#### 3.1 Objective - PCA FPI.5 (a)-(c)

To provide for sustainable onsite wastewater management through the provision of appropriately designed and located land application areas and wastewater treatment units.

Acceptable Solutions	Performance Criteria
<p><b>A1</b></p> <p>Horizontal separation distance from a building to a land application area must comply with one of the following:</p> <p>be no less than 6m; or</p> <p>be no less than:</p> <p>(i) 3m from an upslope building or level building;</p> <p>(ii) If primary treated effluent to be no less than 4m plus 1m for every degree of average gradient from a downslope building;</p> <p>(iii) If secondary treated effluent and subsurface application, no less than 2m plus 0.25m for every degree of average gradient from a downslope building.</p>	<p><b>P1</b></p> <p>a) The land application area is located so that:</p> <p>(i) the risk of wastewater reducing the bearing capacity of a building's foundations is acceptably low; and</p> <p>(ii) is setback a sufficient distance from a downslope excavation around or under a building to prevent inadequately treated wastewater seeping out of that excavation.</p>

Acceptable Solutions	Performance Criteria
<p><b>A2</b></p> <p>Horizontal separation distance from downslope surface water to a land application area must comply with (a) or (b)</p> <p>(a) be no less than 100m; or</p> <p>(b) be no less than the following:</p> <ul style="list-style-type: none"> <li>(i) if primary treated effluent 15m plus 7m for every degree of average gradient to downslope surface water; or</li> <li>(ii) if secondary treated effluent and subsurface application, 15m plus 2m for every degree of average gradient to down slope surface water.</li> </ul>	<p><b>P2</b></p> <p>Horizontal separation distance from downslope surface water to a land application area must comply with all of the following:</p> <ul style="list-style-type: none"> <li>a) Setbacks must be consistent with AS/NZS 1547 Appendix R;</li> <li>b) A risk assessment in accordance with Appendix A of AS/NZS 1547 has been completed that demonstrates that the risk is acceptable.</li> </ul>
<p><b>A3</b></p> <p>Horizontal separation distance from a property boundary to a land application area must comply with either of the following:</p> <p>(a) be no less than 40m from a property boundary; or</p> <p>(b) be no less than:</p> <ul style="list-style-type: none"> <li>(i) 1.5m from an upslope or level property boundary; and</li> <li>(ii) If primary treated effluent 2m for every degree of average gradient from a downslope property boundary; or</li> <li>(iii) If secondary treated effluent and subsurface application, 1.5m plus 1m for every degree of average gradient from a downslope property boundary.</li> </ul>	<p><b>P3</b></p> <p>Horizontal separation distance from a property boundary to a land application area must comply with all of the following:</p> <ul style="list-style-type: none"> <li>(a) Setback must be consistent with AS/NZS 1547 Appendix R; and</li> <li>(b) A risk assessment in accordance with Appendix A of AS/NZS 1547 has been completed that demonstrates that the risk is acceptable.</li> </ul>



Acceptable Solutions	Performance Criteria
<p>A4</p> <p>Horizontal separation distance from a downslope bore, well or similar water supply to a land application area must be no less than 50m and not be within the zone of influence of the bore whether up or down gradient.</p>	<p>P4</p> <p>Horizontal separation distance from a downslope bore, well or similar water supply to a land application area must comply with all of the following:</p> <ul style="list-style-type: none"> <li>(a) Setback must be consistent with AS/NZS 1547 Appendix R; and</li> <li>(b) A risk assessment completed in accordance with Appendix A of AS/NZS 1547 demonstrates that the risk is acceptable</li> </ul>
<p>A5</p> <p>Vertical separation distance between groundwater and a land application area must be no less than:</p> <ul style="list-style-type: none"> <li>(a) 1.5m if primary treated effluent; or</li> <li>(b) 0.6m if secondary treated effluent</li> </ul>	<p>P5</p> <p>Vertical separation distance between groundwater and a land application area must comply with the following:</p> <ul style="list-style-type: none"> <li>(a) Setback must be consistent with AS/NZS 1547 Appendix R; and</li> <li>(b) A risk assessment completed in accordance with Appendix A of AS/NZS 1547 that demonstrates that the risk is acceptable</li> </ul>
<p>A6</p> <p>Vertical separation distance between a limiting layer and a land application area must be no less than:</p> <ul style="list-style-type: none"> <li>(a) 1.5m if primary treated effluent; or</li> <li>(b) 0.5m if secondary treated effluent.</li> </ul>	<p>P6</p> <p>Vertical setback must be consistent with AS/NZS 1547 Appendix R.</p>

Acceptable Solutions	Performance Criteria
<p>A7</p> <p>nil</p>	<p>P7</p> <p>A wastewater treatment unit must be located a sufficient distance from buildings or neighbouring properties so that emissions (odour, noise or aerosols) from the unit do not create an environmental nuisance to the residents of those properties</p> <p><i>Note: Part 6 of the Building Act 2016 specifies requirements for protection work which apply to plumbing work including a wastewater treatment unit.</i></p>

## 4. Designing On-site Wastewater Management Systems

### 4.1 Demonstrating compliance

An on-site wastewater management system (OWMS) designed by an licensed person in accordance with the deemed-to-satisfy provisions of AS/NZS 1547 is an acceptable means of demonstrating that the design complies with Part F1 Deemed-to-Satisfy Provisions of the Plumbing Code of Australia.

If an OWMS is designed using the performance criteria of AS/NZS1547 the designer must be appropriately qualified (as determined by the Director) to prepare performance solutions.

Other relevant published reference documents (from other Australian States and Territories or from an international organizations such as the US EPA - *Onsite Wastewater Treatment Systems Manual 2002*) may be used for designing a wastewater treatment unit or land application area if the deemed-to-satisfy provisions of AS/NZS1547 are not appropriate for class 2-9 buildings. However, the wastewater land application area setback (separation) distances specified in clause 3 of this guideline are applicable to all class 2-9 buildings.

### 4.2 Unique On-site Wastewater Management Systems

A unique OWMS as specified Regulation 3 of the *Building Regulations 2016* is a prototype or one-off installation that is specifically designed for the premises where it is installed and is not for general sale. It must be designed by a person with appropriate qualifications and experience determined by the Director. The designer must refer to the relevant performance requirements and deemed-to-satisfy provisions of AS/NZS1547 (including Appendix A) or relevant Australian Standards or Guidelines from States and Territories or international organisations deemed relevant by the Environmental Health Officer for the design.

An Environmental Health Officer may request a certificate issued by a qualified person for an assessable item (form 55) to verify compliance with the performance requirements for any aspect of an OWMS design.

When a unique or prototype OWMS is proposed to be installed, a risk assessment in accordance with Appendix A of AS/NZS1547 must be completed with particular consideration being given to what will occur if the system fails or does not operate as intended. Before agreeing to the installation of a unique or prototype OWMS ensure that the site is suitable for another accredited OWMS, in case the system needs to be replaced.

For prototype systems ensure what arrangements are in place if at the end of the testing period the OWMS is not operating effectively and must be decommissioned? Does the owner understand that a new OWMS may need to be installed?

The designer of a unique or prototype systems must provide detailed operation and maintenance procedures and evidence that the OWMS and components are ‘fit for purpose’.

If the on-site waste management system produces secondary treated wastewater the effluent quality must comply with the quality specified in the definition of secondary treated effluent (page 5).

#### **4.3 Determining hydraulic loadings (PCA FPI.4)**

Hydraulic calculations for residential premises must be designed using hydraulic loading specified in Appendix H of AS/NZS1547 and the minimum number of person per bedroom shall be in accordance with the Table 1.

Hydraulic loadings for Class 2-9 buildings may be based on occupancy rates derived from Australian Bureau of Statistics data.

**Table 1 – minimum number of persons per bedroom for hydraulic loading calculations for class 1 buildings (dwellings)**

<b>Number of Bedrooms</b>	<b>Minimum number of persons</b>
1	2
2	4
3	5
>3	5 plus 1 person per additional bedroom

***Explanatory notes:***

- Rooms reasonably capable of being used as bedrooms should be counted as bedrooms (i.e. rooms that have similar characteristics to a bedroom regardless of the descriptor on the plans such as a study, office, games room or the like)
- Lower numbers of persons per bedroom may be acceptable for large unit complex’s where stratum title rules (or other legally binding restrictions) exists to limit occupancy numbers.

#### **4.4 Determining minimum capacities for septic tanks (primary wastewater treatment units) (PCA FP 1.4 and 1.5)**

The capacities of primary treatment units specified in Appendix J of AS/NZS1547 satisfy the relevant deemed-to-satisfy requirements of the PCA.

#### **4.5 Waterless Toilets**

The location of composting toilets must comply with Part 3.8.3.4 (b) of the NCC.

Particular attention is required to the type of composting system proposed and the maximum number of persons the system is designed for compared with the design per person loading for the building (clause 4.3). Some composting toilet chambers are accessed from below the floor and others from within the building. The building designer must take into consideration the requirements for non-flushing toilets specified in the NCC and the specific type of composting toilet proposed.

Composting toilets that have liquid discharges may be applied to the soil in an absorption trench if an evaporator is not installed.

Where waterless toilets are used, an appropriate on-site wastewater management system will be required for greywater treatment. Greywater (particularly the kitchen sink) contains solids which need to be removed by primary treatment (e.g. septic tank) before being applied to the wastewater land application area.

#### **4.6 Hydraulic and organic loading for Class 2-9**

If AS/NZS1547 does not apply to the proposed on-site wastewater management system the figures used in Table 4 are acceptable. However, recognised guidelines from other Australian States and Territories or the US EPA Manual may be used to design performance solutions.

#### **4.7 Greywater treatment systems and land application areas**

Greywater treatment systems and the associated land application area are a type of OWMS and a plumbing permit is required which is accompanied by the documents specified in Schedule 2 of the Director of Building Control's Specified List.

Land application area design may be based on appropriate guidelines from other States and Territories, for example the *Reuse of Greywater in Western Australia 2010*. However, the requirements of Clause 3 of this guideline apply for the location of the greywater land application area.

Where greywater diversion systems are installed in areas connected to a sewerage scheme or buildings using an OWMS, a diversion valve must be provided with an overflow to allow the greywater to discharge to the sewer or OWMS.

The Director of Building Controls' Policy on Domestic Greywater Recycling and Reuse provides guidance on acceptable reuse and recycling practices.

#### **4.8 Wastewater pumping chambers**

Where wastewater is required to be pumped, the chamber shall satisfy the structural performance requirements specified in AS/NZS 1546.1 and have;

- an automatic float switch on the pump;
- an audible and visual alarm with the alarm activating in the kitchen or laundry of a building. The alarm panel must be located at a height where it can be easily seen and cannot be obstructed from view;
- capacity to store wastewater generated over a 24 hour period, plus reserve capacity to store wastewater in the event of power failure or pump malfunction;
- installed to prevent hydrostatic uplift;
- a design to prevent seepage water or stormwater entering; and
- in the following situations telemetry must be installed to alert an on-call service to arrange emergency action in the event of pump failure:
  - where overflow is likely to result in pollution of either a sensitive aquatic ecosystem or water that is used for drinking, aquaculture or primary contact recreation;
  - larger commercial developments; and
  - If five or more residential units on the same property are using a communal pump station. Further information on larger pump station requirements can be found in EPA Tasmania - *Sewage Pumping Station Environmental Guidelines December 1999*.

#### **4.9 Even distribution of wastewater**

Wastewater land application areas should be designed to evenly distribute wastewater throughout the whole area. The following devices will assist to achieve this:

- Distribution box (ensure installed level and stabilised with compacted bedding or concrete in reactive soil (clay) where movement may occur and cause the base to no longer be level);
- Gravity dosed using a WaterMark endorsed sewer dosing unit;
- Pressure dosing using pumps or dosing siphons (appropriate pumps must be used taking head and friction loss into consideration);
- Automatic sequencing valve (use the correct valve type for primary treatment or secondary treated effluent); and
- Zone the wastewater irrigation area (generally required on large irrigation areas or sloping sites)

#### **4.10 Access for maintenance**

The PCA requires that an OWMS must be located to provide access for maintenance, monitoring and repairs; the following factors must be considered:

- If the septic tank is buried, provide an access riser with a childproof lid to allow pump out;
- The septic tank is located so that a pump truck can pump out the tank;
- The area around (including head height) the wastewater treatment unit and ORG is safe and accessible for servicing, repairs and maintenance;
- Inspection openings are brought to surface at the inlet to the septic tank and over absorption trenches; and
- When the wastewater land application area fails and repair work is required can machinery access the area?

#### **4.11 Application for plumbing permit**

An application for a plumbing permit is required for a new OWMS or the upgrading of an existing system, including installing a new land application area or a change in type of OWMS.

The documents that are required to be submitted with an application are specified in Schedule 2 Part 3 of the Director's Specified List.

Figures 2 and 3 detail the application and installation process for OWMS.

#### **4.12 Selecting the appropriate OWMS for the site**

AS/NZS 1547—2012 Appendix K provides extensive information to assist a designer design an appropriate OWMS for specific site and soil conditions.

### **5. Matters to consider when assessing an application for an OWMS**

Before an Environmental Health Officer (EHO) provides consent to a plumbing permit for an on-site wastewater management system being issued in accordance with Regulation 34(5) of the *Building Regulations 2016* a technical assessment must be completed which takes into consideration matters contained in Section 5 of this guideline.

#### **5.1 Documentation**

- Is the design consistent with this guideline?
- Have the documents included in Schedule 2 of the Director's Specified list been provided?
- Is the wastewater designer an appropriately qualified building services designer who is competent to design OWMS?

#### **5.2 Wastewater treatment unit**

- Is the proposed OWMS accredited if required?
- If a unique OWMS is proposed what scientific evidence has been provided to demonstrate that the system will satisfy the performance requirements of PCA and AS/NZS1547?
- Is it likely that the wastewater hydraulic or organic loading will exceed the limits specified by the manufacturer, designer or conditions on a Certificate of Accreditation issued by the Director of Building Control?
- Is the wastewater treatment unit or land application area located to prevent damage to the foundations of any buildings either on the site or on a neighbouring property?
- If the building generating the wastewater is commercial and the organic loading is higher than the typical quality of domestic wastewater. Has the designer taken this into consideration when selecting an appropriate wastewater treatment unit?
- Has the designer considered the local climatic conditions where the unit will be installed? Some parts of Tasmania experience very cold temperatures in winter and special design requirements may be required to address very low wastewater temperatures.

### 5.3 OWMS design and land application area

- Is the design of the OWMS consistent with:
  - The site and soil evaluation report?
  - The proposed building design?
  - AS/NZS 1547 (if appropriate)?
- If appropriate has an adequate risk assessment has been completed for the design as specified in Appendix A of AS/NZS 1547? Particular attention must be made to the consequences of system failure and the potential for both on and off-site impacts on water quality. Water used for drinking, domestic use or aquaculture are of highest concern.
- Complete a technical review of the proposed design and if necessary ask the designer to provide an explanation and amend the design if appropriate. The type of issues that may arise are:
  - That the hydraulic loading rates proposed are not consistent with AS/NZS 1547;
  - Inconsistencies between the soil profile description in the site and soil evaluation report and your site observations (or records of SSE reports from surrounding properties with similar site conditions);
  - The slope of the land and direction of fall is different to what is shown on the design;
  - The land application area is not drawn along the contour of the land;
  - The wastewater LAA and wastewater treatment unit will not fit where designed as the design has not be scaled correctly;
  - Location of the land application area is different to the location of the soil profile description in the SSE;
  - Apparent inconsistencies between the soil profile description, nominated DLR and the deemed to satisfy provisions of AS/NZS 1547;
- Any site specific knowledge the EHO or Council may have which can impact on the OWMS, such as high seasonal water table, flooding or significant failure rates of wastewater land application areas on nearby properties.
- If within a hazard area identified in the Statewide Planning Scheme that the design adequately considers the risks associated with land prone to inundation, land stability or coastal erosion (as appropriate).
- The performance requirements of the Plumbing Code of Australia Part F1 On-site Wastewater Management Systems such as;
  - Access for maintenance, servicing and repairs;
  - Protection of public health, the environment and community amenity;
  - The OWMS is appropriately sized for the hydraulic and organic loading;
  - The OWMS is made of suitable materials;
  - Sufficient storage capacity in the event of malfunction or power failure;
  - Sized for peak flows;
  - Avoids contamination of ground and surface water and prevents foul air or gases entering the building; and
  - Avoids the likelihood of uncontrolled discharges.
- Does the design contain any high water consumption plumbing fixtures such as a spa bath or swimming pool backwash which may overload a wastewater treatment unit?
- Is the proposed serviceable life of the OWMS appropriate? An OWMS should have a serviceable life of at least 15-20 years.
- Is the depth to impermeable layers below the base of the LAA sufficient for wastewater treatment?

- Potential for the LAA to be inundated from water run-off or sub-surface seepage. Subsurface seepage is more significant on sloping sites with duplex soils and significant water catchments, particularly if the LAA is installed below natural ground level.
- That there is sufficient fall from the wastewater treatment unit to the land application area (without making the LAA too deep) if a gravity dosed systems is proposed.
- Has a suitable risk assessment been completed where required?
- Are adequate controls in place for the identified risks?
- What plan is in place when the OWMS fails and needs to be replaced? Is there room for a new system to be installed? This is not as critical for secondary treated wastewater applied via sub-surface irrigation if new irrigation pipe can easily be laid in the same location and the soil is not clogged or structurally damaged.
- In soils with high clay content (category 6) where sub-surface irrigation is used, ensure that a sufficient depth (200mm) of topsoil (sandy loam category 2) is provided around the drip irrigation pipe to allow for loss of depth due to erosion and compaction.
- If absorption trenches/bed are proposed in category 5 or 6 soils, what measures are in place to ensure the soil structure is not damaged during excavation? The plumber installing the trenches should seek advice from the designer and have the designer inspect the trenches after excavation and prior to backfill.

#### **5.4 Operation and maintenance**

- Have operation and maintenance procedures been provided with the design?
- If the OWMS will be seasonally used such as a 'shack' or an accommodation premises and the OWMS will not be used for long periods that specific management practices are in place to prevent failure. Examples may include; ensuring that the power supply is not turned off or the system is dosed with a source of 'food' before the building is vacated to provide energy for the microorganisms;
- If a unique OWMS is proposed what operation and maintenance procedures are proposed and who will perform maintenance and monitoring?
- Are the proposed operation and maintenance requirements, servicing frequency and monitoring proposed appropriate for larger commercial systems?
- Relevant operation and maintenance procedures should be included in the plumbing permit and sent to the Building Surveyor for inclusion in the schedule of maintenance (Section 206)
- OWMS are essential building services (Regulation 72)
- Regulation 73 outlines an owner, occupier or person with a contractual responsibility obligations for maintenance and use of plumbing installations
- The Director of Building Control - Determination Accreditation and Maintenance of Plumbing Installations specified the required maintenance and use provisions.

#### **5.5 Certification**

AS/NZS 1547 recommends when an OWMS has been installed that the designer should verify that the system is installed, constructed and commissioned in accordance with the design. Many Councils have traditionally included a condition on the permit that the designer inspects and certifies. However, certification from the designer is only evidence that the system has been installed correctly. It is not self-certification and does not remove a permit authority's obligation to inspect at mandatory notification stages for compliance with the *Building Act 2016* and plumbing permit.



AS/NZS1547 also recommends that certification could be obtained from an independent technical expert such as a professional engineer with relevant experience and competence.

Section 43 of the *Building Act 2016* requires that a designer must act within their area of competence. If a designer does not have appropriate qualifications relevant to plumbing installation inspection the 'weight' that a permit authority can rely on this certification is diminished.

The *Director's Determination* – certificate issued by a qualified person for an assessable item Schedule I, Part B specifies the qualifications of persons who may issue 'certificates' for site and soil evaluation, assessment of system suitability, system design, performance monitoring, installation, commissioning, maintenance, drainage design, wastewater treatment plant design and plumbing work substantial compliance.

In relation to OWMS the following persons are qualified to issue a certificate for installation, commissioning or maintenance:

- Civil Engineer – with PI insurance;
- Environmental Health Officer - with PI insurance; or
- Plumber Practitioner (certifier) – Drainage who has completed a Certificate IV in on-site domestic wastewater management systems and has PI insurance (restricted to systems installed in accordance with AS/NZS1547).

A detailed list of specialists and other persons for plumbing is specified in Schedule 1, Part 2.

OWMS designers must ensure when certifying work that they comply with the *Building Act 2016* and adhere to the relevant code of conduct determined by the Administrator of Occupational Licensing.

Ultimately, the plumber is responsible for ensuring that the OWMS is installed in accordance with the plumbing permit and the permit authority must be satisfied that the permit has been complied with before issuing a certificate of completion.

## **5.6 Additions and alterations to existing buildings**

When buildings are altered, extended or out buildings constructed the works may impact on the existing OWMS. Regulation 25 requires the building surveyor to consider the following before issuing a CLC for notifiable building work:

- if the proposed works will result in a change in use or occupancy of the building that increases the hydraulic loading on the OWMS; or
- requires the existing OWMS to be relocated or upgraded; or
- if the work will have an adverse effect on the operation of any OWMS within 2m of the work.

The building surveyor should seek advice from the relevant EHO on the potential for the proposed works to impact on the OWMS or if the OWMS needs to be upgraded or relocated.

Upgrading, modifying, relocating or installing a new OWMS will require a plumbing permit.

Regulation 13 prohibits a person altering or extending a building, from lowering the standard, or impairing the operation of an essential building service that relates to health, safety or disability access. An OWMS is an essential building service. It is an offence under Regulation 12 to erect a permanent structure or impervious pavement over an OWMS unless authorised under the Act.

## 5.7 Occupancy

Before issuing an occupancy permit the Building Surveyor must take into account matters specified in Regulation 65. In relation to the OWMS the relevant matters are:

- that it has been lawfully installed;
- it has been commissioned and is fit for use; and
- has sufficient capacity for the maximum intended number of occupants.

The loading certificate provided by the OWMS designer will specify the maximum number of people that the system has been designed for.

## 5.8 Reliance on site and soil evaluation report

It is reasonable for an EHO to rely on a SSE report prepared by a qualified person as a true and accurate representation of the site and soil conditions.

It is not an EHO's role to undertake further analysis of the soil, however if an obvious error has been made such as the location of the soil tests holes is not where the designer has located the LAA or the site and soil conditions appear to be inconsistent with the SSE report, the EHO should seek clarification from the designer / site and soil evaluator. An example may be that surface rock is present in the proposed LAA but the SSE report does not mention this.

## 6. Installation of OWMS

AS/NZS1547 provides detailed information on appropriate installation of OWMS. The designer of the OWMS will specify installation instructions, where appropriate.

The plumber performing the work must follow the designer's installation instructions and ensure that:

- the site conditions detailed in the plumbing permit are consistent with the conditions where the OWMS is to be installed. If a variation exists the plumber must consult the designer for written instructions and seek approval from the permit authority to vary the permit (inspecting the site before quoting is highly recommended to avoid delays);
- when the absorption trenches or other types of land application area are excavated, the walls of the trenches must not be smeared (which reduces the soil permeability). Particular attention is required in wet soils with a high clay content;
- pipe work is installed correctly to ensure that wastewater is evenly distributed throughout the land application area;
- the stamped plumbing permit and conditions are on-site when works are occurring;
- before commencing work check that the proposed LAA will fit where designed;
- the LAA is protected from damage during construction;
- the trenches are excavated to the required depth and into the soil profile specified by the designer (refer to figure 1);
- if there is insufficient fall to the wastewater treatment unit or land application area, the plumber must stop work and consult the designer to determine if the land application area can be excavated deeper or if a pump chamber needs to be installed. A variation to the permit is required and the plumber must obtain authorization from the permit authority;
- after installation that the pump chamber and the wastewater treatment unit contain sufficient water to prevent hydrostatic uplift;

- an 'as constructed' plan has been prepared and for the permit authority to complete an inspection at all mandatory notification stages;
- records have been kept of each installation including photographs of the land application area when excavated and before backfilling so that a permit authority or designer can verify that the system has been installed correctly. This will also provide a level of protection for the plumber if the system fails and doubts are raised about incorrect installation.

## 7. Alternative wastewater management options

When a site is not suitable for a LAA or insufficient room exists; off-site disposal of wastewater may be considered. The following options are discussed in Table 2.

**Table 2 off-site disposal options**

Off-site disposal option	Limitations on Use	Matters to consider
The LAA is located on another property	<ul style="list-style-type: none"> <li>• A drainage easement and covenant are required on the land titles to provide access for maintenance and for a new LAA to be installed</li> <li>• Written consent from the land owner of the neighbouring property is obviously required</li> </ul>	<ul style="list-style-type: none"> <li>• The LAA must satisfy the requirements of clause 3. <i>Standards for Wastewater Land Application Areas</i> (property boundary setbacks may be varied for the property generating the wastewater)</li> <li>• Protect the LAA if the property contains livestock</li> </ul>
A boundary adjustment with a neighbouring property to provide more land area	<ul style="list-style-type: none"> <li>• Written consent from the land owner of the neighbouring property is obviously required</li> <li>• That the capacity to sustainably dispose of wastewater on the neighbouring property is not compromised</li> </ul>	<ul style="list-style-type: none"> <li>• The LAA must satisfy the requirements of clause 3. <i>Standards for Wastewater Land Application Areas</i></li> </ul>
A pump out system where faecal material and/or wastewater is stored temporarily on site in a tank which is regularly pumped out or removed from the site and taken to a sewage treatment plant	<ul style="list-style-type: none"> <li>• This type of system is an option of last resort due to the high operational costs and a history of misuse in other Australian States</li> <li>• Generally not suitable for new residential developments</li> <li>• Best used in association with waterless toilets, high water</li> </ul>	<ul style="list-style-type: none"> <li>• A detailed risk assessment in accordance with AS/NZS1547 has been completed incorporating a multiple barrier approach i.e. two or more controls in place if the primary control fails</li> <li>• A binding agreement for the pumping, management, monitoring and maintenance of the pump out system that also applies to future owners</li> </ul>

Off-site disposal option	Limitations on Use	Matters to consider
	<p>conservation plumbing fixtures and water recycling to minimise the volume of water generated</p> <ul style="list-style-type: none"> <li>• Use should be restricted to fixing problem sites on existing residential properties where no other on or off-site options exist</li> <li>• Suitable for public toilet blocks managed by State and Local Government in environmentally sensitive areas where on-site wastewater land application is not possible</li> <li>• A pump out system must be designed as a performance solution</li> </ul>	<ul style="list-style-type: none"> <li>• Operation and maintenance procedures are provided</li> <li>• In high risk situations provide telemetry on the alarm to notify the owner and pumping contractor to pump out</li> <li>• The chamber must comply with the structural requirements of AS/NZS1546.1</li> <li>• The tank must be installed to prevent hydrostatic uplift</li> <li>• High level audible and visual alarm included inside and outside building</li> <li>• The chamber/s are sized to hold a minimum of 14 days design hydraulic loading</li> <li>• Reserve emergency capacity is provided to store at least 1 days design wastewater loading</li> <li>• Measures are included to prevent illegal discharge</li> <li>• The owner of the building provides a written acknowledgement of high operational cost and management requirements</li> <li>• If near a watercourse or stormwater drain dye may be put into the tank to deter illegal discharges</li> <li>• Council may charge a rate for the pumping out of the tank rather than relying on the owner to arrange</li> </ul>

## Regulatory authority requirements

For the purposes of Part FP 1.1 of the PCA the following requirements apply:

- Discharges from an on-site wastewater management system to a water course (where permitted) are specified in the Emission Limit Guidelines for sewage treatment plants that discharge pollutants into fresh and marine waters June 2001 - FP 1.1(a)(i)
- Appropriate environmental quality objectives are contained in the State Policy on Water Quality Management 1997 – FP 1.1 (b)
- Protection of community amenity, public health and sustainable long-term performance is enhanced by ensuring all wastewater is pre-treated to at least primary standard before being applied into the soil FP 1.1(c)(i)
- Public health and amenity is protected by only applying secondary treated wastewater directly onto the surface of the land FP 1.1 (a)(ii)
- To protect public health, the environment and community amenity an on-site wastewater management system shall have a design serviceable of at least 15 years - FP 1.1 (a)(b)(c)

**Table 3 – Minimum land application area**

Soil category for top 1.5m of soil profile as listed in AS/NZS 1547, (refer notes)	Area required per bedroom for primary treatment effluent (m <sup>2</sup> ) reduce by 50% if secondary treated effluent discharged to a trench, bed or mound	Area required per bedroom for irrigated secondary treated effluent (m <sup>2</sup> )		
		<b>Slope</b>		
		<b>&lt;10%</b>	<b>10-20%</b>	<b>&gt;20%</b>
1 (Sand)	50	50	60	100
2 (Sandy loam)	60	55	66	110
3 (Loam)	90	70	84	140
4 (Clay loam)	120	80	96	160
5 (Light clay)	180	100	120	200
6 (Clay)	180	130	156	260

### Notes to Table 3

- Where the soil in the upper 1.5 m of the soil profile comprises two or more soil categories, the required area must be calculated on the basis of the requirements for the predominant soil category.
- If dispersive soils or a limiting layer are encountered within the upper 1 m of the soil profile, then the area required must be calculated on the basis of the requirements for Category 6 soil.
- Minimum land application area for primary treated wastewater including land that is reserved for future waste land application.
- Slope means the average gradient of the land across the land application area.

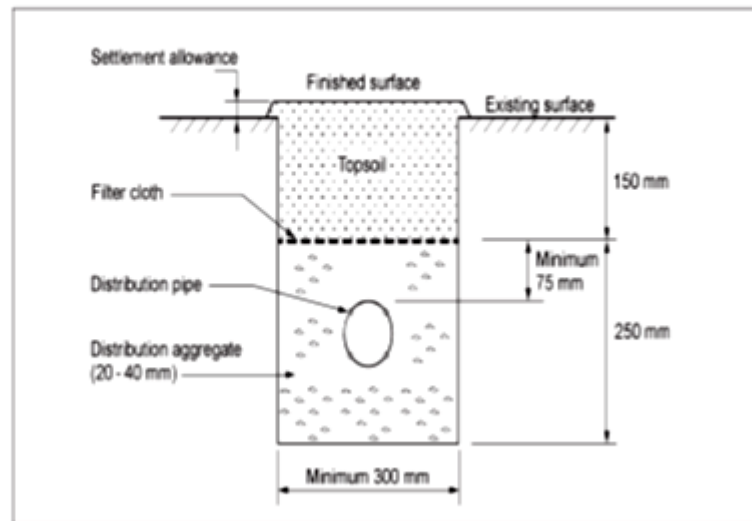
**Table 4 – Minimum daily wastewater allowance for non-residential buildings**

<b>Source</b>	<b>Design hydraulic loading Litres/person/day</b>	<b>Design organic loading grams/person/day</b>
Motel – per bar attendant	1000	120
Motel – meals per diner	10	10
Motel – per resident guest and staff (in house laundry)	150	80
Motel – resident guest and staff (out sourced laundry)	100	80
Restaurant per seat	40	50
Tea rooms and café per seat	10	10
Take-away food per customer	10	40
Conference /function centre	30	35
Public toilet	6	3
Public hall, theatre, gallery (no kitchen)	3	2
Public hall, theatre, gallery (with kitchen)	10	5
Public building with showers and toilets (sports club, gym, pool)	50	10
Hospital (per bed)	350	150
Childcare centre per child and staff	20	20
Factory, office, medical centre per person	20	15
Campgrounds (fully serviced)	150	60
Camp Grounds (with showers and toilets)	100	40

Adapted from Guidelines for Environmental Management – Code of Practice Onsite Wastewater Management EPA Victoria 2013

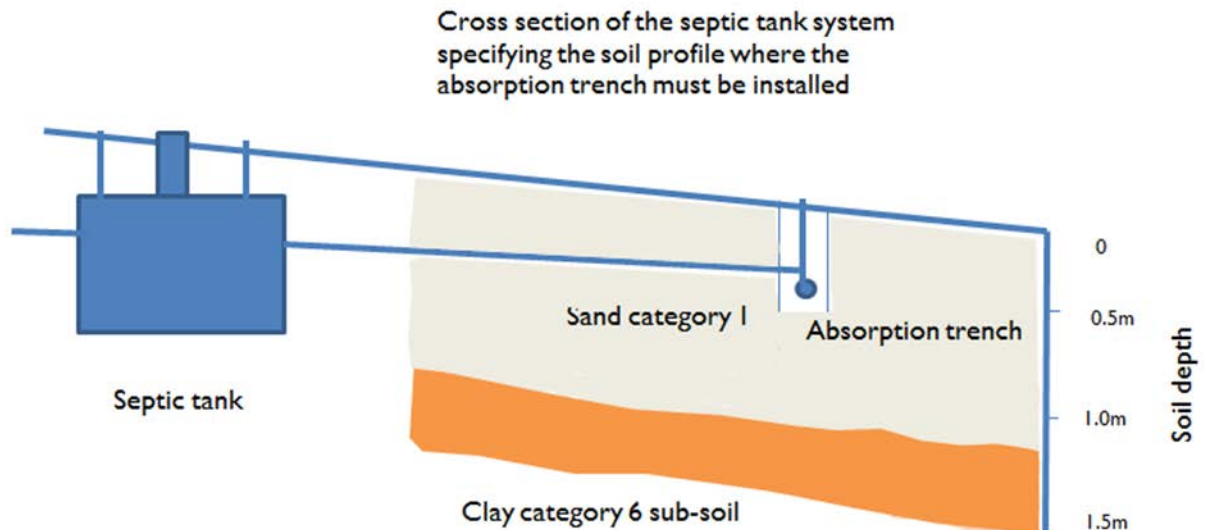
## Figure 1 Examples of minimum OWMS Design Specifications

1.1 Land application cross section and soil profile where the LAA will be installed.



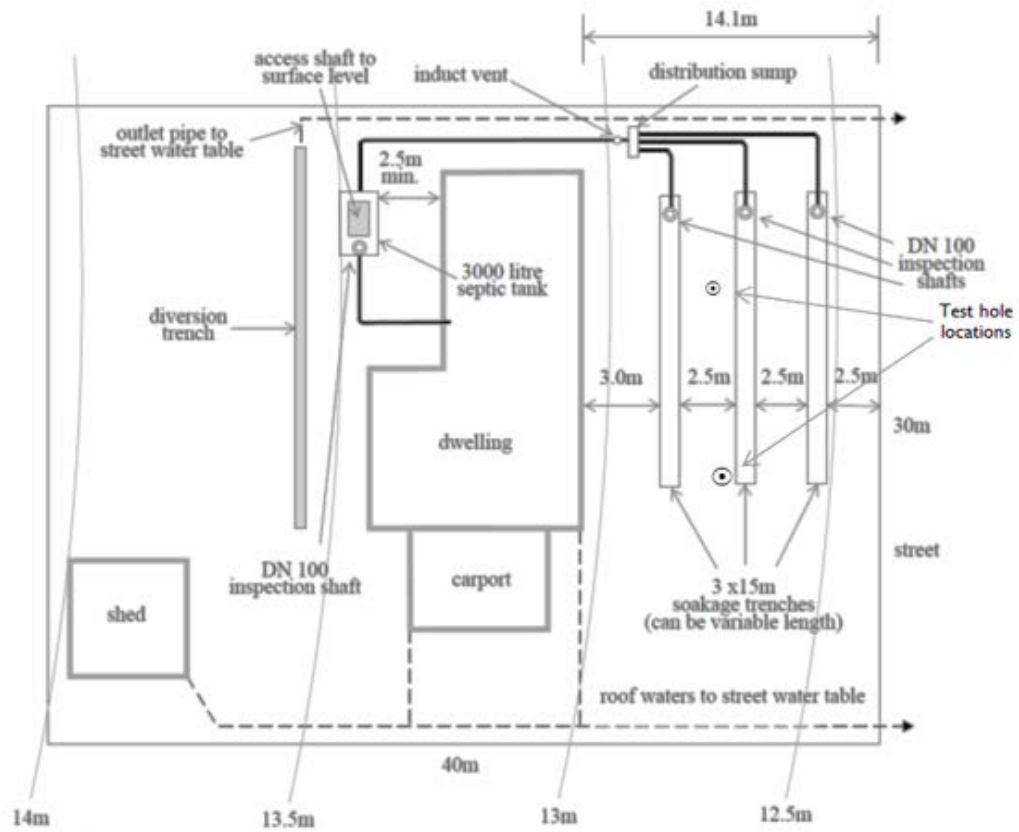
Cross section of the absorption trench

Source: AS/NZS 1547—2012 *On-site domestic wastewater management*



I.3 Example of an OWMS design

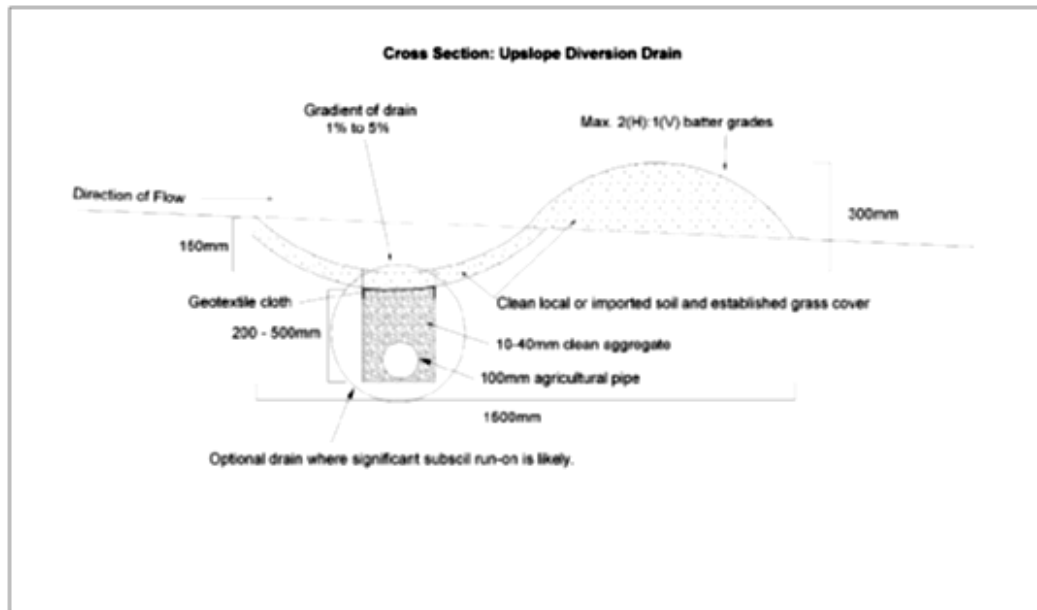
Source: Code of Practice for septic tank systems in South Australia



Source: Code of Practice for septic tank systems in South Australia



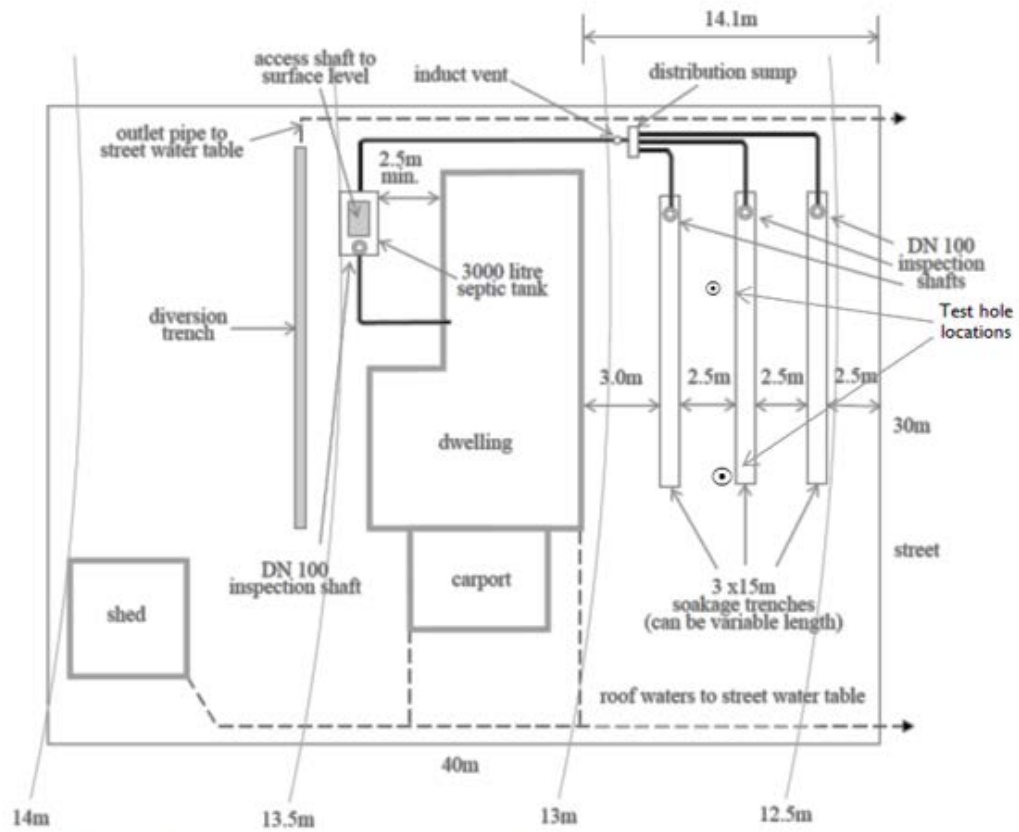
## 1.2 Cross section of a diversion drain



Source: Designing and Installing On-site Wastewater Systems - Sydney Catchment Authority 2012

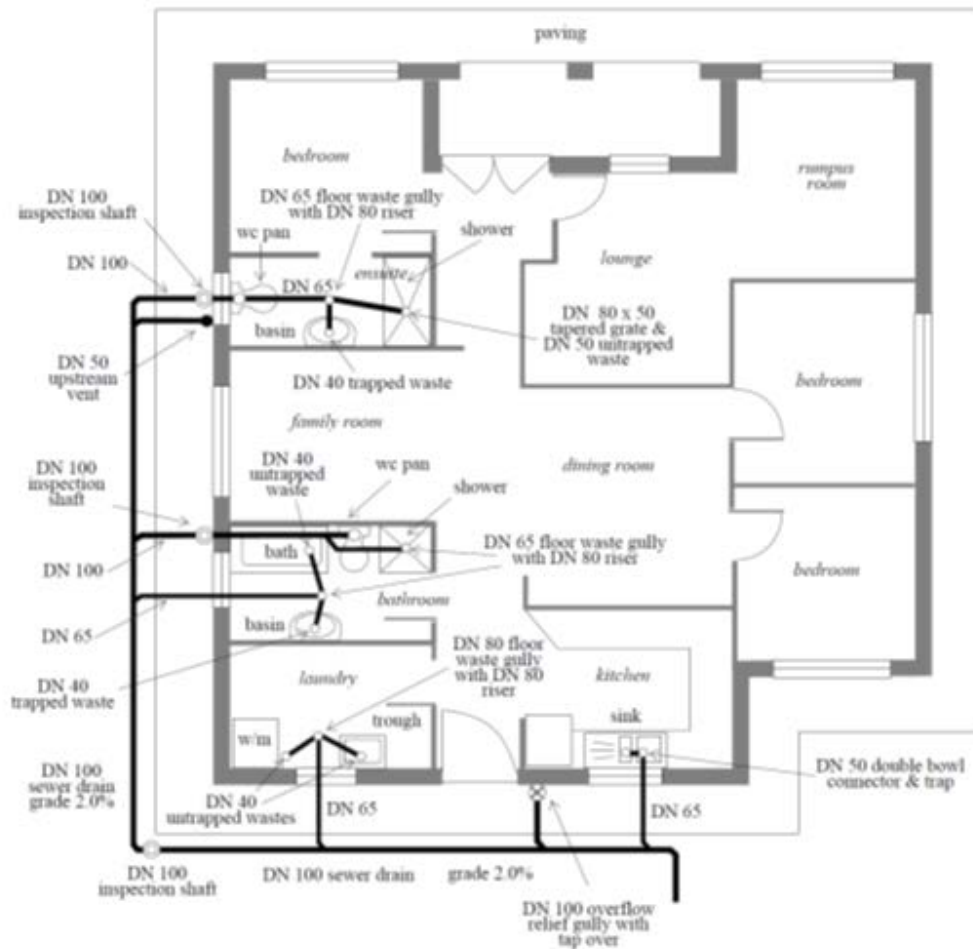
1.3 Example of an OWMS design

Source: Code of Practice for septic tank systems in South Australia



Source: Code of Practice for septic tank systems in South Australia

1.4 Example of a hydraulic design for an OWMS



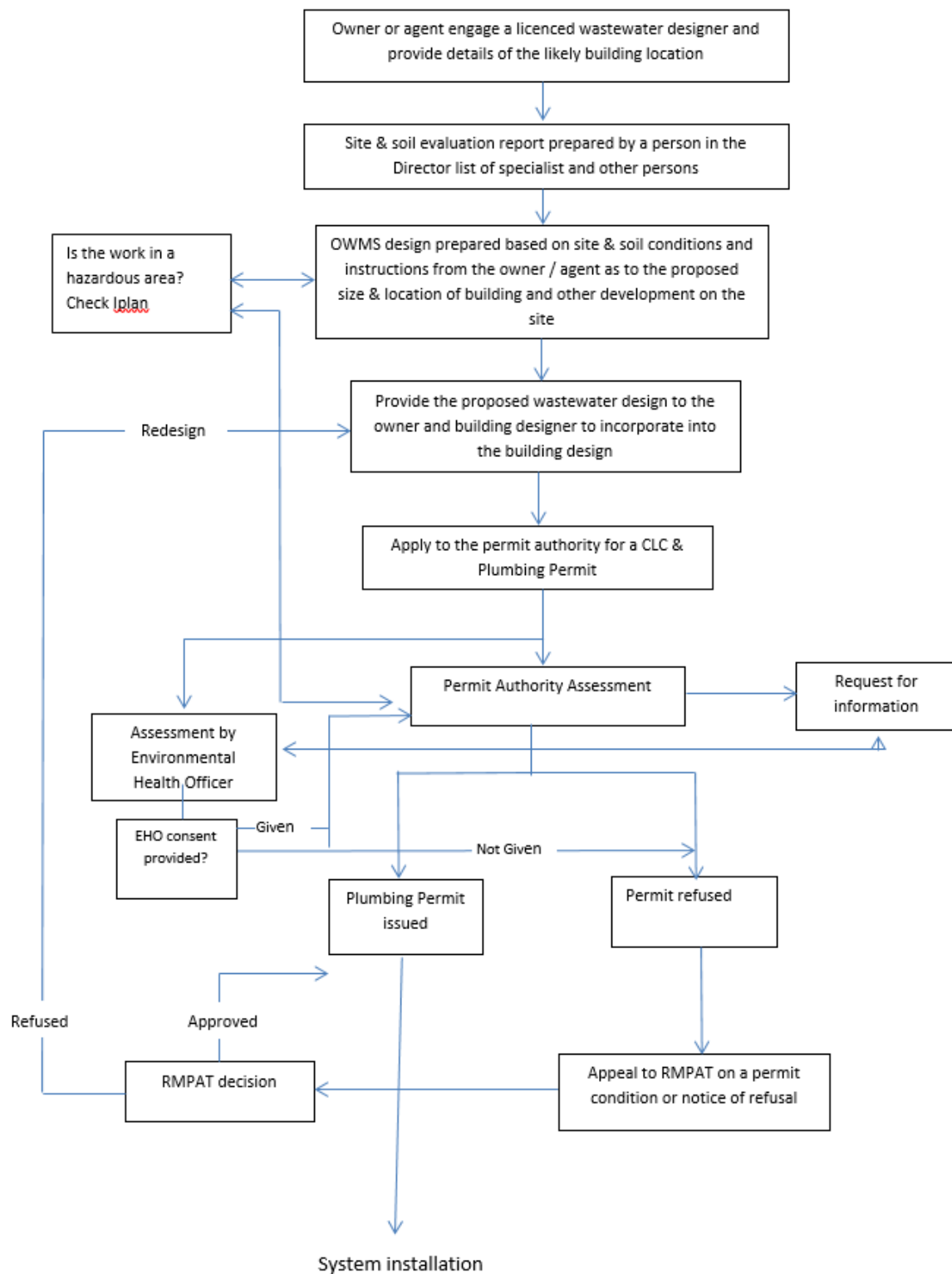
To be drawn to a scale of 1:100

**BUILDING LAYOUT PLAN**

*(Schematic & reduced for printing)*

Source: Code of Practice for septic tank systems in South Australia

**Figure 2 - Process for installing an On-site Wastewater Management System Application & Design**



**Figure 3 – Process for installing an On-site Wastewater Management System**

