Application guidelines for on-site sewerage facilities for non-sewered properties

Contents

1. Introduction

1.1. Purpose

These guidelines have been developed to provide information to assist developers, builders, plumbing practitioners and homeowners interpret the legislation, codes, and Australian Standards governing the design, application, and installation of on-site sewerage facilities in Townsville. These guidelines should be read alongside the Townsville City Plan policy SC6.4.11.8 On-site sewerage facilities when preparing a submission for planning approval, particularly for subdivision planning. It also contains information that may be relevant to permit applications for plumbing and drainage work.

These guidelines are not intended as a substitute for the codes or standards that regulate on-site sewerage facilities and Council recommends appropriate professional advice is sort before proceeding to select, design, and install an on- site sewerage treatment facility. The material is general in nature and before relying on the material in any important matter, readers should carefully evaluate its accuracy, currency, completeness, and relevance for their purpose. It is not intended to be and should not be relied upon as the ultimate and/or complete source of information.

1.2. Definitions

Unless noted otherwise all terms have the same meaning as given in the Plumbing and Drainage Act 2018 (PDA or the Act), the Plumbing and Drainage Regulation 2019 (PDR or the Regulation), the Plumbing Code of Australia (PCA), the Queensland Plumbing and Wastewater Code, prescribed codes and referenced documents. If a definition given in a prescribed code or referenced document is inconsistent with the Act or Regulation, the Act or Regulation prevails to the extent of the inconsistency.

Designer: A person registered with the Townsville City Council who holds either the necessary QBCC licence to design on-site sewerage facilities or has been assessed as having obtained the necessary technical qualifications and experience to design on-site sewerage facilities where the value of the work is less than $1,100.00.

Intermittent water course: A natural or artificial channel, identifiable by recognizable bed and banks, along which rainwater or storm water usually or occasionally flows. The term does not include a closed conduit for conveying storm water.

Top bank: The same meaning as outer bank as defined in the Water Act 2000 s5A.

1.3. Types of Systems

There are many types, makes and models of sewerage systems used in the treatment of on-site sewerage. The most common types utilised in Townsville are as follows:

Primary or septic systems

These are the most basic type of treatment systems. The process involves the retention of wastewater in a primary chamber or septic tank to allow suspended solids to float or settle out of the wastewater stream. The improved quality effluent is traditionally transferred to trenches or beds for final treatment as it passes through the soil profile. These systems are cost effective, require minimal maintenance, are extremely durable and do not require energy to operate.

Secondary treatment plants

These systems are commonly installed when the site is impacted by built or environmental features that restrict setback distances or alternative disposal methods, including spray irrigation, are preferred. The effluent undergoes further treatment after the primary tank which include secondary sedimentation, aeration, and clarification before being transferred to the disposal area. These systems effectively treat wastewater so the effluent may be used for sub- surface and surface irrigation (in addition to below ground trenches) and reduce some setback distance by up to 40%.

Advanced secondary treatment plants

These systems produce an effluent of a very high quality and when properly maintained the treated wastewater can be up to 65 times cleaner than septic tank effluent. They are especially suited to situations where high-water tables exist or where set back distances need to be kept to the very minimum. The advanced secondary treatment process goes through the same treatment stages as secondary treatment plants with the addition of a final disinfection stage, usually completed through chlorination, which removes harmful bacteria, viruses, and pathogens from the effluent. Secondary and advanced secondary treatment plants require regular (quarterly) maintenance to ensure effluent quality continues to meet the required standards. Additionally, these systems usually require an electric connection to run aeration and pumping equipment, but they are efficient, constructed of robust components and durable.

Composting toilets

There are a variety of these alternative systems on the market. The city classifies all waste generated by these systems (compost, nightsoil, organic matter) as being a primary quality. There are strict conditions on the disposal of compost/waste from these types of toilets which owners must adhered to. This type of installation requires a greywater treatment system for the disposal of greywater. The installation is to comply with the requirements of the Queensland Plumbing and Wastewater Code.

1.4. Approved treatment plants

In Queensland, only approved treatment plants and tanks may be installed. A list of approved treatment plants can be found on the state government's website Installing on-site sewerage facilities. If a system is not on the approved list or for septic tanks that don't carry WaterMark approval they cannot be installed.

1.5. Legal parameters

Plumbing and Drainage Act 2018

Plumbing and Drainage Regulation 2019

National Construction Code 2022 Vol.3 – Plumbing Code of Australia (PCA)

Queensland Plumbing and Wastewater Code 2019 (QPWC)

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

AS/NZS 1546.1:2008 – On-site domestic wastewater treatment units, Part 1: Septic Tanks

AS/NZS 1546.2:2008 - On-site domestic wastewater treatment units, Part 2: Waterless composting toilets
AS/NZS 1546.3:2017 – On-site domestic Wastewater treatment units, Part 3: Secondary treatment systems

AS/NZS 1546.4:2016 – On-site domestic wastewater treatment units, Part 4: Domestic greywater treatment systems

AS/NZS 3500.2:2021 - Sanitary Plumbing and Drainage

QDC MP 4.2 – Rainwater Tanks and Other Supplementary Water Supply Systems

Townsville City Plan

2. Applications

2.1. Applying for a permit

Before work commences to install an on-site sewerage facility, a plumbing and drainage permit must be issued for the work. Applications to install an on-site sewerage facility must be accompanied by the necessary forms, plans, reports and fees with Council's Hydraulics Team. The City will assess the submitted information to ensure it complies with the code requirements for the work and issue a permit which is your approval to commence work.

2.2. Forms and documents

A properly made application for a permit to install an on-site sewerage facility must be in the approved form and include but not limited to the following:

a) Application Form 1;
b) Site plan;
c) Floor plan/s and elevations of the proposed building;
d) Site classification report;
e) Articulation plan (soil class H1, H2 & E only);
f) Site and soil evaluation report; and
g) A copy of the treatment plant approval.

The plans must show the location of all proposed and existing buildings/structures, treatment plants and the location of the land application area/s. Additionally, they must include the location of property boundaries, impervious areas (paths, hardstands, carparks etc.), retaining structures, water tanks, and vulnerable bodies of water including bores, pools, dams, permanent and intermittent water courses. Further information on documents required to accompany permit applications can be found in Schedule 6 of the PDR.

2.3. Assessment process

Following the lodgement of an application and payment of the applicable application fee, the following assessment procedures will take place. At any stage during the assessment process, incorrect or incomplete information may cause a delay in the approval process while further information or clarification is sought.

a) The application will be checked to ensure that the application is properly made and all required documentation has been provided.
b) A Council inspector will conduct a site inspection to confirm the information supplied in the application is accurate.
c) The application is checked to ensure that it complies with code requirements.
d) If inconsistencies are identified, an information request will be sent to the applicant requesting further information to allow council to complete the assessment.
e) If the application is approved, a permit will be issued. This permit will contain certain conditions applicable to the installation, operation, and ongoing maintenance of an on-site sewerage facility.

3. Design

3.1. Registered designers

On-site sewerage designers must be registered with Council. Persons wishing to be registered as a designer must apply to Council on *Form OS-02 Application to Register as a Designer of On-Site Sewerage Facilities*.

As prescribed in s64(2) of the Plumbing and Drainage Act 2018, it is the designer's responsibility to ensure the plan for the work complies with the code requirements. Designers must have completed an appropriate training course to enable them to undertake on-site sewerage design and have the necessary competence and experience to perform their duties, as specified in all applicable Queensland legislation, AS/NZS 1547:2012 Clauses 3.3 and 3.4.

Repeated failure to abide by these instructions and submission of substandard applications may see the designer deregistered with Council and reported to the applicable licencing or registration body. Should this happen, no further designs will be accepted by Council from this designer pending the outcome of any applicable investigation.

Further information regarding the technical qualification for licencing can be found on the Queensland Building and Construction Commission's website under technical qualifications for licencing.

3.2. Designer's site and soil evaluation report

3.2.1. Report requirements

The designer's report/design must comply with the requirements of AS/NZS 1547:2012, the *Queensland* Plumbing *and Wastewater Code* and these guidelines. The report must provide all necessary information and calculations to support the design and sizing of the on-site sewerage treatment plant and land application area.

3.2.2. Completion of works requirements

Designers of on-site sewerage facilities shall provide, at the completion of the works, a completed *Form 8 An on-site sewerage work declaration* together with a copy of the commissioning certificate (if a treatment plant is installed) and an as-constructed plan of the installation before a *Form 19 Final inspection certificate* is issued. Designers must carry out, or have carried out on their behalf, the inspections necessary to enable them to provide this documentation.

Please note that the person certifying the completed works cannot be the person who carried out the installation works.

3.3. Equivalent persons and flow rates

The number of equivalent persons, on which the wastewater flow design allowances for an on-site sewerage treatment facility and effluent disposal area are based, shall be the number of bedrooms (as indicated on the

floor plan) plus one. The minimum design for a single bedroom relative's apartment shall allow for two persons.

While some of the Appendices in AS/NZS 1547:2012 are listed as informative, Council will accept these as Acceptable Solutions when used. If information supplied as part of the design is outside these guidelines, then the design shall be supported by a performance solution.

The flow rates shall be determined using Appendix H Typical Domestic Wastewater Flow Design Allowances in AS/NZS 1547:2012 Tables H1 and H2. Table H4 may be used to calculate daily flows for non-residential flow allowances only. Alternatively, where a specific commercial use is not list in Table H4, Table A of the *Planning Guidelines for Water Supply and Sewerage 2010*, Chapter 6, may be used.

3.4. Setback distances

Setback distances are to comply with the requirements of the Queensland Plumbing and Wastewater Code.

Council may, at its discretion, consider viral die off and nutrient decay calculations as a means of justifying a reduced setback distance from **subsurface** land application areas to the following features:

a) Property boundaries, pedestrian paths, walkways, retaining walls.
b) Top water level of a surface water source used for agriculture, aquaculture, or stock purposes.
c) Open (grassed) stormwater drainage channel or drain.

The consideration of reduced setback distances is subject to the requirements of the Townsville City Plan, which may require increased setback distances to watercourses or in some instances, development to be placed outside of riparian or wetland buffer areas as detailed in Part 8.2.9 Water resources catchment overlay code and Part 8.2.8 Natural assets overlay code. Furthermore, it will be necessary for applications to demonstrate that there will be no adverse environmental impacts, taking into consideration cumulative impacts from other development, to place infrastructure near a watercourse, wetland, or open stormwater drainage channel/drain.

3.5. Site and soil evaluation

The on-site designer must undertake (or have undertaken) whatever soil testing procedures they consider necessary to enable an appropriate design to be completed. This may include, but not be limited to, soil percolation tests; bore holes; test pits; and soil textural analysis and their location must be indicated on the site plan.

Council will be assessing whether the following areas have been addressed:

a) Topography and drainage.
b) Off-site impacts.
c) Presence of any fill material.
d) Geotechnical hazards.
e) Potential for environmental or public health impacts.

In addressing the above elements, the site and soil evaluator (as described in AS/NZ Standard 1547:2012) should take the following points into consideration when carrying out a site and soil evaluation:

a) The evaluator is to conduct a site evaluation to determine potential effluent disposal problems. These could include gullies, rock formations, hollows, or inconsistent soil texture, both on and off the property.
b) The evaluator is to also consider previous and current weather conditions in the determination of the site's suitability for effluent disposal.
c) The site plan should show the setback requirements (for buildings, pools, bores, permanent and intermittent water courses and drains etcetera) both on and off the property, which may influence the location of the disposal area.
d) From the commencement of site work the proposed disposal area must not be subject to vehicular traffic or machinery of any type except those required for installation.
e) The proposed land application area shall not be cut, filled or modified in any way after the site evaluation has been carried out. If this does occur the designer must be informed so that appropriate amendments can be made to the design.
f) The designer is to make their recommendation based on the site and soil evaluation carried out.

3.6. Tidal influences on groundwater

In low-lying marine environments with porous soil (e.g. category 2 soils), freshwater tends to collect in lenticular pools on top of the denser seawater intruding through the soil substrate. Thus, the water table rises and falls with the tides. The effect of the tides during times of the new and full moons, have a greater impact on the depth of the water table (Singaraja et al, 2018).

It is recommended that geotechnical surveys to check for groundwater depth in seaside and estuarine environments (Cungulla, Magnetic Island, Cleveland Palms, etc.) should be performed during periods of extreme high tides (i.e. sampling is done during the high tide either on the full or new moon lunar cycle), to ensure that there is sufficient vertical space from the lowest point of the LLA to the potential highest point of the groundwater.

To determine the minimum accepted tidal water table in these areas, the minimum water table level is taken to be the contour level of 2.36 metres (Australian Height Datum). This allows for the highest astronomical tide of 4.22 metres. Therefore, to determine vertical separation distances, this level must be taken into consideration.

Please note that a site and soil evaluation may indicate the presence of a higher water table. This, along with wet weather water tables, should be taken into consideration.

3.7. Pump wells

Pump wells are to be designed using the following design parameters:

a) Have an automatic pump out systems, e.g. float switch.
b) Be fitted with a high water-level alarm.
c) Have an emergency storage volume equivalent to 24-hours peak design flow above the working volume.
d) Be located/installed so as not to be influenced by flooding.
e) Be constructed and installed in accordance with AS/NZS3500.2:2021 Section 12.
f) Be cleaned out on a regular basis.

3.8. Greywater dispersal

3.8.1. Disposal using a sullage hose

Greywater (excluding greywater from a kitchen sink) may be broadcast over a lawn or garden area (within the property), by means of a sullage hose. The following conditions shall apply:

a) The minimum length of a sullage hose shall be 9 m.
b) The minimum internal diameter of a sullage hose shall be 65 mm.
c) Fixtures located in different rooms shall not be connected to the same waste pipe unless the waste pipe either discharges through an overflow relief gully to a 65 mm sullage hose or alternatively discharges to an 80 mm (minimum) sullage hose.
d) The waste pipe connection point for the sullage hose shall be a minimum of 150 mm above the ground surface level unless the ground surface level slopes away from the waste pipe connection point a minimum of 150 mm over the 9 m length of the sullage hose.

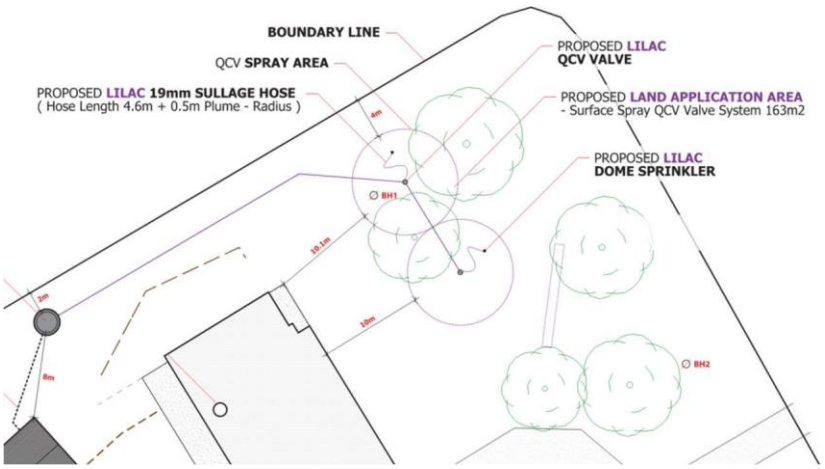
3.8.2. Greywater diversion devices

Greywater diversion devices are commercially available, WaterMark approved devices that dispose greywater to an irrigation system. These devices include filters and screens that remove hair, lint, and other solids from the waste stream before disposal to the lawn or garden. These systems don't require council approval to install, however a licenced plumber must install them to comply with the PDA. These devices must:

a) Be fitted with a switch to divert greywater to a surface or subsurface irrigation system.
b) Automatically divert to sewer if there is a blockage.
c) Have WaterMark approval.

3.9. Spray irrigation areas

Surface spray irrigation shall only be used for the disposal of effluent treated from a secondary and advanced secondary (with or without nutrient reduction) treatment plant or approved greywater treatment plants. The hose length and plume radius shall be used to size the land application area (LAA) to ensure even distribution of the effluent over the designed area is achieved. Council will not accept designs that only show a dimensioned rectangular box for the land application areas when utilising domed type sprinkler heads.



SITE SOILS
Category Four (4), Clay Loam Soils, Moderately Structured, Imperfectly Drained, Ksat : 0.5 - 1.5, DIR : 25mm/Week, Slope @ LAA 2%-3%, Full/Filtered Sunlight, Open Area, Light Grass Cover, Rocky

CALCULATIONS
Proposed Two (2) Bedroom Granny Flat
Hence : Four (4) Persons 4EP
Hence : 4 x 145L per Person per Day = 580L/Day
Hence : 580L/Day x 7 Days = 4060L/Week (Total)
Hence : 4060L/Week Divide by DIR : 25mm/Week = 163 m2

LAND APPLICATION AREA
Surface Spray QCV Valve System 163m2
Install As : Two (2) QCV Valve System
Install As : Hose Length 4.6m + 0.5m Plume - Radius
See Plan

H.S.T.P.
Proposed Advanced Secondary Sewerage Treatment Plant (Min 10EP) Model / Brand to be Advised on the Form 1 Compliance Permit Application

NOTE
Existing Dwelling to Retain Septic System in Place

4. Installation

4.1. Installation procedure

Following the granting of a permit to carry out the work, the licensed drainer may now begin installation of the on- site sewerage facility.

The installation process will need to be inspected by the designer of the facility (or the designer's representative) to ensure that the on-site sewerage facility and land application area/s have been installed in accordance with their design. If the land application area is in a position different to that indicated on the design approved by Council or the make and model of the treatment plant is changed, an application to amended design must be submitted to council for assessment and approval. Council's standard fee would apply for the approval of the amended design. If the change is only in relation to the location of the treatment plant, the change can be recorded on the as-constructed plan.

4.2. Materials

Only approved materials are to be used in the installation of on-site sewerage facilities.

Any pipe and fittings used for the transfer of effluent from a treatment plant to a land application area must be identified by lilac markings or fully lilac in colour. If not, then ALL pipework not colour coded is to be fully wrapped with an appropriate marking tape to designate treated effluent.

4.3. Certificates

The following certificates must be submitted following installation:

a) On-site sewerage facility commissioning certificate,
b) Form 8 An on-site sewerage work declaration, and
c) As-constructed plan showing the location and set-backs of the installed facility.

At the completion of the installation the designer must complete these forms and lodge them with Council's Hydraulics Team before calling for a final inspection.

These certificates and plan/s are to be completed by an appropriate person in accordance with the Plumbing and Drainage Regulation 2019 s69. Certificates issued by a firm or company will not be accepted.

5. Post installation

5.1. Building modifications

Extensions or renovations to existing buildings often require modifications to the on-site sewerage facility to accommodate increased flow. When additional bedrooms are added to an existing dwelling, an application typically becomes necessary to evaluate the on-site sewerage facility and expand the land application area as required. In most cases, it will likely be necessary to upgrade the land application area to dispose the increased load and continue to achieve the performance requirements.

5.2. Replacement/relocation of existing on-site sewerage facilities

Facilities designed by a registered designer (usually after the year 2000).

Existing on-site sewerage facilities that have been designed and certified by a registered designer may only be modified in certain circumstances. (The inappropriate modification of a facility may void any liability the designer had in relation to the facility). Further information can be sought from Council's Hydraulic Team in relation to this issue.

Facilities not designed by a registered designer (usually before the year 2000).

Existing on-site sewerage facilities that have not been designed and certified by a registered designer will need to be upgraded to comply with current code requirements when they are replaced or relocated. Further information should be sought from Council's Hydraulics Team before proceeding to replace, relocate of modify these systems.

5.3. Maintenance

The owner of a property, serviced by an on-site sewerage facility, is required to maintain the facility in appropriate working order in accordance with the PDA s70. Treatment plants are to be serviced in accordance with the treatment plant approval (as granted by the appropriate state government department) and a copy of each Form 11 service report is to be submitted to Council in accordance with the PDR s106(1).

5.4. Registration of treatment plants

Council will be maintaining a register of all on-site treatment plants within the Townsville City Council local government area in accordance with our obligations in accordance with the PDR s114(1).

5.5. Audit program

Council may carry out audit inspections to ensure that on-site sewerage facilities are performing to the requirements of their licence agreements and conditions set out in the permit to install and that there is no threat to public health or damage being caused to the environment.

6. Associated documents

Forms - Application to register as a designer of on-site sewerage facilities, Design Certificate for on-site sewerage facilities, and On-site sewerage facility commissioning certificate can be found on Council's website at townsville.qld.gov.au/payments-rates-and-permits/forms-and-permits

Form 1 Permit work application for plumbing, drainage and on-site sewerage work and Form 8 An on-site sewerage work declaration are issued by the Queensland Government. Copies of these forms can be found on the Queensland Government website.

The *Queensland Plumbing and Wastewater Code* is available on the Queensland Government website.

7. Registered designer's report/design checklist

	Typical information a designer should include in an on-site sewerage facilities report/design. **Note >> This checklist does not need to be submitted.**
	The owner's name and the address of the property
	Council registered designer name
	Show the number of bedroom (if applicable) Note >> all rooms with a robe will be counted as a bedroom
	Show the number of equivalent persons (refer to the calculation in these guidelines)
	Show the "design flow rate" per person (expressed in Litres/Person/Day)
	Show the total design flow rate in litres/day (this equates to the design flow rate per person x equivalent number of persons)
	Level of treatment: primary, secondary, or advanced secondary
	Septic tank capacity (state if an outlet filter is required)
	Soil texture
	Soil category
	State the design loading rate or the design irrigation rate
	Land application area dimensions and total sq/m required. Note: For surface spray irrigation areas, the plan must show hose length and plume radius for each sprinkler to calculate the land application area.
	State the type of land application area and provide cross sectional and plan details of the land application area (include relevant pipework, fittings and valves)
	State if a pump station is required (must have 12 hrs retention volume)
	The alarm type and location of panel (if applicable)
	Detail any environmental concerns. For example, the location of any bores, wells or water courses, etc., are to be indicated on the design, or an indication is to be given that none of these features are located within the applicable set-back distances
	Are all vertical and horizontal separation distances met?
	Show the ground level height above AHD (if in seaside area)
	Cut off drains/diversion mounds (if required)
	A reserve land application area is to be indicated or the issue adequately addressed
	The percentage of fall in the land (in the vicinity of the land application area) should be indicated on the design or an indication given that the land is essentially level
	Site plan • North point. • Full property description including street address and lot and plan details. • Name of person who evaluated the site including licence or registration number if applicable. • Scales of 1:200 or 1:500.

	• Predominant wind direction. • Location, height, density and type of vegetation. • Relevant access roads, tracks, vehicle maneuvering areas, storage areas. • Test boreholes/pits. • Fall of land expressed as a percentage. • Setback distances from the LAA to all. • The location of relevant bores, wells, drains, water courses (including intermittent water courses), creeks, etc. • Relevant buildings, fences, property boundaries, pedestrian paths, walkways, recreation areas, retaining walls, in- ground swimming pools, in-ground potable water tanks. And • Primary and reserve land application areas.