SEEC

Strategic Environmental & Engineering Consulting

Wastewater Management: Site & Soil Evaluation & Disposal System Design

Lot A DP 413644 No. 101 Golspie Road, Taralga

Prepared by:

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17 January 2019

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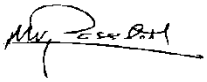
Signed: 

Document Certification

This report has been developed based on agreed requirements as understood by SEEC at the time of investigation. It applies only to a specific task on the nominated lands. Other interpretations should not be made, including changes in scale or application to other projects. The contents of this report are based on a professional appraisal of the conditions that existed at the time of our investigation. Where subsurface investigations have been done the results are only applicable to the specific sampling or testing locations and only to the depth(s) investigated. Because of natural geological variability, and/or because of possible anthropogenic influences, the subsurface conditions reported can change abruptly. Such changes can also occur after the site investigation. The accuracy of the conditions provided in this report is limited by these possible variations and influences and /or is limited by budget constraints imposed by others and/or by adequate accessibility.

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Document Issue Table

Version	Date	Author	Reviewed	Date
0A Draft	15/01/2019	CB	MP	15/01/2019
0A	17/01/2019	CB	Client	17/01/2019
01 Final	17/01/2019	CB		

Design Producer Statement

On-Site Wastewater Disposal System Design

ISSUED BY:	Strategic Environmental and Engineering Consulting (SEEC)
TO:	WaterNSW
DA No:	
OWNER	Mrs Helen Pitt
IN RESPECT OF:	Existing On-site Wastewater Management Systems
AT:	Lot A DP 413644 No. 101 Golspie Road, Taralga

Strategic Environmental and Engineering Consulting have been contracted by Mrs Helen Pitt to provide the technical design details for an on-site wastewater system. This design has been carried out in accordance with:

- SCA, 2012. Developments in Sydney's Drinking Water Catchment - Water Quality Information Requirements.
- DLG, 1998. Environment and Health Protection Guidelines – On-Site Sewage Management for Single House Holds.
- AS/NZS 1547:2012. On-Site Domestic Wastewater Management.

This is an independent design, covered by a current policy of Professional Indemnity Insurance.

DECLARATION:

I believe on reasonable grounds that this design has been carried out in accordance with agency and council requirements, and best practice in on-site wastewater design principles and procedures.

NOTE: This statement does NOT approve the installed system

DISCLAIMER:

Approval is to be sought from SEEC should variations to the specification and layout in this report be considered necessary by the installer before or at the time of installation. Failure to do so will invalidate the Design Producer Statement and SEEC will no longer take responsibility for the design.

The client is to make full disclosure of relevant information on existing and / or proposed activities on the site that will influence estimation of likely daily wastewater quantity (based on the number of potential bedrooms and other wastewater producing activities) and quality (in particular any chemicals in the wastewater stream potentially toxic to biological wastewater processes).

Subsequent changes to the site that might affect the topography and soil profiles are to be notified by the client. Failure by the client to provide this information will invalidate this Design Producer Statement.

Signed:

Date: 17/01/2019

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1 EXECUTIVE SUMMARY

Scope of Work

Strategic Environmental and Engineering Consulting (SEEC) has been commissioned by Phillip Croke to provide this wastewater site assessment. It is required to accompany a planning proposal for the possible two lot subdivision at Lot A DP 413644 No. 101 Golspie Road, Taralga. At the time of inspection there were two dwellings with associated sheds onsite as well as an original dwelling which was run down and uninhabitable. Both existing dwellings are being serviced by septic tank to absorption trench systems. Both disposal systems appear to be in good working order. Therefore, this assessment is required to show how treated wastewater generated from the existing dwellings is currently, and can continue to be, sustainably managed onsite.

Site Description

Lot A DP 413644 is a 2.02 ha (approx.) rural lot located on the south side of Golspie Road, Taralga. One dwelling is located on the western portion of the lot and the other dwelling is located on the eastern portion of the lot. The western dwelling's Effluent Management Area (EMA) is located to the north-west of the western dwelling where the site grades at 7% to the north. The eastern dwelling's EMA is located to the north east of the eastern dwelling where the site grades at 15% to the north (Figure 1) and the absorption trench areas have been leveled out**.** There are no dams, drainage depressions or bores used for potable water within prescribed buffers to the EMAs.

Wastewater Management Systems

The western dwelling is currently being serviced by a septic tank to absorption trench system. There are a total of two trenches which are 0.6 m by 15 m long. The eastern dwelling is also being serviced by a septic tank to absorption trench system with two trenches that are 0.6 m by 40 m long. As the current wastewater management systems are operating effectively no alterations are proposed. However reserve areas sized to current council and WaterNSW standards are required in case they are ever needed. In this case, the reserve areas have been sized to accommodate for Evapotranspiration/Absorption (ETA) beds. For the western dwelling a reserve area of 120 m^2 is needed. This could be provided as two 3 m by 20 m ETA beds. For the eastern dwelling a reserve area of 160 m^2 is required. This could be provided as four 2m by 20 m ETA beds. If ever constructed, the beds must be built to the requirements of AS/NZS1547:2012 (Figures 1 and 4).

It is required that all new developments within the Sydney drinking water catchment have a Neutral or Beneficial Effect (NorBE) on water quality. This is assessed using the NorBE assessment tool which includes a Wastewater Effluent Model (WEM). SEEC has undertaken the WEM (Figures 2 and 3) for the development and determined the reserve wastewater management systems would have a neutral or beneficial effect on water quality. Note the orientation of the EMAs in the WEM models are slightly different to that proposed. This is a result of the model not accurately showing the slope direction.

Conclusions and Recommendations

We conclude the site is suited to dispose primary-treated effluent in the existing wastewater management systems. Specifically, our recommendations are:

1. To leave the current wastewater management systems as they are;
2. To protect the current EMAs from vehicle and stock access (fence them off if necessary);
3. To provide suitable reserve areas sized to the specifications of this report and leave them undeveloped;
4. To preferentially select low phosphorus, liquid detergents;
5. To manage the wastewater systems according to the details of this report, its appendices and the manufacturer's recommendations; and
6. Any intensification of the land use is to be subject to a new wastewater assessment.

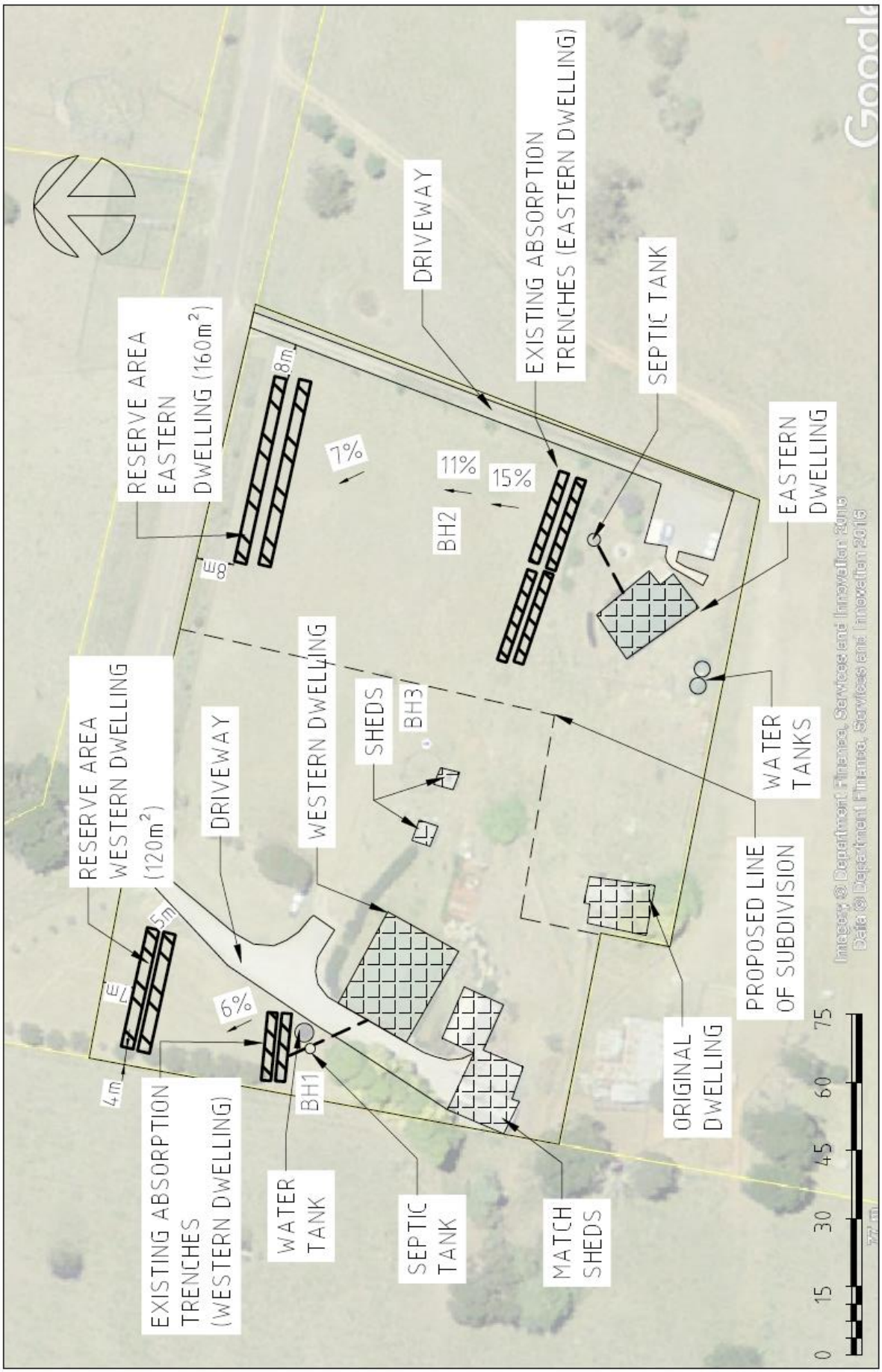


Figure 1 - Site plan and Effluent Management Area

2 SITE DETAILS

Table 1 Site details.

Site Address	Lot A DP 413644 No. 101 Golspie Road, Taralga
GPS Reading	N. 34.393951 E. 149.809747
Owner	Mrs Helen Pitt
Owner Address	101 Golspie Road, Taralga
Owner Phone	0438 472 427
Developer	Mr Phillip Croke
Developer Address	101 Golspie Road, Taralga
Developer Phone	0438 472 427
Allotment Size	2.02 ha (approx.)
Proposed Development	Possible two lot subdivision with existing dwellings
Water Supply	Tank
Number of Potential Bedrooms	7
Local Government Authority	Upper Lachlan Shire

Table 2 Design wastewater loading calculations (for a dwelling) (WaterNSW, 2018).

Design wastewater loading for each potential bedroom	Reticulated / bore water	Tank water
1-2 potential bedrooms	600 L/Day	400 L/Day
3 potential bedrooms	900 L/Day	600 L/Day
4 potential bedrooms	1200 L/Day	800 L / Day
More than 4 potential bedrooms	1200L/Day plus 150L for each additional bedroom	800L/Day plus 100L/d for each additional bedroom
Source: NorBE Assessment Guideline (Sydney Catchment Authority, 2011). Note: the Sydney Catchment Authority adopts a conservative approach for wastewater design calculations. Water saving fixtures should be standard in all new dwellings.		

Design Wastewater Loading

It is proposed to subdivide Lot A DP 413644 into two lots of equal size at this site. There is currently a western dwelling with three-bedrooms being serviced by a septic tank to trench system and an eastern dwelling with four-bedrooms being serviced by a separate septic tank to trench system. Both systems are currently approved and operating normally. Reserve areas have been sized in accordance with current standards should they ever be required. If required, the design loading rate for the western dwelling will be 600 L/day and the design loading rate for the eastern dwelling will be 800 L/day.

3 PHYSICAL SITE ASSESMENT

The site and soil evaluation has been undertaken following AS/NZS 1547:2012: *On-site Domestic Wastewater Management,* Sections 2.1 & 2.2 of the Sydney Catchment Authority's *Designing and Installing On-Site Wastewater Systems* (2012) and Appendix 2 of the 'Environment & Health Protection Guidelines: *On-site Sewage Management for Single Households* (the 'Silver Book', Department of Local Government, 1998).

3.1 Climate

Climate is an important factor in onsite wastewater management. It is particularly important when designing evapotranspiration beds as the dual parameters of incidental rainfall and evaporation have a direct effect on the required size. If ETA beds are adopted a hydraulic balance based on historical climatic data is provided. Areas that have high evaporation and low rainfall are better suited to effluent management than those with a cold and/or wet climate. We have found the site is in an area where evaporation exceeds rainfall for most, if not all of, the year.

3.2 Flood Potential

It is required to locate all effluent management areas (EMAs) above the 1:20 year flood level. This is to reduce the risk of effluent being transported off the site. In addition all electrical components, vents and inspection holes should be located above the 1:100 year flood level. This might involve locating the electrical components remote from the tanks, e.g. on a wall or similar. We are not aware of any flood study having been undertaken on this property. However there does not appear to be any threat of flooding in the EMA.

3.3 Exposure

Sun and wind exposure on the EMA should be maximised to help with evaporation. Factors that affect this are local topography, vegetation and the built environment. Improper location of an EMA in the shade can reduce evaporation by up to 30 percent. We have found that the EMA is well exposed to sun and wind.

3.4 Slope Gradient

Slope is an important parameter affecting the choice of effluent management systems. Excessive slope increases the risk of effluent leaving the site, particularly during wet weather. It also makes the excavation of absorption or ETA beds difficult as their bases must be level. The values suggested are based on ideal site and soil conditions. If conditions are not ideal we might have adopted a more conservative approach. We have found that slopes in the EMA are between 0 and 10%.

3.5 Landform

Different landforms pose different limitations to effluent management. The risk of run-on and hence the risk of runoff from an EMA is directly related to the type of landform and the position of the EMA on it. We have found that the EMA is either on a lower sideslope, a footslope or in saddle. Therefore, the risk of run-on, and hence runoff, is high. The EMA must be protected by an upslope diversion berm that will divert surface stormwater away. Subsurface disposal is preferred.

3.6 Run on and Seepage

Surface stormwater run-on should not be permitted onto an effluent management area. This is because it could transport effluent offsite and into receiving waters. In addition regular run-on might inhibit vegetative growth. We have found that there might be a risk of surface stormwater run-on. This is because the EMA might be in the mid to lower parts of a side slope or there might be some run-on from road(s). An upslope diversion berm should be constructed to control this run-on.

3.7 Erosion Potential

Sites where there is active erosion should be avoided for effluent management. We have found that there are no signs of erosion at this well vegetated site.

3.8 Site Drainage

An EMA must not be placed in wet or damp areas. This is to reduce the risk of effluent leaving the site by either surface waters or groundwater. The type of vegetation and the condition of the soils give good indications of the site's drainage. We have found that there are no signs of moisture tolerant vegetation such as sedges, ferns or Juncas sp. In addition there are no signs of grey mottling in the subsoils within 500 mm of the surface.

3.9 Fill

The presence of fill might affect the choice of an effluent management system, particularly if very high or very low permeability soils have been imported. Fill might also be prone to settlement and might also be detrimental to the establishment of good vegetative cover. We have found that there are no signs of fill at this site.

3.10 Surface Rock

The presence of frequent rock outcrops is usually an indication of shallow and variable soils and/or erosion. In such conditions it might be necessary to import soil to enable the establishment of a good vegetative cover suitable for irrigation. We have found the site has less than 10 percent rock outcrops.

3.11 Groundwater Use

The Sydney Catchment Authority recommends that effluent management areas are not located within 100 m from the high water level in bores that are used for domestic potable water. We have found that there are no bores used for potable water within 100 m of the effluent management area.

3.12 Vegetation

The suitability of the existing vegetation (if any) must be considered. The most common, and one of the most suitable, types of vegetation for effluent management is turf. Turf efficiently covers large areas and provides a good opportunity for evapotranspiration and nutrient uptake (particularly nitrogen). Some native vegetation, particularly that which has developed on poor sandy soils, will not respond well to nutrient-rich wastewater and, if possible, should be avoided or replaced with more suitable species. We have found the

existing vegetation onsite is perennial pasture where the EMAs have a good cover of turf or pasture grasses.

3.13 Proximity to Watercourses

The proximity of natural watercourses or dams is one of the most important factors in the selection of an EMA. It will be necessary to maintain buffers anywhere from 40 m to 100 m between the EMA and a watercourse or dam.

A 40 m buffer is required between an EMA and a drainage depression or a dam, a 100 m buffer is required from a permanent or an intermittent watercourse.

Section 5.4 provides further information of buffers distances.

We have found that there are no watercourses or dams within prescribed buffer distances from the EMA.

3.14 Land Availability

After summarising all of the above, particularly regarding buffer distances, land that is suitable for effluent management on site has been identified. We have found that more than enough land is suitable for effluent management. Figure 1 identifies the area(s) where an effluent management system has been adopted. Effluent must not be applied outside of these areas, unless at the discretion of the supervising authority.

3.15 Stock Present

Stock can cause damage to absorption systems and must be kept out of the EMA by fencing or other physical barrier. We have found that there is risk to the EMA from stock. Fences should be erected around all EMAs to prevent stock access.

4 SOIL ASSESSMENT

The site and soil has been undertaken following AS/NZS 1547:2012 *On-site Domestic Wastewater Management*, Sections 2.1 & 2.2 of the Sydney Catchment Authority's *Designing and Installing On-Site Wastewater Systems* (2012) and Appendix 2 of the 'Environment & Health Protection Guidelines: *On-site Sewage Management for Single Households* (the 'Silver Book', Department of Local Government, 1998).

4.1 Geology and Soil Landscape

The eSPADE, 2018 mapping identifies the site to be on the Ginkin Soil Landscape

4.2 Soil Description

4.2.1 Soil Profile Descriptions

Borehole 1

Layer 1	0	to	600+	Moderately-structured orange brown clay loam. 40-45 mm ribbon
Layer 2		to		Refusal on dense soil

Borehole 2

Layer 1	0	to	600	Moderately-structured orange brown clay loam. 40-45 mm ribbon
Layer 2	600	to	1,000	Moderately-structured orange light clay. 60 mm ribbon, 15% coarse fragments
Layer 3	1,000	to	1,200+	Well-structured medium/heavy clay 100+ mm ribbon, signs of mottling

Borehole 3

Layer 1	0	to	600	Moderately-structured orange brown clay loam. 40-45 mm ribbon
Layer 2	600	to	800+	Moderately-structured orange light clay. 60 mm ribbon, 15% coarse fragments
Layer 3		to		Refusal on dense soil

4.2.2 Soil Classification and Design Loading Rate

Table 3 Selected soil classification and corresponding design loading rate.

Soil Category	Soil Texture	Structure	Indicative Permeability		Design Loading Rate (DLR) (mm/day) (AS/NZS 1547:2012) ETA/ETS Beds & Trenches
1	Gravels & Sands	Massive	>3.0		
2	Sandy Loams	Weak	>3.0		
		Massive	1.4 - 3.0		
3	Loams	High/ Moderate	1.5 - 3.0		
		Weak or Massive	0.5 - 1.5		
4	Clay Loams	High/ Moderate	0.5 - 1.5		
		Weak	0.12 - 0.5		
		Massive	0.06 - 0.12		
5	Light Clays	Strong	0.12 - 0.5		
		Moderate	0.06 - 0.12		
		Weak/ Massive	< 0.06		
6	Medium to Heavy Clays	Strong	0.06 - 0.5	x	5
		Moderate	< 0.06		
		Weak/ Massive	< 0.06		

4.3 Soil Constraints

4.3.1 Soil Depth to a Limiting Layer (e.g bedrock or watertable)

Soil depth is an important factor in choosing a suitable effluent disposal method. The depth of soil is measured to a limiting layer - i.e. bedrock or a periodically high watertable (shown by grey mottling in the soils). Generally, soil is a very good medium for providing treatment to effluent. As the effluent passes through soil it is filtered and there is adsorption of chemicals (particularly phosphorous) onto the soil particles. In addition, the time taken to pass through the soil provides time for viruses to die. At least 600 mm of soil is required under beds or trenches dosed with primary-treated effluent. This can be reduced to 300 mm for secondary effluent but a check must be made of the linear loading rate. We have found that the soil depth is more than 1.2 m. Depending on its permeability disposal of primary treated effluent in either beds or trenches is permissible.

4.3.2 Coarse Fragments

Coarse fragments are those over 2 mm in diameter. They can pose limitations to vegetative growth by lowering the soil's ability to supply water and nutrients. We have found that there are less than 20 percent coarse fragments present.

4.3.3 pH of Soils

The pH of a soil influences its ability to supply nutrients to vegetation. If the soil is too acidic vegetative growth would be inhibited. We have found that the pH of the soil is more than 6.0. This would not inhibit vegetative growth.

4.3.4 Electrical Conductivity

The electrical conductivity of the soil relates to the amount of salts present. A high salt concentration would inhibit vegetative growth. Electrical conductivity has been measured in deci semems per metre (dS/m). We have found the electrical conductivity of the soil is less than 4 dS/m. This would not inhibit vegetative growth.

4.3.5 Emerson Aggregate Test (EAT)

The Emerson Aggregate Test (EAT) is a measure of soil dispersibility and susceptibility to erosion. It assesses the physical changes that occur to a single ped of soil when immersed in water - specifically whether it slakes and falls apart or disperses and clouds the water. We have classed the soil as Class 3(2) which means that the soil shows no dispersion potential.

4.3.6 Phosphorus Sorption

The capacity of a soil to adsorb phosphorus is expressed as its phosphorus sorption capacity. Soils with a high capacity to sorb phosphorous are preferred and can result in smaller application areas. The phosphorous sorption capacity is used in the nutrient balance (WEM model).

TOPSOIL Estimated P-Sorp (mg/kg) = 300
SUBSOIL Estimated P-Sorp (mg/kg) = 500

5 RECOMMENDATIONS

5.1 Wastewater System

The following disposal method has been chosen by the client and/or is considered the most suitable:

ETA/ETS Beds following treatment in a septic tank of 3,000 L capacity.

5.2 Sizing of the Disposal System

AS/NZS 1547:2012 provides a formula to be used to calculate the required area of the ETA bed(s). The formula to calculate the required area of ETA bed(s) is: Required area = wastewater load/ DLR. The DLR from section 4.2.2 is adopted in the calculations.

5.3 Professional Construction

A licensed plumber familiar with the design of wastewater disposal systems must be employed to install the disposal system. A combination of manual and/or automatic switching valves will be used to help switch the wastewater flow between the different beds as required. The full details of the disposal system are given in the accompanying design drawings.

5.4 Buffer Distances

Buffer distances from land applications systems as specified by SCA (2012) and NSW DLG (2012) are outlined in Table 4.

Table 4 Specified Buffer Distances.

Buildings, retaining walls, premise's boundaries, paths, drives and walkways, recreation areas, in-ground swimming pools	3 m downslope or flat, 6 m upslope
In-ground potable water tanks	15.0 m not to be located upslope
Permanent and intermittent watercourses	100 m from high water level
Bore or well used for domestic consumption	100 m from high water level
Dam and drainage depression	40 m from high water level

5.5 Detergent Use

Liquid detergents should be used in the household as powders contain elevated concentrations of salt which could alter the soil's chemistry and reduce its ability to percolate water. All cleaning products must be "Septic Friendly".

5.6 Water Saving Fixtures

This design assumes at least three-star rated plumbing fixtures are used in any new home.

6 NEUTRAL OR BENEFICIAL (NorBE) ASSESSMENT

NorBE Assessment

WEM Summary

version 3

General Information

WEM model ID	**1773071**	Associated DA number	
Model description			
Consultancy	**SEEC**	Consultant	**cbromhead@seec.com.au**
Consultant reference number	**18000445**		
Council	**Upper Lachlan**	Assessing officer	
Nominated lot	**A//413644**	Associated lots	
Development class	**Existing dwelling/dual occ <8bdrm unsewered**		
Date of model run	**1/11/2019 3:04:45 PM**		

Lot	Section	Plan
A		413644

WEM Model Run Summary

Model run outcome **Pending**

Any of the sub-surface plumes reaches:

Lot boundary	**N/A**
Drainage depression	**N/A**
Top bank of watercourse	**N/A**
Another disposal field or onsite stormwater management system	**N/A**
Within 50m, and up gradient of,a licensed drinking water bore	**N/A**

Proposed Front End Design

Length (across slope)(m)	**40.0**	Width (up slope)(m)	**3.0**
Proposed area(m2)	**120.0**	Minimum Required area (m2)	**120.0**
Number of trenches	**0**		
Effluent volume proposed (l/day)	**600**		
Effluent volume calculated (l/day)	**600**		

WEM Model Inputs

Location

Easting	**9558147.861834**	Northing	**4369805.086307**
Slope (m/m)	**0.02561**	Slope is suitable based on site inspection (Applicable to some disposal systems on steep slopes)	**N/A**

Development

Development type	**Dwellings**	Development detail	**3 bedrooms**

WaterNSW

NorBE Assessment

WEM Summary

version 3

Water supply type	**Rainwater**	Spa Bath	**No**
Continuous system use	**Yes**		
Treatment system	**Septic tank**	Disposal system	**ETA bed**

Site

Lot size(m2)	**18864**		
Subject to severe frost	**No**	Bulk density(g/cm3)	**1.58**
Vegetation for nurtrient uptake	**Perennial pasture**	Phosphorus sorption (mg/kg)	**776**
Soil depth (to impermeable layer) (m)	**1.20**	Soil structure	**Strong**
Saturated hydraulic conductivity (Ksat)(m/day)	**0.18**		
Soil texture	**Med-heavy clays**		

Effluent disposal risk factors

Depth to water table	**> 1.0**
Flood potential of disposal system	**Above 1 in 50 year ARI**
Landform score	**Hill crests, convex side slopes and plains**
Run-on and upslope seepage	**None-low, diversion possible**
Rock outcrops, scarp and bedrock	**< 5%**
Distance to drainage dpression	**> 50**
Distance to watercourses and water supply reservoirs	**> 120**
Distance to licenced drinking water bores	**> 150**

WaterNSW

Figure 2 – WEM model for secondary dwelling generated by WaterNSW (2019)

NorBE Assessment

WEM Summary

version 3

General Information

WEM model ID	**1773068**	Associated DA number	
Model description			
Consultancy	**SEEC**	Consultant	**cbromhead@seec.com.au**
Consultant reference number	**18000445**		
Council	**Upper Lachlan**	Assessing officer	
Nominated lot	**A//413644**	Associated lots	
Development class	**Existing dwelling/dual occ <8bdrm unsewered**		
Date of model run			

Lot	Section	Plan
A		413644

WEM Model Run Summary

Model run outcome **Pending**

Any of the sub-surface plumes reaches:

Lot boundary	**N/A**
Drainage depression	**N/A**
Top bank of watercourse	**N/A**
Another disposal field or onsite stormwater management system	**N/A**
Within 50m, and up gradient of,a licensed drinking water bore	**N/A**

Proposed Front End Design

Length (across slope)(m)	**80.0**	Width (up slope)(m)	**2.0**
Proposed area(m2)	**160.0**	Minimum Required area (m2)	**160.0**
Number of trenches	**0**		
Effluent volume proposed (l/day)	**800**		
Effluent volume calculated (l/day)	**800**		

WEM Model Inputs

Location

Easting	**9558250.304116**	Northing	**4369782.204991**
Slope (m/m)	**0.06866**	Slope is suitable based on site inspection (Applicable to some disposal systems on steep slopes)	**N/A**

Development

Development type	**Dwellings**	Development detail	**4 bedrooms**

WaterNSW

NorBE Assessment

WEM Summary

version 3

Water supply type	**Rainwater**	Spa Bath	**No**
Continuous system use	**Yes**		
Treatment system	**Septic tank**	Disposal system	**ETA bed**

Site

Lot size(m2)	**18864**		
Subject to severe frost	**No**	Bulk density(g/cm3)	**1.35**
Vegetation for nurtrient uptake	**Perennial pasture**	Phosphorus sorption (mg/kg)	**743**
Soil depth (to impermeable layer) (m)	**1.20**	Soil structure	**Strong**
Saturated hydraulic conductivity (Ksat)(m/day)	**0.20**		
Soil texture	**Med-heavy clays**		

Effluent disposal risk factors

Depth to water table	**> 1.0**
Flood potential of disposal system	**Above 1 in 50 year ARI**
Landform score	**Hill crests, convex side slopes and plains**
Run-on and upslope seepage	**None-low, diversion possible**
Rock outcrops, scarp and bedrock	**< 5%**
Distance to drainage dpression	**> 50**
Distance to watercourses and water supply reservoirs	**> 120**
Distance to licenced drinking water bores	**> 150**

WEM Plume Map

No image of the plumes is available. This may be because the model has not yet been run or because no image was generated when the model ran.

WaterNSW

Figure 3 – WEM model for secondary dwelling generated by WaterNSW (2019)

7 SYSTEM DESIGN

Note: The system design might be altered slightly by the Conditions of Consent - It is important to check these before work commences. This design assumes a certain design wastewater load. It will be invalidated if that load were to significantly increase (>10 percent): This might occur due to (but not limited to):

- If a spa bath or in-sink food grinder were installed.
- If the home is occupied by more than 2 persons per bedroom.
- If water fixtures are not at least three-star rated.
- If plumbing leaks are not attended to.

The design is warranted to meet the required design guidelines and standards at the time of writing. However, that does not preclude the requirement of the home owner to satisfactorily use and maintain the system to the requirements of the manufacturers and to the generic guidelines given in the following Appendix. In particular there are requirements to:

- ensure that only "septic-friendly" substances are disposed into the system (materials and chemicals).
- Periodically (once per 3-5 years) clean out the septic tank or septic chamber of the AWTS.
- Regularly (once per three months) clean the septic outlet filter or the in-line filter.
- Regularly (once per three months) manually flush the system.
- Periodically (one per year) check the disposal area for signs of seepage.
- Periodically (one per year) check the upslope diversion drain (if applicable) to ensure stormwater is adequately diverted.

Your system will be inspected as required by Council. The Wastewater Contractor must inspect both the treatment system and the disposal area following the checklist given in Appendix 1 and submit the results to Council. Should there be a problem with your system you should initially consult the licensed contractors who installed the system and/or your regular maintenance contractor.

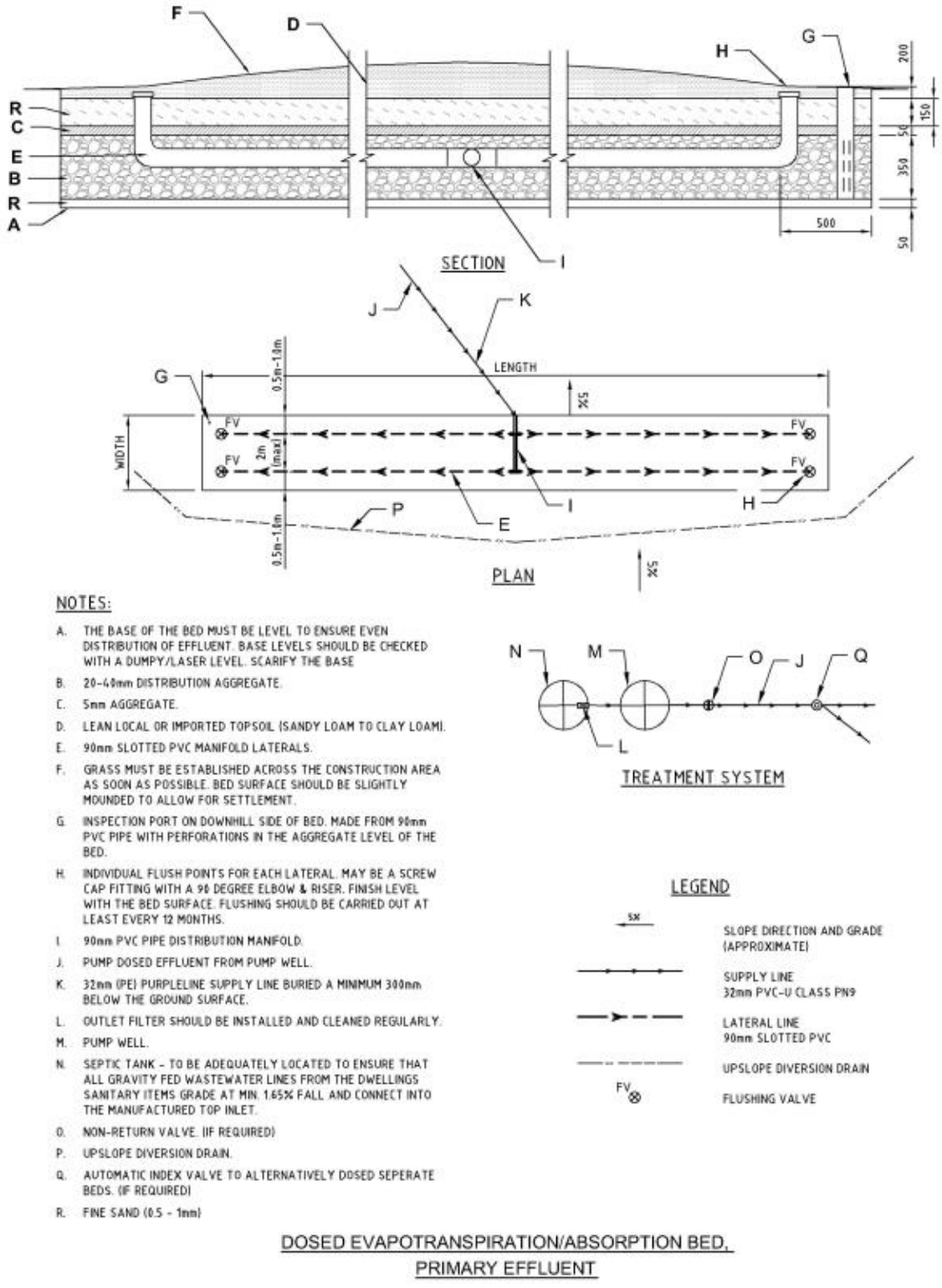


Figure 4 – Proposed Disposal System (Typical details)

8 REFERENCES

Department of Local Government (1998). Environment and Health Protection Guidelines: *Onsite Sewage Management for Single Household.*

eSPADE (2017). NSW Office of Environment and Heritage.

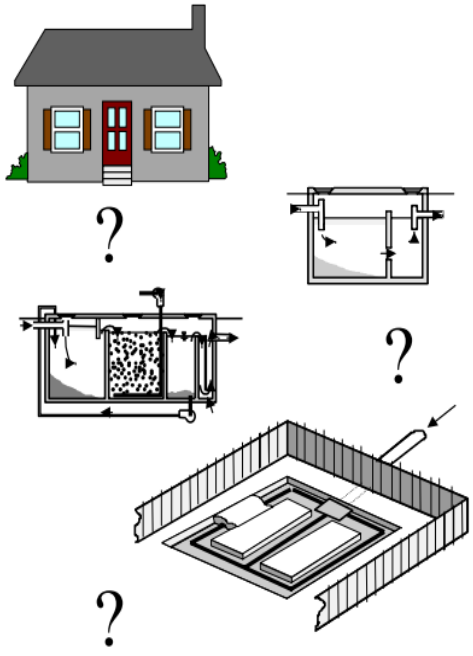
SCA 2012, *Designing and Installing On-Site Wastewater Systems A Sydney Catchment Authority Current Recommended Practice.*

Standards Australia / Standards New Zealand (2012). AS/NZS 1547:2012 *On-site Domestic Wastewater Management*.

9 APENDICIES

Checklist 13.2 Operation inspection(1) of land application area for use by service agents, Council inspectors and system owners				
Does the system owner have a set of plans of the irrigation system and an Operational and Maintenance Manual?			☐ Yes	☐ No
Land Application Area				
Is there evidence of irrigation area damage by vehicle, livestock or domestic animal activities?	☐ Yes	☐ No	Comment:	
Is a good vegetation cover established over the effluent irrigation area?	☐ Yes	☐ No	Comment:	
Are there any green or boggy areas or surface ponding of effluent liquid in the irrigation area?	☐ Yes	☐ No	Comment:	
Are there dry areas or areas lacking vegetation in the irrigation area?	☐ Yes	☐ No	Comment:	
Is the effluent irrigation area associated with an unpleasant smell that would suggest untreated or poorly treated effluent is being used to irrigate?	☐ Yes	☐ No	Comment:	
Has the effluent irrigation area been mown to maintain the grass short?			☐ Yes	☐ No
Treatment and Irrigation System				
Is any stormwater run-on effectively diverted around the irrigation area?			☐ Yes	☐ No
Is the irrigation pump working?			☐ Yes	☐ No
Is the irrigation system working without leaks?			☐ Yes	☐ No
Has the effluent irrigation area been back flushed?			☐ Yes	☐ No
Have the irrigation filters been checked and cleaned?			☐ Yes	☐ No
Does the system require air bleeding?			☐ Yes	☐ No
If an automatic sequencing valve is fitted, does it appear to switch between the different fields sequentially?			☐ Yes	☐ No
If a manual valve is fitted, has it been switched between the different fields?			☐ Yes	☐ No
Is the irrigation area still adequately protected from livestock, vehicles, children etc through the use of fencing, or shrub barriers etc.			☐ Yes	☐ No
Is there any inappropriate use of the irrigation area eg vegetable growing?			☐ Yes	☐ No
Note, if as a system owner, you answered 'No' to any of the above questions, or there are any other problems, you should contact your service provider immediately.				
Service provider: **Contact number:**				

Managing Wastewater In Your Backyard



DO

- ✓ Learn how your sewage management system works and its operational and maintenance requirements.
- ✓ Learn the location and layout of your sewage management system.
- ✓ Have your AWTS (if installed) inspected and serviced four times per year by an approved contractor. Other systems should be inspected at least once every year. Assessment should be applicable to the system design.
- ✓ Keep a record of desludgings, inspections, and other maintenance.
- ✓ Have your septic tank or AWTS desludged every three years to prevent sludge build up, which may `clog' the pipes.
- ✓ Conserve water. Conservative water use around the house will reduce the amount of wastewater which is produced and needs to be treated.
- ✓ Discuss with your local council the adequacy of your existing sewage management system if you are considering house extensions for increased occupancy.

DON'T

- ✘ Don't let children or pets play on land application areas.
- ✘ Don't water fruit and vegetables with effluent.
- ✘ Don't extract untreated groundwater for cooking and drinking.
- ✘ Don't put large quantities of bleaches, disinfectants, whiteners, nappy soakers and spot removers into your system via the sink, washing machine or toilet.
- ✘ Don't allow any foreign materials such as nappies, sanitary napkins, condoms and other hygiene products to enter the system.
- ✘ Don't put fats and oils down the drain and keep food waste out of your system.
- ✘ Don't install or use a garbage grinder or spa bath if your system is not designed for it.

Reducing water usage

Reducing water usage will lessen the likelihood of problems such as overloading with your septic system. Overloading may result in wastewater backing up into your house, contamination of your yard with improperly treated effluent, and effluent from your system contaminating groundwater or a nearby waterway.

Your sewage management system is also unable to cope with large volumes of water such as several showers or loads of washing over a short period of time. You should try to avoid these `shock loads' by ensuring water use is spread more evenly throughout the day and week.

HELP PROTECT YOUR HEALTH AND THE ENVIRONMENT

Poorly maintained sewage management systems are a serious source of water pollution and may present health risks, cause odours and attract vermin and insects.

By looking after your management system you can do your part in helping to protect the environment and the health of you and your community.

For more information please contact:

SEEC

ON-SITE SEWAGE MANAGEMENT SYSTEMS

If you live in or rent a house that is not connected to the main sewer then chances are that your yard contains an on-site sewage management system. If this is the case then you have a special responsibility to ensure that it is working as well as it can.

The aim of this pamphlet is to introduce you to some of the most popular types of on-site sewage management systems and provide some general information to help you maintain your system effectively. You should find out what type of system you have and how it works.

More information can be obtained from the pamphlets:

Your Septic System
Your Aerated Wastewater Treatment System
Your Composting Toilet
Your Land Application Area

You can get a copy of these pamphlets from your local council or the address marked on the back of this pamphlet.

It is important to keep in mind that maintenance needs to be performed properly and regularly. Poorly maintained on-site sewage management systems can significantly affect you and your family's health as well as the local environment.

What is an on-site sewage management system?

A domestic on-site sewage management system is made up of various components which - if properly designed, installed and maintained - allow the treatment and utilisation of wastewater from a house, completely within the boundary of the property.

Wastewater may be blackwater (toilet waste), or greywater (water from showers, sinks, and washing machines), or a combination of both.

Partial on-site systems - eg. pump out and common effluent systems (CES) - also exist. These usually involve the preliminary on-site treatment of wastewater in a septic tank, followed by collection and transport of the treated wastewater to an off-site management facility. Pump out systems use road tankers to transport the effluent, and CES use a network of small diameter pipes.

How does an on-site sewage management system work?

For complete on-site systems there are two main processes:

1. treatment of wastewater to a certain standard
2. its application to a dedicated area of land.

The type of application permitted depends on the quality of treatment, although you should try to avoid contact with all treated and untreated wastewater, and thoroughly wash affected areas if contact does occur.

Treatment and application can be carried out using various methods:

Septic Tank
Septic tanks treat both greywater and blackwater, but they provide only limited treatment through the settling of solids and the flotation of fats and greases. Bacteria in the tank break down the solids over a period of time. Wastewater that has been treated in a septic tank can only be applied to land through a covered soil absorption system, as the effluent is still too contaminated for above ground or near surface irrigation.

AWTS
Aerated wastewater treatment systems (AWTS) treat all household wastewater and have several treatment compartments. The first is like a septic tank, but in the second compartment air is mixed with the wastewater to assist bacteria to break down solids. A third compartment allows settling of more solids and a final chlorination contact chamber allows disinfection. Some AWTS are constructed with all the compartments inside a single tank. The effluent produced may be surface or sub-surface irrigated in a dedicated area.

Composting Toilets
Composting toilets collect and treat toilet waste only. Water from the shower, sinks and the washing machine needs to be treated separately (for example in a septic tank or AWTS as above). The compost produced by a composting toilet has special requirements but is usually buried on-site.

These are just some of the treatment and application methods available, and there are many other types such as sand filter beds, wetlands, and amended earth mounds. Your local council or the NSW Department of Health have more information on these systems if you need it.

Regulations and recommendations

The NSW Department of Health determines the design and structural requirements for treatment systems for single households. Local councils are primarily responsible for approving the installation of smaller domestic septic tank systems, composting toilets and AWTSs in their area, and are also responsible for approving land application areas. The NSW Environment Protection Authority approves larger systems.

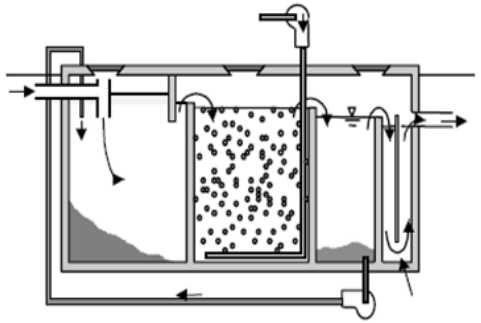
The design and installation of on-site sewage management systems, including plumbing and drainage, should only be carried out by suitably qualified or experienced people. Care is needed to ensure correct sizing of the treatment system and application area.

Heavy fines may be imposed under the Clean Waters Act if wastewater is not managed properly.

Keeping your on-site sewage management system operating well

What you put down your drains and toilets has a lot to do with how well your system performs. Maintenance of your sewage management system also needs to be done well and on-time. The following is a guide to the types of things you should and should not do with your system.

Your Aerated Wastewater Treatment System



Reducing water usage

Reducing water usage will lessen the likelihood of problems such as overloading with your AWTS. Overloading may result in wastewater backing up into your house, contamination of your yard with improperly treated effluent, and effluent from your system entering a nearby river, creek or dam.

Conservative water use around the house will reduce the amount of wastewater which is produced and needs to be treated.

Your AWTS is also unable to cope with large volumes of water such as several showers or loads of washing over a short period of time. You should try to avoid these 'shock loads' by ensuring water use is spread more evenly throughout the day and week.

Warning signs

You can look out for a few warning signs that signal to you that there are troubles with your AWTS. Ensure that these problems are attended to immediately to protect your health and the environment.

Look out for the following warning signs:

- Water that drains too slowly.
- Drain pipes that gurgle or make noises when air bubbles are forced back through the system.
- Sewage smells, this indicates a serious problem.
- Water backing up into your sink which may indicate that your system is already failing.
- Wastewater pooling over the land application area.
- Black coloured effluent in the aerated tank.
- Excess noise from the blower or pumping equipment
- Poor vegetation growth in irrigated area.

Odour problems from a vent on the AWTS can be a result of slow or inadequate breakdown of solids. Call a technician to service the system.

HELP PROTECT YOUR HEALTH AND THE ENVIRONMENT

Poorly maintained AWTSs are a serious source of water pollution and may present health risks, cause odours and attract vermin and insects.

By looking after your treatment system you can do your part in helping to protect the environment and the health of you and your family.

If you would like more information please contact:

SEEC

Aerated Wastewater Treatment Systems (AWTS)

In unsewered areas, the proper treatment and utilisation of household wastewater on-site is critical in preserving the health of the public and the environment. AWTS have been developed as a way of achieving this.

What is an AWTS?

An AWTS is a purpose built system used for the treatment of sewage and liquid wastes from a single household or multiple dwellings.

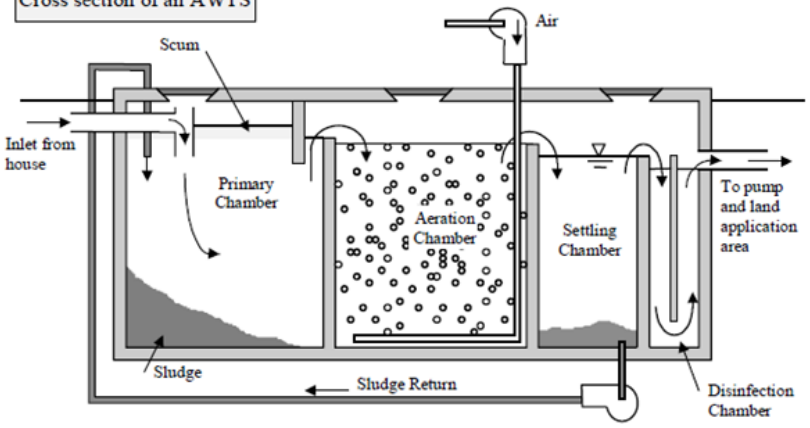
It consists of a series of treatment chambers combined with an irrigation system. An AWTS enables people living in unsewered areas to treat and utilise their wastewater.

How does an AWTS work?

Wastewater from a household is treated in stages in several separate chambers. The first chamber is similar to a conventional septic tank. The wastewater enters the chamber where the solids settle to the bottom and are retained in the tank forming a sludge layer. Scum collects at the top, and the partially clarified wastewater flows into a second chamber. Here the wastewater is mixed with air to assist bacteria to further treat it. A third chamber allows additional clarification through the settling of solids, which are returned for further treatment to either the septic chamber (as shown) or to the aeration chamber. The clarified effluent is disinfected in another chamber (usually by chlorination) before irrigation can take place.

Bacteria in the first chamber break down the solid matter in the sludge and scum layers. Material that cannot be fully broken down gradually builds up in the chamber and must be pumped out periodically.

Cross section of an AWTS



Regulations and recommendations

Local councils are primarily responsible for approving the smaller, domestic AWTSs in their area. The Environment Protection Authority (EPA) approves larger units, whilst the NSW Department of Health determines the design and structural requirements for all AWTSs.

At present AWTSs need to be serviced quarterly by an approved contractor at a cost to the owner. Local councils should also maintain a register of the servicing of each system within their area.

AWTSs should be fitted with an alarm having visual and audible components to indicate mechanical and electrical equipment malfunctions. The alarm should provide a signal adjacent to the alarm and at a relevant position inside the house. The alarm should incorporate a warning lamp which may only be reset by the service agent.

Maintaining your AWTS

The effectiveness of the system will, in part, depend on how it is used and maintained. The following is a guide on good maintenance procedures that you should follow:

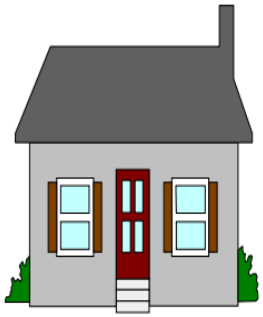
DO

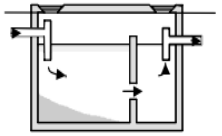
- ✓ Have your AWTS inspected and serviced four times per year by an approved contractor. Assessment should be applicable to the system design.
- ✓ Have your system service include assessment of sludge and scum levels in all tanks, and performance of irrigation areas.
- ✓ Have all your tanks desludged at least every three years.
- ✓ Have your disinfection chamber inspected and tested quarterly to ensure correct disinfectant levels.
- ✓ Have your grease trap (if installed) cleaned out at least every two months.
- ✓ Keep a record of pumping, inspections, and other maintenance.
- ✓ Learn the location and layout of your AWTS and land application area.
- ✓ Use biodegradable liquid detergents such as concentrates with low sodium and phosphorous levels.
- ✓ Conserve water.

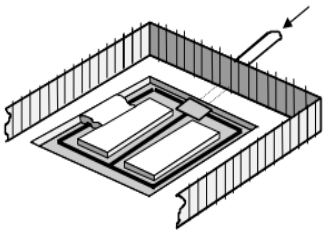
DON'T

- ✗ Don't put bleaches, disinfectants, whiteners, nappy soakers and spot removers in large quantities into your AWTS via the sink, washing machine or toilet.
- ✗ Don't allow any foreign materials such as nappies, sanitary napkins, condoms and other hygiene products to enter the system.
- ✗ Don't use more than the recommended amounts of detergents.
- ✗ Don't put fats and oils down the drain and keep food waste out of your system.
- ✗ Don't switch off power to the AWTS, even if you are going on holidays

Your Septic System







DON'T

- ✘ Don't put large quantities of bleaches, disinfectants, whiteners, nappy soakers and spot removers into your septic tank via the sink, washing machine or toilet.
- ✘ Don't allow any foreign materials such as nappies, sanitary napkins, condoms and other hygiene products to enter the system.
- ✘ Don't use more than the recommended amounts of detergents.
- ✘ Don't put fats and oils down the drain and keep food waste out of your system.
- ✘ Don't install or use a garbage grinder or spa bath if your system is not designed for it.

Reducing water usage

Reducing water usage will lessen the likelihood of problems such as overloading with your septic system. Overloading may result in wastewater backing up into your house, contamination of your yard with improperly treated effluent, and effluent from your system contaminating groundwater or a nearby river, creek or dam.

Conservative water use around the house will reduce the amount of wastewater which is produced and needs to be treated.

Your septic system is also unable to cope with large volumes of water such as several showers or loads of washing over a short period of time. You should try to avoid these 'shock loads' by ensuring water use is spread more evenly throughout the day and week.

Warning signs

You can look out for a few warning signs that signal to you that there are troubles with your septic tank. Ensure that these problems are attended to immediately to protect your health and the environment.

Look out for the following warning signs:

- Water that drains too slowly.
- Drain pipes that gurgle or make noises when air bubbles are forced back through the system.
- Sewage smells, this indicates a serious problem.
- Water backing up into your sink which may indicate that your septic system is already failing.
- Wastewater surfacing over the land application area.

Trouble shooting guide

If there are odours check the following areas:

- Greasetrap (if installed), is it full or blocked?
- Absorption field, is it wet or soggy?
- Has there been recent heavy rain?

Odour problems from a vent on the septic system can be a result of slow or inadequate breakdown of solids. Call a technician to service the system.

HELP PROTECT YOUR HEALTH AND THE ENVIRONMENT

Poorly maintained septic tanks are a serious source of water pollution and may present health risks, cause odours and attract vermin and insects.

By looking after your septic system you can do your part in helping to protect the environment and the health of you and your family.

If you would like more information please contact:

SEEC

SEPTIC SYSTEMS

In unsewered areas, the proper treatment and reuse of household wastewater on-site is critical in ensuring minimal impact to public health and the environment. Septic systems have been developed as a way of achieving this.

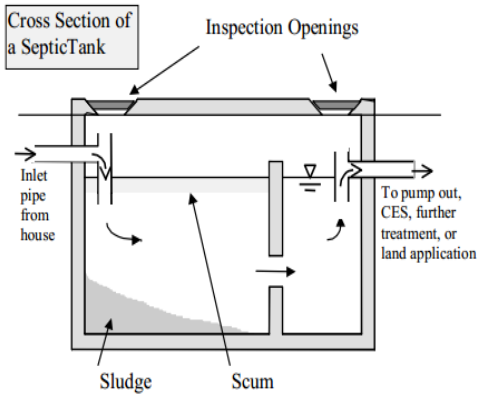
What is a septic system?

A septic system consists of a septic tank combined with a soil absorption system and/or transpiration beds or pump out connections. The system enables people living in unsewered areas to treat and disperse their sewage.

A septic tank is a structurally sound watertight tank used for the treatment of sewage and liquid wastes from a single household or multiple dwellings.

How does a septic system work?

All the wastewater from a household enters the tank. Most of the solids settle to the bottom and are retained in the tank forming a sludge layer, whilst fats and greases collect at the top in a scum layer.

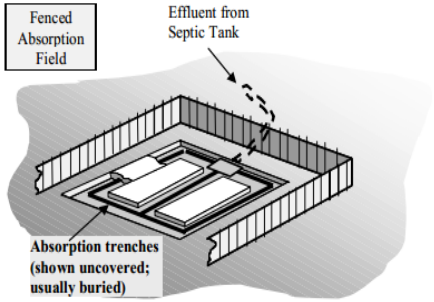


Bacteria in the septic tank break down the solid matter in the sludge and scum layers. Material that cannot be fully broken down gradually builds up in the tank and must be pumped out periodically.

There are three ways to handle septic tank effluent:

On-site application. The effluent flows from the septic tank to transpiration and/or absorption trenches. Here the effluent is mainly absorbed into the soil and partly evaporated by the sun and used by vegetation.

Such application systems have the potential to contaminate groundwater and are not recommended in sensitive locations or in higher density developments. Further treatment followed by subsurface irrigation should be considered.



Pump out. The effluent flows from the septic tank into a collection well or holding tank. At regular periods, a tanker pumps out the holding tank and transports the effluent to an off-site management facility.

Common effluent system (CES). The treated wastewater is transported to an off-site management facility through a network of small diameter pipes.

Regulations and recommendations

An on-site septic system requires approval from the local council before it is put in place. The regulations that apply to single household systems differ from those for multiple dwellings. The Environment Protection Authority (EPA) is responsible for approving septic tanks used to treat wastes generated by multiple dwellings like caravan parks and commercial and industrial premises. The NSW Department of Health determines the design and structural requirements for septic tanks and collection wells.

Local councils have the authority to approve systems certified by the NSW Department of Health for individual properties and ensure the systems do not have adverse impacts on health and the environment. Local councils are responsible for ensuring that the approved system is installed according to specifications and any special conditions, and is maintained and serviced correctly. You should consult your local council on the regulations that apply to you.

Care of the septic tank is only a part of the maintenance of your septic system. Management of the treated wastewater from your septic system is your responsibility and is discussed in the pamphlet "Your Land Application Area". Heavy fines may be imposed if the effluent is managed improperly.

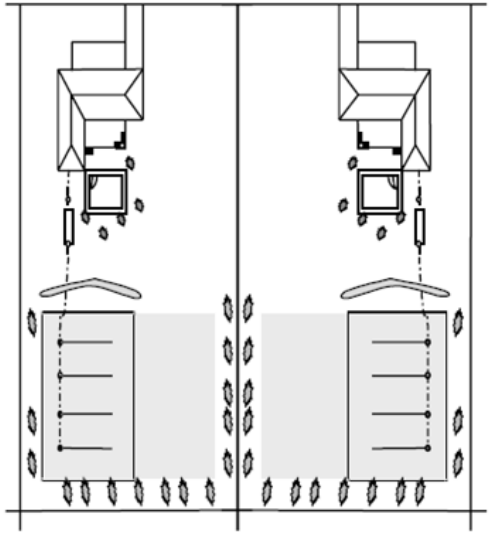
Maintaining your septic system

The effectiveness of the system will, in part, depend on how it is operated and maintained. The following is a guide on how to achieve the most from your system.

DO

- ✓ Have your septic tank desludged every three years to prevent sludge build up, which may 'clog' the pipes and absorption trenches.
- ✓ Have your septic tank serviced annually by contractors to check scum and sludge levels, and the presence of blockages in the outlet and inlet pipes.
- ✓ Have your grease trap (if installed) cleaned out at least every two months.
- ✓ Keep a record of pumping, inspections, and other maintenance.
- ✓ Learn the location and layout of your septic system and land application area.
- ✓ Check household products for suitability for use with a septic tank.
- ✓ Use biodegradable liquid detergents, such as concentrates with low phosphorous.
- ✓ Ensure your tank is mosquito-proofed.
- ✓ Conserve water.

Your Land Application Area



Maintaining your land application area

The effectiveness of the application area is governed by the activities of the owner.

DO

- ✓ Construct and maintain diversion drains around the top side of the application area to divert surface water.
- ✓ Ensure that your application area is kept level by filling any depressions with good quality top soil (not clay).
- ✓ Keep the grass regularly mowed and plant small trees around the perimeter to aid absorption and transpiration of the effluent.
- ✓ Ensure that any run off from the roof, driveway and other impermeable surfaces is directed away from the application area.
- ✓ Fence irrigation areas.
- ✓ Ensure appropriate warning signs are visible at all times in the vicinity of a spray irrigation area.
- ✓ Have your irrigation system checked by the service agent when they are carrying out service on the treatment system.

DON'T

- × Don't erect any structures, construct paths, graze animals or drive over the land application area.
- × Don't plant large trees that shade the land application area, as the area needs sunlight to aid in the evaporation and transpiration of the effluent.
- × Don't plant trees or shrubs near or on house drains.
- × Don't alter stormwater lines to discharge into or near the land application area.
- × Don't flood the land application area through the use of hoses or sprinklers.
- × Don't let children or pets play on land application areas.
- × Don't water fruit and vegetables with the effluent.
- × Don't extract untreated groundwater for potable use.

Warning signs

Regular visual checking of the system will ensure that problems are located and fixed early.

The visual signs of system failure include:

- surface ponding and run-off of treated wastewater
- soil quality deterioration
- poor vegetation growth
- unusual odours

Volume of water

Land application areas and systems for on-site application are designed and constructed in anticipation of the volume of waste to be discharged. Uncontrolled use of water may lead to poorly treated effluent being released from the system.

If the land application area is waterlogged and soggy the following are possible reasons:

- Overloading the treatment system with wastewater.
- The clogging of the trench with solids not trapped by the septic tank. The tank may require desludging.
- The application area has been poorly designed.
- Stormwater is running onto the area.

HELP PROTECT YOUR HEALTH AND THE ENVIRONMENT

Poorly maintained land application areas are a serious source of water pollution and may present health risks, cause odours and attract vermin and insects.

By looking after your sewage management system you can do your part in helping to protect the environment and the health of you and your family.

For more information please contact:

SEEC

LAND APPLICATION AREAS

The reuse of domestic wastewater on-site can be an economical and environmentally sound use of resources.

What are land application areas?

These are areas that allow treated domestic wastewater to be managed entirely on-site.

The area must be able to utilise the wastewater and treat any organic matter and wastes it may contain. The wastewater is rich in nutrients, and can provide excellent nourishment for flower gardens, lawns, certain shrubs and trees. The vegetation should be suitably tolerant of high water and nutrient loads.

How does a land application area work?

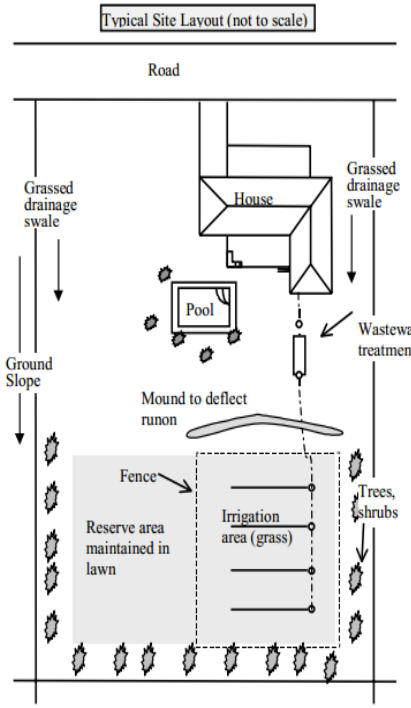
Treated wastewater applied to a land application area may be utilised or simply disposed, depending on the type of application system that is used. The application of the wastewater can be through a soil absorption system (based on disposal) or through an irrigation system (based on utilisation).

Soil absorption systems do not require highly treated effluent, and wastewater treated by a septic tank is reasonable as the solids content in the effluent has been reduced. Absorption systems release the effluent into the soil at a depth that cannot be reached by the roots of most small shrubs and grasses. They rely mainly on the processes of soil treatment and then transmission to the water table, with minimal evaporation and up-take by plants. **These systems are not recommended in sensitive areas as they may lead to contamination of surface water and groundwater.**

Irrigation systems may be classed as either subsurface or surface irrigation. If an irrigation system is to be used, wastewater needs to be pre-treated to at least the quality produced by an aerated wastewater treatment system (AWTS).

Subsurface irrigation requires highly treated effluent that is introduced into the soil close to the surface. The effluent is utilised mainly by plants and evaporation.

Surface irrigation requires highly treated effluent that has undergone aeration and disinfection treatments, so as to reduce the possibility of bacteria and virus contamination.



The effluent is then applied to the land area through a series of drip, trickle, or spray points which are designed to eliminate airborne drift and run-off into neighbouring properties.

There are some public health and environmental concerns about surface irrigation. There is the risk of contact with treated effluent and the potential for surface run-off. Given these problems, subsurface irrigation is arguably the safest, most efficient and effective method of effluent utilisation.

Regulations and recommendations

The design and installation of land application areas should only be carried out by suitably qualified or experienced people, and only after a site and soil evaluation is done by a soil scientist. Care should be taken to ensure correct buffer distances are left between the application area and bores, waterways, buildings, and neighbouring properties.

Heavy fines may be imposed under the Clean Waters Act if effluent is managed improperly.

At least two warning signs should be installed along the boundary of a land application area. The signs should comprise of 20mm high Series C lettering in black or white on a green background with the words:

RECLAIMED EFFLUENT
NOT FOR DRINKING
AVOID CONTACT

Depending on the requirements of your local council, wet weather storage and soil moisture sensors may need to be installed to ensure that effluent is only irrigated when the soil is not saturated.

Regular checks should be undertaken of any mechanical equipment to ensure that it is operating correctly. Local councils may require periodic analysis of soil or groundwater characteristics

Humans and animals should be excluded from land application areas during and immediately after the application of treated wastewater. The longer the period of exclusion from an area, the lower the risk to public health.

The householder is required to enter into a service contract with the installation company, its agent or the manufacturer of their sewage management system, this will ensure that the system operates efficiently.

Location of the application area

Treated wastewater has the potential to have negative impacts on public health and the environment. For this reason the application area must be located in accordance with the results of a site evaluation, and approved landscaping must be completed prior to occupation of the building. Sandy soil and clayey soils may present special problems.

The system must allow even distribution of treated wastewater over the land application area.