ON-SITE WASTEWATER ASSESSMENT FOR PROPOSED RESIDENTIAL DWELLING ON 9-17 GARSWOOD ROAD, GLENMORE PARK

FOLIO NO: LOT 4210 DP 1150762

LGA: PENRITH CITY COUNCIL

CLIENT: C/O- ECONOCYCLE SERVICES (BOB DAY)

Amended 23 February 2016

Our ref: 1331ww

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1. ASSESSMENT CRITERIA

Harris Environmental Consulting was commissioned by Econocycle Services (on behalf of Melisa Michael) to prepare an onsite wastewater management plan for 9-17 Garswood Road, Glenmore Park, lot 4210 DP1150762. The owner plans to build a 4 bedroom residential dwelling on the 8558m² property located within Penrith City Council. Harris Environmental Consulting prepared this Soil and Site Assessment for On Site Wastewater Management in accordance with:

- Penrith City Council's On- Site Sewage Management Policy (nominated irrigation areas for soil types);
- Environment and Health Protection Guidelines (1998) On-site Sewage Management for Single Households (Department of Local Government); and
- AS/NZ 1547:2012 On-site wastewater management (Standards Australia, 2012).

Figure 1 Location of proposed house site

2. SITE INFORMATION

Owner/postal address	Melisa Michael 9-17 Garswood Road, Glenmore Park
Size of property	8558m²
Legal title	Lot 4210 DP 1150762
Local Government	Penrith City Council's On- Site Sewage Management Policy (nominated irrigation areas for soil types);
Proposed development:	Bedrooms 4 | Potential b/rooms 2 | Total 6
Water supply	Town water
Wastewater load assumptions	150L/person/day for town water 120L/person/day for tank water
Design wastewater load	1 master (2 persons/room) 3 bedrooms (1 person/room) 2 potential (1 person/room) = 7 potential persons = 1050L/day
Surface and Subsurface Irrigation area	972m² for 6 bedrooms and clayey soil (see appendix II)
Proposed wastewater treatment	AWTS
Proposed wastewater of disposal	654m² fixed spray irrigation 316m² fixed spray irrigation
Date site assessed:	20/03/2015
Date report modified:	23/02/2016
Site assessor:	Sean Harris Msc Env Science (UOW), Grad dip Nat Res (UNE), BscAppSc, Agriculture (HAC)

3. SITE ASSESSMENT

Climate	Orchard Hills Treatment works (median annual 853.8mm) Badgerys Creek pan evaporation (median 1699mm). The climate provides no significant limitation to onsite effluent management as monthly pan evaporation exceeds rainfall throughout the year.
Flood potential	Treatment system above 1 in 100 year flood level; minor limitation; Land application system above 1 in 20 year flood contour, minor limitation
Exposure	Southern aspect, full sun and wind exposure
Slope	3-5% slope, minor limitation
Landform	Concave top slope, minor limitation
Run-on and seepage	No evidence of moisture tolerant grasses or wet areas; minor limitation
Erosion potential	Minor evidence of sheet erosion; minor limitation
Site drainage	No evidence of poor drainage; minor limitation
Fill	No evidence of fill; minor limitation
Domestic groundwater	No groundwater bores within 100m; minor limitation
Buffer distance from wastewater management system	Permanent waters : 100m+ Intermittent waters : 40m+ Boundary of premises: 3-6m+ Swimming pools: 3-6m+ Buildings: 15m+
Surface rock	No surface rock; minor limitation
Area available	Effluent management area is available. The proposed irrigation area is split into two locations. The area near the front boundary is downslope of the existing dam so runoff can not enter.

4. SOIL ASSESSMENT

Method	Shovel/crowbar			
Depth to bedrock (m)	1000+mm ; moderate limitation			
Depth to high soil watertable	No subsoil mottling; no free water, minor limitation			
Coarse (%)	No coarse fragments in subsoil, minor limitation			
pH (soil/water)	pH 5.5-6; minor limitation			
EAT	3 (2); minor limitation			
Electrical conductivity	0.04 dSm, minor limitation			
Salinity hazard	The Department of Infrastructure, Planning and Natural Resources map of salinity hazard throughout Western Sydney shows the proposed irrigation area as having a **moderate salinity hazard**.			
Domestic groundwater use	The Department of Primary Industries Office of Water search of groundwater bores found there are **no known groundwater bores** within 100m of the proposed irrigation area			
Soil Landscape /GSG Geological unit Great Soil Group	*Blacktown Soil Landscape* *Wianamatta Shale (Sandstone, Siltstone and shale)* *CSIRO defined Red Duplex (red clayed soils)*			
Surface rock	No surface rock in proposed irrigation area, minor limitation			
Bulk density	Permeable, well drained soil profile; moderate limitation			
Phosphorus balance assumptions	P sorption capacity - 600,000mg/m^2/week/depth for clay soil types or 400,000mg/m^2/week/depth for sandy soil types			
Nitrogen and Phosphorus output values	TN output value of 25mg/L and a critical loading rate of 27mg/m^2/day. TP output value of 12mg/L			
Soil profile:	Layer 1		DLR	DIR
	Texture Colour Depth Structure Coarse frag.	Clay loam Black 0-300mm Well structured NA	NA	15
	Layer 2		DLR	DIR
	Texture Colour Depth Structure Coarse frag.	Medium clay Tan 300-1000 Moderately structured NA	NA	NA
	Layer 3			
	Texture Colour Depth Structure Coarse frag.		NA	NA

*Design Irrigation Rate for clayey soils, and 35mm/week for sandy soils. DIR in mm/week

Photo 1 Looking upslope towards the proposed irrigation area

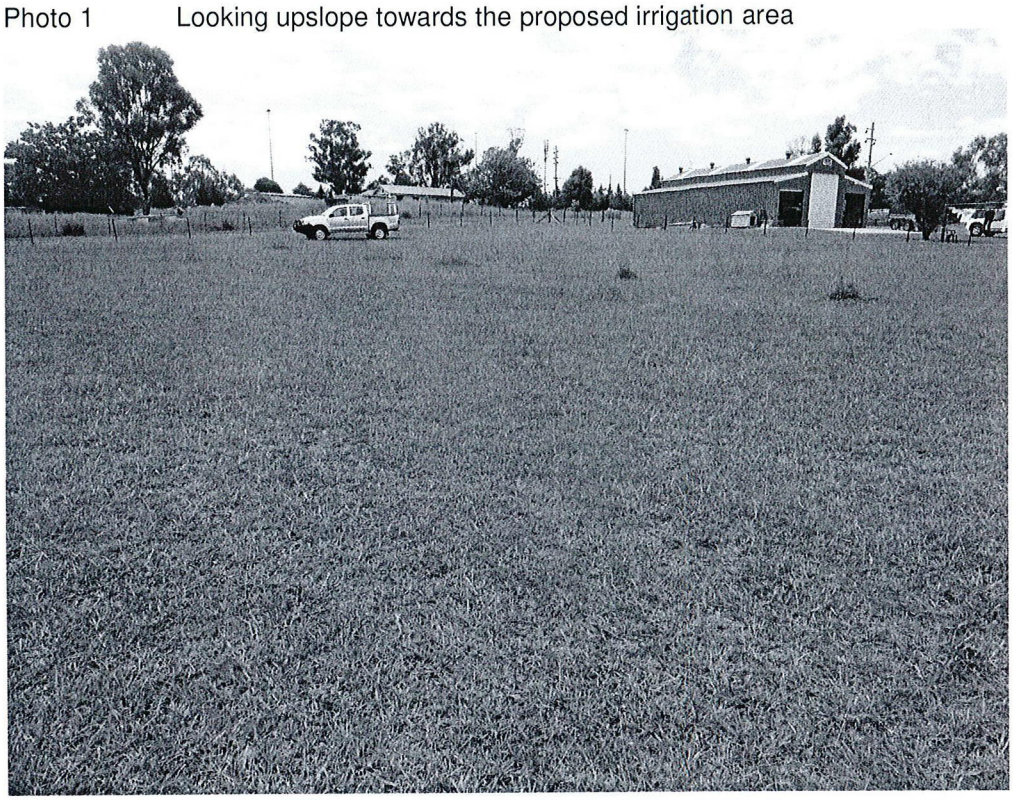


Photo 2 Looking downslope over proposed dwelling

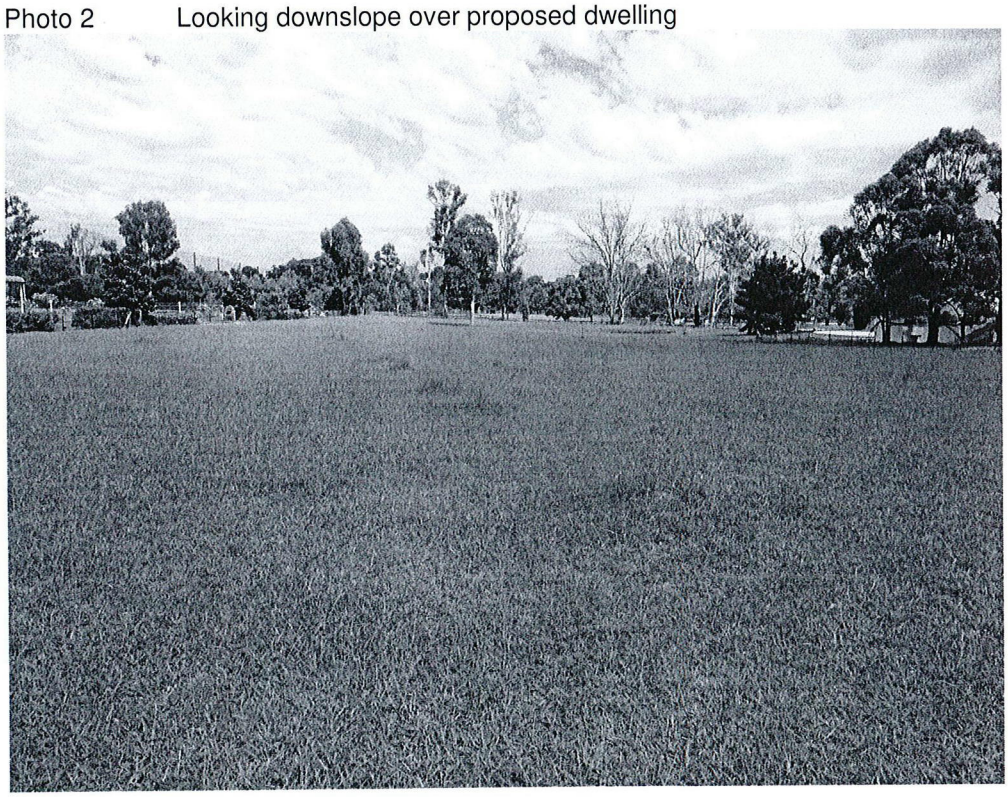
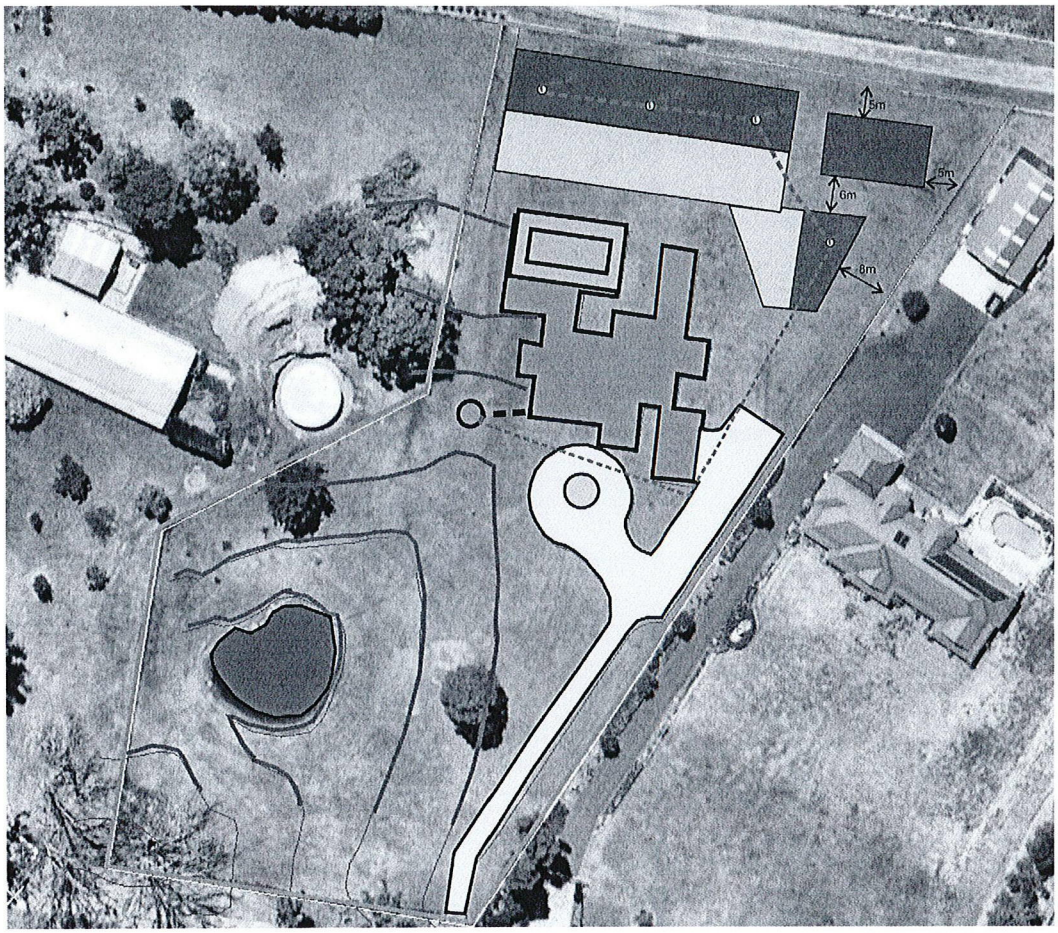


Figure 2 General Site Plan



Description: Proposed residential dwelling 9-17 Garswood Road, Glenmore Park	Client: C/o-Robert Day	Date: 23 February 2016	Our Ref:1331ww

Slope/Runoff 4%

Proposed dwelling

Proposed driveway

Proposed AWTS

Required irrigation area of 972m² to include:

478m² spray irrigation

494m² subsurface irrigation

Note: irrigation laterals to be on the contour.

Property boundary

Contour lines (0.5m)

Sewer pipe from house to AWTS

Buried distribution line from AWTS to irrigation area

Dam

Proposed pool

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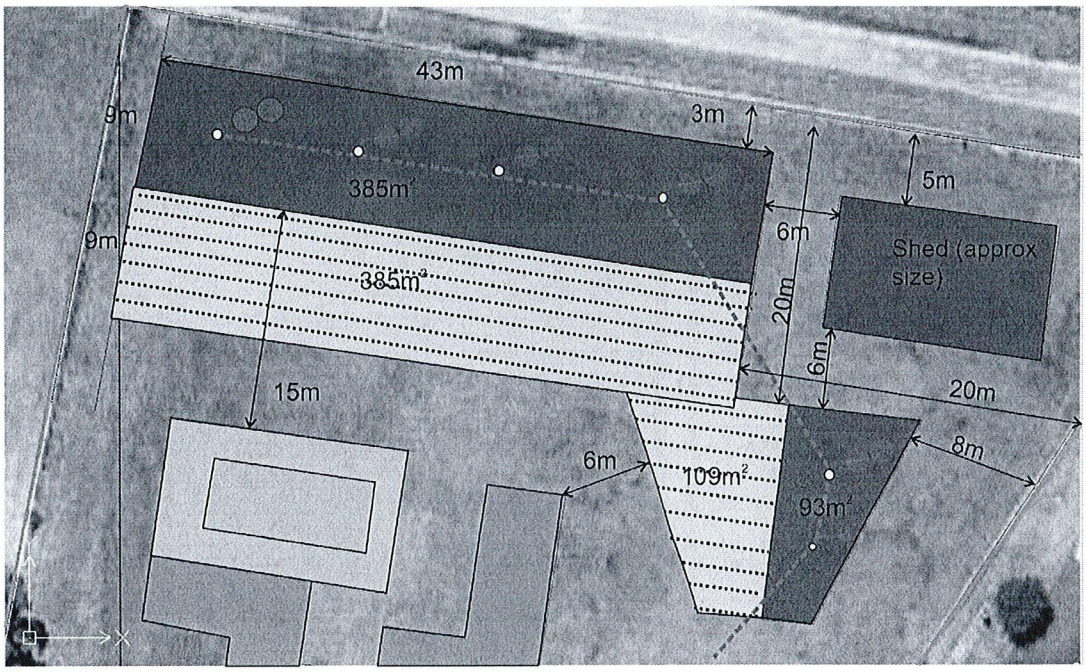
Figure 3 Irrigation Site Plan



Description: System design for proposed residential dwelling 9-17 Garswood Road, Glenmore Park	Client: c/o Robert Day	Date: 23 February 2016	Our Ref:1331ww

Slope/Runoff 4%

Buried distribution line from AWTS to irrigation area

Property boundary

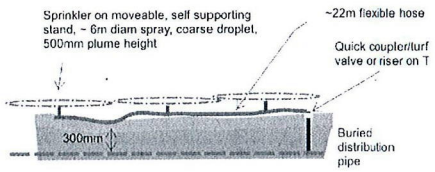
Total area of fixed spray irrigation = 972m², including:

478m² spray irrigation

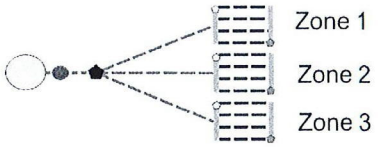
494m² subsurface irrigation
Note: irrigation laterals to be on the contour.

Proposed dwelling

Spray irrigation



Subsurface irrigation



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5. PROPOSED METHOD OF WASTEWATER TREATMENT

5.1 A domestic AWTS has capacity for 10 persons, which would be sufficient for the proposed **4 bedroom house (7 person).** The owner must provide Council with the AWTS manufacturer's specifications of the Sewage Management Facility. (Information on proposed AWTS can be obtained from the manufacturer or NSW Heath Register of Accredited Sewage Management Systems at http://www.health.nsw.gov.au/publichealth/environment/water/waste_water.asp).

5.2 The AWTS manufacturer will provide the necessary plans and specifications including NSW Health Accreditation, tank dimensions and capacity, operation and maintenance details, plus Licensed Plumber's name, address, phone number and license number.

5.3 The AWTS will be installed and maintained in accordance with Section 5 of the guidelines 'On-site Sewage Management for Single Households' (Department of Local Government, 1998) and AS/NZS 1547-2012 'On-site Domestic Wastewater Management' (Standards Australia, 2012);

5.4 Upon approval from **Penrith City Council**, the owner is to enter into a servicing contract with an approved servicing agent for the life of the system. Copies of the written service reports should be lodged with **Penrith City Council** following each quarterly service

5.5 The location of the AWTS is shown on the Site Plan previous. The location of the AWTS should be decided in conjunction by the licensed plumber in consultation with the property owner. The AWTS must be positioned on a stable, level base and be downslope of the building so there is sufficient fall from drainage outlets in the dwelling. The location of AWTS shown on the Site Plan was selected because:

- it is downslope of the buildings from where wastewater is generated;
- at least 2.5m away from the building
- at least 5m from the property boundary
- at least 6m downslope from any in ground water storage tanks.

5.6 AWTS installation must comply with the manufacturer's recommendations, AS/NZS 3500.2:2003 Plumbing and Drainage Part 2 Sanitary Plumbing and Drainage' and Council requirements.

5.7 The sewer pipe between the house, AWTS and irrigation area must be buried at a depth that provides protection against mechanical damage or deformation, in accordance with 'AS/NZS 3500(Set):2003 Plumbing and Drainage Set'. Table 1 shows the minimum pipe depth for trafficable areas.

Table 1 Minimum pipe depth for trafficable areas

Location	Minimum depth of cover (mm)
Where subject to heavy vehicular traffic	500
Where subject to light vehicular traffic	450
Elsewhere	300
Source:'AS/NZS 3500:2003 Table 3.4 Minimum Cover for Buried Piping'	

6. REQUIRED IRRIGATION AREA

In accordance with Table 3 of the Penrith City Council's On Site Sewage Management Policy, (appendix II) the required irrigation area for a dwelling on clay soil types with reticulated water supply:

- 6 potential bedroom occupancy will require a 972m^2 irrigation area, including 316m^2 of subsurface irrigation within 15m of the proposed residence and 654m^2 more than 15m from proposed dwelling. .

7. METHOD OF IRRIGATION

Spray irrigation

7.1 Semi-fixed spray irrigation is proposed. This involves a 300mm deep buried, 25mm purple line polythene pipe (distribution line) from the AWTS to the irrigation area.

7.2 Two quick coupling turf valves are connected to the buried distribution line so fixed access points are available for the connection of a moveable hose and sprinkler. See Figure 2 & 3 and Appendix I for further information.

Subsurface

7.3 Buried subsurface irrigation laterals are to be placed along the contour along the contour at 1m intervals.

8. SUMMARY

This assessment recommends the following:

- Install domestic Aerated Wastewater Treatment System to treat wastewater from proposed residential dwelling;
- Install 972m^2 for the proposed 4 bedroom residence. Two methods of irrigation areas are required, including 316m^2 of subsurface and 654m2 of spray.

9. REFERENCES

Department of Local Government (1998) *On-site Sewage Management for Single Households*. NSW Government.

Standards Australia (2012) Australian/New Zealand Standard 1547:2012 *On-site domestic wastewater management*. Standards Australia.

NSW Health Septic Tank Accreditation Guidelines (2001).

Hazelton, P.A and Murphy, B.W ed. (1992) *What Do All the Numbers Mean? A Guide for the Interpretation of Soil Test Results.* Department of Conservation and Land Management (incorporating the Soil Conservation Service of NSW), Sydney.

Penrith City Council's On- Site Sewage Management Policy

Appendix I Semi Fixed Spray Irrigation

Irrigation set up

a) The irrigation area is to be split into three using turf valves;

b) Within each zone, 4 low plume wobbler / butterfly / rose sprinklers are to be mounted along the length of a ~22m length of 19mm purple wastewater irrigation pipe;

c) The low plume sprinklers should not be capable of producing aerosols;

d) All distribution lines shall be buried to a minimum depth of 300mm below finished surface level or, where this is not possible, covered with 150mm of concrete;

e) The throw on the sprinklers shall not exceed beyond the designated disposal area.

Management of irrigation area

f) The grass within the irrigation should be mown on a regular basis to ensure sprinklers can be seen through grass and any breakage or leaks can be seen and repaired;

g) The effluent disposal area shall be clearly identified within the property by post or some other means.

h) All stormwater and seepage from higher levels shall be diverted away from the effluent disposal area using a dish drain or similar.

i) Fruit or salad vegetables should not be irrigated with effluent from the wastewater treatment system.

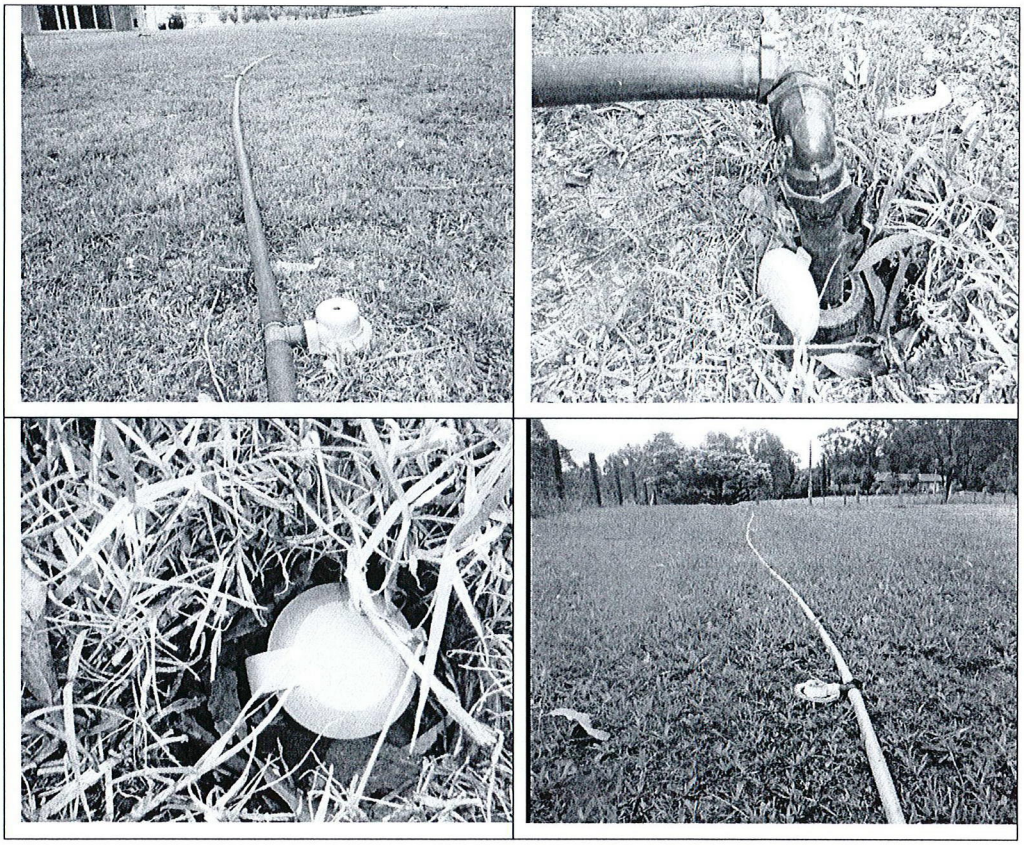
j) The irrigation area should not be used for recreational purposes or used for parking a car.

k) Horse and cattle should not be kept within the effluent disposal area.

l) Buffer distances are 6m if area up gradient and 3m if area down gradient of swimming pools, property boundaries and driveways; 15m buffer to buildings.

m) A warning sign complying with AS1319:1994 – Safety signs for the occupational environment should be located at the boundary of the designated area in one or two places, clearly visible to property uses, with wording such as, RECYCLED WATER, AVOID CONTACT, DO NOT DRINK'.

Example of turf valve, flexible 19mm poly pipe and 'wobbler' sprinklers.



Appendix II Subsurface irrigation

i) The irrigation area should be split into zones of 200 to 300m^2.

ii) Each zone is to receive an even proportion of wastewater, using a sequencing valve, such as a water rotor or similar.

iii) Immediately after the AWTS, a disc filter or a 100 to 150 micron filter is to be installed (ie, before the sequencing valve). The filter must be cleaned regularly (at least every 3 months).

iv) The distribution pipe from the AWTS to the water rotor shall consist of a 25mm uPVC or polythene pipe, buried 300mm underground. Where vehicles pass over the line, it should be 450mm for light traffic and 500mm for heavy traffic.

v) Pressure compensating subsurface drip line is used with emitters and laterals at approximately 800mm spacing's (min 600mm, maximum of 1000mm depending on soil type) and buried to a depth of 100mm below finished ground level (in accordance with ASNZ1547:2012).

vi) The drip line is to be impregnated with root inhibitor or include a tech filter that dispenses a root inhibitor (a chemical injector assembly or impregnated emitter tube) to protect drip line from root ingress.

vii) Air release valves should be located at the highest point and flush valves at the lowest point of each sub-surface zone and shall be contained within a durable protective housing with a lilac lid to indicate wastewater.

viii) Additional air/vacuum valves, pressure-reducing valves and non return / tube non-leakage valves are to be included into the design as needed. ie., where the effluent irrigation area is located above the treatment system or pump well, a non return valve.

ix) The system must have capacity to enable flushing to remove any suspended solids and organic growth that may accumulate.

x) The effluent irrigation system should be tested to ensure there is uniform effluent delivery to all parts of the irrigation area.

xi) The effluent management area must be fenced off from livestock and vehicles.

xii) The irrigation area should be vegetated with grass before commissioning. The grass within the irrigation should be mown on a regular basis and dispose of clippings outside the irrigation area.

Appendix III *Penrith City Council, Table 3*

Table 3 Sizing of domestic Aerated Wastewater Treatment Systems (AWTS) Effluent Disposal Areas

Sizing of AWTS Effluent Disposal Areas			
Unsewered Penrith Suburbs	**No. of Bedrooms**	**Surface and Sub-Surface Irrigation Areas (m^2)**	
		Reticulated Water	Tank Water
Sandy Soil Types ***eg Agnes Banks - east of Castlereagh Road. Castlereagh - north of Devlin Road and east of Castlereagh Road.***	**4 or less**	873	700
	5	1048	838
	6	1223	978
Clay Soil Types ***Most other areas***	**4 or less**	695	556
	5	833	667
	6	972	778

Notes: *(1) The Effluent Disposal Area (EDA) is based on nutrient balances as they are considered to be the most limiting factors in these areas.*

(2) Figures are based on:

- *150 litres per person/day or 120 litres per person/day for tank water supply*
- *One person per bedroom and two for a master bedroom*
- *TN output value of 25 mg/L and a Critical Loading Rate of 27 mg/m^2/day*
- *TP output value of 12 mg/L*
- *P sorption capacity - 600,000 mg/m^2/depth for clay soil types or 400,000 mg/m^2/depth for sandy soil types*
- *Design Irrigation rate of 15 mm/week for clay soil types or 35 mm/week for sandy soil types.*

(3) A Wastewater Assessment is required for applications with more than 6 bedrooms.