

METAL RECYCLING FACILITY DEVELOPMENT

LOT 3 DP251779

88 MURRAYS FLAT ROAD

TOWRANG. NSW. 2580

WASTEWATER MANAGEMENT REPORT



Prepared by SOWDES
1 October 2025

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INTRODUCTION & DISCLAIMER

SOWDES has been commissioned to undertake a site and soil assessment of a private property identified as Lot 3 DP251779 - 88 Murrays Flat Road at Towrang. NSW. 2580 for the purpose of determining appropriate methods for the treatment and disposal of wastewater generated onsite and to present these recommendations in a report format to complement the proponent's development application to Council. The development application is for the establishment of a metal recycling facility and will include the re-purposing on an existing residential dwelling to an administration office combined with staff amenities. Effluent treatment and management will leverage of an existing onsite wastewater management system.

The recommendations within this report are based on the details contained in the attached site information sheets and are referenced by AS/NZS 1547:2012 "On-site Domestic Wastewater Management", "On-site Wastewater Management Guidelines (2025)", Local Council regulations, and "Designing and Installing On-Site Wastewater Systems" (A Water NSW Current Recommended Best Practice - 2019).

Accompanying this documentation is a site plan that includes the major landform features and approximate locations of proprietary infrastructure items. These are placed within the site plan for conceptual purposes and will need to be amended on site to accommodate the final design concepts, suffice to say that the final design concepts do not reduce the need to include such facilities. The following information, details and recommendations are based on site specific parameters obtained from the initial requesting brief and instructions provided by the clients (or their representatives) and the site-specific conditions that were applicable at the time of the site inspection. Any subsequent alterations to the nominated location of the proposed infrastructure items or referenced guidelines after the date of this report may therefore render this report and its recommendations invalid.

This site soil classification has been undertaken on the assumption that the site and soil assessments provide an indicative representation of the geological and substrate materials that underlie the nominated effluent disposal area. Variability within soil classes and profile can be experienced with very distinct boundary changes occurring within relatively small areas hence the recommendations within this report are construed in good faith whilst also acknowledging that what lies beneath the surface is always difficult to precisely quantify. It is for this reason the soil type and site conditions should be constantly monitored during the excavation/installation process to identify any significant variability from the soil class determination of this report. If any such variability within the soil profile is encountered, it should be referred back to the author of this report for reclassification and/or a redesign of the wastewater management system. Any subsequent changes in the surface or sub-surface conditions that occur after the site assessment, or if episodic, ephemeral, or unpredictable events such as perched water tables, over-land flooding, or alterations to drainage systems affect the site conditions then these are outside the control or reasonable knowledge of the author and therefore no liability can be attributable.

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1 October 2025





1. EXISTING LAND USE, SITE CONDITIONS & DEVELOPMENT DETAILS		
#	DESCRIPTION	DETAIL
1.1	Property details	Lot 3 DP251779
1.2	Formal address	88 Murrays Flat Road, Towrang. NSW. 2580
1.3	Land Zoning	The development site is zoned E4 - General Industrial.
1.4	Area	The development property is irregular in shape being somewhat rectangular except that from a point approximately midway along the southern boundary there is a kick in the boundary alignment to the southwest that makes the western boundary significantly longer than the eastern boundary. The site has historically been used for low-intensity farming practices and comprises approximately 32.26 hectares of land.
1.5	Access	The development site is accessed from the Murrays Flat Road which lies adjacent to the western boundary with three separate entrances off the roadway into the site. The first entrance is located in the southwestern corner and is clearly identified with an access gate however to date it is not used regularly. The second entrance is located approximately 390 metres further north along Murrays Flat Road from the southwestern corner and it is the main entrance to the property with a gravel carriageway that leads up to an existing dwelling and curtilage. The third entrance is located near to the northwest corner of the property, approximately 80 metres north of the main entrance, and it is just aligned with a 20-metre-wide Right of Carriageway within the property that runs parallel to the northern boundary and is assumed to benefit the adjoining land holding to the immediate east of the site. The existing internal access carriageway is formed as a loop commencing from the main entrance and sweeping along the front aspect of the dwelling and then heading to the northwest to exit at the gateway associated with the Right of Carriageway.
1.6	Slope / topography	The development property is divided into two distinct topographical regimes with the majority of the site to east of the nominated development precinct having a general fall from the southeast to the northwest at an average grade of 3.3% (~2°) with subtle changes in surface micro-relief around several drainage depressions and farm dams.



		The western quarter of the site where the proposed development will be located has a general fall from the southwest to the north-northeast at similar grades and variations. The two topographical regimes converge at a defined drainage depression that runs through the site in a south to north alignment.
1.7	Site stormwater drainage	The development site is burdened by several defined drainage depressions and farm dams, some of which have been purposely designed and constructed in what appears to be soil and water protection measures. The most significant of the drainage systems is the main corridor that essentially runs parallel to the Murrays Flat Road traffic corridor in a south to north alignment through the site and is approximately 200 metres to the east of the western boundary. This system is highlighted by a moderately sized dam in the northern third of its alignment through the property and receives most of the incoming flows from a catchment that begins on the southern side of the Hume Highway traffic corridor and includes the adjoining property to the immediate south. A second drainage corridor traverses the eastern portion of the property in a southeast to northwest pattern and includes a series of small dams that cascade from one to the other over a short distance. The outlet from the dam in the main drainage corridor and the last dam in the secondary drainage system both discharge into a small dam just to the south of the Right of Carriageway along the northern boundary with the combined outflows eventually draining into the Wollondilly River approximately 800 metres to the north of the property. There are a few other smaller dams within the property, some of which in the eastern portion have diversion berms running parallel to the contours of the terrain to direct upslope flows into them, and others in and around the nominated development precinct which would have been used for stock drinking water in separated fenced paddocks are relatively small and have a limited contributing catchment area.



		Rainwater runoff from the roof of an existing dwelling is collected in an 80,000-litre metal water tank that is located to the north of the dwelling.
1.8	Vegetation	The vegetation formations throughout the property are dominated by open paddocks that have historically had improved pastures and grasslands for livestock to graze, and possibly the production of silage with pictorial evidence of regular slashing. The dam within the main drainage corridor has a small stand of trees along the western banks whilst the dam near to the northern boundary has scattered trees and shrubs along the incoming and outgoing drainage channels, and around the top of the banks on most aspects. Within the western portion of the site where the proposed metal recycling facility will be established the vegetation formations are essentially the same as the paddocks to the east - being dominated by open grasslands, however there is a short row of radiata pine trees just to the south of the main entrance to the holding which provides an element of screening from the prevailing winds and privacy for the existing dwelling from the road corridor. On the northern aspect of the main entrance there is a continuation of the trees along the western boundary that extends for approximately 50 metres and then turns at 90° to run east – west which also provides shielding from the prevailing winds and screening of vehicle traffic for the existing dwelling.
1.9	Existing site conditions	The development property has an existing dwelling and associated infrastructure located within a defined curtilage in the northwestern portion of the property. The dwelling has been vacant for quite some time however it is well constructed and in relatively good condition with the landowners undertaking regular maintenance works and ground-keeping as necessary. To the immediate south of the dwelling is a detached roofed structure that possibly could have been designed as a covered entertainment area but has actually been used as an outdoor workshop and combined service area with a stone paved floor that blends in with similar paving on the eastern aspect of the dwelling.



		The existing dwelling is serviced by a wastewater management system which comprises a recently installed aerated wastewater treatment system unit (AWTS) that is located to the north of the dwelling footprint. It is assumed that the AWTS unit replaced an older septic tank which is still visible on the site, and this was possibly due to the fact that the older absorption disposal system associated with the septic tank was non-compliant due to its proximity to the drainage corridors that traverse the property to the east of the dwelling. Historical imagery suggests that there was an absorption disposal system between the septic tank and the drainage corridor to the east of the defined house paddock which is less than 40 metres away and to rectify the non-compliance conditions the AWTS was installed to enable effluent to be pumped further away, and this possibly coincided with the sale of the property to the current owners in 2021. The AWTS unit has been installed just to the north of the old septic tank but during the site inspection it was observed that the standard irrigation disposal kit that comes with the 'off the shelf' package was still to be installed correctly suggesting that the unit has very little to no use at present, and it was also noted that the backfilling around the new AWTS unit was not completed properly with the surrounding soils finished below the natural ground level.
1.10	Development details	The proposed development is for the establishment of a metal recycling facility that will process up to 30,000 tonnes of metals per year which is to be located along the western boundary of the property within the existing grass paddocks to the south of the dwelling and curtilage. The recycling component of the development will be contained within a defined precinct that will occupy an area of 4.733 hectares and include dedicated entrance and exit provisions with inter-connecting roadways and a manned gatehouse; sorting bays to separate the different types of incoming metals; a de-pollution shed to manage dismantling of vehicles and similar end-of-life machinery; pre-shredding bays and storage areas; shredding, cutting, and hammermill processing facilities; post-shredding storage and sorting areas; and ancillary structures and facilities.



		Further details of the facility operations are contained in the accompanying Environmental Impact Statement and other supporting documentation and plans. Once operational the facility will employ up to 15 full-time persons with the potential for a small number of additional persons on a short-term basis associated with inward and outward truck movements, service contractors, and occasional visitors. The existing dwelling will be re-purposed into an administration building with combined staff amenities, whilst the surrounding curtilage between the dwelling and the recycling facility precinct will include a staff and visitor parking area. To eliminate the need for staff working within the recycling precinct and the gatehouse to have to walk to the re-purposed administration building to use toilet, kitchen, and showering facilities the 'main workshop' shed within the recycling precinct will include these same facilities in conjunction with a common staff room, whilst the gatehouse will have a small toilet facility. The recycling precinct within the site will be no closer than 50 metres to any 'top of bank' associated with the main drainage corridor to the east that runs through the development site however there is very limited space available between the recycling precinct and the drainage corridor to install a separate wastewater management system to manage the sewage from the amenities and gatehouse facilities within the recycling precinct. It is therefore proposed that the drainage of sewage from the recycling precinct will be transferred to the existing AWTS unit located to the north of the dwelling to minimise the number of wastewater treatment systems on the property, and to ensure that the existing AWTS unit receives a reasonable volume of daily inflows so that it will operate at its design performance levels. The distance from the amenities section within the main workshop to the location of the existing AWTS unit is approximately 270 metres over an undulating terrain which makes the use of standard sewer grade pipe installed at the minimum grades and ground covers as prescribed by the relevant standards essentially impossible to achieve.
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		To compensate for the distance and grade challenges it is proposed that the sewage from the amenities within the main workshop and the toilet facility in the gatehouse will be collected in separate low-pressure sewer pump stations (equal to the Aquatec 'Sewertec 1' model B/1100l) and transferred to the AWTS unit via a dedicated 40mm to 50mm polyethylene lines. Use of the low-pressure sewer pump stations will ensure that sewage loading from the amenities in the main workshop and the toilet in the gatehouse is transferred to the AWTS unit in regular but small volumes, and that there is provision for an additional storage volume above the normal discharge level in the event of a power supply failure or there is an unexpected surge load.
1.11	Summary of the wastewater management proposal	The proposed metal recycling facility development will employ a total of 15 full-time persons in various capacities including administration during each working day with a small number of persons on a short-term basis. The proposed staff numbers have the potential to generate an effluent volume of approximately 600 litres per day under different loading allowances (refer to Section 4) which will be collected and treated in the existing AWTS unit. The AWTS unit will need to be fully serviced and commissioned in accordance with the manufacturer's guidelines prior to operational use of the facility, and the treated effluent will be discharged to a 'primary' surface irrigation disposal area of no less than 300m² to be located to the north of the AWTS unit – in a position where it is greater than 40 metres from the nearest dam or drainage depression. To ensure that the nominated surface irrigation disposal area is not overly inundated with effluent disposal a 'second' or reserve area of the same size will be facilitated immediately adjacent to the nominated primary irrigation disposal area. The following sections within this 'Wastewater Management Report', the 'Design and Installation Requirements' and the 'Technical Specifications' provide a detailed summary of the site conditions and wastewater management system recommendations.



2. SOILS			
#	DESCRIPTION	DETAIL	
	Sample number	1	2
2.1	Location UTM coordinates	Latitude: 755448.8 Longitude: 6153535.2	
2.2	Method of sampling	Hand augur - 75Ø	
2.3	Soil depths	600mm	
2.4	Topsoil depth	<200mm	
2.5	Reason for termination	Consolidated materials	
2.6	Soil characteristics	Dry silty loam topsoil to 200mm followed by a sandy loam to clay loam prior to the termination depth. The soils are comprised of a mid-brown coloured topsoil in the top 200mm that rapidly transitions into a lighter brown colour below the topsoil zone. The dry and non-adherent nature of the soils made extraction difficult. Weathered gravels at the base of the sample.	
2.7	Coarse fractions	Loose stones and pebbles generally less than 20mm throughout the sample	
2.8	Clay content	<20%	
2.9	Depth of plant roots	<400	
2.10	Electrical conductivity readings (mS/cm ⁻¹)	0.02	
2.11	pH readings	4.8 – 4.9	
2.12	Soil classification	Moderately structured clay loam	
2.13	Type of wastewater treatment system	Secondary treatment	
2.14	Design load rating	The design load rating for an irrigation disposal system can be determined by a number of calculations, with the largest land area requirement being the determining factor. Refer to Section 4 for a detailed summary of the design loading rate requirements.	
2.15	Additional soils information	Further details of the soil characteristics are included amongst the supporting documents that follow this section of the report.	



3. SITE & DESIGN CONSTRAINTS		
#	DESCRIPTION	DETAIL
3.1	Description	For developments that occur within the boundaries of the Sydney drinking water catchment a site analysis tool that identifies potential geophysical constraints for the proposed site in relation to natural features such as soil, drainage, slope, vegetation, precipitation and certain other parameters has been made available for reference by wastewater management consultants and other land planners. In relation to this development the site analysis tool indicates that the parameters of drainage, soil depth, and dispersive soils may be a potential constraint throughout the development area. Using these potential constraint maps as a guide for siting the development and the effluent disposal system, some if not all the potential constraints can in the first instance be confirmed, and thereafter as necessary be avoided or addressed by appropriate design and siting measures.
3.2	Drainage	The portion of the development site where the existing wastewater management system is located is burdened by the alignment of a rather broad drainage corridor that runs south – north through the property, approximately 40 metres to the east of the existing dwelling. The drainage corridor has a defined main channel that contains the majority of low flow events, however in larger rain events, such as the 1% AEP the system broadens through a series of dams and extends out to defined banks that are located either side of the main channel. The existing AWTS unit is located approximately 30 metres from the banks of the drainage corridor with very limited area available around the AWTS unit for the installation of an effluent disposal area that meets the relevant buffer distance criteria. There is however a suitable area to the northwest of the AWTS unit between a row of established pine trees and the existing internal looped access carriageway where a surface irrigation disposal area can be established that is greater than 60 metres from the nearest margins of the defined drainage corridors and therefore 'drainage' is not considered to be a potential constraint for the development.



3.3	Soils	The soils within the nominated effluent disposal area are comprised of a silty loam to 200mm that rapidly transitions into clay loam with weathered gravels at the termination depths. The weathered gravels commence approximately 500mm below the natural surface level which essentially eliminates the use of a passive wastewater treatment methods such as a septic tank and absorption disposal bed for the collection, treatment, and disposal of effluent that will endure over the long-term life of the development. It is therefore considered that secondary treatment of effluent in a NSW Health Department accredited Aerated Wastewater Treatment System unit to a quality that can be applied above ground is the best option for the management of effluent and therefore 'soil' condition will not be a limiting factor.
3.4	Dispersive soils	Part of the site soil assessment procedure subjects each sample to an immersion and stability test to determine the structural suitability of the soil peds to resist slumping under constant exposure to a saturated soil condition. In these field tests the deeper soil samples displayed moderate structural stability under constant immersion; however it noted that the application of treated effluent by way of distributed spray irrigation to an area that is set to a fully vegetated cover is less likely to have an impact on soil degradation and translocation and it is therefore considered that 'dispersive soils' is not a potential constraint.
3.5	Considerations	Notwithstanding the possible limitations imposed by various geophysical constraints, an examination and assessment of the site and soil characteristics within the nominated effluent disposal area has determined that the existing conditions are conducive for effluent disposal via surface irrigation application. Refer to the attached 'Water Sensitive Design Mapping Constraints' overlay images on pages 26 and 27 of this report for graphic representation and details of the site characteristics discussed in this section.
3.6	WEM Summary	In addition to the site analysis tools referenced above a second level of constraint assessment in the form of an online modelling tool is also available to check that the effluent plume associated with the proposed wastewater treatment system does not migrate outside the property boundary or to environmentally sensitive receiving points.



		The modelling outcomes identified as the <i>WEM Summary</i> (Wastewater Effluent Model Summary) from the Water NSW 'NorBE Assessment' portal produces a predictive plume representing the anticipated migration of effluent, nitrogen, phosphorus and faecal coliforms based on the combined measures of effluent treatment, disposal method and disposal area location. The resulting plume is a prediction based on a combination of factors including the site's soil characteristics, the topography, daily effluent loading, and treatment methodologies. By achieving a plume for all four constituent parameters that remain inside the property boundary whilst also not effecting sensitive environmental receptors then the design is deemed to satisfy the 'Neutral or Beneficial Effect' (NorBE) criteria for wastewater management assessment purposes. A model predicting the effluent plume for this development has been prepared with the summary results presented at the end of the 'Wastewater Management Report' section of this report. It is noted that within the attached model the alignment of the effluent disposal area has automatically been rotated by approximately 45° to the design alignment which is based on the underlying topographical data within the modelling parameters and these cannot be changed at the input level.
3.7	Groundwater Sources	The development property is located within the 'Goulburn Fractured Rock Groundwater Source' as defined in the <i>Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources 2011</i> administered under 'Section 50 of the Water Management Act (2000)', which sets out prescribed activities and conditions for water supply works associated with a groundwater source – including bores. Part 9 > Clause 40 > Subclause (1) states that a water supply work approval must not be granted or amended to authorise the construction of a water supply work which, in the Minister's opinion, is or is proposed to be located: a/. within 250 metres of the plume associated with a contamination source listed in Schedule 3, or



		b/. between 250 metres and 500 metres of the plume associated with a contamination source listed in Schedule 3, unless the Minister is satisfied that no drawdown of water will occur within 250 metres of the plume associated with the contamination source, or c/. at a distance specified by the Minister that is more than 500 metres from the plume associated with a contamination source listed in Schedule 3, if a greater distance is determined by the Minister to be necessary to protect a water source, the environment or public health or safety. Schedule 3 of the <i>Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources 2011</i> specifically defines an onsite sewage disposal system or septic tank as a contamination source, irrespective of the use of water from the bore. Whilst the development proposal is not for a 'water supply approval' as defined under the Water Management Act, the installation of a wastewater management system must still consider the effect of such an installation on existing and possible future water supply works. Where the proposed location of an effluent disposal area may be less than 250 metres from an identified groundwater bore a 'draw down analysis' similar to that prescribed by Cromer, Gardner and Beavers 'An Improved Viral Die-off Method to Estimate Setback Distances' (2001) may be undertaken to demonstrate that the proposed lesser separation distance will be suitable. In relation to this particular development a search of the Water NSW 'Groundwater Data Base' for any registered bores within 500 metres of the proposed effluent management system has been undertaken which resulted in 'two' findings. The nearest of the bores is located approximately 300 metres to the northwest of the nominated effluent disposal area and is used as a monitoring bore for the Goulburn Mulwaree Council's sewage irrigation farm which is located on the opposite side of Murrays Flat Road. The other identified groundwater bore is privately owned and located approximately 400 metres due north of the nominated effluent disposal area.
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		As there are no registered bores within 250 metres of the nominated effluent disposal area it is therefore considered that a draw-down analysis is not required and that <i>groundwater sources</i> will not be a constraint for the development.
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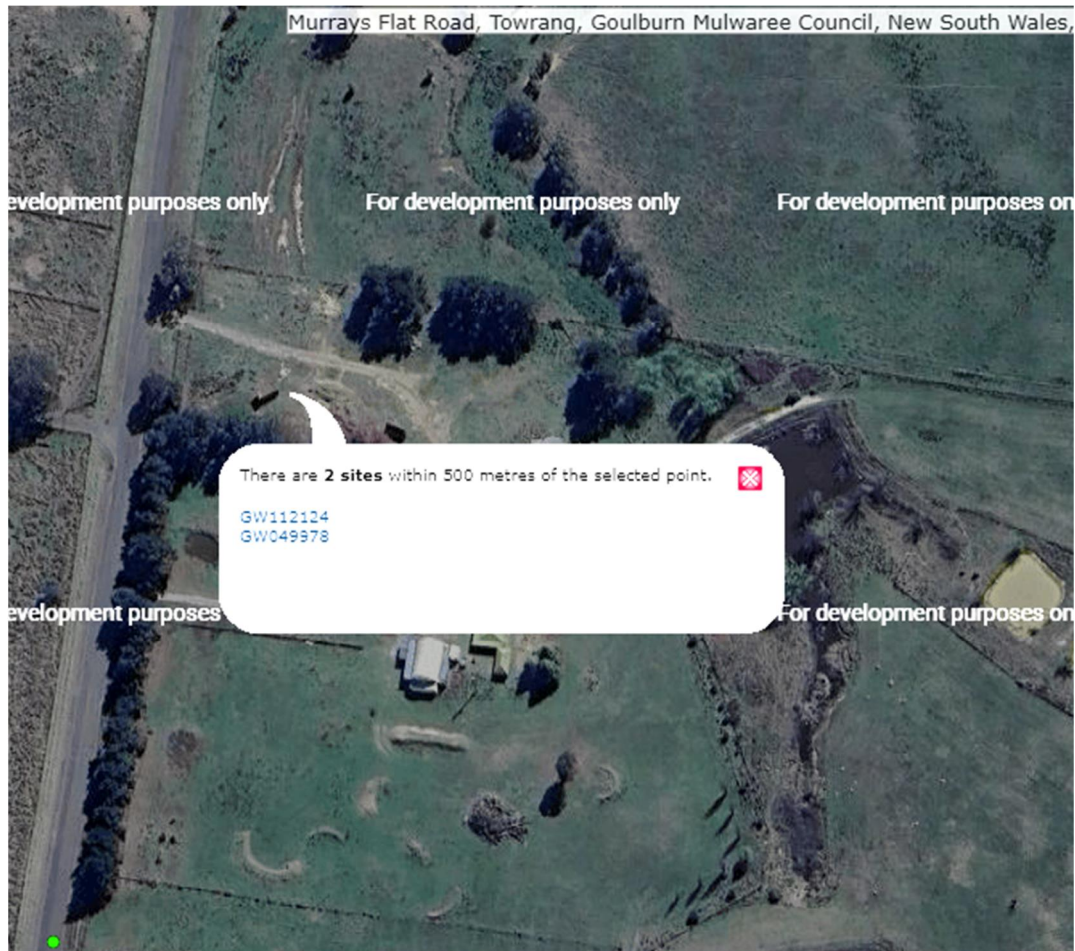


Image from the Water NSW Groundwater Data Base confirming that there are two registered bores within 500 metres of the effluent disposal areas.

** At the time of preparing and completing this document the relevant Water NSW website was displaying the repeated overlay wording 'For development purposes only' which unfortunately cannot be removed from the image.



4. DAILY LOADING AND DISPOSAL AREA CALCULATIONS		
#	DESCRIPTION	DETAIL
4.1	Design Load Rating (DLR) summary	For irrigation disposal systems the design loading rate can be calculated in a number of ways, with the 'nitrogen loading', 'soil phosphorus sorption capacity', and 'water balance using a nominated irrigation area' (hydraulic calculation) being the primary considerations with the calculation that generates the greatest land area requirement being the 'determining factor'.
4.2	Disposal Area Calculation	To determine the land area requirement for a surface irrigation disposal system, the formula of $A = Q / DIR$ applies where; A is the "effective application area" subject to direct irrigation from a combination of hose length and spray radius emitted from the sprinkler outlet. Q is the quantity of inflows based on the following daily allowances for a non-residential dwelling development in accordance with the publication titled "Septic Tank and Collection Well Accreditation Guideline (NSW Health Department, 2001): • Factories & offices: 10 full-time persons (recycling) at 43 litres / person for WC, urinal, basin, shower, and kitchen = 430 litres • Factories & offices: 5 full-time persons (admin + gatehouse) at 29 litres / person for WC, urinal, basin, and kitchen = 145 litres • Public halls: 5 short-term persons at 3 litres per person for WC, urinal, basin, and kitchen = 15 litres. Total daily loading of 590 litres which has been rounded up to 600 litres for design and modelling purposes. DIR (design irrigation rate). The numbers that determine the land area requirement are automatically generated within the 'WEM' model mentioned previously in Section 3 and are based on the site and development specific inputs such as daily effluent volumes, nitrogen and phosphorus concentrations, soil type and depth, vegetation formations under the area of irrigation, and the capacity of the soils based on texture and profile to assimilate nutrients. The numbers that determine the land area requirement are presented on page 28 of this report for information purposes. For this development the land area requirement for the water balance (hydraulic) requirements is 167m², the soil phosphorus sorption capacity requires 258m², whilst the area for the nitrogen loading is 274m² which is the 'determining factor' and therefore the effective irrigation area must be at least 274m².



5. PROPOSED WASTEWATER MANAGEMENT SYSTEM		
#	DESCRIPTION	DETAIL
5.1	Description	With consideration of the site conditions, development proposal and identified constraints it is determined that the proposed development will be serviced by an Aerated Wastewater Treatment System (AWTS) and a surface irrigation disposal system comprising the following features:
5.2		The existing Aerated Wastewater Treatment System (AWTS) unit that is located approximately 15 metres to the north of the existing dwelling structure will be retained however prior to its initial use it will be serviced and commissioned by the manufacturer or their appointed technician to ensure that the unit is working as per the product's accreditation approval, and that the backfilling around the top of the unit be completed by adding additional fill material in compacted layers such that the finished level matches that of the surrounding ground levels.
5.3		The existing septic tank which has been bypassed be formally decommissioned in accordance with Section 1 of the NSW Health Department publication titled: 'Advisory Note 3 - Destruction, Removal or Reuse of Septic Tanks, Collection Wells, Aerated Wastewater Treatment Systems (AWTS) and other Sewage Management Facilities (SMF), (January 2017)' – refer to the Technical Specifications section for details.
5.4		The sewage waste from the amenities in the main workshop and the toilet facility in the gatehouse will be collected in separate low-pressure sewer pump stations equal to the <i>Aquatec Sewertec 1 - B/1100L</i> unit that will transfer the waste material at pre-determined volumes that are controlled by an internal float switch to the existing AWTS unit via a 40Ø PN12.5 polyethylene pipe with a lilac-coloured stripe that is to be installed at least 450mm below natural ground level
5.5		The AWTS unit will transfer the secondary treated effluent to a land application system comprising a primary disposal area of not less than 300m ² to be located approximately 60 metres upslope and to the west of the AWTS unit – between an existing row of trees and the access carriageway, and a secondary disposal area also of 300m ² to be located immediately to the west of the primary disposal area
5.6		The treated effluent from the AWTS unit is to be transferred to each irrigation disposal area via a 32Ø PN12.5 polyethylene pipe with lilac-coloured stripe that will be connected to a ' <i>K Rain</i> ' Series 4000 sequencing valve that is cammed for 4 zones and located at the head of each irrigation area.



5.7		The sequencing valve will be installed such that the body of the valve is slightly higher than the highest irrigation outlet point to prevent possible back pressure on the automatic cam operation inside the valve.
5.8		A total of 4 distribution laterals will be installed from each sequencing valve with each lateral to have a 'pair' (two) outlet points in the form of quick coupling turf valves with lilac-coloured lids that finish at surface level.
5.9		Each 'pair' of quick coupling turf valves (4 in total per area) will have an inter-changeable 'hose set' comprised of a compatible bayonet style turf valve key, a 90° elbow, a 4 metre length of 20Ø lilac coloured distribution hose, and a 20Ø BSP lilac coloured 'capitol' sprinkler.
5.10		Each cycle of the irrigation pump will activate the cam within the sequencing valve to the next available port in the sequence to create an automatic rotation of the irrigation system
5.11		Each sprinkler hose should be rotated manually by pivoting the turf valve key and shifting the sprinkler outlet to a new location at least weekly during the warmer months and every two to three days during the cooler months.
5.12		Stormwater diversion mounds will be constructed on any upslope aspect of the wastewater management system
5.13		Appropriate signage around the nominated effluent disposal area noting the fact that effluent water is discharged to the ground with wording to the effect of: "RECLAIMED WATER – AVOID CONTACT"
5.14		The location of all drainage lines, electrical services and transfer pipes that lie between the existing dwelling, the AWTS unit, and the effluent disposal areas should be identified by placing marker posts in the ground and will need to be installed deep enough below finished ground level to avoid possible compaction and physical damage by vehicles and large machinery.
5.15		Refer to the accompanying "Wastewater Management Site Plan" – Ref: 0060222-W101-A for the layout of the irrigation disposal system, and refer to the accompanying "Wastewater Management Disposal - Aerated Wastewater Treatment System to Surface Irrigation Disposal" plan, Ref: 0060222-W102-A for the conceptual design details of the irrigation disposal system.



6. CONSTRUCTION & MAINTENANCE

#	DESCRIPTION	DETAIL
6.1	Construction details	The size and configuration of the irrigation disposal areas has been calculated assuming an average of 150 litres of secondary treated effluent being discharged during each pump cycle of the AWTS unit. Assuming a full wastewater loading of 600 litres per day for the development then each distribution lateral within the irrigation area should receive on average at least one application per day. All below ground pipes should be labelled with a lilac-coloured stripe or appropriate warning tape to reduce the chances of cross-connection with potable water supplies, and to highlight the location of services in the ground for future reference. All quick coupling turf valves are to have a lilac-coloured lid that finishes at ground level, and all turf valve keys must be a compatible fit with the turf valve – ideally spring controlled. For the effluent irrigation disposal system to be effective and prevent possible land degradation and localised saturation, each sprinkler should be rotated at least once per week during the warmer months, and at least every 2 to 3 days during the cooler months. The distribution of effluent between the primary and secondary disposal areas should be managed such that each area receives an equal amount of loading each year which will assist in preventing possible waterlogging and/or runoff during the cooler and wetter months, and even vegetation cover. To avoid over-application of effluent irrigation in one location the position of the sprinklers in each distribution zone shall be such that there is no overlap of sprays with a sprinkler in an adjoining distribution zone within the same cycle.
6.2	Vegetation and ground cover	The secondary treated effluent should not be applied to any consumable plant species such as fruits or vegetables as the quality of effluent water can alter with time, maintenance of the unit, usage and inputs, and the ability for plants to screen out viruses and harmful pathogens is not a matter of certainty. This practice is also prohibited under NSW State Health Department guidelines.



6.3	Maintenance and protection of the effluent management system	It is recommended that as the grass or vegetation cover increases across the irrigation disposal areas that each area be mowed or slashed regularly to manage the heights such that they don't interfere with the normal distribution pattern of the sprinklers. Prior to any mowing or slashing of the irrigation disposal area all hose sets (turf valve key, distribution hose and capitol sprinkler) will need to be completely removed from their respective quick coupling valves and the lids closed to prevent damage to the units, and all hose sets then returned immediately to the turf valve after the mowing is completed and prior to the next irrigation application. Finally, the AWTS unit will need to be serviced on a regular basis in line with the system manufacturer's accreditation guidelines and Council requirements and a copy of all service records should be forwarded to Council after service event for their records to ensure compliance with this requirement.
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Example of warning sign to be posted around the outside of the effluent disposal area



7. SUMMARY & CONCLUSION		
#	DESCRIPTION	DETAIL
7.1	Summary requirements	For this development to dispose of a potential effluent volume of 600 litres per day within a moderately structured clay loam soil environment the sewage waste from the re-purposed dwelling into an administration building and staff amenities, and the amenities within the main workshop and gatehouse will need to be collected and treated in the existing AWTS unit that is located to the north of the existing dwelling building. Secondary treated effluent from the AWTS unit will be directed to a primary and secondary surface irrigation disposal area to be located approximately 60 metres to the west of the AWTS unit with each to have a minimum 'effective application' area of 300m². The final location of low-pressure sewer pump stations, the transfer lines between the main workshop and the gatehouse and the AWTS unit, the transfer line from the AWTS unit to the irrigation disposal areas, and the irrigation disposal areas will need to be determined during the setout of the site so that they are protected from possible damaged caused by vehicle or machinery traffic whilst also being protected from surface water run-on. All drainage pipework and electrical services associated with the various components of the wastewater management system will need to be installed deep enough below finished surface level and any internal driveways to protect them from mechanical and/or compaction damage, and the AWTS unit will need to be maintained on a regular basis in accordance with the accreditation, licencing, and Council requirements. To ensure that the treated effluent being discharged to the nominated irrigation disposal areas does not create waterlogging and ground saturation the primary and secondary application areas should be used equally throughout the course of a year with the distribution between each system being monitored regularly.
7.2	Checklists and material requirements	Within the next section titled "Design and Installation Requirements" is a list of the main components and materials required to undertake the installation of the proposed wastewater management system, along with a simple construction and installation procedure that is specific to the development site and designed to assist the installer understand the design concept and refine the location of the various components.



		At the conclusion of that section are two separate checklists and an installation declaration to be completed by the installers of the wastewater management system which are to be presented to the Council and the property owners after practical completion of the installation. One checklist covers the installation of the Aerated Wastewater Treatment System which is already installed but not fully commissioned, whilst the second checklist covers the installation of the surface irrigation disposal systems. Both checklists plus the Installer's Declaration are to be completed with as much detail as applicable to the development and then submitted as part of the overall certification process to ensure compliance with the recommendations of this report.
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1.2 Neutral or beneficial effect on water quality

Development in the Sydney drinking water catchment is regulated by the *State Environmental Planning Policy (Biodiversity and Conservation) 2021* (the B&C SEPP). Under the SEPP, proposed developments in the Sydney drinking water catchment that need consent under a council local environmental plan cannot be approved unless the consent authority is satisfied the development would have a neutral or beneficial effect (NorBE) on water quality.

A neutral or beneficial effect on water quality means development that:

- has no identifiable impact on water quality, or
- will contain any water quality impact on the development site and stop it from reaching any watercourse, waterbody or drainage depression on the site, or
- will transfer any water quality impact outside the site where it is treated and disposed of to standards approved by the consent authority.

In addition, the SEPP states that 'Development consent must not be granted to development on land in the Sydney Drinking Water Catchment unless the consent authority is satisfied the development is consistent with the NorBE Guideline'. The 'Neutral or Beneficial Effect on Water Quality Assessment Guideline' [NorBE Guideline] (WaterNSW, 2022) provides advice about the meaning of the neutral or beneficial effect, how to show it, and how to assess an application against the NorBE test. If you are unsure how to categorise your proposed development or activity, contact WaterNSW's Catchment Assessments team via environmental.assessments@waterNSW.com.au.

Exert from the publication titled "Developments in the Drinking Water Catchment – Water Quality Information Requirements" (Feb. 2023) detailing in brief the requirements for all developments within the Sydney drinking water catchment.



ON-SITE SEWAGE (WASTEWATER) MANAGEMENT

GENERAL NOTES TO BE APPLIED AS APPROPRIATE FOR THE DEVELOPMENT

1. All proposed wastewater management collection, treatment and discharge measures are to be installed and commissioned in accordance with the recommendations of the Wastewater Management Assessment that accompanies this development, all relevant NSW Health Department guidelines, Council's engineering standards, and any conditions of development consent.
2. If the site soil conditions encountered within the area nominated for effluent disposal during the construction process vary from those described in the Wastewater Management Assessment seek additional information and design options from the designer of the system before progressing to completion.
3. All wastewater management collection, treatment and discharge components such as tanks, transfer pipework, disposal areas, and any associated infrastructure used in the construction of the wastewater management system are to be protected from potential physical damage by the installation of appropriate mechanisms such as bollards, fencing or barricades to the satisfaction of the consent authority and/or certifying engineer.
4. All plants, grasses and ground covers sown as part of wastewater treatment measures are to be maintained and/or replaced until a satisfactory strike rate of at least 90%, or until such time as plants have established rigour and survivability. Particular attention is required for sowing plants during the hotter summer months, and when there will be no monitoring of the survivability of the plant material for extended periods of time due to the likes of holidays or contractors moving on due to project completion.
5. Ensure that all civil works such as stormwater diversion berms, mounds and/or trenches are installed prior to completion of the job, and that all excess spoil is removed from around the effluent management area
6. All construction checklists are to be completed with as much detail as appropriate for the development with a copy of the checklist to be presented to the property owner, Council (certifier), and a copy retained by the installer.
7. At the completion of the project complete the 'Certification Statement', add additional information to the statement as necessary, and then present a copy of the Certification Statement to the property owner, Council (certifier), and retain a copy for future reference
8. Where possible and appropriate, take photos of the earthworks and installation process at various milestone points and present a copy of the images to the property owner and Council (certifier) to help with identification of the installed products and materials, and for future reference as to the location and physical characteristics of the system.



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A: 31 Hoddle Avenue
Goulburn. NSW. 2580
ABN: 63 326 094 249



DESIGN PRODUCER STATEMENT

On-site Wastewater Management and/or Effluent Disposal System Design

Issued By: SOWDES

To: Goulburn Mulwaree Council

SOWDES Reference No: 0060222

Issued To:

In Respect Of: On-site wastewater management system

For Development At: Lot 3 DP251779
88 Murrays Flat Road, Towrang. NSW. 2580

SOWDES has been engaged by the proponents to provide the technical design details for an on-site wastewater management system.

The design has been carried out in accordance with the following Standards and Best Practice Guidelines:

- 'Developments in Sydney's Drinking Water Catchments – Water Quality Information Requirements'. Water NSW (2015)
- 'Environment and Health Protection Guidelines On-site Sewage Management for Single Households'. Department of Local Government. (1998)
- AS/NZS 1547:2012 'On-site domestic wastewater management'
- 'Designing and Installing On-site Wastewater Systems'. Water NSW (2019)

For details of the site assessment and design particulars, refer to the **Wastewater Management Report prepared by SOWDES** dated 1 October 2025.

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.



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

Under certain conditions, **SOWDES** is available to certify the installed system. These conditions include:

- the technology supplier(s) take(s) full responsibility for the stated quality and performance of technologies and other equipment supplied
- the installer(s) take full responsibility for installing the system as specified by **SOWDES** design reports and the appropriate Conditions of Consent unless departure from the stated specification(s) is subsequently agreed between the installer, SOWDES and the relevant consent authority
- prior to the installation of the wastewater management system as specified in the wastewater management report dated 1 October 2025 **SOWDES is to be engaged under separate contract** to supervise the installation of all the specified system components.

DISCLAIMER:

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

This design is based on the site assessment carried out by **SOWDES** and the conditions applicable at the time of the site assessment. 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'.

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

For and on behalf of **SOWDES**

Paul Johnson

Paul Johnson (JP)
Bachelor of Science Agriculture / Horticulture (CSU / UWS)
Graduate Diploma Bush Fire Protection (UWS) FPAA Member – Level 3 - BPAD27823
Graduate Certificate Engineering – Water (UTS)
Professional Engineer (Civil) – Engineers Australia (MIEAust - NER)
1 October 2025





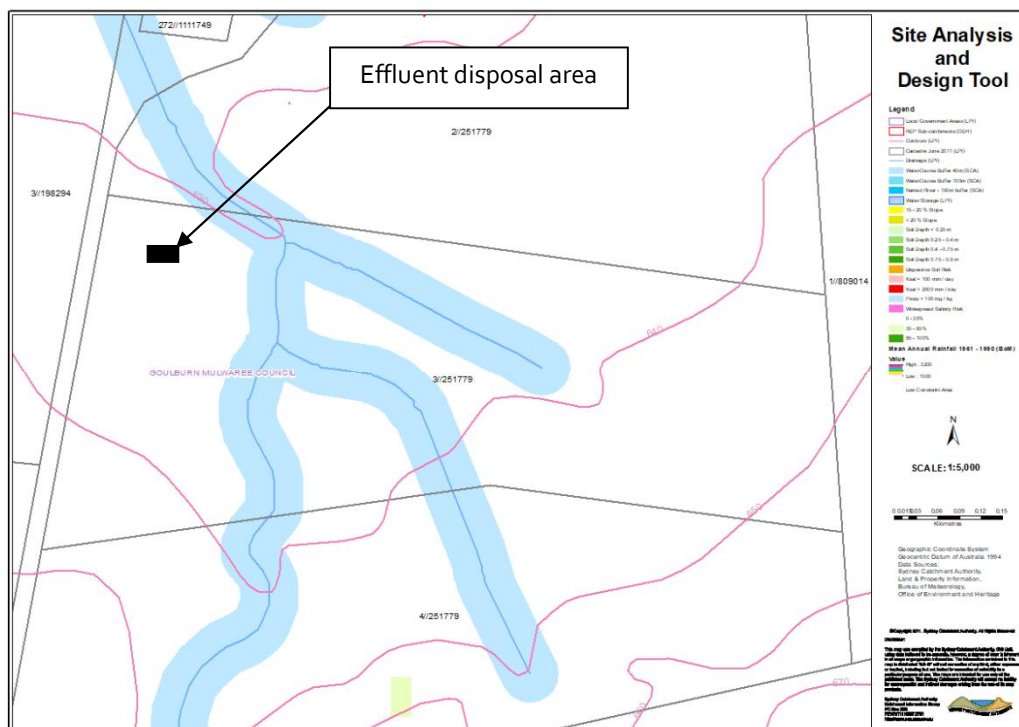
Soil Sample 1

Site Details: Lot 3 DP251779 Error! Unknown document property name. , Towrang. NSW. 2580				Date of Inspection: 27 July 2022	
Landform: Simple slope to open depression		Topography: Slopes from north to south		Sample 1 EMA Area	
Vegetation: Grasslands & improved pastures		Land Use: Equine facility & rural enterprise		GPS Coordinates Latitude: Error! Unknown document property name. Longitude: Error! Unknown document property name.	
Elevation: 35m	Aspect: Southerly		Slope: <5°	Microrelief: Elongated depression	

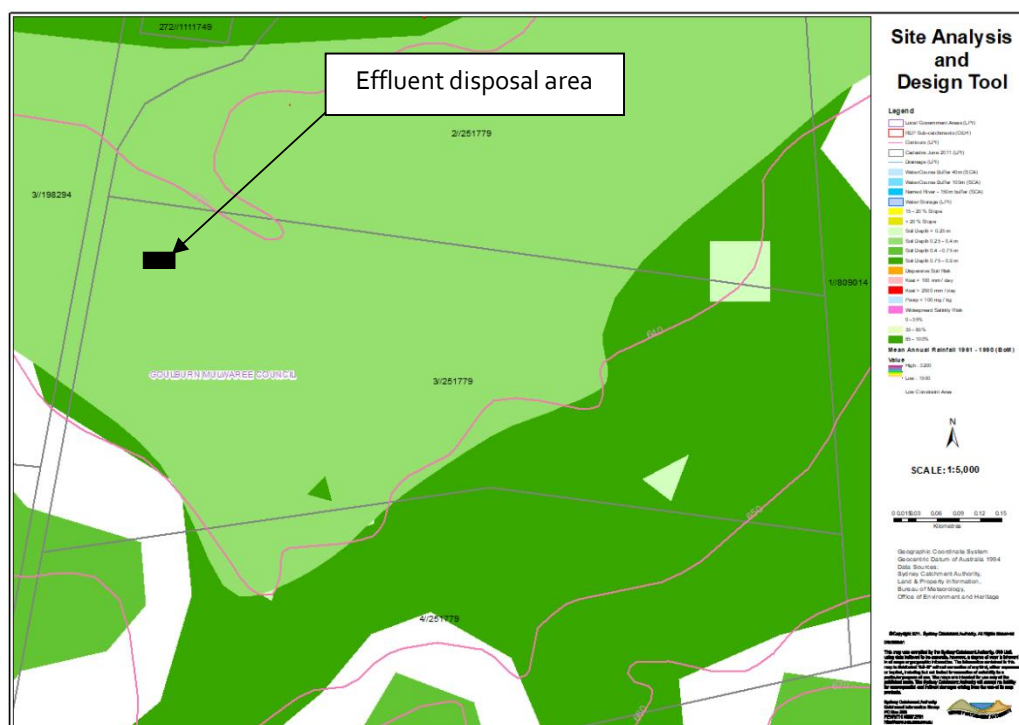
The soil is assessed to have a design irrigation rate (DIR) for absorption purposes of 3.6mm per day, set at a conservative rate for secondary treated effluent discharging within a moderately structured clay loam soil environment (Table A1 from the publication titled "Neutral or Beneficial Effect on Water Quality Assessment Tool, Consultants and Consultant Administrators User Guide" - WaterNSW – Oct. 2021, page 50)

	Depth mm	Texture	Coarse Fraction	Condition of Surface Soil	Pedality / Structure	Fabric	Consistence	EC / pH	Water Regime	Boundaries	Horizons
	0-100	silty loam	<20mm	firm	polyhedral, weak	earthy	dry, weak		slowly permeable, moderately well drained		A1
	100-200	silty loam	<20mm		polyhedral, weak	earthy	dry, weak			gradual	A2
	200-300	loam	<20mm		polyhedral, weak	rough ped	dry, weak	0.02 / 4.8			
	300-400	clay loam	<20mm		polyhedral, moderate	rough ped	dry, firm			gradual	B1
	400-500	clay loam	<20mm		polyhedral, moderate	rough ped	dry, firm				
	500-600	clay loam	<20mm		polyhedral, moderate	rough ped	dry, firm	0.02 / 4.9			
	600-700										C
	700-800										
	800-900										
	900-1000										

Water Sensitive Design – Drainage & Soil Depths Constraints Overlay

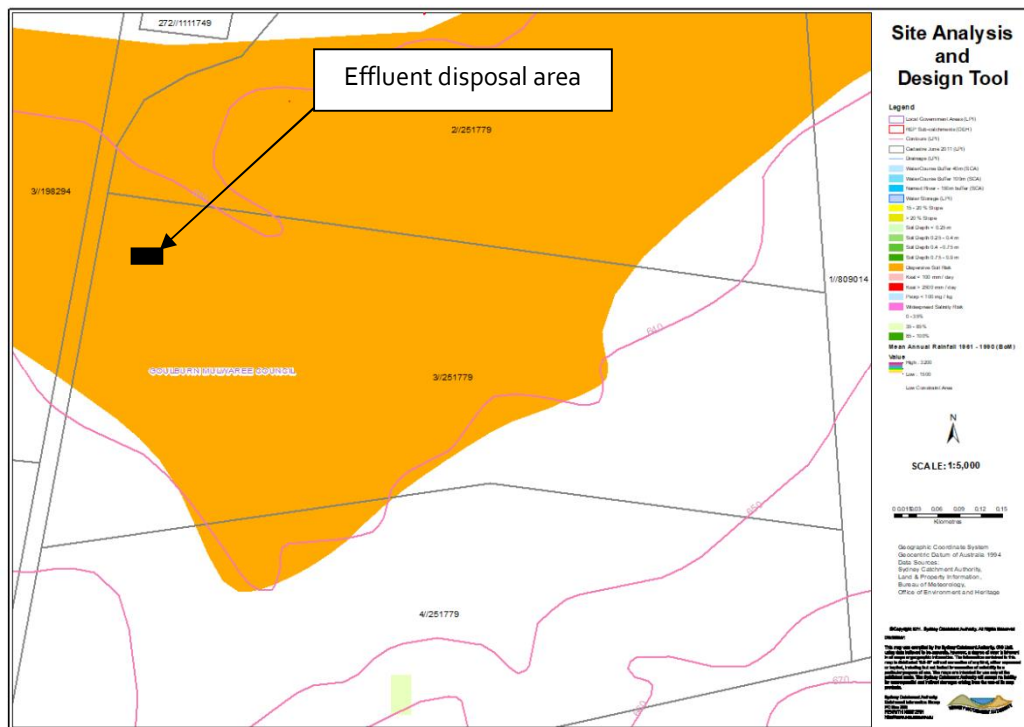


Drainage constraints overlay with 40 metre buffer zone



Soil depth constraints overlay.

Water Sensitive Design – Dispersive Soils Constraints Overlay



Dispersive soils constraints overlay



LAND AREA CALCULATION FOR A SURFACE IRRIGATION DISPOSAL SYSTEM (THE LARGEST AREA IS THE MINIMUM REQUIREMENT)

				Nutrient Area		Hydraulic
				N	P	
	System Type	AWTSS	AWTS Standard			
Cx	Nutrient concentration			30	12	
Q	Daily Flow (five bedrooms)	600				
UR	Plant uptake (refer to Table A2 – page 28)	2l/m	Lawn unmanaged	240	12	
DIR	Design soil depth	0.6				
Soil Type	Soil texture (refer to Table A1 – page 28)	4a	Clay Loams – High / moderate			
BD	Bulk density		1.5			
Np	Soil porosity		0.433962264			
Gs	Soil specific gravity	2.65				
X sorp	Nutrient sorption		400			
DIR	Design Irrigation Rate (refer to Table A1 – page 28)		3.6			
AD	Minimum effluent irrigation area			274	258	167

= Largest land area requirement



Table A1. Design Loading Rates for Hydraulic Loading Sizing

Soil Texture	Soil Structure	Secondary Effluent
Gravels & Sands	Structureless	5
Sandy Loams	Weak	5
Sandy Loams	Massive	5
Loams	High/Moderate	4
Loams	Weak/Massive	4
Clay Loams	High/Moderate	3.6
Clay Loams	Weak	3.6
Clay Loams	Massive	3.6
Light Clays	Strong	2.9
Light Clays	Moderate	2.9
Light Clays	Weak/Massive	2.9
Med-heavy Clays	Strong	2.1
Med-heavy Clays	Moderate	2.1
Med-heavy Clays	Weak/Massive	2.1

(adopted in part from the publication titled "Neutral or Beneficial Effect on Water Quality Assessment Tool, Consultants and Consultant Administrators User Guide" - WaterNSW – Oct. 2022, page 50)

Table A2. Plant Nutrient Uptake Rates for Effluent Disposal

CODE	CROP	Total Nitrogen (kg/ha/year)	Total Phosphorus (kg/ha/year)
1gqw	Good quality woodland	90	25
1pqw	Poor quality woodland	65	20
2lfm	Lawn – fully managed (clippings removed)	240	30
2lum	Lawn – unmanaged	120	12
3ip	Improved pasture	280	24
3pp	Perennial pasture	99	11
4stfm	Shrubs and some trees – fully managed	150	16
4stum	Shrubs and some trees - unmanaged	75	8

(adopted and slightly modified from the publication titled "Neutral or Beneficial Effect on Water Quality Assessment Tool, Consultants and Consultant Administrators User Guide" - WaterNSW – Oct. 2022, page 50)



Recommended Buffer Distance for On-site Wastewater Management Systems in the Sydney Drinking Water Catchment

Feature	Level of effluent treatment	Effluent application method	Buffer distance	
			Upslope	Downslope/Flat
Buildings, boundaries, paths and walkways, retaining walls	Primary	Subsoil	4.0m	2.0m
	Secondary (disinfected)	Subsurface and surface irrigation (including drip and trickle)	6.0m	6.0m
Premises boundaries, paths and walkways, recreation areas, in-ground swimming pools	Primary	Subsoil	6.0m	3.0m
	Secondary (disinfected)	Subsurface irrigation	4.0m	2.0m
		Surface irrigation	6.0m	6.0m
In-ground potable water tanks	Primary	Subsoil	15.0m	15.0m
	Secondary (disinfected)	Subsurface and surface irrigation	Not applicable	15.0m
Permanent and intermittent watercourses	Primary	Subsoil	100m from high water level\	
	Secondary (disinfected)	Subsurface and surface irrigation	100m from high water level	
Bore or well used for domestic consumption	Primary	Subsoil	100m from high water level	
	Secondary (disinfected)	Subsurface and surface irrigation	100m from high water level	
Dam and drainage depression	Primary	Subsoil	40m from high water level	
	Secondary (disinfected)	Subsurface and surface irrigation	40m from high water level	

Adopted from 'Designing and Installing On-site Wastewater Systems – A Water NSW Current Recommended Practice (2019), Table 2.6 (page 23)



WASTEWATER MANAGEMENT SYSTEM RECOMMENDATION

Collection and Treatment:

System Type	Aerated Wastewater Treatment System - Existing
Treatment Level	Secondary
Brand	Eco-Septic
Model	Eco-Pro
Tank Capacity	Nominally 1,500 litres – 10 persons per day
Location (approximate)	Approximately 15 metres to the north of the existing dwelling
Low-Pressure Sewer Pump Station	Equal to Aquatec 'Sewertec 1 – B/1100L' unit to be located just outside the amenities within the main workshop.

Disposal Method:

Method	Surface irrigation
Dimensions / Area	A primary and secondary irrigation disposal area - each with an effective irrigation application area of at least 300m ²
Description / Location (approximate)	The primary irrigation area will be located approximately 60 metres to the west of the AWTS unit between a row of trees and the internal access carriageway with the secondary disposal area to be constructed to the immediate west of the primary area (refer to the Wastewater Management Site Plan).
Proprietary Products	Eco-Septic 'Eco - Pro' AWTS unit, Aquatec 'Sewertec 1 – B/1100L' low-pressure sewer pump station unit, quick coupling turf valves with lilac coloured lids, lilac coloured capitol style sprinklers, turf valve keys, lilac coloured hoses for on ground distribution, K-Rain 4000 series 4-port sequencing valve cammed for four zones inside a weather-proof cover, 32Ø uPVC pressure pipe, 32Ø PN12.5 PE poly pipe, 40Ø PN12.5 PE poly pipe 'Reclaimed Effluent' warning sign.



NorBE Assessment

WEM Summary

version 3

General Information

WEM model ID	3327445	Associated DA number							
Model description	AWTS to surface irrigation								
Consultancy	SOWDES	Consultant	sowdes@sowdes.com						
Consultant reference number	0060222								
Council	Goulburn Mulwaree	Assessing officer							
Nominated lot	3//251779	Associated lots	<table><tr><th>Lot</th><th>Section</th><th>Plan</th></tr><tr><td>3</td><td></td><td></td></tr></table>	Lot	Section	Plan	3		
Lot	Section	Plan							
3									
Development class	Retail/office – unsewered								
Date of model run	8/2/2025 1:55:23 PM								

WEM Model Run Summary

Model run outcome **Satisfied**

Any of the sub-surface plumes reaches:

Lot boundary	No
Drainage depression	No
Top bank of watercourse	No
Another disposal field or onsite stormwater management system	No
Within 50m, and up gradient of, a licensed drinking water bore	No

Proposed Front End Design

Length (across slope)(m)	25.0	Width (up slope)(m)	12.0
Proposed area(m ²)	300.0	Minimum Required area (m ²)	274.0
Number of trenches	0		
Effluent volume proposed (l/day)	600		
Effluent volume calculated (l/day)	600		

WEM Model Inputs

Location

Easting	9555254.960132	Northing	4332779.849657
Slope (m/m)	0.01620	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
Water supply type	Rainwater	Spa Bath	No





NorBE Assessment

WEM Summary

version 3

Continuous system use	Yes		
Treatment system	AWTS standard	Disposal system	Irrigation surface
Site			
Lot size(m2)	322620		
Subject to severe frost	No	Bulk density(g/cm3)	1.50
Vegetation for nutrient uptake	Lawn - fully managed (clippings removed)	Phosphorus sorption (mg/kg)	400
Soil depth (to impermeable layer) (m)	0.60	Soil structure	High/moderate
Saturated hydraulic conductivity (Ksat)(m/day)	0.75		
Soil texture	Clay loams		
Effluent disposal risk factors			
Depth to water table	0.4 - 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 depression	> 50		
Distance to watercourses and water supply reservoirs	> 120		
Distance to licenced drinking water bores	> 150		



NorBE Assessment
WEM Summary
WEM Plume Map

version 3





Design and Installation Requirements

Table of Contents

- Wastewater Management System Treatment and Disposal Recommendations
- Materials and Installation Requirements Summary
- Wastewater Management Site Plan – Ref: 0060222-W101-A
- Conceptual Design for Surface Irrigation Disposal Systems – Ref: 0060222-W102-A
- Installation Checklist for Aerated Wastewater Treatment Systems
- Installation Checklist for Surface Irrigation Systems
- Installer's Declaration



WASTEWATER MANAGEMENT SYSTEM RECOMMENDATION

Collection and Treatment:

System Type	Aerated Wastewater Treatment System - Existing
Treatment Level	Secondary
Brand	Eco-Septic
Model	Eco-Pro
Tank Capacity	Nominally 1,500 litres – 10 persons per day
Location (approximate)	Approximately 15 metres to the north of the existing dwelling
Low-Pressure Sewer Pump Station	Equal to Aquatec 'Sewertec 1 – B/1100L' unit to be located just outside the amenities within the main workshop.

Disposal Method:

Method	Surface irrigation
Dimensions / Area	A primary and secondary irrigation disposal area - each with an effective irrigation application area of at least 300m ²
Description / Location (approximate)	The primary irrigation area will be located approximately 60 metres to the west of the AWTS unit between a row of trees and the internal access carriageway with the secondary disposal area to be constructed to the immediate west of the primary area (refer to the Wastewater Management Site Plan).
Proprietary Products	Eco-Septic 'Eco - Pro' AWTS unit, Aquatec 'Sewertec 1 – B/1100L' low-pressure sewer pump station unit, quick coupling turf valves with lilac coloured lids, lilac coloured capitol style sprinklers, turf valve keys, lilac coloured hoses for on ground distribution, K-Rain 4000 series 4-port sequencing valve cammed for four zones inside a weather-proof cover, 32Ø uPVC pressure pipe, 32Ø PN12.5 PE poly pipe, 40Ø PN12.5 PE poly pipe 'Reclaimed Effluent' warning sign.



Materials and Installation Requirement Summary.

The following Tables represent the primary material, location, construction, installation, commissioning and operational components of the wastewater management system and are to be undertaken to ensure compliance with the design concepts. The respective lists may not be in any particular order of undertaking, and some of the lesser requirements may be omitted or not specifically mentioned, however this does not preclude the need to undertake or supply such items.

Construction Materials / Proprietary Products

Component	Product Description
AWTS unit	Eco-Septic 'Eco-Pro' - Existing
Low-pressure pump station	Equal to Aquatec 'Sewertec 1 – B/1100L'
Automatic sequencing valve	K-Rain 4000 series 4-port outlets cammed for 4 zones (#4404)
Turf valve & key	Professional quality 20Ø turf valve and key with lilac coloured lid
Sprinkler outlets	Lilac coloured 'capitol' style sprinkler – 20Ø BSP thread
Distribution hose and fittings	20Ø lilac coloured or striped distribution hose and durable above and below ground fittings
Isolating & flush valves	Professional quality irrigation grade fittings
Transfer line	32Ø and 40Ø PN12 SWJ uPVC pipe or PN12.5 PE poly pipe with lilac striping (as specified in the design and construction details)
Valve cover	Weatherproof cabinet / cover for the automatic sequencing valve to provide access for maintenance and protect the unit from frost
Warning tape	Provide 'Reclaimed Water' warning tape where labelling is not fixed to the pipe system during manufacturing

Location: (refer to the site plan for the proposed locations of main items)

Description	Completed			
Install the AWTS approximately 15 metres to the north of the existing dwelling	☒	Yes	☐	No
Install a low-pressure sewer pump station outside the amenities within the main workshop building and the entrance gatehouse	☐	Yes	☐	No
Install an effluent disposal system comprising a primary and secondary irrigation disposal area to the west of the AWTS unit with each disposal area to be at least 300m ²	☐	Yes	☐	No
Construct earthen mounds on any upslope aspect of the effluent management system to divert surface water run-off away from both the AWTS unit and the surface irrigation area	☐	Yes	☐	No

Construction / Installation: AWTS and Low-pressure sewer pump station

Description	Completed			
Install the AWTS unit and the low-pressure sewer pump station as per the manufacturer's specifications including appropriate transfer pump to meet site conditions and performance criteria and any filters or valving on the outlet side.	☐	Yes	☐	No
Connect the drainage pipes from the re-purposed dwelling, the main workshop and the gatehouse to the inlet side of the AWTS unit and connect the 32Ø pump discharge line from the pump well to the irrigation disposal area	☐	Yes	☐	No



Construction / Installation: Surface Irrigation Disposal System.

Description:	Completed			
Ensure that the area identified for effluent irrigation disposal in the Wastewater Management Report is still suitable and free of any other services, utilities or trafficable areas that could be affected by exposure to irrigation applications, and that the height of the vegetative cover does not impede the natural distribution pattern of the sprinkler outlets, mow or slash the area if necessary.	☐	Yes	☐	No
Install a 32Ø transfer line from the outlet of the AWTs unit to the inlet side of each K-Rain sequencing valve, ensuring that at least the first and last 2 metres of the pipeline is in PN12 SWJ uPVC pipe material for strength and rigidity. Other sections of the pipeline – particularly for long runs can be in 32Ø PN12.5 PE poly pipe.	☐	Yes	☐	No
In accordance with the manufacturers recommendations, ensure that the body of each sequencing valve is slightly higher than the highest outlet point in the irrigation disposal system to avoid the potential for back-pressure on the unit that could affect the operation of the internal cams. This does not necessarily mean that the sequencing valve has to be above ground.	☐	Yes	☐	No
Connect 4 distribution pipes to the outlet side of each sequencing valve with each line being a separate distribution zone, ensuring that at least the first 2 metres of each pipe is in PN12 SWJ uPVC pipe material for strength and rigidity. Other sections of the pipeline – particularly for long runs can be in 32Ø PN12.5 PE poly pipe.	☐	Yes	☐	No
Continue each lateral distribution line to the designated irrigation disposal areas as per the Wastewater Management Report and design, and ensure that all pipes have suitable lilac coloured 'Reclaimed Water' identification labelling or warning tapes prior to backfilling	☐	Yes	☐	No
Install all quick coupling turf valves with lilac-coloured lids as per the Wastewater Management Report and design ensuring that the closed lids finish at natural surface level.	☐	Yes	☐	No
For each disposal area assemble 4 'sprinkler hose sets' each comprised of a bayonet style turf valve key, a 20Ø x 90° elbow, a 4-metre length of 20Ø lilac coloured hose, and a 20Ø BSP lilac coloured 'capitol' style sprinkler, and insert each set into one of the quick coupling turf valves in each distribution zone.	☐	Yes	☐	No
Undertake a flow test of the system to check for any leaks, proper rotation of the sequencing valve, and even distribution of effluent from each sprinkler outlet.	☐	Yes	☐	No
Complete backfilling over the pipe trenches and cover the sequencing valve with a suitable weather-proof cabinet or cover, particularly for frost protection.	☐	Yes	☐	No
Where the sequencing valve is required to be installed above ground secure the body of the valve and the pipe network to a post or other form of stabilising system to prevent unnecessary movements and to keep the entire unit upright.	☐	Yes	☐	No
Create stormwater diversion mounds on any upslope side effluent irrigation disposal areas to divert surface flows away	☐	Yes	☐	No



Erect exclusion fencing around the effluent disposal system to protect the area from heavy vehicle and large animal traffic movements and place warning signs around the margins of the surface irrigation area with wording to the effect of "RECLAIMED EFFLUENT – AVOID CONTACT – DO NOT DRINK"	☐	Yes	☐	No
---	--------------------------	-----	--------------------------	----

Commission / Operation:

	Completed			
Commission the AWTS unit as per manufacturer's specifications and requirements	☐	Yes	☐	No
Commission the low-pressure sewer pump stations as per manufacturer's specifications and requirements	☐	Yes	☐	No
Decommission the existing septic tank in accordance with Section 1 from the NSW Health Department publication titled 'Advisory Note 3 - Destruction, Removal or Reuse of Septic Tanks, Collection Wells, Aerated Wastewater Treatment Systems (AWTS) and other Sewage Management Facilities (SMF), (January 2017)'	☐	Yes	☐	No
Organise appropriate 'hold' and 'witness' inspections as required in the Council's conditions of consent.	☐	Yes	☐	No
Complete certification and installation declaration requirements and submit to Council and client. Provide the client with all necessary operating instructions, warranty information and emergency contact information.	☐	Yes	☐	No



Example of warning sign to be posted around the outside of the effluent disposal area



PLEASE REFER TO THE A1 DRAWING TITLED 'WASTEWATER MANAGEMENT SITE PLAN'

REFERENCE No. 0060222-W101-A



PLEASE REFER TO THE A₃ DRAWING TITLED 'SURFACE IRRIGATION DISPOSAL'

REFERENCE No. 0060222-W102-A



Checklist. AWTs Tank Installation Inspection for use by Plumbers / Installers and Council Inspectors		
Owners name:		
Address:		
Installation date:		
Tank description:		
Type of AWTs		
Manufacturer:		Model:
Material:	☐ Plastic / Poly	☐ Concrete ☐ Fibreglass ☐ Other
Manufacturer's load bearing rating:		
Multiple tanks:	☐ Yes	☐ No
Specified or calculated tank capacity of each tank		
Tank 1	Litres	Tank 2 Litres
Tank dimensions and capacities (as provided on manufacturer's design specification sheet)		
	Tank 1	Tank 2
Exterior dimensions (diameter & height)	mm	mm
Interior dimensions (base to invert of outlet)	mm	mm
Exterior height of inlet invert	mm	mm
Exterior height of outlet invert	mm	mm
Effective depth	mm	mm
Capacities of each tank		
Anaerobic (Septic)	Litres	Aeration Litres
Clarifier (sludge settling)	Litres	Pump well (chlorine contact) Litres
Other (describe)		
Excavation / settling tank		
Location of tanks (describe):		
Nature of installation	☐ Free standing	☐ Buried
Verify required inlet / outlet elevations	☐ Yes	☐ No
Ground water present in excavation	☐ Yes	☐ No



Checklist. AWTs Tank Installation Inspection for use by Plumbers / Installers and Council Inspectors			
Bottom of excavation			
Level	☐ Yes	☐ No	
Free of rock and debris	☐ Yes	☐ No	
Bedding material			
Description:	Depth	cm	
Free of large rocks and debris	☐ Yes	☐ No	
Compacted	☐ Yes	☐ No	
Structural integrity of tank verified			
Tank installed level	☐ Yes	☐ No	
Tank oriented correctly	☐ Yes	☐ No	
Flotation protection (for buried tanks only)			
Buoyancy calculation provided on design	☐ Yes	☐ No	
Anchor weight installed	☐ Yes	☐ No	
Other (describe)			
Backfill			
Backfill material			
Free of debris and large rocks	☐ Yes	☐ No	
Compacted	☐ Yes	☐ No	
Piping			
Piping in appropriate sequence (inlet / outlet)	☐ Yes	☐ No	
Inlet mm	Outlet / supply line mm		
Pipe specifications (nominal diameter and material)			
Return line mm	Electrical conduit mm		
Joints in excavated area	☐ Yes	☐ No	
Pipe sealing			
Pipes sealed (including electrical conduit)	☐ Yes	☐ No	



Checklist. AWTs Tank Installation Inspection for use by Plumbers / Installers and Council Inspectors	
Type of sealant	Inlet
	Outlet / supply line
	Return line
	Electrical conduit
Recirculation device ☐ Yes ☐ No	
Type of device	
Tank lids	
Venting ☐ Yes ☐ No	
Tank vent (description)	
Tank water tightness testing ☐ Yes ☐ No	
Manufacturer testing ☐ Yes ☐ No	
Pumps operational ☐ Yes ☐ No	
Pump timing ☐ Yes ☐ No	
Alarm to indicate no irrigation / high water ☐ Yes ☐ No	
Service contract in place ☐ Yes ☐ No	
Service provider:	
Contract number:	
Comments, actions or repairs needed: (Where a response has been selected in the above Checklist requiring additional information please specify the action plan and corrective process undertaken or proposed to be undertaken to remediate the problem, or the alternative that is being offered).	
Name / title of inspector:	
Signature:	Date:



Checklist. Installation of surface irrigation systems for use by Plumbers / Installers and Council Inspectors			
Is the effluent irrigation area located according to the conditions of consent and the wastewater report or any covenant?	☐	Yes	☐ No
Is the size of the effluent irrigation area consistent with the conditions of consent and the wastewater report?	☐	Yes	☐ No
Is the effluent irrigation area located according to buffer distances relating to:			
Dwelling and other buildings (15m)?	☐	Yes	☐ No
Swimming pool and other sensitive receptors (6m; irrigation should area not be located upslope of feature)?	☐ N/A	☐ Yes	☐ No
Driveways and property boundaries (3m downslope and where flat, or 6m upslope)?	☐	Yes	☐ No
Drainage features (100m to a permanent or intermittent watercourses or 40m to dams and drainage depressions)?	☐	Yes	☐ No
Fixed sprinkler type:	☐ Bayonet	☐ Pop-up	☐ Other (describe)
Sprinkler head type (describe)?			
What is the sprinkler plume height?	mm		
What is the sprinkler throw (radius)?	m		
Are the sprinklers appropriately placed given their throw and plume height?	☐	Yes	☐ No
Do the sprinklers receive uniform amounts of effluent?	☐	Yes	☐ No
Have manual or automatic sequencing valves been installed?	☐	Yes	☐ No
Has a disc filter been installed upstream of any sequencing valve?	☐	Yes	☐ No
Have air, pressure reducing and/or non-return valves been incorporated into the design (as needed)?	☐	Yes	☐ No
Does the irrigation system have a flushing valve?	☐	Yes	☐ No
Does the flushing line return to the wastewater treatment system (not the primary chamber)?	☐	Yes	☐ No
Is the flushing line directed to a small absorption pit?	☐	Yes	☐ No
Has the pump sufficient capacity to service the demands of the effluent irrigation area and overcome friction and head losses in the system?	☐	Yes	☐ No
Is the effluent distribution line from the tank to the effluent irrigation area buried at an appropriate depth (min. 300mm) and in a manner that provides protection against mechanical damage?	☐	Yes	☐ No
Are the distribution laterals buried at a depth between 100 – 150mm?	☐	Yes	☐ No
Has the irrigation area been protected to prevent damage (eg, fencing)?	☐	Yes	☐ No



**Checklist. Installation of surface irrigation systems for use by Plumbers / Installers
and Council Inspectors**

NB. Some of the questions in the above checklist may not be relevant for either the initial installation inspection or ongoing operational inspections. In this case answer N/A.

Service provider:

Contact number:

Comments, actions or repairs needed: (Where a response has been selected in the above Checklist requiring additional information please specify the action plan and corrective process undertaken or proposed to be undertaken to remediate the problem, or the alternative that is being offered).

Name / title of inspector:

Signature:

Date:



COMPLETION OF WORKS INSTALLATION CERTIFICATE On-site Wastewater Management and/or Effluent Disposal System

Issued By

(Installer's Details):

To: Goulburn Mulwaree Council

Development

Application No:

Property Owners:

Development At: Lot 3 DP251779

88 Murrays Flat Road, Towrang. NSW. 2580

Description of the
Project:

- 1/. Commission the existing AWTS in accordance with the manufacturer's requirements and decommission the septic tank
- 2/. Install the low-pressure sewer pump stations in accordance with the manufacturer's installation requirements and connect the outlet to the existing AWTS unit.
- 2/. Establish a primary and secondary effluent irrigation disposal area approximately 60 metres to the west of the AWTS unit
- 3/. Establish a regular maintenance contract with an approved service provider
- 4/. Erect exclusion fencing around the perimeter of the irrigation disposal area and install warning signs on each aspect of the fence.

INSTALLED IN ACCORDANCE WITH:

- SOWDES Wastewater Management Report dated 1 October 2025 Ref: 0060222

DATE OF SITE INSTALLATION INSPECTION: _____

INSTALLATION REPORT SUMMARY (includes any variations to the original design, etc):

- Variations:
- Report:

DECLARATION:

I believe on reasonable grounds that all the wastewater works have been completed in accordance with **SOWDES Wastewater Management Report dated 1 October 2025, Ref: 0060222** and Council Consent Number _____

For and on behalf of (Installer's Details):

Name:

Signature:

Title:

Date:

cc: the property owners



Technical Specifications

Table of Contents

- NSW Health Department 'Advisory Note 3 - Destruction, Removal or Reuse of Septic Tanks, Collection Wells, Aerated Wastewater Treatment Systems (AWTS) and other Sewage Management Facilities (SMF), (January 2017)'
- Eco-Septic 'Eco-Pro' Aerated Wastewater Treatment System
- Aquatec 'Sewertec 1 – B/1100L' low-pressure sewer pump station
- K-Rain 4000 Series Sequencing Valve
- Plant Species Suitable for Use in Evapotranspiration & Absorption Beds and Irrigation Disposal Systems
- General Notes and Guidelines Adopted from the Publication Titled "*On-site Sewage Management for Single Households* (1998)", NSW Department of Local Government, the NSW Environment Protection Authority, the NSW Department of Health, the NSW Department of Land and Water Conservation, and the NSW Department of Urban Affairs and Planning.



Health

Advisory Note 3 — Revised January 2017

Destruction, Removal or Reuse of Septic Tanks, Collection Wells, Aerated Wastewater Treatment Systems (AWTS) and other Sewage Management Facilities (SMF)

1. Septic Tank / Collection Well:

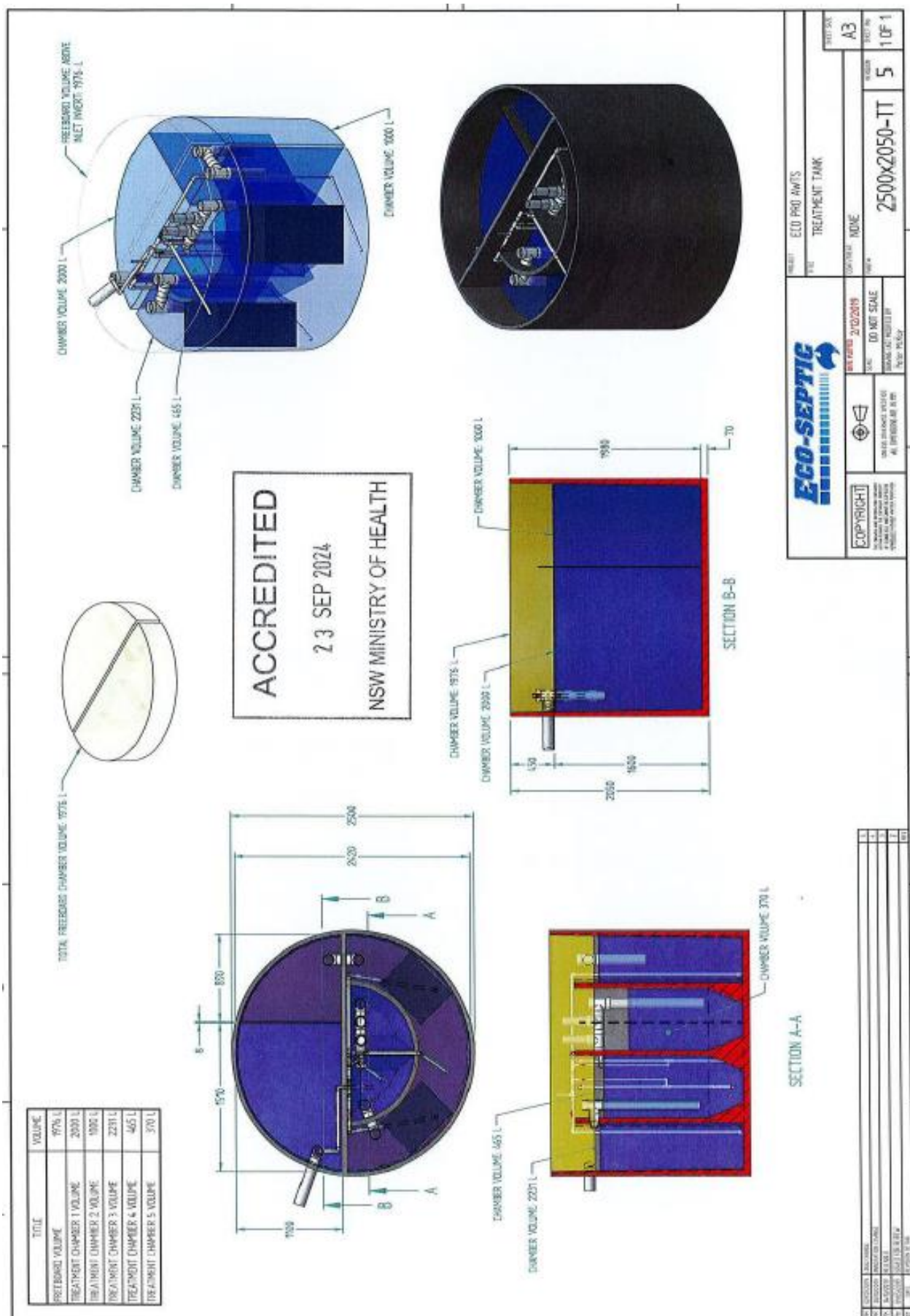
1.1 Demolition On-Site

1.1.1 The contents of the septic tank / collection well are to be removed by a method acceptable to the local council, either by tanker removal to an appropriate authorised site or pumped into the existing disposal trench if of sufficient capacity and which then should be sealed. The contents of a septic tank or collection well must not be broadcast or discharged above ground.

1.1.2 The sides, lid, baffle or partition (if fitted) and square junctions of the tank should be hosed down as the waste is being removed.

1.1.3 The tank is to be treated by liberally broadcasting "Builders' (hydrated) Lime" over the exposed surfaces. It is advisable to wear personal protective equipment.

1.1.4 Several holes should be punched or drilled into the base of the tank. The lid and those parts of the walls baffle and square junctions above the ground should be demolished and collapsed into the tank and the tank filled with clean soil or rubble and topped with clean soil. This should be performed to ensure that voids cannot develop which would allow collapse and injury in the future.







K-RAIN 4000 **DISTRIBUTING VALVES** **THE NEXT GENERATION OF** **PROFESSIONAL PRODUCTS.**



FEATURES/BENEFITS

- **2 Year Trade Warranty**- Factory support up to two years after purchase.
- **ABS Polymer Construction**- High-strength, non-corrosive body for long product life.
- **Available in 4 and 6 Outlet Models**- Can quickly and easily change from two to six watering zones.
- **Simplicity of Design**- Valves are easily maintained and serviced for long product life.
- **Operates at Low 10 GPM at Pressures of 25-75 PSI**- Reliably automates multiple zoned residential and small commercial irrigation or wastewater systems.

K
RAIN®

IRRIGATION SOLUTIONS WORLDWIDE™



K-RAIN MODEL 4000: DISTRIBUTING VALVE

The 4000 distributing valve offers a reliable, economical way to automate multiple zoned residential and small commercial irrigation systems. The simplicity of design and a minimum of moving parts ensures ease of maintenance and long service life.

These patented valves allow for the number of watering zones to be changed quickly and easily. They are ideally suited for both city water and pump applications and may also be used for onsite wastewater or effluent water applications.

The 4000 valve is available in 4 or 6 outlet models. A quick change of the cam allows the valve to operate from 2 to 6 zones. The valve will operate with flows as low as 10 GPM and at pressures of 25 to 75 PSI.

The distributing valve shall carry a two-year trade warranty against manufacturing defects.

HOW TO SPECIFY



IRRIGATION SOLUTIONS WORLDWIDE™

K-Rain Manufacturing Corp.
1640 Australian Avenue
Riviera Beach, FL 33404 USA
PH: 1-561-844-1002 FAX: 1-561-842-9493
1-800-735-7246
EMAIL: krain@k-rain.com
WEB: http://www.k-rain.com

MODELS

4 Outlet - 1 1/4" x 1 1/4" Models

4400	No Cam
4402	Cammed for 2 Zone Operation
4403	Cammed for 3 Zone Operation
4404	Cammed for 4 Zone Operation

Other Options: Add to Part Number
RCW Reclaimed Water Use

4 Outlet - 1" x 1" Models

4410	No Cam
4412	Cammed for 2 Zone Operation
4413	Cammed for 3 Zone Operation
4414	Cammed for 4 Zone Operation

6 Outlet - 1 1/4" x 1" Models

4600	No Cam
4602	Cammed for 2 Zone Operation
4603	Cammed for 3 Zone Operation
4604	Cammed for 4 Zone Operation
4605	Cammed for 5 Zone Operation
4606	Cammed for 6 Zone Operation

Other Options: Add to Part Number
RCW Reclaimed Water Use

6 Outlet - 1" x 1" Models

4610	No Cam
4612	Cammed for 2 Zone Operation
4613	Cammed for 3 Zone Operation
4614	Cammed for 4 Zone Operation
4615	Cammed for 5 Zone Operation
4616	Cammed for 6 Zone Operation

SPECIFICATIONS

- Constructed of High Strength, Non-Corrosive ABS Polymer
- Flow Range:
4 Outlet Valve: 10-40 GPM
6 Outlet Valve: 10-25 GPM
- Pressure Rating: 25 - 75 PSI
- Pressure Loss:
4 Outlet Valve
Flow (GPM) 10 20 30 40
PSI Loss 2.0 3.0 4.5 6.4
6 Outlet Valve
Flow (GPM) 10 20 30
PSI Loss 2.5 4.5 7.5
- Inlet: Slip and Glue Connection
4400 Series: to 1 1/4" PVC Pipe
4410 Series: to 1" PVC Pipe
4600 Series: to 1 1/4" PVC Pipe
4610 Series: to 1" PVC Pipe
- Outlets: Slip and Glue Connections
4400 Series: to 1 1/4" PVC Pipe
4410 Series: to 1" PVC Pipe
4600 Series: to 1" PVC Pipe
4610 Series: to 1" PVC Pipe
- Dimensions: Height: 5-3/4"
Width: 5-3/4"

INSTALLATION TIPS

- We Recommend the Installation of an Atmospheric Vacuum Breaker Between the Pump and the Valve.



**Plant Species Suitable for Use in Evapotranspiration & Absorption Beds and Irrigation
 Disposal Systems – check local nurseries for other options.**

Botanical name	Common name	Form	Height (m)	Description	Planting density (/ m ²)
<i>Carex appressa</i>	Tall sedge	M	0.5 - 1.2	Dense, robust and tough, hairy and sticky	4 - 8
<i>Carex fascicularis</i>	Tassel sedge	M	0.5 - 1.0	Coarse, tufted plant	6 - 8
<i>Carex inversa</i>	Knob sedge	M	0.5 - 1.0	Small tufted or spreading clump	10
<i>Ficinia nodosa</i>	Knobby club-rush	M	0.6 - 1.5	Tall, coarse, wiry and densely tufted perennial rush with creeping rhizomes	6 - 8
<i>Juncus amabilis</i>	-	M	0.2 - 1.2	Rhizomatous tufted perennial rush	8 - 10
<i>Juncus flavidus</i>	Yellow rush	M	0.4 - 1.2	Rhizomatous tufted perennial rush, yellow-green	8 - 10
<i>Juncus gregiflorus</i>	-	M	0.5 - 1.4	Rhizomatous tufted perennial rush	8 - 10
<i>Juncus procerus</i>	-	M	1.0 - 2.0	Rhizomatous tufted perennial rush	8 - 10
<i>Lepidosperma gladiatum</i>	Coastal sword sedge	M	1.0 - 1.5	Leaves wide and flat with dark green blades	6
<i>Lepidosperma laterale</i>	Variable sword sedge	M	0.5 - 1.0	Leaves wide and flat with dark green blades	6
<i>Lepidosperma longitudinale</i>	Common sword sedge	M	0.6 - 1.7	Sedge with long, flat dark green blades	6
<i>Lomandra filiformis</i> ssp. <i>filiformis</i>	Wattle mat rush	M	0.15 - 0.5	Small tussock with fine blades	6 - 8
<i>Lomandra longifolia</i> var. <i>exilis</i>	-	M	0.5 - 1.0	Large tussock with broad flat leaves	4 - 6
<i>Lomandra longifolia</i> var. <i>longifolia</i>	Spiny-headed mat rush	M	0.5 - 1.0	Large tussock	4 - 6
<i>Patersonia occidentalis</i>	Long purple flag	M	0.2 - 0.5	Compact clumping perennial herb	6 - 8
<i>Poa labillardieri</i>	Common tussock grass	M	0.3 - 0.8, stems 1.2	Large, coarse densely tufted tussock	6 - 8
<i>Poa morrisii</i>	Velvet tussock grass	M	Prostrate - 0.3	Soft, dense tussock	6 - 8
<i>Schoenus melanostachys</i>	-	M	0.5 - 1.0	Perennial with short stout rhizome, often forms big weeping tussocks	6 - 8

Key to plant species Form:

M

Emergent macrophyte



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.

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

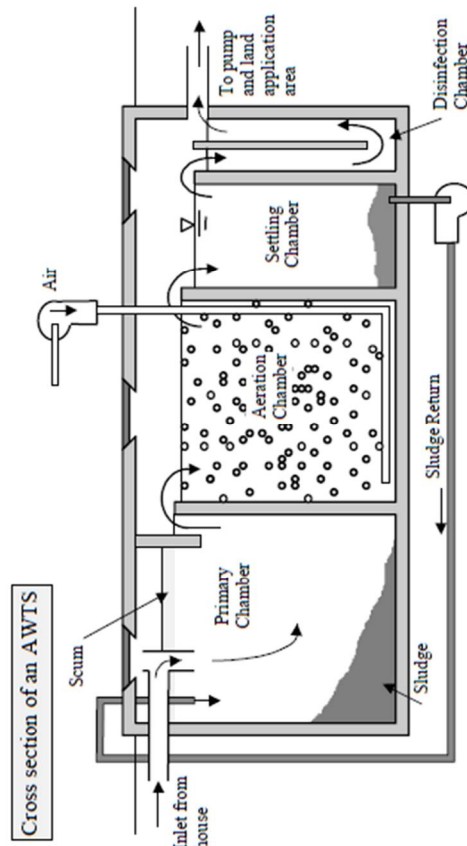
The effectiveness of the system will, in part, depend on how it is used and maintained. The following is a guide on good maintenance procedures that you should follow:

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



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 are 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.

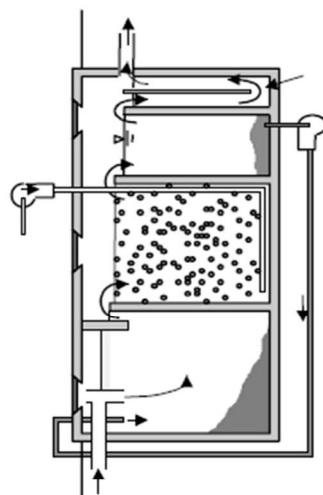
HELP PROTECT YOUR HEALTH AND THE ENVIRONMENT

Poorly maintained AWTs 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:

Your Aerated Wastewater Treatment System





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).

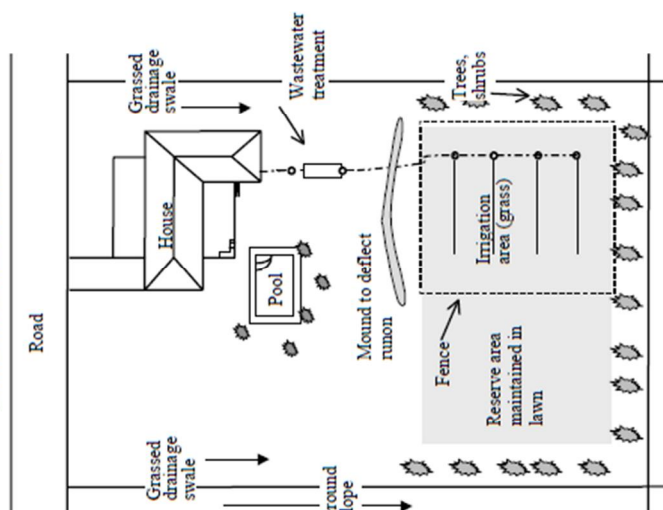
Soil absorption systems do not require highly treated effluent, and wastewater treated by a septic tank is reasonable as the solids content in the effluent has been reduced. Absorption systems release the effluent into the soil at a depth that cannot be reached by the roots of most small shrubs and grasses. 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.

Typical Site Layout (not to scale)



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.



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.

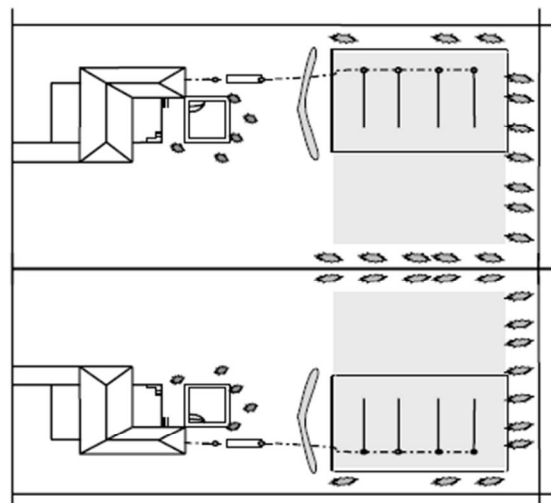
HELP PROTECT YOUR HEALTH AND THE ENVIRONMENT

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.

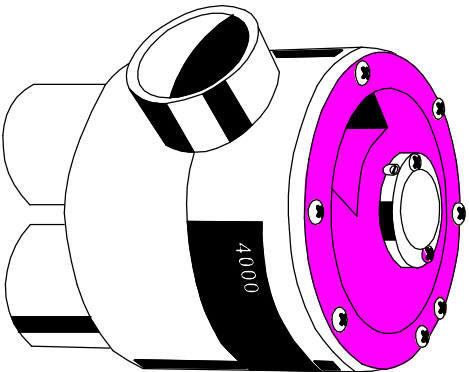
For more information please contact:

Your Land Application Area

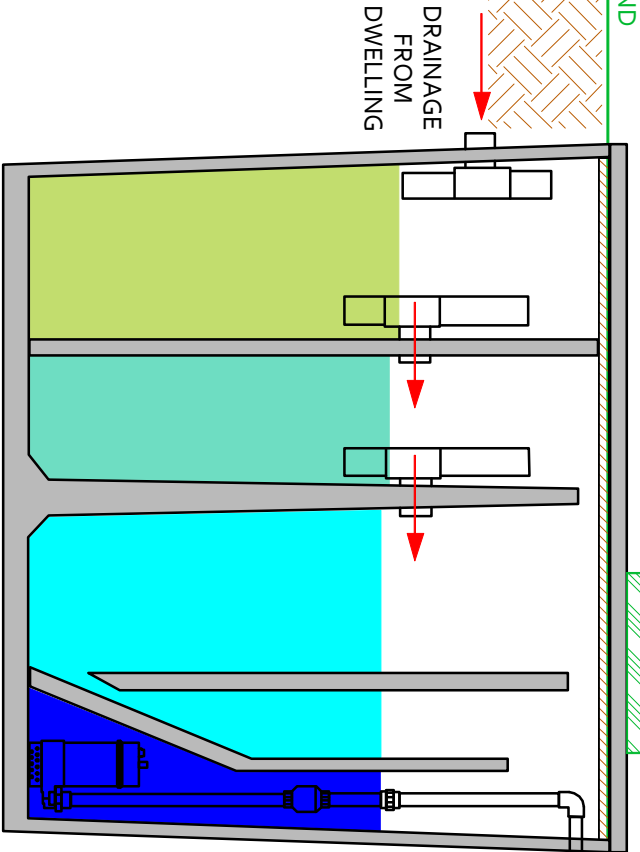


Specifications:

- Constructed of high strength, non-corrosive ABS polymer
- Flow range
 - 4 outlet valve: 40-150lpm
 - 6 outlet valve: 40-95lpm
- Pressure rating: 60-520 kPa
- Pressure loss:
 - 4 outlet valve
 - Flow (lpm) 40 75 115 150
 - Pressure loss (kPa) 14 21 31 44
 - 6 outlet valve
 - Flow (lpm) 40 75 115
 - Pressure loss (kPa) 17 31 52
- Inlet: slip and glue connection
 - 4 outlet: to 1 1/2" PVC pipe
 - 6 outlet: to 1 1/2" PVC pipe
- Outlets: Slip and glue connections
 - 4 outlet: to 1 1/2" PVC pipe
 - 6 outlet: to 1" PVC pipe



4 OUTLET 'K-RAIN' INDEXING VALVE (OR SIMILAR) INSTALLED ABOVE GROUND AND AS PER THE MANUFACTURERS DESIGN SPECIFICATIONS

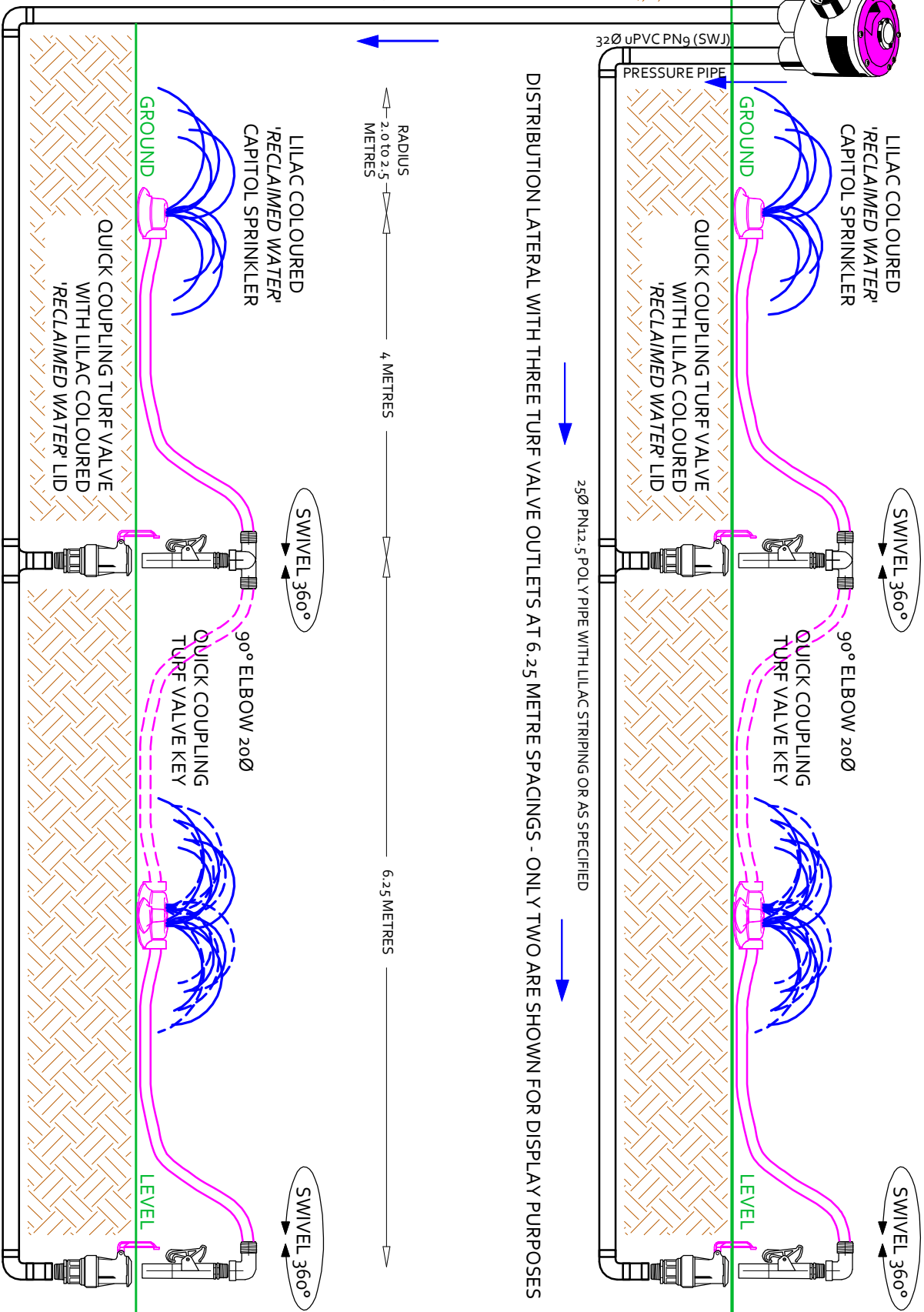


AS PER DESIGN DETAILS
FIRST 2 METRES TO BE 32Ø uPVC PN9 (SWJ) PRESSURE PIPE



- REMOVE THE QUICK COUPLING KEY AND HOSE FROM EACH TURF VALVE AND CLOSE THE COVERS FOR MOWING AND MAINTENANCE PURPOSES.
- ROTATE THE POSITION OF EACH SPRINKLER AROUND THE TURF VALVE ON A REGULAR BASIS (NOMINALLY ONCE PER WEEK) AND STAGGER THE LENGTH OF EACH HOSE TO ENSURE AN EVEN APPLICATION OF EFFLUENT IRRIGATION OVER THE ENTIRE AREA.
- AVOID POSITIONING OF THE SPRINKLERS WHERE IT WILL CREATE A SPRAY OVERLAP WITH THE ADJOINING SPRINKLER WITHIN THE SAME CYCLE.

ENSURE THAT ALL QUICK COUPLING KEYS ARE REINSTATED AFTER MOWING AND BEFORE THE NEXT IRRIGATION CYCLE.



DISTRIBUTION LATERAL WITH THREE TURF VALVE OUTLETS AT 6.25 METRE SPACINGS - ONLY TWO ARE SHOWN FOR DISPLAY PURPOSES

DRAWING REFERENCE		PROJECT TITLE	
TITLE	AWTS TREATMENT UNIT	WASTEWATER MANAGEMENT DISPOSAL	
A	DEVELOPMENT APPLICATION	CONCEPTUAL DESIGN DETAILS	
SOWDES		DRAWING TITLE	
24 Middle Avenue Goulburn NSW 2580 E: jowdes@sowdes.com M: 0428 893 401		AERATED WASTEWATER TREATMENT SYSTEM TO SURFACE IRRIGATION DISPOSAL	
		STREET ADDRESS	
		88 MURRAY'S FLAT ROAD	
		TOWNRANG, NSW. 2580	
		DRAWING DATE	
		01/10/2025	
		SHEET NUMBER	
		02	
		REFERENCE NUMBER	
		0060222	
		DRAWN BY	
		PJ	
		DRAWING SCALE	
		N.T.S	
		SHEET SIZE	
		A3	
		DRAWING REFERENCE NUMBER	
		0060222-W102-A	

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