



## **Title/Type: On-Site Sewerage Management System Design Report**

**Property Address: 156 Ainsworth Road, Mongogarie, NSW, 2470**

**Lot/DP: 9/755625**

**Council: Richmond Valley Council**

**Date: December 2023**

**Prepared for: Andrew Bevan**

**Prepared by: Ecoteam**

**Internal Document Number: 23399**

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The information contained in this publication is based on knowledge and understanding at the time of writing. However, because of advances in knowledge, users are reminded of the need to ensure that information upon which they rely is up to date and to check currency of the information with the appropriate LGA Council Officers or government advisory body.

## SUMMARY

Ecoteam has been engaged by Andrew Bevan to design an On-Site Wastewater Management System (OSSMS) for 2 proposed dwellings on Lot/DP 9/755625, 156 Ainsworth Road, Mongogarie, NSW, 2470. The property area is 39.15 ha. The new OSSMS system will treat the wastewater from both dwellings and will be comprised of an AWTS, and spray irrigation.

### Soils

Soils are Strongly Structured Light Clay of the Yorklea soil landscape. Soils are non-dispersive and slaking with a pH of 4.5-5.

### Site Constraints

The Land Application Area (LAA) is located approximately 25 m south, down slope of the proposed 2-bedroom dwelling and 50 m south down slope of the proposed 3-bedroom dwelling. LAA is sloped to the south at 13% with good exposure. The site is grassed around the LAA and is located outside of all building, boundary, and environmental buffers. There is bedrock across the site at varying depths ranging from 750 mm to 450 mm around the LAA.

### Modelling Parameters

Modelling parameters are based on the Richmond Valley Council On-site Sewage Wastewater Model. Treatment system is sized on 3 BR + 2BR (7 EP). The proposed dwellings utilise roof harvesting rainwater supply with full water saving devices (120L/person/day) (LGA guidelines) for a total daily wastewater load of 840 L/day.

### System Components

The treatment system is shown in **Table 1**.

**Table 1.** Wastewater treatment components.

Component	Required	Specified
<b>Primary and Secondary treatment</b>	AWTS	Taylex ABSNR-1350+P
<b>Pump</b>	Submersible Pump	Davey D40
<b>Filter</b>	Suitable Filter	40 mm Triangle 120-micron filter assembly
<b>Land application</b>	378 m <sup>2</sup>	424.25 m <sup>2</sup> Spray Irrigation 4 sprayer heads (XCEL-WOBBLER #6 MA nozzle)

## Conclusion

- a) Soil characteristics, conditions and drainage are suitable for effluent land application via spray irrigation and will provide optimal conditions for plant growth.
- b) The LAA is located approximately 25 m south from the proposed 2-bedroom dwelling and 50 m south of the proposed 3-bedroom dwelling with suitable reserve area in the same location.
- c) The aspect of the proposed LAA is south with a 13% slope. There is good exposure across the LAA.
- d) Soils indicated slaking, non-dispersive, Strongly Structured Light Clays with a pH of 4.5-5.
- e) LAA will be 424.25 m<sup>2</sup> to safely dispose of treated wastewater.
- f) The LAA is located outside of all building, boundary, and environmental buffers.
- g) There is bedrock across the site at varying depths ranging from 750 mm to 450 mm around the LAA. Disposal to be achieved through spray irrigation.

The wastewater system is designed for the site to achieve a sustainable wastewater treatment solution as per the Local Government Area (LGA) On-Site Sewage and Wastewater Management Strategy and Australian Standards AS/NZS1547:2012. The proposed design addresses all the site constraints and provides an ecologically sustainable solution and effectively manages potential risks to environmental and human health.

## PROPRIETOR'S DECLARATION

***Please read the design report and sign this declaration before lodging with Council.***

I have read the report and understand the concepts and physical attributes of the system. I agree to maintain the system using the methods and scheduling recommended by the designer.

Signed by the proprietor

Date

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# 1. INTRODUCTION

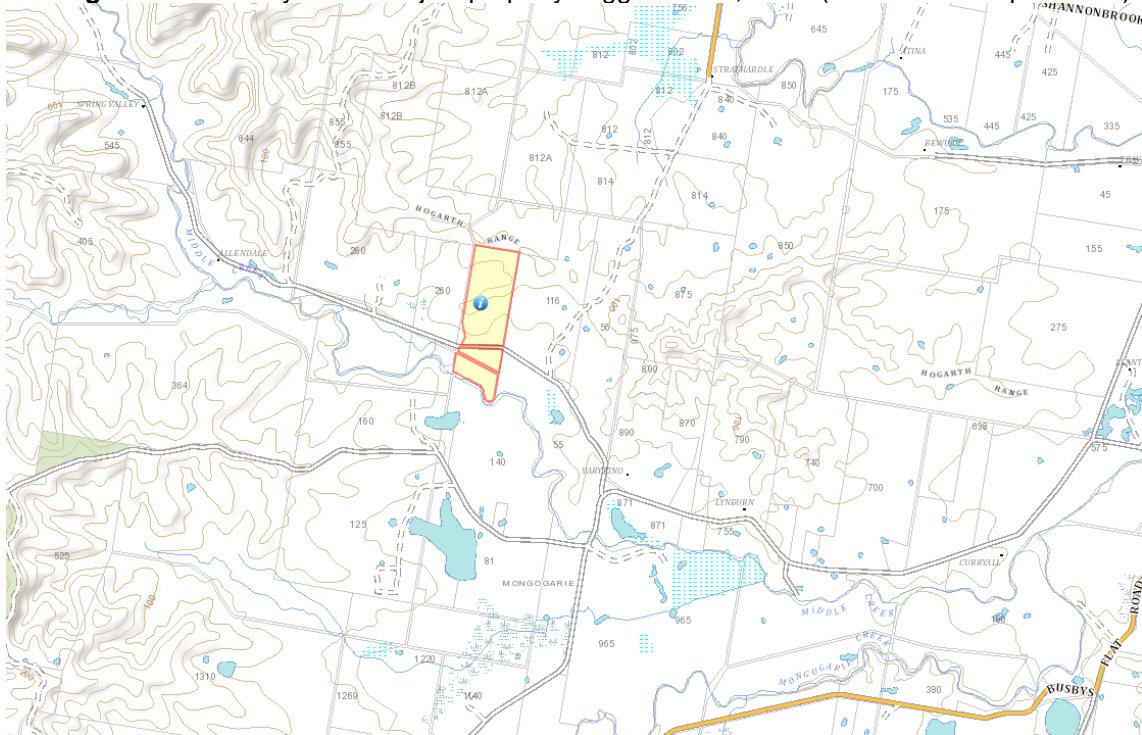
## 1.1. Project Outline

Ecoteam has been engaged by Andrew Bevan to design an On-Site Wastewater Management System (OSSMS) for a residential dwelling. Refer to **Table 2** for the property and dwelling details. Refer to **Figure 1** for the location of the property.

**Table 2.** Details of the subject property and proposed development.

Feature	Description
<b>Proposed development</b>	A 3-bedroom dwelling and a 2-bedroom dwelling
<b>Number of bedrooms</b>	Primary 3 BR, secondary 2 BR - (7EP)
<b>Address</b>	156 Ainsworth Road, Mongogarie, NSW, 2470
<b>Lot/DP</b>	9/755625
<b>Local Government Area</b>	Richmond Valley Council
<b>Zone (Richmond Valley Council Local Environment Plan (LEP) 2014</b>	RU1 Primary Production
<b>Allotment size</b>	39.15 ha
<b>Easements</b>	None
<b>Water supply</b>	Roof water harvesting.
<b>Date of assessment</b>	24/11/2023
<b>Recent weather conditions</b>	Sunny and fine
<b>Existing vegetation</b>	Grassed with trees

**Figure 1.** Locality of the subject property flagged in red, NSW (Source: Six Maps Online).



## 2. SITE ASSESSMENT & LIMITATIONS

Site characteristics recorded during the site assessment were used to direct the OSSMS designs as per the LGA Council On-site Sewage and Wastewater Management Strategy. **Table 3** summarises the site characteristics for the proposed development. **Appendix A** presents a property overview and soil investigation locations.

**Table 3.** Site features, limitations & design considerations.

Site Feature (Method of assessment)	Limitation Guideline	Description	Design Consideration
<b>Slope (clinometer)</b>	>15%	13%	Irrigation
<b>Landform (observed)</b>	Convergent land shape (drainage-concentrating)	Divergent	No Limitation
<b>Exposure / aspect (observed)</b>	Facing within SW or SE quadrant, and sheltered from sun-wind	South facing aspect, good exposure	Prevent overshadowing of LAA.
<b>Buffer distance to water body &amp; human-made features (Measured: desktop/field, NSW NR Atlas)</b>	<100 m to perennial and intermittent watercourse <250 m to domestic groundwater wells <40 m to gullies <b>LAA</b> <12 m if up-gradient and <6 m if down-gradient of property boundaries, but 6 m/3 m as above for pools	✓ ✓ ✓ ✓	No Limitation
<b>Run on and up slope seepage (observed)</b>	Major, where diversion not practical	Moderate w/ divergent landscape	No Limitation
<b>Flooding potential (observed/anecdotal)</b>	Disposal system below 1 in 20-year flood contour OR Treatment system below 1 in 100-year flood contour	Above all flood levels	No Limitations
<b>Site drainage (observed/estimated)</b>	Signs of surface dampness	No visible signs of surface dampness	No Limitation
<b>Vegetation indicating waterlogging (observed)</b>	Presence of sedges that indicate waterlogged soil	Absence of sedges that indicate waterlogged soil	No Limitation
<b>Surface condition (observed)</b>	Bare ground or cracking	No bare ground, grass cover	No Limitation
<b>Fill (observed/anecdotal)</b>	Disposal area contains fill	Disposal area not on fill	No Limitation
<b>Erosion / mass movement (observed)</b>	Rills, slips	No sign of rills, slips	No Limitation
<b>Soil category</b>	Soil Categories 5,6 excluding strongly structured light clays (dispersive or shrink-swell soils are to be considered as Soil Category 6 soils)	Strongly Structured Light Clay (Category 5)	No Limitation
<b>Coarse fragments (observed)</b>	Occupies >20% of soil volume (increase Soil Category by one class)	Occupies <5% soil volume	No Limitation
<b>Field pH (Raupach field test)</b>	≤5.5	4.5-5	Ameliorate with Lime at a rate of 150g/m <sup>2</sup>
<b>Dispersiveness (Modified EAT)</b>	Class 3 or 4	Class 1 and 2	No Limitation
<b>Depth to watertable or bedrock (observed/estimated)</b>	Soil depth of <1 m before groundwater or bedrock is encountered	Bedrock encountered 450 mm to 750 mm	Treatment system with nutrient reduction and chlorination required. LAA to be spray irrigation.

### 3. SOIL

#### 3.1. Geology & Soil Landscape.

Table 4 presents the geology and soil landscape of the proposed LAA.

**Table 4.** Geology and soil landscape.

Feature	Description
<b>Geology</b>	Grafton Formation: sandstone, siltstone, claystone, coal. Tertiary gravels (gravel, sand, sandstone and greybilly) also occur throughout this soil landscape (Chesnut 1980).
<b>Soil landscape</b>	<i>Yorklea</i> (yo) – very low undulating rises on Grafton Formation sediments and Tertiary gravels. Relief is 20 –30 m, slopes 2–10%. Slopes are simple and convex; crests are moderately broad. Extensively cleared tall eucalypt woodland with banksia woodland on sands and gravels.
<b>Soil</b>	Moderately deep (100–150 cm), moderately well-drained Red and Yellow Earths on crests. Moderately deep (100–150 cm), poorly drained Red Podzolic Soils, Yellow Podzolic Soils, Soloths with occasional Lateritic Podzolic Soils on slopes.
<b>Soil landscape limitations</b>	Highly erodible, hardsetting, dispersible, slowly permeable, seasonally waterlogged soils of low fertility. Localised salinity.

#### 3.2. Soil Test pits

Three soil test pits were dug by excavator at the site. Refer to **Tables 5, 6, and 7** for soil profile descriptions. **Appendix B** presents photo plates of soil profiles for the test pits. Bedrock was encountered between 450 mm to 750 mm depth within test pits.

**Table 5.** Test pit 1 soil profile descriptions

Test pits B1 (North)							
<b>Soil landscape:</b>		<i>Yorklea</i>					
Horizon	Depth (mm)	Colour	Structure	Texture	Coarse Fragments	pH	Dispersive Class
1	0-200	Brown	Strongly	Loam	0%	5	2
2	200-450	Brown	Strongly	Light Clay	0%	4.5	2
3	450-750	Brown	Strongly	Light Clay	0%	4.5	2
<b>Limitation * No limitation ✓ :</b>				✓	✓	x	✓



**Table 6.** Test pit 2 soil profile description.

<b>Test pit B2 (East)</b>							
<b>Soil landscape:</b>		<i>Yorklea</i>					
<b>Horizon</b>	<b>Depth (mm)</b>	<b>Colour</b>	<b>Structure</b>	<b>Texture</b>	<b>Coarse Fragments</b>	<b>pH</b>	<b>Dispersive Class</b>
1	0-200	Brown	Strongly	Clay Loam	0%	5	2
2	200-400	Brown	Strongly	Clay Loam	0%	5	2
3	400-600	Brown	Strongly	Light Clay	0%	4.5	2
<b>Limitation * No limitation ✓ :</b>			✓		✓	x	✓

**Table 7.** Test pit 3 2 soil profile description.

<b>Test pit B3 (West)</b>							
<b>Soil landscape:</b>		<i>Yorklea</i>					
<b>Horizon</b>	<b>Depth (mm)</b>	<b>Colour</b>	<b>Structure</b>	<b>Texture</b>	<b>Coarse Fragments</b>	<b>pH</b>	<b>Dispersive Class</b>
1	0-150	Brown	Strongly	Loam	0%	5	2
2	150-450	Brown	Strongly	Light Clay	0%	4.5	2
<b>Limitation * No limitation ✓ :</b>			✓		✓	x	✓

### 3.3. Soil Summary

The presence of the following soil characteristics demonstrates that soils are generally consistent across the location and are suited for the proposed disposal method.

- Strongly Structures Category 5 Light Clays.
- Class 1 and 2, non-dispersive, slaking soils.
- 0% coarse fragments.
- Soil pH of 4.5-5.
- Bedrock at 450 mm to 750 mm depth

## **4. SITE OPPORTUNITIES AND DESIGN CONSIDERATIONS**

### **4.1. Site Opportunities**

- The dwellings utilise rainwater harvesting tank water supply with flushing toilets and full water saving devices.
- Soil characteristics, conditions, and drainage are suitable for the proposed disposal method.
- There is a suitable area approximately 25 m south from the proposed 2-bedroom dwelling and 50 m south of the proposed 3-bedroom dwelling for disposal and reserve area.
- The proposed LAA is divergent with good exposure across the LAA.
- LAA cleared therefore, tree clearing will not be required.
- The LAA is located outside of all building, boundary, and environmental buffers.

### **4.2. Design Considerations**

- Slope is 13%.
- Minor runoff during rain events along with divergent slope, no need for diversion drain.
- Bedrock was encountered across the site ranging from 450 mm to 750 mm requiring spray irrigation for LAA.
- Soils are acidic requiring amelioration with lime at a rate of 150 g/m<sup>2</sup>.
- The site outside the LAA is heavily vegetated making it unsuitable for alternative LAA locations.

The wastewater system is designed for the site to achieve a sustainable wastewater treatment solution as per the LGA Council On-Site Sewage and Wastewater Management Strategy and Australian Standards AS/NZS1547:2012. The proposed design addresses all the site constraints and provides an ecologically sustainable solution that will effectively manages potential risks to environmental and human health. The system will replace a failing system and therefore environmental outcomes will be improved.

## 5. TREATMENT COMPONENTS & SIZING

### 5.1. Modelling Parameters

The Richmond Valley Council On-site Wastewater Model (Single Rural Households) was used to size the treatment and land application components (**Appendix C**).

### 5.2. Household Water Usage

Household water usage was estimated using council OSSMS guidelines (**Table 8**).

**Table 8.** Household water usage.

Parameter	Description / Value
Water supply	Rainwater Supply
Number of bedrooms	3 Bedrooms + 2 Bedroom
Person's equivalent	7 EP
Total daily flow (L/day)	840 L

### 5.3. AWTS

The following is specifications for the AWTS (**Table 9**). See **Appendix D** for service and maintenance requirements as well as further design specifications and certificate of accreditation.

**Table 9.** Septic Tank Details.

Parameter	Description / Value
AWTS	Taylex ABSNR-1350+P
Maximum Load	9 EP
Water received	Toilet, bathroom, kitchen, laundry
Pump out frequency	(see <b>Table 10</b> )
Pumps to	LAA via indexing valve

## 5.4. Disposal Pump

Sump pump will be installed in the AWTS pump out chamber to deliver wastewater to the LAA. Pump design specification are present in **Table 10**, and **Appendix E**. A vacuum breaker and non-return valve will be located on the outlet from the pump well. AWTS specified in report has additional storage in case of pump failure.

**Table 10.** Disposal pump details.

Parameter	Description / Value
<b>Type</b>	1 x Davey D40 sump pump or similar will be installed in the AWTS
<b>Pressure Line</b>	40 mm Lilac Polypipe PN8
<b>Pump operation</b>	A level float switch activates the pump when the effluent reaches the maximum operating water level and deactivates the pump when the effluent reaches the minimum operating water level.
<b>Discharge per cycle</b>	Approximately 500 L per cycle
<b>Pump Capacity</b>	Duty Point for flushing: 91.71 l/min at 9.28 m head Duty point for irrigation: 16.4 l/min at 11.57 m head (See <b>Appendix A</b> )
<b>Expected cycle length</b>	30 minutes
<b>Expected activation interval</b>	14.3 hours
<b>Failure alarm</b>	An electrical cable and all-weather power outlet will be positioned adjacent to the sump to provide power for the pumps and the failure alarm.
<b>Located</b>	In AWTS pump out chamber
<b>Pumps to</b>	Irrigation field

### ***Pump failure alarm***

The AWTS will be fitted with a pump failure alarm which will include a flashing light located directly adjacent to system or in a visible area on or around the tank (e.g., on structure wall). The alarm shall be activated when the water level increases within the AWTS. The expected life of an effluent sump pump is 3 – 10 years.

### ***Pump commissioning***

Prior to commissioning of the pumps, the following testing procedure will be undertaken. Steps 2 to 4 should be conducted annually.

1. A 24-hour draw-down test for leaks with the lid on, recording any drop in the water level (with the pump off).
2. Three draw-down tests should be undertaken to confirm that the pump is operating as specified.
3. The failed-pump alarm should be checked to ensure that it is working and set at an appropriate level.
4. Check that float switches are functioning, and free of entanglement.

## 5.5. Filter and Water Conditioning System

Refer to **Table 11** for the filters and conditioning system details and **Appendix A** for a filtration layout.

**Table 11.** Summary of Filter Manifolds

Parameter	Description / Value
Pressure gauges	400 kPa Pressure Gauge located immediately up and downstream of the inline disk filter.
Disk filter	DN40 TRI T040V 120 mesh screen filter
Air release valve/ vacuum breaker.	DN40 RIV Comb Air Relief Valve
Flows to	Irrigation Field

## 5.6. Surface Spray Irrigation

Spray irrigation specifications are present in **Table 12**. Detailed diagram of the LAA and irrigation specifications are present in **Appendix A**. Sprinkler specifications are present in **Appendix F**.

**Table 12.** Surface Irrigation Specifications

Parameter	Description / Value
Distribution	40 mm high pressure poly pipe
Surface sprayers	4 XCEL-WOBBLER #6 MA nozzles spaced at 12.5 m apart raised 600 mm with risers.
Air release valve/vacuum breaker	DN40 RIV Comb Air Relief Valve
Signage	The effluent irrigation area requires signs indicating “Sewage disposal area.”

## 5.7. Flushing

Flushing pit specification and times are shown in **Table 13**.

**Table 13.** Flushing Irrigation Specification

Parameter	Description / Value
Flush Valve	40 mm Ball Valve with upstream pressure gauge (open to
Travel time from pump to flushing valve	80 seconds
Flushing time	120 seconds
Flushing pressure	9.28 m
Flushing pit dimensions	W: 1 m L: 3 m D: 0.4 m
Flush pit capacity	480 L
Flushing velocity	1.3 – 1.5 m/s

## **6. OPERATION & MAINTENANCE**

### **6.1. Source Control**

- Use biodegradable and low phosphorus detergents where possible.
- Minimise the amount of bleach, Napisan<sup>®</sup>, disinfectants or chemicals entering the system.
- Use low sodium detergents in washing machine to reduce sodium entering disposal areas.

### **6.2. AWTS**

- The owner's manual prepared by the manufacturer shall contain a plan for the on-going management of the AWTS. The plan shall include details of:
  - the treatment process,
  - procedures to be followed in the event of a system failure,
  - emergency contact numbers,
  - maintenance requirements,
  - inspection and sampling procedures to be followed as part of the on-going monitoring program developed by the local council.
- Effluent from the AWTS taken in any random grab sample shall comply with the following standard:
  - BOD5 -less than 30 mg/L,
  - TSS -less than 45 mg/L,
  - E. coli -less than 100 cfu/100 ml,
  - Free residual chlorine -greater than 0.5 and less than 2.0 mg/L.

### **6.3. Pump**

- Conduct a 24-hour draw-down test for leaks with the lid on, recording any drop in the water level (with the pump off)
- Three pump draw-down tests should be undertaken to confirm that the pump is operating as specified.
- The water level alarm should be checked to ensure that it is working and operating at an appropriate level.
- Check that float switches are functioning, and free of entanglement.

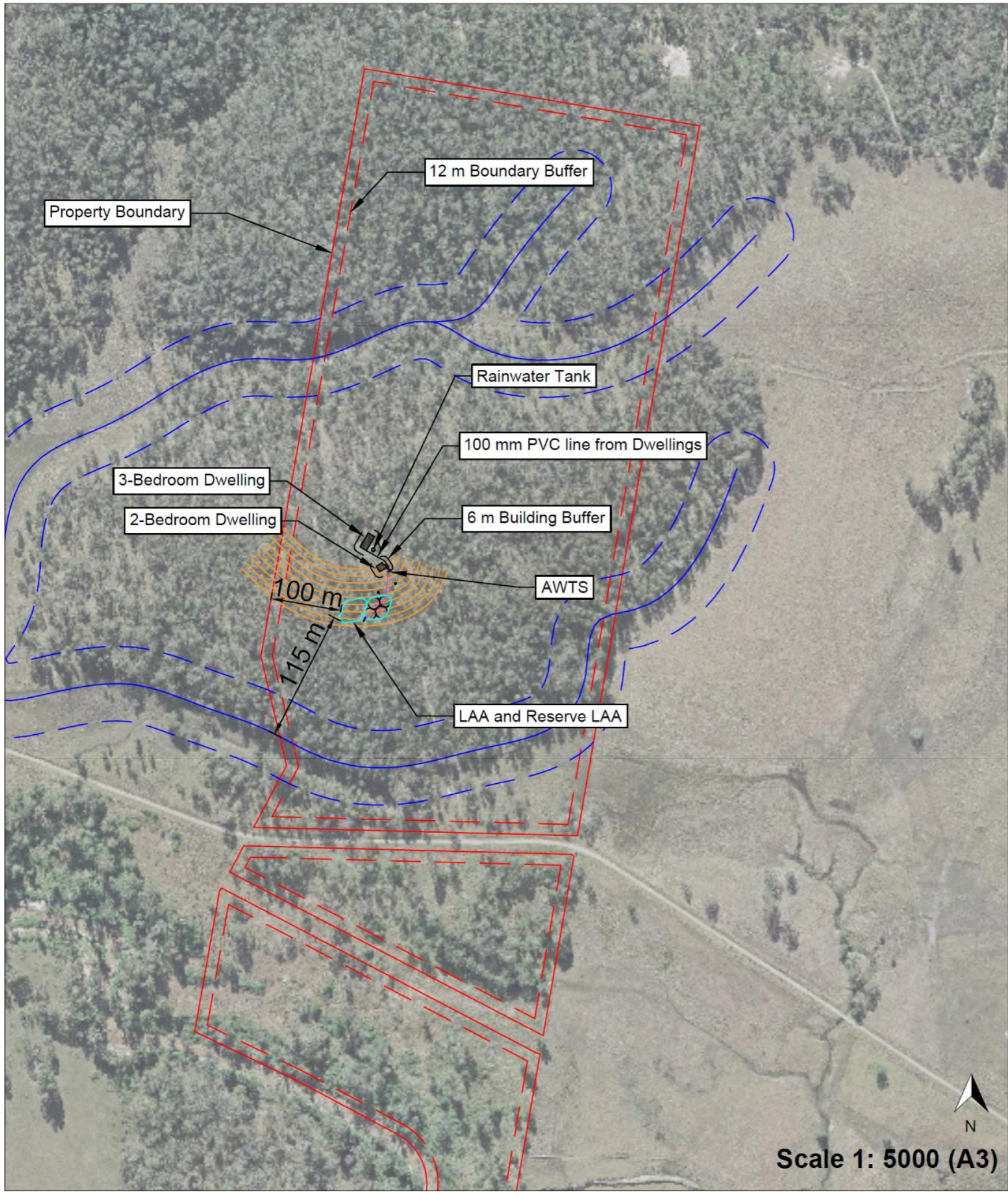
### **6.4. Filtration & Conditioning System**

- The primary disc filter (black) should be removed and cleaned with a pressurised hose every 6 months and reinstalled. Replace every 2-3 years.
- The tech filter (brown) should be checked and cleaned every 12 months. Replace every 2 years.

### **6.5. Spray Irrigation Field**

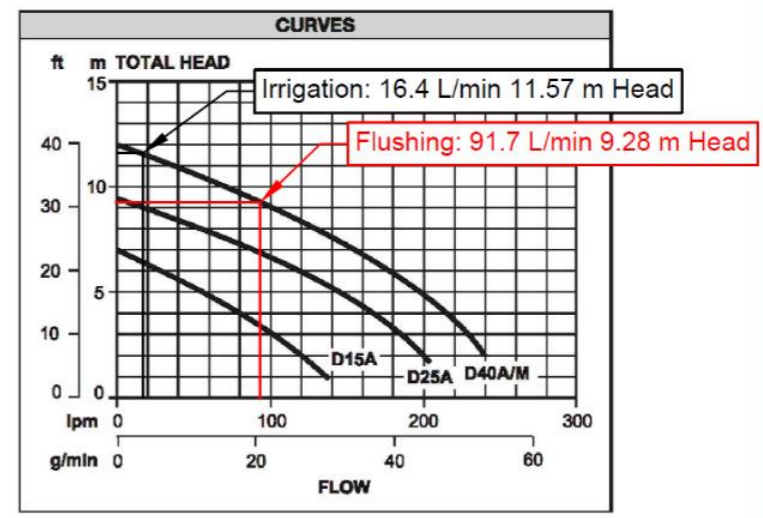
- Prevent entry of vehicles and livestock to the irrigation area. Fence if required.
- The vegetation in the irrigation area is to be maintained (i.e. mowed)
- Air release valves should be checked for signs of leakage every 3 months and removed, cleaned, and reinstalled every 12 months. Replace as required.
- Apply gypsum to LAA if soil instability is noticed or damage to the soil surface occurs.

## **Appendix A. System Design**



### 23399 Irrigation System Design Parameters

ITEM	UNITS	RESULTS
<b>Bedrooms</b>		3+2
<b>Number of EP</b>	EP	7
<b>Total daily output</b>	l/day	840
<b>Hydraulic loading area</b>	m <sup>2</sup>	378
<b>Nutrient Loading area</b>	m <sup>2</sup>	63.7
<b>Land application area</b>	m <sup>2</sup>	424
<b>Soil type</b>		Light Clay
<b>Average site slope</b>	%	13
<b>LTAR</b>	mm/week	13.9
<b>Vegetation</b>		Turf
<b>Gross application rate</b>	mm/hr	2.1
<b>Number of irrigation zones</b>		1
<b>Zone area</b>	m <sup>2</sup>	424.25
<b>Pump out volume</b>	L	500
<b>Quantity applied</b>	mm	1.2
<b>Irrigation duration</b>	min	33.3
<b>Irrigation Frequency</b>	hrs	14.29
<b>Emitter spacing</b>	m	12.5
<b>Emitter output rate</b>	l/hr	246
<b>Mainline diameter</b>	mm	40
<b>Flushing velocity Mainline</b>	m/s	1.3-1.5
<b>Pump type</b>		Davey D40
<b>Flush pit Volume</b>	L	480
<b>Flush pit porosity</b>		0.4
<b>Irrigation duty</b>	Flow (l/min)	16
	Pressure (m)	11.6
<b>Flushing duty</b>	Flow (l/min)	92
	Pressure (m)	9.3



#### Legend

- BOUNDARY: Solid red line
- BOUNDARY BUFFER 12 M: Dashed red line
- GULLY: Solid blue line
- GULLY BUFFER 40 M: Dashed blue line
- BUILDING: Grey rectangle
- BUILDING BUFFER 6 M: Dashed black line
- SOIL TEST PITS: Circle with #
- SLOPE: #% with arrow
- 1M CONTOUR: Dashed orange line
- TAYLEX ABSNR-1350+P: Hexagon with W
- DAVEY D40: Hexagon with V
- 40 MM PN8 HDPE: Solid purple line
- 40 MM 120 MICRON FILTER: Square with X
- XCEL-WOBBLER #6 MA NOZZLE: Circle with 2
- 40 MM BALL FLUSH VALVE: Circle with O
- IRRIGATION ZONE: Solid cyan line

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**PROJECT NAME:** 23399 - Ainsworth - OSSMS

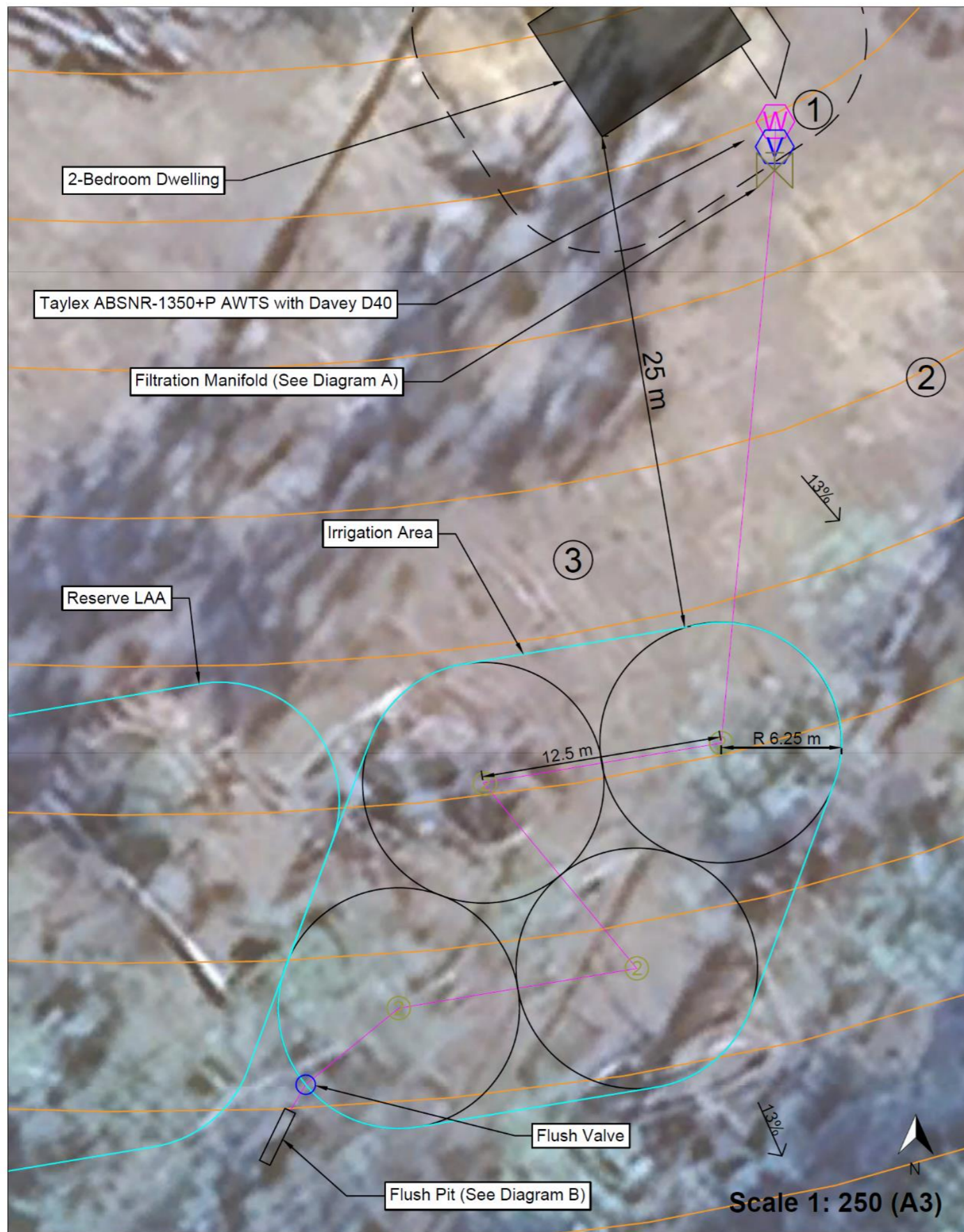
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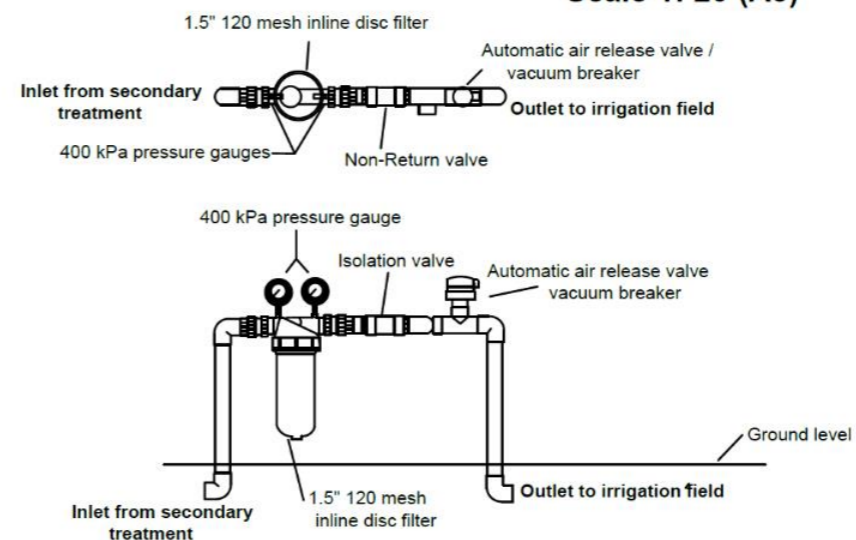
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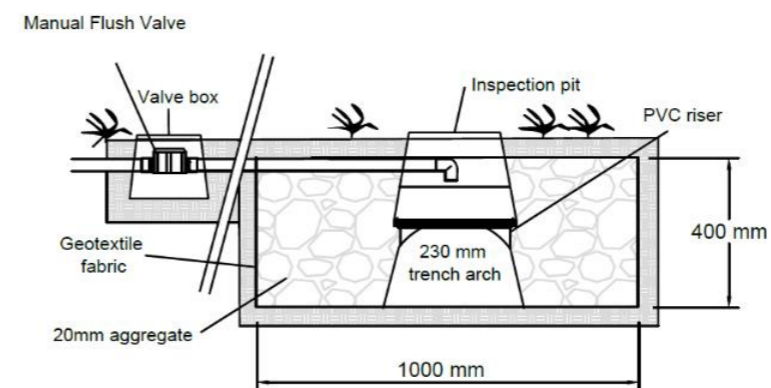
Irrigation Filtration - Diagram A

Scale 1: 20 (A3)



Flush pit side view - Diagram B

Scale 1 : 20 (A3)



Legend

BUILDING	
BUILDING BUFFER 6 M	
SOIL TEST PITS	
SLOPE	
1M CONTOUR	
TAYLEX ABSNR-1350+P	
DAVEY D40	
40 MM PN8 HDPE	
40 MM 120 MICRON FILTER	
XCEL-WOBBLER #6 MA NOZZLE	
40 MM BALL FLUSH VALVE	
IRRIGATION ZONE	
25 MM AGGREGATE	
EARTH	
GEOTEXTILE FABRIC	



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PROJECT NAME: 23399 - Bevan - OSSMS

DRAWING TITLE: Irrigation Design  
System components

SCALE: 1:10 - 1:250 SHEET SIZE: A3 SHEET NO: 2 of 2

PROJECT NO: 23399 STATUS: Final Drawing

DRAWING TYPE: 2a

**Appendix B. Soil and Site photos**



**Plate A. Test pits 1.**



**Plate B. Test pits 2.**



**Plate C. Test pits 3.**



**PLATE D. Soil profiles and assessment.**

 A photograph showing a cleared area of reddish-brown soil. In the background, there is a large, light-colored, cylindrical structure, possibly a water tank or septic tank, and a dense line of trees under a blue sky with scattered clouds.	<p><b>Plate E</b> (24/11/23) View south over the cleared pad for proposed 3-bedroom dwelling.</p>
 A wide-angle photograph of a cleared, sandy area. The ground is uneven and shows signs of recent clearing. A dense forest of tall, thin trees forms the background under a bright sky.	<p><b>Plate F</b> (24/11/23) View south over the cleared pad for proposed 2-bedroom dwelling.</p>
 A photograph of a cleared area with sparse vegetation and a few small trees. The ground is a mix of soil and debris. A dense forest of tall trees is visible in the background.	<p><b>Plate G</b> (24/11/23) View south over the proposed LAA.</p>
 A photograph showing a cleared area with a small, light-colored structure in the distance. The foreground is a mix of soil and debris, and a dense forest of tall trees is in the background under a blue sky with clouds.	<p><b>Plate H</b> (24/11/23) View northeast over the proposed LAA.</p>

## Appendix C. Wastewater Model

Clear		RVC On-site Wastewater Model (Single Rural Households) OSmodel170115.xls Printed 21-12-2023	Default	User-defined
<b>Client</b>		Andrew Bevan		
<b>Address</b>		156 Ainsworth Road, Mongogarie		
<b>Site</b>		Block size (m2)		391500
		Buffer (m) from land application area to <input type="text" value="stream"/>	>100	
		Water (L/p.d) from <input type="text" value="Roof water harvesting"/>	120	
		Persons		7
		<input type="checkbox"/> Internal wastewater sources split? <input type="checkbox"/> Multiple households? How many?		
<b>Wastewater components/system</b>	Toilet	<input checked="" type="checkbox"/>		
	Bathroom	<input checked="" type="checkbox"/>		
	Laundry	<input checked="" type="checkbox"/>		
	Kitchen	<input checked="" type="checkbox"/>		
	Total wastewater flow (L/d) [needs caution if user-defined]		840	
<b>Treatment system</b>	<input type="text" value="Secondary: AWTS"/>			
	Nitrogen removal %		20%	66.9%
	Maximum N allowed to go down from system (kg/yr)		15.00	
<b>Land application</b>	Land application type	<input type="text" value="Subsurface drip irrigation"/>		
	Design depth of root zone (mm)		300	
<b>Soil information</b>	Morand code (examples)	<input type="text" value="'Alluvial' Soils= dp, ep, le, n"/>		
	Phosphorus sorption (kg/ha.m)		10000	
	Depth to water table or bedrock (for P calcs) (m)			0.5
	Texture/structure	<input type="text" value="Light clays - strongly structured"/>		
	DIR (mm/d)	4.25		
<b>Area calculations</b>	Hydraulic area (m2) (or override with SSI industry estimate)		378.0	<input type="button" value="Calc Area"/>
	Nitrogen area (m2) [allowing export of 15.00 kg/yr]		0.0	
	Phosphorus area (m2)		63.7	
	<b>Required land application area (m2)</b>		<b>378.0</b>	<input type="button" value="Print"/>
				66.9%

## Appendix D. NSW Health Certificate of Accreditation



### **Certificate of Accreditation Sewage Management Facility Aerated Wastewater Treatment System Advanced Secondary Effluent Nutrient Reduction**

*This Certificate of Accreditation is issued by the Secretary of the NSW Ministry of Health pursuant to Clause 41(1) of the Local Government (General) Regulation 2021.*

**System:** *Concrete ABSNR-1350+P Advanced Secondary Nutrient Reduction AWTS*

**Manufacturer:** *Taylex Australia Pty Ltd*

**Address:** *56 Prairie Road, Ormeau, Queensland, 4208*

*The Concrete ABSNR-1350+P Advanced Nutrient Reduction AWTS as described in Schedule A, has been Accredited as a sewage management facility in accordance with the Secondary Treatment System Accreditation Guideline 2018 for use in single domestic premises in NSW. This Accreditation is subject to the conditions and permitted uses specified in Schedule B.*

*Director, Environmental Health  
for Secretary (delegation PH335)*

**Issued:** *20/12/2022*  
**Certificate No:** *STS-AWTS071*  
**Expires:** *31 December 2027*

**Schedule A:**

**Specification: Taylex Concrete ABSNR-1350+P Advanced Secondary Nutrient Reduction AWTS**

Name and Model of STS: Taylex Concrete ABSNR-1350+P Advanced Nutrient Reduction Secondary AWTS (known as Taylex Concrete ABSNR-1350+P Advanced AWTS)

The Taylex Concrete BSNR-1350+P Advanced AWTS is designed to treat sewage daily flow rate of 1350 litres per day from a residential dwelling occupied by 9 persons.

The STS is contained in one of the following vessels:

- Vessel 1: A collection well with design capacity of 9,320 L; NSW Health Accreditation Number STCW045;
- Vessel 2: A collection well with design capacity of 11,000 L; NSW Health Accreditation Number STCW045;
- Vessel 3: A collection well with design capacity of 11,700 L; NSW Health Accreditation Number STCW045;

Chamber	Design capacities
Primary treatment	2,565 L (1,684 L + 842 L)
• Partition	yes
Secondary treatment	
• Aeration chamber	2,071 L
• Clarifier	602 L
• Irrigation chamber	621 L
Emergency storage	3,440 L
Operational water level (depth)	
• primary	1,430 mm
• secondary	1,410 mm

The emergency storage capacity is achieved by increased height of chambers.

The attached "Specification" should be consulted.

**Schedule B: Conditions of Accreditation**

**1. General**

- 1.1 Prior to installation the owner/occupier of the premises shall make an application, in accordance with Clause 26 of the *Local Government (General) Regulation 2021*, to the local authority for approval to install and operate the Taylex Concrete ABSNR-1350+P Advanced AWTS as a Sewage Management Facility in accordance with Section 68, Part C of the *Local Government Act 1993*.
- 1.2 The local authority shall apply those Conditions of Accreditation, appropriate to the owner / occupier, to any approval to operate the Taylex Concrete ABSNR-1350+P Advanced AWTS issued under Clause 45(4), *Local Government (General) Regulation 2021*.
- 1.3 In accordance with Clause 36 of the *Local Government (General) Regulation 2021*, the Taylex Concrete ABSNR-1350+P Advanced AWTS shall have an expected service life of 5 years in the case of mechanical and electrical components and 15 years in the case of other components.
- 1.4 The owner / occupier shall ensure that the Taylex Concrete ABSNR-1350+P Advanced AWTS is installed or constructed:
  - in accordance with the accredited specifications of the type tested unit and in accordance with good trade practice, and
  - so as to allow ease of access for maintenance, and
  - with regard to the health and safety of users, operators and persons maintaining the facility, and
  - must be installed or constructed so as to make appropriate provision for access to, and removal of, contents in a safe and sanitary manner, and
  - must, if it is intended to be a permanent fixture, be anchored to prevent movement.

- 1.5 The manufacturer / supplier shall ensure that the Taylex Concrete ABSNR-1350+P Advanced AWTS is supplied, constructed, and installed in accordance with the design (including the disinfection unit) as submitted and accredited by the NSW Ministry of Health. The Taylex Concrete ABSNR-1350+P Advanced AWTS shall not be modified or altered except that alternate individual mechanical and electrical components such as pumps, PLCs, etc, may be substituted provided that the component meets the accredited design specification.
- 1.6 Any permanent modification or variations to the accredited design of the Taylex Concrete ABSNR-1350+P Advanced AWTS shall be submitted for separate consideration and variation of the Certificate of Accreditation by the NSW Ministry of Health. Modifications will be considered in accordance with section 2.3.13 of AS1546.3:2017.
- 1.7 Each Taylex Concrete ABSNR-1350+P Advanced AWTS shall be permanently and legibly marked by the manufacturer in accordance with section 3 of AS1546.3:2017.
- 1.8 The manufacturer shall supply with each Taylex Concrete ABSNR-1350+P Advanced AWTS an owner's manual, which sets out the care, operation, maintenance, and on-going management requirements of the system. The owner's manual prepared by the manufacturer shall specifically contain a plan for the on-going management of the Taylex Concrete ABSNR-1350+P Advanced AWTS. The manual shall include details of:
  - the treatment process,
  - procedures to be followed in the event of a system failure,
  - emergency contact numbers,
  - maintenance requirements,
  - inspection and sampling procedures to be followed as part of any on-going monitoring program developed by the local authority.
- 1.9 The manufacturer shall provide the following information to each local authority where it is intended to install a Taylex Concrete ABSNR-1350+P Advanced AWTS in their area once Ministry Accreditation has been obtained:

<ul style="list-style-type: none"><li>• Statement of warranty</li><li>• Statement of service life</li><li>• Quality Assurance Certification</li><li>• Installation Manual</li><li>• Service Manual</li><li>• Owner's Manual</li></ul>	<ul style="list-style-type: none"><li>• Manufacturer's Service Report Form</li><li>• Engineering Drawings</li><li>• Specifications</li><li>• A4 Plans</li><li>• Certificate of Accreditation documentation from NSW Health.</li></ul>
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The manufacturer need not provide the above information to the local council where the information or document is contained on the manufacturer's web site.

## **2. Installation and Commissioning**

- 2.1 The owner / occupier shall have the Taylex Concrete ABSNR-1350+P Advanced AWTS inspected and checked by the manufacturer or the manufacturer's agent. The manufacturer or the agent is to certify that the system has been installed and commissioned in accordance with its design, conditions of accreditation and any additional requirements of the local authority.
- 2.2 The owner / occupier shall ensure that all electrical work is carried out on the Taylex Concrete ABSNR-1350+P Advanced AWTS by a licensed electrician and in accordance with the relevant provisions of AS/NZS 3000.
- 2.3 The owner / occupier shall not commission the Taylex Concrete ABSNR-1350+P Advanced AWTS unless the land application system has been completed.

## **3. Maintenance**

- 3.1 The owner / occupier of the premises shall enter into a minimum 12-month contract or agreement with a service agent and ensure that the Taylex Concrete ABSNR-1350+P Advanced AWTS is serviced:

- in accordance with the manufacturer's / supplier's service manual and using the manufacturer's / supplier's service sheet; and
  - by a service agent who
    - has completed a course on the servicing and maintenance of STS; and has some supervised servicing experience or extensive un-supervised experience;
    - is employed or authorised by the manufacturer / supplier of the Taylex Concrete ABSNR-1350+P Advanced AWTS;
    - uses replacement parts which meet the minimum specification of the Taylex Concrete ABSNR-1350+P Advanced AWTS;
    - has advised of their name, contact details and credentials to the local authority;
    - submits a completed NSW Health "Local Council Service Report" (template attached) to the local authority immediately after each and every service;
    - shall report to the local authority any instances where the owner / occupier refuses to authorise repairs, replacement of parts or maintenance; and
    - does not perform electrical work or enter confined spaces unless trained and is suitably qualified to do so.
- 3.2 The owner/occupier shall not service the Taylex Concrete ABSNR-1350+P Advanced AWTS unless they are an authorised agent of the manufacturer.
- 3.3 The Taylex Concrete ABSNR-1350+P Advanced AWTS once installed and commissioned shall be serviced at three (3) monthly intervals.
- 3.4 The manufacturer / supplier of the Taylex Concrete ABSNR-1350+P Advanced AWTS shall place on its web site a copy of the service manual, service sheet or form and specifications for the Taylex Concrete ABSNR-1350+P Advanced AWTS to facilitate servicing, maintenance and repairs. Commercial-in-confidence documents may be provided directly to the service agent without uploading to the web site.
- 3.5 Each three-monthly service shall, as a minimum where provided, include a check on all mechanical, electrical and functioning parts of the system including:
- The chlorinator and replenishment of the disinfectant,
  - Pump and air blower,
  - The alarm system,
  - Slime growth on the filter media,
  - Operation of the sludge return system,
  - The effluent irrigation area,
  - On-site testing for free residual chlorine, pH and dissolved oxygen at the appropriate check points.
- 4. Verification**
- 4.1 Effluent from the Taylex Concrete ABSNR-1350+P Advanced AWTS taken in any random grab sample shall comply with the following standard:
- BOD<sup>5</sup> less than 30 mg/L
  - TSS less than 45 mg/L
  - E. coli less than 100 cfu/100 ml
  - Free residual chlorine greater than 0.2 and less than 2.0 mg/L
- 5. Permitted uses**
- 5.1 The effluent is suitable for re-use for garden purposes by way of any of the forms of irrigation as described in AS/NZS 1547:2012:
- above ground spray irrigation; and/or
  - surface drip irrigation covered by mulch; and/or
  - sub-surface drip irrigation installed at around 100 mm depth; and or
  - any form of sub-soil application.
- Each of the forms of irrigation or application is subject to the approval of the local authority.



**6. Advanced Secondary Treatment System**

- 6.1 The Taylex Concrete ABSNR-1350+P Advanced AWTS when tested by a Product Certification Body in accordance with AS1546.3:2017 was found to comply with the Advanced Secondary Effluent Criteria as follows:

**TABLE 2.1 (Abrev) AS1546.3:2017  
ADVANCED SECONDARY EFFLUENT COMPLIANCE CRITERIA FOR A STS**

Parameter	Advanced secondary effluent	
	90% of Samples	Maximum
BOD5	≤ 10mg/L	12 mg/L
TSS	≤ 10 mg/L	8 mg/L
<i>E. coli</i> *	≤ 10 cfu/100mL	3 cfu/100mL
FAC †	Minimum 0.5 mg/L †	N/A
Turbidity ‡	N/A	10 NTU

- \* Where disinfection is required.  
 † Where chlorine disinfection is used.  
 ‡ Minimum level, not 90% of samples.  
 ? Where UV light is used for disinfection.

**7 Reduction in nutrient levels**

During the testing of the Taylex ABSNR-1350+P Advanced AWTS the treated effluent was tested for total Nitrogen (TN) and total Phosphorous (TP) concentrations. The treatment process has the capacity to reduce the TN and TP concentrations as follows:

- Total N from an average of 70.4 mg/l to 23.3 mg/l which represents a reduction of 66.9%.
- Total P from an average of 11.64 mg/l to 0.4 mg/l which represents a reduction of 96.65%.



Local Council STS (DGTS) Service Report: February 2018		
Owner's Name:	Local Council:	
Installation Address:		
System Brand & Model:	<input type="checkbox"/> Domestic	<input type="checkbox"/> Commercial
Date of this service: / /	Date of last Service: / /	Next service due: / /
Has the STS/DGTS been <b>serviced</b> in accordance with the manufacturer's / supplier's requirements and using the service sheet? <input type="checkbox"/> Yes <input type="checkbox"/> No If "No" why not?		
STS/DGTS <b>functioning</b> correctly? <input type="checkbox"/> Yes <input type="checkbox"/> No If "No" why not?		
<b>According to sludge-judge or other methodology is de-sludging needed?</b> <input type="checkbox"/> Yes <input type="checkbox"/> No If "Yes" what action is recommended?		
<b>Offensive odours?</b> <input type="checkbox"/> Yes <input type="checkbox"/> No If "Yes" what action is recommended?		
<b>Alarms</b> tested and functional? <input type="checkbox"/> Yes <input type="checkbox"/> No If not "functional" what action is recommended?		
<b>Final Effluent Quality</b>		
Tested? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Disinfected? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Chlorine tablets remaining? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Quality? <input type="checkbox"/> Satisfactory <input type="checkbox"/> Unsatisfactory		
On what evidence is this judgement made? If "Unsatisfactory" what action was recommended?		
<b>Land Application Area</b>		
Surface ponding? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Run off? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Excess plant growth? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Effluent leaving premises. <input type="checkbox"/> Yes <input type="checkbox"/> No		
High risk areas contaminated? * <input type="checkbox"/> Yes <input type="checkbox"/> No * Patio, play areas, BBQ, etc		
Operating satisfactorily? <input type="checkbox"/> Yes <input type="checkbox"/> No If "Not operating satisfactorily" what action was recommended?		
<b>Overall Condition of STS?</b> <input type="checkbox"/> Excellent <input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor		
Comments / Action Recommended / Repairs Needed / Repairs Performed:		
Has the owner / occupier taken recommended actions? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Service Agent:	Contact Details:	
Signature:	Date:	

Source: Adapted from "Checklist 4.2: Operational AWTS inspection report for use by service providers and Council inspectors" in *Designing and Installing On-Site Wastewater Systems*, Sydney Catchment Authority, May 2012



## Specification

### **CONCRETE ADVANCED BLOWER SYSTEM**

- Nutrient Reduction**
- 1350L/per day**
- with Taylex Phosphorus Removal System**

ABSNR-1350 P



**TAYLEX ADVANCED BLOWER SYSTEM NUTRIENT REDUCTION 1350L/ per day with Taylex Phosphorus Removal System ABSNR -1350 P**

**Specification**

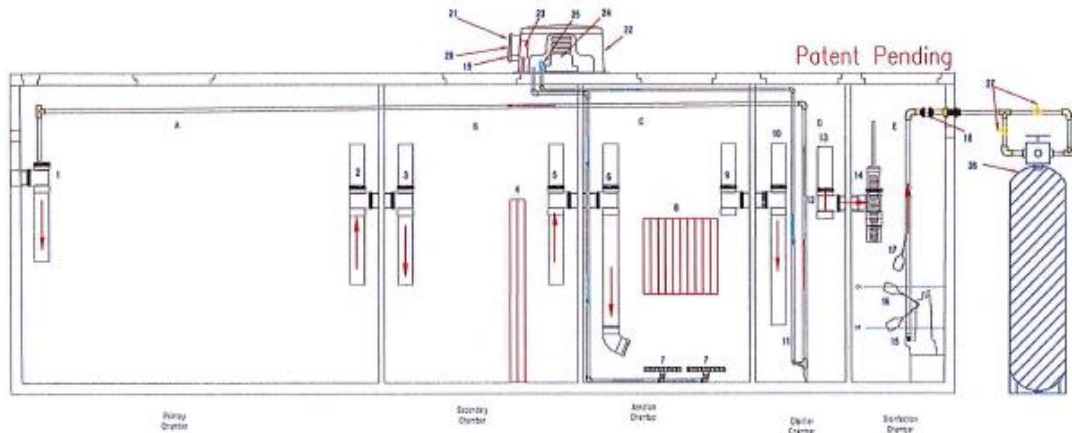
**General Description:**

The Taylex Advanced Blower System NR 1350 P (ABSNR-1350 P) Secondary Treatment System (STS) is designed to treat the wastewater from a residential dwelling up to 1,350 Litres per day, with a daily flow of 150 Litres per person and an average daily BOD<sup>5</sup> 70g per person.

The Taylex ABSNR-1350 P STS is contained in one vertical axis type cylindrical precast concrete collection well with a design capacity of 9,320 Litres and an operating capacity of 5,880 Litres.

**Flow path of wastewater:**

1. A primary pre-treatment chamber, with a capacity of 1,684 Litres.
2. A secondary pre-treatment chamber, with a capacity of 842 Litres.
3. An aeration chamber, with a capacity of 2,071 Litres. This chamber is fitted with bio block media, 2, 9" disk diffusers.
4. A sedimentation / clarifier chamber, with a capacity of 662 Litres, containing a Taylex Filter Control (TFC) fitted to the outlet, and recirculation to the primary.
5. A Disinfection chamber, with a capacity of 621 Litres, incorporating a capacity of 300 Litres for chlorine contact of effluent. A chlorine disinfection unit is installed on the inlet to the irrigation chamber. The system is fitted with either a Davey D25 or D42 Irrigation Pump.
6. An Emergency Storage Buffer 3440 Litres.
7. The automatic irrigation pump transfers the treated effluent to the effluent disposal area / land application area (LAA).





**Product Specification Table:**

Australian Standards Compliance		
Effluent Testing	AS1546.3:2017	
Tank Design and Testing	In Ground	AS1546.1:2008
	Above Ground	AS3735.2001
System Model	ABSNR -1350 P	Concrete
Treatment Level	Advanced Secondary + % Nutrient Reduction + aylex Phosphorus Removal System	

Tank Capacity	
Total Tank Capacity	9320L
Operating Capacity	5880L

System Chamber Capacities	
Primary Chamber	1684L
Secondary Chamber	842L
Aeration Chamber	2071L
Clarifier Chamber	662L
Irrigation Chamber	621L
Emergency Storage	3440L
Maximum Hydraulic Loading Capacity	1,350 litres per day / 9EP

Design Parameters		
Parameter	Total Per Day	Total Per person Per day
Daily Flow	1,350L / 9 EP	150L
Maximum Organic Loading BOD <sup>5</sup>	630g	70g
Total Suspended Solids (TSS)	630g	70g
Total Nitrogen (TN)	135g	15g
Total Phosphorus (TP)	22.5g	2.5g

Effluent Compliance: AS1546.3:2017		
Biochemical Oxygen Demand (BOD <sup>5</sup> )	≤10mg/l	
Total Suspended Solids (TSS)	≤10mg/l	
E.Coll	≤10cfu/100ml	
Min. FAC	Min 0.5 mg/l	

Temperature		
Operating Temperature C°	Minimum	Maximum
		-2°C

Electricity Consumption	
Kilowatt hours per day (kWh/d)	1.90
Kilowatt hours per 1000L (kWh/1000L)	1.52


Servicing and Maintenance	
Servicing Frequency	Every 3 months



**Components List & Repair/ Replacement Instructions:**


- |  |   |
|--|---|
| <ol style="list-style-type: none"> <li>1. Primary Chamber</li> <li>2. Secondary Chamber</li> <li>3. Aeration Chamber</li> <li>4. Clarifier Chamber</li> <li>5. Irrigation Chamber</li> </ol> | <ul style="list-style-type: none"> <li>- 100mm inlet Junction, BIO Block</li> <li>- 100mm Junction x 2</li> <li>- 100mm Junction x 2, BIO Block, Air Lift, Disk Diffuser</li> <li>- 100mm Junction, Taylex Filter Control, Recirculation Chamber</li> <li>- 100mm Junction, Chlorine Dispenser, Irrigation Pump, High Level Alarm Float, 100mm Elbow</li> </ul> |
|--|---|

**Component List**





<p><b>TANK</b></p> <p>Concrete Tank and Lid Made from 32mpa concrete with SL 41Mesh</p> <p>Repair / Replacement Details: Replacement lids available from Taylex Industries or your local Service Agents.</p> <p>Chips and cracks can be repaired using Sika panel patch or mortar.</p>	
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<ol style="list-style-type: none"> <li>1) 100mm Sweep Tee With dropper pipe and riser</li> <li>2) Repair / Replacement Details: Replacement tee and pipe can be purchased from a local plumbing store. Cut 100mm pipe at wall and using a 100mm slab repair coupling install new tee.</li> <li>3)</li> <li>5)</li> </ol>	
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<ol style="list-style-type: none"> <li>4) BIO Block Media Width - 385mm Length - 110mm Height - 1400mm Surface Area - 20.6m<sup>2</sup></li> </ol>	
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<ol style="list-style-type: none"> <li>6) 100mm Sweep Tee With 1000mm dropper pipe and 100mm 45° M&amp;F Bend</li> <li>Repair / Replacement Details: Replacement tee and pipe can be purchased from a local plumbing store. Cut 100mm pipe at wall and using a 100mm slab repair coupling install new tee.</li> </ol>	
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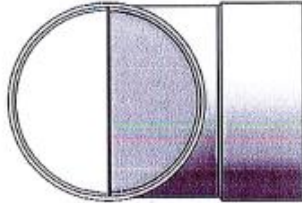


<p>7)</p>	<p>Diffuser x 2 Material - EPDM Diameter - 250mm (9 inch)</p> <p>Repair / Replacement Details: Turn the system off. Replace the diffuser by making a new complete aeration pipe assembly fitted with the Diffuser. Cut the main aeration supply line, place the new diffuser in the system, weighed down with a small concrete block and rotate the diffuser under the biomass. Re fix the new aeration pipe assembly complete with a joining socket. Removing the old Diffuser is not required. Turn the system on. Purchase the complete assembly from Taylex.</p>	
<p>8)</p>	<p>BIO Block Media Width - 550mm Length - 1100mm Height - 500mm Surface Area - 105m<sup>2</sup></p>	
<p>9) 10) 13)</p>	<p>100mm Sweep Tee With dropper pipe and riser</p> <p>Repair / Replacement Details: Replacement tee and pipe can be purchased from a local plumbing store. Cut 100mm pipe at wall and using a 100mm slab repair coupling install new tee.</p>	
<p>11)</p>	<p>Recirculation System</p> <p>For the transfer of fluids using the 'Venturi Principle'. Air is injected toward the base of a vertical open ended PVC conduit. Continuous displacement occurs as the air moves vertically to the liquid, drawing liquid through the bottom of the conduit. The air/liquid mixture reaches a vertical maximum where it then moves through the 90° bend into the primary chamber. The conduit is arranged in the base of the clarifier so that the residual sludge constitutes the main vacuum target.</p> <p><b>Sludge Base Removal</b> Sludge deposit removal is to be scheduled 1 time per 6 years or as determined necessary by a licenced Taylex Sales Technician or the client or due to mechanical failure.</p> <p><b>Servicing</b> Routine maintenance/servicing of the Taylex ABSNR -1350 P is to be scheduled quarterly or as determined necessary by an approved Taylex Sales Technician or due to mechanical failure. Refer to Field Service Report sheet for testing requirements.</p> <p>Repair / Replacement Details: Turn the system off. Replace the Sludge Recirculation Assembly by cutting the main line and installing the new assembly with a joining socket. Turn the system on. Purchase the complete assembly from Taylex.</p>	



12) **Taylex Filter Control (TFC)**  
 Material – Stainless steel


Repair / Replacement Details:  
 Replace the TFC assembly by cutting the 100mm slab repair coupling, install the replacement TFC assembly.



14) **Chlorine Dispenser**  
 Material – HD Polyethylene  
 Length – 500mm  
 Diameter – 90mm

The chlorine dispenser is placed in the 100mm Tee located in the irrigation chamber.


Repair / Replacement Details:  
 Repairing the Chlorine Dispenser is not recommended. If the Dispenser is damaged, replace it with a new unit. Purchase the complete assembly from Taylex.



15) **Irrigation Pump**  
 The irrigation pump is self-controlled via a ball bearing activated float switch. When the according volume is reached in the pump chamber, the ball bearing in the float moves and creates an active connection. The treated effluent is pumped to the approved dispersal zone, as the chamber reaches minimum volume, the float drops and de-activates the pump. The type and capacity of the pump will be in accordance with the land application requirements.

Repair / Replacement Details:  
 Turn the system off. Replace the pump by disconnecting the barrel union, be sure not to drop the internal valve assembly. Lift the Pump Assembly out of the tank. Undo the threaded fitting connect to the outlet of the pump. Re apply thread tape and fix the threaded fitting back onto the pump. Return the assembly to the tank and re-connect the barrel union, ensuring the valve is seated correctly. Turn the system on. Purchase the correct pump from Taylex or a local outlet, ensuring the performance is identical to the pump removed.

<u>DAVEY D42 – 32m Head</u>	<u>DAVEY D53 – 45m Head</u>
Voltage – 220 -240 IP 68	Voltage – 220 -240 IP 68
AMPS – 4.3 Phase 1 50hZ	AMPS – 5.7 Phase 1 50hZ
Max Flow – 130L/min 7m	Max Flow – 130L/min 12m









17) Alarm System High Water  
 Material - PVC  
 Length - 20mm  
 Width - 90mm  
 Trigger - High Water  
 Code - 3  
 Visual - Red L.E.D - 3 Flashes  
 Audible - Micro Buzzer  
 Voltage - 12V

Repair / Replacement Details:  
 Turn the system off. Replace the float by disconnecting the electrical connection in the terminal block, located in the lower section of the control box. Feed the new float cable into the control box and connect to the terminal block, fixing the screws firmly. Re fix the float to the pipe assembly and loop the lead around the barrel union, to set the float height. Turn the system on. Purchase the float from Taylex.



18) Non- Return Valve  
 Height - 85mm  
 Length - 140mm  
 Width - 85mm


Repair / Replacement Details:  
 Turn the system off. Replace the Non- Return Valve by cutting the pipe in either side of the valve. Re-join the pipe using sockets and glue the Valve and sockets together. Ensure the glue is set before turning the system back on.



19) Control Panel Box  
 Material - HD Polyethylene  
 Height - 210mm  
 Length - 190mm  
 Width - 85mm

The weather proof control box is fixed to the side of the blower box using stainless steel screws. The control panel is fitted to the inside of this box and is connected to the power, high water alarm and pressure switch, via a gland at the back of the box.

Repair / Replacement Details:  
 Repairing boxes is not recommended. Replacements boxes be purchased from Taylex or your local service agent.




20) ECO Control Panel  
 (240v to 12V Power Supply)  
 Length - 160mm  
 Height - 100mm

The Taylex ECO is a 12V controller powered by the 240v to 12v power supply plug. As the unit is 12V all works including replacements and repairs do not need to be completed by a Licenced Electrician. All service agents can therefore complete all works within the Control Box and on the Taylex ECO Controllers.

The Taylex ECO Controller Assembly (complete with Controller, Control Panel Box, 3 x GPO Assembly and Blower Box) is classed as electrical equipment and has been certified to comply with AS/NZS 3820, meeting the Electrical Safety requirements in Australia and New Zealand

Repair / Replacement Details:  
 Turn the system off. Replace the Control Panel by removing the 4 screws in the control box. Disconnect the Loom plug from the rear of the panel. Connect the loom to the new panel; return the new Control Panel to the control box and re fix the 4 screws. Turn the system on. Purchase the Control Panel from Taylex.





- 21) LED Light  
Height - 30mm  
Length - 20mm

The LED visual alarm is constructed within the Eco Panel. This LED Red light will flash when an alarm is present. The number of flashes represent the particular code.

Repair / Replacement Details:  
Replacement of the LED lights only is not possible; the complete Control Panel must be replaced. Purchase the Control Panel from Taylex.



- 22) Blower Box  
Material - HD Polyethylene  
Height - 350mm  
Length - 600mm  
Width - 400mm

The Blower box is fitted to the lid of the ABS using 4 x 30mm anchors.

Repair / Replacement Details:

Repairing boxes is not recommended. Replacement boxes can be purchased from Taylex or your local service agent.

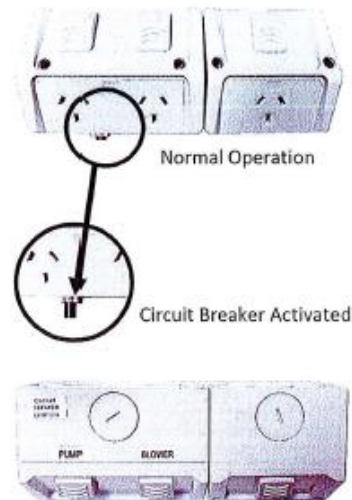


- 23) Weatherproof GPO's  
Single  
Height - 85mm  
Length - 85mm  
Width - 80mm
- |        |                |
|--------|----------------|
| Double | Height - 85mm  |
|        | Length - 115mm |
|        | Width - 80mm   |

Mains 10amp power is connected through the 25mm coupling provided on the side of the ABSNR -1350 P and pulled up through a conduit into the Single GPO. The 12volt power pack plugs into the single GPO to power the control panel. The blower and irrigation pump are plugged into the double GPO.

The double GPO contains a 5amp circuit breaker, which will activate if either the pump or blower (or both) draw too many amps, indicating a fault with the pump or blower. The breaker can be reset by pushing in the button if activated. The systems normal operation including alarms will continue to function, if the breaker is activated.


Repair / Replacement Details:  
Replacing the GPO's can only be completed by a licenced electrician, please refer to the Taylex Electrical Connection instructions for details. Replacements can be purchased from Taylex or your local service agent.





24) Nitto 120L Blower  
 Material – Alloy / Plastic  
 Height – 232mm  
 Width – 210mm  
 Length – 407mm  
 Weight – 9.7kg  
 Noise Rating: 40dB(A)  
 Capacity – 120L  
 Back Pressure Range – 5kpa – 25kpa  
 Motor Power – 130 Watts  
 Power Source – 240V 50Hz

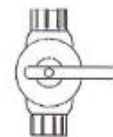
Repair / Replacement Details:  
 Purchase replacement Blowers and parts from Taylex.



25) Recirculation Control Valve

The Recirculation system has been designed to recirculate a precise volume of bacteria and sludge back to the primary chamber for denitrification and sludge management. The control valve should be set to '10' on the dial for optimum operation.

Repair / Replacement Details:  
 Turn the system off. Replace the Recirculation assembly by cutting the main line and installing the new assembly with a joining socket. Turn the system on. Purchase the complete assembly from Taylex.




26) Taylex Phosphorus Removal System (TPRS)  
 27)

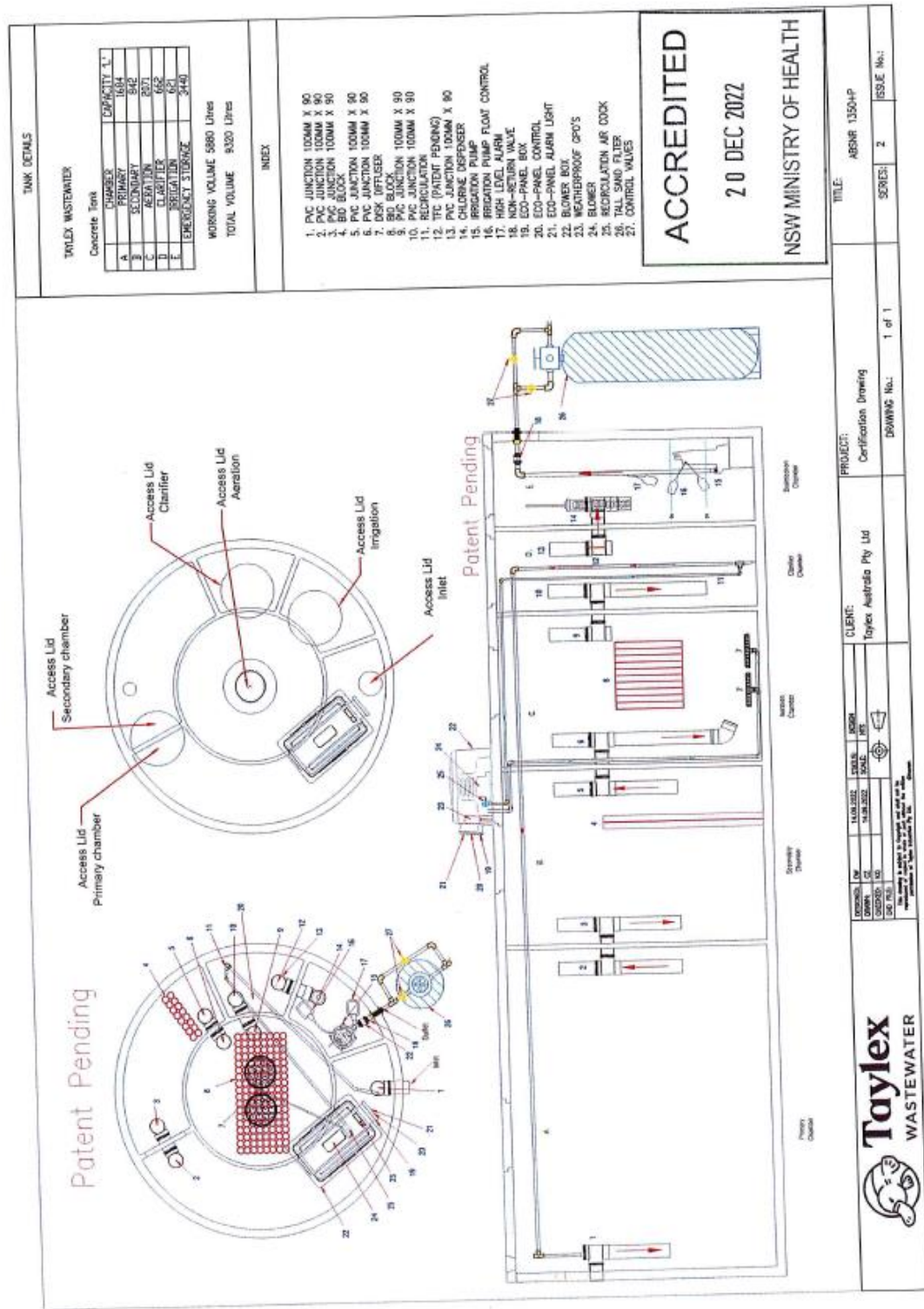
The TPRS has been designed to absorb the total phosphorus remaining in treated effluent. A specially develop Taylex P Media is used to complete the absorption process. The filter control valves are included for balancing and servicing purposes.

Repair / Replacement Details:  
 The Taylex 'P' Media will need periodical replacement which will depend upon the incoming phosphorous load into the system, therefore replacement is as required. Owners are encouraged to use low phosphate product to maximise the lift of the media.

Replace by pumping out the media and replacing with the correct kg or filter media and Taylex 'P' Media, your Taylex Service Technician can complete this process.

The Media and P Media can be purchased from Taylex.





## Appendix E. Pump Specification



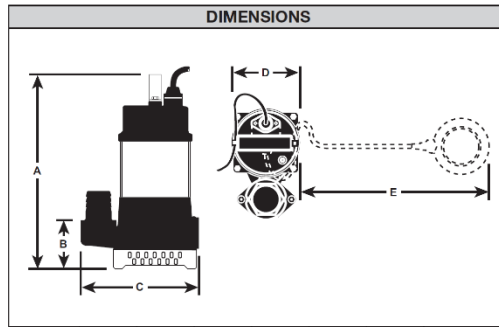
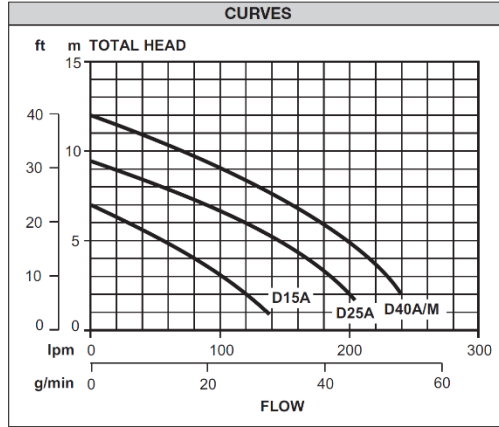
### Submersible Drainage Pumps

OPERATING LIMITS	
Capacities to	240 lpm
Maximum total head	12m
Maximum submergence	10m
Maximum operating temperature	50°C
<b>Suitable Fluids:</b> Clean or "grey water" of neutral pH containing up to 10% small soft solids or 1% fine solids. Some wear should be expected while pumping hard solids in suspension.	

MATERIALS OF CONSTRUCTION	
Part	Material
Motor top	Polycarbonate (D15), Cast Iron (D25/40)
Pump body	Cast iron
Motor shell	304 stainless steel
Strainer	304 stainless steel
Impeller	Polycarbonate (D15), Cast Iron (D25/40)
Lip ring	Nitrile
Mechanical seal	Silicon carbide/ceramic in oil bath w/- oil seal Carbon/ceramic on motor side (D25/40)
Seal and bottom bearing housing	Cast iron
Handle	304 stainless steel
Fasteners	304 stainless steel
Float & power supply leads	HO7RN-F oil resistant

ELECTRICAL DATA			
Supply voltage/Hz	240V/50Hz single phase		
Cable length	10m		
Output	150W	250W	400W
Start	9.0A	12.0A	10.5A
Run	1.5A	2.2A	3.7A
Speed	2 pole, 2850rpm		
Insulation class	F		
IP rating	X8		
Starting	P.S.C.		

INSTALLATION & PRIMING	
Use a rope to position and retrieve the pump. Do not lower or retrieve the pump using the power lead as this may damage the cable entry seals, causing water leaks and unsafe operation.	
Don't use this product for recirculating or filtering swimming pools, spas, etc. While these pumps are built to high safety standards, they are not approved for installations where people will be in the water while they are operating.	
Don't pump abrasive materials. Sand and grit in the water being pumped will accelerate wear, causing shortened pump life.	
Keep your pump clean, particularly in situations where lint, hair or fibrous materials may get bound around the pump shaft. Regular inspection and cleaning will extend pump life.	
Make room for the float switch to operate. Automatic models have a float switch to turn them on when the water level rises and turn them off again when it has been pumped down to the safe operating level of the pump. If the float switch is not free to rise and fall, correct pump operation may not be possible.	
Don't run your pump dry. Non-automatic models must be switched off manually or by way of an external float/level switch when the water level is reduced to the top of the pump housing.	



Model	A	B	C	D	E	Outlet	Weight (kg)
D15A	320	60	160	115	260	1¼" F	5.5
D25A	370	85	225	145	290	1½" F	9
D40A/M	430	85	225	145	290	2" F	11

All dimensions in mm unless otherwise stated.



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This literature is not a complete guide to product usage. All images provided in this document are for illustration purposes only. Further information is available from your Davey Dealer, Davey Support Centre and from the relevant product Installation and Operating Instructions. Must be read in conjunction with the relevant product Installation and Operating Instructions and all applicable statutory requirements. Product specifications may change without notice. © Davey is a registered trademark of Davey Water Products Pty Ltd. © Davey Water Products Pty Ltd 2017.

DWPT165/0617

## Appendix F. Sprinkler Specifications

MINI-WOBBLER WOBBLER **XCEL-WOBBLER**

### Xcel-Wobbler® Mid & High Angle

WOBBLERS

The Xcel-Wobbler uses Senninger's off-center rotary-action technology. It provides an extremely uniform and instantaneous application pattern over a large area at lower pressures, and with very low evaporative loss.



#### OVERHEAD COMPARISON OF SPRINKLER DISTRIBUTION PATTERNS



The Xcel-Wobbler's larger area of instantaneous application minimizes the impact on the soil structure, helping to maintain infiltration capability.



MID-ANGLE



HIGH-ANGLE

#### FEATURES

- Counter-balance reduces vibration for a smooth, stable performance
- Only one moving part - which translates to longer life
- Connections: 3/4" or 1/2" NPT male
- Flow rates: 0.78 to 6.97 gpm (177 to 1583 L/hr)
- Operating pressures: 10 to 25 psi (0.69 to 1.72 bar)
- Low wind drift and evaporative loss at low pressures
- Two-year warranty on materials, workmanship and performance
- Color-coded nozzles for easy size identification. Warranted to maintain correct orifice size for five years

*The Xcel-Wobbler provides a maximized area of coverage for under-tree applications and nursery canopy applications.*

Mid & High Angle **Xcel-Wobbler®**

SPRINKLER BASE PRESSURE-US	psi				SPRINKLER BASE PRESSURE-METRIC	bar			
	10	15	20	25		0.69	1.03	1.38	1.72
<b>#6 Nozzle - Gold (3/32")</b>					<b>#6 Nozzle - Gold (2.38 mm)</b>				
Flow (gpm)	0.78	0.95	1.10	1.23	Flow (L/hr)	177	216	250	279
MA Diameter at 1.5 ft ht (ft)	32.0	35.0	38.5	41.0	MA Diameter at 0.46 m ht (m)	9.8	10.7	11.7	12.5
HA Diameter at 1.5 ft ht (ft)	36.5	41.0	45.0	46.0	HA Diameter at 0.46 m ht (m)	11.1	12.5	13.7	14.0
<b>#7 Nozzle - Lime (7/64")</b>					<b>#7 Nozzle - Lime (2.78 mm)</b>				
Flow (gpm)	1.06	1.30	1.50	1.68	Flow (L/hr)	241	295	341	382
MA Diameter at 1.5 ft ht (ft)	33.0	36.5	40.5	41.0	MA Diameter at 0.46 m ht (m)	10.1	11.1	12.4	12.5
HA Diameter at 1.5 ft ht (ft)	40.0	46.5	47.0	50.5	HA Diameter at 0.46 m ht (m)	12.2	14.2	14.3	15.4
<b>#8 Nozzle - Lavender (1/8")</b>					<b>#8 Nozzle - Lavender (3.18 mm)</b>				
Flow (gpm)	1.40	1.71	1.98	2.21	Flow (L/hr)	318	388	450	502
MA Diameter at 1.5 ft ht (ft)	34.0	38.5	41.0	42.5	MA Diameter at 0.46 m ht (m)	10.4	11.7	12.5	13.0
HA Diameter at 1.5 ft ht (ft)	42.0	46.5	47.0	51.5	HA Diameter at 0.46 m ht (m)	12.8	14.2	14.3	15.7
<b>#9 Nozzle - Grey (9/64")</b>					<b>#9 Nozzle - Grey (3.57 mm)</b>				
Flow (gpm)	1.80	2.20	2.54	2.84	Flow (L/hr)	409	500	577	645
MA Diameter at 1.5 ft ht (ft)	34.5	40.5	42.0	43.0	MA Diameter at 0.46 m ht (m)	10.5	12.4	12.8	13.1
HA Diameter at 1.5 ft ht (ft)	44.0	47.0	50.5	52.5	HA Diameter at 0.46 m ht (m)	13.4	14.3	15.4	16.0
<b>#10 Nozzle - Turquoise (5/32")</b>					<b>#10 Nozzle - Turquoise (3.97 mm)</b>				
Flow (gpm)	2.22	2.72	3.14	3.51	Flow (L/hr)	504	618	713	797
MA Diameter at 1.5 ft ht (ft)	36.0	41.0	42.5	44.0	MA Diameter at 0.46 m ht (m)	11.0	12.5	13.0	13.4
HA Diameter at 1.5 ft ht (ft)	44.5	49.0	50.5	53.5	HA Diameter at 0.46 m ht (m)	13.6	14.9	15.4	16.3
<b>#11 Nozzle - Yellow (11/64")</b>					<b>#11 Nozzle - Yellow (4.37 mm)</b>				
Flow (gpm)	2.69	3.30	3.81	4.26	Flow (L/hr)	611	749	865	968
MA Diameter at 1.5 ft ht (ft)	36.0	41.5	43.0	44.0	MA Diameter at 0.46 m ht (m)	11.0	12.7	13.1	13.4
HA Diameter at 1.5 ft ht (ft)	44.5	50.5	51.5	54.0	HA Diameter at 0.46 m ht (m)	13.6	15.4	15.7	16.5
<b>#12 Nozzle - Red (3/16")</b>					<b>#12 Nozzle - Red (4.76 mm)</b>				
Flow (gpm)	3.23	3.96	4.57	5.11	Flow (L/hr)	734	899	1038	1161
MA Diameter at 1.5 ft ht (ft)	36.5	41.5	44.5	44.5	MA Diameter at 0.46 m ht (m)	11.1	12.7	13.6	13.6
HA Diameter at 1.5 ft ht (ft)	46.0	50.5	52.0	54.5	HA Diameter at 0.46 m ht (m)	14.0	15.4	15.9	16.6
<b>#13 Nozzle - White (13/64")</b>					<b>#13 Nozzle - White (5.16 mm)</b>				
Flow (gpm)	3.80	4.65	5.38	6.01	Flow (L/hr)	863	1056	1222	1365
MA Diameter at 1.5 ft ht (ft)	36.5	41.5	44.5	45.0	MA Diameter at 0.46 m ht (m)	11.1	12.7	13.6	13.7
HA Diameter at 1.5 ft ht (ft)	46.5	51.0	52.5	55.5	HA Diameter at 0.46 m ht (m)	14.2	15.6	16.0	16.9
<b>#14 Nozzle - Blue (7/32")</b>					<b>#14 Nozzle - Blue (5.56 mm)</b>				
Flow (gpm)	4.40	5.39	6.23	6.97	Flow (L/hr)	999	1224	1415	1583
MA Diameter at 1.5 ft ht (ft)	37.0	42.5	45.0	46.5	MA Diameter at 0.46 m ht (m)	11.3	13.0	13.7	14.2
HA Diameter at 1.5 ft ht (ft)	47.0	51.0	53.0	55.5	HA Diameter at 0.46 m ht (m)	14.3	15.6	16.2	16.9

Sprinkler performance may vary with actual field conditions. Other nozzle sizes are available. Consult factory for specific performance data. Stream heights range from 2.5 to 5.5 ft (0.8 to 1.7 m) above nozzle based on pressure and nozzle size. Minimum recommended riser height is 1.5 ft (0.46 m).

WOBBLERS