TREATMENT PLANT APPROVAL 07/2019

Plumbing and Drainage Act 2018, part 4.

Queensland Government

Approval

1. The **Envirocycle Model 10NR Advanced Secondary Quality Wastewater Treatment System with Nutrient Reduction** ("the system") described in the Specifications and Drawings in the attached Schedule and manufactured by **AWTS Maintenance Services Pty Ltd** (ABN 88 073 578 195) ("the manufacturer") has been assessed in accordance with the (previous) Queensland Plumbing and Wastewater Code (QPW Code) dated 26 October 2017.

2. Approval is granted for the advanced secondary quality wastewater treatment system with nutrient reduction, subject to compliance by the manufacturer with the requirements of the *Plumbing and Drainage Act 2018*, part 4 and the conditions of approval detailed below.

3. This approval, the conditions of approval and the Schedule comprise the entire Chief Executive Approval document.

4. Any modification by the manufacturer to the design, drawings or specifications scheduled to this approval must be approved by the Chief Executive.

Conditions of approval

1. The manufacture, installation, operation, service and maintenance of the systems must be inconformity with the conditions of this Treatment Plant Approval.

2. The advanced secondary quality wastewater treatment system with nutrient reduction, which is an example of the approved systems, may only be used on premises that generate per day

   (a) a maximum hydraulic loading of 1,500 litres; and

   (b) a maximum organic loading of 700 grams BOD_5.

3. The system must continue to meet the requirements of advanced secondary quality wastewater treatment system with nutrient reduction, producing the following effluent quality —

   (a) 90% of the samples taken must have a BOD_5 less than or equal to 10 g/m^3 with no sample greater than 20 g/m^3.

   (b) 90% of the samples taken must have total suspended solids less than or equal to 10g/m_3 with no sample greater than 20g/m^3.

   (c) 90% of the samples taken must have a thermotolerant coliform count not exceeding 10 organisms per 100 mL with no sample exceeding 200 organisms per 100mL.

   (d) The manufacturer has included nitrogen and phosphorus reduction in the treatment process, the effluent compliance criteria must continue to meet, in addition to the above, the following nutrient criteria:

      a. 90% of the samples taken, with 95% confidence limits shall have a total nitrogen concentration less than or equal to 13 mg/L; and

4. Each system must be serviced in accordance with the details supplied in the owner's service and maintenance manuals.

5. Each system must be supplied with —

   (a) a copy of this Treatment Plant Approval document;

   (b) details of the system;

   (c) instructions for authorised persons for its installation;

   (d) a copy of the owner's manual to be given to the owner at the time of installation; and

   (e) detailed instructions for authorised service personal for its operation and maintenance.

6. This approval does not extend, apply to, or include the land application system used in conjunction with an approved system installed on premises.

7. At each anniversary of the Treatment Plant Approval date, the manufacturer must submit to the Chief Executive a list of all systems installed in Queensland that they have received an installation and commissioning certificate during the previous 12 months.

8. Where the Chief Executive is notified of any system failures that they believe are a result of poor design or faulty manufacture, the Chief Executive may randomly select a number of installed systems for audit. The Chief Executive will notify the National Association of Testing Agencies (NATA) accredited laboratory nominated by the manufacturer, which systems are to be audited for Biochemical Oxygen Demand (BOD_5) and Total Suspended Solids (TSS). The sampling and testing of the selected systems, if required, is to be done at the manufacturer's expense. The following results must be reported to the Chief Executive;

   (a) Address of premises.

   (b) Date inspected and sampled.

   (c) Sample identification number.

   (d) Biochemical Oxygen Demand (BOD_5).

   (e) Total Suspended Solids (TSS).

9. The Chief Executive may, by written notice, cancel this approval if the manufacturer fails —to comply with one or more of the conditions of approval; or within 30 days, to remedy a breach, for which a written notice been given by the Chief Executive.

10. This approval may only be assigned with the prior written consent of the Chief Executive.

11. The Chief Executive may, by written notice, cancel this approval if the manufacturer fails —

    (a) to comply with one or more of the conditions of approval; or

    (b) within 30 days, to remedy a breach, for which a written notice been given by the Chief Executive.

12. This approval may only be assigned with the prior written consent of the Chief Executive.

13. This approval expires on 1 January 2024 unless cancelled earlier in accordance with paragraph 9 above.

Lindsay Walker
Director
Plumbing, Drainage and Special Projects
Building Legislation and Policy
Date approved: 12 September 2019

Level 7,
63 George Street Brisbane
GPO Box 2457, Brisbane Qld 4001
Telephone +61 7 3008 2557
Facsimile +61 7 3237 1248
Website www.hpw.qld.gov.au

ABN 61 331 950 314

TREATMENT PLANT APPROVAL No. 07/2019
Plumbing and Drainage Act 2018, part 4

SCHEDULE

Attachment 1

Specifications & Drawings for the

Envirocycle Model 10NR Advanced Secondary Quality Wastewater Treatment System with Nutrient Reduction

General Description- Envirocycle 10NR

The Envirocycle 1ONR Aerated Wastewater Treatment System (AWTS) is designed to treat the wastewater from a residential dwelling occupied by a maximum of 10 persons.
The Envirocycle 1ONR AWTS is contained in one vertical axis type cylindrical precast concrete collection well with a design capacity of 7000 litres. The operational water level in the system varies from 1300 mm at LWL to 1560 mm at HWL.
The system consists of:
1. A primary sedimentation chamber with a capacity at LWL of 1320 litres;
2. A anaerobic filtration chamber with a capacity at LWL of 1430 litres and containing four (4) rows of Bio Cord filter media measuring 1000 mm long x 420 mm wide x 1000 mm high with a surface area of 32.5 m2;
3. A contact aeration chamber with a capacity at LWL of 1695 litres and containing 10 individual sections of Bio Cord filter media made up in five (5) rows measuring 2000 mm long x 420 mm wide x 1000 mm high with a surface area of 65 m2.
In both chambers the Bio Cord media is held in place in a rigid frame;
4. A secondary sedimentation chamber with a capacity at LWL of 515 litres;
5. An irrigation pump chamber with a capacity at LWL of 340 litres;
6. An UV disinfection unit is installed in the outlet pipe from the irrigation pump to the land application system. The UV unit's peak flow rate is 500 litres/hour. The UV lamp has an operating total wattage of a minimum of 38 Watts or greater and has a life of 8500 hours before replacement;
7. Air is supplied to the contact aeration chamber by an air blower with an output of 80 litres/minute;
8. A submersible irrigation pump with a 9 metre head or greater is installed in the irrigation pump well.

The UV disinfection unit operates at its optimum when the flow rate is restricted to 6 litres/minute or less (38 watt lamp). A PVC ball valve may be installed on the pump line inside the tank to ensure that the flow rate is not exceeded if the irrigation system exceeds the given flow.

Treatment Plant Approval

Approval No: 07/2019

Date of Issue: 12/9/19

Delegate Signature:

Envirocycle Model 10NR
A product of AWTS Maintenance Services Pty Ltd
Aerated wastewater Treatment System
Non Conventional Type

1: Design Condition

1) Hydraulic and Organic Loading

Hydraulic Loading - Average 180 lit/p.d. x 10 EP =1800 lit/d
Max. 250lit/p.d. x 10EP = 2500 lit/d
Inflow ; 16 hr/d

	lit/d	lit/hr	lit/min
Dailey average flow	1800	75	1.25
Maximum hourly Peak flow		834	13.90
3 hr maximum peak flow		1250	20.84

1:2 Organic Loading (Dailey Average)

BOD: 70g/p.d. x 10EP = 700 g/d
SS: 70g/p.d. x 10EP = 700 g/d
T - N : 15 g/ p.d. x 10EP = 150 g/d
T - P : 2.5 g/ p.d. x 10EP =25 g/d

1: 3 Effluent (Dailey Average)

BOD: < 10mg/ l
SS: < 10mg/ l
T - N < 10mg/ l
T - P < 5mg/ l

2: Design Specification

1) Treatment method; Anaerobic filter contact aeration & flow regulation process.
2) Chamber capacities (minimum)

Each chamber has a capacity equal to or greater than the values calculated by formula.

2)- 1 Primary Sedimentation Chamber Volume (VPS)

Min. VPS > Q x 2/3 (m3) where Q = Daily Average Flow
Min. VPS > 1.8 (m3/d) x 2/3 =1.2m3

2) - Anaerobic Filtration Chamber Volume (VAF)

Min. VAF > Q x 2/3 (m3)
Min. VAF > 1.8 (m3/d) x 2/3 = 1.2m3
Anaerobic Filter volume ratio >25%
Minimum Volume 1.2m3 x 25% =0.3m3
Anaerobic filter surface area - 45m2/m3
Min. Filter Surface area needed = 0.3m3 x 45m2/m3 = 13.5m2

2) – 3 Contact Aeration Chamber Volume (VCA)

By Hydraulic loading Min. VCA = Q x 3 / 4 (m^3)

Contact Filter volume ratio > 50%

Minimum volume of Contact Filter = 1.35m^3 x 50% = 0.675 m^3

Contact Filter surface area = 45 m^2 / m^3

Min. Surface area of Contact filter = 0.675 m^3 x 45 m^2 / m^3 = 30.38 m^2

Air supply (AV) by Air Blower

Min. AV needed = Aeration Chamber volume x 2.4/60min

2) – 4 Secondary Sedimentation Chamber Volume(VSS)

Min. VSS = Q x 6 / 24hr(m^3)

= 1.8 m^3 x 6 / 24 hr = 0.45 m^3

Minimum depth	> 1.2 m
Sludge hopper slope	> 60 °
Minimum surface area	> 0.52 m^2
Maximum surface loading	< 14.0 m^3/ m^2.d
Maximum rise velocity	< 0.6 m / hr
Maximum weirs flow	< 7.2 m^3/ m.d

2) – 5 Pump Chamber Volume (VPu)

Min. VPu = Q x 3 / 24 hr (m^3)

= 1.8 x 3 / 24 hr = 0.225 m^3

2) –6 Flow Regulation Volume (VFR)

Min. VFR = Q x 12 / 24 hr (m^3)

= 1.8 m^3 x 12 / 24 hr = 0.9 m^3

2) – 7 Disinfection System

UV disinfection – Maximum flow = 300lit/hr

Outflow Thermotolerant Coliform < 30 cfu/100ml

3: Operation

3) – 1 Aeration:

Intermittent aeration

3) – 2 Aerobic to Anaerobic process circulation:

Circulation rate Q x 1.5 ~ 4.0 (where Q = Daily hydraulic loading)

3) – 3 Irrigation:

By submersible pump > 180 lit /cycle

3) – 4 Flow Regulation

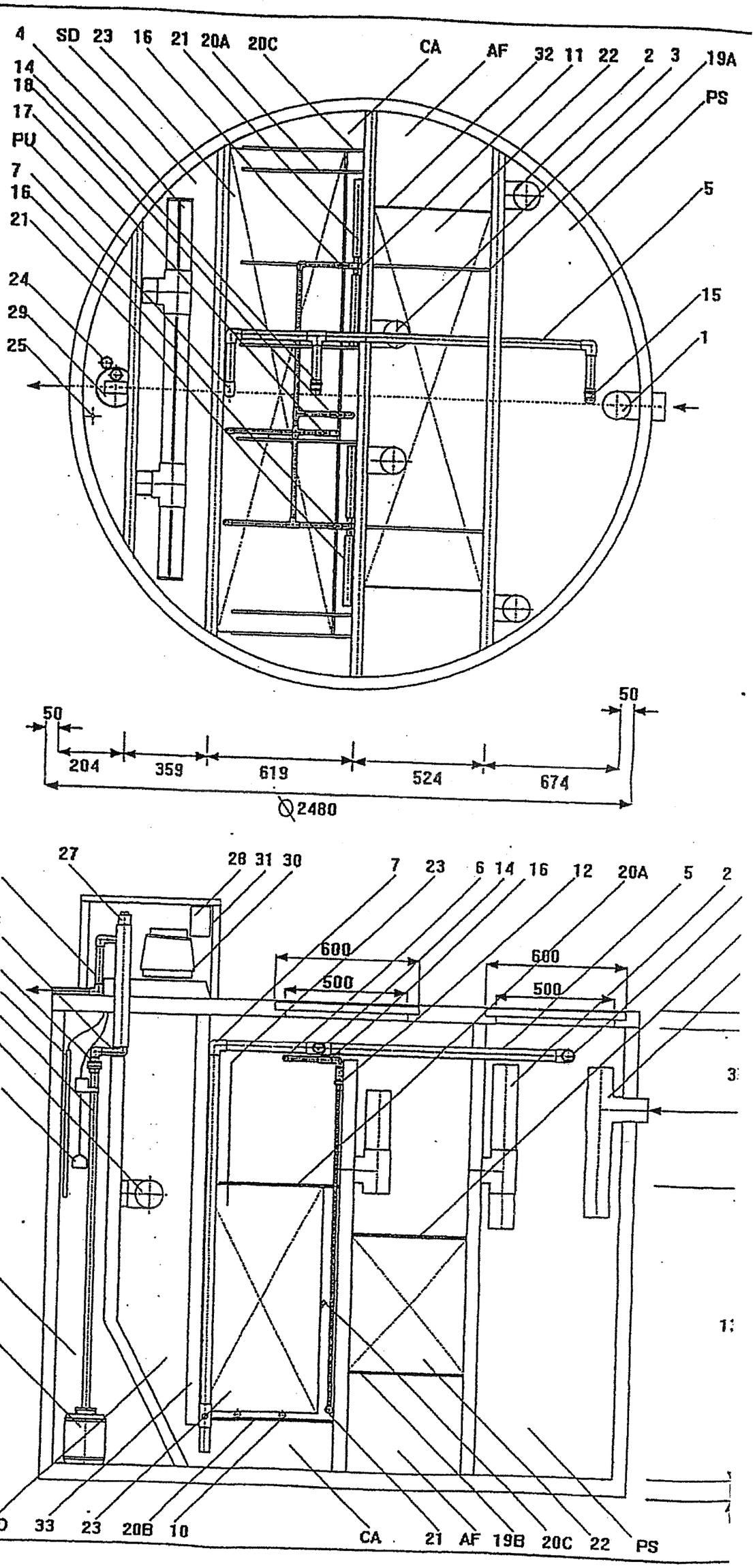
By Pump operating intermittently

COMPONENTS LIST

No.	Description	Material	Specification
1	Inflow Junction	PVC	Ø100 Sewer pipe Ø100 sewer Junction 90°
2	Outflow Junction	PVC	Ø100 Sewer pipe Ø100 sewer Junction 90°
3	Outflow Junction	PVC	Ø100 Sewer pipe Ø100 sewer Junction 90°
4	Weir	PVC	Ø100 Sewer pipe Ø100 End Cap Ø100 sewer Tee 90°
5	Circulation Pipe	PVC	Ø 32 Pressure pipe
6	Air Pipe	PVC	Ø 15 Pressure pipe
7	Airlift Pump	PVC	Ø 32 Pressure pipe
8	Irrigation Pump Pipe	PVC	Ø 25 Pressure pipe
9	UV Outflow Pipe	PVC	Ø 25 Pressure pipe
10	Diffuser	PVC	Ø 15 Pressure pipe
11	Diffuser Holder	PVC	Ø 15 Pressure pipe
12	Union	PVC	Ø 15 Pressure
13	Union	PVC	Ø 25 Pressure
14	Circulation Weir	PVC	Ø 32 End Cap
15	Circulation Weir	PVC	Ø 32 End Cap
16	Air Valve	PVC	Ø 15 valve
17	Air Valve	PVC	Ø 15 valve
18	Air Valve	PVC	Ø 15 valve
19A	Filter Holder	GAL	Ø 11 mm
19B	Filter Holder	GAL	Ø 11 mm
20A	Filter Holder	GAL	Ø 11 mm
20B	Filter Holder	GAL	Ø 11 mm
20C	Filter Holder	GAL	Ø 11 mm
21	Diffuser	PE	Ø 30
22	Anaerobic Filter	PP	-
23	Aerobic Filter	PP	-
24	Sensor	PVC	Ø 76 mm
25	High Water Level Alarm	PVC	Ø 15mm
26	Filter	PE	25mm
27	UV Filter	SS	Ø 63mm
28	Electric Panel	-	See Wiring diagram for model 10NR
29	Irrigation Pump	-	≥ 0.1KW
30	Air Blower	Air Pump	100lit/min
31	Blower Cover	Concrete	Reinforced concrete
32	Baffle	FRP or PVC	≥ 2.0 mm
33	Baffle	Concrete	Reinforced concrete
PS	Primary Sedimentation Chamber		
AF	Anaerobic Filtration Chamber		
CA	Contact Aeration Chamber		
SS	Secondary Sedimentation Chamber		
PU	Pump Chamber		

19A 1

Name:	**ENVIROCYCLE® - MODEL 10NR** A product of [redacted]	
Drawing:	Plan/Elevation Aerated Wastewater Treatment System	
Drawn By:	A. Chiba	Drawing No: 990215-1
Scale:	1: 25	
Date:	15 February 1999	



Treatment Plant Approval

Approval No: 07 | 2016

Date of Issue: 12/11/19

Delegate Signature: