On-site Effluent Treatment National Testing Programme (OSET NTP)

PERFORMANCE CERTIFICATE
EcoSewerage On-site Domestic Wastewater Treatment System, OSET NTP Trial 8, 2012/2013

System Tested

The **EcoSewerage** on-site wastewater treatment system comprises a vermiculture primary/secondary treatment system followed by a series of subsurface flow wetlands. Rated design capacity is 1,000 litres/day. The vermiculture unit is 1,500 litres in capacity with gravity flow through 5 layers of gravel, bark, coconut husk, chopped plastic bottles and Novacoil to a 70 litre capacity flow balancing pump chamber in the base of the unit fitted with a 2 litres/minute solar powered pump discharging to the wetland. The wetland is1,000 litres liquid volume and consists of 5 cells in series containing media comprising No.4 chip metal, bark and filter husk. It is planted with 3 wetland species. Emergency storage is 928 litres (640 litres in and above worm bed, 288 litres above wetland). No tertiary treatment (such as UV disinfection) is incorporated.

Test Flow Rate

The **EcoSewerage** system was tested at 1,000 litres/day (equivalent to servicing a 3-bedroom 5 to 6 person household) over an 8 month (35 week) period November 2012 to June 2013 followed by a 1 month (4 week) high load effects test in July 2013 involving 5 days at 2,000 litres per day then 1,000 litres/day over the following 3 weeks.

Testing and Evaluation Procedures

A total of 37 treated effluent samples of organic matter (BOD_5) and suspended solids (TSS) at generally six day intervals during weeks 9 to 35 were tested and evaluated against the secondary effluent quality requirements of the joint Australia/NZ standard AS/NZS 1547:2012. The EcoSewerage plant comprises a vermiculture treatment unit followed by a multi-media wetland. Such systems typically take longer for the media to both flush clean and stabilise (media development). This plant was no different. After reviewing the results the Management and Audit Committee considered it reasonable to allow a longer media development period through to Week 13 and substituted 7 results prior to this for two results after the high flow test, giving 33 results rather than 37 results for the AS/NZS 1547:2012 evaluation.

A total of 16 treated effluent samples of organic matter (BOD_5), total suspended solids (TSS), total nitrogen (TN), ammonia nitrogen (NH_4-N), total phosphorus (TP) and faecal coliforms (FC) at generally six day intervals during weeks 23 through 35 were benchmarked and rated on their median values. In addition, the energy used by the treatment system was assessed on the mean of consumption levels over the 16 sample days.

AS/NZS 1547:2012 Secondary Effluent Quality Requirements

These requirements are that 90% of all test samples must achieve a BOD_5 of $\leq$ 20 g/m^3 and TSS of $\leq$ 30 g/m^3 with no one result for BOD_5 being >30 g/m^3 and no one result for TSS being >45 g/m^3. The **EcoSewerage system** achieved a performance level of **100%** for BOD_5 and **100%** for TSS based on the set of 34 test results in weeks 13 to 35, plus two results after the high flow test, with no results exceeding the maximums. The **EcoSewerage system** thus meets the secondary effluent quality requirements of AS/NZS 1547:2012.

Benchmark Ratings

The EcoSewerage system achieved the following effluent quality ratings for the sixteen benchmarking results in weeks 23-35.

Indicator Parameters	Median	Std Dev	Rating	Rating System				
				A+	*A*	*B*	*C*	*D*
BOD_5 (mg/L)	*5*	*1.1*	**A**	*<5*	*<10*	*<20*	*<30*	*≥30*
TSS (mg/L)	*3*	*1*	**A+**	*<5*	*<10*	*<20*	*<30*	*≥30*
Total Nitrogen (mg/L)	*22*	*0.7*	**B**	*<5*	*<15*	*<25*	*<30*	*≥30*
NH_4- Nitrogen (mg/L)	*19.2*	*1.1*	**C**	*<1*	*<5*	*<10*	*<20*	*≥20*
Total phosphorus (mg/L)	*3.2*	*0.3*	**B**	*<1*	*<2*	*<5*	*<7*	*≥7*
Faecal Coliforms (cfu/100mL)	*24,400*	*47,000*	**C**	*<10*	*<200*	*<10,000*	*<100,000*	*≥100,000*
Energy (kWh/d) (mean)**	*0.7*	*0.5*	**A**	*0*	*<1*	*<2*	*<5*	*≥5*

** **Note:** Overall energy rating reflects conditions at the test facility – power consumption for effluent pumping under field conditions will be specific to the distribution system as installed.

This Performance Certificate is specific to the **EcoSewerage system** model as specified above when operated at a flow rate of 1,000 litres/day, and is valid for 5 years from the date below. For the full OSET NTP report on the performance of the **EcoSewerage system** contact Coastal Plumbing and Drainage, Coromandel. P: (07) 866 8456 M: 0274 881 203

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