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REVIEW: ECOplus Water Recycling System - HOUSEHOLD WATER SAVING and WASTEWATER REDUCTION POTENTIAL

Background

The ECOplus Water Recycling System is an engineered household greywater treatment unit which is configured to recycle reclaimed greywater back to the water closet cistern for toilet flushing. The treatment process consists of filtering, disinfecting and deodorising stages, using greywater sourced from bath, shower and washing machine. The recycle flow can be diverted on demand for trickle irrigation of ornamental and landscaped garden areas.

The ECOplus recycling system has particular application for existing households in rural residential areas serviced by septic tank and soakage field systems where the soakage field performance can be improved by flow reduction. It also has application for new houses in such areas where design and operation of the on-site domestic wastewater management system can benefit from flow reduction, and the land-application area (soakage field) can be consequently downsized. Furthermore, the double benefit of having recycled water available for garden watering is a most useful water conservation measure, particularly during summer, while at the same time enabling additional reduced loading and recovery of the septic tank soakage field.

The ECOplus recycling system has been appraised by BRANZ as "fit for purpose" and that it "can be used to meet the relevant provisions of the NZ Building Code".

Review

The water saving capacity of the ECOplus recycling system can be quantified by examining various water use scenarios. The table below sets out the three scenarios, the first two being based on retrofitting an older rural residential dwelling with an ECOplus system, the with a dual flush toilet and ECO system. The third scenario relates to a new dwelling provided with a low flush toilet and additional water conservation measures together with the ECO system.

It can be seen that the ECOplus recycling system can deliver between 20% and 30% reduction in both water usage and effluent output depending upon the mix of fixtures and appliances in the dwelling. However, in terms of overall significance to operation of an on-site wastewater system, it is the actual volume reduction in wastewater output that determines the benefit to an existing system, or to the design size of a new system. Combined measures maximise benefit.

ECO Wastewater Recycling Systems notes that total water savings of up to 70% can be achieved where treated greywater is provided for trickle irrigation of garden areas landscaping. This claim seems entirely reasonable, and thus represents a seasonal benefit in reducing both household water consumption and wastewater production.

Water Saving and Water Reduction Potential

Household Water Usage Scenario	Appliance/Fixture Per Capita Daily Flow Allowance (l/c/d)				Design Flow for On-site System (l/c/d)	Water Saving from ECO
	Water Closet	Laundry	Shower	Wash basins		
1(a) Standard water closet (1 litres/flush) plus standard shower fittings and top-load washing machine	66	22	90	30	208	
1(b). As above plus ECO recycling system	-	22	90	30	142	32%
2(a) Standard dual flush water closet (11/5.5 litres/flush) plus standard shower fittings and top load washing machine	38	22	90	30	180	
2(b). As above plus ECO recycling system	-	22	90	30	142	21%
3(a) Low flow water closet (6/3 litres/flush) plus low flow shower fittings and front-load washing machine	22	13	45	30	110	
3(b). As above plus ECO recycling system	-	13	45	30	88	20%

Opinion

The ECO Water Recycling System is a soundly engineered greywater treatment system that enables treated greywater to be used for water closet flushing in a manner that produces significant savings in potable water consumption for a household. This has two benefits. First in reducing water demand. Second, in reducing effluent output for subsequent treatment and disposal.

Where used in rural residential areas, the reduction of effluent output has particular significance. First, for an existing dwelling, it can relieve the hydraulic loading on the septic tank effluent soakage field, thus enabling rejuvenation of an overloaded field, and/or improvement in the long term performance of a non-overloaded field. Second, for a proposed new dwelling, the installation of the recycle system provides for reduction in desing flows and thus reduced sizing for the land-application system. Third, the use of recycle flows for garden watering provides flow relief for the land-application area, thus enabling resting and rejuvenation, particularly during summer dry periods. This garden watering flow relief creates an operational factor of safety, and contributes to sustaining the long term performance of the on-site wastewater management system. - **Ian Gunn**