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where Life informs design®

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Recirculating Wastewater Garden®

The following is a press release article focusing on the Recirculating Wastewater Garden as developed by Ecological Engineering Group for use in single family homes and is an excellent introduction into RWWG for anyone interested in this environmental opportunity.

A recent development proves that wastewater can be ecologically and economically managed all the while producing valuable plants for a variety of purposes from fossil fuel alternatives to horticulture products.

Called the Recirculating Wastewater Garden®, the system was developed by Sustainable Strategies, an ecological design and engineering firm. The Recirculating Wastewater Garden (RWWG) is an alternative to a soil absorption system, commonly called a “drain field” or “leach field.” In contrast, the RWWG uses up a building’s average daily flow of wastewater by irrigating plants in a lined garden and disinfecting a portion of the treated graywater to be used for purposes other than for drinking, such as watering plants, flushing toilets, car washing—and even for skating rinks and evaporative air conditioning.

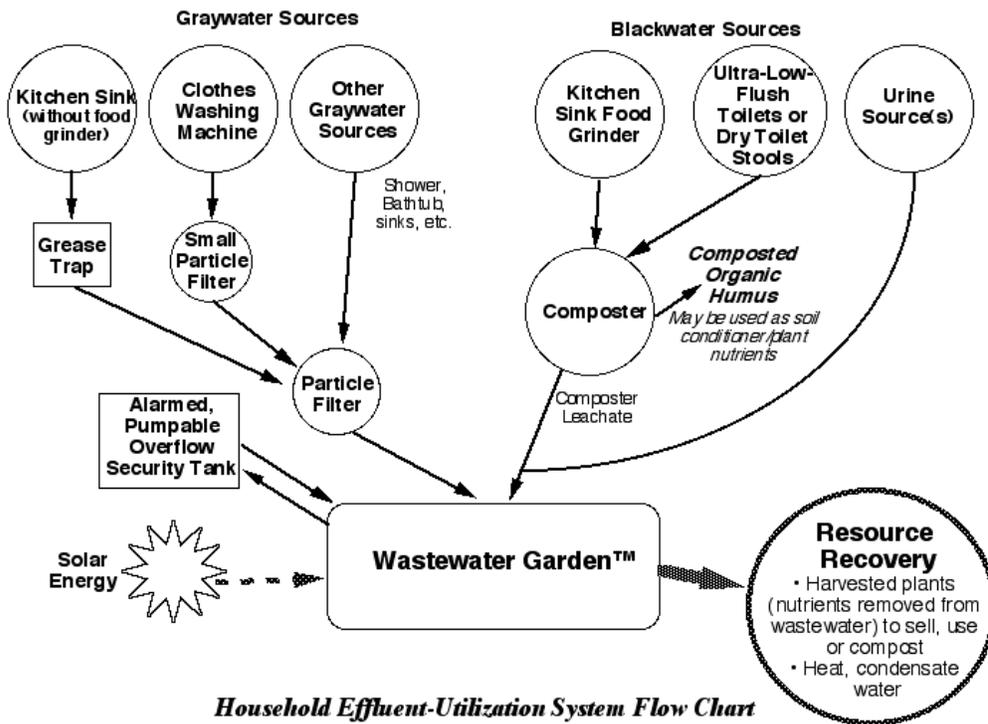
The first recirculating wastewater gardens for graywater were installed in Massachusetts in 1995 and for blackwater in Canada in 2004 (See: www.watersheds.ca/whatwedo/wwg.html).

The Wisconsin Department of Commerce approved the first Graywater system that treats wastewater for recycling back to a building or outdoor irrigation and other non-potable purposes. The first approval was for a new three-bedroom Residence in Portage County in 2004.

The patent-pending design features a filter, a collection tank, and an engineered lined garden bed filled with specially chosen substrate and thirsty plants called phreatophytes, such as willows, bamboo and certain vines,. As the filtered wastewater passes through the garden bed, it is treated by a complex micro-ecosystem within the root zone, called the Rhizosphere.

All of the wastewater can be used up by the plants through a process called evapotranspiration or ET. Plants bring water and nutrients up their roots and release the water as vapor from special openings under the leaves called stoma. The ET variables are plant eco-physiology (some plants are thirstier than others), total leaf area, and ambient thermal energy (temperature) and relative humidity. Treated wastewater is collected in the garden bed and recirculated or diverted to a storage tank to be disinfected and used“.

The Wisconsin system employs a composting toilet for feces and the RWWG for graywater. In future systems, diverted urine can be combined with graywater to provide valuable nutrients to the plants as shown in the following diagram:



Wisconsin has been a leader in developing the next generation of high-performance on-site wastewater treatment systems,” says David Del Porto, senior designer at Sustainable Strategies, the developer of the Wastewater Garden. “The approval of the first Recirculating Wastewater Garden to use up or recycle wastewater shows Wisconsin’s Department of Commerce’s plumbing program’s understanding of the importance of wise use and preservation of water resources with systems that are simple and affordable”

The final engineering was completed by the Ecological Engineering Group (EEG) of Concord, Massachusetts, a licensee of Sustainable Strategies. EEG designs ecological wastewater systems for Clients worldwide.

The Property owner’s Responsibility

The RWWG is a solution for household wastewater treatment that appeals to many home owners particularly those with troublesome soils or high water tables. The opportunity to reduce or eliminate the amount of waste a residence produces is a real possibility but it comes with certain responsibilities that a septic system owner would be unfamiliar with. Even the use of a septic system requires that the users pay attention to how much water is used within the residence and what chemicals end up down the drain, but an RWWG goes a step further.

As the basis of the system is a relationship between microorganisms and plants, the property owner of an RWWG would need to pay attention to all things important to a septic system but must also act as a gardener. The health of the plants (and by extension the microorganisms) is critical to the success of the system. Anyone considering an RWWG must be aware of their responsibility to be aware of the plants’ health. While not uncommon for plants to die too much loss of plant life will eventually cause the system to fail. Conversely, the plants may flourish with the water and nutrients they are being fed and the property owner must trim and harvest certain amounts of plant material to allow all the plants to thrive.

All Recirculating Wastewater Gardens are custom designed with plants that the property owner has interest in as well as suited for the climate of the home and also comes with an operation and maintenance manual. EEG staff is also available to discuss and offer advice and care of an RWWG but those not familiar with basic gardening principles and signs of trouble may wish to seek additional gardening education.

Uncovered Willow Gardens in Cold Climates

The Danish Environmental Protection Agency has been monitoring many of the 30 – 60 Willow (*Salix viminalis*) wastewater gardens constructed in Denmark. These gardens use the pore spaces in the uncovered garden bed to store filtered septic tank all winter long. When the willows leaf-out during the growing season all of the stored effluent is transpired as well as the effluent from the growing season. In Tappernøje by "Pilehuset", a shared living complex - there exists as far as is known, the eldest willow bed garden in Denmark. It was established during the winter of 1991/92. The shared living complex is a part of the institution for handicapped, "Marjatta", whose pedagogical fundament builds on the philosophy and principles of Rudolf Steiner. The wastewater garden has been dimensioned sufficiently large enough to ensure that the applied amounts of wastewater from 11 adults as well as rain, has been able to evaporate all of it in the growing season. Overflow/breakout has therefore not been the case, and the garden has been leak-tight since its construction in 1992. Because the stored effluent is below the frost line, the effluent does not freeze. Approximately one third of the area is harvested every year. The tenants of the shared living complex do this job during a weekend. What is harvested is used to make wickerwork, or woodchips to be employed as mulch in the flowerbeds around "Pilehuset". (Danish EPA • 29 Strandgade • DK-1401 København K • Tel: +45 32 66 01 00 • Fax +45 32 66 04 79 • e-mail: mst@mst.dk)

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