

Engineering

EcoSystems:

An alternative to conventional wastewater treatment



By Todd J. Palmatier

As our region continues to search for fair and economical solutions to the ongoing issue of wastewater treatment and disposal, suggestions to use, upgrade and build

on existing technology and infrastructure where and when possible make sense and deserve careful consideration.

Serious consideration should be given to use of systems utilizing eco-toilets, urine diversion and greywater treatment to achieve the goals of reducing nutrient overload to our groundwater, ponds and coastal water resources. Collectively referred to here as an EcoSystem, the use of these

measures could provide a simple alternative to expensive, energy-intensive, high-maintenance treatment systems that rely on disruptive installation of complex collection systems and consume great quantities of potable water.

An EcoSystem involves the installation and use of simple components that require minimal, low-tech maintenance. What comprises an EcoSystem? First of all, eco-toilets would replace the conventional flush toilets. An eco-toilet is a composting toilet that is far advanced from the roadside or campground composting toilets many may be familiar with. Modern composting toilets are self-contained and are designed to be odor-free and provide easy access for servicing. Depending on the model and installation arrangement, they require no or minimal water for flushing. Conventional toilets and treatment systems use significant amounts of potable water that is then contaminated with sanitary waste which must then be treated and disposed of. That is the irony of the process. With conventional treatment and disposal systems, clean and increasingly scarce potable water is intentionally contaminated by septic waste, then subjected to what may be a complicated treatment process for disposal back into our environment. The treated

effluent is rarely, if ever, returned to its original quality. Small wonder our water resources are becoming more and more impaired.

The composted material from the eco-toilet collects in a separate chamber and is removed once every year or two. This material can be rendered pathogen-free and used as fertilizer under certain regulatory limits and restrictions, as currently allowed. No expensive collection system is required. There is no pumping, no huge energy expenditure, and minimal water is necessary. Maintenance requirements are low and can be provided by a local service company. In the end, instead of having a waste that needs further processing and disposal, an eco-toilet produces a valuable, usable product.

The second component would be a urine diversion system. Why divert the urine? Urine contains about 80 percent of a typical household's nitrogen, over 60 percent of the phosphorus and most of the pharmaceuticals. By diverting and retaining the urine, most of the nitrogen, phosphorus, pharmaceuticals and other potential contaminants are prevented from entering the groundwater, rivers and streams, freshwater ponds and estuaries, while containing it for reuse. A urine holding tank can be

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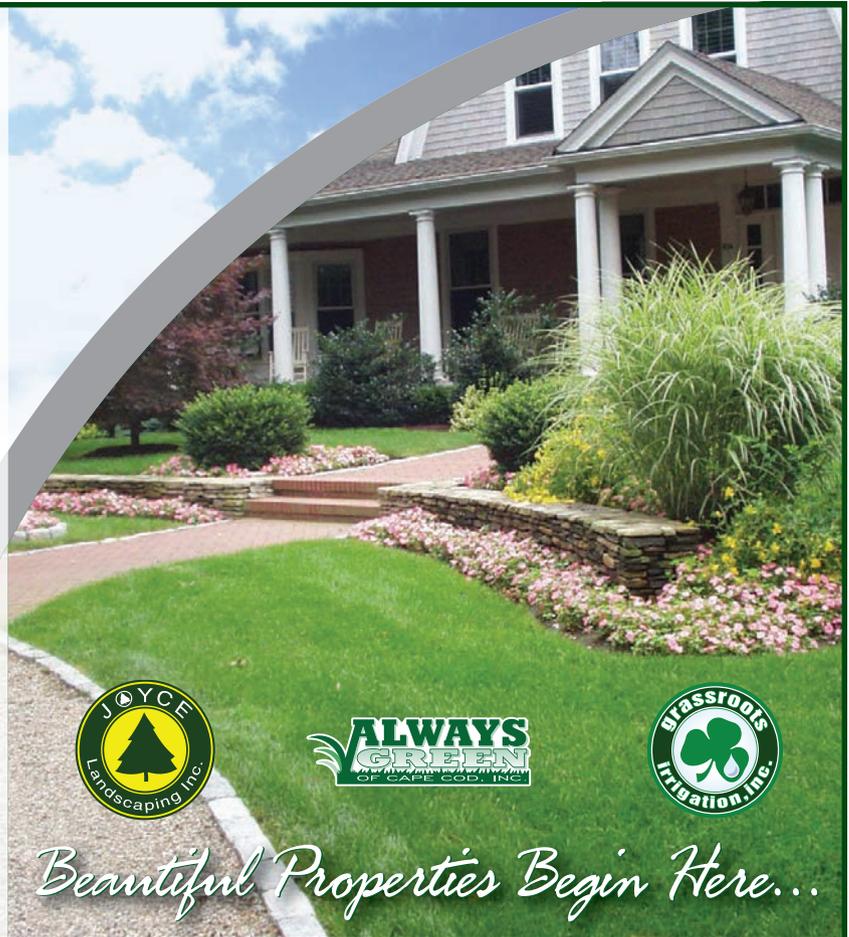
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The Centers for Disease Control estimates that waterborne disease costs the public more than \$970 million per year. The use of EcoSystems can help reduce this burden as well as decrease the nutrient enrichment of our water resources simply by preventing the introduction of septic waste into the ground and water.

sized and installed onsite, or as a shared tank for several properties. The urine would be pumped periodically by a local service company for processing. The high nitrogen and phosphorus-rich content makes it ideal for fertilizers that could be used locally or marketed for profit.

The third component is the greywater – water from sinks, showers, laundry, dishwashers, etc. Greywater is typically low in the nutrients of concern. Greywater can be treated to reuse standards and used for irrigation, boiler water, flushing, etc., which reduces the need for potable water that would normally be required for these uses. Alternatively, the greywater could be processed through an existing I/A treatment system for direct discharge to the ground, or simply discharged to a Title 5 system.

Here are some of an EcoSystem’s advantages:

- Eliminate the discharge of sanitary waste into the environment – immediately

- Prevent nitrogen and phosphorus in sanitary waste from entering groundwater and surface waters
- Drastically reduce nutrient contamination of our coastal and freshwater resources, including drinking water wells
- Contribute to a revitalization and healing of our waterways and a recovery of near-shore fisheries habitat
- Help meet Total Maximum Daily Loads (TMDLs) established for estuaries and avoid costly treatment measures that may take years to achieve the desired results
- Energy reduction
- Reduced water use
- Sustainable
- Produce valuable recyclable products.

The use of eco-toilets on Cape Cod is not unprecedented. With the benefit of grants,

incentives, and the hard work of the Falmouth Water Quality Management Committee (WQMC), a program is currently being implemented to install eco-toilets to immediately reduce nutrient contamination of selected water resources in Falmouth. This group, with the support and contributions of the Green Center and the Cape Cod Eco-Toilet Center, is operating in close cooperation with the Town of Falmouth, Barnstable County and state regulators to demonstrate the effectiveness of this strategy as an alternative to sewerage in targeted areas.

At this point, the use of EcoSystems should be a concept for consideration. As the discussion and planning of ways to address the enormous wastewater issues facing most towns continue, it would serve the citizens well to have an open and frank assessment of the possibilities, advantages, and benefits of EcoSystems and compare them to the other more conventional solutions being evaluated. **CPB**

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