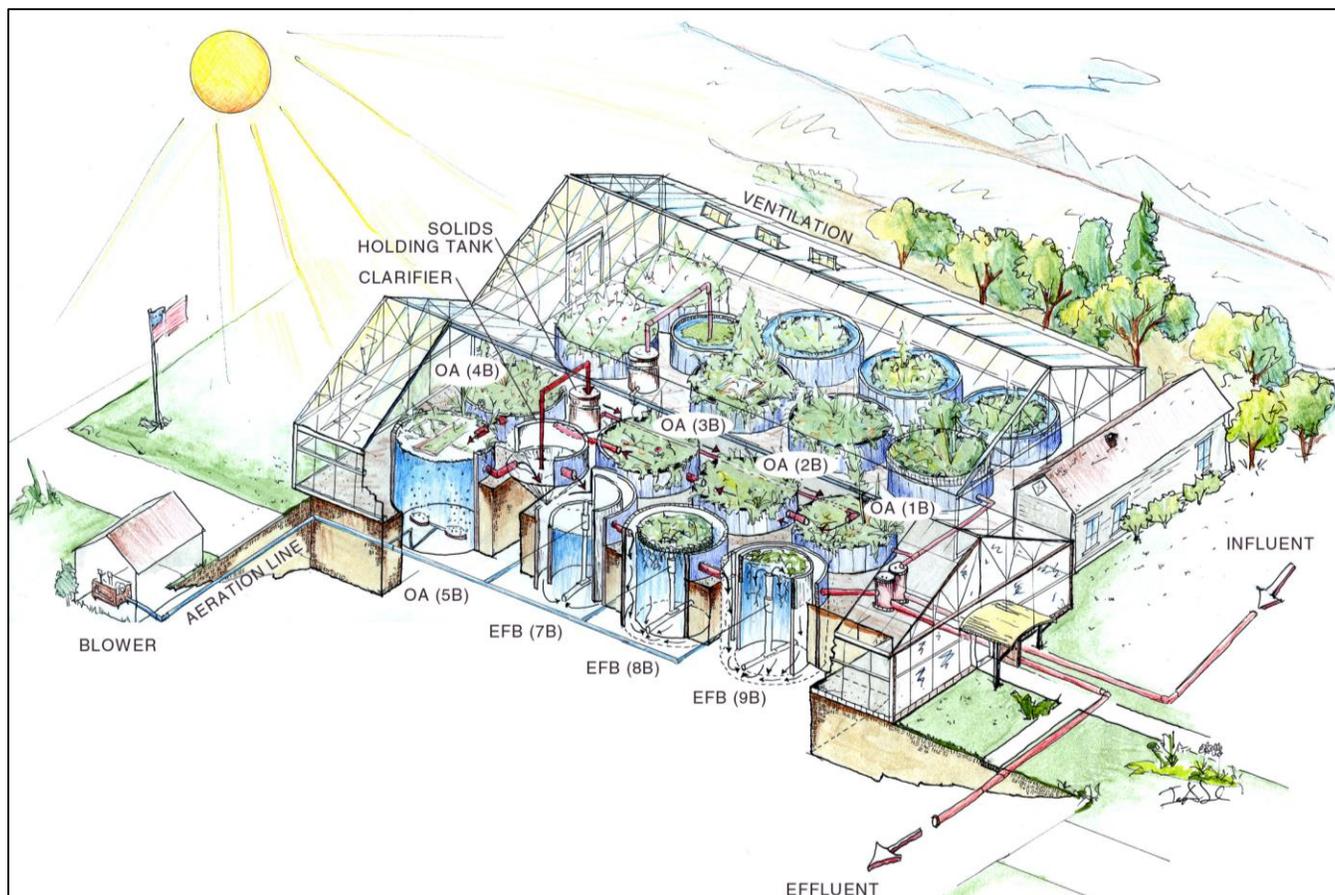




South Burlington Municipal Eco-Machine®



Artist's rendering of the South Burlington system

“As we move into the 21st century we need to be developing ways to manage waste using ecological systems. Supporting projects like the [Eco] Machine is consistent with a progressive and forward-thinking economic development strategy.”

--Chuck Hefter, South Burlington City Manager

Background & Design

Located in the City of South Burlington, Vermont, the South Burlington Eco-Machine was built with a grant from the US Environmental Protection Agency to demonstrate year-round, high performance ecological treatment. The South Burlington Eco-Machine was built in late 1995 by Living Technologies and Dr. John Todd with Ocean Arks International providing scientific oversight. The system was successfully operated until 2001. Operational data was used for a number of published evaluations and as the basis for the EPA's acceptance of the technology.

Waste Stream	Domestic Wastewater
Treated Flow	80,000 GPD
HRT (hours)	2.8 days
Treatment Level	Tertiary
Year Built	1995



Designed to achieve stable nutrient removal, this Eco-Machine was a cost-competitive alternative treatment option compared to a conventional system. With its aesthetic beauty and lack of offensive odor, this system demonstrated at a large scale how ecological treatment is compatible with a residential environment.

The South Burlington Eco-Machine was also used as a teaching tool for many different schools and universities in the region. Elementary through high school science students toured the facility for hands on lessons on ecology, engineering, and environmental stewardship. University students were given more involved assignments in the intricacies of each ecosystem and research applications. The facility provided many students the opportunity to work in and around this innovative system.



A researcher comparing influent, left with treated effluent, right

Treatment Process

On a daily basis, the sewage typically generated by 1,200 residents at 80,000 gallons was diverted from the city's conventional waste treatment plant to the Eco-Machine. Sewage flowed to a greenhouse with two treatment trains, each with five aerobic reactors, a clarifier and three Ecological Fluidized Beds. The open aerobic reactors used diffusers and floating plant racks to maintain a diversity of vascular plant species (over 350 species were tested including many flowering plants). The air and plants provided an environment that hosted a variety of organisms that digested the nutrients and pollutants in the wastewater. Biochemical Oxygen Demand (BOD), Total Suspended Solids (TSS) ammonia and total Nitrogen were reduced in this stage of treatment. A clarifier followed the open aerobic reactor to settle out solids. Ecological Fluidized Beds (EFBs) in each train followed the clarifier and provided final polishing, nitrification and digestion of suspended solids.



Healthy plant growth in the aquatic cells



John Todd
Ecological
Design