

Solaire Apartments, Battery Park

Building Type: Multi-unit residential

Building Size: 357,000 sq. feet (33,160 sq. meters)

Location: New York City, New York, United States

Occupancy Date: Completed August 2003

Application: Wastewater reuse

Treatment Plant Size: 700 sq. feet (65 sq. meters)

Capacity: 25,000 gpd (95 m³/d)

LEED Rating: U.S. Green Building Council LEED-NC Gold



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Introduction

As municipal, water supply and wastewater treatment costs continue to rise, and environmental efficiency becomes a more important focus, water reuse has proved to be a beneficial and economical tool in green building design. Treating collected stormwater and wastewater on-site creates the ability to reuse treated water for flushing toilets, irrigation and cooling towers; greatly reducing the amount of fresh water that is taken from a municipal water supply and eliminating the need to pump wastewater to a municipal plant.

Plant Overview

The 250-unit, Solaire Apartments in Battery Park continues the city's trend to reusable, sustainable, and efficient residential development. This specific development was a private-public partnership and is the first "green" residential high-rise building that incorporates advanced materials, energy conservation and water reuse in an urban setting. The development has adopted features that will become a must in the future as populations grow and water resources become limited.

The Solaire Apartments selected GE Water & Process Technologies' proprietary ZeeWeed[®] membrane bioreactor (MBR) process to treat, store and reuse the wastewater for toilet flushing, irrigation and cooling towers. This approach reduces the freshwater taken from the city's water supply by over 75%, and significantly decreases energy costs as less drinking water is pumped from the city's treatment plant and wastewater is not transferred to the city's wastewater treatment system. The system is the first onsite water recycling system in the U.S. built inside a multi-family, residential building. It is unique for such a system to be located in an urban setting as they are more commonly found in rural or suburban environments where access to public systems are lacking.

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Process Overview

The 25,000 gpd (95 m³/d) onsite wastewater treatment, storage and reuse system is located in the building's basement, and includes a series of common-walled, cast-in-place, concrete tanks. The first step in the process is a collection and settling tank where large solids are removed. The wastewater then flows to a bioreactor, which contains active bacteria used to consume or digest the biodegradable waste.

ZeeWeed ultrafiltration membranes are immersed directly into the bioreactor, which eliminates the need to settle solids, and significantly decreases the necessary size of the treatment tanks. Permeate pumps are used to gently pull the wastewater through thousands of membrane fibers. Each fiber is filled with billions of microscopic pores that physically block suspended solids, bacteria and viruses from passing through—guaranteeing an exceptional water quality and clarity on a continuous basis.

The treated water is then further disinfected by ultraviolet lights. Any remaining color and odor is removed using an ozone generator that also provides a residual disinfection during water storage. The storage tanks serve as reservoirs for the treated water, which is used as flush water, make-up water for the cooling towers, and for irrigation.



Typical Treated Water Results		
	Raw Water	Treated Water
BOD (mg/L)	230	<2
TP (mg/L)	230	<2
TN (mg/L)	45	<3 ¹

¹ With anoxic zone