

Peach Lake Finds a Solution for a Dying Septic System

Part 1 of 2

By Joseph Harmes

It only took a few generations and several hundred dying septic systems to age an idyllic vacation spot like Peach Lake.

A CLOSER LOOK AT PEACH LAKE

Fed for millennia by fresh flowing springs—with no creeks or rivers for drainage—a basin eventually matured into a 1.5-mile long and half-mile wide aquatic paradise originally named Pechquenakonck by the Kitawonks, a Mohegan group.

Around the dawn of World War I, vacation homes started to occupy the pristine shoreline of what pioneer Dutch farmers first named Peach Pond; later, Peach Lake. Inevitably, water quality deteriorated as the reservoir's spring intake was supplemented by wastewater flushed from these summer bungalows and cabins, equipped with septic systems that only have a normal life expectancy of ten to forty years.

By the 1990s, the problem of wastewater—mostly during the peak

Memorial Day to Labor Day period—was aggravated by the arrival of full-time residents who were upgrading once simple seasonal properties in lakeside communities like North Salem and Southeast into pleasant abodes with additional bathrooms, washing machines and dishwashers.

"Most of the people are here year-round but we do have the 20 to 30 percent that are there in the summer months," says Warren Lucas, supervisor of the Town of North Salem. "These communities grew



Peach Lake is a quiet, private lake located in Putnam and Westchester counties in New York, about a ninety minute commute from Grand Central Terminal. Single-family homes surround the lake, consisting of both seasonal and full-time residents.

up around the lake back in the 20s and 30s and at this point we have in some cases the second or third home rebuilt on these properties."

Young families purchasing their first houses, retirees and even work day commuters to Grand Central Terminal about ninety minutes away further pushed Peach Lake's fragile ecology to the brink.

THE PUSH TO IMPROVE WATER QUALITY

A campaign to improve the water quality of Peach Lake began over forty years ago and gained traction when the Citizens Statewide Lake Assessment Program (CSLAP), a volunteer lake monitoring and education program, began sampling Peach Lake's water in 1999.

Over the next decade, the project found the "recreational suitability of the lake to be unfavorable" and "'slightly' to 'substantially' impacted for most recreational uses" like swimming and boating as failing septic systems had a negative impact on water quality.

CSLAP's reports noted "High coliform counts (resulting in occasional beach closures), along with algal blooms and excessive aquatic weed growth strangled areas near the shores. The aquatic growth may also depress dissolved oxygen in the lake to the point where the fishery may also be affected" and storm events frequently led to fish kills.

A wastewater study showing eutrophication (an excess of nutrients such as nitrates and phosphates) led to Peach Lake's inclusion on New York State's List of Impaired Waters.

The situation was fully addressed in 2010 when a new sewage treatment system was designed to replace the area's 470 deteriorated septic tanks.

LOOKING FOR CAUSES . . . AND SOLUTIONS

Engineers blamed the septic failure on multiple origins. Scores were situated too close to streams, drainage ditches or the lake. Leach

fields at many properties were sized to the original summer cottages and not adequate for the additions or newer homes; current regulations require 5 feet between the septic tank and groundwater. Significant numbers failed percolation tests due to poor

soil conditions and shallow bedrock.

Executing the 2010 plan would be no easy task as it required the input, cooperation and approval of 1,000 citizens and four lake association boards; the formation of sewer districts which included inter-municipal

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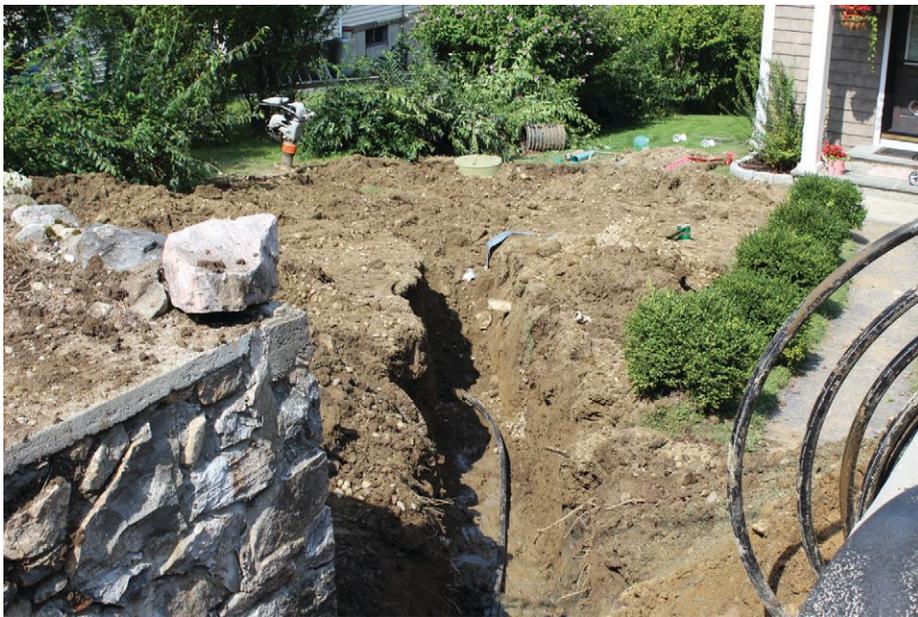
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agreements between North Salem and Southeast and their respective counties, Westchester and Putnam, which border Peach Lake; and, a half-dozen state and municipal

agencies including the New York City Department of Environmental Protection (NYDEP) about 50 miles south which receives 10 percent of its drinking water from the Croton

Watershed to which Peach Lake belongs.

Financing was equally complicated. The \$30 million project would be footed by East of Hudson Funds from Westchester and Putnam counties, the NYDEP and federal American Recovery and Reinvestment Act funds created during the Great Recession to stimulate municipal infrastructure projects.

Residents agreed to levy themselves \$1,200 per year per household for thirty years to form the Peach Lake Sewer District. Operation and maintenance costs for a low-pressure sewer system (LPS) incorporating grinder pump stations were calculated at \$40,000 annually. The treatment plant's O&M added another \$275,000, planners said.

Public outreach began at grassroots gatherings like pancake breakfasts where surveys and questionnaires were distributed to residents. As with all municipal sewer

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projects, planners needed to win close coordination and cooperation from homeowners for property visits, maps, surveys, deed preparation, easement negotiations/acquisitions and construction observation on private property.

Seemingly the biggest concern of residents was that an adequate sewer system might increase the density of homes or create condo development. It was agreed that only existing land surveys would be acknowledged with the caveat each home could be expanded or replaced with one new structure.

North Salem and Southeast were divided into two separate State Environmental Quality Reviews for efficiency and less complication given the size and impact of the project.

"I have 74 percent of the homes (360)," says North Salem's Lucas. "Southeast has 26 percent (120)." The sewage treatment facility is owned in a 74-26 partnership between the two towns.

In order to pamper local sentiment, the head works and micro-filtration facilities of the Peach Lake Sewer Treatment Plant (a small, mostly-automated facility designed to process 170,000 gallons per day) are housed in red and white buildings camouflaged to mimic the ubiquitous horse barns synonymous with the pastoral landscape.



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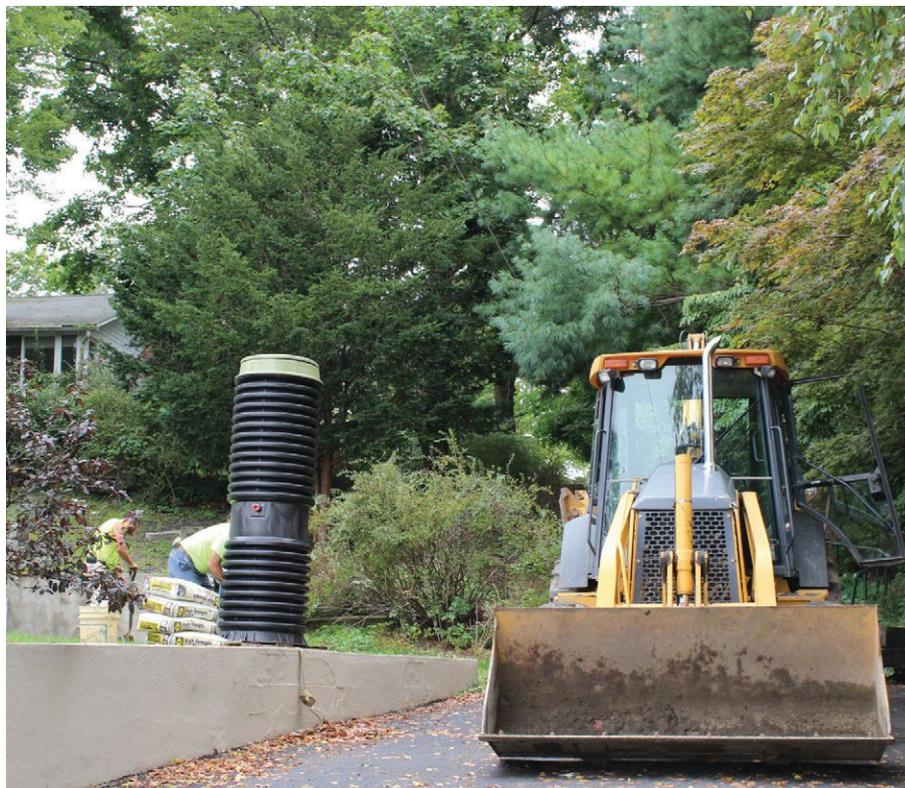




A LOOK AHEAD

Two sewer proposals were considered: A gravity/low-pressure hybrid with eight pump stations and a low-pressure sewer system employing grinder pumps at each home (or, where housing is dense, a duplex pump serving multiple dwellings). Next month, we'll conclude this case study by exploring Peach Lake's decision and the benefits they discovered. ♦

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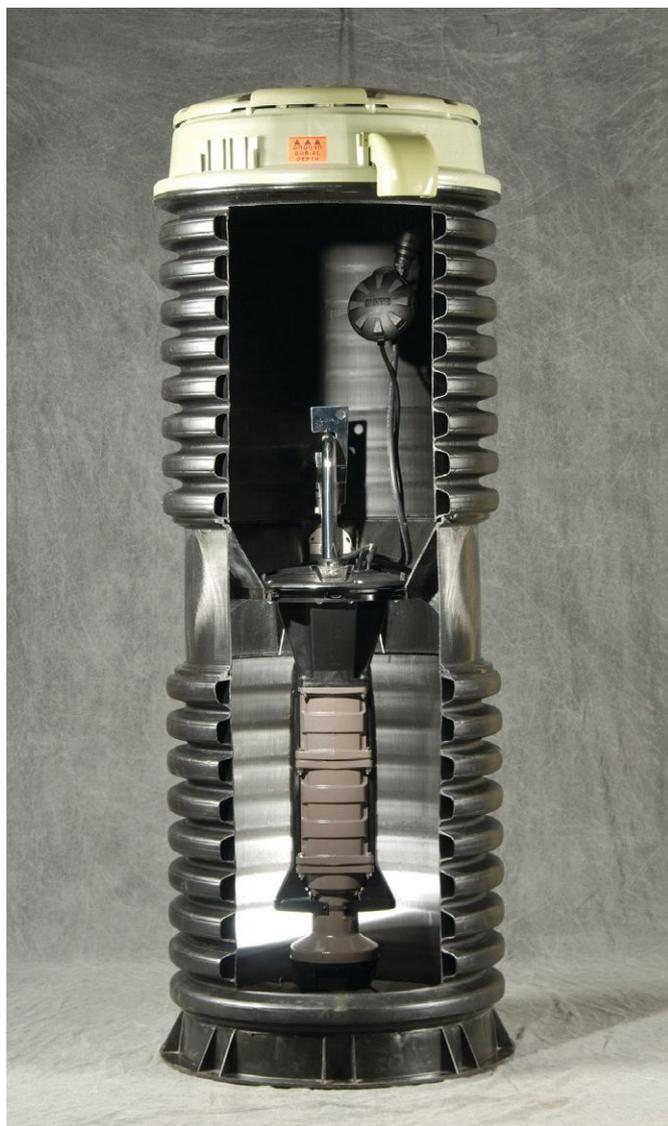
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Peach Lake Finds a Solution for a Dying Septic System

Part 2 of 2

See Part 1 on
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By Joseph Harmes



Last month, we introduced the dilemma of dying septic systems pushing the fragile ecology of Peach Lake to the brink. After two separate State Environmental Quality Reviews were performed, two sewer proposals were considered—either a gravity/low-pressure hybrid with eight pump stations or a low-pressure sewer system employing grinder pumps at each home.

BUILDING THE LPS

"The gravity system would have the disadvantages of needing land in several associations for pump stations, as well as requiring deeper excavations, more blasting, greater infiltration and inflow and more attention to groundwater disposal during construction," says Sarah Cwikla, an engineer with G.H.D. of Middletown, Connecticut, which designed the project. "The low-pressure sewer system would be less expensive to construct but required individual (grinder) pumps."

Unlike septic, LPS is environmentally safe. LPS construction costs can be 50-percent lower than a conventional gravity system, partly because it eliminates lift stations which in the United States can run about \$350,000 to \$500,000 each.

Cwikla's team recommended grinder pumps manufactured by Environment One Corporation in Niskayuna, New York, about 125 miles north of Peach Lake. It has assembled around 500,000 grinder pumps at its facility which comprise the largest installed base of pressure sewers in the world. E/One's waterfront LPS projects include Martha's Vineyard, Baja California (Mexico), and Hawaii.

"I did talk to some other communities in Pennsylvania and around the U.S. down south and they were using the grinder pumps, specifically E/One, and I talked to them about what they saw and most of them were happy with the units," says Lucas of his due diligence.

GRINDER PUMPS IN THE LPS

An LPS begins at the grinder pump which accepts wastewater, grinds its contents into fine slurry, and transports it through small-diameter 2 inch to 4 inch PVC pipes buried just beneath the frost line to roadside force mains.

Most installations around the lake consist of a rugged E/One DH071 grinder pump station, the company's most popular model, incorporating a 1 horsepower pump in a 70-gallon tank.

The grinder pump is automatically activated and runs for very short periods. Electrical consumption of the grinder pump is low—a household that uses 250 gallons of water per day should use less than 10 kWh per month to run the pump.

As with thousands of other installations, E/One's grinder pumps were set in the footprint of an old Peach Lake septic tank or just adjacent to it making the installations far less environmentally disruptive to private landscapes.

"It is rare that a district take on the responsibility of installing grinder pumps on private property," says Cwikla. "This required extensive planning with each resident and coordination of septic pump outs and grinder pump installations."

Whereas about thirty of North Salem's homes are close together with only a few feet between them, "most of them are on at least a quarter-of-an-acre or so, if not more," says Lucas.

EFFECTIVE AND EFFICIENT

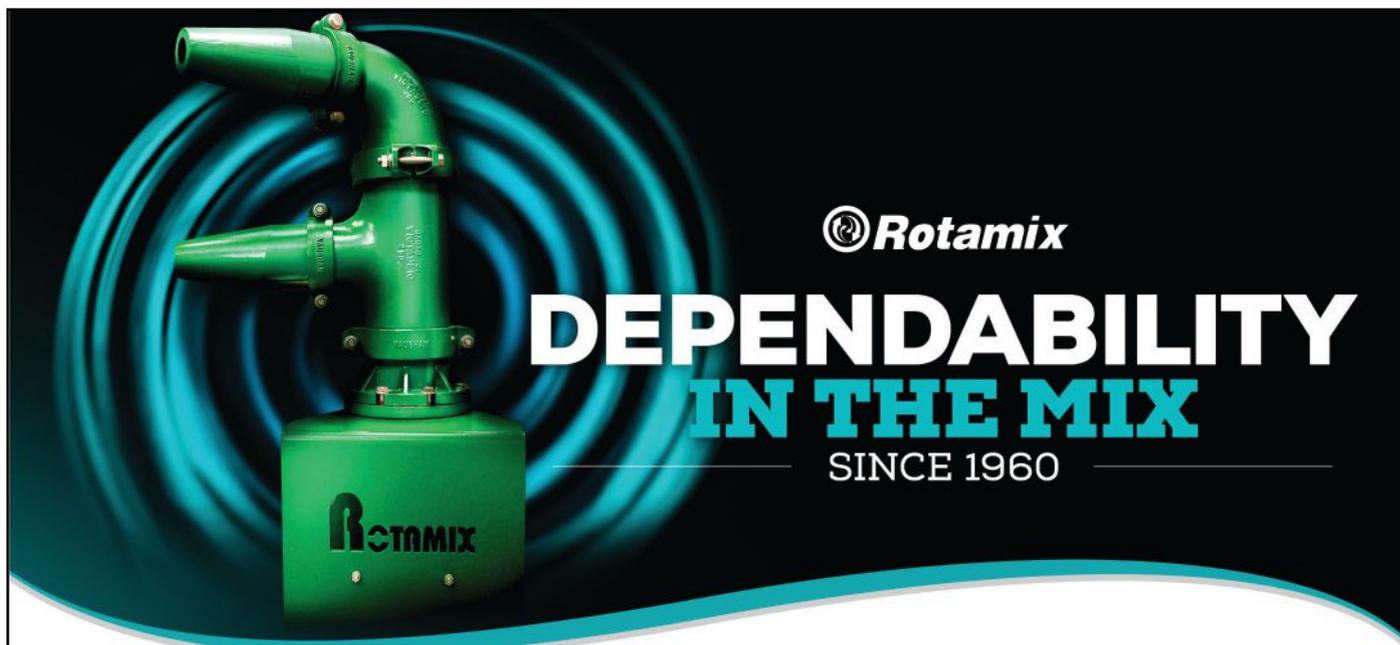
A gravity system to service these far-flung residences distributed on roller coaster elevations was cost-prohibitive. With LPS, the wastewater can be propelled uphill from the homes and around contours. It is effective for distances at more than a mile from force mains or water treatment facility.

"From (G.H.D.'s) point of view there were several reasons why they thought (LPS) was more appropriate based on how the homes were laid out in communities, and this is on the lake," says Lucas. "So it's kind of hard at least for a large number of homes to gravity feed without the grinder pumps. The grinder pumps are actually lifting the effluent, the sewage, up to the lines," Lucas adds.

"I obviously have a bunch of homes right around the lake and so you're not going to gravity feed out of those," Lucas says. "It's just not going to happen."

The E/One grinder pump addresses this with a progressing cavity pump—rather than a centrifugal pump—which produces a nearly constant discharge rate over a wide range of head conditions, including negative head conditions.

"The one thing that did impress me, because I was very concerned about these things being able to push against the head, you know, a static head in the line," says Lucas. "This is a rolling hill topology so you have people that are 30 to 40 feet higher in some areas than others closer to the lake so those pumps have to pump it up at high pressure



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basically to put the stuff into the line. And there's been no issues at all in terms of capacity or volume issues with these pumps. They have no problem working correctly handling the volumes and stuff or pushing against the pressures of the line."

A HISTORY OF SUCCESS

Even though LPS technology has been refined for more than forty-five years, many like Lucas remain unfamiliar with its capabilities. While satisfied E/One's grinder pumps could sufficiently service single-family homes, he fretted over the large, almost nightly events his town's facilities host during the summer.

"I have large lake community buildings—we call them pavilions—where you have 300 to 400 people in a building when they have a party or something," says Lucas. "I did have a concern up front about their ability to actually pump the volumes but there's been no problems at all. So it does service those."

Reliability and low operation and maintenance costs are inherent with grinder pumps.

A recent study analyzing a ten-year-old E/One grinder pump installation found them not only dependable but cost effective: Mean time between service calls (MTBSC) was approximately twenty-eight years; O&M costs were about \$37/year/home (excluding power).



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"Based on what's needed for the community and how it's working here, it works really good," says Lucas. "You just don't have the breaks in the lines and you don't have those kinds of problems. There's no catastrophic problems with the low-pressure system."

Septic debacles polluted Peach Lake for nearly a century but the switch to a hospitable LPS means there's now more than just a fiery sunset burnishing the horizon.

A BRIGHT FUTURE

Peach Lake's collection system and treatment plant were completed in 2012 and the final grinder pumps installed in 2013. Until the new LPS was online, concerns about deteriorating septic made it almost impossible to obtain a building permit for expanding homes and adding bedrooms.

With the transition from decentralized, independent septic schemes to a centralized low-pressure sewer system, real estate values in the project area are increasing in tandem with improvement in lake quality.

Homeowners are free to build additions and convert demure abodes to comfortable year-round residences. Some obsolete housing stock is being replaced with entirely new structures. In one case, a property owner erected a modular home so it would be ready for occupancy as soon as a grinder pump hook-up was available.

Just before the system's inauguration, a member of the North Salem Town Board asked Cwikla the \$30 million question everyone wanted answered about their investment: "When will the lake be really clean?"

"You won't see an immediate effect," Cwikla responds. "In five or six years you'll begin to see major changes. In ten years there will be a significant change." ♦

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