

On-Site Waste Water Systems
Point and Non-Point Pollution Code Enforcement

**Alternative Wastewater Technologies in Real Life -
Examples from the Canandaigua Lake Watershed**

A talk given by George Barden, Canandaigua Watershed Inspector

April 14, 2005

Sponsored by Croton Watershed Coalition

(This meeting was attended by three members of the Three Lakes Council Board of Directors: Jack Sinnott, president; Jean Lewis, secretary; Paul Lewis, chair of the Three Lakes Council Lake Management Committee. Jean Lewis took the following notes at this very information meeting).

CANANDIAGUA WATERSHED DISTRICT

Canandaigua Lake is one of the Finger Lakes in Central NY State. Its watershed is all the area surrounding it where if one drop of water falls onto that land, it flows down to the lake.

Canandaigua Lake is a drinking water source for 60,000 people in 5 towns.

There are public sewers on the northern 1/3 of the lake -- the effluent flows away from Canandaigua Lake into the Barge Canal. The sewer system was designed to handle 500 million gallons per day but currently handles only 3 million gals. per day.

The rest of the lake has on-site systems. There are 4,250 septic systems on the lake.

It is the position of the Department of Environmental Conservation (DEC) that "Part of the solution of pollution is dilution."

SEPTIC SYSTEMS VS WASTEWATER TREATMENT

A septic system is not a treatment system. It relies on soils to "treat" waste.

Septic tank size and design must be based on the type and quality of soils, and on use.

Proper care and maintenance are key to long-term effective use (regular septic pumping, tank inspection, water conservation, etc.).

Properly designed, constructed and maintained sewage systems pose no undue health risk to the environment.

SEPTIC SYSTEM DESIGN:

- Must meet state and local regulations.
- Must be appropriately sized.
- Must have appropriate soil type, area, and depth to water table.

The average life a conventional septic system is 25-30 years.

Current State regulations, which have been in place since 1990, apply to new construction only. Repair or replacements of failed older systems in the Canandaigua Watershed have been done under Section 75A of the code (appendix).

In New York State, you need:

- 4' depth of usable soil.
- A percolation rate of 1-60 minutes/ inch.
- A proper slope.
- 100' distance between septic tank and wells.
- To place the bottom of septic field trenches above the 10 year flood level.

Three sets of problems are caused by failed septic systems in watershed areas.

- There is a Public Health threat of disease from pathogens and nitrogen.
- There is a threat to lake health resulting from lake aging due to excess nutrient loading.
- An unhealthy lake eventually becomes an economic threat because it affects property values.

What if a site doesn't meet 75A standards in the Canandaigua Watershed?

- You do the best you can, being aware of the risk/liability associated with a severe site.
- For severe sites, the homeowner MUST retain a Design Professional (under local law).
- Why? This protects the homeowner and the Town from most liability (though not all).
- A severe site is defined as:
 - o not having 4' depth of soil
 - o not having a good percolation rate (1-60 min. /inch)
 - o having a slope greater than 15%

ALTERNATIVE SYSTEMS

Section 75A (of state code) allows certain alternatives to conventional sewage systems. For both traditional and alternative systems, the square footage of bedrooms determines septic size.

Alternatives outlined in 75A include raised bed and mound systems.

Alternative systems must be designed by a licensed professional engineer.

AEROBIC TREATMENT SYSTEMS

Septic systems are anaerobic.

Some of the alternative systems are aerobic. They have a mechanical device that aerates the sewage --it resembles an oversize fish tank bubbler.

Sewage goes from the house to the tank containing an aerobic unit. From there, the treated effluent goes to a distribution box and then out to fields or infiltrator chambers.

Aerobic systems:

- work well
- have been tested for a long time
- have 98% efficiency in removing pathogens
- don't remove nutrients such as phosphorous

The Canandaigua Watershed District requires that when a septic system fails, its replacement must meet current standards - it must be located be 100' away from lake or as far away as is possible.

In cases where it cannot be located 100' away from the lake, George has the authority to work with professional designers to find creative engineering solutions:

- If the house is at the edge of the lake they pump the septic up a hill to an aerobic treatment system.
- Where the soil is poor, they bring in soil with good percolation rate.
- They require a planted buffer to eat up nutrients.

The Canandaigua Watershed District allows aerobic systems for new construction as well as for replacing failed older systems.

The space requirement is about the same as traditional septic systems.

They use infiltrator chambers in place of the old field pipes.

Aerobic treatment companies are looking at add-ons for aerobic systems that would filter out phosphorous. One such system is the KNRD system under development by White Knight.

Costs:

It costs about \$15,000 - \$20,000 to get an aerobic unit, including installation

Canandaigua requires that you purchase a maintenance agreement with the manufacturer or an authorized service person to have the unit inspected and maintained two times/year.

If you need to pump sewage uphill to the aerobic treatment system, the pumping system costs about \$2,500 - \$3,000.

One infiltrator chamber system he has used (for leach fields) is:
Equalizer 24 chamber system for septic leach fields. The manufacturer is:
Infiltrator Systems, Inc.
O.O. Box 768
6 Business Park Road
Old Saybrook, CT 06475
800-221-4436

If you replace a failed system with an aerobic treatment system, the leach field can be smaller.

Aerobic treatment systems must be sized according the number of bedrooms:
The smallest size allowed - for 3 bedrooms - must handle 500 gal/day
For a 4 bedroom house, the unit must handle 600 gal/day.
For a 5 bedroom house, the unit must handle 750 gal/day.

Some aerobic treatment systems (such as White Knight) are concrete.
Other manufacturers use fiberglass units that are more practical in tight areas.
Manufacturers of fiberglass units:
Milti-Flo
Clearstream
Nyatic

The bottom of the septic field trench must be 1' above the 10-year flood level in Canandaigua (George's criteria). The trench should be 2' deep for aerobic systems.

For small lots where there is no place for a conventional system, a raised crib can be built of either pressure treated lumber or landscaping block to hold soil that "polishes" the effluent.

A grinder pump can be used in front of an aerobic treatment system

The soil surrounding the fields provides the "polishing treatment."

It is important to plant a buffer of trees and native plants between the fields and the lake. For nutrient removal, plant lawn grass (perennial rye, fescues, etc.) on top of the fields; they soak up nutrients. The grass should be mowed to improve nutrient uptake. This is particularly important in an aerobic system where the fields are shallow; grass pulls the nutrients up and out rather than having them go down and eventually into the lake.

In Canandaigua, they require homeowners to sign a maintenance agreement by an authorized dealer. Twice a year inspections are required as long as the unit is used. The homeowner must send receipts from the authorized maintenance dealer to the Watershed Inspector to verify that the inspections have taken place.

Aerobic systems can't be buried. They need to be accessible to the manufacturer's rep for twice a year inspection. The area around the exposed cap (which resembles a domed garbage can lid) can be landscaped.

MICROBIAL INNOCULATOR GENERATOR

Another type of alternative system is the Microbial Inoculators Generator. This type promises to clean up failed leach lines. It can be installed in the existing septic tank.

This is a concrete tank with a raised collar for maintenance. It has an air compressor to aerate the waste. The cleaned effluent reactivates leach lines and leach fields by oxidizing and breaking down sludge in the leach line. The effluent is clear; the bio-mass is gone.

As with the Aerator systems, maintenance is required twice per year.

HOLDING TANKS

These are ONLY used in the case of repair, as a last resort, where none of the above options can be used.

They are NOT allowed for new construction.

They MUST be pumped when full, and Canandaigua requires installation of an alarm that goes off then the tank is nearing capacity.

The MINIMUM size required is a 1,000 gallon tank. You can hook up two 1,000 tanks serially for expanded capacity.

Where holding tanks are used, Canandaigua REQUIRES low flow faucets, showers and toilets.

Homeowners who have holding tanks are advised that taking laundry to the Laundromat will lengthen the time between pump-outs.

One home owner with a 2,000 holding tank found that if clothes were washed at the Laundromat rather than at home, he needed to have the tank pumped out every 2-1/2 months instead of every month.

The Canandaigua Watershed monitors pumping by requiring pumping receipts.

REMEDIAL ACTION GUIDELINES

Remedial action requires:

1. Development of effective and economic alternative systems for limited sites
2. Development of a system that encourages strict compliance

KNOW THE CODE.

KNOW THE LIMITATIONS

The Town of Gorham has a small pipe sewage treatment plant.

QUESTIONS

Q. How are these alternative systems managed and monitored?

A. For any alternative system within a watershed area you need a management program in place - someone to track units and monitor them. That person is called a Responsible Management Entity (RME). I am the RME for the Canandaigua Watershed District - I carry out inspection and enforcement duties.

Q. Are there grants available for sewage treatment plants or on-site units?

A. Not that I know of. The only ones I know of are for people in the lowest economic bracket.

Q. How was your Watershed Commission formed?

A. We had to get an Inter-municipal Agreement (IMA) that required approval by every local government involved.

Q. How is your work funded?

A. The Management Plan has a funding provision based on a complicated taxing formula.

Q. What effect do pharmaceuticals have on the effectiveness of aerobic or microbial inoculator treatment systems?

A. They do have an effect. I have had one experience with this. Inspections indicated that one man's treatment system was not working properly. I eventually discovered that he had cancer and was undergoing chemo. So pharmaceuticals do compromise effectiveness.

