

P01-03 System Profile

Glorified Onsite System

Cluster technology on a Minnesota lake saves a community money and legal ramifications

By Scottie Dayton

The idyllic Cedar Lake community in Faribault, Minn., had some serious sewage treatment problems; some septic systems emptied directly into the lake, others didn't comply to code, and still more had failed mound systems. The community was compiled of upscale homes ranging in age from 5 - 20 years old.

Until Minnesota's new septic laws went into effect 10 years ago, homeowners with failing systems weren't required to upgrade their sewage systems. By today's standard most financing agencies and local governments force sewer treatment upgrades when property is sold or additions are built on to the house. However, with MPCA (Minnesota Pollution Control Agency) constantly moving toward getting everyone to have a working treatment system, Cedar Lake Cluster Association forced the issue. Threatened with local government intervention, 38 homeowners in the association hired Ellingson Companies of West Concord, Minn., to install a wastewater treatment system.

"These lakeside lots are slightly larger than city ones," says company salesman Jeremy Ellingson, "After building a cabin, garage, boathouse, and tool shed on their property, and designers figure in the lake and well setbacks, not much room remains for a mound's footprint." Ellingson's solution would push all the sewage to one location away from the lake and homes, and the owners wouldn't have to operate or maintain the system.

Site conditions

The water table along Cedar Lake varies, but is classified as moderately high. Soil is mostly clay with a little sand. Mounds are the preferred method of onsite treatment in this area. Some sites with failed mounds had spongy ground with effluent bubbling up.

System operations

Ellingson Companies installed a cluster unit with Environmental One's pressure sewer system. Instead of a septic tank buried in the yard, homeowners received a GP 2010 vertical Grinder Pump with check valve, 70-gallon high-density polyethylene (HDPE) tank, and controls. Solids, ground into fine particles, pass through the pump and check valve. A 1-HP, high-torque motor running at 1725 rpm. discharges 11 gpm at 40 psi into a 1-1/4-inch HDPE sewer-rated pipe.

This pipe connects to a forcemain ranging in size from 1-1/2 - 4" in diameter based on flows, Performance Pipe was the polyethylene (PE) manufacturer on this project. The forcemain carries the sewage into two 10,000 gallon septic tanks located away from the lake and houses. Effluent

gravity feeds from the septic tanks to a 2,500 gallon pump tank. Two Goulds' submersible 1/2-HP effluent pumps pressure distribute the effluent evenly to the drainfield. This contains four cells with a total of 7514' of Prinsco 10-inch diameter Goldline gravel-less leachbed pipe (GLP).

Numerous 1-inch diameter lines and valves connect to each GLP so the cells can be individually monitored, the disbursement rotated to increase the system's longevity, and the cells rested to get better overall treatment.

Installation

“When compared to a gravity sewer and municipal treatment, a cluster system is comparable in quality yet in most cases less expensive to install,” says Ellingson. “Lift stations also aren't necessary, because the force main doesn't have to be on grade and the individual pumping units can carry the sewage for miles. Following the land's contours, we buried the pipe just below the frost line. In Minnesota, that's 6-1/2 to 7-feet deep.”

Ellingson Companies crews directional bore the 1-1/4" service laterals into each backyard for the hookup to each E/One grinder station. Then a small excavation is made at the road to install a curbstop to isolate each property from the main and in the yard near the existing tank for the pump station. Finally the service lateral and existing gravity lines are hooked to the new system with minimal restoration and abandonment of the existing system is the final stage. Also restoration is minimized along the main, excavations are usually only made around every 1,000 feet, they directional bore the pipe and “pothole” at intersections and the end of lines to connect the pipes. Flushing stations are also installed at the ends of the main lines for future maintenance if needed. “Directional boring doesn't tear up or block off streets or destroy expensive landscaping when installing a pressure sewer system,” says Ellingson Companies.

The MPCA requires designing systems 33 percent larger than necessary. Cedar Lake's system can handle 10,000 gallon a day from the combined 38 homes. Enough land is available for the system to be expanded time and again. It cost each owner \$9,800, about the price of a typical mound system in Minnesota yet get a lot more longevity and a better system.

Maintenance

When the project was complete Ellingson Companies became the maintenance provider, to operate and maintain the systems to ensure longevity of the system. “Unlike traditional onsite systems, Cedar Lake Homeowners don't have to pump and maintain a septic tank in their yards,” says Ellingson, “but the county has just one system to regulate instead of thirty eight.”

Sidebar:

Location: Cedar Lake in Faribault, Minn.

Facility Served: Community of 38 single-family homes

Designer: **Ellingson Companies, West Concord, MN**

Installer: Ellingson Companies, West Concord, Minn.

Site Conditions: Mostly clay with some sand and a moderately high water table

Type of System: Cluster unit with pressure sewer system

Installed Cost: \$9,800 per homeowner

Hydraulic Capacity: 10,000 gallons per day

Suppliers:

Environment One Corporation
Niskayuna, New York

Goulds Pumps Water Technologies
Auburn, New York

Performance pipe
Distributed by Foreer Supply, Milwaukee, Wis.

Prinsco
Prinsburg, Minn.