

A Wing and a Hoot

Aerobic treatment units and an oversized system design enable a Virginia golf course to reopen on time

By **Scottie Dayton**

Red Wing Lake Golf Course in Virginia Beach, Va., closed in fall 2004 for a tee-to-green renovation that included replacing its old septic system and drainfield. Effluent no longer flowed to the absorption bed, so a pumper came every two weeks to empty the 1,000-gallon tank.

A pumped effluent septic system was selected as the replacement. Only contractors who had installed five systems this large within the previous 10 years could bid on the project. Just one area company qualified, but the quoted price stressed Red Wing's budget.

The city Parks and Recreation Department had hired the Kevin Tucker Design Group in Nashville, Tenn., to redesign the golf course. Tucker asked Ron Suchecki of Hoot Aerobic Systems in Lake Charles, La., about advanced onsite solutions.

The resulting system involved a meter dosing and equalization tank, suspended-growth fixed-film

biological nutrient reduction treatment systems, and drip irrigation. The system went active in September 2006 for the grand reopening of Red Wing Lake Golf Course and its first tournament.

Site conditions

The golf course has eight man-made lakes and is one-half mile from the Atlantic Ocean. Soils are sandy loam with seasonal high groundwater at four feet. The loading rate is 0.20 gpd per square foot. Because the course lies in a floodplain, no material from outside the site could be imported.

System components

"This system has lots of redundancy to handle shock loads," says Suchecki. "It required an oversized system because of the strength of the influent. The system is also oversized because the state considered the clubhouse snack bar a 50-seat restaurant serving two meals a day." Engineers



A work crew delivers a 17,000-pound Hoot H-1000 AND treatment system with 1,000 gpd capacity, built on 1,469-gallon pump tank. The unit was moved with a crane truck built by Hoot Aerobic Systems.

"We used drip irrigation so that the grass can uptake whatever nutrients are left in the water. That will reduce the overall fertilizer applied to the area and protect the groundwater."

Ron Suchecki

sized the system to handle 1,990 gpd. Its major components are:

- 3,300-gallon, two-chamber concrete meter dosing and equalization tank. All tanks made by Hoot Aerobic Systems.
- PL525 effluent filter and tank alert from Polylok Inc., Wallingford, Conn.
- Two 2-inch solids duplex Goulds pumps (WW511A) configured for duplex control with meter dosing.
- Three Hoot H-1000 AND aerobic treatment plants each with 1,850 gallons volumetric capacity.

- Three 1,460-gallon built-on concrete pump tanks.
- 3-zone ACT C200S auto-flush filter system from JNM Technologies, Bryan, Tex.
- Two duplex 3/4-hp 20EB107 Goulds effluent pumps.
- 4,500 feet of Netafim Bioline tubing in three 180- by 20-foot zones. Emitters are on 2-foot centers at 0.61 gallons per hour.
- IFS duplex meter dosing panels from SJE-Rhombus Controls, Detroit Lakes, Minn.
- RMS-300 telemetry monitoring from NSF International, Ann Arbor, Mich.

System Profile

Location:	Virginia Beach, Va.
Facility served:	Red Wing Lake Golf Course
Designer-installer:	Hoot Aerobic Systems, Lake Charles, La.
Site conditions:	Sandy loam, seasonal high groundwater at 4 feet, loading rate 0.20 gpd per square foot.
Type of system:	H-1000 AND treatment plants, Hoot Aerobic Systems
Hydraulic capacity:	1,990 gpd



A Hoot team installs a panel rack for the controls and blowers. Three of the four tanks can be seen along with the generator used for temporary power-up.

System operation

To determine the system's hydraulic flow, Suchecki and Engineering Services Inc. of Virginia Beach combined the flow from the clubhouse and new maintenance compound, then added the peak flows from two major tournaments. "During competitions, several hundred people use the restrooms just before they start golfing, then again when they return for lunch," says Suchecki. "These hydraulic spikes probably contributed to the previous system's failure."

Because the changes qualified as a new system, it was rebid. Hoot won the bid and qualified by doing the work corporately. "We used Landscapes Unlimited, the excavation team from Raleigh, N.C., that had worked on this course," says Suchecki. "Although my crew and equipment traveled 2,000 miles, we still saved the city more than \$100,000."

Waste from the clubhouse bathrooms and snack bar grease trap flow through separate 4-inch Schedule 40 PVC lines that merge as they exit the building. The new 1,200-foot sewer pipe from the maintenance compound ties into the main line at grade.

Influent gravity-flows into the septic tank's 1,850-gallon pretreat-



ment compartment, then through the effluent filter into the second chamber — a 1,469-gallon meter dosing and equalization tank. Pumps send the effluent to a manifold feeding the aerobic treatment units. A manual ball valve network enables them to be turned on and off based on seasonal hydraulic demand. The units are dosed every 15 minutes.

Sewage from the equalization tank is pumped to the aeration chambers of the H-1000 systems,



Above, the control panel rack, nearly finished. Temporary cords hanging from the panels were used to perform the inspection power-up. At left, trench installation for the subsurface drip distribution system and flush return manifolds for two of three zones.

where it is mixed with oxygen. Aerobic microorganisms feeding on the organic materials convert ammonia to nitrate. Sewage upflows from the bottom of these chambers and settles as clear, odorless effluent as it rises through the clarifiers.

The liquid then passes into the pump tanks. A portion of the daily flow returns to the pretreatment tank. Recirculation on these systems can reduce total nitrogen by more than 60 percent from influent levels. Any activated sludge settling in the clarifiers is reintroduced to the aeration chambers by sewage movement in those chambers.

The three pump tanks are inter-

connected. "By joining them to form one 4,380-gallon pump tank, we have a full day's storage capacity above the alarm-on point," Suchecki explains. Effluent passes through the metered ACT C200S filter system before being pumped to the 9,000-square-foot drip irrigation drainfield. Its three zones can be turned on and off depending on hydraulic demand.

The filtration system is back-flushed automatically several times a day. The backflush system also performs field flushes and achieves a scouring velocity of 2 fps. Drip lines are flushed automatically once a week.

Installation

The three-day installation in mid-July was a corporate venture. Besides Landscaping Unlimited, K.R. "Trapper" Davis, owner of Coastal Plains Environmental Group, LLC, Providence, Va., supervised and obtained supplies locally. "He's the system's service provider and needs to know what is underground," says Suchecki. "As a former regulator, Trapper also was familiar with Virginia's code and proved a valuable resource throughout the project."

Hoot owners Todd and Troy Cormier assisted Suchecki with the installation, while an employee drove the crane truck carrying one concrete tank and lids. A semi-trailer transported the other three tanks. Suchecki coordinated the arrival with Landscape Unlimited. No bedding of the holes was required, as this was a sand excavation.

JNM Technologies owner Jim Prochaska supervised installation of the drip dispersal system and provided the custom-designed auto-flushing headworks system. The drip tubing was installed 6 to 8 inches deep with a chain trencher, and backfilled with a mini-excavator. The absorption bed was more than 1,000 feet from the pump tanks.

"We used drip irrigation so that the grass can uptake whatever nutrients are left in the water," says Suchecki. "That will reduce the overall fertilizer applied to the area and protect the groundwater."

Meanwhile, Virginia Beach Municipal Maintenance arranged the pumping, chlorination, crush-

ing, and backfilling of the old septic tank. They also pumped the grease trap. The City of Virginia Beach camera-inspected and approved the pipes from the buildings to the new lines.

Sucecki tapped into the original combined sewer line where it came to grade. “We had to install additional cleanouts every 50 feet because the code had changed,” he says. “We also replaced any broken cleanouts.”

Hoot personnel built a rack to hold the control panels. Then the greenskeepers poured a concrete base for the Troy Air linear blowers. This area was surrounded by bushes to disguise it.

One obstacle Sucecki encountered was no electricity. A new meter should have been installed, but wasn't. Regulations required the system to be permitted at three stages before the utility could run



The JNM Technologies three-zone ACT C200S auto-flush filter system installation.

the new power line. “We used a generator to show inspectors that the system was operational, then returned two weeks later to complete the permanent hookup,” Sucecki says. “These delays brought the job right down to the wire.”

Maintenance

Hoot requires the system to be maintained professionally every six months. Red Wing greenskeepers are trained to handle emergencies until Davis arrives. The checklist



Installation of the dual-manifold air-vacuum relief valve and support block.

includes cleaning the filters, observing the pumps in action and cleaning their intakes, making sure distribution matches the hydraulic demand, looking inside the clarifiers, and ensuring that the reverse flow is working properly and the ACT C200S filters are clean.

Drip zones must be pressurized to check for breaks in the tubing, and the air filters on the blowers must be cleaned. ■

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