

## **Sewer Anywhere and Save**

A recurring dilemma for resort developers is that conventional utilities are cost-prohibitive or simply not suitable for pristine mountain, lakeside, and beach terrains. In many cases, low-pressure sewer (LPS) systems can make the difference between building and not building. The more beautiful and challenging the landscape, the bigger the potential profits with LPS technology.

This revolutionary innovation is an economical, environmentally friendly, and gravity-defying solution that flies in the face of a convention dating from the face of a convention dating from Roman times — the deep trenches, large-diameter mains, and expensive lift stations of traditional gravity sewer systems.

Gravity sewers are environmentally inappropriate and financially unsound for many parcels of real estate, including Golf Digest's top 50 courses, the 655-acre Forest Highlands resort outside Flagstaff, Arizona. Forest Highlands installed an LPS system to sewer its volcanic-rock terrain. The use of LPS techniques — with small-diameter pipes buried just below the frost line, following the contours of canyons and streams — made possible the construction of luxury homes amidst Ponderosa pines with minimal up-front expense and environmental disruption.

"The product was new to me coming into the project, and how it worked out was a definite plus," says Ronald A. Todd, project manager of Forest Highlands.

## **Using Technology to Maximize Profit**

After 25 years of research, development refinements, and "on system" experience, LPS systems have matured into a mainstream technology with a proven track record in terrain as diverse as the Rocky Mountains; Martha's Vineyard; Puget Sound; Hawaii; and Branson, Missouri.

An LPS system begins with a grinder pump, a device barely bigger than a beer keg. It can be installed inside or outside a building. The grinder pump accepts wastewater, grinds its contents into a fine slurry, and transports it through small-diameter pipes. The installation of shallow-lying pipes is applicable to any terrain — sand, lava, coral, and high water tables — without the ecological disruption caused by excavation for large-scale gravity systems.

LPS providers see growing acceptance on projects of increasing size. Communities of 2,500 homes, supporting populations of more than 20,000, are now using LPS systems because they are tougher, cheaper, and do the job more effectively.

Fairfield Glade, a resort and retirement community on Tennessee's Cumberland Plateau, has four golf courses, 11 lakes, 16,000 plotted homesites, and 31 miles of LPS mains. Fairfield Glade conducted an economic study to choose efficient sewer systems and found that the relatively modest front-end cost of LPS systems makes using grinder pumps economical for its low-density housing units.

With a conventional sewer system, a developer must fund all of the cost at the beginning and then wait to sell his lots, tying up millions of dollars for months or years. He pays for the whole gravity system; homeowners pay only for sewer hook-ups.

With an LPS system, however, the developer merely lays the lines, an installation no more difficult than that of a lawn sprinkler system. Each homeowner foots the cost of a grinder pump — about \$2,500. The developer can defer 50 to 90 percent of the cost to sewer a given lot or building site until he begins construction on it or sells it to a builder. This economization could make the difference in getting a project started, especially in a setting where buildout occurs slowly.

With a well-designed system, properly installed, the operating costs per unit can be under \$50 annually, based on the extended service life of some LPS systems on the market. Units are available that require no annual preventive maintenance; their supplier calculates that the mean time between service calls on its product is in excess of eight years.

"Low maintenance cost and dependability highlight the performance of [these] pumps," says Barry Field, Fairfield Glade's director of public works.

### **The Un-Gravity Solution**

In some cases, anything but an LPS system is impractical. When Ahnert Enterprises (now Resorts USA Inc.) was developing homesites at the Saw Creek ski run in the Pocono Mountains of northeastern Pennsylvania, the builder found grinder pumps were the only viable application for parcels that some might see as unusable.

Gravity sewers entail extensive, expensive earth removal and labor to dig deep, steep trenches that create a downhill grade. Grinder pumps defy gravity, forcing sewage uphill from low-lying lots such as some at Saw Creek Estates, where orphaned lots ripened into attractive and valuable home sites. The flow can travel up to two miles over hilly terrain.

"The Saw Creek Estates resort community is located in a rocky valley with big elevation variations. Using gravity sewers would have involved rock blasting and digging trenches 20 to 30 feet deep. In some cases, development would have

been literally impossible. The grinder pump gave us the only feasible way to sewer these areas," says Chuck Hannig of Resorts USA. Hannig has been using LPS systems for more than 10 years and has more than 1,000 pumps in operation.

Danny Lister, general manager of land planning for National American Corporation, has grinder pumps in condominium and single-family home developments in Pennsylvania and South Carolina.

"Using LPS systems instead of gravity saved us over 60 percent on cost per linear foot," Lister says. "Furthermore, they are extremely easy to install."

A consulting engineer involved in conventional sewer systems can design LPS systems with the professional help of an architect, engineer, or supplier. The fundamentals of installing pipe, connections and valves are exactly the same. The difference is the grinder pump, in which all sewage-handling operations are safely sealed inside a pump tank housing a quiet high-torque, low-speed motor. Average power consumption is about 20 kilowatt hours a month.

LPS systems are not just for special applications. They are the intelligent solution for a total development, regardless of topography and other special conditions, because they cost less than a traditional system. In addition to construction savings, they yield significant operational savings. Unlike a traditional system, in which groundwater infiltration might add 50 percent to wastewater flow, LPS technology avoids groundwater infiltration and thus requires smaller wastewater treatment plants. Some innovative LPS systems also realize savings by irrigating golf courses with treated effluent.

An LPS system can restore water quality in communities plagued with failing septic tanks, which may pollute groundwater supplies, degrade recreational waterways, and jeopardize health.

Planners in the sparsely populated region around Branson, Missouri, "America's MusicShow Capital," have turned to LPS technology to supplant aging septic systems with safe, feasible, and harmonious sewer infrastructure that protects the Ozark region's unspoiled lakes.

For resorts, with reputations constantly on the line, reliability is paramount. LPS systems have proven to be an effective, dependable method of sewerage after a quarter-century of testing in condition as extreme as Arctic permafrost.

"Ours is a vacation community," says George Nicklas, general manager of Wintergreen Resort in Virginia. "Because its inhabitants are renters, our sewage system takes more abuse than one for permanent residences would. Yet, our grinder-pump maintenance record has been excellent for over a decade."

## **Delicate Harmonies**

Why aren't LPS systems more visible? One reason is a lot of people simply never heard of them.

Breaking through perceptual barriers is a bigger challenge. Despite its maturity, some remain reluctant to embrace what they still regard as a new technology, and some suppliers' equipment has had disappointing service records, creating misapprehensions about the proven track record of the latest products.

Another misconception is that LPS systems are suitable only for small houses or weekend-getaway resorts. The truth is, they are installed at luxurious villas. One of the biggest single-family residences employing an LPS system is the 16th-century Drottningholm Palace, home of Sweden's royal family. LPS clearly is past its trial period; its acceptance is growing.

America's inventory of resort and retirement accommodations will double in the next 30 years. Many of these projects will include environmentally sensitive vacation villas and single-family dwellings built around golf courses, an arrangement for which LPS technology is ideally suited. It complies easily with new U.S. federal clean-water regulations and the ecological and cost constraints faced by developers worldwide.

Stephen V. Ardia is board chairman of Environment One Corporation. Ardia joined Environment One in 1995 after serving as president and chief executive officer of Goulds Pumps Inc., which entered the ranks of the Fortune 500 during his tenure. He has a bachelor's degree from the U.S. Merchant Marine Academy and a Master of Business Administration degree from Rutgers University.

This article originally appeared in *Vacation Industry Review*.