

Close Quarters

An aerobic treatment unit and drainfield chambers help designers make the most of a site's restrictive conditions

By **Scottie Dayton**

A couple razed their old house on California's exclusive Trancas Beach and built a two-story, four-bedroom home. The upgrade included replacing the conventional septic system.

John Yaroslaski P.E., founder of Ensitu Engineering in Morro Bay, Calif., designed a new onsite system large enough to handle regular high usage. However, the required setbacks from surface water, wells, the enlarged house, and property lines limited treatment options. Environmental issues with shallow groundwater further restricted choices. Finally, the only space available for the new system was the old drainfield in the courtyard.

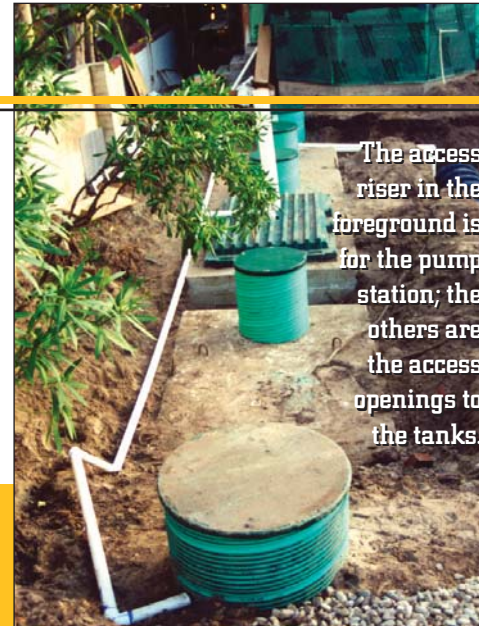
Yaroslaski's design provides primary and secondary treatment and reduces the drainfield's overall footprint to 820 square feet. Russell Mosser of Mosser Plumbing

& Heating Inc. in Malibu got the job through a general contractor.

Site conditions

The long, narrow, two-thirds-acre lot has a large front yard with 75 feet of Pacific Ocean frontage. Behind it is the 4,000-square-foot house, courtyard, and a two-car garage that forms part of the security wall.

Trancas Beach is a pristine area along the Pacific Coast Highway. The land slopes gently away from the beach and up the mountains from which groundwater flows. The soil is classified as native sand and shell with a fast percolation rate. Liquefaction can be a problem. Most onsite systems for new construction in Malibu are drainfields with tertiary disinfection.



The access riser in the foreground is for the pump station; the others are the access openings to the tanks.

System components

Yaroslaski sized the system to handle 600 gpd. The heart of the system is a two-compartment, 2,500-gallon concrete pretreatment tank containing a Bio-Microbics 1.5 HiStrength fixed activated sludge treatment (FAST) unit.

A large box-like container suspended from the lid inside the tank contains media to which bacteria cling. Above ground under a poly box is the blower unit with a blower motor and air filter. The system also includes:

- 2,500-gallon dosing/surge tank with duplex pump system
- 24-inch-diameter, 30-inch-high pump basin with 2-inch discharge grommet, Biotube pump vault, and VeriComm telemetry monitoring system vault from Orenco Systems Inc., Sutherlin, Ore.
- Two 1/2 hp 2-inch alternating Grundfos sewage ejector pumps
- 20 high-capacity Infiltrator chambers from Infiltrator Systems Inc., Old Saybrook, Conn.

System operation

From the house, wastewater gravity flows 50 feet through 4-inch ABS black sewer pipe to the septic tank, then into the second chamber containing the FAST unit. A pump lifts the liquid into the FAST unit, which reduces biochemical oxygen demand and suspended solids. "This system was the best choice because it can handle shock loads and self-adjust to low flow periods," says Yaroslaski.

The effluent gravity feeds to the pres-

surized dosing tank. Four times an hour, the pump activates, sucking the liquid through an effluent filter before it reaches the pump vault. High-head effluent pumps deliver the pretreated liquid to the zone valves for dispersing to two 410-square-foot leachfields. There it flows through washed sand and returns to the environment.

"I was concerned about the possibility of masking the sand if we used gravel in the leachfield," comments Yaroslaski. "The chambers eliminated the need for gravel, maintained the proper separation to groundwater, and offered the maximum internal volume per foot for increased surface area."

Mosser adds that the chambers also solved the biomat problem. "We can monitor the water level through access ports, make adjustments, and prevent a biomat from clogging the chambers," he says.

Installation

Mosser and his crew faced two problems. First, the security wall kept them from driving any equipment onto the site. A 35-ton crane hoisted components and machinery from the road into the courtyard, passing them between the power lines and garage roof. "That was the hardest part of the installation," recalls Mosser. "We sometimes had about an inch clearance."

After removal of the old treatment system, excavation began for the new one, but the sand kept caving in. "That was our second challenge. We went on height-

System Profile

Location:	Trancas Beach, Calif.
Facility served:	4-bedroom home
Installer:	Mosser Plumbing & Heating Inc., Malibu, Calif.
Site conditions:	Sand and shell with fast percolation
Type of system:	Fixed activated sludge treatment (FAST) unit from Bio-Microbics and 20 Infiltrator chambers from Infiltrator Systems Inc.
Hydraulic capacity:	600 gpd

ened safety alert and inserted prefab shoring walls as we excavated,” says Mosser. “My company has a perfect safety record and we all worked hard to keep it that way.”

Excavated drainfield sand was dried on site, transported to waiting trucks by conveyor belt, then hauled to a landfill. The belt also brought in washed granule sand for tertiary treatment. The fiberglass FAST unit was installed in the 32,000-pound septic tank while it was still sitting on the road. The men carried in the chambers, drilled holes through the tops, and hung 1-inch PVC pipe to transport the effluent. They laid a filter fabric over the chambers to keep out dirt, covered that with a thin layer of gravel, then backfilled with native soil.

Maintenance

When the system was installed in the summer of 2001, the City of Malibu required only twice a year inspections due to the system’s telemetry monitoring. “Today, the Regional Water Quality Board and Coastal Commission require quarterly water samples,” Mosser says.

Should a problem arise, the telemetry system sends an alert by way of Mosser’s company computer. Using any computer, Mosser dials into the system’s control

Partial installation of the chambers with gravel bed and pipes for dispersing the treated effluent.



panel, evaluates what is going on, and can usually solve the problem from the keyboard. “It saves a lot of service calls, and all my customers benefit from that,” he says.

The FAST unit requires quarterly maintenance to ensure that the blowers are working and all parts are functioning properly. “We check the dosing piping to make sure it isn’t clogged,” says Mosser, “because back then systems weren’t installed with back-flush capabilities. They are now.” The system is functioning flawlessly. ■



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