

O R E N C O C A S E S T U D Y

Diamond Lake, Washington: *12-Year Old Effluent Sewer Requires Little Maintenance*



The community of Diamond Lake, in northeast Washington state, saved its beautiful 800-acre lake by replacing all its old, leaking septic tanks and inadequate disposal systems with watertight tanks and an Orenco effluent sewer system. Diamond Lake's wastewater system serves more than 500 homes, as well as one of the largest Boy Scout camps in the country.



"We're operating this system – water and sewer – with just two guys. More than 500 sewer customers and 600 water customers. It's easy to maintain."

Larry Garwood
Diamond Lake
Water & Sewer District

In the early 1970's, the residents of Diamond Lake, Washington knew that something had to be done about their wastewater. According to Bob McGowan, long-time member of the Diamond Lake Water & Sewer Commission, "Our lake was being destroyed by leaking septic tanks and failing drainfields."

The community needed federal funding assistance. Even so, "A gravity system was way out of reason," recalls Larry Garwood, system operator. After nearly 15 years of research and planning, the Commission decided on an effluent sewer and purchased ProSTEP™ pumping systems from Orenco.

Construction began in 1987. Installation went well but was not easy, since the soil was heavy clay, with high groundwater. In addition, about 25% of the excavation had to be blasted for the tanks and minimum 42"-deep collection lines. "If the engineers had known about the rock, the cost estimates for the gravity sewer would have been even higher," says Garwood.

More than a dozen years later, everyone is pleased with the system, according to Garwood and McGowan. All wastewater and water system maintenance is handled by just two operators. "The system is easy to learn and maintain," says Garwood. "We don't have many alarm calls. Pump motors never give us a problem, and the lines are performing well." (See "Operation/Maintenance" summary on back.)

Equally as important, wastewater services are very cost-effective, both for the district and its citizens. Customers pay \$15/month for residential properties and \$25/month for commercial properties.

Best of all, there's the lake. Within three years after Orenco's effluent sewer was installed, it was clear and clean again. "It recovered very early on," says Commissioner McGowan. "Diamond Lake is now a showcase." (*Continued on back.*)



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SUMMARY OF SPECIFICATIONS

Diamond Lake, Washington Effluent Sewer Using Orenco Systems' Equipment

INSTALLATION DATE

1987

TOTAL PROJECT COST

\$2,951,280 (excluding lagoon)
\$5,540 per home

ON-SITE FACILITIES

533 EDU's, mostly residential
529 STEP units, 4 STEG units

TANKS

RESIDENTIAL

1,000 gal single-compartment concrete tank
with effluent filters or screened pump vaults.

Tanks were tested extensively for watertightness and structural integrity.

COMMERCIAL

Multiple 1,000 gal or 2,000 gal tanks.

PUMPS

1/2 Hp (8 gpm typical) turbine effluent pumps.

COLLECTION SYSTEM

Each lot has 1.5" - 2" service lines
6.5+ miles of 3" - 8" main lines

Effluent quality of collection system (measured
at inlet of first lagoon):

BOD = ~170± mg/L ('89-'91)

TSS = ~40± mg/L ('89-'91)

TREATMENT SYSTEM

3-CELL AERATED LAGOON:

1 cell is 3/4 acre x 10.5' deep (on average)

2 cells are 3.75 acre x 16' deep

180,000 gpd design

Q (summer average) = 68,000 gpd

Q (winter average) = 45,000 gpd

37.9 million gallons winter storage capacity
(on average)

DISPOSAL

410,000 gpd irrigation to 38-acre alfalfa field
(Winter hold; summer irrigate)

OPERATION/MAINTENANCE

Entire system (wastewater and water) maintained by two full-time operators.

About 2 alarm calls per week (often for customer power failure).

Average time spent at site for an alarm: 20 min.

Calls typically broken out as follows:

Screen cleanings: 30

Pumps (cleaning): 30

Miscellaneous: 20

Control panels: 11

Discharge assemblies: 10

Floats: 5

Service lines: 2

Pump motors: 1

FEES

\$15/month residential

\$25/month commercial



This map shows the effluent collection system for the 533 homes around Diamond Lake, in eastern Washington. A 1/2 Hp pump in each septic tank transports wastewater to an aerated lagoon, six miles distant, with no lift stations required.



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