

# Prelos™ Sewers



## Cost-Effective, Environmentally Sound Wastewater Collection System

**IDEAL FOR COMMUNITIES OF ALL SIZES**

- Subdivisions
- Neighborhood clusters
- Commercial properties
- Sewer expansions
- Septic tank abatement
- Ecologically sensitive areas
- Challenging site conditions



# Prelos Sewers

## Choose the **Superior** Wastewater Solution:

## **Prelos Liquid-Only (Effluent) Sewers**

Communities and developers around the world struggle with wastewater collection and treatment issues. In many areas, gravity sewer systems are too costly. Moreover, gravity sewers are not watertight, so their overflows contaminate our rivers, bays, and oceans.

*"Given the diversity of the new technology that is now being developed, it is reasonable to speculate that, in the future, the continued use of conventional gravity flow systems will be a thing of the past."*

Dr. George Tchobanoglous, UC Davis, Author of *Wastewater Engineering: Treatment, Disposal, Reuse and Small and Decentralized Wastewater Management Systems*

*"Managed decentralized wastewater systems ... merit serious consideration in any evaluation of wastewater management options for small and mid-sized communities and new development."*

EPA, *Response to Congress on Use of Decentralized Wastewater Systems*, April 1997

Liquid-only (effluent) sewer systems are becoming recognized as one of the best solutions for collecting waste and transporting it to a treatment facility.

Orenco has helped hundreds of communities throughout the world to design, build, and maintain low-cost, reliable liquid-only sewers. Depending on terrain, liquid-only sewers are often half the cost of gravity sewers, or less.<sup>1</sup>

Orenco's Prelos (pressurized liquid-only sewers) are decentralized collection systems that are compatible with existing wastewater infrastructure. They take the burden off maxed-out municipal systems and allow sustainable service area expansion. For monitoring and control, Orenco offers telemetry panels that provide the power of SCADA at an affordable price.



There are other decentralized sewer technologies – grinder systems, for example. However, because the effluent from a Prelos Sewer is relatively free of grease, oil, and solids, the pumps and collection lines require less maintenance than grinder systems. And the high-quality filtered effluent from a Prelos Sewer requires less costly treatment.

For all these reasons, communities that purchase our liquid-only sewers enjoy system-wide, long-term savings.



# system-wide long-term savings

<sup>1</sup> Water Environment Research Foundation Fact Sheet C1 (Gravity Sewer Systems) and Fact Sheet C3 (Effluent Sewer Systems), 2010.



# Prelos Sewers

## How a Prelos Sewer Works

With a Prelos Sewer, raw sewage flows from the house or business to an underground tank that's designed to be watertight, where it's pretreated. Only the filtered liquid is discharged (by either pump or gravity) through the service lines to shallow, small-diameter collection lines that follow the contour of the land. Solids remain in the underground tank for passive, natural treatment. Tanks typically need pumping only once every 10-12 years, depending on the number of users.<sup>2</sup>

Prelos Sewers are designed as a totally integrated package, and system components are compatible and pre-assembled. Each item is covered by a limited warranty and components are corrosion-resistant, durable, and lightweight.



1

The Prelos Processor™ provides primary treatment, so only liquids are conveyed to the treatment facility.

2

Our patented Biotube® Pump Vault filters out solids, and our pumps can last more than 25 years,<sup>3</sup> requiring minimal or no maintenance.

3

One-inch (25-mm) diameter service laterals can be easily installed with a trencher.

4

Small-diameter mainlines follow the contour of the ground, saving on excavation costs. No expensive manholes or lift stations are required.

5

Primary wastewater treatment provided by the Prelos Sewer can decrease the capital cost and operating cost of the wastewater treatment plant.<sup>4</sup>



### From Sewer to Treatment

The high-quality, filtered effluent from a liquid-only sewer is ideal for use with a low-cost, low-maintenance treatment system, such as Orenco's AdvanTex® AX100 textile filter. From there, it can be used for irrigation, toilet flushing, or other kinds of beneficial reuse (subject to local regulations). Without infiltration or solids to worry about, the size of the treatment plant can be substantially reduced. This saves money on equipment, installation, and operation costs.

*Pictured at left is part of the South Alabama Utility (SAU) wastewater treatment facility in West Mobile. Phase I and Phase II include 36 AdvanTex AX100 units. Two additional phases of similar size are planned or under construction. Under SAU's program, all parties – developers, property owners, and the utility – share the cost of extending the wastewater infrastructure on a "build-as-you-go" basis.*

<sup>2</sup> Terry R. Bounds, P.E., 1995. "Septic Tank Septage Pumping Intervals." Sutherlin, Oregon: Orenco Systems, Inc., 13.

<sup>3</sup> As seen in the Elkton, Oregon, sewer system.

<sup>4</sup> As seen in the Montesano, Washington, sewer system.

# Prelos Sewers

## A Fraction of the Cost of Gravity Sewers

Prelos Sewers dramatically reduce short-term and long-term wastewater treatment costs for communities and developers. In fact, liquid-only sewers can be half the cost of gravity sewers, or less.<sup>5</sup> Here are the many ways you save:

### Save On Equipment And Labor

- Collection lines are shallowly buried, just below the frost line, reducing excavation costs.
- Inexpensive, small-diameter collection lines are used.
- Expensive manholes and lift stations are eliminated.
- Installation time is reduced by one-half or more, compared to gravity sewers.<sup>6</sup>

- Ease of installation causes less disruption to communities, allowing businesses to operate normally during construction.
- Ease of installation makes the system well-suited for community “self-help” programs.
- Most equipment isn’t purchased until lots are developed, which defers costs.

### Save On Operation And Maintenance

- Low maintenance requirements have been documented with liquid-only sewers.<sup>7</sup>
- 24-hour back-up storage in on-lot tanks reduces emergency calls and overtime costs.
- Homeowners pay about \$1.50/month in energy costs for pumps.<sup>8</sup>
- Residential tanks typically need pumping just once every 10-12 years, depending on the number of residents.<sup>9</sup>

### Save On Treatment Costs

- Because of high effluent quality, low-cost treatment systems – such as packed-bed filters and subsurface disposal – are ideal.
- Less costly permitting and testing are required when not discharging into waterways.
- Treatment facilities can be sized economically, since the whole system is designed to be watertight. There’s no need to allow for the infiltration and inflow from high stormwater flows or groundwater.



Orengo's Prelos Sewer Systems are ideal for new subdivisions, whether on flat ground or on the most difficult terrain.

*"In general, alternative collection systems should be considered for smaller rural communities with low population density and site specific environmental conditions . . . Shallow bedrock, high groundwater conditions, extremely flat or very hilly terrain and limited room for construction make alternative collection systems more cost-effective than conventional systems."*

Illinois Community Action Association  
*Alternative Wastewater Systems in Illinois*

<sup>5</sup> As seen in the Vero Beach, Florida, sewer system.

<sup>6</sup> Ibid.

<sup>7</sup> Bill Cagle, Terry Cargil, and Roger Dickinson, 2013. "20-Year Life Cycle Analysis of an Effluent Sewer (STEP) System." *Proceedings of the Water Environment Federation Technical Exhibition and Conference*, Chicago, Illinois, October 5-9. Alexandria: Water Environment Federation, 14.

<sup>8</sup> Run Time = 20 min/day, VAC = 115, A = 12.7, National Average Power Cost = \$0.10/kWh.

<sup>9</sup> Terry R. Bounds, P.E., 1995. "Septic Tank Septage Pumping Intervals." Sutherlin, Oregon: Orengo Systems, Inc., 13.



# Prelos Sewers

## Community Case Studies

Hundreds of communities throughout North America are successfully collecting and treating their wastewater with Orenco wastewater solutions. For more detailed case studies, visit [www.orengo.com/resources/case-studies](http://www.orengo.com/resources/case-studies).

### **Diamond Lake, Washington**

In 1986-87, an Orenco liquid-only sewer system serving 500 homes was installed in this Washington lakeside community. Half the properties were seasonally occupied, with sudden start-ups, prolonged shut-downs, and very cold winters. Even so, operator Larry Garwood said, "The systems are simple, dependable, and easy to maintain."

### **Lacey, Washington**

Lacey, Washington, was an early adopter of Orenco liquid-only sewer. The community's first mainlines were installed in 1986. Orenco staff worked closely with the city to design an effective maintenance schedule that would provide residents with a sustainable and affordable level of service. "We truly appreciate the effort that Orenco has made in doing what they can to reduce our costs and effort," said Terry Cargil, City of Lacey Water and Wastewater Supervisor. The city now has over 3,400 Orenco Sewer connections and almost 50 miles of small-diameter, liquid-only sewer mains.

### **Elkton, Oregon**

In 1989, an Orenco liquid-only sewer system was installed to serve more than 100 homes and businesses in Elkton, Oregon, at an average cost of less than US \$7,000 per home for both collection and treatment. Ten years after installation, maintenance on the entire collection system averaged less than one hour per month, and not a single residential septic tank needed pumping.

### **Steamboat, Oregon**

In 1999, an Orenco liquid-only sewer, followed by an innovative textile filter treatment system, was installed in Steamboat, Oregon, to replace a leaking gravity system along a wild and scenic river. Annual operating costs have been reduced by 72%!<sup>10</sup>

### **SW Barry County, Michigan**

To preserve water quality, this Michigan lake county has had a liquid-only sewer system since 1993. The collection system started with more than 1,200 Orenco units, which have been so dependable that almost 1,000 more have since been installed.



### **Mobile, Alabama**

In the 1990's, South Alabama Utilities realized it needed to provide wastewater services to new subdivisions or risk losing customer share. Since then, SAU has installed Orenco liquid-only sewer systems serving 47 subdivisions. The collection system is connected to 3,000 homes, has capacity for 4,000, and includes more than 80 miles (129 km) of pipe.

*"Progressive AE has been designing and observing the installation of STEP systems for small Michigan communities for over 15 years. And we've used the Orenco Systems STEP unit exclusively for more than 10 years."*

William J. Parker, P.E.  
Progressive AE

<sup>10</sup>. Interview with Jim Van Loan, owner of the Steamboat Inn, April 20, 2000.

# Prelos Sewers

## Frequently Asked Questions

Liquid-only or "effluent" sewer systems have been in use for several decades. During that time, the technology has improved so dramatically that liquid-only sewers are highly recommended by the U.S. Environmental Protection Agency, as well as by engineers, academics, and public agencies.



### **Who takes care of the system?**

The community or a utility will own the system and provide centralized maintenance. Orenco's VeriComm® Monitoring System can provide automated, round-the-clock, computerized supervision. Orenco provides training for system operators and engineers.

### **Will there be lots of service personnel on the property?**

Service time per home is minimal. Utility meter readers come by far more frequently.

### **Do pumps have to be repaired or replaced frequently?**

No. With normal maintenance and cleaning, our pumps can last more than 25 years.<sup>11</sup> Plus, the electricity to run them averages about \$1.50 per month.<sup>12</sup>

### **Will the system smell bad?**

No, not if properly designed and installed. Any wastewater collection system will smell if not properly designed and installed.

### **I've heard stories about these systems failing. Are they true?**

Orenco liquid-only sewers work well. Solid engineering, proper equipment, and attention to detail ensure that. With any type of sewer system, poor engineering, substandard equipment, or sloppy installation can cause problems. These sewers have a well-documented track record of success.

### **Is the underground tank hard to take care of?**

No. We require tanks that are designed to be watertight, and most need pumping only once every 10–12 years.<sup>13</sup> Otherwise, they're underground, out of sight, and out of mind.

### **What happens to the solids that accumulate in the tank?**

Accumulation of solids occurs slowly because of the digestion process that takes place in the tank (which is designed to be watertight). In fact, the tank digests more than 80% of the biosolids.<sup>14</sup> Remaining solids are easily managed through planned pumping schedules.

### **What if something goes wrong with my tank?**

Each property has a control panel with an alarm function. Your system's operator will be automatically notified of any alarms. And the 24-hour reserve space in your tank gives the operator time to have a problem checked.

### **If I have more questions, who can I call?**

Call Orenco at 541-459-4449 or toll-free at 800-348-9843.

<sup>11</sup>. As seen in the Elkton, Oregon, sewer system.

<sup>12</sup>. Run Time = 20 min/day, VAC = 115, A = 12.7, National Average Power Cost = \$0.10/kWh.

<sup>13</sup>. Terry R. Bounds, P.E., 1995. "Septic Tank Septage Pumping Intervals." Sutherlin, Oregon: Orenco Systems, Inc., 13.

<sup>14</sup>. H. Phillip, S. Maunoir, A. Rambaud, and L. S. Philippi, 1993. "Septic Tank Sludges: Accumulation Rate and Biochemical Characteristics." Proceedings of the Second International Specialized Conference on Design and Operation of Small Wastewater Treatment Plants; Trondheim, Norway.



# Prelos Sewers

## Rely on Orenco for **System Support**

Orenco's innovative solutions to wastewater problems have been helping to protect people, neighborhoods, and communities since 1981. Our designs appear regularly in engineering textbooks and professional journals, and our engineers are invited to speak around the world. We routinely offer our expertise in the following ways:

### **Project Delivery**

On the front end, Orenco offers design reviews for community systems. On the back end, we provide a variety of asset management services, including O&M protocols and recommendations to optimize financial performance.

### **Engineering and Technical Support**

We can provide referrals to engineers who have successfully designed liquid-only sewers. And we offer a wide range of engineering and technical support services, including

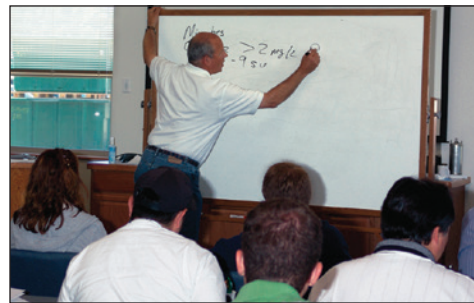
permitting assistance, plan reviews, hydraulic analyses, and electronic drawings of products and systems. We also provide plan reviews, bid documents, material specifications, O&M support, and tech support for advanced controls, including telemetry and SCADA.

### **Training**

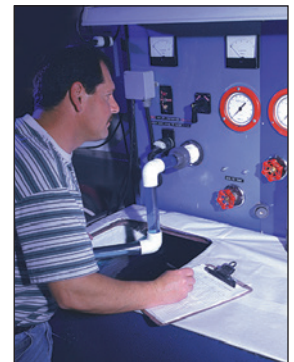
We offer installation and operation trainings at our headquarters in Oregon, U.S.A., at off-site locations, and via webinars.

Because our team of civil, environmental, mechanical, and electrical engineers

works exclusively in the decentralized sewer industry, we're able to offer unmatched technical assistance. When you choose an Orenco system, you'll have the industry leader behind you.



*We provide training at our Oregon headquarters and around the country.*



*Orenco maintains an environmental lab and invests heavily in research.*

*Our engineers offer unmatched technical assistance. Orenco's engineers and scientists have more than 500 years' experience in the water/wastewater industry.*



# Prelos Sewers



Orenco Systems is owned and managed by engineers who develop wastewater systems that work – systems based on sound science. Left to right: Eric Ball, P.E., Jeff Ball, P.E., Hal Ball, P.E., and Terry Bounds, P.E. (in front).

## Defining Sustainable Solutions Since 1981

With a deep respect for the environment and a long tradition of innovative problem-solving, Orenco Systems designs and builds the world's best decentralized wastewater systems with pride in Southern Oregon. Our products help ensure the health and safety of people, neighborhoods, and communities everywhere by protecting the world's water.



Orenco is headquartered at a 26-acre (10.5 ha) site in Oregon, a state that's known for its environmentally sustainable practices.

We maintain an environmental lab and employ dozens of civil, electrical, mechanical, and manufacturing engineers, as well as wastewater treatment system operators. Orenco's technologies are based on sound scientific principles of chemistry, biology, mechanical structure, and hydraulics. As a result, our research appears in numerous publications, and our engineers are regularly asked to give workshops and trainings.

Founded in 1981, Orenco has become an industry leader, with about 350 employees and some 330 points of distribution across North and Central America, Australasia, Europe, and Africa. Our systems have been installed in more than 70 countries around the world.

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814 Airway Avenue, Sutherlin, OR 97479 USA  
800-348-9843 or +1 541-459-4449  
[www.orenco.com](http://www.orenco.com)