

# Wastewater Solutions

**Affordable Wastewater Treatment Solutions from Orenco Systems<sup>®</sup> Inc.**

Schools and churches pose a challenge for engineers of decentralized wastewater systems because of their unique design considerations (see sidebar). Orenco's AdvanTex<sup>®</sup> Treatment Systems are ideal for schools and churches, and Orenco's wastewater equipment has been installed in more than 200 schools and churches throughout North America, as well as in Africa, New Zealand, and the Caribbean. In fact, an AdvanTex Treatment System for a school in Warren, Vermont, was honored with a 2001 "Engineering Grand Award for Water Resource Projects" by the American Consulting Engineers Council.



Photo courtesy of Lloyd Construction Company

Orenco's AdvanTex<sup>®</sup> Wastewater Treatment System was installed at the Andrada Polytechnic/Patano High school campus near Tucson. (Story on back)

## Wapsie Valley High School, Iowa

### *Excellent treatment despite variable flows*

Wapsie Valley High School had surfacing wastewater flowing over the school's parking lot from a failed, 45-year-old drainfield. Wildly varying flows and site constraints posed additional problems. During the school year, wastewater flows averaged 5,000 gpd (18.9 m<sup>3</sup>/day), and big events strained the system's capacity to a peak of 13,000 gpd (49.2 m<sup>3</sup>/day). During the summer, however, flows dwindled to almost nothing. Most wastewater treatment technologies perform poorly under these conditions.

After evaluating the situation, the project engineer, Cary J. Solberg, P.E., chose an AdvanTex Treatment System manufactured by Orenco, for its ability to handle variable flows, as well as for its relatively low energy consumption and ease of installation/operation. Once the AdvanTex system was installed, the consistently high quality of the effluent took the strain off the existing drainfield, which was rehabilitated and placed back into service. Sampling showed that the system's effluent BOD<sub>5</sub>, TSS, and NH<sub>3</sub>-N were averaging less than 10 mg/L, 10 mg/L, and 5 mg/L, respectively.\*

\* Samples collected between 1-13-06 and 5-10-06.

## **Design Considerations for SCHOOLS & CHURCHES**

Because of their intermittent usage, schools and churches require the ability to start up quickly and handle highly variable flows, both weekly and seasonally. These facilities also require the ability to handle varying waste strengths. For example, schools with kitchens and showers vary significantly from those without.

AdvanTex<sup>®</sup> Treatment Systems use a multi-pass, packed-bed filter treatment technology that is well suited for these applications, especially in conjunction with equalization tankage (which also allows for downsizing of the treatment facility). AdvanTex offers increased process stability and more consistent effluent quality than conventional activated sludge systems, which are difficult to operate part-time with highly variable flows and waste strengths. Consequently, depending on local regulations, AdvanTex effluent can be reused for irrigation.

For a copy of Orenco's AdvanTex Design Criteria, call 800-348-9843 or +1-541-459-4449.

*Continued on next page*



Photo courtesy of Reed Johnson

*This new Catholic church in the Arlington, Virginia, diocese needed excellent wastewater treatment due to heavy clay soils.*



Photo courtesy of FexTex Systems

*This new Bellingham, Washington, school needed to meet stringent nutrient limits because of high groundwater.*

## St. Francis de Sales Church, Virginia

### *Excellent treatment for clay soils*

The Catholic Diocese of Arlington, Virginia, needed a wastewater system for a new church. The parishioners of St. Francis de Sales Church in Purcellville had outgrown their current facility and were building a new one right next to the old one. The diocese staff approached engineer Ray Freeland, P.E., who had consulted with them on another project using Orenco's AdvanTex Treatment Systems.

The church is sited on heavy clay soils and the system needed to provide excellent treatment to preserve its drainfield and meet a permit limit of 10 mg/L BOD. Consequently, Freeland recommended a 21' AdvanTex AX-Max unit. The AX-Max uses a multi-pass, packed-bed filter treatment technology to treat water to better than secondary standards. After treatment, the resulting effluent is dispersed via a shallow-placed drip field. The system was installed in late 2014.

## Andrada Polytechnic and Patano H.S., AZ

### *Speedy installation for high-profile schools*

Andrada Polytechnic, a 600-student school that includes academies in health sciences and transportation, shares its campus with Patano High, an award-winning 200-student alternative school. This facility needed a shared wastewater system that met requirements for energy efficiency and LEED certification. IWS, a design/build company, worked with the construction company to meet the site's unique design considerations and three-month timeframe. The



campus installed a primary treatment system followed by (8) AdvanTex AX100 secondary treatment units. Effluent is reused for sub-surface irrigation.

## Meridian School District, Washington

### *Enhanced nitrogen removal for high groundwater*

The Meridian School District in Bellingham, Washington, needed to build a new elementary school for 600 students. Because of high groundwater and strict nutrient limits, the school was required to install a wastewater system that could meet a TN requirement of 20 mg/L despite an extremely high level of influent ammonia, which is common with schools.

The district's engineer contacted FexTex Systems, an Orenco distributor, who suggested four of Orenco's AdvanTex AX-Max textile filter units to provide 2-stage secondary treatment, as well as tertiary treatment (BOD polishing) behind an up-flow filter (for enhanced nitrogen-removal). The design also included alkalinity and carbon feed systems and a recirc return line. This robust and sophisticated solution was designed to meet not just current nutrient reduction requirements but future requirements, as well. For the present, FexTex and Orenco have been commissioning the various processes and stages, followed by sampling, to find the optimal balance of treatment and cost.

The new school — Irene Reither Elementary — opened in January 2014 and has posted TN levels under 10 mg/L.\* The entire system is monitored by an Orenco TCOM remote telemetry control panel, which automatically tracks daily flows and conditions. "We're seeing increasingly stringent nitrogen limits, everywhere," says Orenco engineer David Lepre. "This project shows that we can install a system that meets these new nitrogen limits, even in the most difficult of situations."

*\* Samples collected and analyzed by a third party between 3-25-14 and 12-10-14.*



Photo courtesy of FexTex Systems

*Irene Reither Elementary uses four AdvanTex AX-Max™ units and an Orenco DuraFiber™ Shelter in its nutrient-reducing WWTS.*

*Data used by Orenco to derive the representations and conclusions contained within this Case Study were current as of September, 2016.*

**Orenco Systems®, Inc. • 800-348-9843 • +1 541-459-4449 • www.orenco.com**