An Affordable Wastewater Collection and Treatment Solution for Municipalities and Communities

**VICTORIA, PRINCE EDWARD ISLAND**

**Problem**
The Community of Victoria, PEI, needed to replace its antiquated, failing septic systems with an environmentally-sensitive, cost-effective solution suited to the unique requirements of its location. In addition, the treatment system had to accommodate the highly-variable daily flows common to a summer vacation destination.

**Solution**
Victoria chose an Orenco® Effluent Sewer, followed by an AdvanTex® AX100 Treatment System, because of the system’s outstanding treatment and low operating and lifetime costs. The system is scalable and is capable of treating flows of up to 95 m³/d (25,000 gpd) during the tourist season, with peaks of over 180 m³/d (50,000 gpd).

**Scalable, Award-Winning Wastewater Solution**
The Community of Victoria is a picturesque, rural fishing village located on Prince Edward Island in the Canadian Maritime Provinces. Its natural beauty, period buildings, and attractions make it a popular tourist destination. The community’s public health and its development potential, however, were hampered by sanitation problems. Many historic buildings in the town core were using antiquated septic systems, which were surrounded by water, the small town of Victoria, PEI, needed a community wastewater solution that was both environmentally-sensitive and affordable. After installing an Orenco® Effluent Sewer followed by Orenco’s AdvanTex® Treatment System, the community and its consulting engineer have won multiple awards, including the 2011 “Sustainable Community Award” from the Federation of Canadian Municipalities. Photo courtesy of Ron Garnett - AirScapes.ca.
frequently failing and in need of upgrades. Most of the small lots could not support a modern septic system meeting current codes. As a result, residents and business owners were forced to use a “bubble gum” approach to the problem, employing frequent septic tank pumping to get through the busy summer tourist season. Provincial regulators would not approve new development or expansion of businesses until the Village solved its septic problems.

When community members searched for a cost-effective, sustainable wastewater system, they had specific parameters in mind. First, because residential lots in the village center were laid out in the 1800’s and were not large enough to accommodate traditional onsite wastewater systems, they needed a compact solution. Second, because treated effluent might negatively affect the nearby harbor and estuary, direct effluent discharge to the bay was not a popular option with residents and business people who depended on Victoria’s coastal waters for their livelihood. Third, because Prince Edward Island relies on groundwater for its drinking water, the system needed to work well as part of an integrated, sustainable, watershed-based approach.

Engineering Technologies Canada, Ltd. (ETC: www.engetech.ca), was retained in September, 2003, to identify and evaluate the various options and recommend a wastewater management solution best suited to the community’s needs. After a detailed life-cycle analysis of several conventional and alternative systems, ETC recommended an Orenco® Effluent Sewer and AdvanTex® Treatment System. Installation was completed in 2008, and the system services 57 residential locations and 6 commercial sites with a mixture of both STEG (effluent gravity) and STEP (effluent pumping) equipment.

Following primary treatment in collection tanks at each site, treated effluent is pumped to the AdvanTex Treatment System. AdvanTex attached-growth treatment systems use a textile media to treat effluent effectively. The AdvanTex system has low power requirements and low O&M costs. Because effluent is dosed at a specific rate to AdvanTex pods, the system can accommodate widely varying daily flows. The AdvanTex system can also be easily expanded to allow for further development in the area.

After AdvanTex treatment, the effluent is dispersed to two land-based dispersal systems. The pressure-dose sand dispersal bed (mantle) operates year-round, while a subsur-
face drip irrigation system comes on line during the busy summer season to provide the total required effluent dispersal capacity.

Another key part of the integrated approach was a water efficiency program in which regular toilets were replaced with low-flow models (6 litres/flush or less), and water meters were installed at each connection. In addition to reducing potable water demands, this helped reduce the amount of effluent needing treatment and allowed ETC to reserve more land at the wastewater treatment site for future expansion.

Victoria’s system is also scalable. While all 10 AdvanTex AX100 pods are used for peak summer flows, in the slower winter season the system uses only 3 pods and 2 pumps, conserving energy and extending equipment life.

Since the system is so robust and reliable, only a part-time operator is needed. This was a critical factor for the Community. According to Kelly Galloway, P. Eng., the system’s designer, “Operation and maintenance associated with traditional, ‘big city’ sewage treatment solutions can be onerous and time-consuming, requiring advanced, high-level operators. If these technologies are misapplied they can be a huge burden on small rural communities, often making up the biggest portion of their utility costs.” The operator monitors the system remotely and is notified if any maintenance is needed via an Orenco TCOM™ telemetry panel. Effluent quality is excellent; though cBOD and TSS levels of 15 mg/L each were anticipated, actual levels are consistently less than 10 mg/L each. The system also exceeded the desired treatment requirement for Total Nitrogen.¹

---

Not Just for Villages!

Hundreds of communities in North America, Australasia, and parts of Europe use Orenco Sewers. Larger communities include …

- SW Barry County, Michigan: 4,500 connections
- Mobile, Alabama: 4,000 connections
- Lacey, Washington: 2,800 connections
- Yelm, Washington: 1,800 connections
- Missoula, Montana: 1,500 connections
- Montesano, Washington: 1,300 connections
Municipal and Community Market

“Residents and tourists alike enjoy the quality of life offered by Victoria: sport fishing, clamming, bird watching, photography, water sports, pristine beaches, and coastal sunrises and sunsets are just some of the many eco-based activities and attractions. Protection and enhancement of the delicate ecosystem in the Victoria Harbour and the Westmoreland River estuary is of paramount importance to the village residents and tourists.”

– Hilary Price, Community of Victoria

For the system’s design, Galloway won the 2009 Engineers PEI Award for Engineering Achievement; subsequently, the Community of Victoria was honored with the 2010 “Municipal Achievement Award” from the Federation of PEI Municipalities and the 2011 “Sustainable Community Award” from the Federation of Canadian Municipalities.

ETC was successful in solving Victoria’s challenging sanitation problems, which had eluded resolution via traditional engineering solutions for over 20 years,” said Garry MacDonald, P. Eng., in his nomination of Galloway for the Engineers PEI Award. While more than 2,500 AdvanTex AX100 filters have been installed elsewhere, MacDonald noted that “[This was the] first municipal-scale STEG/STEP effluent sewer collection system in PEI … [and the] first major municipal scale, synthetic packed-bed filter (PBF) treatment system in Atlantic Canada.”

Hilary Price, Administrator for the Community of Victoria, puts it this way: “The AdvanTex system was installed and became totally operational in 2008 … [It] has been a stimulus for expansion in our tourism businesses and has allowed our residential population to dramatically increase. Prior to the installation of this central sewage system, the community periodically experienced bad odours from failing septic systems. The new central sewage system rectified this problem and removed the serious public health hazard caused by failing septic systems … This system has exceeded our expectations in dealing with our wastewater disposal.”

For more information about effluent sewers, Orenco Sewers™ and AdvanTex® Treatment Systems, contact Orenco Systems®, Inc.
With an Orenco® Effluent Sewer, every lot in a community or subdivision includes an on-lot tank for collecting household wastewater. (See illustration, below.)

Solids remain in the tank, for passive, natural treatment. Then the filtered effluent is discharged (by either pump or gravity) through shallowly-buried, small-diameter collection lines that follow the contour of the land. The filtered effluent then flows to a nearby AdvanTex® Treatment System (See illustration, Side B.)

1. Watertight tanks provide primary treatment, so only liquids are conveyed to the treatment facility. With proper use, tanks can go 8-12 years between pump-outs.

2. Our patented Biotube® Pump Vault filters out solids, and our lightweight, non-corroding pumps can last more than 25 years.

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

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

5. Filtered effluent is conveyed by gravity from homes at higher elevations, so no pump is typically required.
HOW IT WORKS:
Orenco® Effluent-Only Sewer to AdvanTex® Treatment System

AdvanTex Treatment Systems are an award-winning\(^1\), low-cost, and low-maintenance technology. They can be installed in-ground or partially bermed, for a very low profile. Larger units can be purchased with a catwalk (for operator ease of servicing) and set above-ground. Filtered effluent from each property’s on-lot tank is conveyed through shallowly-buried, small diameter collection lines to a recirc tank at the AdvanTex treatment facility.

\(^1\) To see awards video, go to: [http://www.orenco.com/videos/orenco/AwardsPlayer.html](http://www.orenco.com/videos/orenco/AwardsPlayer.html)