

## Frederick-Winchester Service Authority Performance Contract

The Frederick-Winchester Service Authority (FWSA) is an organization that has been a quiet anchor of the community. Since 1974, FWSA has provided reliable and effective sewage treatment for the citizens and businesses of Frederick County and the City of Winchester, VA. In recent years, FWSA has focused on becoming a more efficient organization, identifying ways to minimize costs to citizens and the community while providing new services and supporting local future economic development. In 2010, FWSA expanded its Opequon Water Reclamation Facility (WRF) to 12.6 millions of gallons per day (mgd) and upgraded for enhanced nutrient removal capabilities that met Virginia Department of Environmental Quality requirements.

FWSA, in keeping with its goals of minimizing costs to citizens and the community while providing new services and supporting local future economic development, sought to further expand the operations at this facility. Currently under construction, and preparing for full operations in May 2016, FWSA's Opequon Water Reclamation Facility is being further improved through a \$45 million Energy Performance Contract providing facility-wide organics co-digestion, cogeneration and operational efficiency project. The project is being delivered by Energy Systems Group, a leading energy services provider and when completed, the Opequon WRF will be the first enhanced nutrient removal facility in the United States, with strict limits of nitrogen at 3 mg/L and phosphorus at 0.197 mg/L, to become a nearly net energy zero facility.

The centerpiece of the FWSA project is the Green Energy Facility – a new anaerobic digestion complex sized and designed, from inception, for high-strength organic waste co-digestion and electric cogeneration. The facility consists of three 1.25 million gallon digesters with a central digester control building, electrical cogeneration, and liquid/cake waste receiving. The high-strength organic waste receiving station allows tankers of pumpable waste to be unloaded at 400 gallons per minute to the storage/mix tank. The storage/mix tank provides a system waste wide spot allowing for intermixing via pumping of thickened WAS (waste activated sludge) with the trucked in organic wastewater and near constant digester feeding. At full operation the facility will have acceptance capability of 125,000 gallons per day of high-strength organic waste and co-digest this material with plant sludge in the primary anaerobic digesters. The identified organic wastes that will be accepted include trap grease, dairy processing waste, meat processing DAFT (dissolved air floatation thickener) sludges, beverage production wastes, and pretreatment/municipal biosolids cake. The biogas produced will run 848 kilowatts of electrical cogeneration that, at start-up, will meet the majority of the treatment plant's electrical needs.

Another unique aspect of this project is the installation of the Ostara Pearl® Process to recover and reduce phosphorus nutrient loading of anaerobic side streams to the liquid portion of the plant. The FWSA determined early in the design process that the receipt of organics could

not consume any of the plants permitted liquid-side phosphorus treatment capacity. With dairy waste, which is high in phosphorus, forecasted to be a considerable portion of the incoming organic waste, this product was determined to be the most cost effective solution for side stream treatment. Since phosphorus is an element that may only be mined and is an essential ingredient for fertilizer and crop production, this process provides additional beneficial reuse.

Significant infrastructure renewal is part of the project as well, including aeration system improvements, new sludge conveyance and dewatering, primary electrical and emergency back-up systems, and facility improvements. As a result of this innovative and multi-faceted project, FWSA has substantially increased its value to the community. Through increased revenue streams and enhanced efficiency, the facility has been able to self-fund needed infrastructure improvements without increasing costs to rate payers.

