

# FACILITY FOCUS

## Chambers Creek Regional Wastewater Treatment Plant

**Location:** University Place, Wash.

**Startup date:** 1984

**Service population:** 300,000

**Number of employees:** 55

**Design flow:** 170 ML/d (45 mgd)

**Average daily flow:** 68 ML/d (18 mgd)



The Pierce County (Wash.) Chambers Creek Regional (CCR) Wastewater Treatment Plant sits on a former gravel mine along the shores of Puget Sound. It is the third largest water resource recovery facility (WRRF) discharging into this estuary. The county strives to be a good environmental steward to ensure the facility contributes to the health of Puget Sound.

The CCR facility site resides within a 376-ha (930-ac) park that includes the Chambers Bay Golf Course. Since its construction in the 1980s, the facility went through an upgrade in 1991 and a major expansion and upgrade in 2017.

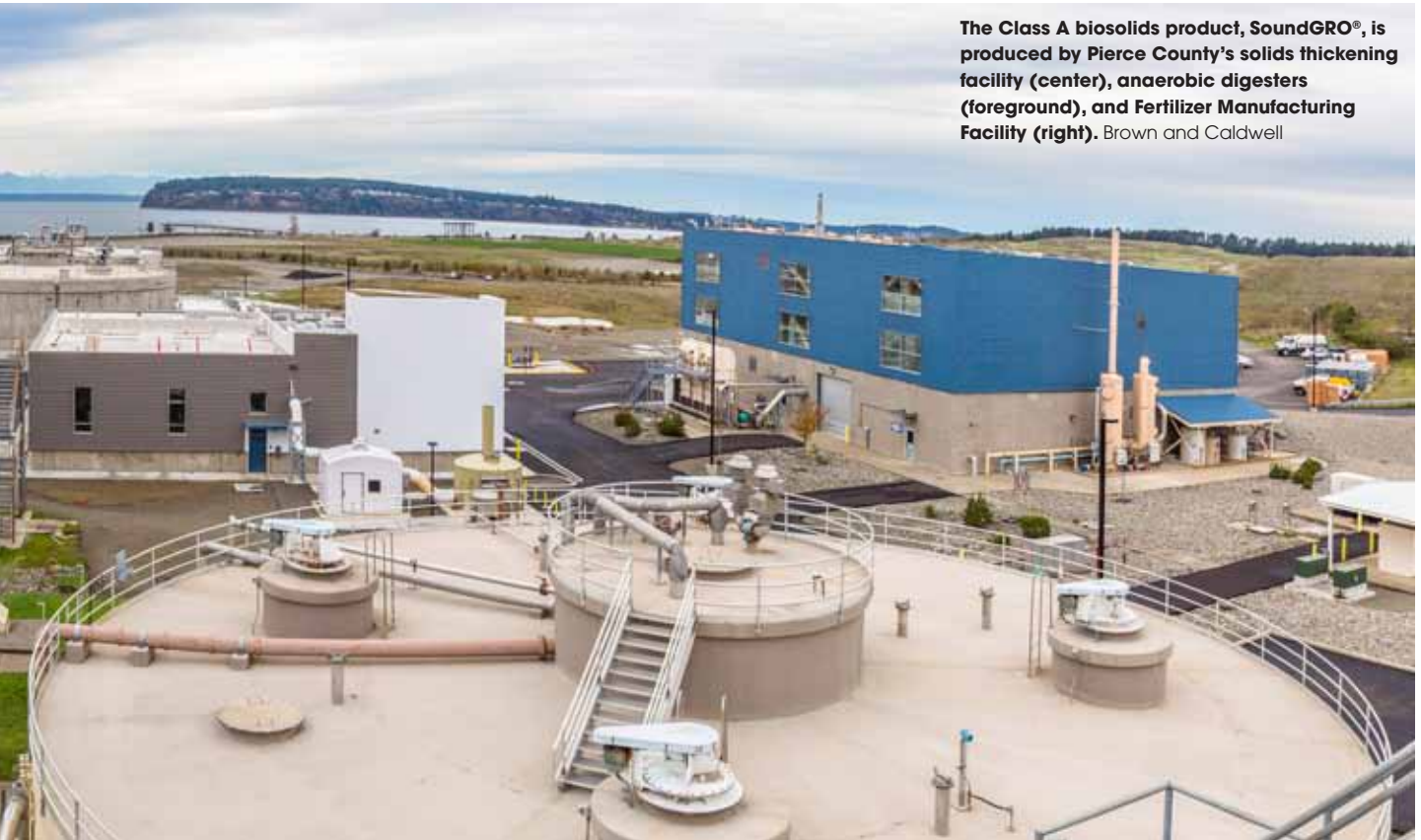
A team led by Brown and Caldwell (Walnut Creek, Calif.) planned and designed the facility expansion to anticipate not only future increases in flows and loads but also more stringent discharge limits. The \$342 million project increased the facility's capacity from 109 ML/d (28.7 mgd) to 170 ML/d (45 mgd) and upgraded its treatment processes. The facility now is equipped to serve a population projected to double by 2040.

With the project, the CCR facility became one of the first WRRFs in the U.S. to implement DEMON® technology that uses a naturally occurring bacteria called anammox to remove nitrogen from sidestream flows.



The upgrade of the Chambers Creek treatment facility was the single biggest public works project ever undertaken by Pierce County. The total project value totaled approximately \$350 million. Construction of the new anaerobic digesters (shown) will provide solids handling capacity through 2040.

Kennedy Jenks



The Class A biosolids product, SoundGRO®, is produced by Pierce County's solids thickening facility (center), anaerobic digesters (foreground), and Fertilizer Manufacturing Facility (right). Brown and Caldwell



The Chambers Creek facility is located adjacent to Pierce County's Chambers Bay Regional Park and Golf Course. The facility plays a key role in the health of area waters as the third-largest WRRF discharging into Puget Sound. Brown and Caldwell



▶ Before construction in 2017, a public open house was held for the community. The event informed about the potential effects of construction, possible traffic pattern changes, features of the upgraded facility, the facility's sustainable design elements, funding, and the wastewater treatment process.

The upgraded facility was designed to accommodate tours with a standard tour route and a viewing platform at new aeration basins. During construction of the facility upgrade, tours brought nearly 400 individuals to the site to help educate about the scope of the improvements and the associated benefits. Tour participants included elected officials, water sector employees from other WRRFs, representatives from professional organizations, students from local colleges, and local emergency first-responders.



▶ The expanded CCR facility includes preliminary treatment with a combination of step screens and perforated plate screens, followed by aerated grit chambers.

Primary sedimentation tanks and primary effluent equalization tanks are covered and ventilated to activated carbon scrubbers for odor control. The secondary treatment process consists of seven secondary clarifiers in addition to aeration basins that can be operated in conventional and nutrient removal modes.

Facility effluent is disinfected using ultraviolet light before being discharged to Puget Sound. A portion of effluent is treated to Class A reclaimed water standards for reuse inside the facility, with the ability to serve additional external uses in the future.

Primary and waste activated sludges are thickened with rotary drum thickeners and then pumped to anaerobic digesters. Digested solids are dewatered and dried at the Fertilizer Manufacturing Facility to produce the county's Class A, Exceptional Quality biosolids product, SoundGRO Fertilizer®.

Centrate from the solids dewatering process is treated at the sidestream treatment facility using the DEMON® process.

**With the facility located next to a regional park and golf course, elimination of nuisance odors is critical. Primary clarifiers and flow equalization tanks are covered and ventilated through activated carbon scrubbers to achieve odor limits mandated in conditional use permits.** Brown and Caldwell



**The Biological Process Building houses chemical feed systems, including methanol (shown), polymer, and polyaluminum chloride. The building also serves as the facility's main operations control center.** Brown and Caldwell



**The newly constructed aeration basins provide the flexibility to operate the secondary treatment process in different configurations, anticipating potentially more stringent discharge limits to Puget Sound.** Brown and Caldwell

▶ Recent upgrades at the CCR facility include installation of anammox-based technology, increases in biogas use capacity, and addition of reclaimed water production and distribution.

The DEMON<sup>®</sup> technology reduces chemical use by 50% and oxygen demands by 25%. It will reduce sidestream ammonia and total Kjeldahl nitrogen discharges by more than 80% and sidestream total inorganic nitrogen discharges by more than 75% (monthly average).

Methane produced in the digesters is used for heating throughout the facility.

The upgrades are estimated to save the county \$7 million in life-cycle costs in addition to the \$30 million saved by efficiently repurposing existing structures rather than constructing new facilities.

The upgrades have earned the facility recognition as

- American Public Works Association 2018 Project of the Year – Environment in the more than \$75 million category, and
- American Council of Engineering Companies 2017 Gold Award and National Finalist – Waste and Stormwater. 🏆



**Chambers Creek is one of the first WRRFs in the U.S. to implement the Anammox DEMON<sup>®</sup> technology for the removal of nitrogen from sidestream flows.** Brown and Caldwell

**Aeration basin capacity was increased by a factor of five to provide the flexibility to operate the secondary treatment process in different modes. This change was made to anticipate more stringent discharge limits in the future.** Brown and Caldwell

**As part of the facility upgrade, an existing aeration basin was retrofitted for the installation of the Anammox DEMON<sup>®</sup> nitrogen removal technology for sidestream (centrate) treatment.** Brown and Caldwell

