

## environment

### WASTEWATER

# Seattle Membrane Plant Treats to Higher Levels

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By Lucy Bodilly and John J. Kosowatz

**F**aced with sprawling growth in the greater Seattle area, King County water officials have capitalized on the population's environmental awareness to push through a \$1.7-billion wastewater treatment system that could become the country's showcase for advanced secondary treatment. Taking advantage of technological advances that lower energy needs and produce an effluent clean enough to be sold for nonpotable use, the county's division of wastewater control is building a 36-million-gallon-per-day plant, the largest in the U.S. to use membrane bioreactors, borrowing from systems developed to treat drinking water.

The Brightwater plant, located 11 miles north of Seattle in Bothell, will handle wastewater flows from King County's northern reaches and part of neighboring Snohomish County. Flows will be delivered to the plant through a 13-mile conveyance tunnel now being bored under three tunneling contracts through soft ground of mostly glacial till. The 16-ft-dia. tunnel will do triple duty. It is being fitted with a force main to handle raw wastewater flows, boosted on its way to the plant with a 170-mgd pump station. Other pipes will deliver reclaimed water that will be sold for irrigation or industrial use, and treated effluent that will be discharged through a new outfall to 400-ft depths in Puget Sound. Sections of the tunnel are also designed to handle excess stormwater flow. By 2040 the plant, designed by CH2M Hill Cos.'s Bellevue, Wash., office, will be expanded to provide average daily treatment capacity of 54 mgd.



But the system swings on the MBR system, which treats secondary effluent to levels greater than conventional activated sludge systems to produce effluent greatly exceeding federal standards. "It costs more, but allows us to go to a higher level of treatment and even supply high-grade water effluent to local golf courses and provide for industrial uses," says Christie J. True, King County water treatment director.

**"It costs more but allows for a higher level of treatment and supply of high-grade effluent."**

— CHRISTIE J. TRUE,  
WATER TREATMENT DIRECTOR

Key to the project's economics was the state Dept. of Ecology's approval to build the MBR system for only base loads, an exception from its rule requiring full secondary treatment for all flows. Peak flows in Brightwater's service

area are estimated at 170 mgd by 2040. Stan Hummel, county wastewater capital projects supervisor, says providing MBR treatment for peak flows would have sent costs soaring, partly because of MBR systems' operating power needs. Instead, the county's team proposed a strategy to split flows during wet weather: Base loads will be treated with MBRs and excess flow will be split, undergoing chemically enhanced primary treatment only. The two will then be blended to a quality level that still exceeds state and federal standards, and discharged through the outfall.