

Reclaimed Water Program

Reclaimed water is wastewater treated to such a high level that it can be used safely and effectively for many purposes, such as irrigation, groundwater recharge, wetland enhancement, streamflow augmentation, street cleaning, and industrial cooling and process water. Production and use of reclaimed water can help King County to better manage its effluent and provide regional benefits such as reducing effluent discharges to Puget Sound and increasing flows for fish in local streams.

The RWSP calls for the county to actively pursue the use of reclaimed water to help preserve water supplies in the region, enhance or maintain fish runs, and preserve environmental and aesthetic values. RWSP policies encourage the county to work with local water purveyors to evaluate opportunities to use reclaimed water in their service areas and to explore ways to increase the use of reclaimed water at the county's existing and future wastewater treatment facilities. The policies also direct the county to evaluate reclaimed water as a potential alternative to meet identified conveyance needs.

This chapter describes reclaimed water accomplishments in 2008 in the following areas:

- Production and use of reclaimed water from the county's existing regional treatment plants—the South and West Point Treatment Plants
- Startup of the Carnation Treatment Plant
- Construction of the Brightwater reclaimed water system
- Initiation of a planning process to develop a Reclaimed Water Comprehensive Plan
- Reclaimed water studies
- A proviso in the 2009 King County Budget (adopted in November 2008) relating to the reclaimed water program.

The discussions for these topics also include plans for activities in 2009.

8.1 Reclaimed Water from Existing Regional Treatment Plants

King County's reclaimed water program has been active for more than 10 years. The Wastewater Treatment Division (WTD) has been producing reclaimed water since 1997 at the county's South Treatment Plant in Renton and West Point Treatment Plant in Seattle. All reclaimed water produced at WTD's existing facilities for off-site distribution—and those anticipated at future facilities—meets or will meet Class A reclaimed water standards, as defined by the Washington

State Departments of Ecology and Health. Reclaimed water standards vary from Class A to Class D, based on water quality parameters and allowable uses. Class A reclaimed water is the highest quality water and is allowed for all permitted uses of reclaimed water, which include non-potable uses such as irrigation, groundwater recharge, wetland enhancement, streamflow augmentation, and street cleaning.

South plant produced approximately 93 million gallons of Class A reclaimed water in 2008. The majority of the water was used at the plant for process water and irrigation, saving an estimated \$80,000–\$90,000 per year in potable water costs.¹ The remaining water was used off-site for the following purposes:

- Approximately 5–6 million gallons was sold to the City of Tukwila for irrigation of Fort Dent Park (including newly constructed soccer fields where the Seattle Sounders Football Club practices) and city public works uses such as street sweeping and sewer flushing.
- A small truck-and-haul program provided reclaimed water for irrigating newly planted vegetation on King County–managed stream restoration sites and a wetland/native plant nursery adjacent to the treatment plant operated by the King Conservation District (Figure 8-1).

In 2008, the county and the City of Tukwila renewed a sale and distribution agreement for reclaimed water, under which the city will continue to act as a reclaimed water purveyor in its service area. In addition, the Tukwila City Council approved an agreement in July 2008 to extend the reclaimed water distribution line from South plant to Foster Golf Links. Construction of a 500-foot pipe from the Interurban reclaimed water transmission line to Foster Golf Links began in early 2009. The City of Tukwila is managing construction of this pipe.



Figure 8-1. King Conservation District Nursery

¹ Net cost savings are avoided costs less reclaimed water system operating costs.

In 2008, the West Point Treatment Plant produced and used approximately 183 million gallons of Class A reclaimed water. All of the reclaimed water produced at West Point is exclusively used at the plant site for process water and irrigation in place of potable water, saving an estimated \$450,000–\$575,000 in potable water costs per year.²

8.2 Carnation Treatment Plant

The City of Carnation decided to replace on-site septic systems with a new wastewater treatment facility and collection system to better protect public health and the environment, achieve the city’s comprehensive plan goals, and maintain and enhance community livability. The city designed and built the local wastewater collection system and contracted with King County to design, build, operate, and maintain a new treatment plant and associated discharge facilities.

Construction of the Carnation Treatment Plant (Figure 8-2) was completed in February 2008. The plant began operating in May, and a community celebration and dedication of the facility was held in June.



Figure 8-2. Carnation Treatment Plant

The Carnation plant uses membrane bioreactor technology (MBR) and is designed to treat all the wastewater to Class A reclaimed water standards. The plant has a dual discharge system: an outfall that discharges to the Snoqualmie River and another outfall that discharges to a wetland in the Chinook Bend Natural Area (Figure 8-3). The Reclaimed Water Use permit, authorizing discharge to the wetland, was approved in December 2008. Discharge to the wetland, which serves as the primary discharge location, is expected to begin in spring 2009. The river outfall is being used during plant startup. Once discharge begins to the wetland, the river outfall will be

² The West Point plant has a larger cost savings in potable water costs than South plant because West Point uses more than twice the water and pays a higher rate for the water. Net cost savings are avoided costs less reclaimed water system operating costs.

used only when required by a regulatory agency (such as when necessary to augment flows in the Snoqualmie River), in case of plant upset or failure of ultraviolet disinfection system, or during periods of scheduled maintenance. Since startup, the facility has consistently met Class A reclaimed water standards.

In August 2008, the Carnation Treatment Plant earned the WateReuse Association's Small Project of the Year Award in recognition of the facility's innovative use of reclaimed water to enhance wetlands and preserve local habitat at Chinook Bend Natural Area.³

More information on the Carnation Treatment Plant is available on the Web at <http://www.kingcounty.gov/environment/wtd/About/System/Carnation.aspx>.

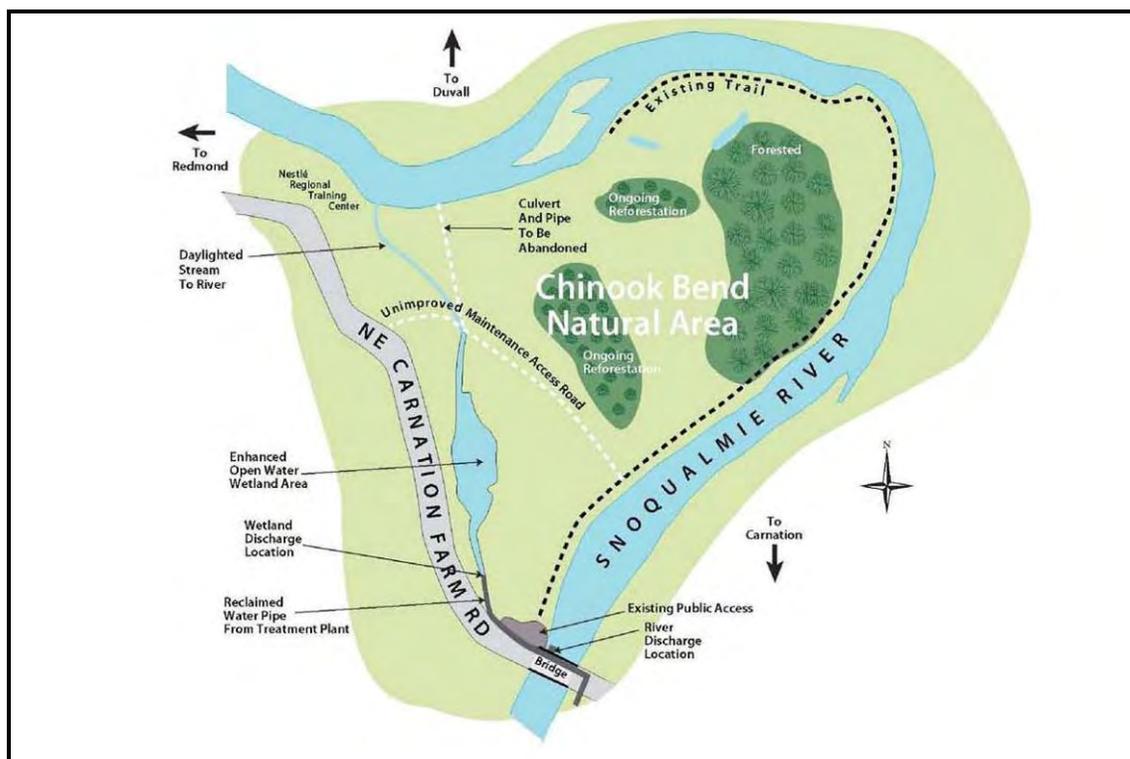


Figure 8-3. Chinook Bend Natural Area Wetland Enhancement

8.3 Brightwater Reclaimed Water System

The Brightwater reclaimed water system consists of south and west reclaimed water transmission lines that are commonly referred to as the Brightwater backbone (Figure 8-4). The backbone is under construction and will be completed as part of the larger Brightwater Treatment System project (see Chapter 2). The south transmission line, or South Segment, runs from the

³ The WateReuse Association is a nonprofit organization whose mission is to advance the beneficial and efficient use of water resources through education, sound science, and technology using reclamation, recycling, reuse, and desalination for the benefit of its members, the public, and the environment. More information on the association is available on the Web at <http://www.watereuse.org/>.

Brightwater Treatment Plant through the Sammamish Valley. It will consist of two portions of new pipe and a portion of converted existing force main. The west transmission line, or West Segment, is a dedicated reclaimed water pipeline that is being installed inside the effluent tunnels that go from the Brightwater plant to the Ballinger Way Portal in the City of Shoreline. The West Segment is designed to allow distribution from the access portals along the effluent tunnel route.

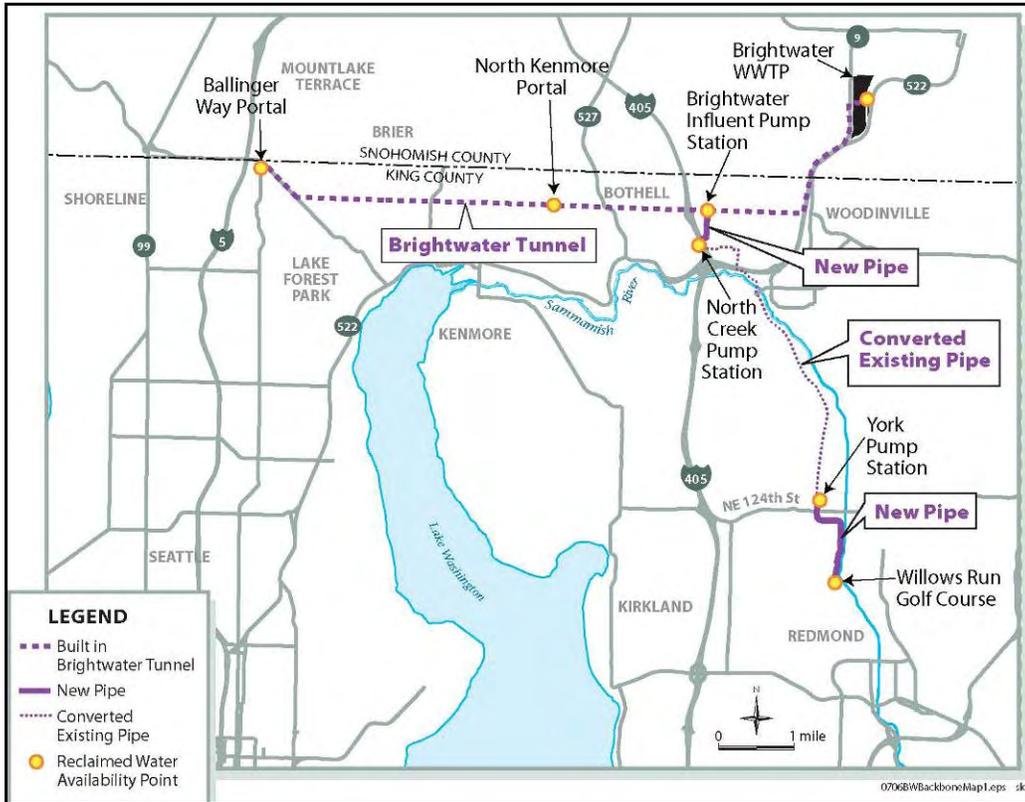


Figure 8-4. Brightwater Reclaimed Water System

Initially, only the South Segment will be operational. It will be able to start transporting up to 7 million gallons per day (mgd) of reclaimed water to the Sammamish Valley sometime in 2012. In 2008, construction was substantially complete on the portion of the South Segment that connects the Brightwater Influent Pump Station with the North Creek Pump Station. Construction was under way in 2008 on the remainder of the South Segment and is expected to be substantially complete in late 2009. WTD continued to work with local jurisdictions, water purveyors, and other interested entities to identify and confirm potential markets and demand for reclaimed water in the Sammamish Valley area. WTD also continued to work with water purveyors in this area to determine their interest in serving as reclaimed water purveyors in their service areas. These efforts will continue in 2009.

In October 2008, the King County Council approved Ordinance 16281, authorizing the King County Executive to execute a 30-year use agreement with the Lake Washington Youth Soccer Association (LWYSA) for development, operation, maintenance, and use of the county-owned Sixty Acres Park for a first-class soccer complex. As part of the agreement, LWYSA will pursue the use of reclaimed water for irrigation purposes at the soccer fields when it becomes available

from Brightwater. During 2008, WTD and the King County Parks and Recreation Division worked with LWYSA to develop engineering design alternatives and other technical information necessary to serve the park with reclaimed water from the South Segment of the Brightwater backbone. These efforts will continue in 2009.

Further infrastructure will be needed to enable use of the additional 14 mgd of reclaimed water that will be available from the Brightwater system. This infrastructure will be developed after demand for the water exists. Potential uses associated with these facilities will be evaluated in the Reclaimed Water Comprehensive Plan (described later in this chapter).

8.4 Reclaimed Water Comprehensive Plan

In July 2008, WTD began a planning process to develop a Reclaimed Water Comprehensive Plan (Plan) to determine if, how, when, where, and by what funding mechanisms over the next 30 years the county's existing reclaimed water program should expand. WTD is working with a broad range of interested parties and individuals in this multiyear planning effort, including tribal governments, local jurisdictions, water purveyors, wastewater utilities, regulatory agencies, environmental groups, business interests, and the public. WTD is also coordinating closely with the Metropolitan Water Pollution Abatement Advisory Committee on this effort.

Highlights of activities in 2008 are as follows:

- **Holding meetings to discuss the planning process and purpose of the Plan.** From July through mid-October 2008, WTD held meetings with 27 interested entities to get feedback on the planning process and contents of the Plan, identify potential uses for reclaimed water, and develop criteria to help evaluate potential uses for reclaimed water. A summary of these discussions is available on the Web at http://your.kingcounty.gov/dnrp/library/wastewater/rw/CompPlan/081030_Workshop01_MeetingSummaryJuly-Oct2008.pdf.
- **Convening a regional workshop.** A regional workshop was held in October 2008. Fifty people, representing tribes, state and regional agencies, cities, wastewater utilities, water purveyors, local and regional oversight organizations, and environmental groups, participated in the workshop. The purpose of the workshop was to share information about the planning process, summarize what had been heard to date in individual meetings, and discuss and solicit comments on evaluation criteria. A summary of the workshop is available on the Web at http://your.kingcounty.gov/dnrp/library/wastewater/rw/CompPlan/081205_Workshop01_Summary.pdf.
- **Collecting data on potential uses for reclaimed water.** In late 2008, WTD began meeting with local jurisdictions, water purveyors, wastewater utilities, and other interested parties to gather specific information on potential uses for reclaimed water and develop a database of identified potential reclaimed water consumptive and environmental enhancement uses for analysis during the planning process. These efforts will continue in 2009.

8.5 Reclaimed Water Studies

In 2008, WTD participated in four reclaimed water studies:

- Two studies—a turf irrigation study and an ornamental plant and food crop irrigation study—were undertaken in partnership with University of Washington researchers to develop local, independent, best-available science about the public health and environmental impacts of using reclaimed water.
- WTD is working with the Covington Water District to update the 2006 Covington Water District Water Reuse Feasibility Report.
- Seattle Public Utilities (SPU) started a reclaimed water feasibility study in summer 2008. SPU and WTD are working closely on this effort.

The following sections describe these studies.

8.5.1 Turf Grass Irrigation Study

The turf grass irrigation study was initiated in 2007 and completed in 2008. The study used turf grass collected from Foster Links Golf Course in Tukwila and irrigated it with Class A reclaimed water produced at South plant. It was conducted at the greenhouse at the University of Washington Botanic Gardens. The study focused on plant health and public safety issues associated with using reclaimed water from South plant to irrigate turf grass for local golf courses, business parks, and sports fields. Key research issues were salt buildup/tolerance, fate and transport of pharmaceuticals and chemicals found in personal care products, and grass growth response. The results indicate that irrigation of turf grass with reclaimed water from South plant fosters healthy growth without salt buildup, requires significantly less fertilizer (and therefore cost savings for golf courses), and carries no risk of exposure to pharmaceuticals and the chemicals under study.

The report, titled *Fate of Personal Care Products and Pharmaceuticals and Growth Response for Reclaimed Water Irrigated Turf Grass*, was published in 2008 and is available on the Web at <http://www.kingcounty.gov/environment/wastewater/ReclaimedWater/ProgramLibrary.aspx>.

8.5.2 Study of Ornamental Plant and Food Crop Irrigation

In 2008, WTD initiated a two-year study to look at plant growth response and human health effects associated with irrigating commercially grown ornamental plants and food crops with reclaimed water produced at South plant. The study was designed to address concerns expressed by potential reclaimed water customers, including commercial nurseries, local food producers, and flower farmers in the Sammamish Valley, regarding flower/leaf ratios, salt sensitivities, and aesthetic qualities. Local nursery and truck farmers assisted in the selection of ornamentals tested. Food crops that could be eaten raw (lettuce, strawberries, and carrots) were chosen because they pose a higher risk of exposure than from cooked vegetables.

Initial results from greenhouse trials conducted at South plant demonstrate that commercially marketable and aesthetically pleasing crops can be grown with reclaimed water from South plant. Washed and unwashed raw vegetables irrigated with reclaimed water were tested and met food safety standards for human consumption. The second year of research will be done under field conditions. The field site will be raised beds in South plant's demonstration garden (Figure 8-5). Beds of ornamentals and food crops will be grown with reclaimed water, potable water with fertilizer, and GroCo compost (produced from composted biosolids and sawdust). A final report is expected to be issued in early 2010.



Figure 8-5. Greenhouse at South Plant with Demonstration Garden Beds in the Distance

8.5.3 Covington Water Reuse Feasibility Study Update

King County and the Covington Water District signed a three-year Memorandum of Agreement in 2007 to jointly fund and pursue a phased approach to explore opportunities for reclaimed water development in the district's service area. In 2008, the two parties worked collaboratively on the first phase of an update to the 2006 Covington Water District Water Reuse Feasibility Report using current WTD flow data. Results from these efforts will be incorporated into the development of the Reclaimed Water Comprehensive Plan.

8.5.4 Seattle Public Utilities Reclaimed Water Feasibility Study

In summer 2008, SPU began a feasibility study of potential reclaimed water uses south of the Ballinger Way Portal on the west transmission line of the Brightwater reclaimed water system. The study area is generally north of the Lake Washington Ship Canal to the King County boundary. SPU will use the results of the study to help evaluate its level of interest in being a

reclaimed water purveyor in Seattle. WTD is working closely with SPU on the study and will incorporate the results into the Reclaimed Water Comprehensive Plan. The study is expected to be finished in 2009.

8.6 Budget Proviso

The 2009 King County Budget, which was approved by the King County Council in November 2008, includes a proviso directing WTD to transmit a report to the council for review and approval by motion. The report is to cover (1) the status of the work program related to reclaimed water and progress on the reclaimed water backbone project; (2) a status report on the division's efforts to market and establish contracts for the sale of reclaimed water produced at King County wastewater treatment facilities; and (3) analysis and development of preliminary rate structures and policies for the sale of reclaimed water from King County facilities. The budget proviso calls for the report to be submitted by June 1, 2009.