A GOOD NEIGHBOR

King County is committed to protecting the water resources of the region and the health and well-being of our customers and future generations. We work to ensure safety and minimize impacts of all projects affecting the natural environment, wastewater facility neighbors and our employees.

At South Plant, we have devoted extensive effort to odor control, water reclamation and native landscaping to minimize the impact of the plant on the surrounding community.

Waterworks Gardens opened next to South Plant in 1996 as a system for incorporating stormwater treatment with public art. With trails, art, native plants, wildlife and ponds, this eight-acre public park naturally cleans all storm water from South Plant.

Contact Us:
South Treatment Plant
1200 Monster Road Southwest
Seattle, WA 98055 206-684-2400

For **Treatment Plant Tours** or further information please call 206-296-8286 or 1-800-325-6165, ext. 68286, or see our Web site ***http://dnr.metrokc.gov/wtd/.***

Alternative formats available

206-684-1280 or TTY Relay: 711

King County
Department of
Natural Resources and Parks
Wastewater Treatment Division
201 S. Jackson Street, Suite 500
Seattle, WA 98104-3855

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SOUTH TREATMENT PLANT

Protecting Public Health and the Environment

Clean Water – A Sound Investment

King County
Wastewater Treatment Division

For more than 40 years, the people of King County's Wastewater Treatment Division have been committed to protecting public health and the environment by transporting, treating and reclaiming wastewater and its byproducts. We work continually to improve and protect regional water quality.

Lake Washington — the '50s

Lake Washington — fishable and swimmable today

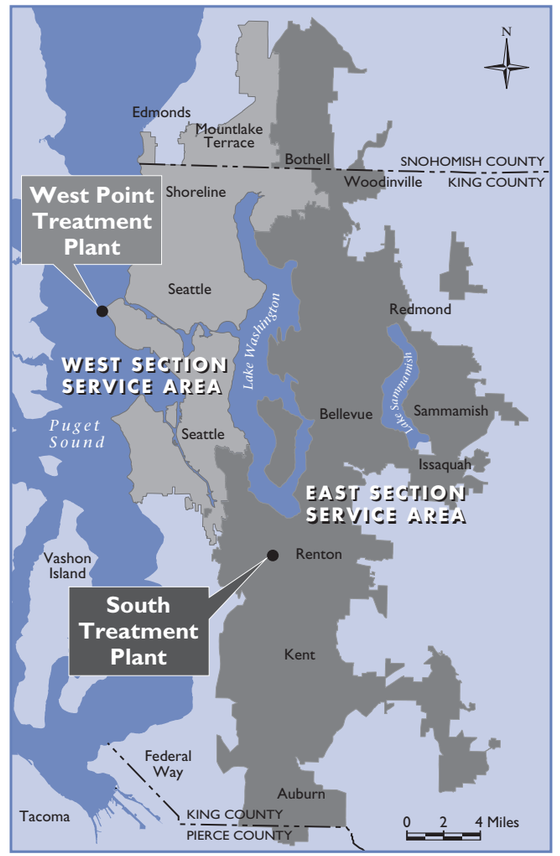
The **South Treatment Plant** is part of the regional wastewater treatment system that serves more than 1.4 million people and covers 420 square miles. South Treatment Plant cost-effectively treats wastewater and stormwater from homes, offices, schools, agencies, businesses and industries along the east side of Lake Washington from south Snohomish County to north Pierce County.

THE PEOPLE OF SOUTH TREATMENT PLANT — '24/7'

Thanks to nearly 140 dedicated employees, the South Plant treatment system runs 24 hours a day, seven days a week. Trained professionals — operators, lab technicians, maintenance employees, process control personnel and administrative staff — ensure the South Treatment Plant and the pipelines and pump stations that supply it with wastewater operate effectively. Our goal is to provide the region with the best wastewater treatment service available while operating as efficiently and effectively as possible.

King County, working in your neighborhood to protect public health and the environment.

SERVICE AREA MAP



The **South Treatment Plant** sits on 94 acres in Renton, Wash. Plant workers operate facilities for treating wastewater, producing biosolids, reclaiming water, recovering energy, and testing alternative or advanced treatment processes.

THE STORY BEHIND SOUTH PLANT

During the 1950s, small treatment plants served many suburban areas of King County. Large amounts of untreated and minimally treated wastewater were discharged daily into Lake Washington, Lake Sammamish and Puget Sound. The water quality of Lake Washington became unfit for human use, raising citizen concern about pollution and prompting the creation of a regional wastewater treatment system.

HISTORY

1958 — King County voters created the Municipality of Metropolitan Seattle (Metro) to provide wastewater treatment services and to clean the waters of Lake Washington and Elliott Bay.

1965 — South Plant was completed as a secondary treatment facility.

1993 — Voters decided to merge Metro with King County, and King County assumed responsibility for South plant.

1997 — King County began producing reclaimed water at South Plant.

MANAGING SEPARATED SEWER SYSTEMS

Stormdrains in separated systems drain straight to the nearest waterway. In a combined system, the stormwater goes to the treatment plant. Either way, stormdrains are no place to dispose of motor oil or other pollutants.

In east and south King County areas served by South Plant, sewage and stormwater flows go to separate systems. Separated systems are efficient because only wastewater from homes, business and industry is treated before it is discharged. Stormwater, which is mostly relatively safe and clean rainwater, is not treated in the area served by the South Treatment Plant.

Because storm drains in the separate system discharge into local water bodies, all individuals must take responsibility to make sure oil, grease, detergent from car washing and pesticides do not end up in storm drains.

KEEPING RAINWATER OUT OF THE SEWER SYSTEM

Cracked pipes, leaky manholes, and improperly connected storm drains and downspouts allow for the inflow of stormwater and the infiltration of groundwater into the treatment system. During heavy rains, that inflow and infiltration makes up to 75 percent of the water treated at South Treatment Plant. Treating clean rainwater is unnecessary, expensive and inefficient and can cause overflows that degrade our environment. King County is working with local agencies and residents to control this problem.

REGULATION AND PERMITTING

Like most other treatment plants throughout the United States, South Treatment Plant discharges treated wastewater every day into a local water body, Puget Sound. To ensure these waters stay safe for human and wildlife use, the U.S. Congress passed the Clean Water Act in 1972 to regulate the discharge of pollutants.

One way the state Department of Ecology enforces the law is by issuing a National Pollution Discharge Elimination System Permit. This permit (available on our Web site) sets water quality standards and specifications for monitoring, treating and discharging treated wastewater through the South Treatment Plant outfall in Puget Sound.

CONTROLLING WASTES AT THE SOURCE

Students touring the treatment plant learn about wastewater treatment and what they can do to keep harmful substances out of the waste stream.

Responsibilities of the Wastewater Treatment Division begin even before wastewater enters pipes and treatment plants. The utility regulates business and industry to monitor and restrict the type and amount of waste that enters the system. We also work with the public to provide information about safe practices and alternatives. Preventing contaminants from entering the sewer system is the easiest and least expensive way to protect people and the environment. Extensive information is available on our Web site or by calling our division.

CUTTING-EDGE TECHNOLOGIES

King County is always on the lookout for new technologies that will enable us to do our work more efficiently and effectively. When possible, we test new wastewater technologies, many of which offer the potential for producing cleaner water, smaller facilities, easier operation and lower costs. We also test new energy recovery technologies and have operated several pilot projects, such as the Fuel Cell Demonstration Project, in recent years.

WASTEWATER TREATMENT - REUSE AND RECYCLE!

South Treatment Plant's wastewater treatment facilities produce many valuable byproducts that can be reused within the plant and throughout the region.

RECLAIMED WATER Secondary effluent is reused on-site for cleaning and as a water source for the treatment process. A portion of the final effluent undergoes further treatment for irrigation and industrial use by businesses, parks and nurseries near the treatment plant.

BIOSOLIDS Biosolids are the nutrient-rich organic matter produced by treating wastewater. King County is one of the first utilities in the U.S. to earn a prestigious national certification for a management system for producing high-quality environmentally safe biosolids.

Some of South Treatment Plant's biosolids are sold as a soil amendment for agriculture in Eastern Washington. The rest is used in forest fertilization or composted for landscaping and gardening.

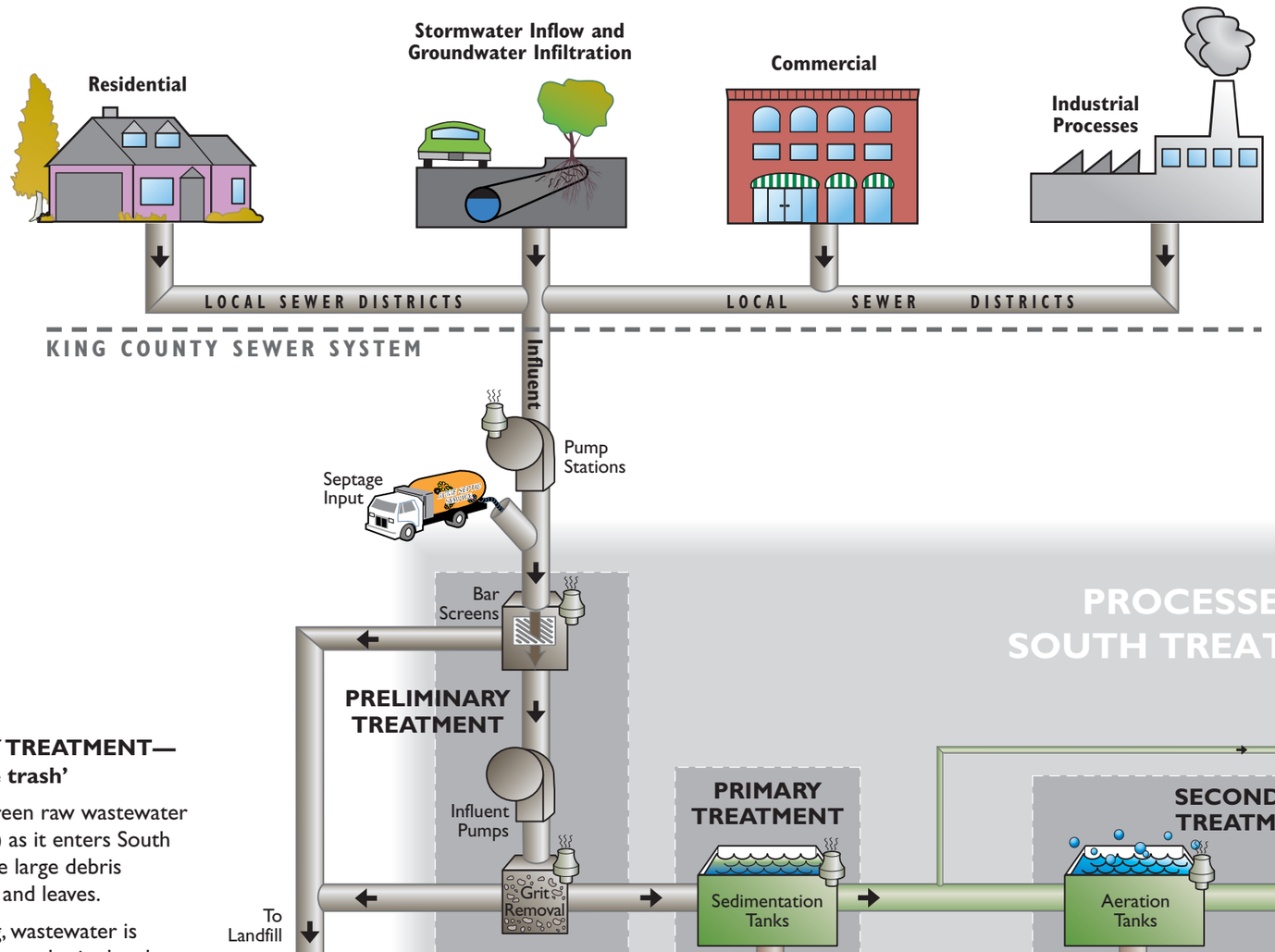
Composted biosolids make a wonderful soil amendment for gardens and commercial landscapes.

ENERGY RECOVERY Digester gas is a byproduct of the biosolids digestion process. It is a gas composed of methane and carbon dioxide produced by active anaerobic bacteria. This gas is captured, separated and cleaned, then either sold to Puget Sound Energy or used on-site as an energy source for a cogeneration system and fuel cell. Both the cogenerators and fuel cell produce electricity and heat for plant use. The electricity offsets as much as 45 percent of the plant electrical demand and frees up an equivalent amount of power for use in homes and businesses.

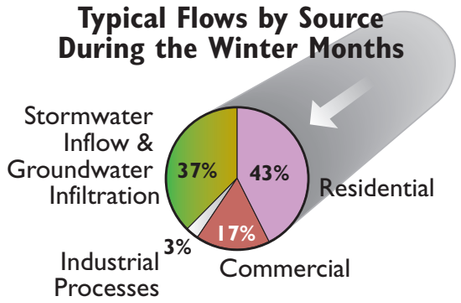
King County
Department of Natural Resources and Parks
Wastewater Treatment Division
http://dnr.metrokc.gov/wtd/

WASTEWATER TREATMENT PROCESS

How is wastewater treated at King County's South Treatment Plant?



WHAT'S COMING INTO THE PLANT?



PROCESSES WITHIN SOUTH TREATMENT PLANT

ODOR CONTROL – 'the Sniff Test'
In order to minimize odors, we cover or contain the potentially smelly processes and collect the air for treatment.

SOUTH TREATMENT PLANT FACTS

Design average wet weather flow: 115 million gallons per day

Design secondary capacity: 240 million gallons per day

Design maximum capacity: 325 million gallons per day during peak storms

Length of effluent transfer pipe from South Treatment Plant to Duwamish Head: 12 miles

Outfall pipe: 10,000 feet long, 625 feet deep, 500-foot diffuser

Reclaimed water produced: about 100 million gallons per year

Biosolids produced: about 55,000 wet tons per year

Methane gas produced: about 2.8 therms per year

Expected electrical production: up to15 million kilowatt-hours per year (after cogeneration system is online in 2005)

Septage (waste from septic tanks) treated: about 17 million gallons per year

PRELIMINARY TREATMENT— 'Taking out the trash'

- Bar screens screen raw wastewater (called influent) as it enters South Plant to remove large debris like rags, paper, and leaves.
- After screening, wastewater is pumped into aerated grit chambers that remove sand and gravel.
- The debris and grit removed during this process are trucked to a landfill.

PRIMARY TREATMENT — a physical process — 'Scum floats; sludge settles'

- Wastewater settles in long tanks called primary sedimentation tanks. Heavy material sinks to the bottom (as sludge), and light material floats to the top (as scum).
- Skimmers remove scum from the surface of the water, and scrapers remove sludge from the tank bottom. Both are then sent onto the solids handling process.
- At this point anything that could have settled out has. The treated water, now called primary effluent, flows to the secondary treatment process.
- South Treatment Plant is designed to handle a peak hydraulic flow of 240 million gallons a day (mgd) through secondary treatment. In an extreme rainstorm during a wet winter, excess flows may be diverted around secondary treatment and disinfected.

SECONDARY TREATMENT — a biological process — 'Friendly bugs eating contaminants'

- Primary effluent is pumped to aeration tanks where oxygen is added to encourage growth of useful bacteria naturally present in the wastewater. Bacteria from the end of the treatment process are also recycled—'more hungry mouths to feed'—to speed up the reaction.
- Bacteria eat suspended and dissolved organic material in the water. In the process, they produce more bacteria.
- The wastewater then goes to secondary clarifiers, large round sedimentation tanks where bacteria settle to the bottom of the tank as secondary sludge.
- Most (90 percent) of secondary sludge goes back to the aeration tanks to process ("eat") more organic material; the rest goes to the solids handling process.
- The remaining water—secondary effluent—leaves the clarifiers at least 85 percent cleaner than when it entered South Plant.

DISINFECTION — 'Zapping pathogens'

- Secondary effluent is chlorinated, destroying most remaining pathogens, or disease-causing bacteria.
- The chlorine dilutes as it flows through the 12-mile-long effluent transfer pipe and meets up with the outfall pipe to exit from the diffuser into Puget Sound.

RECLAIMED WATER — 'Saving H20'

- After disinfection, some secondary effluent undergoes advanced treatment (coagulation, filtration, disinfection) to reduce use of drinkable water in plant processes. The water is also used off-site for landscape irrigation and to replace drinking water use in industrial processes.

SOLIDS HANDLING — Creating biosolids — 'Blend, thicken, digest, dewater'

- Raw organic solids—primary and secondary scum and sludge from the sedimentation and clarifier tanks—are blended and thickened in a dissolved air flotation tank. The solids are then pumped to porous conveyor belts that use gravity to drain water off and thicken the material.
- After thickening, the solids are pumped to digester tanks where anaerobic bacteria at 98 degrees Fahrenheit break down organic material and pathogens. The activity of the bacteria creates digester gas and reduces the solids mass by 50 percent.
- The digested solids are then pumped from digesters to equipment that uses centrifugal force to remove water from the solids.
- Water removed from the digested solids goes back to the wastewater treatment process. The resulting dewatered solid material is nutrient-rich biosolids.
- South Treatment Plant is a nationally recognized member of the National Biosolids Partnership—through its environmental management system—aimed at producing biosolids that are safe for use as a soil amendment.

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