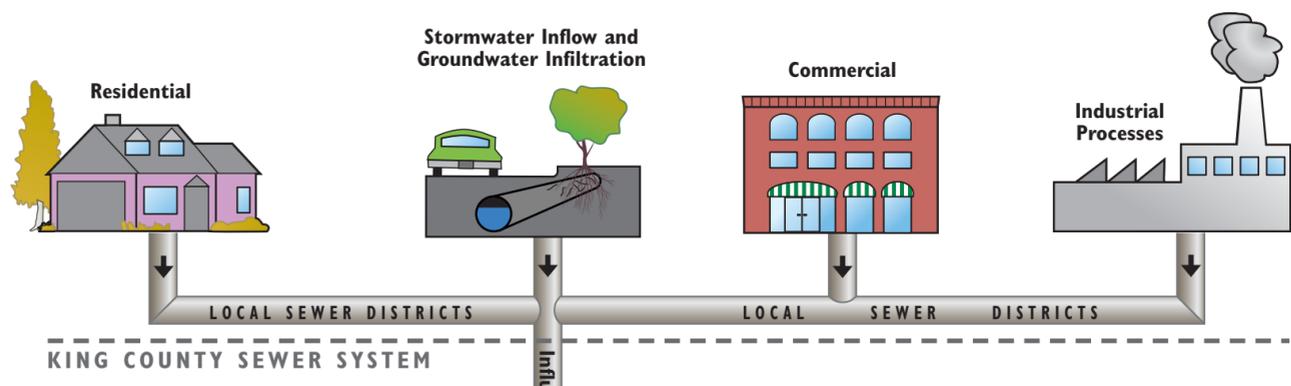
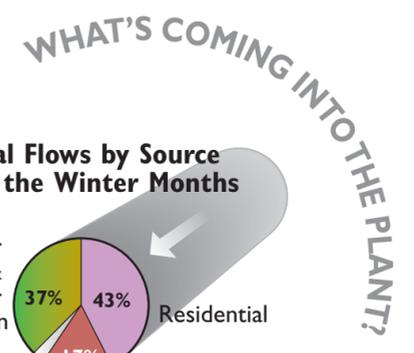


WASTEWATER TREATMENT PROCESS

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



PROCESSES WITHIN SOUTH TREATMENT PLANT

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 H2O'

- 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.

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 to 15 million kilowatt-hours per year (after cogeneration system is online in 2005)
- Septage (waste from septic tanks) treated: about 17 million gallons per year

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.

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

