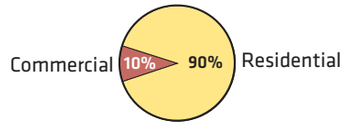
King County
Department of Natural Resources and Parks
Wastewater Treatment Division

Carnation Treatment Process

WHAT'S COMES INTO CARNATION?

Typical Flows by Source During Winter Months

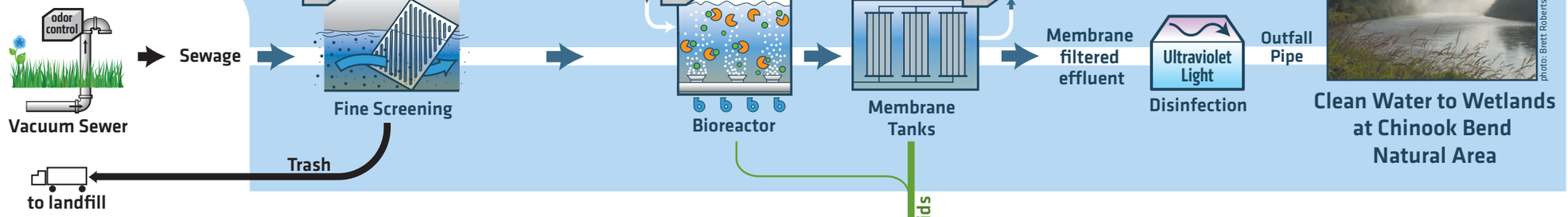


PRELIMINARY TREATMENT

ADVANCED TREATMENT

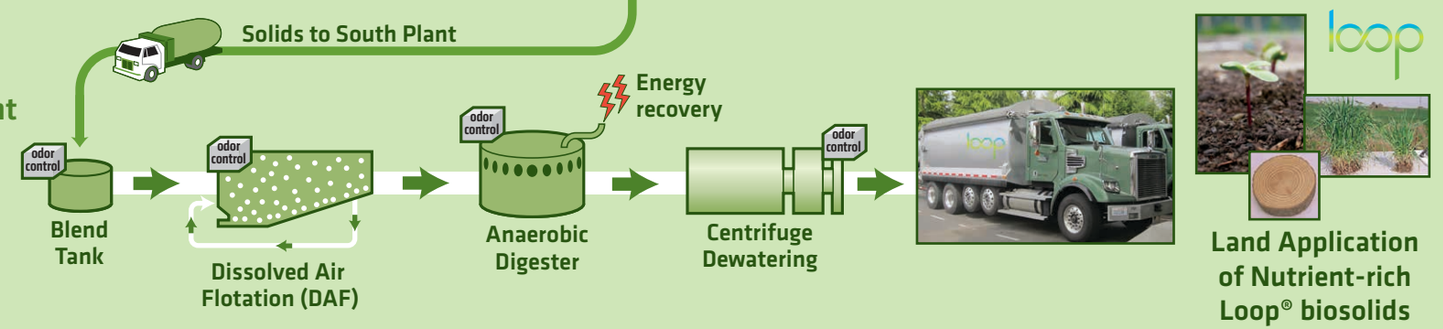
PRODUCTS

Water Treatment



Solids

Solids Treatment at South Plant in Renton



DCE: 12781w

CARNATION FACTS

Design maximum capacity:
430,000 gallons per day

Outfall pipe:
Chinook Bend Wetland
or Snoqualmie River

Average flow:
111,000 gallons per day

Solids sent to South Plant:
13 dry tons per year

AT SOUTH PLANT

Biosolids produced:
about 14,000 dry tons per year

Biogas generated:
3.5 million therms per year

At Carnation Treatment Plant

About 111,000 gallons of wastewater (sewage) come through the Carnation Treatment Plant every day. This wastewater carries trash, dirt, organic waste, bacteria, pathogens, and small amounts of chemicals from homes and businesses in the City of Carnation.

STEPS OF WASTEWATER TREATMENT

Preliminary Treatment: Taking Out the Trash and Grit

- Metal screens filter out trash items, such as cleaning wipes, feminine products and paper towels.
- The wastewater then enters a tank that has air added to help separate the grit (dirt, sand and gravel) out of the water.
- The trash and grit collected during preliminary treatment are trucked to a landfill.

Secondary Treatment: Organic Waste and Nitrogen Removal

- The wastewater then flows through a series of unaerated and aerated tanks.
- The warm, oxygen-rich environment in the aerated tanks activates naturally occurring bacteria. These bacteria consume the remaining organic material in the wastewater, and convert ammonia nitrogen to nitrate.
- The unaerated tanks allow the bacteria to convert the nitrate to nitrogen gas which escapes into the atmosphere.
- Next, the mixture of wastewater and bacteria enters the membrane tank, which is full of fine filters that will only allow water molecules to flow through.
- The solids and bacteria that are filtered out are sent back to the aeration tanks.

Disinfection: 'Zapping Pathogens'

- After filtration, the water is disinfected using ultraviolet (UV) light, to ensure any disease-causing bacteria, such as pathogens, are destroyed.
- The water is now 99% cleaner than when it entered the treatment plant.

SOLIDS TREATMENT

Biological treatment and dewatering at South Treatment Plant, Renton, WA

- The excess solids (human waste and food pieces) are removed from the tanks and trucked to South Treatment Plant for further treatment. Approximately, two truckloads of solids go to South Plant each week.
- The organic solid waste trucked from Carnation is blended together and put in large tanks called digesters. These big tanks use bacteria and heat to help digest, or break down, the organic solids.
- After about 30 days in the digester, excess water is removed using a centrifuge (high-powered spinning machine), and the material is now called biosolids.
- Biosolids are used as a nutrient-rich soil amendment for crops and forests in Washington state, putting our "waste" to good use.

RESOURCE RECOVERY

Recycled Water

About 32 million gallons of the clean wastewater are sent to a wetland enhancement site at the Chinook Bend Natural Area every year. The clean water meets Washington State Class A Recycled water standards.

Nutrients: Loop® Biosolids

The solids treatment process at South Plant produces a nutrient-rich biosolids product called Loop® and is sold to farms and forests as an alternative to chemical fertilizers. Loop® can be composted further to create GroCo®, a retail product for home gardens and landscapes.

Energy

Biogas from the solids treatment process is converted into electricity and used on the treatment plants for heating tanks and buildings. Some of the gas is also scrubbed, removing impurities, and sold to local utility companies for use as natural gas in local homes and businesses.

YOU CAN HELP

- Flush only human waste and toilet paper down the toilet. Other "flushable" products are NOT good for pipes and sewer systems.
- Use simple, biodegradable ("green") personal care and cleaning products. Find recipes to make your own! *kingcountyhazwastewa.gov/en/households-disposal/householdssafer-home-products*
- Control rainwater by installing a rain garden or rain barrel at your home. You can also prevent runoff pollution by cleaning your car at a car wash, scooping your dog's waste, and picking up litter. These actions all help protect our local water quality.

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