

South Treatment Plant Facts in Metric (2013)

Technical Facts and Information about Wastewater Treatment Processes

1200 Monster Rd S.W.
Renton, WA 98057

Design Basis

- Average Dry Weather Flow (ADWF): 364 Million lpd (Mlpd)
- Average Wet Weather Flow (AWWF): 435 Mlpd
- Peak Hourly or Wet Weather Flow (PWWF): 1231 Mlpd
- 394 square kilometer service area includes 32 individual sewer jurisdictions.

Influent Pumping:

- 6 non-clog centrifugal pumps; 4 @ 379 Mlpd, 1 @ 237 Mlpd, and 1 @ 142 Mlpd
- “Firm” capacity: 1,477 Mlpd (largest pump out of service)

Influent Screens

- Bar Screens: Eight mechanically cleaned screens each 1.8m W x 4.6m H; 2 with 1.9cm bar spacing, 2 with 1.1cm bar spacing, 4 with 0.9cm bar spacing
- Screenings Transfer Pumps: Three non-clog centrifugal pumps 91 lpm
- Screenings Dewatering Equipment: 3 rotary screw pumps 1128 lpm

Grit Removal, also known as *Pre-aeration*

- Pre-aeration Tanks: 3 total; 2 tanks @ 8.4m W x 38.1m L x 4.6 m D; 1 tank @ 8.7m W x 35.8m L x 4.9m D; average design detention time 15.2 min each.
- Pre-aeration blowers: 2 turbo blowers each rated 75 KW @ 7362 m³/min
- Grit Pumps: 17 recessed-impeller pumps each rated 61lpm @ 7.5KW (12 ea) and 11KW (5 ea)

Primary Sedimentation

- Sedimentation Tanks: 12 total; 8 South, 4 North; 10.4m W x 50m L x 2.9m D each.
- Raw Sludge Pumps: 12 recessed-impeller pumps each rated 76 lpm @ 15KW.
- Scum Pumps: 6 total; 4 progressive-cavity pumps each rated 6KW @ 14 lpm and 2 recessed-impeller pumps each rated 15KW @ 76 lpm.
- Primary Treatment Removal (2013): 62% Suspended Solids removed and 43% BOD removed

Secondary Air Activated Sludge

- Aeration Tanks: 4 total @ 16.2 MI each; 4 passes per tank each 9.1m W x 96.7m L x 4.6m D.
- Aeration Blowers: 7 total
 - ◇ 4 – “Turblex” single-stage mixed-flow blowers each rated 746 KW @ 377 m³/min
 - ◇ 1 – “Hoffman” multi-staged blower rated 895 KW @ 660 m³/min
 - ◇ 2 – “Hoffman” multi-stage blowers rated 447 KW @ 396 m³/min

Secondary Clarifier Tanks

- 24 tanks total, each 30.5 diameter
 - ◇ 4 tanks @ 4.3m D with Peripheral Feed (Tanks #1 - #4) Detention time AWWF- 3.5hrs
 - ◇ 20 tanks @ 5.5m D with Center Feed (Tanks #5 - #24) Detention time AWWF- 4.5hrs
- Return Activated Sludge: 48 centrifugal variable-speed pumps each rated 19 KW @ 11,360 lpm
- Waste Sludge Pumps: 3 centrifugal variable-speed pumps each rated 30KW @ 6,625 lpm

Disinfection

- Liquid Sodium Hypochlorite (12.5% NaOCl) Dosing: 2 Systems
 - ◇ East System: 2 storage tanks @ 45,435 liters each; 3 “Tuthill” gear pumps each rated 0.75KW @ 19 lpm; 1 “Waterchamp” rapid-speed mixer rated 15KW.
 - ◇ West System: 2 storage tanks @ 45,435 liters each; 3 “Tuthill” gear pumps each rated 0.75KW @ 19 lpm; 1 “Waterchamp” rapid-speed mixer rated 15KW.
- Contact Channels: 2 each @ 3.6m W x 3.6m deep:
 - ◇ North Channel: 503m L @ 6.7 MI volume (goes past ETS weir to Green River gate)
 - ◇ South Channel : 354m L @ 4.8 MI volume (goes to ETS weir)

Effluent Pumping

- “Firm” pumping capacity: 1,231 Mlpd (largest pump out of service);
- Total installed pumping capacity: 1363 Mlpd
- 4 Duty pumps each rated 485KW @ 212 Mlpd
- 4 Peaking pumps each rated 1909KW @ 341 Mlpd

Effluent Transfer and Marine Outfall

- Transfer Pipe: 2.7m dia. x 16Km long following the Duwamish River to Elliot Bay
- 2 Submarine Outfalls with Diffusers 192m below mean sea level
 - ◇ Outfall A: 3Km L x 162.5cm dia. pipe with 151m L diffuser section
 - ◇ Out fall B: 2.8Km L x 162.5cm dia. pipe with 167m L diffuser section

Solids Treatment

- Dissolved Air Flotation Sludge Thickeners: 6 tanks total at 3.4m Depth; 4@16.8m dia. and 2@19.8m dia.
- Solids Loading Capacity: 103,420 Kg/day for 16.8m tanks; 72,120 Kg/day for 19.8m tanks.
- Anaerobic Sludge Digestion: 5 digesters total at 30.5 m dia.
 - ◇ 4 primary tanks with floating covers @ 13m deep and 25-day average detention.
 - ◇ 5th or “Blending” Tank with fixed cover @ 7m deep and 5-day average detention.
 - ◇ Solids Loading Capacity: 131,540 Kg/day average; 170,550 Kg/day max month.
- Centrifuge Dewatering: 3 Andritz Model D7LL Centrifuges
 - Capacity: 680-1135 lpm and 1535 Kg/hr
 - Feed sludge: 2.8% - 3.2% solids
 - Dewatered Biosolids Product: 22% - 25% solids
 - Solids Capture: 95%
 - Polymer Dose: 15.8-20.4 Kg polymer per metric ton applied
 - ◇ Polymer feed pumps: 3 Progressive-cavity @ 6KW each
 - ◇ Sludge feed pumps: 3 Progressive-cavity @ 6KW and 1439 lpm each
 - ◇ Truck Haul: 26 cubic meter per truck; 6 hauls daily average; 54,430 metric wet tons hauled annually
 - ◇ Polymer Storage and Makeup Systems for Dry and Liquid Polymer

Odor Control

- Primary: 2 Wet Scrubbing Packed Bed Towers each 7362 m³/min capacity, 3.7m dia. with 3.0m packed bed depth, hypochlorite and caustic soda dosing, 1893 lpm scrubbing liquid circulation rate.
- Secondary: 2 Wet Scrubbing Packed Bed Tower at 946 m³/min capacity, 3.7m dia. with 3.0m packed bed depth, hypochlorite and caustic soda dosing, 1890 lpm scrubbing liquid circulation rate.
- DAFT: 1st stage – 1 Wet Scrubbing Packed Bed Tower at 28 m³/min capacity, 0.8m dia. with 3.0m packed bed depth, hypochlorite and caustic soda dosing, 570 pm scrubbing liquid circulation; 2ndStage - 2 Activated Carbon Scrubbing Towers each 467 m³/min capacity.
- Sludge Dewatering Building: 1st stage – 2 Wet Scrubbing Packed Bed Towers each 949 m³/min capacity, 3.7m dia. with 3.0m packed bed depth, hypochlorite and caustic soda dosing, 1893 lpm liquid circulation rate; 2nd Stage - 1 Activated Carbon Scrubbing Tower at 1897 m³/min capacity.

Septage

- 91 million liters annually
- 1.81 million Kg solids annually or 3-5% of South Plant’s influent solids

Energy/Gas and Heating Systems

- “Binax” Biogas Scrubbing System – 56,633 m³/day capacity or 1.1 Billion BTU/day.
 - ◇ Three gas compressors: 2 each rated 112KW @ 16,990 m³/day/day and one rated 261KW @ 35,396 cm/day.
 - ◇ Three scrubbing water pumps: 2 rated 149KW @ 3Mlpd and 1 rated 186 KW @ 3.3Mlpd.
 - ◇ Two Packed Bed Scrubbing Towers: 18m tall x 1.5m dia.
 - ◇ Three Gas Drying Sodium Aluminate Columns
- Co-Generation Facility – 8 MW Capacity
 - ◇ Two 3.5MW gas turbine generators with 24 million BTU/hr steam heat recovery systems; natural gas and scrubbed biogas fueled
 - ◇ One 1.0MW steam turbine generator
- Hot Water Boiler; Digester gas fueled @ 11.7 million BTU/hr capacity
- Heat pumps: Two units at 5 and 4.5 million BTU/hr each capacity (3 units are mothballed).
- Campus-wide hot water loop for heating of digesters, buildings and underground galleries