

Existing Treatment System

Redwood Sanitary Sewer Service District
Josephine County, Oregon



Parametrix, Inc.

4. EXISTING WASTEWATER TREATMENT SYSTEM

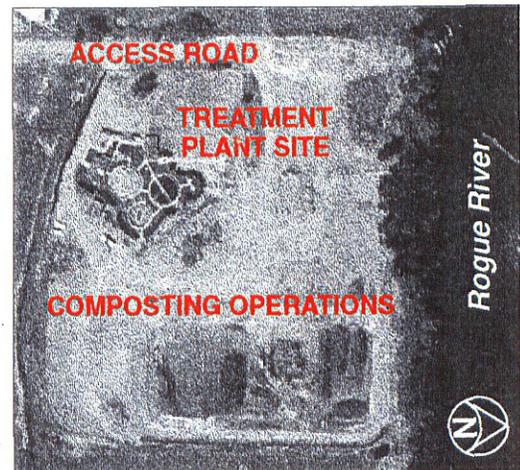
4.1 EXISTING WASTEWATER TREATMENT PLANT

4.1.1 Description of Facilities

The existing Redwood WWTP is a conventional activated sludge plant with no primary sedimentation (Figure 4-1). The plant is located at the west end of the District's service area (see Figure 3-1).

Located at the plant site are the unit treatment processes, a control/laboratory building, the blower/sludge pumping building, and biosolids composting operations. The unit treatment processes include the following components:

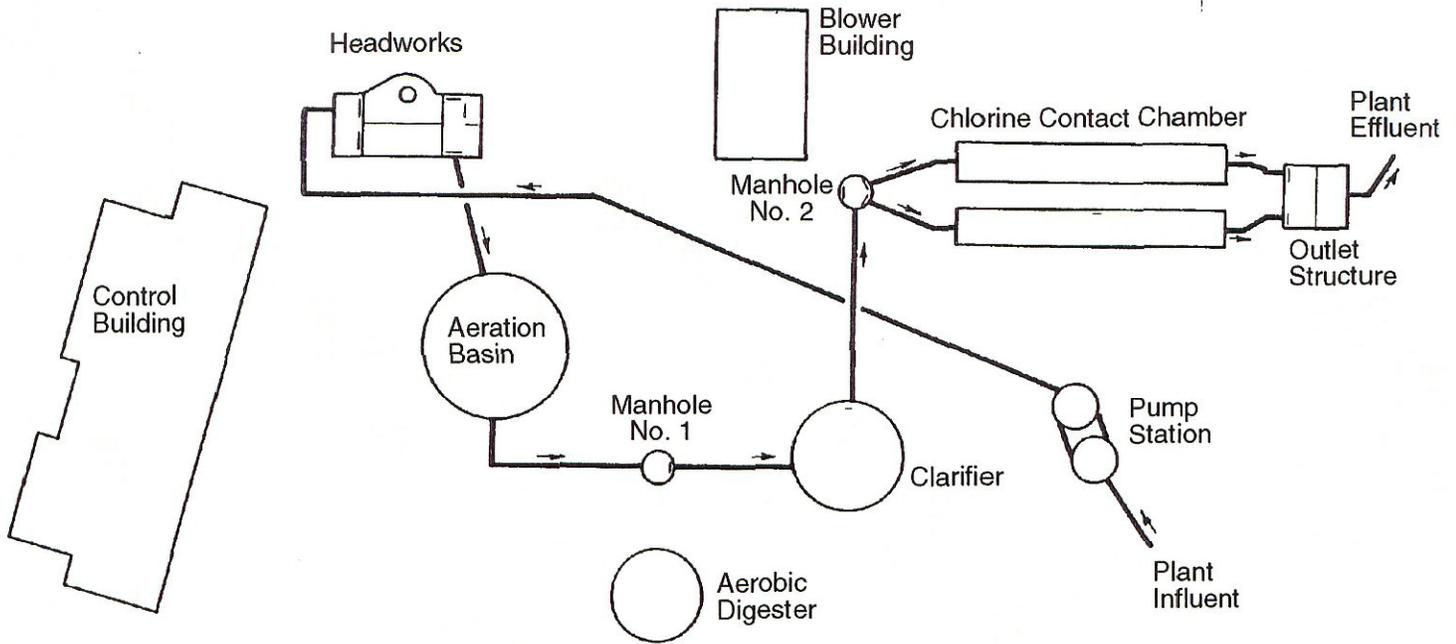
- Influent pump station
- Headworks with comminutor
- Aeration basin
- Secondary clarifier
- Chlorine contact chamber
- Effluent outlet structure and outfall
- Aerobic digester
- Biosolids compost facility



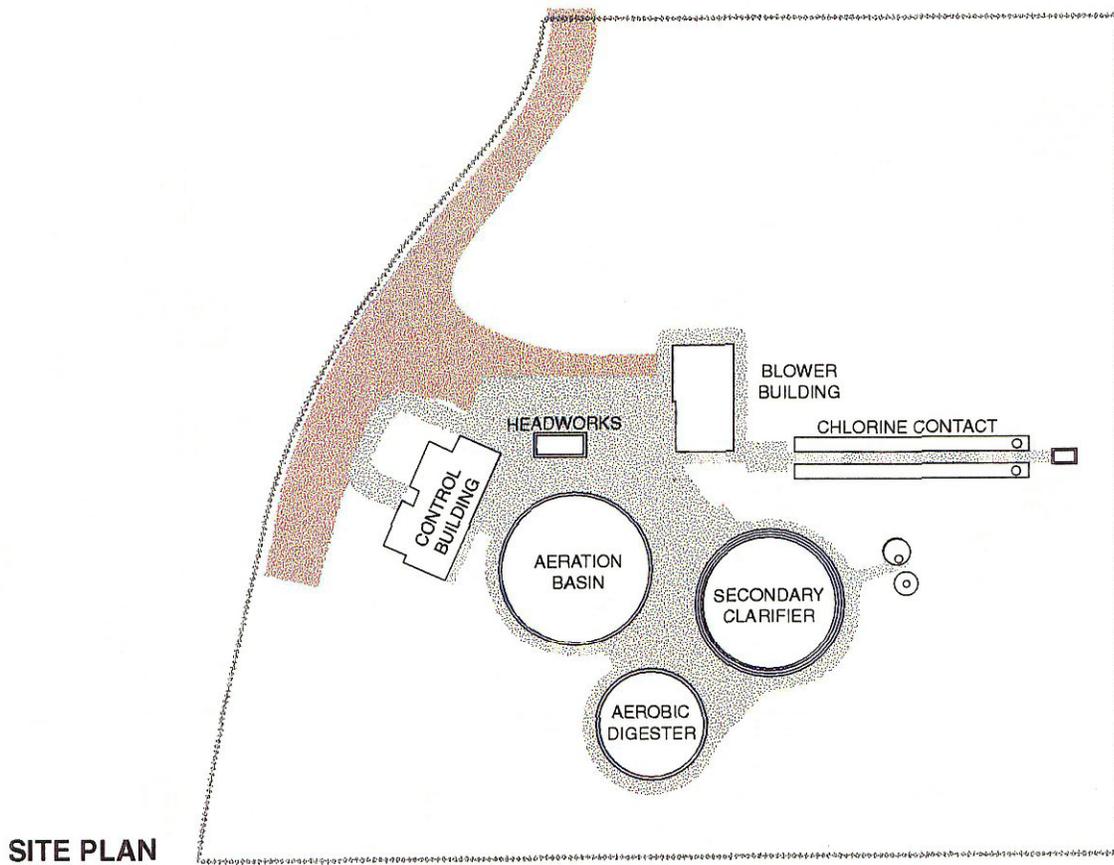
The wastewater enters the treatment plant at the influent pump station, and is pumped to the headworks where the solids and debris are shredded by a comminutor or screened through a $\frac{3}{4}$ -inch opening bar screen. This completes primary treatment at the plant.



Existing Headworks



PROCESS SCHEMATIC



**Figure 4-1
Process Schematic
and Site Plan**

From the headworks, wastewater is directed to the aeration basin, where it undergoes biological treatment which results in activated sludge. Wastewater in the basin is aerated using positive displacement blowers situated in the blower building. Coarse bubble diffusers are located on three (3) air diffuser pipelines submerged in the tank. The wastewater in the aeration basin is referred to as "mixed liquor."



Existing Aeration Basin and Control Building

The mixed liquor from the aeration basin is then transferred to the secondary clarifier where the biological floc and other solids are separated from the treated wastewater.

A portion of the solids (referred to as return activated sludge) collected at the bottom of the clarifier are recycled back to the headworks to maintain a sufficient level of microorganisms of an optimum age to reduce the organic load in the wastewater. The remaining solids are directed to the aerobic digester.



Secondary Clarifier

The solids are treated further in the aerobic digester before being sent to the compost facility for final disposal. Supernatant, the clarified liquid that forms on top of the solids in the digester, is sent back to the influent pump station for treatment.



Existing Aerobic Digester

Treated wastewater is disinfected with chlorine before discharge to the Rogue River. A contact chamber provides the time needed for the chlorine to reduce the potential pathogenic bacteria to an acceptable number. The effluent is measured prior to discharge. A weir is used to control the level of release and the flow rate.

The plant treats wastewater which is generated from residential homes. There are no known industrial discharges to the system; also, the plant does not accept septage from septic tank pumpers.

A detailed plant capacity analysis included in the 1994 District's Wastewater Facility Plan is included in Appendix D. The capacity of each portion of the process was analyzed. The facilities are capable of handling a maximum month average flow of 0.6 mgd and a peak hour flow of 1.44 mgd.

4.2 WASTEWATER FLOW AND LOAD

Before the Redwood WWTP capacity requirements can be determined and wastewater treatment alternatives evaluated, existing flow and load needed to be reviewed. The flow/load analysis was based on wastewater data collected at the Redwood WWTP from September 1995 to August 1998.

The solids are treated further in the aerobic digester before being sent to the compost facility for final disposal. Supernatant, the clarified liquid that forms on top of the solids in the digester, is sent back to the influent pump station for treatment.



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4.2.1 Existing Wastewater Flow

Effluent wastewater flow measurements have been taken at the Redwood WWTP since 1978. These measurements are based on the water level measured upstream of a 60° V-notch weir at the effluent structure. Average monthly flow values for the last 3 years are shown in Figure 4-2. A very thorough flow evaluation, made in 1994 as part of the District's Wastewater Facility Plan, is included in Appendix E.

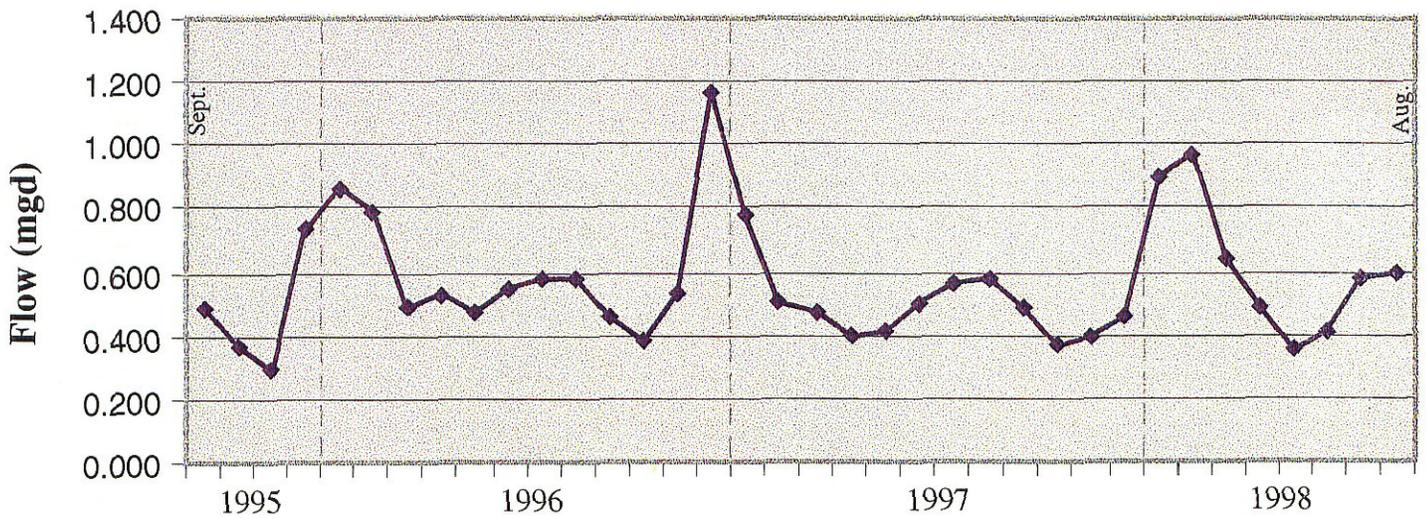
Based on average flow and peak day flow, a summary table of flow conditions was prepared (Table 4-1).

Table 4-1 1998 Plant Flow Conditions Million Gallons Per Day (mgd)				
	Max. Month	Max. Week	Peak Day	Average
Summer - Dry Weather	0.54	0.58	0.76	0.49
Winter - Wet Weather	1.16	1.20	1.48	0.63
Annual	---	---	---	0.56

4.2.2 Existing Wastewater Load

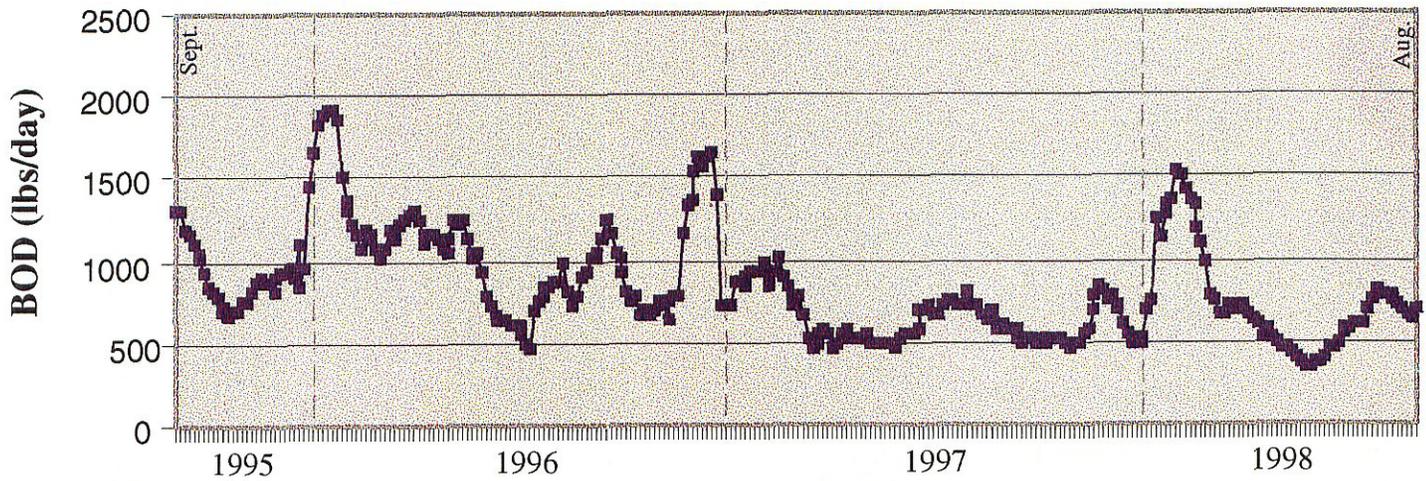
Influent and effluent wastewater Biochemical Oxygen Demand (BOD) and Total Suspended Solids (TSS) are measured twice per week to quantify the load of pollutants in the wastewater. BOD and TSS are normally measured in mg/L of water. Using the BOD concentration and wastewater flow measurements, plant influent pounds of BOD per day were calculated. Three years of 30-day average BOD lbs/day calculation results are shown on Figure 4-3. Using monthly average and peak day BOD lbs/day, a summary table of BOD load conditions was prepared (Table 4-2) from data dated January through December of 1995 to 1998.

Table 4-2 1998 Plant BOD Load Conditions (lbs/day)				
	Max. Month	Max. Week	Peak Day	Average
Summer - Dry Weather	1,122	1,345	2,488	716
Winter - Wet Weather	1,589	1,731	4,428	969
Annual	---	---	---	843



Redwood Wastewater Treatment Plant
#27-2192-05 2/99

Figure 4-2
Redwood WWTP Average
Daily Flow/Month



Redwood Wastewater Treatment Plant
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Figure 4-3
Redwood WWTP 30-Day
Average BOD

Using the TSS concentration and wastewater flow measurements, plant influent pounds of TSS per day were calculated. Table 4-3 is a summary of TSS load conditions. This table used data from January through December of 1995 to 1998 to calculate the maximum month and week, peak day and average.

	Max. Month	Max. Week	Peak Day	Average
Summer - Dry Weather	1,398	1,576	2,455	930
Winter - Wet Weather	1,116	1,404	3,473	829
Annual	---	---	---	879

4.3 PLANT REGULATORY LIMITATIONS

The regulatory limitations for the Redwood WWTP are documented in the plant's NPDES permit. The effluent limitations in this permit vary by time of year (Table 4-4). In addition, the plant flow is limited to an average monthly value of 0.48 mgd.

Parameter	Average Effluent Concentrations		Monthly Average lb/day	Weekly Average lb/day	Daily Maximum lbs
	Monthly	Weekly			
May 1 - October 31					
BOD	20 mg/L	30 mg/L	80	120	160
TSS	20 mg/L	30 mg/L	80	120	160
FC* per 100 ml	200	400			
November 1 - April 30					
BOD	30 mg/L	45 mg/L	120	180	240
TSS	30 mg/L	45 mg/L	120	180	240
FC* per 100 ml	200	400			
Other Parameters (year-round)			Limitations		
pH			Must be within the range 6.0 - 9.0		
Average percent removal (BOD & TSS)			Must be minimum of 85 percent, monthly average		
Average dry weather flow to the treatment facility			0.48 mgd		

* Fecal Coliforms