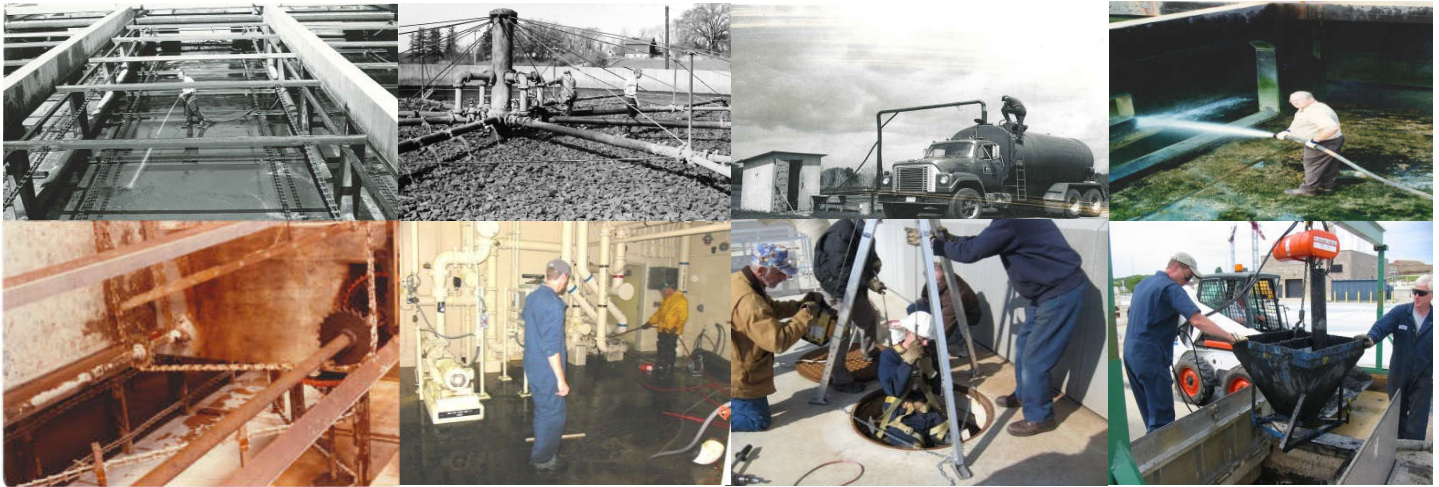
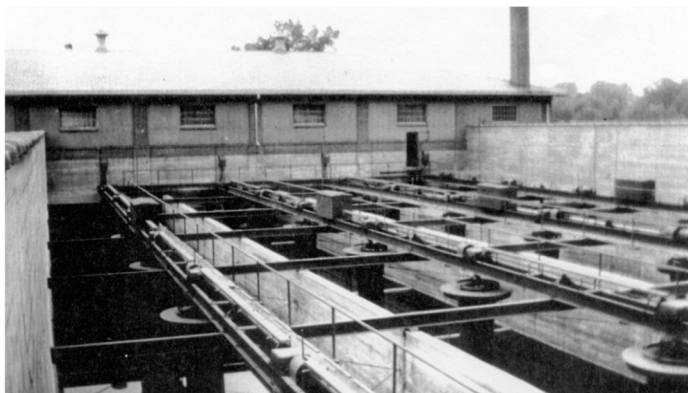




History of Wastewater Treatment in Rochester, MN



It is hard to imagine that until the early 1900's, Rochester, like most cities, did nothing about its sewage. Human, animal, and industrial wastes were absorbed by the ground or poured into a nearby waterway. A nearby waterway meant the Zumbro River for Rochester and surrounding communities. This method was called "disposal by dilution". In 1916 farmers from Cascade township began to complain about the condition of the Zumbro River. As Rochester grew, the proportion of sewage entering the Zumbro increased the severity of downstream pollution. Farmers pleaded with the county seats to do something as they saw their cows, pigs, and chickens died from drinking the polluted river. Soon, the farmers threatened lawsuits stating that they were robbed of the natural use of the river as a drinking source for their livestock. The City recognized that if they did not quickly take steps to stop polluting the river, the State Board of Health could intervene and forbid the further use of the river for disposing of sewage. An emergency election was held and bonds were passed to approve a treatment plant.



In 1926, Rochester's first wastewater treatment plant was built south of the current Rochester Recreation Center. Sewer lines that were partially installed as far back as 1894 were connected to the plant to begin treatment. The mechanical activated sludge plant was designed for a flow of 2.2 million gallons per day at a cost of \$276,000 and was the largest of its kind in the United States at that time. Once sewage entered

the plant, it passed through a screen with 3/16" openings to collect debris. Flow traveled to the aeration tanks where sewage was drawn from the bottom of the tanks and sprayed over the surface for aeration. The flow proceeded to clarifiers where sediment was settled and pumped to digestion tanks where vegetable and animal matter was decomposed to a product called sludge. The clarified water

now had removed 98% of organic material and was discharged to the river. Sludge from the digestion tanks was sent into one of four sludge drying beds. The sludge, being about 95% moisture, was then dried for approximately 60 days to remove water, leaving a thin layer of dried sludge which was collected and used as a fertilizer. This plant was later decommissioned in 1952 and demolished in 1988.

With Rochester continuing to grow, the plant became overloaded shortly after the plant was put online. The City had also grown out and began to surround the wastewater plant. In 1945, land was purchased two miles north of the City where the current facility is located. The plant is now once again surrounded by the City. In 1949 the Pollution Control Commission asked that the City proceed with all possible diligence to expedite construction of adequate sewerage treatment facilities, including a program for financing, as soon as possible.



In 1952, the new wastewater treatment plant was installed consisting of bar screens, grit collection, fine screens, trickling filters, settling tanks, and chlorination. Trickling filters were a popular wastewater treatment technology that provided low operating costs and simple operation. Chlorination was new to wastewater treatment at the time and was used to kill most of the pathogenic organisms rendering the effluent safe for discharge into the Zumbro River. The total cost for the new treatment facility was \$1,900,000. Shortly after construction, it was realized that the sludge treatment process required an upgrade.

In 1957 two anaerobic digesters were constructed to reduce sludge volumes and further treat the solids.

In 1967 an activated sludge treatment process was added to the facility. The new process consisted of grit removal, preaeration tanks, primary settling tanks, aeration tanks, final settling tanks, a blower building, additional chlorinating tankage, a sludge thickening tank, sludge lagoons and sludge drying beds. The expanded plant was rated for 12 million gallons a day and cost \$2,700,000. The project was the first major expansion and required work to be performed with existing processes online. This expansion also added a tunnel system which allowed the majority of operations to exist underground.



In 1973 a Pre-Chlorination Facility was constructed on 3rd Ave NW for odor control. Later in 1983, the facility was decommissioned when the 1980 plant went online. The City also changed the name of the

sewage plant in 1974 from Sewage Treatment Plant to Water Reclamation Plant. Naming a wastewater plant as Water Reclamation is now very common but was very progressive at the time.

Due to heavy flooding in the 1960's, the City of Rochester and Olmsted County realized flood control was needed. Beginning in 1976, a flood control plan was developed and a bill was submitted to Congress in 1977. Unfortunately, a flood hit the City of Rochester before the bill was approved. On July 5, 1978 the City of Rochester received 6" of rain that caused major flooding throughout the City. The Water Reclamation Plant, being along the Zumbro River, did not escape its wrath when its banks overflowed. With water flooding the 28 foot deep sub-basement of the plant, the staff realized they had to cut power to the plant as Utility Department could not reach them. Ninety percent of the pumping equipment, plus control boards and motors then became unavailable for use. Temporary treatment of sewage was done with six 2,000 gallons per minute submersible pumps which pumped the sewage through a one inch bar screen and into final settling tanks before discharging it into the Zumbro River. Transportation to and from the plant during the flood was achieved by using an employee's fishing boat as all roads were flooded. Repair costs for the 1978 flood damage totaled \$240,000.



A second treatment plant expansion was started in 1980 due to stricter MPCA effluent standards and increasing wastewater flows. The expansion added an administration building, equalization basin, high purity oxygen plant, primary clarifiers, intermediate clarifiers, final clarifiers, thickening building with centrifuges, pho-strip phosphorus removal system, gas compression building with storage sphere, chlorination treatment facility, and computer control for the entire

plant. Part of the stricter MPCA regulations required Rochester to be the first wastewater treatment facility in the state to have an effluent phosphorous limit. The plant also had an energy recovery system which included methane gas collection, boilers, two 400 HP engines, and final effluent water heat recovery system for process equipment and HVAC. The expanded plant was designed to treat 19.1 million gallons a day and cost \$56,000,000. Amazingly, 85% of the treatment plant upgrade cost was paid for by the Federal Government under the Clean Water Act.

In 1988, a chemical storage facility was added to house chemicals used for phosphorus removal. The pho-strip process installed in the 1980 plant expansion was declared a failed technology and the plant turned to chemical precipitation to meet effluent limits. Cost of the facility was \$900,000.

A new Solids Handling Improvements Project was completed in 1992 that included two new anaerobic digesters that were constructed to meet the needs of future growth and to obtain higher levels of treatment. Two gravity belts replaced three centrifuges for sludge thickening, and a 4.7 million gallon biosolids storage tank was constructed to increase the overall storage capacity. The large storage tank was critical to allow for spring and fall application rather than the historical winter application which was extremely difficult in the sub-zero temperatures. This improvement cost \$14,600,000.



In 1999 the Water Reclamation Plant entered into a project with the MPCA to voluntarily close the sludge lagoon and landfills located on the property. The contents of the lagoons and the landfills were combined and properly sealed at a location just northwest of where the plant sits today.

In 2004, the aeration basin complex (ABC) plant was constructed to run parallel to the existing high purity oxygen (HPO) plant and increased the plant's capacity to 23.9 million gallons per day. Crews had to blast 28 feet to excavate 150,000 cubic yards of rock to clear the way for the new plant which is located on the west side of the 1980's plant. An 84" sewer main was installed bringing flow to the new headworks building which contained a pumping station, fine screens, and grit removal. A portion of flow was now sent to the new ABC plant that consisted of a primary clarifier, two aeration basins, and a final clarifier. A third gravity belt was added to the solids handling facility and a second 2.5 million gallon biosolids tank was added as well. The ABC plant can be expanded on site up to a capacity of 60 MGD using the 2004 headwork's building and extending the modular components of the primary clarifiers, aeration basins, and final clarifiers. Total cost for the expansion and upgrade was \$75,000,000.

