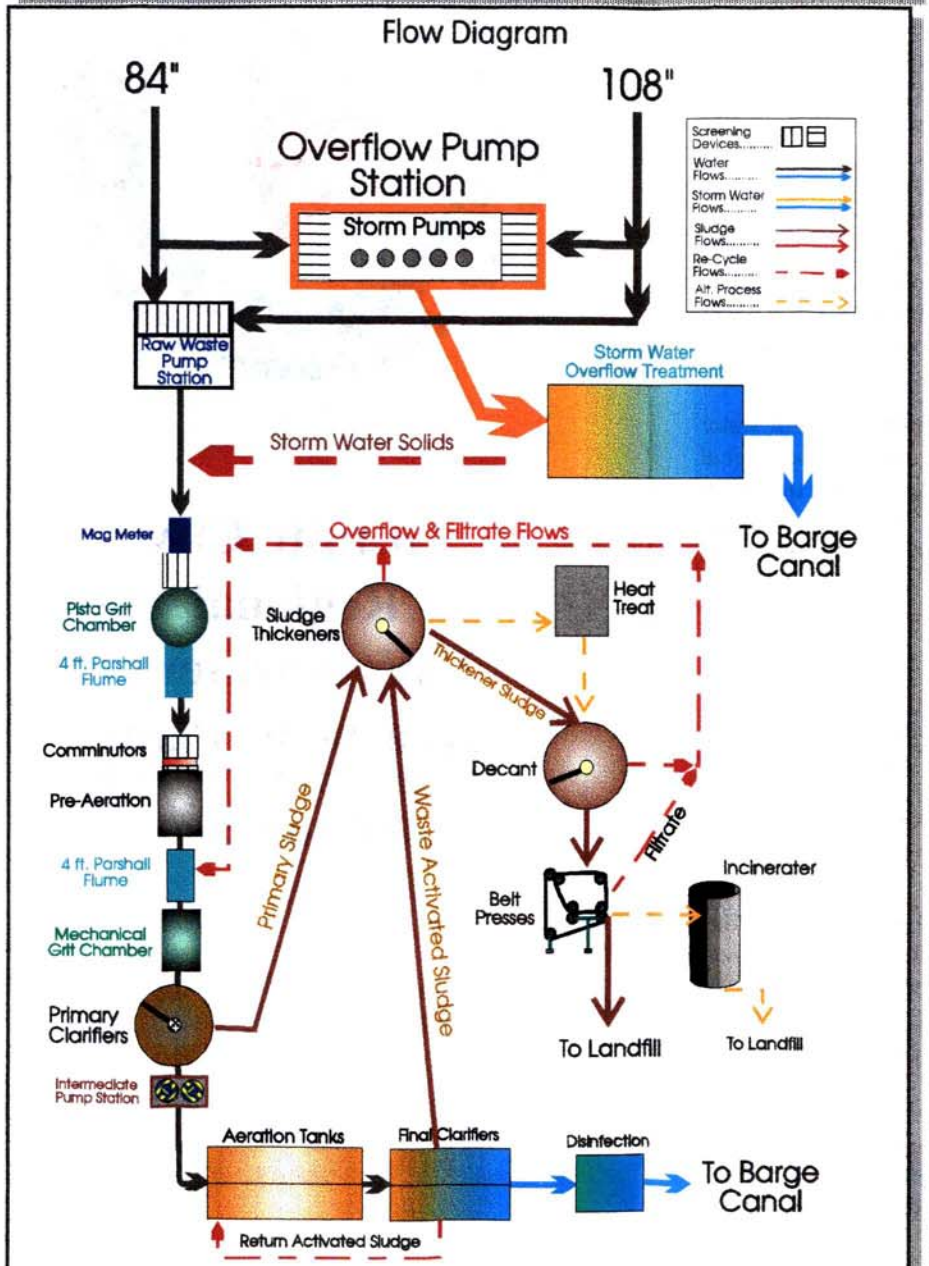
Treatment Units

Collection System: Sanitary and Industrial Wastewaters are brought to the facility by two major trunklines, 84j and 108j diameter sewers. During dry weather, sewage flows into the raw waste pump station. During wet weather, storm flows in excess of plant capacity are diverted into the combined overflow treatment system.

Flow Diagram



Preliminary Treatment:

- **Raw Waste Screen:** Mechanically cleaned bar screen to remove the trash which would clog pumps & plant piping.
- **Raw Waste Pumps:** Five 100 hp pumps capable of pumping 7000 gpm each at variable flows & speeds.
- **Influent Monitoring:** Auto sampler & magnetic flow meter are located immediately upstream from the grit chamber.
- **Grit Removal :** Sewage passes through a manual barscreen before entering the Pista grit chamber. The mechanism removes collected grit from the hopper bottom of the chamber to grit concentrators and dewatering dumpsters.
- **Comminutors:** Cutting device that reduces the size of larger solids that pass through the raw waste pumps.
- **Pre-Aeration:** Air is pumped into sewage to control odors, septicity, reduce temperature & improve sedimentation.
- **Parshall flume & Grit Tank:** Original structures provide additional flow monitoring & grit removal.

Primary Treatment: Six Primary settling tanks are 80 ft. in diameter and equipped with mechanical sludge collectors and surface skimmers. Heavy solids settle to the bottom of the tanks and form sludge which is removed from the tank for further treatment in other areas of the plant. Floating scum is removed by the surface skimmer into hoppers for further treatment similar to the sludge.

Secondary Treatment:

- **Activated Sludge Tanks:** Effluent from the Primary settling tanks enters a set of screw pumps which lift it into the activated sludge tanks. The activated sludge process is a biological sewage treatment method. Sewage is mixed with activated sludge and air is pumped into the mixed liquor. This provides a controlled environment in which bacteria consume organic mater in the sewage and thereby stabilize it.
- **Final Clarifiers:** Treated sewage from the activated sludge tanks flows into the final clarifiers. In these sedimentation tanks the solids from the activated sludge process settle out & result in an effluent with low BOD and solids concentration. Four tanks with traveling bridges are provided for this purpose. Each bridge continuously pumps the settled sludge from the basin floor while traveling back and forth from the influent end to the effluent end. The sludge is largely returned to the activated sludge process. The water surface is skimmed at the influent end of the tanks to remove floating scum concentrates. A portion of the sludge and the scum are removed for sludge processing and disposal.

Disinfection & Effluent Monitoring: Prior to its discharge to the Chain of Rocks Barge Canal, the effluent from the final clarifiers flows through a chlorination process for final disinfection. As the Final effluent flows through the chlorination tanks chlorine is added to kill any bacteria which may be in the plant effluent. The chlorination process produces residual toxic compounds that can accumulate in the environment. In order to reduce this, the EPA only requires disinfection during warm weather months. Discharge flow is monitored by a 4 ft. Parshall flume and samples are collected by an automatic sampler from the plant effluent.

Sludge Handling:

- **Sludge Thickeners:** Sludge from the primary clarifiers and waste activated sludge from the final clarifiers is pumped to two sludge thickener tanks. These tanks provide quiescent conditions where additional concentration of the sludge takes place. Thickened sludge then goes on for additional treatment. Decanted water is re-cycled to the head of the treatment system.
- **Heat Treatment:** (Alternate Process - not in service) Thickened sludge is subjected to a heat treatment process which sterilizes, and improves the filterability of the solids.
- **Sludge Decant Tank:** Thickened sludge that has been subjected to heat treatment or has by-passed heat treatment enters the decant tank. This allows additional separation of solids from the water. Overflow is re-cycled to the head of the system.
- **Sludge Dewatering:** Winkle belt presses further concentrate sludge pumped from the sludge decant tank. A polymer feed and mixing system treats the sludge prior to filtration. The Filter cake is either incinerated or is trucked away for disposal.
- **Incineration:** (Alternate Process - not in service) Filter cake is transported by a series of conveyors to a multiple hearth incinerator where it is burned. The ash from the burned filter cake is transported by truck for proper disposal.

Combined Overflow Treatment: In wet weather periods, sewers in Granite City and other areas transport both sanitary and storm water. A special treatment system accomplishes treatment when the total flow in the sewers exceed 1.5 times the actual number of units in operation. Overflow dams in the sewers divert excess flow into the combined overflow treatment system. The overflow treatment system consists of: mechanical barscreens which remove large materials which could harm pumps; five, automatically controlled, 300 hp overflow pumps capable of pumping 34,000 gpm each; and two 80 x 680 ft. double pass treatment tanks. Chlorine is added at mid- tank for disinfection & treated overflow is discharged to the plant outfall sewer. After a storm event, floor settlings in the tanks are collected in a sump at one end of the tank and pumped into the plant for treatment.