

water main which collects the water from all ten filters. This central main tapers from 48 inches to 72 inches in diameter and at the north end of the filter house is connected to a by-pass tank from which the water flows by gravity to the reservoir attached to the existing slow-sand filtration plant. From the reservoir it flows through steel mains to the tunnel shaft at Hanlan's Point where it enters the tunnel constructed underneath the bay. Arrangements have also been made whereby the filtered water can be by-passed direct to the city without flowing through the storage reservoir.

Pumping Station.—The pumping station and boiler house are under one roof 75 ft. x 142 ft., with a division wall separating the boiler room from the pumping station. The boiler house contains four dry-back return tubular boilers of 300 h.p. each, capable of being run at 200 per cent. overload. The boilers are hand-fired, but automatic dampers regulate the draft and the steam pressure. They were built by the International Engineering Works. Connected with the boilers is a buff-colored radial brick chimney, 7 feet inside diameter and 120 feet above the level of the grate bar, built by the Canadian Chimney Co.

Toronto Hydro-Electric power is used for pumping.

As a stand-by and for use during the peak load, a 1,200-kilowatt generator has been installed, gear-driven by a DeLaval steam turbine. The three pumps supplying water to the filters operate against a total lift of 32 feet. The delivery of these pumps will be automatically

maintained by the level of the water in the filters by hydraulically operated valves working through a pilot valve device. All of these pumps were supplied by the Turbine Equipment Co. and were DeLaval pumps. In the pumping station seven smaller pumps have been

installed for use as drainage pumps, hydraulic-power pumps and back-wash water-tank pumps. Provision has also been made for moving into this building some of the pumps from the existing slow-sand filtration plant. The switch-board has been constructed by the Canadian Westinghouse Co. Two 12-ton Hepburn travelling cranes have been installed for handling the machinery

Intake.—Two 72-inch steel pipes, running parallel 21 feet below water level, form the intake, the construction of which was difficult owing to the very liquid sand encountered and the close proximity of existing works. Each pipe connected to a valve chamber of the existing city intake. It was necessary to lay the intake pipe close underneath the two pipes carrying the existing water supply. Obstacles such as an abandoned wooden stave pipe, crib work, old concrete pipes and logs were encountered. The length of 95 feet from the south, working northwards, was piled with Lackawanna steel sheet piling

on both sides, and the new pipes laid and concreted under water by divers. The northmost half of the intake was sheeted in a similar manner, but in this case the water was pumped out and the pipes laid and concreted in the dry.

Toronto Filter Plant Facts in Tabloid

Cost, approximately, \$1,066,282

Normal Rate of Filtration, 60 million imperial gallons per 24 hours.

Maximum Rate of Filtration, 30 million imperial gallons in 10 hours.

Capital cost per million gallons normal capacity, \$17,771.

Plan area of filters, 17,450 sq. ft.

Normal Rate of Filtration per sq. ft. filter area, 143 gals. per hr.

Number of Filters, 10.

Units in each Filter, 30.

Diameter of each Filter, 50 ft.

Depth of Filter tanks, 14 ft.

Loss of head in sand, 10.5 ft.

Loss of head in washers, 3.5 ft.

Average depth of sand in Filters, 9 ft.

Total sand in each Filter, 600 cu. yds.

Drifting sand in each Filter, about 300 cu. yds.

Weight of each Filter including sand and water, 1,550 tons.

Operating pressure on control valves, 700 lbs. per sq. in., hydraulic.

Plant area, 2.4 acres.

Guaranteed efficiency, 90 to 98%.

Contract awarded, May, 1914.

Probable date of completion, November, 1916.

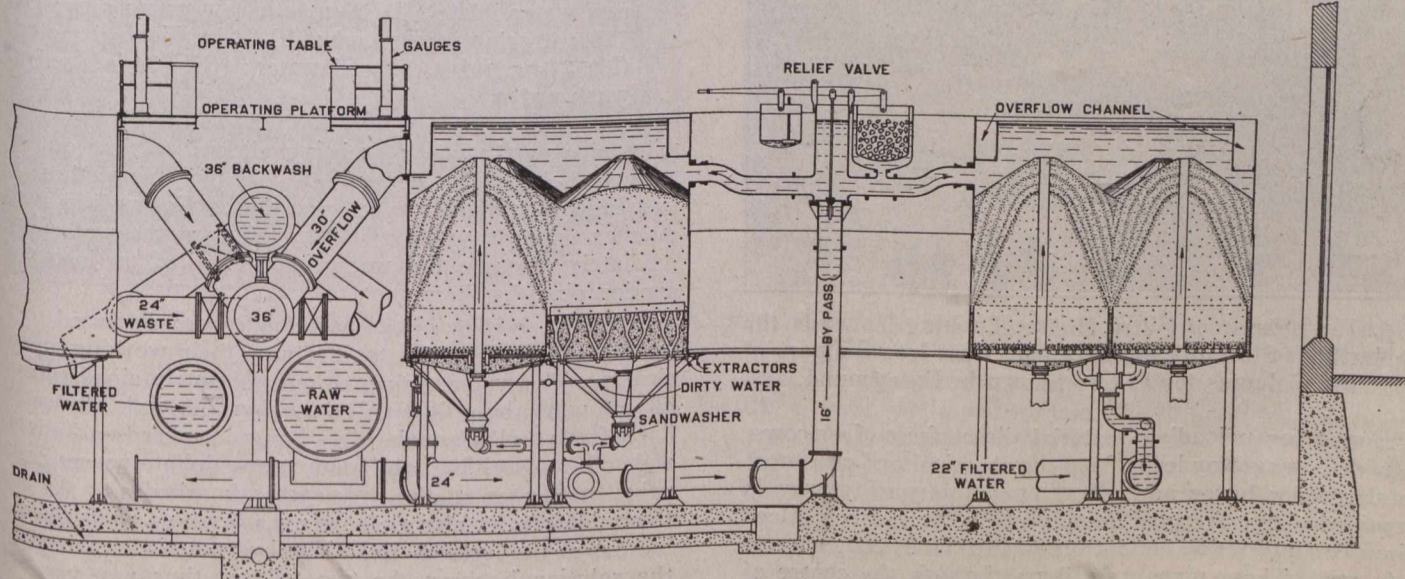


Fig. 5.—Section Through Single Filter.