

The Canadian Engineer

An Engineering Weekly

CONSTRUCTION OF A CONCRETE SEWER TUNNEL THROUGH DIFFICULT GROUND.

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The sewer described in this article, and known as Barton Section 1, forms part of a system of storm overflow sewers provided to relieve the congestion of the existing sewers in the western section of the city of Toronto, known as the Garrison Creek drainage area.

The existing sewer for which relief is provided by this storm sewer is that running along Bloor Street easterly from the Garrison Creek (at Willowvale Park) to Huron Street.

Floodings were experienced in cellars of houses and stores during heavy rains, and in view of the immediate addition of the northern districts, the necessity for relief became more urgent.

The general scheme of existing drainage of the area in question is that of tributary sewers extending from south to north, with main sewers running east and west. These main sewers discharge into the Garrison Creek, which runs practically north and south, discharging into the lake at the south end.

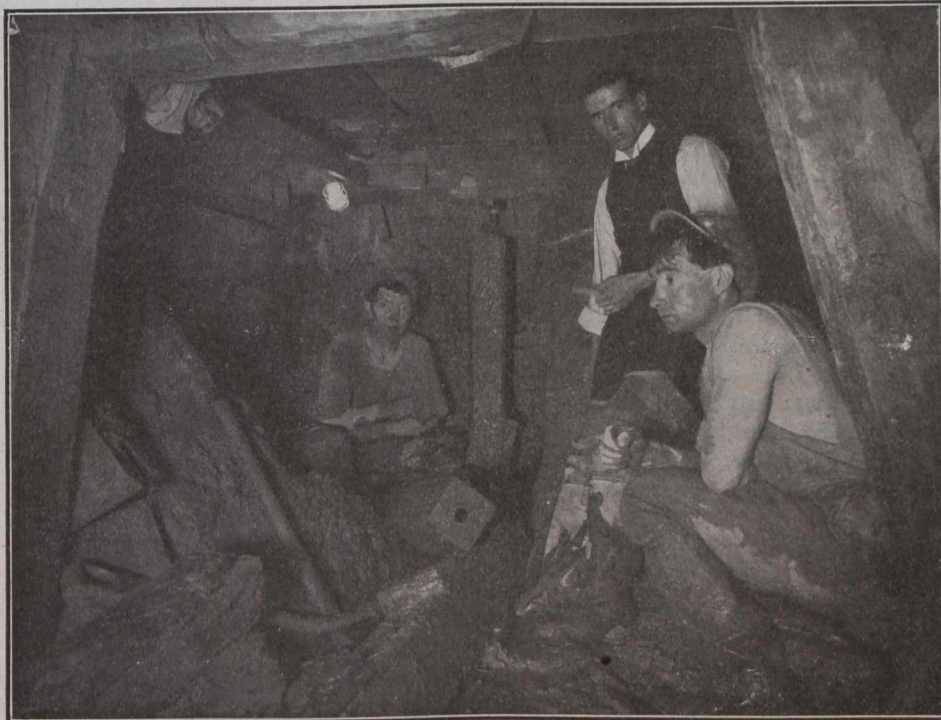
The question of paralleling, in order to relieve Bloor Street Sewer, was considered out of the question on account of the busy nature of the street, and the presence of the street railway tracks. Other utilities underground were numerous and formed obstructions. The geological formation was found to be bad for sewer construction in tunnel, involving running sand, clay and water pockets, boulders, etc. The idea of open cutting could not be entertained owing to the obstructions and street traffic. On these accounts it was decided to place the sewer on Barton and Lowther Avenues, to the north, although the subsoil, as indicated by borings, was equally bad, being

of glacial deposit formation, as in Bloor Street, but the streets were not so hampered with excessive traffic, and in the event of open cutting having to be resorted to, would inconvenience little.

The total area drained by the Barton Avenue sewer is 701 acres, and extends some 670 feet north of the C.P.R. northern line. The whole area has a fall from north to south and is practically level from east to west.

The existing sewers and those new sewers required for future drainage run along the north and south streets, discharging into Bloor Street at the south end. The system is the "combined."

The method of interception is that of tumbledown shafts, as shown in Fig. 2, with tumbledown C. I. pipe shoots for the smaller sewers and the sanitary flow of the larger ones. The whole flow, sanitary and storm, is intercepted and carried in the storm sewer. Separation of the sanitary and storm water is provided for at Bloor Street on the Garrison Creek sewer. The



Heading at Station 28 + 00, Abandoned at Station 28 + 28.

channel provided for the sanitary flow in the storm sewer is shown in Fig. 2.

The total length, including section 2, is 7,741 feet; section 1, to which this article refers, is 3,345 feet long and is at the outlet end of the sewer.

Fig. 2 shows the typical cross section of the sewer as carried out. The flat section was designed to same height across the low-lying land of Willowvale Park, so that mounding would not be necessary. The remaining sections gradually increasing in size towards the outlet, are designed for tunneling so that the invert can be placed, as conditions per-