



**Environmental  
Hydraulics  
Group Inc.**

**Hydraulic Design & Analysis  
- Water & Sewage**

**Project: Greenfield Drop Shaft Physical Model**

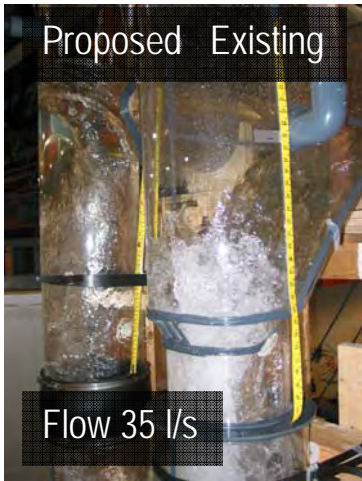
**2001-782**

**Location: Hamilton, Ontario**

**Client: City of Hamilton**

**Completed: December 2001**

**Description:** In 1999, the City of Hamilton retained EHG to develop alternatives to improve hydraulic problems experienced with the existing Greenfield dropshaft (see Project sheet 1999-012). In 2002, EHG was retained again to conduct a physical model of the existing and proposed (by EHG) Greenfield dropshafts, which transports sewage from atop the Niagara Escarpment to the bottom (45 m drop) and then travels horizontally about 1 km to the Combined Sewer Overflow (CSO) tank which was previously reviewed and improved by EHG prior to this project (see project sheet 2001-781).



The 1:12 physical model consisted of: an existing drop shaft (4.5 m height and 0.26 m diameter) with 16 m long and 0.3 x 0.27 lower level arch tunnel. The proposed drop shaft and tunnel were similar in size to the existing one with a vortex inlet and deep sump. EHG recommended an air vent of 50 mm diameter is to connect the two lower tunnels and the two drop shaft inlets. 8 pressure gages were installed to estimate the wind flow.

**Benefits to Client:** Results of the modeling test confirmed the existing adverse hydraulic conditions including heavy air entrainment, surcharging and surging. It also showed the effectiveness of the recommended scheme which results in significant reduction of turbulence & air entrainment, adequacy of air recirculation and subsequently great improvement to the downstream trunk sewer system and the CSO tank.

