

The Problem

Two new single family residences had been constructed on a structural fill that had been placed to raise the grade on the lots that backed onto a wooded drainage ravine. The structural fill was placed over the native soil during May/June, 1993. Construction of the foundation for the residences was started in June, 1994 and completed in September, 1994. Cracks in the exterior brick facing of residences were first noticed in November, 1994.

Based on the geometry and history of the cracks, it was apparent that there was some movement occurring, both horizontally and vertically. The amount of fill placed under the building foundations in May/June 1993 appeared to vary between zero at the front of the residence to approximately 6 feet (1.8 m) below the foundations under the rear portion of the building. There was a soft fill zone at the rear of the residences.. The rear of both residences was expected to continue to settle and, in effect, slide down the ravine causing differential movement from the front.

The Solution

Due to both vertical and horizontal movement it was decided that vertical piers and horizontal anchors were needed for stabilization. Forty SS-150 Helical Piers[®] consisting of two helix lead sections were installed to prevent further vertical settlement. Installation depth varied from 11 to 25 feet (3.3 m to 7.6 m).



Five SS-175 **Chance[®] Tie Back Anchors** consisting of a three helix configuration were installed and attached to the rear concrete foundation to prevent further horizontal movement. An additional five SS-175 **Chance[®] Helical Piers** were installed to accommodate the vertical component of the horizontal load plus the dead load. **Chance[®] Helical Piers** were the most economical and least disruptive option that existed.

Results

Since the completion of the project the structures have been monitored for movement on a regular basis by a registered Ontario Land Surveyor. Monitoring will continue.