



GEO-FOUNDATIONS Contractors Inc.

CN Grimsby



Date: 2003

Technology: Micropiles

Geo-Foundations, as design-builder, has constructed an innovative slope stabilization scheme for rail operator CN at a site south of St. Catharines, Ontario. At Mile 10.74 of CN's Grimsby Subdivision, just below grade on the south slope of a 15-metre high earth embankment, there now exists a 62-metre long reinforced concrete beam. The beam is parallel to the twin rail tracks, and ties together an array of 125 micropiles. Half of the 12-metre deep micropiles are vertical while the other half are inclined towards the core of the embankment.

Prior to the stabilization work, the slope had experienced settlements requiring costly maintenance and rail speed restrictions through the affected area. Although CN has enjoyed past success using soil nailing to stabilize some slopes (such as the work completed by Geo-Foundations in 2002 at the Dundas Subdivision), soil nailing at this site would have necessitated the removal of a significant portion of the tree cover that serves as a useful buffer directly between the rail road and a neighbouring mid-rise condominium structure.

In collaboration with geo-structural consultant Isherwood Associates, Geo-Foundations embraced a least-invasive approach to design and construction, replacing the proposed soil nailing scheme with the eventually constructed micropile wall. Using a light weight drill rig installing grout-flushed micropiles from near the crest of the embankment, the rail line was maintained open during the entire construction operation, with only a small amount of light brush removed from the slope to facilitate construction.



Final re-grading after cap beam construction



Micropile installation with fully maintained rail service



Micropile load testing