

A CASE HISTORY

Project:

Billboard in Substation
Toronto, ON

Geotechnical Consultant:

Haddad Geotechnical Inc.
Markham, ON

Consultant:

Yolles Partnership Inc.
Toronto, ON

Contractor:

EBS Engineering
Construction Breslau, ON

The Problem:

The City of Toronto requested that Ontario Hydro improve the streetscape of its transformer station downtown at John and Wellington streets. To do so, a 34-ft.-high billboard was to be erected, 210 ft. long on one street and 170 ft. on the other. The billboard frame was to be structural-steel trusswork supported by eight structural-steel towers.

Large overturning moments due to wind loading would have required large spread footings. These were prohibited by limited site space. Concrete caissons also were eliminated as design possibilities at all but two towers due to 150 kV overhead and underground power lines.

Soil conditions: 39" of fill overlying Medium-Dense Silt Till. At 30 to 50 ft. depth, Very Dense Till.

**The Solution:**

The design consultants decided to construct reinforced concrete footings supported by Chance Helical Pulldown® Micropiles at each tower or diagonal brace. Helical Pulldown® Micropiles were specified to resist compressive or tensile loads resulting from overturning moments acting on the footings.

Advantages of the Helical Pulldown® Micropiles include: Small installation equipment (mini-excavator); ability to install in close proximity to underground utilities; ability to install in alignment with diagonal braces on towers; measuring installation torque at 12" intervals to confirm the capacity of each pile.

The Helical Pulldown® Micropile size and configuration used was the SS175 with a three-helix lead section and a single-helix extension shaft at 13 to 16 ft. depths to engage the harder Till layer for resistance to uplift. Each pile included a 6" diameter grout column around the shaft above the helices to create skin friction with the soil and increase uplift resistance. Installation depth varied from 29 to 36 feet on the 79 piles. Each pile was designed to sustain a 40 kip unfactored load in tension or compression.



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