

Case History, No. 4

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The Problem

An eleven storey Condominium building in southern Ontario had been constructed in the early nineties on a dense clay till capping an artesian aquifer. Large open bottom sumps installed during the initial construction to control the groundwater, undermined four shear walls, two columns and the parking garage foundation walls on the south-west corner of the structure and disturbed the dense sand layer underneath the clay till.

Considering the relatively limited access in the parking garage and the artesian aquifer, pile driving and caisson installation were not viable underpinning options.



The Solution

CHANCE® HELICAL PIERS® were determined to be the most viable solution to underpin the structure. An ASTM D 1143 - S1, 24 hour standard test method for piles under static axial compressive load was completed prior to project startup to confirm the capacity of the helical piers. The helical pier size and configuration used was the SS-200 with 200mm (8 inch), 250mm (10inch), and 300mm (12 inch) diameter helices. A 150mm (6 inch) diameter Helical PULLDOWN™ Micro Pile (using EBS-301 grout) was sleeved with PVC along the entire shaft to increase the lateral stability and prevent negative skin friction on the helical piers if the clay till continued to settle. Installation depths varied from 10.4 to 13.4 metres (34-44ft). Eighty-three piers were installed to a minimum allowable working load of 266kN (60Kips) or a minimum ultimate load capacity of 533 kN (120Kips).



Results

Since the completion of the project the structure has been monitored for movement four times a year. No settlement movement has been recorded since the structure was underpinned.