

Push Piers and Helical Piles Underpin Existing Building and Support Addition

Project

Church Addition

Location

Burlington, Ontario

CHALLENGE ▾

The Pineland Baptist Church in Burlington, Ontario planned for a 300 square-foot addition to its main structure, originally built in the 1960s. The existing church lies within a predominately residential area with a wooded ravine and creek located roughly 150 feet from the proposed addition.

The design team anticipated a soil profile below the addition consisting of approximately 10 feet of fill and weak native silt underlain by competent shale. The proposed addition would therefore require deep foundations and the existing building would need to be underpinned in the area of the adjacent work. The work would also have to be completed within an area of limited access and without excessive construction vibration.

SOLUTION ▾

Hydraulically driven push piers and new construction helical piles were chosen as the ideal methods to underpin the existing structure and support the proposed addition. Both systems can be installed quickly and easily with relatively small equipment that causes little to no vibrations.

The push pier underpinning system consisted of nine (9) Model 350 (3.50-inch OD by 0.165-inch wall) piers with side-load brackets. A design ultimate capacity was specified as 180 kN (\approx 40.5 kips). The existing wall footing was prepared at each pier location by removing excess concrete that extended beyond the plane of the vertical face of the wall to limit eccentricity and allow for proper bearing of the retrofit brackets. Each pier was driven to the native shale layer



Area of proposed addition

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► *Continued*

approximately 10 feet below the bottom of the footing to achieve hydraulic fluid pressures of at least 2,900 psi, corresponding to approximately 41.1 kips of drive force. After the piers were driven individually, they were reloaded to an appropriate service load and locked-off to stabilize the existing church foundations adjacent to the future work.

A total of eleven (11) helical piles were installed for the proposed addition. Each pile utilized an 8"-10" double-helix plate lead configuration. The helical piles were also installed to the competent shale layer and achieved torque-correlated ultimate capacities greater than 80 kips. The installed piles were cut to specified elevations and fitted with new construction brackets. The helical pile and push pier installations were completed within three working days.



Preparing footing for push pier retrofit brackets



Helical piles installed for addition; push piers installed along existing footing

PROJECT SUMMARY ▼

Architect:	Stephen Robert Hitchcox Architect (SRHA)
Structural Engineer:	L. H. Schwindt & Company, Inc.
Geotechnical Engineer:	Soil-Mat Engineers & Consultants Ltd.
Pile and Pier Installer:	Foundation Supportworks of Ontario
Products Installed	(9) Foundation Supportworks® PP350 Push Piers; (11) Foundation Supportworks HP350 Helical Piles, 8"-10" Lead Section; Installed Depths of approximately 10 feet; Design Ultimate Capacities of 40.5 kips and 80 kips, respectively

For additional case study and technical information please visit Commercial.Supportworks.com.