Retrofit Helical Piers Stabilize Wall

Project
River Road Pump Station

Location
Council Bluffs, IA

CHALLENGE

The River Road Pump Station, constructed in 2001, consists of a 2,700 square-foot, two-story building that pumps collected storm water into the Missouri River. Cracks in the poured concrete north foundation wall indicated that the structure was settling differentially. Initial underpinning recommendations to stabilize the building included either helical piers or hydraulically-driven push piers with a design working compression load of 35 kips per pier.

One soil boring was advanced for the original construction of the building. The boring identified 12 feet of clay fill underlain by loose to medium dense sandy silt to a depth of 17 feet. Beneath the silt, medium stiff clay was observed to a depth of 23 feet underlain by loose to medium dense sand to the maximum depth explored of 50 feet. Groundwater was observed at a depth of 15 feet at the time of the exploration.

Fractured concrete

SOLUTION

Helical piers, determined to be the better fit for the soil conditions, were ultimately selected to stabilize the north wall of the building. The underpinning design included nine retrofit helical piers, spaced 5.5 feet on center, with a design working load of 35 kips each. The helical pier configuration consisted of Model 288 (2.875-inch O.D. by 0.276-inch wall) hollow round shaft with a 10”-12”-14” triple-helix lead section followed by two 14-inch helix plates on the first extension. Prior to advancing the lead sections, 16-inch diameter holes were augered at each pier location to a depth of eight feet below the bottom of the footing to allow all five helix plates to pass the footing while maintaining the proper pier angle of two to three degrees. The piers were installed with a skid steer to depths of 40 to 55 feet and to torque-correlated ultimate capacities of at least 70 kips (FOS ≥ 2). Non-shrink grout was placed between the retrofit brackets and the footing to fill any voids and to eliminate possible point loading on the bearing plate of the bracket. Hydraulic cylinders were used

Preparing footing

Helical pier extension advanced through pre-augered hole

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Continued

to uniformly load the piers to the design working load. After the piers were loaded, the augered holes were backfilled with grout and the brackets were epoxy-anchored to the footing as specified by the project engineer. Despite longer than normal footing preparation due to the footing being much larger than anticipated and containing No. 8 rebar, the entire project was completed in just three days.

Completed pier with retrofit bracket; excavations filled with cement grout

Completed project

PROJECT SUMMARY

Structural Engineer:	HGM Associates Inc.
General Contractor:	TAB Construction Company
Certified Pier Installer:	Thrasher Commercial
Products Installed:	(9) Foundation Supportworks® Model 288 Helical Piers, 10”-12”-14” Lead Section and 14”-14” Extension, Installed to Depths of 40 to 55 feet, Design Working Load of 35 kips

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

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